

Augmentation of labour with synthetic oxytocin: a mixed methods study

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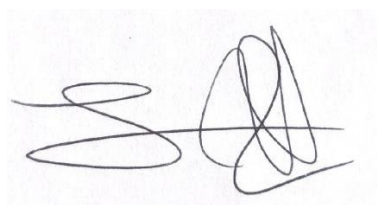
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Declaration

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Silvia Alòs Pereñíguez

Summary

Background: Augmentation of labour with synthetic oxytocin is one of the most frequently performed childbirth interventions among women with spontaneous onset of labour. Rates of augmentation of labour with synthetic oxytocin are unknown in many countries and, where data is collected, they vary widely between countries and among maternity hospitals within the same country. To date, there is a paucity of research on women's views and experiences of augmentation of labour with synthetic oxytocin, both internationally and in Ireland. Additionally, the prevalence and associated factors with augmentation of labour with synthetic oxytocin within the Irish context have not been examined.

Aim: To achieve a greater understanding of women's views and experiences of augmentation of labour with synthetic oxytocin internationally and in Ireland, and to estimate the prevalence and factors associated with augmentation of labour with synthetic oxytocin in Ireland.

Methodology: A multistage mixed methods study was conducted. Four interlinked sequential phases were utilised to synthesise the international evidence on women's views and experiences of augmentation of labour with synthetic oxytocin, provide a rich description of women's experiences of augmentation of labour with synthetic oxytocin in Ireland and identify associated factors with augmentation of labour with synthetic oxytocin among women birthing within the Irish context. Phases 1 and 2 comprised the qualitative component of this mixed methods study with a qualitative evidence synthesis (n=25) and a qualitative descriptive study (n=14). Phases 3 and 4 comprised the quantitative component. The data reliability issues encountered during the data analysis of Phase 3, a national cross-sectional study (n=24,001), led to the addition of Phase 4: a single-site cross-sectional study (n=2,086). Integration occurred at two key points at the design and discussion levels.

Findings: Augmentation of labour with synthetic oxytocin has a significant impact on women's birth experiences. Regardless of the country or context, women recalled augmentation of labour with synthetic oxytocin mainly in negative terms and consistently described it as atypically painful. Most women wanted to be involved in the decision to have their labour augmented, although the meaning of feeling involved varied according to their knowledge and trust in their healthcare professionals. Concerning findings emerged in relation to informed consent where women described having their labour

augmented without consent, feeling intimidated to comply and acquiesce, or giving consent without receiving enough information to give genuine informed consent. Women with limited knowledge of augmentation of labour with synthetic oxytocin and women from countries with underdeveloped maternal healthcare services showed a more favourable attitude towards having their labour augmented and seemed to accept augmentation of labour with synthetic oxytocin more readily. Some even thought that augmentation of labour with synthetic oxytocin was part of having a 'normal' birth, emphasising its widespread use in clinical practice. In contrast, other women who had their labour augmented felt 'rushed' into giving birth, with frequent references to time constraints and rigid time frames for giving birth. After the birth and over time, women moved from self-blame towards feeling betrayed by their healthcare professionals and '*the system*'. Women regretted not having asked more questions, having been too trusting of healthcare professionals and accepting to have augmentation of labour with synthetic oxytocin. In subsequent pregnancies and births, women adopted different strategies to avoid undergoing augmentation of labour with synthetic oxytocin for a second time.

The prevalence of augmentation of labour with synthetic oxytocin in Ireland remains unknown. Only those findings from Phase 4 (single-site cross-sectional study) contributed data to the quantitative component. The overall prevalence of augmentation of labour with synthetic oxytocin in this phase was 18.70%. A total of 37.41% nulliparous women and 6.62% multiparous women underwent augmentation of labour with synthetic oxytocin. Nulliparity (OR 8.42, 95% CI 6.48-10.96; RR 2.60, 95% CI 2.37-2.84; $p<0.001$) and private care (OR 1.67, 95% CI 1.19-2.35; RR 1.58, 95% CI 1.17-2.14; $p=0.004$) predisposed women to undergoing augmentation of labour with synthetic oxytocin. The crude analyses demonstrated a positive association between augmentation of labour with synthetic oxytocin and instrument-assisted birth (OR 5.40, 95% CI 4.15-7.05; RR 1.54; 95% CI 1.48-1.58; $p<0.001$), caesarean section (OR 3.08 95% CI 2.18-4.35; RR 1.25; 95% CI 1.19-1.3; $p<0.001$), suspected fetal hypoxia during labour as per CTG trace or fetal scalp pH results (OR 3.80, 95% CI 2.97-4.86; RR 2.75, 95% CI 2.30-3.27; $p<0.001$), women having their baby admitted to NICU (OR 2.36, 95% CI 1.36-4.10; RR 2.29, 95% CI 1.35-3.89; $p=0.003$), postpartum haemorrhage (OR 2.11, 95% CI 1.60-2.80; RR 1.86, 95% CI 1.50-2.34; $p<0.001$), fetal scalp blood sampling (OR 3.99, 95% CI 2.36-6.78; RR 3.79, 95% CI 2.28-6.28; $p<0.001$), epidural analgesia (OR 19.81, 95% CI 14.23-27.58; RR 3.12; 95% CI 2.87-3.38; $p<0.001$) and episiotomy (OR 3.75, 95% CI 2.98-4.72; RR 2.37, 95% CI 2.07-2.72; $p<0.001$). After adjustment for potential confounders, a positive association between augmentation of

labour with synthetic oxytocin and instrument-assisted birth (aOR 2.62, 95% CI 1.95-3.52; RR 1.36; 95% CI 1.26-1.44; $p<0.001$), caesarean section (aOR 1.99, 95% CI 1.36-2.90; RR 1.17; 95% CI 1.09-1.24; $p<0.001$), suspected fetal hypoxia during labour as per CTG trace or fetal scalp pH results (aOR 1.81, 95% CI 1.37-2.38; aRR 1.21, 95% CI 1.12-1.29; $p<0.001$), women having their baby admitted to NICU (aOR 2.01, 95% CI 1.09-3.71; aRR 1.21, 95% CI 1.03-1.34; $p=0.026$), fetal scalp blood sampling (aOR 2.22, 95% CI 1.25-3.94; aRR 1.34, 95% CI 1.10-1.53; $p=0.007$) and epidural analgesia (aOR 14.09, 95% CI 10.02-19.80; aRR 1.63; 95% CI 1.60-1.66; $p<0.001$).

Conclusions: Augmentation of labour with synthetic oxytocin remains one of the most frequently performed childbirth interventions among women with spontaneous onset of labour, particularly among nulliparous women. The widespread use of augmentation of labour with synthetic oxytocin along with its potential significant implications on women's birth experiences, mode of birth, further childbirth interventions, and adverse perinatal outcomes underscore the need for continued research, and reassessment of current practices and policies on this topic.

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List of abbreviations

ACHI: Australian Classification of Health Interventions

ACOG: American College of Obstetricians and Gynaecologists

ACS: Australian Coding Standards

AOL: Augmentation of labour with synthetic oxytocin

BMI: Body Mass Index

COREQ: Consolidated criteria for Reporting Qualitative studies

CTG: Cardiotocography

EMC: Electronic Medicines Compendium

FDA: Food and Drug Administration

GDPR: General Data Protection Regulation

GP: General Practitioner

HIE: Hypoxic Ischemic Encephalopathy

HIPE: Hospital In-Patient Enquiry Scheme

HIQA: Health Information and Quality Authority

HPO: Healthcare Pricing Office

HSE: Healthcare Service Executive

ICD-10-AM: International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification

ISMP: Institute for Safe Medication Practices

MBS: Medicare Benefits Schedule

MN-CMS: Maternal and Newborn Clinical Management System

MN-CMS: Maternal and Newborn Clinical Management System

NICE: National Institute for Care Excellence

NICU: Neonatal Intensive Care Unit

NS: Non-Significant

NTMA: National Treasury Management Agency

OASI: Obstetric Anal Sphincter Injuries

PRISMA: Preferred Reporting Items for Systematic reviews and Meta-Analyses

PTSD: posttraumatic stress disorder

QES: Qualitative evidence synthesis

REC: Research Ethics Committee

sOT: synthetic oxytocin

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

UK: United Kingdom

USA: United States of America

VAS: Visual Analogue Scale

WHO: World Health Organization

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1. Chapter 1: Introduction

1.1. Introduction to the topic

Childbirth is an event of profound significance in women's lives. It can be a transformative experience and an opportunity for the creation of healthy attitudes and behaviours towards motherhood (Downe et al., 2020). It remains in women's memory for more than a decade (Bossano et al., 2017). Despite most women desiring a non-medicalised childbirth, the rates of childbirth interventions such as induction of labour or caesarean sections have steadily increased over the past few decades worldwide (World Health Organization (WHO), 2018). While some of these interventions have been extensively investigated (Coates et al., 2019; Middleton et al., 2020; Panda, 2020), others such as augmentation of labour with synthetic oxytocin (AOL) have not captured as much attention to date. Augmentation of labour with synthetic oxytocin is one of the most frequently performed childbirth interventions among women with spontaneous onset of labour (WHO, 2014). It consists of accelerating labour progress through the administration of synthetic oxytocin (sOT), a drug that stimulates uterine contractions. Augmentation of labour with synthetic oxytocin is indicated in the management of labour dystocia, that is, when labour is assessed to be progressing abnormally slow (WHO, 2014).

The stark disparities in AOL rates between countries and between maternity hospitals within the same country (Seijmonsbergen-Schermers et al., 2020; Seijmonsbergen-Schermers et al., 2018) have raised concerns about its potential overuse in clinical practice, leading to debates about the balance between necessary childbirth interventions and the preservation of labour and birth as normal or physiological processes (Miller et al., 2016). In Ireland, the AOL rate is currently unknown. Notwithstanding that there is no conclusive evidence to date, AOL has been associated with a higher risk of undergoing further childbirth interventions such as epidural analgesia, episiotomy, instrument-assisted birth and caesarean section (Bernitz et al., 2014; Sakala et al., 2020); as well as subsequent adverse perinatal outcomes such as postpartum haemorrhage (Bernitz et al., 2023). In Ireland, to the best of this author's knowledge, no research studies have explored these associations to date.

Understanding the impact of AOL is crucial for both women and healthcare professionals. Such an understanding would support them in being more able to discuss and weigh up the benefits and risks when considering its use including how it may affect women's birth

experiences. Yet it is not clear how women experience AOL. Studies on this topic have primarily focused on associated birth outcomes rather than on how women view and experience this childbirth intervention (Begley et al., 2014). Some quantitative studies have shown associations between AOL and negative birth experiences (Johansson & Finnbogadóttir, 2019; Nystedt & Hildingsson, 2018), but others pointed to the experience of labour dystocia as the plausible cause (Kempe & Vikstrom-Bolin, 2020). Qualitative research on AOL is also limited and has tended to focus on women's experiences of labour dystocia rather than on AOL itself (Kissler et al., 2020). Whilst investigating AOL and labour dystocia as separate entities may be challenging, not doing so leaves significant gaps in the understanding of the broader implications of AOL as a childbirth intervention. Furthermore, inconsistencies in the definitions of normal progress in labour and labour dystocia still prevail. Recent updates reflect a growing comprehension about the variability of labour duration and highlight the need to allow for extended periods of time before labour dystocia is diagnosed and childbirth interventions like AOL are considered (Maaløe et al., 2023). This is particularly relevant as it calls into question some previous research (Armstrong & Kenyon, 2017) by suggesting overdiagnosis of labour dystocia as a potential source of bias, implying that many of the women included could have been progressing normally.

Overall, there is a need to continue to investigate AOL through both quantitative and qualitative methods to address current knowledge gaps, develop a more insightful understanding of AOL and its potential impacts, and ultimately inform clinical practice. Acknowledging the benefits of a dual approach in addressing the complexities of AOL, this thesis presents a mixed methods study on AOL.

1.2. Journey to and through the study

Originally from Spain, my thirst of knowledge brought me to Ireland. After four years in clinical practice, mainly as a labour ward midwife, I started the PhD programme in September 2021 after I was successfully awarded the full-time PhD scholarship from the School of Nursing and Midwifery, Trinity College Dublin. This scholarship gave me the opportunity to focus on conducting this study full-time and to finally start a career in academia; one of my deepest ambitions at a professional level.

As a midwife and nurse, I was always passionate about women's health, particularly in the field of labour and birth. My interests on studying the use of sOT grew after meeting Professor Deirdre Daly who encouraged me to explore the literature on this topic and ultimately, to apply for the PhD programme under her supervision. While I was preparing my research proposal, the study topic moved naturally towards AOL. The scarcity of studies on AOL was palpable, especially when compared to the extensive research available on other related topics such as induction of labour.

Initially, the present mixed methods study was designed as a 3-phased study that would include a qualitative evidence synthesis (QES) on women's views and experiences of AOL (Phase 1), a qualitative descriptive study on women's experiences of AOL in Ireland (Phase 2), and a national cross-sectional study on the prevalence, and associated factors with AOL within the Irish context (Phase 3). However, important data reliability issues were encountered in Phase 3, making it necessary to readapt the original research design. After extensive discussions with the data curators about the data coding and careful consideration of timelines with my supervisors, a single-site cross-sectional study on associated factors with AOL within the Irish context was added to the study (Phase 4). Further details on the decision to include this additional phase can be found in sections 6.6. and 6.7.

1.3. Format of the thesis

This thesis is organised in nine chapters. In chapter 2, a literature review on the relevant concepts, historical events and research studies related to AOL is presented. The principal characteristics of maternity care in Ireland, where this mixed methods study has been conducted, are also discussed.

Chapter 3 outlines the methodology of the present study. It describes the aim and objectives of the study, the philosophical and epistemological underpinnings of pragmatism and provides a clear rationale for the mixed methods design as being the most suitable to meet the research aim and objectives. It also includes an overview of the rationale and background supporting the introduction of Patient and Public Involvement (PPI) in the qualitative descriptive study on women's experiences of AOL in Ireland (Phase 2).

Chapters 4, 5, 6 and 7 present the QES on women's views and experiences of AOL (Phase 1), the qualitative descriptive study on women's experiences of AOL in Ireland (Phase 2), the national cross-sectional study on the prevalence, and associated factors with AOL within the Irish context (Phase 3), and the single-site cross-sectional study on associated factors with AOL within the Irish context (Phase 4), respectively. Each of these phases includes detailed descriptions of their corresponding objectives, ethical considerations, methods, and results.

In Chapter 8, the key results of the study are discussed within the wider national and international literature on AOL. The meta-inferences resulting from the integration of the qualitative and the quantitative components of the study are shown in a joint display and discussed within a comprehensive mixed methods perspective. Finally, this chapter also identifies the principal strengths and limitations of the study.

Chapter 9, the last chapter, closes this thesis with recommendations for clinical practice, policy, and research; followed by the dissemination plan and conclusions of the study.

2. Chapter 2: Literature review

2.1. Introduction

The aim of chapter 2 is two-fold: to introduce the reader to key concepts and historical events, and to contextualise AOL within the broader literature. The chapter begins with a definition of endogenous oxytocin and sOT, their principal characteristics and effects, and the potential risks of sOT in the short- and the long-term. The chapter then proceeds with the definition of AOL and a brief historical background by reviewing its introduction in clinical practice. To quantify AOL, some rates of its use are presented. Finally, predisposing and associated factors with AOL are described.

2.2. Endogenous oxytocin

Oxytocin is a neuropeptide comprised of nine amino acids. It is synthesised in the supraoptic and paraventricular nuclei of the hypothalamus and stored and released into the bloodstream from the posterior pituitary (Uvnäs-Moberg, 2024). The natural form of oxytocin was first described by the English physiologist Henry Dale who observed how the administration of an extract from the human posterior pituitary caused uterine contractions in a pregnant cat while studying the pharmacological properties of ergot¹. Dale named this unknown substance as 'oxytocin' from the Greek '*oxutokia*', meaning 'quick birth' (Dale, 1906).

Oxytocin is a hormone that plays an important role in social interaction, including mother-baby bonding and maternal behaviour, and it has positive effects on emotions such as fear, pain, and stress (Buckley et al., 2023; Olza et al., 2020; Uvnäs-Moberg, 2024; Wu & Kostoglou-Athanassiou, 2021).

During labour, oxytocin is released in short pulses to the bloodstream that become more frequent as labour progresses, stimulating uterine contractions (Uvnäs Moberg et al., 2020). The reflex that results from the compression of the fetal head against the cervix,

¹ Ergot is a fungus that grows on cereal grains and grasses that has strong uterine contractile properties and was employed during the 19th century to accelerate labour Page, K., McCool, W. F., & Guidera, M. (2017). Examination of the Pharmacology of Oxytocin and Clinical Guidelines for Use in Labor. *J Midwifery Womens Health*, 62(4), 425-433. <https://doi.org/10.1111/jmwh.12610> .

the Ferguson reflex, also contributes to increasing oxytocin levels during labour via a positive feedback mechanism (Walter et al., 2021). Within the brain, this translates into a release of more oxytocin and endogenous opiates, which contribute to natural pain relief. Oxytocin also triggers the milk ejection reflex (Uvnäs Moberg et al., 2020).

2.3. Synthetic oxytocin

In 1955, fifty years after its discovery, Vincent du Vigneaud was awarded The Nobel Prize in Chemistry for determining the amino acids sequence of oxytocin and succeeding in producing sOT for the first time (Du Vigneaud, 1956).

The increasing evidence of the key role that oxytocin plays in social interaction, emotion and stress regulation have led to research into the therapeutic applications of sOT in the treatment of diverse medical conditions such as addiction disorders, depression, autism, and schizophrenia (Baracz et al., 2020; Rene Hurlemann, 2018). However, the main application of sOT has undoubtedly been in midwifery and obstetrics because of its uterotonic properties.

Synthetic oxytocin stimulates the smooth muscle of the uterus increasing the frequency, duration and strength of the contractions. It is used for induction and augmentation of labour, and for the prevention and treatment of postpartum haemorrhage (WHO, 2014, 2018b, 2020b). Transiently, sOT also increases the uterine resting tone, that is the tone in between contractions (Shmygol et al., 2006). Commercialised under the tradenames Syntocinon® and Pitocin®, its effects occur almost immediately following intravenous administration, reaching a steady-state concentration within 30-40 minutes. Its plasma half-life, the time it takes to reduce the amount of drug in the body by half, ranges from 3-20 minutes and its effects subside within ~1 hour (Crall & Mattison, 1991; Food and Drug Administration (FDA), 2023; Health Products Regulatory Authority (HPRA), 2021; Seitchik et al., 1984). Theoretically, its large molecular size (1007.19 g/mol) (National Center for Biotechnology Information, 2022) and hydrophilic nature make it impossible for sOT to cross the placental and blood-brain barrier (Torres et al., 2020). This means that sOT does not affect the woman's brain during labour like endogenous oxytocin does (Buckley et al., 2023; Olza et al., 2020).

The bioavailability of sOT depends on several factors that influence each other in a complex way, including its metabolism and clearance which occurs mainly in the kidneys, liver and systemic circulation (FDA, 2023; HPRA, 2021). Oxytocinase, which is an enzyme that controls the degradation of sOT/oxytocin in the hypothalamus, uterus, placenta and plasma, also plays a key role in its regulation (HPRA, 2021; Tobin et al., 2014). To cause an effect, sOT needs to bind to an oxytocin receptor. Once bound, it increases the intracellular Ca^{2+} , leading to muscle cell contraction (Bell et al., 2014). This contraction is influenced by the number of oxytocin receptors, their ability to bind, the amount of sOT that is being administered and the oxytocinase activity (Rene Hurlemann, 2018; Uvnäs-Moberg, 2024). At a practical level, this may result in wide variations in the amount of sOT that is needed to augment labour effectively depending on women's individual characteristics (Amico et al., 1984). Moreover, in *in vitro* studies, prolonged exposure to sOT has led to the desensitisation of oxytocin receptors (Phaneuf et al., 2000), limiting the contractility capacity of the uterus. The maximum safe dosage of sOT that may be administered is also influenced by the characteristics of the augmented uterine contractions and the tolerance of the fetus to these (Yulia & Johnson, 2014).

2.4. Synthetic oxytocin: a high-alert medication

Synthetic oxytocin is in the top 10 list of medications linked to errors in obstetric practice and it is the drug most associated with preventable adverse perinatal outcomes (Clark et al., 2009; Kfuri et al., 2008). In 2007, the Institute for Safe Medication Practices² (ISMP) added sOT to the list of high-alert medications (ISMP, 2007). High-alert medications are drugs that require special caution as they can result in significant harm when used inappropriately. In 2020, the same organisation reported several maternal and neonatal deaths related to sOT misuse (ISMP, 2020).

Worldwide, a frequent allegation in maternity claims is the misuse of sOT. In the United States of America (USA), it is estimated that ~50% of all paid maternity claims involve sOT misuse (Clark et al., 2008; Clark et al., 2009). In Canada, sOT misuse is the second most

² The Institute for Safe Medication Practices is an independent non-profit organisation dedicated entirely to preventing medication errors.

prevalent insurance claim in maternity hospitals (ISMP, 2022). In Sweden, reviews on maternity claims published in the last two decades found that 68% of the cases included inappropriate sOT use and that up to 71% of all suspected asphyxia-related malpractice claims included sOT misuse (Berglund et al., 2008; Jonsson et al., 2007). In the United Kingdom (UK), sOT misuse has also been repeatedly implicated in maternity claims and inquiry reports of incidents resulting in severe adverse perinatal outcomes (NHS Litigation Authority, 2012; Ockenden, 2022; Royal College of Obstetricians and Gynaecologists, 2020).

In regard to neonatal severe adverse outcomes, sOT has been involved in a high proportion of cases where babies died or were left severely disabled (e.g. cerebral palsy) during labour (NHS Litigation Authority, 2012; Ockenden, 2022; Royal College of Obstetricians and Gynaecologists, 2020). Burgod et al. (2021), demonstrated a positive correlation between neonatal encephalopathy and term babies of women whose labours were induced or augmented with sOT (OR 2.19, 95% CI 1.58-3.04; $p < 0.001$) in a meta-analysis that combined data from seven different countries (7 studies, $n = 24,208$). When they performed a subgroup analysis based on the country income classification (low- and middle-income countries versus high-income countries), the association remained evident although it was more pronounced for low- and middle- income countries (OR 2.76, 95% CI 2.03-3.76; $p < 0.001$) where continuous monitoring of contractions and fetal heart rate is not universally performed when sOT is infused. Further, most of the studies included did not report on the dosages and regimens that had been employed. Considering that most errors in the use of sOT are dose-related and frequently involve a lack of prompt recognition and management of excessive uterine contractions known as hyperstimulation (Simpson & Knox, 2009), these findings should be interpreted with caution.

Other severe adverse perinatal outcomes linked to sOT include placental abruption, amniotic fluid embolism and uterine rupture. For example, Zhang et al. (2021) in a meta-analysis (14 studies, $n = 48,457$) found that the pooled rates of uterine rupture in women with a previous caesarean section who were administered sOT during labour compared to women who were not were 1.4% and 0.5% respectively ($p < 0.001$). Whilst the analysis according to the onset of labour (i.e. induced versus augmented labour) revealed higher rates of uterine rupture in women with induced labours, 2.2% versus 1.7%, the difference between groups did not show statistical significance. Again, neither the sOT dosages nor regimens in the included studies were reported.

Some other maternal adverse effects of sOT administration include headache, hypotension, tachycardia, bradycardia, nausea, vomiting, and water intoxication (HPRA, 2021). Whilst these are all of concern, undoubtedly one of the most important adverse effects given its high incidence and potential risk of complications is uterine hyperstimulation: excessively strong, long or frequent contractions (Leathersich et al., 2018), with or without fetal heart rate abnormalities.

The term 'hyperstimulation' has been subject of controversy for being a poorly defined concept. In 2008, some obstetric experts and representatives from organisations such as the American College of Obstetricians and Gynecologists (ACOG) proposed to replace the term with 'tachysystole' which was defined as more than five contractions in ten minutes, during a thirty-minute window (Macones et al., 2008). Using this definition, Heuser et al. (2013) found an incidence of 11% in a cohort of 50,335 births and identified sOT use as a strong predictor for tachysystole events (RR 1.69, 95% CI 1.56-1.83; $p < 0.001$). Noteworthy, the term 'tachysystole' did not address the duration, or strength of the contractions, nor the uterine resting tone, all of which are known factors that affect fetal oxygenation during labour (Bakker et al., 2007; Peebles et al., 1994). After a contraction, it may take up to 1.5 minutes to re-establish fetal oxygenation in women in spontaneous labour (McNamara & Johnson, 1995) compared to 2.3 minutes in women with augmented labours (Peebles et al., 1994). Additionally, in the event of a reduction in the utero-placental perfusion as a consequence of sOT (i.e., too long, frequent or intense contractions), it may take up to 45 minutes for the fetus to regain a normal oxygenation pattern after the sOT infusion is stopped, even when low dosages are employed (Donald & Sabaratnam, 2023). Therefore, some authors argued that the ACOG's definition ignored the pathophysiological principles of intrapartum hypoxia and that its adoption in clinical practice could result in harm, particularly in babies with poor placental reserve (e.g. babies with intrauterine growth restriction) (Sukumaran et al., 2021). Several authors questioned the underlying evidence supporting the adoption of 'tachysystole' to guide clinical practice and called for a more conservative approach to managing uterine contractions during labour (Page et al., 2017; Sukumaran et al., 2021). Recently, and along the same lines, the National Institute for Health and Care Excellence (NICE) (2023) recommended a more cautious approach when sOT is used during labour, aiming for 3-4 contractions in 10 minutes.

2.5. Synthetic oxytocin beyond birth

Despite the view that sOT cannot cross the placental or the blood-brain barrier (Buckley et al., 2023; Torres et al., 2020), several authors postulated that its administration might interfere beyond labour and birth, altering adaptation to motherhood and affecting the offspring's neurological development (Bell et al., 2014). Research on these longer-term effects is relatively new and the underlying mechanism of how this may be possible remains unknown. To date, very few studies demonstrated passage of sOT through these protective barriers, mainly in animal models with very high dosages being administered which are not used in clinical practice (Buckley et al., 2023). Some authors hypothesised that the inherent stress of labour and the immature fetal blood-brain barrier could result in an increased permeability of these protective barriers, allowing the flow of sOT through (Marín Gabriel et al., 2015; Walter et al., 2021). Transcytosis³ has been also suggested as an alternative explanation (Nathan et al., 2021).

2.5.1. Synthetic oxytocin and breastfeeding

Notwithstanding that there is no conclusive evidence to date, the number of research studies suggesting a link between sOT infusion to induce or augment labour and negative breastfeeding outcomes is growing. A cohort study that videotaped mother-baby dyads (n=86) during skin-to skin contact observed that babies exposed to sOT expressed less primitive neonatal reflexes associated with successful breastfeeding (Marín Gabriel et al., 2015). More recently, a Japanese cohort study that assessed babies' sucking ability using a pacifier (n=86) reported inferior outcomes in those exposed to sOT compared to those non-exposed (Omaru et al., 2024). Another large Australian cohort study (n=599,191) showed an increased odds of formula feeding during hospitalisation (aOR 1.24, 95%CI 1.22-1.26; p<0.001) and a decreased proportion of mothers exclusively breastfeeding at three and six months postpartum after sOT infusion (Andrew et al., 2022). Smaller cohort studies also demonstrated a negative association between sOT exposure and breastfeeding success rates at discharge (Brimdyr et al., 2015; Fernández-Cañadas Morillo et al., 2019; García-Forte et al., 2014; Gomes et al., 2018; Olza Fernández et al., 2012; Takács et al., 2021) although some of these studies showed only a trend and did not reach statistical significance (Gomes et al., 2018). Other studies found no difference in cessation

³ Transcytosis is a characteristic transcellular transport that enables macromolecules to cross the placental and the blood brain barrier.

of exclusive breastfeeding rates at one, three and six months postpartum between women exposed and non-exposed to sOT during labour (Fernández-Cañadas Morillo et al., 2019). Others have suggested that epidural analgesia (Takahata et al., 2023), or the combination of epidural analgesia and sOT administration, rather than sOT alone, negatively affected breastfeeding outcomes (Takahashi et al., 2021).

2.5.2. Synthetic oxytocin and maternal mood

The number of research studies suggesting a potential link between intrapartum sOT administration on maternal mood is rising. For example, two cohort studies reported a positive relationship between sOT administration during labour and higher blood oxytocin levels at two months postpartum (Gu et al., 2016; Prevost et al., 2014). However, one of these studies further concluded that this positive relationship did not translate into women reporting increased well-being. Compared to non-exposed, women exposed to intrapartum sOT scored significantly higher in depressive and anxiety symptoms (Gu et al., 2016). Similarly, a large USA cohort study (n=46,732) found that intrapartum sOT infusion increased the risk of depressive or anxiety symptoms in women with (RR 1.36, 95% CI 1.20–1.55) and without (RR 1.32, 95% CI 1.23–1.42) a previous history of depression or anxiety, irrespective of the mode of birth (Kroll-Desrosiers et al., 2017). More recently, an Israeli cohort study (n=386) found higher odds of posttraumatic stress symptoms at two months postpartum in women who received infused sOT during labour in comparison with women who did not (Tenne et al., 2023). Some authors hypothesised that this could be due to desensitisation of oxytocin receptors in key areas for emotion regulation after high dosages of sOT administration (Witteveen et al., 2020). Others reported contrary findings and suggested that a negative birth experience due to issues related to suboptimal sOT infusion (e.g., hyperstimulation), rather than sOT itself, could explain these findings (Takács et al., 2019).

2.5.3. Synthetic oxytocin and the offspring

Some research studies have linked intrapartum sOT use to neurological developmental issues among the offspring, such as autism. For example, Gregory et al. (2013) conducted an epidemiological analysis that merged two large databases in North Carolina in the USA, one including information about birth and the other about childhood (n=625,042). They reported that women who had their labour induced or augmented had higher odds of having a baby with an autism diagnosis in childhood, after adjusting for potential

confounders such as socioeconomic status, gestational age, or mode of birth (OR, 1.27;95%CI, 1.05-1.52). However, the observational nature of the study, together with the lack of specific information about sOT use among the women included (i.e., women could have been induced with other methods other than sOT), warrant caution with the interpretation of their findings. Likewise, other observational studies which have attempted to explore this association in more detail report mixed findings and with insufficient conclusive evidence to make any recommendations apart from warranting further investigation (Kenkel et al., 2019; Smallwood et al., 2016; Stockholm et al., 2021; Tichelman et al., 2021; Weisman et al., 2015).

2.6. Augmentation of labour with synthetic oxytocin

Augmentation of labour is one of the most performed childbirth interventions among women with spontaneous onset of labour. It stimulates labour progression by increasing the frequency, duration, and strength of the contractions and it is usually performed with an intravenous sOT infusion after spontaneous or artificial rupture of the membranes (WHO, 2014). After spontaneous onset of labour, once a woman's uterine contractions become regular, labour is expected to progress within a certain time frame that varies depending on local protocols, policies, and guidelines. If a woman's labour does not progress accordingly, she is assessed as progressing abnormally slow. This is labelled as labour dystocia⁴, which is one of the leading causes of caesarean sections (Neal et al., 2015). Augmentation of labour with synthetic oxytocin is indicated in the management of labour dystocia. Yet, the exact diagnostic criteria of what constitutes labour dystocia remains controversial and has changed substantially over the past twenty years (Hamilton et al., 2023; Neal et al., 2015).

One of the most decisive theories of labour progression in the history of contemporary obstetrics has been the so-called 'Friedman curve'. In 1954, Emmanuel Friedman published an observational study that analysed the cervical dilation pattern of 100 women

⁴ The nomenclature used to refer to labour dystocia differs widely in the scientific literature. The same concept may be found as slow progress in labour, delay in labour, failure to progress, protracted or obstructed labour, among others. Neal, J. L., Ryan, S. L., Lowe, N. K., Schorn, M. N., Buxton, M., Holley, S. L., & Wilson-Liverman, A. M. (2015). Labor Dystocia: Uses of Related Nomenclature. *J Midwifery Womens Health*, 60(5), 485-498. <https://doi.org/10.1111/jmwh.12355>

in labour and concluded that cervical progress was characterised by an S-shaped curve. He divided labour into four periods: the latent, acceleration, steady and deceleration periods (Friedman, 1954). A year later, Friedman published a second study with 500 nulliparous women reaching very similar conclusions. He defined the active phase of labour as the point from which cervical dilation increased rapidly (from 3cm to 9cm) and 1-2cm/hour as the minimum expected rate of cervical dilation during this phase (Friedman, 1955). It is worth mentioning that almost all the participating women in this second study (n=481) were sedated with a combination of pethidine and scopolamine⁵, that the most common mode of birth was forceps-assisted birth (n=275), and that several women's labours were induced or augmented with sOT (n=69). Friedman's observations became the reference point of normal progress in labour for midwifery and obstetric practice and had a huge impact on subsequent research and policies on labour management. For example, in 1994, the WHO affirmed that labour progression in 90% of nulliparous women was expected to be of ≥ 1 cm/hour once in active first stage of labour (from 3cm cervical dilatation onwards) (WHO, 1994).

It was not until 2002, almost fifty years later, that Friedman's theory of labour progression was genuinely challenged for the first time. Zhang et al. (2002) examined the labour duration of 1,329 nulliparous women and described that it took them ~5.5 hours on average to progress from 4cm to 10cm cervical dilation. In addition, they did not observe the deceleration phase described by Friedman and suggested that Friedman's theory of labour progression together with the consequent diagnostic criteria of labour dystocia were erroneous. From that moment, the number of studies re-evaluating women's labour duration multiplied (Blankenship et al., 2019; Grantz et al., 2015; Inde et al., 2018; Oladapo, Souza, et al., 2018; Tilden et al., 2022; Zhang et al., 2010). A systematic review by Oladapo et al. (2018) involving 99,971 women with low-risk pregnancies who started labour spontaneously and who birthed a live baby with an Apgar score of ≥ 7 at 5 minutes concluded that a labour progression of ≥ 1 cm/hour was unrealistic for both nulliparous and multiparous women, and called for an urgent review of clinical practices to reduce the number of women who may undergo AOL unnecessarily. The same year, the WHO retracted its previous statements for leading to unnecessary AOL and caesarean sections.

⁵ Scopolamine is an anticholinergic drug that causes amnesia. It was used to erase women's memories of their birth experience and it was popularised in the first half of the 20th century. Taylor, E. (2023). Hanna Rion and The Weekly Dispatch's twilight sleep crusade. *Med Humanit*, 49(4), 659-667. <https://doi.org/10.1136/medhum-2022-012595> .

By basing their recommendations on 95th percentile thresholds, they redefined normal labour duration of the active first stage (from 5cm cervical dilatation onwards) up to twelve and ten hours for nulliparous and multiparous women, respectively (WHO, 2018a).

2.7. Active management of labour

Perhaps one of the most defining historical events to understand the introduction of AOL in clinical practice is the so-called 'active management of labour', also known as 'the Dublin method' (O'Driscoll & Meagher, 1986). Active management of labour was a routine policy introduced in 1972 in the National Maternity Hospital Dublin, following the lead of the obstetrician Kieran O'Driscoll. Active Management of Labour was based on two pillars: labour duration restriction up to a maximum of twelve hours and continuous one-to-one support from a midwife throughout labour for all nulliparous women. In order to be admitted to the labour ward, women had to be deemed to be in active labour, which was defined as having painful contractions and complete cervical effacement (regardless of cervical dilation):

'A diagnosis of labour is made when a woman admits herself with painful uterine contractions and the cervix is found to be completely effaced on pelvic examination. Such a woman is retained in the delivery unit and therefore committed to delivery within 12 hours' (O'Driscoll & Meagher, 1986, p.32).

Once admitted to hospital, women underwent artificial rupture of the membranes routinely. Two hours later, if their labour was assessed to be progressing slowly i.e., if cervical dilatation was <1cm per hour, AOL was commenced. This policy was quickly popularised as an example of modernity and efficiency in maternity services (O'Driscoll & Meagher, 1986). Despite not being the policy's original objective (O'Driscoll et al., 1994), the publication of several studies suggesting that active management of labour was effective in decreasing the number of caesarean sections resulted in its implementation in numerous maternity hospitals across the world (Akoury et al., 1988; López-Zeno et al., 1992; Turner et al., 1988). In his book, O'Driscoll described numerous benefits of active management of labour for women, babies, healthcare professionals and administrators. For women, it was thought to decrease the risk of rotational forceps (mid-cavity forceps), dehydration, ketosis and salt depletion. Women were also thought to be more capable of

giving birth 'by themselves' as the authors argued that '*the morale of the average woman begins to deteriorate perceptibly after 6 hours*' (O'Driscoll & Meagher, 1986, p.24). For babies, active management of labour was believed to prevent them from serious injury because it reduced the need of instrument-assisted births. In relation to staff, O'Driscoll described how midwives' exposure to the '*physical degradation*' of women who were in labour for 'too long' triggered a sense of impotence and made them use more drugs (i.e., pethidine) to alleviate their own stress. Finally, for administrators, active management of labour was postulated as a modern system that enabled anticipation and planification of maternity services, as they were able to calculate how many hours women would spend in the labour ward.

In the National Maternity Hospital, labour dystocia was defined as a labour duration of thirty-six hours in 1963, of twenty-four hours in 1968 and of more than twelve hours in 1972 (O'Driscoll & Meagher, 1986). On 1st January 1972, active management of labour was implemented as a hospital policy for all nulliparous women and, to this day and despite being repeatedly discouraged (NICE, 2017, 2023; WHO, 2014; 2018), active management of labour is still an ongoing practice in the National Maternity Hospital.

2.8. Augmentation of labour with synthetic oxytocin worldwide

A systematic review by Kujabi et al. (2022) that analysed data on AOL rates in lower- and middle-income countries found that in South Asian countries such as Bangladesh, Pakistan, and India, the number of women who undergo AOL exceeds 50%. In some Sub-Saharan African countries including Kenya, Burkina Faso, and Uganda, use of AOL ranges from 31% to 50%, in contrast with other Sub-Saharan African countries like Ethiopia or Tanzania where AOL rates range from 6% to 15%. In Central American countries, 32% of women undergo AOL in Honduras, 19% in El Salvador, and 32% in Nicaragua.

In high-income countries, wide variation in the proportion of women who undergo AOL has been also noted. In the USA, around 46% of women have their labour augmented (Zhu et al., 2024). In Europe, use of AOL is 30% in France (Le Ray et al., 2022), 32% in Norway (Bernitz et al., 2023), and 22% in Italy (ISTAT, 2017).

2.9. Maternity care in Ireland

In Ireland, maternity care is free through the Maternity and Infant Scheme (Health Service Executive (HSE), 2023). Women share their antenatal care with their General Practitioner (GP) and the maternity hospital. Labour and birth are attended by midwives and obstetricians are present if complications arise. In Ireland, there are nineteen maternity hospitals. All of them are public, although women may choose to attend an obstetrician semi-privately or privately through private health insurance or out-of-pocket payments.

For those with semi-private care, labour and birth are also attended by midwives and obstetricians are again present if complications arise. Postnatal care, however, is provided in wards with two-four beds (public wards may have around eight beds).

For those with private care, a midwife provides intrapartum care and attends the birth when it is spontaneous. The obstetrician is the lead maternity care provider throughout women's pregnancy and birth (they are always present during the birth even if it is spontaneous) and postnatal care is provided in a single room (HSE, 2023).

Additionally, women can choose to give birth at home in Ireland. This service is also free of charge for women who meet specific medical and obstetric criteria although some women may choose to pay for a private home birth midwife (HSE, 2023).

2.10. Augmentation of labour with synthetic oxytocin in Ireland and its influences

Acknowledging the extent of sOT in clinical practice and its relevance as a causative or contributory factor in maternity claims, the State Claims Agency undertook a national evaluation on sOT practices across Ireland in 2015. A questionnaire was sent to each of the nineteen maternity hospitals to assess the minimum standards in policies, procedures, protocols and guidelines in relation to sOT use. All maternity units except one responded (n=18) and all of which reported recording the use of sOT in women's healthcare records and the partogram. None of the maternity hospitals obtained written informed consent before administering sOT and only twelve specifically stated the need for a clinical assessment prior to the use of sOT in their guidelines. The evaluation highlighted the

marked disparity in practices between Irish maternity hospitals and the urgent need to standardise sOT use. They also suggested a potential reduction in the number of maternity claims and in the cost to the Irish taxpayer if this materialised (Godfrey, 2015). Although the economic impact attributable specifically to sOT is not publicly available, the National Treasury Management Agency (NTMA) (2017) revealed that claims against maternity services in Ireland cost €1.4 billion in one year and these claims were mainly in relation to intrapartum brain-injury cases.

In 2016, the national guideline 'Oxytocin to Accelerate or Induce Labour' was published. The guideline states that sOT must be constituted by adding 10 IU to 1 litre of NaCl 0.9%. After clinical assessment, the recommended starting infusion rate is 1-5mU/min (6-30ml/hour). This rate can be increased 1-5mU/min (6-30ml/hour) every 15-30 minutes in the absence of tachysystole (defined as >7 and >5 contractions in 15 minutes in nulliparous and multiparous women, respectively) and concern about fetal wellbeing, up to a maximum of 30mU/min (180ml/hour). Finally, the Irish national guideline recommends to audit sOT use according to the Robson Ten Group Classification (Institute of Obstetricians and Gynaecologists et al., 2016). No updates on this guideline have been made since its introduction and, to the best of this author's knowledge, the only Irish maternity hospital that reports on the rates of AOL is the National Maternity Hospital. According to their 2022 annual report, 45.6% of nulliparous and 4.6% of multiparous women had their labour augmented that year (The National Maternity Hospital, 2023).

In 2018, the Report of the External Independent Review of Maternity Services at Portlincula University Hospital noted the misuse of sOT as one of the main issues that needed to be addressed after reviewing eighteen cases in which babies died or were left with a profound disability during labour. Specifically, a reference was made to the lack of a clear indication for the use of sOT (Walker et al., 2018).

Three years later, the HPRA (2021b) which is an independent government agency that regulates drugs, medical devices and health products in Ireland, advised the use sOT for induction and augmentation at the same concentration recommended in the national guideline (although by adding 5 IU to 500 ml of NaCl 0.9%). However, it recommended a starting rate of 1-4mU/min (6-24ml/hour), with gradual increasing intervals of not less than 20 minutes at 1-2mU/min (6-12ml/hour) until a contraction pattern comparable to spontaneous labour is achieved. In addition, the HPRA highlighted that *'in pregnancy near*

term this can often be achieved with an infusion of less than 10 milliunits/minute (20 drops/minute), and the recommended maximum rate is 20 milliunits/min (40 drops/minute)’ (HPRA, 2021b, p.1) meaning that a regular contraction pattern is usually achieved with dosages of <60ml/hour and that the maximum recommended dose is of 120ml/hour. Moreover, the HPRA emphasised the importance of close monitoring of the contractions and the fetal heart rate throughout, and of discontinuing the infusion in the event of hyperstimulation and/or concerns related to fetal wellbeing (HPRA, 2021b).

More recently in 2022, the European Association of Perinatal Medicine, an international association that promotes the development and implementation of clinical guidelines across Europe, published a guideline on sOT use. Their recommended concentration is the same as that stated in the Irish national guideline and proposed by the HPRA (by adding 5 IU to 500 ml of NaCl 0.9%). The recommended starting dose is 2mU/min (12ml/h), with gradual increasing intervals every 30 minutes at 2mU/min (12ml/h) until a pattern of 3-4 contractions in 10 minutes is reached. The maximum recommended dose is of 30mU/min (180ml/h) (Nunes et al., 2022). Nonetheless, Ireland is one of six European countries that has not subscribed to this association yet (European Association of Perinatal Medicine, 2024).

Finally, only last year the NICE (2023) in the UK published the guideline ‘Intrapartum Care’. In this guideline, it advises aiming for a pattern of 3-4 uterine contraction in 10 minutes when using sOT and increasing intervals are restricted to every 30 minutes. No specific dosages of sOT are recommended. The reader is redirected to the summary product characteristics in the Electronic Medicines Compendium (EMC) which is a database of information for drugs licensed in the UK. The recommended constitution of sOT is to add 5 IU to 500 ml of NaCl 0.9% while the recommended starting rate is of 1-4mU/min (6-24 ml/hour) with gradual increasing intervals of 1-2mU/min (6-12ml/hour) (EMC, 2022). [Table 1](#) shows a comparison between the four regimens hereabove described.

Table 1: Comparison between the four regimens on sOT influencing the Irish context

	Amount of sOT	Infusion fluid	Starting dose	Escalation rate	Maximum infusion rate	Recommended contraction pattern
Irish National Guideline	10 IU	1,000 ml NaCl 0.9%	1-5mU/min	1-5mU/min every 15-30 minutes	30mU/min	≤ 7 contractions in 15 minutes (nulliparous women) ≤ 5 contractions in 15 minutes (multiparous women)
Health Products Regulatory Authority	5 IU	500 ml NaCl 0.9%	1-4mU/min	1-2mU/min every ≥20 minutes	20 mU/min	<i>'Until a contraction pattern similar to that of normal labour is established'</i>
European Association of Perinatal Medicine	5 IU	500 ml NaCl 0.9%	2mU/min	2mU/min every 30 minutes	30mU/min	3-4 contractions in 10 minutes
NICE	5 IU*	500 ml NaCl 0.9%*	1-4mU/min*	every 30 minutes	20 mU/min*	3-4 contractions in 10 minutes

*Data not directly stated in the guideline. From NICE, the reader is redirected to the EMC, in which these recommendations for sOT are available. Note that the concentration of sOT is the same for all guidelines and that 1mU/min = 6ml/hour.

2.11. High-dose versus low-dose regimens of augmentation of labour with synthetic oxytocin

As illustrated above, great variation in the regimens for the use of intrapartum sOT persists. In fact, a multinational study that compared sOT administration regimens in 12 countries labelled as ‘inexplicable’ the disparities between them (Daly et al., 2020a). Broadly, regimens of intrapartum sOT administration fall into two groups: high-dose and low-dose. High-dose regimens are defined as starting dosages and increments of $\geq 4\text{mU/min}$ and low-dose regimens as starting dosages and increments of $< 4\text{mU/min}$. Increment intervals vary across studies and guidelines from 15 to 60 minutes (Daly et al., 2020b; Kenyon et al., 2013). Specifically in the field of AOL, a systematic review by Kenyon et al. (2013) that pooled data from 644 women found that high-dose regimens of AOL were more effective over low-dose regimens in shortening labour (MD -3.50 hours, 95% CI -6.38 to -0.62; $p=0.02$), decreasing the incidence of caesarean sections (RR 0.62, 95% CI 0.44-0.86; $p<0.001$) and increasing the incidence of spontaneous vaginal births (RR 1.35, 95% CI 1.13-1.62; $p<0.001$). There was no statistical significance in adverse perinatal outcomes such as postpartum haemorrhage, uterine hyperstimulation, fetal distress or admission to neonatal intensive care unit (NICU). Nevertheless, when one of the studies at high risk of bias was removed from the analysis, the differences between groups for caesarean sections and spontaneous vaginal births were no longer significant. A more recent systematic review by Aboshama et al. (2021) that included data from 3,154 women also observed that high-dose compared to low-dose regimens of AOL reduced the length of labour (MD -1.02 hours, 95% CI -1.77 to -0.27; $p=0.008$) but no differences were found in the incidence of caesarean sections (OR 0.76, 95% CI 0.52-1.10; NS). Regarding spontaneous vaginal births, they initially reported a favourable result towards high-dose regimens (OR 1.66, 95% CI 1.03-2.66; $p=0.04$) but when they reduced the heterogeneity within the included studies by excluding two of the trials, the difference was no longer statistically significant. In relation to adverse effects, they reported a higher incidence of uterine hyperstimulation (OR 2.09, 95% CI 1.56-2.81; $p<0.001$) in women who underwent AOL with high-dose regimens.

Conceivably, these differences between systematic reviews may be explained by the number of women included as well as the heterogeneity of dosages and escalation rates within the high- and low-dose regimens. When looking at the differences between caesarean section rates according to high- and low-dose regimens of AOL, some authors

have suggested that restrictions on the time that women are allowed to labour before their progression is deemed abnormal, depending on the country where the trials are conducted, could explain these divergent results between studies (Selin et al., 2019).

2.12. Predisposing factors for augmentation of labour with synthetic oxytocin

2.12.1. Nulliparity

Several factors predispose women to undergoing AOL. Perhaps one of the most frequently discussed in the scientific literature is nulliparity (i.e. being a first-time mother) (Belghiti et al., 2013; Gu et al., 2020; Litorp et al., 2021; Oscarsson et al., 2006). Tracy et al. (2007) analysed data on all low-risk women who gave birth in Australia between 2000 and 2002 (n=753,895) and reported that 44% of nulliparous women underwent AOL compared to 28% of multiparous women. More recently in a multinational cross-sectional study, Seijmonsbergen-Schermers et al. (2020), reported rates of AOL of 71% in nulliparous women compared to 38% in multiparous women in Finland; and of 38% and 13% in the Netherlands, respectively. Other observational studies also demonstrated that nulliparity is a strong predictor for AOL with statistical significance (Gu et al., 2020; Lyngbye et al., 2022).

2.12.2. Early admission to hospital

Minimal cervical dilation at admission to hospital is another predisposing factor extensively discussed in the scientific literature. In the USA, a multicentre cross-sectional study (n=21,858) that examined relationships between cervical dilation on admission to hospital and childbirth interventions in nulliparous women found that those who were admitted to hospital at 0-3cm cervical dilation were 5 times more likely to have their labour augmented compared to those who were admitted at 6-10cm (aRR 5.02, 95% CI 4.50-5.60) after adjusting for maternal characteristics such as age and ethnicity (Iobst et al., 2019). Other observational studies, including cohort studies, reached similar conclusions and highlighted the importance of admitting women only once in active labour to avoid potentially unnecessary AOL among other childbirth interventions (Gjærum et al., 2022; Neal et al., 2014; Neal et al., 2018; Rosli et al., 2023; Schick et al., 2020).

2.12.3. Obesity

Obesity is another factor that has been widely studied in relation to AOL albeit with mixed results. In 2021, a cohort study on associations between Body Mass Index (BMI) and childbirth interventions (n=7,189) found an increased risk of AOL in nulliparous women with obesity that reached statistical significance when their BMI was $\geq 35 \text{ kg/M}^2$ (aOR 1.54, 95% CI 1.11-2.15; p=0.010) (Dalbye et al., 2021). In the same year, a multicentre observational study (n=1,097) reported that nulliparous women with a BMI $\geq 30 \text{ kg/M}^2$ compared to women with a lower BMI were more likely to undergo AOL at an earlier cervical dilation stage ($\leq 5 \text{ cm}$). This group of women also seemed to receive larger cumulative dosages of sOT and higher maximum rates of sOT. However, when the analysis was adjusted simultaneously for cervical dilation at start of AOL, fetal birth weight and epidural analgesia, these results were no longer statistically significant (Ramö Isgren et al., 2021). Other studies observed a positive correlation between obesity and longer exposures and higher dosages of sOT in women undergoing AOL but potential confounders such as those mentioned above were not considered (Soni et al., 2013; Subramaniam et al., 2018).

2.12.4. Epidural analgesia

Effective epidural analgesia provides rapid pain relief among women in labour and it is another factor that has been widely linked to AOL. A multicentre cohort study conducted in Germany (n=3,955) observed that 59% of nulliparous and 44% of multiparous women had a sOT infusion following epidural analgesia administration. However, the absolute numbers in the group of multiparous women who had epidural analgesia were relatively low and the study included women with induced labours which is known to substantially alter labour progression (Petersen et al., 2013). Specifically in women with spontaneous onset of labour, some authors identified epidural analgesia as an independent risk factor of AOL (Lundgren et al., 2022). In parallel, others suggested that AOL put women at a higher risk of epidural analgesia request, even in women who expressed preferences for giving birth without pharmacological pain relief (Kpéa et al., 2015; Quach et al., 2020). Elsewhere, it was found that AOL was positively associated to epidural analgesia both prior to and after its administration (Dickinson et al., 1997) while others also found strong correlations between the two but did not specify which of the two interventions was performed first (Espada-Trespacios et al., 2021; Rydahl et al., 2021).

2.13. Associated factors with augmentation of labour with synthetic oxytocin

2.13.1. Mode of birth

There is evidence that AOL influences the mode of birth. In a survey-based study, Sakala et al. (2020) reported that women (n=1,934) who underwent AOL were more likely to have a caesarean section (OR 1.74, 95% CI 1.08-2.79; $p < 0.05$). Nonetheless, when they adjusted their analysis for parity, this difference was no longer significant. Oscarsson et al. (2006) in a subgroup analysis of a cohort study (n= 58,598) showed an association between AOL and instrument-assisted births (aOR 5.8, 95% CI 5.4-6.3) and caesarean sections (aOR 1.6, 95% CI 1.5-1.9) after adjusting for confounding variables such as parity. Overall, observational studies reported findings along the same lines in regard to instrument-assisted births but divergent results when analysing the relationship between AOL and caesarean sections (Bernitz et al., 2014; Gross et al., 2014; Kjaegaard et al., 2009). On the other hand, experimental studies also reported mixed results between AOL and mode of birth. A systematic review by Bugg et al. (2013) on low-risk women with slow labour progress (8 randomised controlled trials, 1,338 women) found no significant differences in the incidence of caesarean sections or instrument-assisted births between AOL and no AOL, nor in early versus delayed AOL. In another systematic review on low-risk women (7 randomised controlled trials, 5,390 women), Brown et al. (2013) reported that active management of labour (i.e., routine artificial rupture of the membranes, AOL if labour if cervical dilation progressing < 1 cm per hour, and one-to-one care) did not reach statistical significance in relation to caesarean sections compared to routine care. When examining research studies conducted specifically on women with epidural analgesia, AOL also did not appear to modify the mode of birth (Costley & East, 2013). However, the lack of standardisation in the concept of labour dystocia makes it difficult to interpret these results between studies.

2.13.2. Further childbirth interventions

Existing research recognises the association between AOL and undergoing further childbirth interventions. For example, AOL may increase the likelihood of fetal heart rate abnormalities and uterine hyperstimulation (Verspyck & Sentilhes, 2008). If this happens, interventions to assess the fetal wellbeing may be employed such as inserting a fetal scalp electrode and/or performing fetal scalp blood sampling (Girault et al., 2024). In turn,

further interventions to expedite birth may be employed such performing an episiotomy or an instrument-assisted birth (Bernitz et al., 2014).

2.13.3. Adverse maternal outcomes

Data from several studies suggested that AOL may be linked to adverse maternal outcomes. For instance, a retrospective cohort study (n=18,258) found a correlation between AOL and Obstetric Anal Sphincter Injuries (OASI) in women with spontaneous vaginal births (OR 1.60, 95% CI 1.14-1.94; p<0.01). However, when they adjusted their analyses with potential confounders including nulliparity and duration of second stage of labour, this difference was no longer statistically significant (Selmer-Olsen et al., 2019). Another example of adverse maternal outcomes linked to AOL is postpartum haemorrhage. As previously discussed, in *in vitro* studies, prolonged exposure to sOT resulted in the desensitisation of oxytocin receptors (Phaneuf et al., 2000), limiting the contractility capacity of the uterus. Consequently, women may be more likely to experience postpartum haemorrhage secondary to uterine atony. Bernitz et al. (2023), in a secondary analysis of a cluster randomised trial (n=7,277), reported a positive association between AOL and postpartum haemorrhage (aOR 1.43, 95% CI 1.03-1.98; p=0.031) that was even more pronounced when high dosages of sOT, $\geq 20\text{mU/min}$, were used (aOR 1.94, 95% CI 1.30-2.90; p=0.001). Zhu et al. (2024), in a retrospective cohort study (n=20,889), found a modest increase in the risk of postpartum haemorrhage in women who underwent AOL. However, when controlling for potential confounders, no statistically significant differences between women who did and did not have their labour augmented were found. Overall, it is difficult to draw any definite conclusions on this issue because many studies estimated blood loss visually and, across studies, different dosages of sOT and escalation intervals were used.

2.13.4. Negative birth experiences

The WHO (2018) defined women's birth experience as an outcome as relevant as optimal clinical care. Yet, it is frequently not evaluated in research conducted on AOL (Begley et al., 2014) and qualitative research has tended to focus on women's experiences of labour dystocia rather than on AOL itself (Kissler et al., 2020). In the quantitative field, a Swedish cohort study (n=16,775) found that AOL was an independent risk factor for dissatisfaction with the birth experience after adjusting for population characteristics such as age and parity (aOR 2.11, 95% CI 1.83–2.44; p<0.05) (Falk et al., 2019). Other cross-sectional studies

also reported AOL as a factor associated with negative birth experiences (Johansson & Finnbogadóttir, 2019; Nystedt & Hildingsson, 2018; Waldenström, 1999). In contrast to these studies, others suggested that a long labour duration rather than AOL could explain women's negative birth experiences (Gaudernack et al., 2020b; Kempe & Vikstrom-Bolin, 2020). For instance, a cohort study including 26,429 women observed that a labour duration ≥ 12 hours doubled the risk of having a negative birth experience compared to having a labour duration < 12 hours in nulliparous women (aOR 2.11, 95% CI 1.81–2.46; $p < 0.05$) and reported similar results for multiparous women. Although they observed a higher risk of having a negative experience for those who underwent AOL, ~43% of participants, they did not adjust their analyses for AOL and failed to discuss AOL as a potential confounding variable (Carlhäll et al., 2022). Other authors pointed to both long labour duration and AOL as associated factors to negative birth experiences (Nystedt & Hildingsson, 2018). Noteworthy, most of these studies captured very limited data on women's negative birth experiences due to the nature of their design as the birth experience was evaluated with tools such as the Visual Analogue Scale (VAS) (Carlhäll et al., 2022; Falk et al., 2019; Johansson & Finnbogadóttir, 2019). Other quantitative studies investigated the birth experience of women who underwent AOL under high- and low-dose regimens of sOT and did not find differences between these two groups (Selin et al., 2021).

Having a negative birth experience may have further negative consequences for women. These include fear of future childbirth, difficulties in mother-infant bonding, anxiety, depression, or posttraumatic stress disorder (PTSD), in addition to the challenges of motherhood itself (Ertan et al., 2021; Seefeldt et al., 2021; Watson et al., 2021; Wigert et al., 2020). Some evidence has suggested that women may request an elective caesarean section in future pregnancies (Gamble et al., 2007; O'Donovan & O'Donovan, 2018) or even decide not to have more children as a result of a negative birth experience (Larkin et al., 2012).

2.14. Conclusions

Definitive conclusions on the use of sOT are difficult to make. Most authors agree that the use of sOT warrants caution as it is a high-alert medication that has been linked to maternal and neonatal severe adverse outcomes, and it has been implicated in a considerable

proportion of maternity claims. In the long-term, the effects of sOT on breastfeeding outcomes, maternal mood and the offspring remain unknown. Augmentation of labour with synthetic oxytocin is one of the most performed childbirth interventions in women with spontaneous onset of labour. The remarkable disparities noted in the AOL regimens used have exemplified how little consensus has been reached in the scientific community. Broadly, they can be distinguished in two groups: high- and low-dose regimens. The numerous changes in the definitions of normal progress in labour and labour dystocia, the inevitable observational character of most study designs and the limited and contradictory conclusions between studies on AOL make it necessary to keep investigating on this topic.

Factors such as nulliparity, early admission to hospital, obesity, or epidural analgesia predispose women to undergoing AOL. On the other hand, undergoing AOL may put women at a higher risk of undergoing further childbirth interventions such as instrument-assisted births. Uterine hyperstimulation is one of the adverse outcomes more frequently discussed in the scientific literature due to its incidence and potential risk of complications resulting therefrom. Controversy exists over whether AOL, or long labour duration, increase the risk of having a negative birth experience.

3. Chapter 3: Methodology

3.1. Introduction

The aim of Chapter 3 is to present the overall methodology of the study. The chapter begins with the aim and objectives. It then addresses pragmatism as the philosophical paradigm underpinning the study and presents the mixed methods design of the study: a multistage mixed methods study with four phases. The study design is presented in writing and in a diagram followed by the justification for using mixed methods, integration and the quality standards that were applied to the study. The chapter ends with an introduction to Patient and Public Involvement (PPI) and outlines how and for what purposes it was implemented into this study. As previously introduced in this thesis, the reader should be aware that the initial study design included three phases only. However, the identification of important data reliability issues in Phase 3 made it necessary to add a final phase, Phase 4, in order to identify associated factors with AOL among women birthing within the Irish context – objective iv). Chapter 3 describes the four phases together with the objectives that each of these phases aimed to answer but later in the thesis, Phase 3 is omitted when findings and interpretations are being discussed.

3.2. Aim and objectives

The overall study aim is to achieve a greater understanding of women's views and experiences of augmentation of labour with synthetic oxytocin internationally and in Ireland, and to estimate the prevalence and factors associated with augmentation of labour with synthetic oxytocin in Ireland.

The research objectives are as follows:

- i) To synthesise the international evidence on women's views and experiences of AOL.
- ii) To provide a rich description of women's experiences of AOL in Ireland.
- iii) To estimate the prevalence of AOL among women birthing in the nineteen maternity hospitals in Ireland.
- iv) To identify associated factors with AOL among women birthing within the Irish context.

3.3. Philosophical and epistemological issues pertinent to the study

A paradigm is an umbrella term that encompasses the perspectives that characterise how individuals understand the nature of the world and the relationships within this world and its parts (Guba & Lincoln, 1994). According to Morgan (2007, p.2), a paradigm is '*the consensual set of beliefs and practices that guide a field*'. It is a theoretical framework that guides how knowledge is acquired and interpreted within a discipline (Weaver, 2018), what other authors in the field of mixed methods like Creswell & Plano Clark (2011b, p.39) have named '*worldview*'. In the context of mixed methods research, adopting a paradigm means adopting determined philosophical assumptions that will influence several aspects of the research process, including the research methods (Houghton et al., 2012).

For years, both quantitative and qualitative purists rejected the idea that combining research methods was possible. This polarisation against mixing paradigms, the so-called 'paradigm wars', lasted until the late 1980s (Doyle et al., 2016). From the postpositivist perspective, quantitative researchers argued that only measurable data could lead to the discovery of the truth; and from the constructivist perspective, qualitative researchers claimed that all knowledge was of a subjective and contextual nature and therefore rejected this premise (Christensen, 2020). For many authors, the adoption of an alternative paradigmatic foundation that allowed diverse philosophical assumptions and methods became the solution to overcome this debate (Greene, 2007). Many, though not all, quantitative and qualitative researchers shifted their mindset when they realised that they shared some mutual basis (Creamer, 2018a). Nowadays, while there is an ongoing trend towards valuing quantitative research methods in some fields such as the healthcare sciences (e.g., randomised controlled trials), many academics recognise the benefits of mixing quantitative and qualitative research methods and the paradigm debate is no longer as significant for researchers (Christensen, 2020).

The dominant paradigm underpinning the present thesis is pragmatism. Pragmatism emerged as a philosophy in the late nineteenth century in the USA. Rooted in the ideas of key thinkers such as Charles Sanders Peirce and William James, pragmatism emphasises solving real-world issues and focuses on the practical application of ideas (Suzie Kim & Kollak, 2006).

Currently, pragmatism serves as a foundational approach across many different disciplines, including midwifery and nursing, particularly in mixed methods research. As a research paradigm, it is a pluralistic stance that focuses on what works to answer the research objectives and that values the acquisition of knowledge through objective and subjective data (Creswell & Plano Clark, 2011a; Doyle et al., 2016).

Pragmatism believes that reality and knowledge are uncertain, evolving and contextual. It therefore views reality as a normative concept rather than an achievable truth (Creswell & Plano Clark, 2011a; Kaushik & Walsh, 2019). Pragmatism postulates that *'all human enquiry involves interpretation and imagination, intentions and values but must also necessarily be grounded in empirical embodied experience'* (Yardley & Bishop, 2008, p.355). As a philosophical underpinning, pragmatism rejects the forced dualism between postpositivists and constructivists and moves beyond it towards a practice-orientated approach (Creswell & Plano Clark, 2011b). It emphasises the flexibility of choice to produce research in a useful way (Creamer, 2018b) in which the research objectives by themselves determine the methodology and the most appropriate methods to be employed (Tashakkori et al., 2020).

To fully understand a certain paradigm, in this case pragmatism, the following elements or dimensions must be addressed: ontology (the nature of reality and what is real), epistemology (how knowledge is gained and the relationship between the researcher and what can be known), axiology (the role of values), and rhetoric (the research language) (Allemang et al., 2022; Creswell & Plano Clark, 2011b; Kaushik & Walsh, 2019). Hereunder, each of these are addressed and applied to the study:

- **Ontology:** There are singular and multiple realities. Quantitative and qualitative research offer different perspectives which are shaped by context and human experience. Although realities are constantly created and renegotiated through interaction with the world, there is a reality independent to ourselves (Allemang et al., 2022; Creswell & Plano Clark, 2011b). Accepting this was fundamental to address the research objectives. To synthesise the international evidence on women's views and experiences of AOL and to provide a rich description of women's experiences of AOL in Ireland – objectives i) and ii) meant that Phases 1 and 2 aimed to capture the multiplicity of realities that women experienced undergoing AOL. However, there was an independent reality, quantifiable and

objective, in which those experiences were grounded. To estimate the prevalence of AOL among women birthing in the nineteen maternity hospitals in Ireland, and to identify associated factors with AOL among women birthing within the Irish context – objectives iii) and iv), meant that Phases 3 and 4 aimed to capture the singularity of the reality independent to women's views and experiences of AOL. This exploration of the realities (of women's views and experiences of AOL) versus the reality (of the prevalence and associated factors of AOL) reflected the pluralistic essence of pragmatism, in which quantitative and qualitative approaches co-exist *pari passu* within the same study.

- Epistemology: Knowledge is pluralistic, contextual and assessed according to its consequences i.e. towards solving practical problems (Allemang et al., 2022; Creswell & Plano Clark, 2011b). Within this study, epistemology was constructed through multiple sources of data. Both quantitative and qualitative data provided valuable insights into AOL as a layered whole. As the reader will see, each phase aimed to address certain objectives but no source of knowledge was considered superior to the other. Instead, they complemented each other and examined AOL with an alternate lens to answer the different research objectives and offer a more comprehensive understanding of AOL. Women's views and experiences of AOL internationally and in Ireland – objectives i) and ii), through qualitative lens and the prevalence and associated factors with AOL in Ireland – objectives iii) and iv), through quantitative lens. By combining both types of data, Phases 1 and 2 provided context and breadth to the numbers and statistics of Phase 4 and this facilitated the real-world application of the findings to inform clinical practice.
- Axiology: Values are situational, and dynamic (Allemang et al., 2022; Creswell & Plano Clark, 2011b). Within this study, my own role as a midwife and my interest in childbirth marked the onset of this study. I positioned myself as acknowledging the need for statistics and the value of statistics in maternity services but also convinced about how meaningless these may become if women's voices are not kept at the centre. I therefore valued both quantitative and qualitative approaches. Acknowledging that my experiences and values as a midwife could not be separated from those as a researcher, Phases 1 and 2 provide a reflexivity statement together with numerous examples of how interpretations from the data are drawn. Other measures aimed at ensuring trustworthiness such as thick

description are also incorporated throughout the thesis. These are addressed in greater depth in Chapter 4 and 5.

- Rhetoric: Language is adapted according to the needs of the research (Kaushik & Walsh, 2019). In this study, rhetoric is anchored between objective and deductive language, and subjective and inductive language, according to the nature of data being analysed. For example, in the national cross-sectional study (Phase 3), an objective approach is employed with predominance of the third person in writing and tabular forms to illustrate the findings. In the qualitative descriptive study (Phase 2), a subjective approach is used with a mixture of the first and third person in the writing, and diagrams to illustrate the findings. The nature of the qualitative descriptive study (Phase 2) made it necessary to adapt rhetoric accordingly (Sandelowski, 2000b), as qualitative descriptive studies require staying close to the participants own words, in this case to women's experiences of AOL in Ireland. For instance, I started coding 'sOT infusion' but I soon changed it to 'drip', as this was the word women employed when recalling their birth stories.

Not without controversy, the flexibility and integration of diverse methods that characterise pragmatism have been criticised for potentially leading to superficiality or ambiguity. To address these concerns, it is paramount that any research grounded in pragmatism provides a clear rationale for its adoption in answering the objectives and demonstrates methodological coherence and rigour (Kaushik & Walsh, 2019). Overall, choosing pragmatism to underpin this thesis allowed me to answer my research aim and objectives and adapt the approach to each phase i.e., quantitative or qualitative, depending on the needs of the research. In other words, pragmatism gave me the basis to focus my research to what worked for each phase, proceed accordingly and integrate the findings as planned and as opportunities arose. Moreover, pragmatism afforded the opportunity to learn and benefit from becoming immersed in both quantitative and qualitative methods and data analyses. As a novice researcher exploring AOL in childbirth, I accepted the singular reality of the prevalence and associated factors with AOL within the Irish context and the multiple realities that would be uncovered from exploring and listening to women's views and experiences of AOL.

3.4. Study design: mixed methods

The present study employed a mixed methods design. In line with pragmatism, mixed methods encourage the incorporation of ‘multiple ways of seeing’ (Greene, 2007, p.20). They use both qualitative and quantitative methods, and integrate them (Creswell & Plano Clark, 2011a). Mixed methods enable a wider and deeper comprehension of human phenomena because they allow for a more comprehensive analysis that enable researchers to explore not only what is happening but also why and how it occurs. Therefore, they are becoming especially relevant in healthcare research (Doyle et al., 2016). Bazeley (2018a, p.7) defines mixed methods as ‘any research that involves multiple sources and types of data and/or multiple approaches to analysis of those data, in which integration of data and analyses occurs prior to drawing final conclusions about the topic of the investigation’.

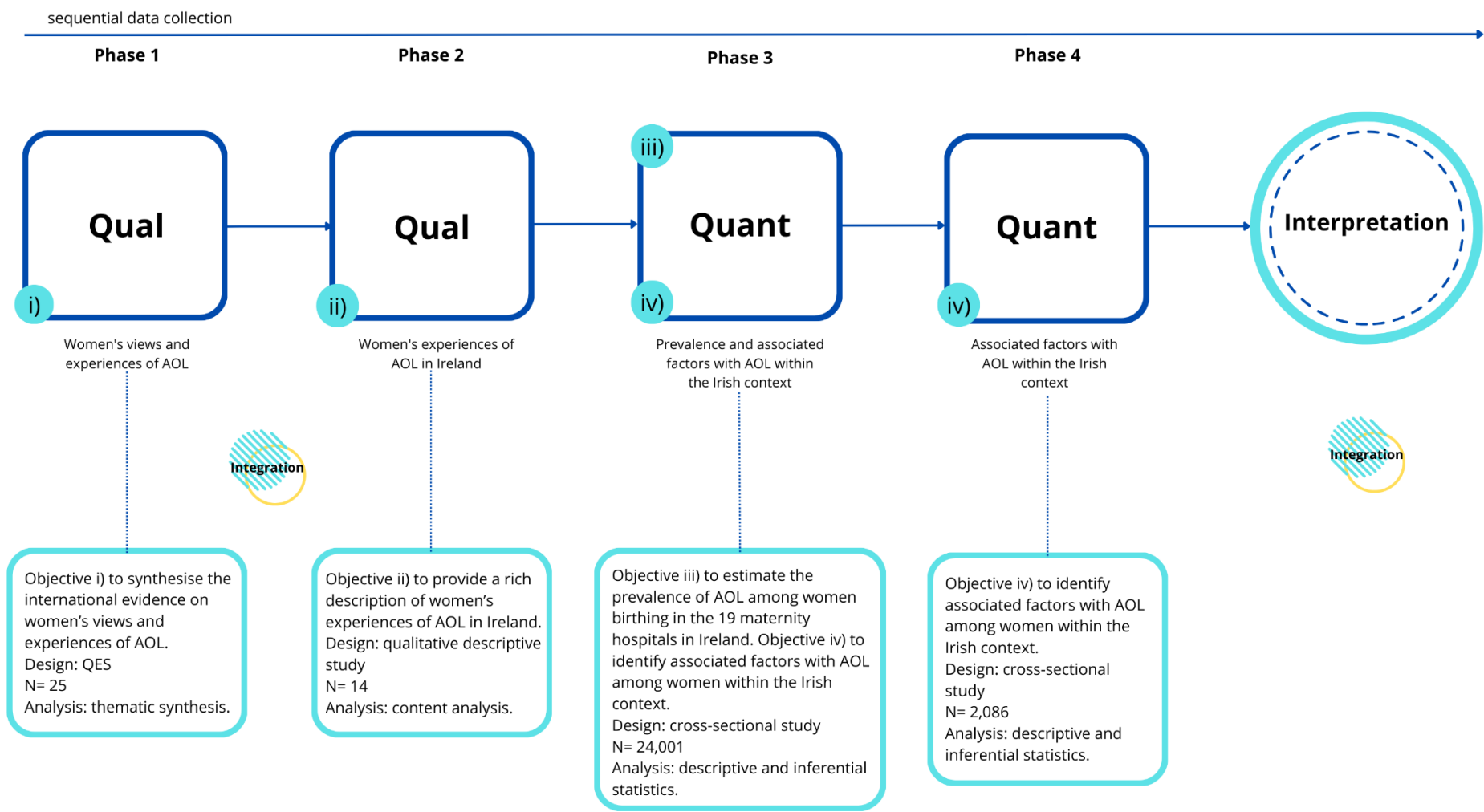
By definition, mixed methods designs are flexible. While there are examples of common typologies of mixed methods designs (Creswell, 2003; Creswell & Plano Clark, 2011a; Johnson & Christensen, 2019; Sandelowski, 2000a), these do not constrain researchers in their decisions but instead lay the foundations of what needs to be considered in order to succeed and achieve the research aim and objectives (Halcomb, 2019). The proposed study in this thesis is a multistage mixed methods study design (Creswell & Plano Clark, 2011a; Schoonenboom & Johnson, 2017). Multistage mixed methods studies are characterised by combinations of sequential (exploratory or explanatory) and/or convergent approaches (Fetters et al., 2013; Schoonenboom & Johnson, 2017) and have been successfully employed in healthcare research (Fetters et al., 2007; Laugesen et al., 2020). In midwifery, there are many examples of successful mixed methods studies at doctoral level (Gallagher, 2012; Larkin, 2009; O'Malley, 2019; Panda, 2020). Although multistage mixed methods studies offer a comprehensive view of the research topic, in this case of AOL, they are often complex and may involve extended timeframes, as well as challenges related to integration. Therefore, special attention must be given to planning and developing clear integration strategies across the different phases to ensure its successful conduct (Halcomb, 2019).

This thesis includes the conduct of four interlinked sequential phases: a QES on women’s views and experiences of AOL (Phase 1) – objective i); a qualitative descriptive study on women’s experiences of AOL in Ireland (Phase 2) – objective ii); a national cross-sectional study on the prevalence, and associated factors with AOL within the Irish context (Phase

3) – objectives iii) and iv); and a single-site cross-sectional study on associated factors with AOL within the Irish context (Phase 4) – objective iv).

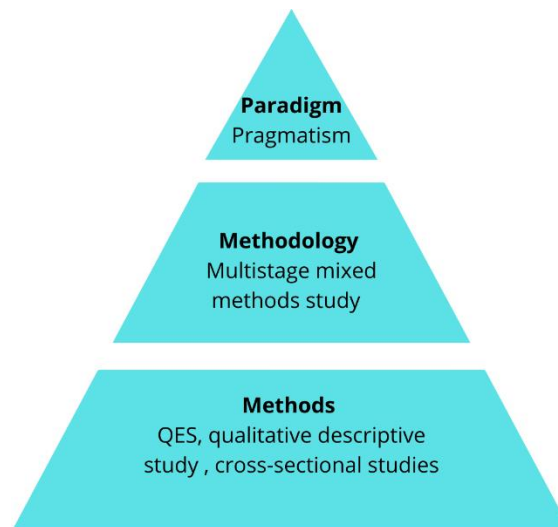
Unfortunately, the data reliability issues encountered in Phase 3 made it impossible to answer objectives iii) and iv) but the addition of Phase 4 allowed objective iv) to be addressed and identify associated factors with AOL among women birthing within the Irish context. For writing purposes only, the qualitative component (Phases 1 and 2) is addressed first in this thesis and is then followed by the quantitative component (Phases 3 and 4). Chronologically, the order in which the study took place is as follows: Phase 1, Phase 3, Phase 2, and Phase 4. In terms of time, Phases 2, 3 and 4 overlapped partially. A graphical representation of the study design is illustrated in [Figure 1](#). Note that integration, where quantitative and qualitative elements are mixed, occurred at two core points. This is further addressed in Section 3.6.

Figure 1: Diagram of the study design



Taking Crotty's classification model (1998), the global structure of this study is as follows:

Figure 2: Structure of the study methods, methodology and paradigm



3.5. Rationale for study design

Whilst combining qualitative and quantitative methods can be challenging, it is particularly important that the researcher provides a clear rationale for choosing a mixed methods design (Creswell & Plano Clark, 2011a). Drawing on Bryman's justifications, the main rationales for using mixed methods in the present study were as follows (Bryman, 2006, p.10):

- *'Different research questions'*: both qualitative and quantitative data were required to answer the aim and objectives. To synthesise the international evidence on women's views and experiences of AOL, and to provide a rich description of women's experiences of AOL in Ireland – objectives i) and ii), a qualitative approach was needed. To estimate the prevalence of AOL among women birthing in the 19 maternity hospitals in Ireland, and to identify associated factors with AOL among women birthing within the Irish context – objectives iii) and iv), a quantitative approach was required.
- *'Completeness'*: the use of both quantitative and qualitative data in this study sought to gain a comprehensive account of AOL, bringing to light the statistics of AOL in

Ireland and women's views and experiences of AOL. By combining both methods, a more complete understanding of AOL was achieved.

- '*Instrument development*': the findings of the QES (Phase 1) laid the foundations of the interview guide of the qualitative descriptive study (Phase 2) and refined the variables of data collection of the two cross-sectional studies (Phases 3 and 4).

3.6. Integration

A key factor and one of the major challenges to be considered in the conduct of a mixed methods study is integration, that is, where quantitative and qualitative elements are mixed or interlinked to create a whole account of the research findings (Creamer, 2018b; Halcomb, 2019; Zhang & Creswell, 2013). Integration is what differentiates mixed methods from pure quantitative and quantitative research; mixed methods culminate with a whole that is greater than and goes beyond the mere sum of its parts (Teddlie & Tashakkori, 2009). In other words, where ' $1 + 1 = 3$ ' (Fetters & Freshwater, 2015, p.2). As Bryman (2007, p.15) argues, the singularity of every research makes it very challenging to establish templates or rules of thumb for integrating mixed methods but integration should make the quantitative and qualitative research findings '*mutually illuminating*'.

Integration may occur at different points of the research study (Fetters et al., 2013; Younas et al., 2020) but it should be purposefully and intentionally designed in order to avoid a last effort to integrate the findings at the very end (Bazeley, 2018a, p.278). It is worth stressing, however, that integration is also a dynamic process that should allow the researcher to incorporate the unique opportunities that the study brings throughout (Creamer, 2018b). Being actively engaged during the collection of both quantitative and qualitative data facilitates integration as it allows the drawing of potential explanations, interpretations, conclusions, further research questions and reliability concerns (Maxwell et al., 2015). This was the case of the present study. My active involvement enabled me to promptly recognise patterns and discrepancies in the data which led to additional questions that needed to be answered as I continued to collect data. It also helped me address the data reliability issues of Phase 3 early on and to successfully add Phase 4 to the study, ensuring a final robust quantitative component. Furthermore, being actively involved throughout the research process allowed me to refine my interpretations and draw more nuanced conclusions of the study.

Mixed methods studies that demonstrate substantial integration include those with complementary purposes (Boeije et al., 2013) like the present study. Integration was planned in advanced at several points with two key integration points at the design and discussion levels, and with an overriding complementarity goal: to give a comprehensive account of AOL. A sequential, developmental integration approach was employed in which each phase informed the choices in the design and methods of the following phase (Bazeley, 2018b, p.72). According to Zhang & Creswell, this type of mixing or integration in which a phase is built upon the findings of the previous phase is called '*connection*' (2013, p.52). The findings from the QES (Phase 1) informed both the development of the interview guide of the qualitative descriptive study (Phase 2) and the outcome variables that were collected in the cross-sectional studies (Phases 3 and 4). For example, in the QES women talked about the 'cascade of interventions', which made me reconsider some outcome variables such as internal fetal monitoring or episiotomies that I had initially not thought about. The challenges encountered in the national cross-sectional study (Phase 3) together with the preliminary findings of the qualitative descriptive study (Phase 2) raised concerns on data reliability and resulted in the conduct of an additional single-site cross-sectional study (Phase 4). Other unexpected examples reinforcing connection were incorporated throughout the study as they emerged. For example, women talked about the baby being malpositioned or in a posterior position which they said made their labour and birth more difficult in the qualitative descriptive study (Phase 2). This prompted me to request and include the outcome variable 'fetal position at birth' in the single-site cross-sectional study (Phase 4) and analyse its relationship with AOL.

Finally, integration of the findings is presented and discussed with the broader scientific literature in Chapter 8, the discussion chapter. A joint display, which is a powerful tool to show integration in mixed methods studies (Creamer, 2023; Younas et al., 2020), is also presented in Chapter 8 ([Table 33](#)). In this joint display, meta-inferences, overall understandings from the quantitative and qualitative findings (Doyle et al., 2016), are presented and then discussed.

3.7. Quality standards

Before proceeding to examine in detail each phase of this study, it is important to underline the standards of quality that were followed. Different quality criteria for every phase of this

thesis were adopted, consistent with its singular methodological needs. The QES on women's views and experiences of AOL (Phase 1) was conducted and written up according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021); the qualitative descriptive study on women's experiences of AOL in Ireland (Phase 2) according to the Consolidated criteria for Reporting Qualitative studies (COREQ) (Tong et al., 2007), and the two cross-sectional studies on the prevalence and associated factors of AOL (Phases 3 and 4) according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (von Elm et al., 2007).

As a mixed methods study, however, an umbrella criterion for guiding and quality assessing this research as a mixed methods study was also adopted. While there are several options available for researchers, the six core criteria described by Hirose & Creswell (2023) were chosen for this thesis. These quality criteria were specifically designed for evaluating mixed methods studies and they offer a short yet comprehensive checklist. Furthermore, the description of the quality criteria includes a practical example which is particularly helpful for novice researchers. [Table 2](#) presents a summary of the quality criteria by Hirose & Creswell (2023) along with the corresponding sections in which these are further developed in the present study.

Table 2: Quality criteria to assess mixed methods studies according to Hirose & Creswell (2023) applied to this study

Core criterion	Summary and/or corresponding thesis sections
Advance a rationale for the use and appropriateness of mixed methods methodology	Different research questions, completeness, and instrument development. Section 3.5.
Write quantitative, qualitative, and mixed methods questions or aims	To achieve a greater understanding of women's views and experiences of AOL and to estimate the prevalence and associated factors of AOL in Ireland. Section 3.2.

Report the quantitative and qualitative data separately	Chapters 4 and 5 report the qualitative component of the study. Chapters 6 and 7 report the quantitative one.
Name and identify the type of mixed methods design and present a diagram of it	This is a multistage mixed methods study. Section 3.4. and Figure 1 .
State the use of integration in a joint display	Table 33
Discuss how meta-inferences and value resulted from the integration analysis	Section 8.4.

3.8. Patient and public involvement

The descriptive qualitative study on women's experiences of AOL in Ireland was underpinned by PPI. Patient and public involvement is defined as conducting research with or by members of the public (in this case with women who underwent AOL in Ireland), rather than to, about or for them (Health Research Board, 2016; Roberts et al., 2012).

Including PPI holds the potential to improve the quality and relevance of research, empower the public and create new forms of impact (Kaisler & Missbach, 2020). Despite it often being time and resource intensive, its incorporation has shown positive results in doctoral theses for facilitating the researcher's development (Roberts et al., 2012; Tomlinson et al., 2019). The PPI Ignite Network from the University of Galway recommends to do '*a small amount of involvement well, rather than attempting to embed PPI across all parts of a PhD research study, if you are faced with limitations on time, resources and support*' (National University of Ireland Galway, 2022). On the other hand, working with an existing network can facilitate the incorporation of PPI (Tomlinson et al., 2019). Acknowledging the time constraints and the resources available, I decided to incorporate PPI in the qualitative descriptive study (Phase 2) with women who participated in the Maternal health And Maternal Morbidity in Ireland (MAMMI) study (Trinity College Dublin) which is my primary supervisor's research. Patient and public involvement was well underway and developed within the MAMMI study (Daly et al., 2022b; Hannon et al., 2022) which meant that I could benefit from their PPI network as well as their expertise and experience.

The introduction of PPI into the descriptive qualitative study led to invaluable perspectives. It challenged my assumptions and opened up opportunities for reflection, as some authors have previously suggested (Jennings et al., 2018). For the PPI collaboration group, involving themselves in a descriptive qualitative study on women's experiences of AOL ensured that the research focused on issues that most matter to them, making the study more relevant to the women involved and bridging the gap between research and the community, as reported elsewhere (Arumugam et al., 2023).

When considering the number of people to involve, researchers must carefully examine the scope of the research. A PPI collaboration group should provide a wide range of views on the study theme but it should also involve people meaningfully (NHS Health Research Authority, 2019). Moreover, a PPI collaboration group can inform all parts of the research cycle, from identifying the research question to the implementation and dissemination of the findings (HSE Research & Development, 2021). In this research study, the objectives pursued with the PPI collaboration group within the qualitative descriptive study on women's experiences of AOL in Ireland (Phase 2) were to co-develop the interview guide, give feedback on the analysis of the data and co-design the dissemination strategy. A group of four to eight women for the PPI collaboration group was deemed appropriate to contribute to the study. A more detailed explanation about how PPI was threaded throughout is provided in Chapter 5.

3.9. Conclusions

The present study aims to achieve a greater understanding of women's views and experiences of augmentation of labour with synthetic oxytocin internationally and in Ireland, and to estimate the prevalence and factors associated with augmentation of labour with synthetic oxytocin in Ireland. To answer this aim, pragmatism has been chosen as the philosophical paradigm underpinning the study. The study is comprised of four sequential phases conforming to a multistage mixed methods study. The three main rationales that justify the adoption of a mixed methods study design are: different research questions, completeness and instrument development. Integration takes place at two main points at the design (through connection) and discussion levels. For each phase, different quality criteria are applied but the umbrella six-core criterion by Hirose & Creswell (2023) is also applied throughout to assess the overall quality of the study as a mixed methods study.

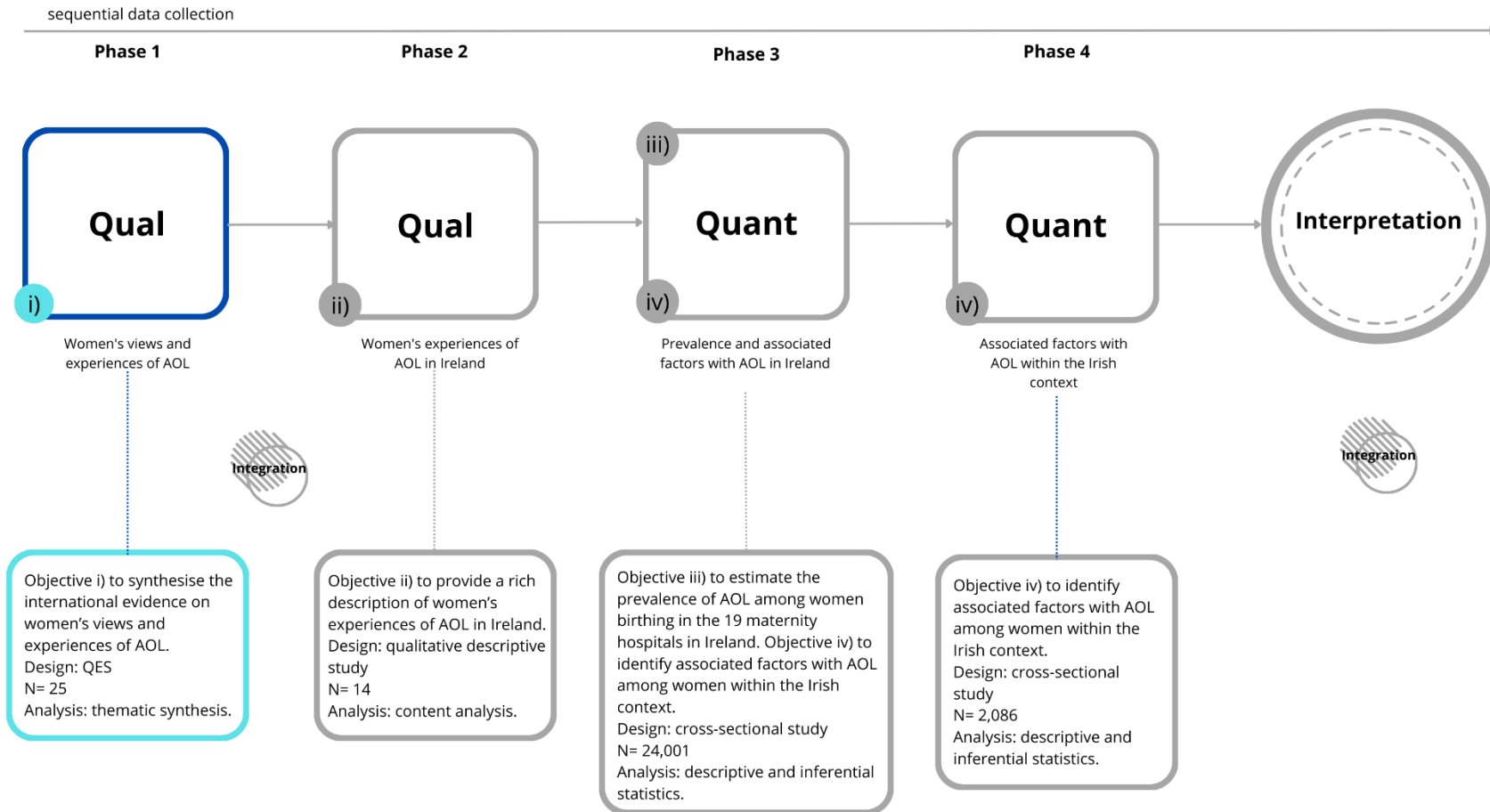
Finally, PPI is incorporated in the qualitative descriptive study on women's experiences of AOL in Ireland (Phase 2) with women from the MAMMI study (Trinity College Dublin).

4. Chapter 4: Phase 1 - Women's views and experiences of augmentation of labour with synthetic oxytocin infusion: a qualitative evidence synthesis

4.1. Introduction

This chapter presents the objectives, methods and results of Phase 1: a QES on women's views and experiences of AOL. Despite AOL being one of the most performed childbirth interventions among women in labour, women's experiences and perspectives of AOL are not well understood. A QES was deemed as the most appropriate approach due to its exploratory nature, its ability to effectively synthesise research on poorly understood topics and its suitability for the identification of gaps that need further investigation (Flemming & Noyes, 2021). This provided an ideal foundation for the present mixed methods study on AOL. The QES was registered in PROSPERO (CRD42021285252) in November 2021. A month later, the QES' protocol was published in the *HRB Open Research* (Alòs-Pereñíguez et al., 2022a). In January 2023 the QES was published in the journal *Midwifery* (Alòs-Pereñíguez et al., 2023b). Chapter 4 presents an expanded and a more in-depth account of this publication, especially with respect to methods. [Figure 3](#) shows where Phase 1 fits within the thesis as a whole.

Figure 3: Diagram of the study design. Chapter focusing on Phase 1



4.2. Objective

To synthesise the international evidence on women's views and experiences of AOL – objective i).

4.3. Methods

4.3.1. Design

A QES was employed to systematically retrieve, integrate and interpret qualitative findings from primary research studies on women's views and experiences of AOL. Preliminary searches revealed that qualitative data on this topic were scarce and challenging to access. Additionally, a QES is a valuable research design for uncovering underexplored areas within a particular topic, refining future research studies and identifying gaps that require further investigation (Flemming & Noyes, 2021). Given these considerations, a QES was deemed the most suitable design to initiate this mixed methods study.

For methodological guidance, I referred to published methods papers on QES from Cochrane (Booth, 2017; S. Lewin et al., 2018). I also attended an online training on QES conducted by Evidence Synthesis Ireland and Cochrane Ireland, as well as a masterclass on systematic reviews delivered by Prof Valerie Smith in the School of Nursing and Midwifery, Trinity College Dublin.

4.3.2. Inclusion criteria

The SPIDER (sample, phenomenon of interest, design, evaluation and research type) tool (Cooke et al., 2012) was used to define the inclusion criteria and guide the search strategy:

- **Sample:** women of any age, parity, and cultural background who, after spontaneous onset of labour, underwent AOL.
- **Phenomenon of Interest:** women's views and experiences of AOL. Alternative terminology referring to AOL such as stimulation or acceleration of labour was considered to ensure a broad retrieval of data.

- **Design:** qualitative studies of any design including phenomenology, grounded theory, ethnography, action research and feminist research. Mixed methods design studies where qualitative data could be extracted separately were also considered for inclusion, as well as survey designs with open-ended questions that provided qualitative data.
- **Evaluation:** inductive and deductive themes representative of women's views and experiences of AOL.
- **Research type:** published studies. No language nor time restrictions were applied although studies had to be in English or Spanish language to be included.

4.3.3. Study search

An initial scoping search in MEDLINE and CINAHL was undertaken in September 2021 to identify potentially relevant studies and search terms. No previous QES on AOL were found. The search strategy consisted of a combination of index terms and keywords. An example of it is provided below, in [Table 3](#).

Table 3: Example of the preliminary search strategy used in Phase 1

women* OR woman* OR mother* OR parturit* OR matern* OR pregnan* OR nullipar* OR multipar* OR postnatal* OR perinatal* OR post-natal* OR peri-natal* OR childbirth* OR birth* OR postpartum*
(augment* OR accelerat* OR stimulat* OR speed*) N4 (labor* OR labour* OR birth* OR parturit* OR childbirth* OR "child birth*") OR oxtoc* OR oxytoc* OR ocytoc* OR ocitoc* OR pitocin OR syntocinon OR "oxytocin- induce*" OR "oxytocin prepar*"
("qualitativ*" OR "qualitative stud*" OR "qualitative analysis" OR "qualitative method*" OR "focus group*" OR interview* OR "triangulat*" OR "narrative*" OR "naturalistic inqur*" OR "feminist research*" OR "grounded theor*" OR "hermeneutic*" OR "phenomenol*" OR "ethnograph*" OR "ethnonurs*" OR "ethnological research" OR "ethnomethodolog*" OR "purposive sampl*" OR "theoretical sampl*" OR "thematic analysis" OR "content analysis" OR "discourse analysis" OR "action research" OR "participatory research" OR "constant comparative method" OR "mixed model" OR "mixed method*" OR

“mixed design*” OR “multiple method*” OR multimethod* OR “open-ended question*” OR “open-ended survey*” OR “open-ended interview*”)

OR

(experien* OR view* OR percept* OR perceiv* OR attitud* OR believ* OR belief* OR perspective* OR opinion* OR express* OR thought* OR think* OR feel* OR reaction* OR emotion* OR comprehen* OR understand* OR stance* OR “personal valu*” OR awar* OR approach* OR “self report*” OR self-report* OR emot*)

This search strategy was tailored to each of the following databases:

- MEDLINE (1961 –October 2021)
- CINAHL (1982 –October 2021)
- EMBASE (1990 –October 2021)
- PsycINFO (1990 –October 2021)
- Maternity and Infant Care (1985 –October 2021)
- Web of Science Core Collection (1990 –October 2021)

The final search strategy was carefully developed with the support of Mrs. Jessica Eustace-Cook who is a subject librarian in the School of Nursing and Midwifery, Trinity College Dublin. The final search strategy together with the number of retrievals in each of the databases that were searched can be found in Appendix 1. The search was expanded by additionally searching the grey literature in thesis repositories (EThOS and DART-Europe) and the WHO International Clinical Trials Registry Platform. The reference lists of the studies identified for inclusion was also exhaustively reviewed.

4.3.4. Study selection

All retrieved citations were uploaded into EndNote® (version EN20) and duplicates removed. The remaining records were uploaded into Covidence® and rechecked for duplicates. Both the author of this thesis (SAP) and Dr Deirdre O’Malley (DOM) screened 20% of the retrieved records and piloted agreement at title and abstract screening stage.

Once high agreement was verified, above 80% (Shea et al., 2017), SAP screened the remaining records. Full texts of potentially relevant studies were independently reviewed by SAP and DOM. Covidence® allowed the research team to blindly undertake this process (i.e. the researchers could not see the other researcher’s responses until they had both finished). Once both had completed the full-text review, disagreements were discussed until consensus was achieved. For inclusion, both authors had to agree. Reasons for exclusion at full-text stage were also discussed, grouped and recorded. For instance, if several reasons for exclusion were identified in a study, SAP and DOM agreed the main reason to exclude it. A total of six main reasons for exclusion at full-text review were identified: content not relevant, language, not a published study (blog entries, books, letters to the editor, magazine articles outside the context of research), ‘others’ views’ (studies on healthcare professionals’ views), study design (quantitative study designs) and duplicates. The results of the search strategy as well as the study screening and inclusion process, are presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (Page et al., 2021) in the results section ([Figure 4](#)).

4.3.5. Assessment of methodological quality

Appraising methodological quality of the studies included in a QES may strengthen its comprehension and applicability. Whilst many appraisal tools are available, researchers might choose which to use according to their objectives and expertise, as well as the time and resources available (Majid & Vanstone, 2018). In this QES, the Evidence for Policy and Practice Information (EPPI) and Co-ordinating Centre’s appraisal tool was used (Thomas et al., 2003). This tool assesses the primary studies across 12 criteria grouped in three main categories: quality of study reporting, strategies employed to ensure reliability and validity, and quality of the methods employed ([Table 4](#)).

Table 4: EPPI and Co-ordinating Centre’s appraisal tool for assessing quality criteria (Thomas et al., 2003)

Quality of study reporting:	A - Aims and objectives clearly reported
	B - Adequately described the context of the research
	C - Adequately described the sample & sampling methods
	D - Adequately described the data collection methods
	E - Adequately described the data analysis methods

In	Good or some attempt to establish the:	F - Reliability of the data collection tools
		G - Validity of the data collection tools
		H - Reliability of data analysis
		I - Validity of the data analysis
	Quality of the methods:	J - Used the appropriate data collection methods to allow for expression of views
		K - Used the appropriate methods for ensuring the analysis was grounded in the views
		L - Actively involved the participants in the design and conduct of the study

qualitative research, the term ‘reliability’ may be defined as the consistency in the application of procedures during the conduct of a study (Noble & Smith, 2015). For example, when evaluating reliability in the data collection tools (criterion F), strategies such as the use of interview guides or observation charts were taken into consideration. When evaluating reliability in the data analysis (criterion H), the transparency in the analysis process was assessed, including strategies such as coding independently, prolonged engagement with the data, reflexive journals or discussions within the research team. On the other hand, the term ‘validity’ refers to the integrity and precision in which the findings accurately reflect the data (Noble & Smith, 2015). For assessing validity in the data collection tools (criterion G), strategies such as audio-recording and transcription were taken into account. When evaluating validity in the data analysis (criterion I), techniques such as triangulation or negative case analysis were considered.

The applicability of both terms ‘reliability’ and ‘validity’ in qualitative research is subject to debate because of their (post)positivist nature. Whilst this terminology might not be considered appropriate to some qualitative researchers, others argue that these terms are *‘overarching constructs that can be appropriately used in both quantitative and qualitative methodologies’* (Cypress, 2017, p.5). The EPPI and Co-ordinating Centre’s appraisal tool was purposively designed for synthesising qualitative data (Thomas et al., 2003) and previous QES in the field of maternal health have employed it successfully (Panda, Begley, et al., 2018; Smith et al., 2021). Acknowledging that there is a paradigm shift eschewing the (post)positivist notions of objectivity and accuracy in qualitative research but also the contextuality in which the EPPI and Co-ordinating Centre’s appraisal tool was developed

(early 2000s), the review team adhered to their authors' guidance when assessing the methodological quality of the primary studies.

Two reviewers (SAP and DOM) quality assessed each of the included studies in the QES independently in Microsoft Excel®. Final standards for a 'yes' or 'no' response were agreed through discussions. Explanatory notes specifying the rationale for those criteria which were not met were recorded. Regardless of the results of their methodological quality, a decision was made to extract data and synthesise all studies, as even poorly-reported qualitative research can provide relevant accounts of the phenomenon being studied (Soilemezi & Linceviciute, 2018). For illustration purposes, the results of the methodological quality assessment are reported in tabular form ([Table 6](#)).

4.3.6. Data extraction and synthesis

A purposively designed data extraction form was developed in Microsoft Excel® (Alòs-Pereñíguez et al., 2021). The data extracted included details about the setting, study period, aim, design, description of the population, sampling method, sample (including characteristics such as age, race, parity), methods of data collection and analysis and findings regarding women's views and experiences of AOL. Women's verbatim quotes and authors' interpretations from both the results and discussion sections were included. The rationale behind this decision was that it enabled the research team to analyse and capture women's own narratives while acknowledging the expertise of the researchers' interpretations and reflections of women's views and experiences of AOL. Their observations in relation to the context, beliefs, and dynamics between, for example, women and their healthcare providers, were key to understand and provide a more nuanced interpretation of the data. Two reviewers (SAP and DOM) independently piloted the data extraction form on three studies. Microsoft Excel® was very useful for comparing succinct descriptive data between studies but it made it difficult to extract the data in relation to women's views and experiences of AOL. A decision was then made to extract this data in a separate Microsoft Word® file. After verifying agreement in the piloted studies, SAP completed data extraction from the remaining studies.

Thematic synthesis as described by Thomas and Harden (2008) was employed. Acknowledging the value of QES in informing policy and practice, these authors proposed a method for bringing together qualitative evidence while preserving the context in which primary research were embedded in. Following the authors' guidance, the synthesis was

performed in 3 sequential stages: 1) line by line coding of data from primary studies, 2) development of descriptive themes and 3) generating analytical themes (Thomas & Harden, 2008). Label codes were developed inductively to capture the meaning in each sentence that was extracted from the primary studies. To add more rigour to the synthesis process, two reviewers (SAP and DOM) independently coded data from three primary studies and then compared and discussed the label codes. The remaining studies were coded independently by SAP and checked and discussed with DOM. Regular meetings within the QES team (SAP, DOM, DD) were held, which enabled a more fluid iteration (moving back-and-forth across data) and allowed for assumptions to be challenged, analysis to be questioned and ultimately, a deep and insightful understanding of the data to be reached. As similarities and differences became apparent, codes were refined and grouped into descriptive themes. Through their interpretation, analytical themes were generated and agreed by the team. A reflective journal to record ideas and issues arising during the data analysis was kept and facilitated the discussions within the research team. Finally, this QES used the formal guideline of Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 statement (Page et al., 2021) to enhance transparency.

4.3.7. Assessment of confidence in the findings

The level of confidence in the review findings was established by using Grading of Recommendations Assessment, Development and Evaluation-Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) (Booth et al., 2018; Colvin et al., 2018; Glenton et al., 2018; Simon Lewin et al., 2018; S. Lewin et al., 2018; Munthe-Kaas et al., 2018; Noyes et al., 2018). GRADE-CERQual individually assesses the confidence of every distinct review finding according to its four components: methodological limitations, coherence, extent or adequacy of contributing data, and relevancy to the review question. Once all the QES findings had been developed and written up, the research team fragmented the findings into short statements that summarised the review findings. This phase was particularly challenging, as the balance between too little and too much splitting led to a risk of the data analysis being over-simplified (Simon Lewin et al., 2018). All these short statements were listed in tabular form before being assessed against the four components of the GRADE-CERQual:

- The methodological limitations component refers to the extent to which the conduct of the studies contributing to an individual finding could have an impact on its confidence when interpreting that finding (Munthe-Kaas et al., 2018). In other words, it assesses whether any methodological concerns could jeopardise its trustworthiness. The assessment of this component was facilitated by the results from the EPPI and Co-ordinating Centre's appraisal tool (Thomas et al., 2003).
- The coherence component evaluates how clear and solid a finding is. It assesses the confidence from the content of the data, exploring its depth and width. This includes the analysis of the data supporting each review finding and reporting on dissonant cases that challenged its overall interpretation (Colvin et al., 2018).
- The adequacy of contributing data component refers to the assessment of data richness and quantity. It considers the level of detail of the available data in understanding this individual finding which includes taking into account the number of studies and participants contributing to the review finding (Glenton et al., 2018).
- The relevance of the data component assesses the extent to which the data supporting a finding is applicable to the context of the review aim. That means to determine how well-aligned the primary studies and the review are according to their research question or objectives, population and the phenomenon of interest (in this case women's views and experiences of AOL) (Noyes et al., 2018).

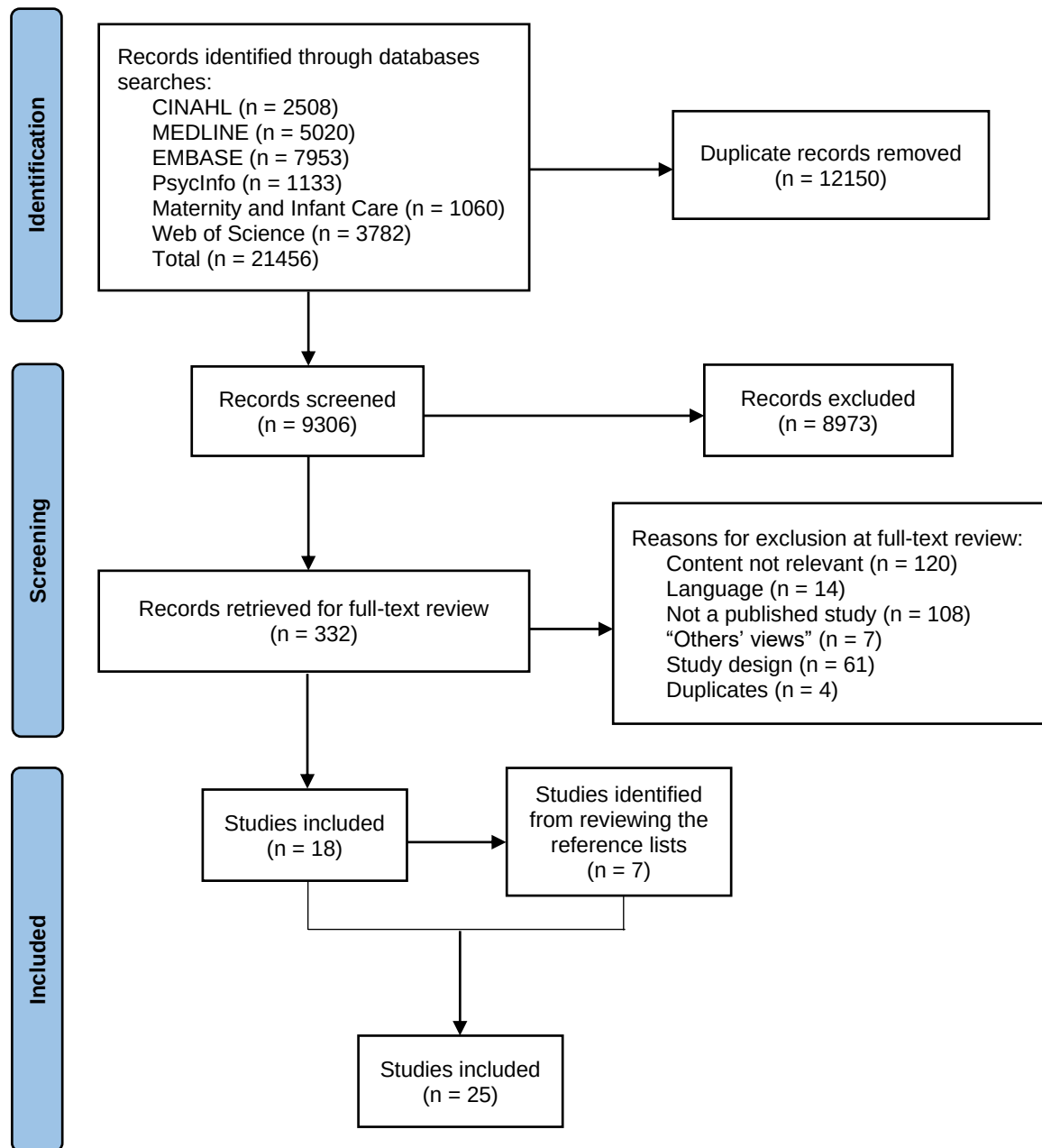
Once each finding was assessed according to the above-mentioned components, an overall assessment of confidence was conducted. All findings were deemed to be of 'high confidence' at the outset and were downgraded to moderate, low, or very low confidence accordingly (i.e., if there were concerns regarding any of the GRADE-CERQual components that could weaken the finding). This process was conducted independently by two reviewers (SAP and DOM or SAP and DD) and agreed by consensus. Following the GRADE-CERQUAL guidance, the four components were given equal weight when being assessed overall, and particular caution was taken not to rate down twice a review finding for the same concern in different components (Simon Lewin et al., 2018). All findings were discussed in meetings by the three members of the research team before applying the final overall assessment.

4.4. Results

4.4.1. Study selection

After duplicates were removed, 9,306 citations were uploaded into Covidence software for title and abstract screening against the inclusion criteria. A total of 332 records were potentially eligible and screened in full. The terms induction of labour and AOL were used interchangeably in many publications which made this process more challenging for the review team. No further studies were identified through the grey literature sources but the review of the reference lists added seven more studies to the QES. Finally, a total of twenty-five studies were included (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Carlton et al., 2005; Cipolletta & Balasso, 2011; Cipolletta & Sperotto, 2012; Collins et al., 2021; Davis, 2019; Deepak et al., 2013; DeSisto et al., 2016; Happel-Parkins & Azim, 2016; Hatamleh et al., 2013; Kjaergaard et al., 2007; Koski et al., 2014; Malacrida & Boulton, 2014; McCallum & dos Reis, 2008; McCourt, 2014; McKenna & Symon, 2014; Meyer et al., 2016; Niles et al., 2021; Nystedt et al., 2006; Pimenta et al., 2014; Raven et al., 2015; Regan & McElroy, 2013; Turan et al., 2006; Westergren et al., 2019). [Figure 4](#) illustrates the search and selection process.

Figure 4: Flow diagram of studies' screening and selection. Adapted from Page et al. (2021)



4.4.2. Description of included studies

The twenty-five studies were published between 2004 and 2021 and were conducted across fourteen countries: USA (n=6), Sweden (n=3), Brazil (n=2), Canada (n=2), Italy (n=2), UK (n=2) and one in each of the following countries: China, Denmark, Ghana, India, Jordan,

Turkey and Switzerland, with one being conducted in both USA and Mexico (border communities). Most studies were conducted more than ten years ago with four studies providing data collected within the last five years (Collins et al., 2021; Davis, 2019; Niles et al., 2021; Westergren et al., 2019). Twenty studies used a qualitative design (Blix-Lindstrom et al., 2004; Carlton et al., 2005; Cipolletta & Balasso, 2011; Cipolletta & Sperotto, 2012; Collins et al., 2021; Davis, 2019; Deepak et al., 2013; DeSisto et al., 2016; Happel-Parkins & Azim, 2016; Hatamleh et al., 2013; Kjaergaard et al., 2007; Koski et al., 2014; Malacrida & Boulton, 2014; McKenna & Symon, 2014; Meyer et al., 2016; Nystedt et al., 2006; Pimenta et al., 2014; Raven et al., 2015; Regan & McElroy, 2013; Westergren et al., 2019), four were mixed methods (Bielinski-Blattmann et al., 2016; McCallum & dos Reis, 2008; McCourt, 2014; Turan et al., 2006) and one was a survey with open-ended questions (Niles et al., 2021). Interviews were the most preferred method of data collection (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Carlton et al., 2005; Cipolletta & Balasso, 2011; Cipolletta & Sperotto, 2012; Collins et al., 2021; Deepak et al., 2013; Happel-Parkins & Azim, 2016; Hatamleh et al., 2013; Kjaergaard et al., 2007; Koski et al., 2014; Malacrida & Boulton, 2014; McKenna & Symon, 2014; Meyer et al., 2016; Nystedt et al., 2006; Pimenta et al., 2014), although some authors used a combination of methods, usually interviews with either focus groups or non- or participant observation (Davis, 2019; DeSisto et al., 2016; McCallum & dos Reis, 2008; McCourt, 2014; Raven et al., 2015; Regan & McElroy, 2013; Turan et al., 2006). The vast majority of the studies explored different aspects of women's childbirth experiences that included both participants who had undergone AOL and participants who had not. Two studies focused exclusively on women's experiences of AOL (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007). Consequently, it was not possible to estimate a sample size of the women represented in this QES. Women were aged between fifteen and forty-five years although five studies did not provide this information (Deepak et al., 2013; Koski et al., 2014; McCourt, 2014; Pimenta et al., 2014; Turan et al., 2006). Women's ethnicity was reported in nine of the studies (Carlton et al., 2005; Collins et al., 2021; Davis, 2019; Happel-Parkins & Azim, 2016; Malacrida & Boulton, 2014; McCallum & dos Reis, 2008; Meyer et al., 2016; Niles et al., 2021; Regan & McElroy, 2013) with being 'white' the most represented ethnic group. [Table 5](#) presents a summary of the descriptive characteristics of the included studies.

Table 5: Descriptive characteristics of the included studies

Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
Bielinski-Blattmann et al. 2016	To examine the relationship between qualitatively and quantitatively assessed birth experiences and rates of post-birth distress and depressive symptoms three to four weeks postpartum	Switzerland	Between 1997 to 1999, and between 2008-2011	Women in the postpartum period were interviewed between 48-96 hours after giving birth and further assessed 3-4 weeks later	127 women	Convenience sampling	Mixed methods	Surveys and semi-structured interviews	Content analysis
Blix-Lindstrom et al. 2004	To describe women's experiences of participating in decision-making related to augmentation of labour	Sweden	Not reported	Primiparous women who had a vaginal birth were interviewed 1–3 days after childbirth	20 women	Purposive sampling	Qualitative	Open-ended interviews	Modified grounded theory
Carlton et al. 2005	To gain an understanding of factors that influence women to change their birth preferences during labor	USA	Not reported	Primiparous and multiparous women who gave birth vaginally and who had changed their preference for pain management during labor. Interviews were conducted within a month of giving birth	33 women	Purposive and convenience sampling	Descriptive qualitative	Semi-structured interviews	Ethnographic techniques
Cipolletta & Balasso 2011	To explore how women live the experience of giving birth and the treatment that they received in hospital, focusing	Italy	Not reported	Primiparous women who had a spontaneous birth were interviewed 1–3 days after childbirth	10 women	Not reported	Exploratory descriptive	Semi-structured interviews	Grounded theory-based approach, combining thematic analysis

	on their needs and on their points of view								with constant comparison

Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
Cipolletta & Sperotto 2012	To compare the hospital management of childbirth with respect to women's perception and satisfaction	Italy	Not reported	Primiparous women were interviewed during the first 48 hours after childbirth	20 women	Not reported	Qualitative	Semi-structured interviews	Grounded theory
Collins et al. 2021	To examine the nature and characteristics of Black women's interactions with medical providers during childbirth when accompanied by a perinatal support professional (PSP; similar to a doula)	USA	Between 2017 and 2018	Women involved in a perinatal support programme were interviewed during the postpartum (babies between 6.8 and 34.8 weeks old)	25 women	Not reported	Qualitative descriptive	In-depth interviews	Husserlian descriptive phenomenology
Davis 2019	To examine pregnancy, prematurity, labor, and birthing among Black women who have secured educational attainment and/or professional status	USA	From 2011 until ? (not stated)	Most women interviewed (except in five instances) had had their babies admitted to the Neonatal Intensive Care Unit	17 parents in total / 14 women	Not reported	Qualitative	Interviews and ethnographic observations	Black feminist approach
Deepak et al. 2013	To document health providers' and community members' current knowledge, attitudes, and practices regarding uterotonic use during labor and delivery in India's Karnataka state	India	Between June and August 2011	Women who delivered within six months prior and mothers-in-law with at least one grandchild	140 in total / 20 women and 20 mothers-in-law	Purposive and snowball sampling	Qualitative	Semi-structured in-depth interviews	Thematic coding and content analysis

Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
DeSisto et al. 2016	To explore how low-risk, nulliparous pregnant women and their doctors in two contiguous U.S.–Mexico border communities communicate about methods of delivery and how they perceive that the delivery method decision is made	Mexico / USA	Between May and August 2012	Nulliparous women in late stages of pregnancy with no known risk factors or plans for a cesarean birth. Twelve of them were interviewed in the postpartum	18 women and 5 obstetricians	Purposive sampling	Qualitative	Direct observations (prenatal care visits), semistructured in-depth interviews, and brief structured interviews	Standard qualitative analysis techniques
Happel-Parkins & Azim 2016	To understand and contextualise the childbirth experiences of first-time mothers in the Midsouthern United States who planned to have a natural childbirth	USA	Not reported	Women who had intended to have a natural, drug-free childbirth for the birth of their first child	6 women	Snowball sampling	Qualitative Narrative Inquiry	Semi-structured lifestory interviews	Thematic analysis
Hatamleh et al. 2013	To assess the quality of maternity care in Jordanian public maternity hospitals and to determine whether the experiences were similar to those reported from other countries	Jordan	Between December 2009 and February 2010	Women who had a singleton live birth after 37 completed weeks of pregnancy were interviewed between 2 and 24 hours after giving birth	460 women	Not reported	Qualitative exploratory	Semi-structured interviews	Content analysis

Kjaergaard et al. 2007	To gain a deeper understanding of some nulliparas' experience of non-progressive and augmented labour and their experience of the care	Denmark	Between May and November 2005	Primiparous women who gave birth following nonprogressive labour and AOL were interviewed 4–15 weeks after giving birth	10 women	Purposive sampling	Qualitative descriptive	Open interviews	Constant comparative method (Grounded Theory)
Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
Koski et al. 2014	To describe Ghanaian health care providers' and community members' knowledge, perceptions, and practices of uterotonic usage at or near labor and delivery	Ghana	Between September to October 2010	Women who had given birth within the prior 6 months and mothers aged 50 years and older from 3 different districts	185 in total / 30 new mothers and 30 'older' mothers >50 years old	Combination of random, purposive, and snowball sampling	Qualitative	Semi-structured in-depth interviews	Thematic coding
Malacrida & Boulton 2014	To understand how informed choice, consumer ideologies and medical influences interacted in the women's birth 'decisions' prior to and during birth	Canada	Between 2010 and 2013	Women who had given birth within the prior 3 years	22 women	Snowball sampling	Qualitative	Semi-structured, narrative interviews	Feminist theoretical framework
McCallum & Dos Reis 2008	To reveal the effect of cultural practices on the way in which normal birth is conducted in a public hospital in Brazil	Brazil	Between March 2002 and March 2003	Primiparous and multiparous women who had recently given birth in a public maternity hospital	26 women, 19 health care professionals (+113 questionnaire staff)	Not reported	Mixed methods	Participant observation, semi-structured interviews, structured questionnaire, in-depth interviews	Not reported

McCourt 2014	(To compare) the experience of women receiving the new model of care against the experience of women receiving conventional shared care in a neighbouring area	UK	Not reported	Women who participated in a large-scale longitudinal survey on women's experiences of birth were recruited for interviews	44 women (interviews) (+focus groups and 1403 women in the survey)	Not reported	Mixed methods	Questionnaire, interviews, focus groups (this paper focuses on the interviews)	Grounded theory (reported in a previous publication)

Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
McKenna & Symon 2014	To explore the reasons for requesting a water vaginal birth after caesarean and to explore women's experiences	UK	Between March and April 2012	Multiparous women who had a water vaginal birth after a previous caesarean birth. All had their babies in a midwifery led care unit and received one-to-one midwifery care	8 women	Purposive sampling	Qualitative interpretative	In-depth semi-structured interviews	Constant comparative method
Meyer et al. 2016	To gain a detailed and distinctive understanding of the barriers to perinatal care in rural and peri-urban areas of Georgia	USA	Between July and August 2013	Women who had given birth within the prior year and who resided in the study areas at the time of their last birth	24 women and 4 key informants	Not reported	Qualitative	In-depth interviews	Applied thematic analysis
Niles et al. 2021	To explore the impacts on quality of care, including the experiences and perspective of service users who have declined aspects of their maternity care	Canada	Between January and June 2014	Women who planned to have a baby, were expecting a baby or have had a baby in British Columbia and who answered the open-ended questions	2051 women in total / 892 participants confirmed declining some aspects of their care, offering the 1540 narrative comments	Convenience, purposive and snowball sampling	Qualitative	Open-ended questions (survey)	Thematic analysis

Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
Nystedt et al. 2006	To illustrate women's experiences of prolonged labour	Sweden	Between November 2002 and April 2003	Primiparous women with spontaneous onset of labour and diagnosis of prolonged labour with assisted vaginal or caesarean birth were interviewed 1-3 months after giving birth	10 women	Purposive sampling	Qualitative	Thematic interviews	Thematic content analysis
Pimenta et al. 2014	To understand how culture influences the woman in labor process, especially on the perceptions and expectations of women about childbirth and questioning and resistance to the biomedical model	Brazil	Between January and March 2011	Women of childbearing age with a history of vaginal or caesarean birth who participated in the groups of family planning and who gave birth from 2004 onwards	8 women	Not reported	Qualitative descriptive	Semi-structured interview	Thematic content analysis
Raven et al. 2015	To explore women's perceptions and experiences of the quality of care during childbirth in a rural setting in China	China	Between 2007 and 2009.	Women with a range of ages, parities, education levels, types and places of childbirth (eight different facilities (six township and two county level hospitals)) were interviewed within twelve months after giving birth	69 women in total / 35 for semi-structured interviews	Purposive sampling	Qualitative	Semi-structured interviews and focus groups	Framework approach
Regan & McElroy 2013	To understand the factors that contributed to the overuse of caesarean sections in the U.S.,	USA	Not reported	Low-risk primigravid women completed a projective test, participated	49 women	Purposive sampling	Qualitative	Projective test, focus group and	Consensual Qualitative

	specifically, what factors influence women's decisions around giving birth			in a focus group session, and a postpartum interview in the first six weeks after birth				semi-structured interviews	Research method

Reference	Aim	Country	Study period	Context	Sample size	Sampling method	Design	Data collection	Data analysis technique (qualitative data)
Turan et al. 2006	To document the current state of evidence-based obstetric practices and, for those practices that did not follow current evidence-based guidelines, to identify provider attitudes, social pressures, and beliefs, as well as patient preferences	Turkey	Between 2001 and 2002	Women in the postpartum (106 had a vaginal birth and 44 a caesarean birth) from 3 different hospitals. Fifteen were selected for in-depth interviews, conducted in the postpartum ward	150 women, 15 maternity workers, administrators (number not specified)	Not reported	Mixed methods	Semi-structured questionnaires, in-depth, interviews, and structured observations	Conceptual framework for the quality of maternity care (developed by the research team)
Westergren et al. 2019	To elicit pregnant women's perceptions of childbirth as expressed in their birth plans, and through a feminist lens analyse their wishes, fears, values, and beliefs about childbirth, as well as their expectations on partner and midwife	Sweden	Between March and June 2016	Women who gave birth in an obstetrician-led hospital labour ward consented to access their birth plans and antenatal and intrapartum electronic medical records. The birth plan template was introduced by midwives at 32-33weeks gestation	132 women	Not reported	Qualitative	Women's birth plans	Qualitative content analysis

4.4.3. Quality assessment

The methodological quality of the studies ranged from one study meeting all twelve quality criteria (Niles et al., 2021) to one study meeting only two criteria (Davis, 2019). Ten of the included studies met ten or more criteria (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Cipolletta & Sperotto, 2012; Collins et al., 2021; Deepak et al., 2013; DeSisto et al., 2016; Kjaergaard et al., 2007; Malacrida & Boulton, 2014; Niles et al., 2021; Nystedt et al., 2006; Regan & McElroy, 2013; Turan et al., 2006). Criterion I – validity of the data analysis and L – active involvement of the participants in the design and conduct of the study were the most frequently unmet criteria. [Table 6](#) shows the results of the methodological quality assessment.

Table 6: Methodological quality appraisal of included studies

Reference	Criteria met	Description of quality criteria
Bielinski-Blattmann et al. (2016)	A, B, C, D, E, F, G, J, K, L	<i>Quality of study reporting</i> A - Aims and objectives clearly reported B - Adequately described the context of the research C - Adequately described the sample & sampling methods D - Adequately described the data collection methods E - Adequately described the data analysis methods <i>There was good or some attempt to establish the:</i> F - Reliability of the data collection tools
Blix-Lindstrom et al. 2004	A, B, C, D, E, F, G, H, J, K	
Carlton et al. 2005	A, B, C, D, F, G, I, J, K	
Cipolletta & Balasso 2011	A, B, D, E, F, G, J, K	
Cipolletta & Sperotto 2012	A, B, C, D, E, F, G, H, J, K	
Collins et al. 2021	A, B, C, D, E, F, G, H, I, J, K	
Davis 2019	B, J	
Deepak et al. 2013	A, B, D, E, F, G, H, I, J, K	
DeSisto et al. 2016	A, B, C, D, E, F, G, H, J, K	
Happel-Parkins & Azim 2016	A, B, C, D, E, H, J, K	
Hatamleh et al. 2013	A, B, D, E, F, G, H, J, K	
Kjaergaard et al. 2007	A, B, C, D, E, F, G, H, J, K	
Koski et al. 2014	A, B, C, E, F, G, H, J, K	
Malacrida & Boulton 2014	A, B, C, D, E, F, G, H, J, K	
McCallum & Dos Reis 2008	A, B, D, J	
McCourt 2014	A, B, C, D, J, K	
McKenna & Symon 2014	A, B, C, E, G, I, J, K	
Meyer et al. 2016	A, B, C, D, E, F, G, J, K	
Niles et al. 2021	A, B, C, D, E, F, G, H, I, J, K, L	
Nystedt et al. 2006	A, B, C, D, E, F, G, H, J, K	
Pimenta et al. 2014	A, D, J, K	
Raven et al. 2015	A, B, C, D, E, F, G, J, K	

Regan & McElroy 2013	A, B, C, D, E, F, G, H, I, J, K	G - Validity of the data collection tools
Turan et al. 2006	A, B, D, E, F, G, H, I, J, K	H - Reliability of the data analysis
		I - Validity of the data analysis
Westergren et al. 2019	A, B, D, E, F, G, H, J, K	<i>Quality of the methods</i>
		J - Used the appropriate data collection methods to allow for expression of views
		K - Used the appropriate methods for ensuring the analysis was grounded in the views
		L - Actively involved the participants in the design and conduct of the study

4.4.4. Data synthesis

Three dominant analytical themes, each with two descriptive subthemes, emerged from the data synthesis. These were: 1) Feeling stuck, with associated subthemes of feeling involved in the decision to augment labour and flaws with informed consent 2) Past and present shaping the future, with subthemes of knowledge, beliefs and their influence on expectations and the experience of AOL on future births and 3) Cause and effect of AOL, with associated subthemes of cause and effect of AOL and supportive and discouraging roles. [Table 7](#) presents the studies that contributed data to each analytical theme. To add transparency, [Table 8](#) provides an audit trail of the process from coding to generating descriptive themes and developing the analytical themes. Illustrative participant quotes from the included studies are presented in the text supporting the thematic synthesis and Appendix 2.

Table 7: Studies that contributed data to each descriptive and analytical theme

Analytical themes	Descriptive themes	Contributing studies
Feeling stuck	Feeling involved in the decision of AOL	Blix-Lindstrom et al. (2004), Cipolletta & Balasso 2011, Cipolletta & Sperotto 2012, Davis 2019, Deepak et al. 2013, DeSisto et al. 2016, Happel-Parkins & Azim 2016, Hatamleh et al. 2013, Kjaergaard et al. 2007, Koski et al. 2014, Malacrida & Boulton 2014, McCallum & Dos Reis 2008, McCourt 2014, McKenna & Symon 2014, Niles et al. 2021, Pimenta et al. 2014, Raven et al. 2015, Regan & McElroy 2013, Turan et al. 2006, Westergren et al. 2019
	Flaws with informed consent	Blix-Lindstrom et al. 2004, Cipolletta & Balasso 2011, Cipolletta & Sperotto 2012, Collins et al. 2021, Davis 2019, Deepak et al. 2013, DeSisto et al. 2016, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, Koski et al. 2014, McCallum & Dos Reis 2008, McCourt 2014, Niles et al. 2021, Pimenta et al. 2014
Past and present shaping the future	Previous knowledge and its influence on expectations	Bielinski-Blattmann et al. 2016, Blix-Lindstrom et al. 2004, Collins et al. 2021, Davis 2019, DeSisto et al. 2016, Happel-Parkins & Azim 2016, Hatamleh et al. 2013, Kjaergaard et al. 2007, Koski et al. 2014, McCallum & Dos Reis 2008, McCourt 2014, Meyer et al. 2016, Raven et al. 2015, Regan & McElroy 2013, Turan et al. 2006, Westergren et al. 2019
	Experience of AOL on future births	Kjaergaard et al. 2007, McKenna & Symon 2014, Westergren et al. 2019
Cause and effect of AOL		Bielinski-Blattmann et al. 2016, Blix-Lindstrom et al. 2004, Collins et al. 2021, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, McCallum & Dos Reis 2008, McCourt 2014

	Supportive and discouraging roles	
	Cause and effect of AOL	Bielinski-Blattmann et al. 2016, Blix-Lindstrom et al. 2004, Carlton et al. 2005, Cipolletta & Sperotto 2012, Collins et al. 2021, Deepak et al. 2013, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, Koski et al. 2014, Malacrida & Boulton 2014, McCallum & Dos Reis 2008, McCourt 2014, McKenna & Symon 2014, Niles et al. 2021, Nystedt et al. 2006, Pimenta et al. 2014, Turan et al. 2006, Westergren et al. 2019

Table 8: Audit trail from coding to the development of analytical themes (codes reduced for illustrative purposes)

Codes	Descriptive themes	Analytical themes
Professionals' decision The cascade of interventions Decision making does not mean satisfaction Refraining from participating in decision making Considering alternatives to AOL	Feeling involved in the decision to augment labour	Feeling stuck
No informed consent Not questioning the need for AOL Questioning the need for AOL Informed consent	Flaws with informed consent	
Unmet expectations Physiological capacity to give birth Careproviders=source of information Previous knowledge on AOL AOL=normal	Knowledge, beliefs and their influence on expectations	Past and present shaping the future
Influence on future decisions	Experience of AOL on future births	
AOL=pain Exhaustion AOL and epidural Feeling unable to cope AOL=need to speed up labour	Cause and effect of AOL	Cause and effect of AOL
Midwives=support, trust Disrespectful care Family= no support Family=support	Supportive and discouraging roles	

4.4.5. Theme 1 – Feeling stuck

Twenty-one of the included studies contributed data to the analytical theme of Feeling stuck and its two descriptive subthemes: feeling involved in the decision to augment labour and flaws with informed consent.

4.4.5.1. Feeling involved in the decision to augment labour

Women valued being involved in the decision to have their labour augmented (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007; McCourt, 2014). For some women, AOL was the point at which the desire of a non-medicalised birth had to be abandoned. For them, feeling involved was seen as *‘a step towards acceptance of a medical delivery and reconciliation’* (Kjaergaard et al., 2007, p.8). However, the meaning of feeling involved was widely influenced by women’s knowledge and sense of trust towards their healthcare providers. For some women, it meant being informed about the intervention before it was performed. For others, it meant actively participating in the decision-making process i.e. deciding whether they wanted or did not want to have their labour augmented, and being able to consider other alternatives to AOL:

‘They (the midwives) asked me about everything, they asked if I wanted them to rupture the membranes and if I wanted an enema and all kind of things’ (Blix-Lindstrom et al., 2004, p.4).

Nonetheless, a willingness to participate in decisions regarding AOL did not automatically translate into being involved in decision-making (Blix-Lindstrom et al., 2004; Davis, 2019; Happel-Parkins & Azim, 2016; McCallum & dos Reis, 2008). Augmentation of labour with synthetic oxytocin was frequently presented to women as a decision that had already been made rather than an option to be discussed (Blix-Lindstrom et al., 2004; Cipolletta & Sperotto, 2012; Deepak et al., 2013; DeSisto et al., 2016; Happel-Parkins & Azim, 2016; Hatamleh et al., 2013; Kjaergaard et al., 2007; Koski et al., 2014; Pimenta et al., 2014). Most women narrated their experiences of AOL through a passive voice, often in third person: *‘he ordered’, ‘she decided’, ‘they wanted’*:

‘As soon as I got to the hospital and the midwife informed my doctor about my condition, he ordered an induction [AOL] straight away so that my cervix would open’ (Hatamleh et al., 2013, p.8).

In seven studies, the participating women themselves referred to the so-called 'cascade of interventions' (Bielinski-Blattmann et al., 2016; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; Malacrida & Boulton, 2014; McCourt, 2014; McKenna & Symon, 2014; Regan & McElroy, 2013). This concept refers to how childbirth interventions have a snowball effect on requiring further interventions, potentially unnecessary, if labour had been not disrupted in the first place (Simpson & Thorman, 2005). Women often used it to illustrate how they felt stuck in accepting AOL and other childbirth interventions reluctantly. For these women, the cascade of interventions signified how their autonomy and choices disappeared once the first intervention had been performed, especially if there were any concerns about the baby's safety (McCourt, 2014):

'It is true what they say about one type of intervention leading to another, and before you know it, you have all of them' (Malacrida & Boulton, 2014, p.11).

4.4.5.2. Flaws with informed consent

Concerning findings regarding informed consent emerged from the analysis in fourteen studies (Blix-Lindstrom et al., 2004; Cipolletta & Sperotto, 2012; Collins et al., 2021; Davis, 2019; Deepak et al., 2013; DeSisto et al., 2016; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; Koski et al., 2014; McCallum & dos Reis, 2008; McCourt, 2014; Meyer et al., 2016; Niles et al., 2021; Pimenta et al., 2014). Women narrated either having their labour augmented without consent (Blix-Lindstrom et al., 2004; Deepak et al., 2013; Happel-Parkins & Azim, 2016; McCallum & dos Reis, 2008; Pimenta et al., 2014), feeling intimidated to comply and consent (Cipolletta & Sperotto, 2012; Collins et al., 2021; Davis, 2019; Kjaergaard et al., 2007; Koski et al., 2014; Niles et al., 2021) or giving consent without receiving enough information to give genuine informed consent (Kjaergaard et al., 2007; McCourt, 2014; Meyer et al., 2016):

'They immediately hooked me up to Pitocin. I didn't realize that I was on it until it was already dripping. And I was like, "What is that?" and they're like, "Well, you're on a pit drip"... "Honey, you're in a hospital and this is how we do it' (Happel-Parkins & Azim, 2016, p.5).

Some women expressed doubts about needing AOL (Collins et al., 2021; Kjaergaard et al., 2007; Koski et al., 2014; McCallum & dos Reis, 2008; Niles et al., 2021; Pimenta et al., 2014) and even declined it initially. Women used words such as '*rushed*', '*pressured*', '*pushy*' or

'coercion' to explain how they felt about ultimately consenting to AOL (Cipolletta & Sperotto, 2012; Collins et al., 2021; Davis, 2019; Kjaergaard et al., 2007; Koski et al., 2014; Niles et al., 2021). This experience also made them bring into question the integrity of their healthcare providers. In Niles et al.'s words, women *'were worn out from the fight'* (Niles et al., 2021, p.7):

'Another client described the pressures that she felt when she was not dilating as quickly as the doctors wanted. She said, 'Everything was all good until it came time to them wanting to give me drugs'. She said her team of residents got 'a little pushy, and it's like impatient'' (Collins et al., 2021, p.7).

Other women highlighted the lack of information they received about AOL when recounting their experience, putting into question the legitimacy of their consent (Kjaergaard et al., 2007; McCourt, 2014; Meyer et al., 2016). Some who gave consent regretted it afterwards:

'If I'd known it was that painful I would have waited, even if it meant going home and coming back. I wouldn't do it again... I think I thought I was going to die' (McCourt, 2014, p.5).

4.4.6. Theme 2 – Past and present shaping the future

Seventeen of the included studies contributed to the theme of Past and present shaping the future and its two subthemes: knowledge, beliefs and its influence on expectations and experience of AOL on future births.

4.4.6.1. Knowledge, beliefs and their influence on expectations

Women's knowledge and beliefs shaped their expectations of childbirth. In general, women believed in their own capacity to give birth and felt confident about it (Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; Koski et al., 2014; Regan & McElroy, 2013). The fact that many women had not even envisaged the possibility of needing AOL was a good illustration of this. However, women with limited knowledge of AOL and women from countries with underdeveloped maternal healthcare services (Brazil, Ghana, India) seemed to express a more favourable attitude towards AOL. Some considered AOL as a 'normal' intervention, even necessary for a successful childbirth (Blix-Lindstrom et al., 2004; Deepak et al., 2013; Koski et al., 2014; McCallum & dos Reis, 2008). Some authors observed that

this idea emerged exclusively from new generations of mothers, where beliefs about the need to augment labour to facilitate birth was becoming popular (Deepak et al., 2013; Koski et al., 2014):

‘(...) the concept of ‘forcing’ labor emerged exclusively from new mothers. This was in stark contrast to responses from many older mothers, who often described birthing as a natural event requiring little to no intervention’ (Koski et al., 2014, p.7).

In three studies, some women requested AOL from their healthcare providers (Koski et al., 2014; Raven et al., 2015; Turan et al., 2006). These women believed that AOL would shorten their labour and therefore reduce the time they were experiencing pain. The same belief was evident in another study from a woman commenting upon her daughter-in-law’s childbirth:

‘(...) they said that it would induce pain fast and delivery would happen, and the reason for doing so is because she was not in a position to bear the pain’ (Deepak et al., 2013, p.7).

Similarly, limited knowledge of AOL predisposed women to accepting AOL more easily or handing the decision to their healthcare providers (Blix-Lindstrom et al., 2004; Cipolletta & Balasso, 2011; DeSisto et al., 2016; Kjaergaard et al., 2007; Koski et al., 2014). Data suggested that these women were also more likely to be given less information about the intervention beforehand compared to women who did have some knowledge of AOL (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007; Koski et al., 2014):

‘You know we don’t have any knowledge so if you go to the hospital or a TBA [Traditional Birth Attendant] and they give you any drugs or preparations you will take it’ (Koski et al., 2014, p.7).

Women acquired knowledge from a variety of sources including the internet, magazines, childbirth educational programs, healthcare providers, relatives and friends (Blix-Lindstrom et al., 2004; Happel-Parkins & Azim, 2016; Raven et al., 2015; Regan & McElroy, 2013). Having previous knowledge about childbirth, and specifically about AOL, acted as a double-edged sword. For some women it meant being better able to communicate their wishes to the healthcare providers (Blix-Lindstrom et al., 2004). To others, it made them challenge the decision about the need of AOL. Women reported how acting ‘too knowledgeable’ could be perceived as a sign of insubordination in the eyes of their

healthcare providers. The concept of there being consequences in their care as a result of non-compliance emerged in three studies (Cipolletta & Sperotto, 2012; Davis, 2019; Happel-Parkins & Azim, 2016):

‘Crystal sensed that Junior’s stay in the NICU was longer than necessary as a penalty for her being forthright about the kind of birth she wanted’ (Davis, 2019, p.9).

Although AOL was repeatedly mentioned as an example of unmet expectations (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Collins et al., 2021; Davis, 2019; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; McCourt, 2014; McKenna & Symon, 2014; Niles et al., 2021; Westergren et al., 2019), this by itself did not automatically translate into a negative childbirth experience. Communication and support, primarily from healthcare providers, were crucial factors that moulded how AOL was experienced (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007; McCourt, 2014):

‘So I had the drip and it worked well because she increased it slowly... I could keep pace with it and that was in fact very nice’ (Kjaergaard et al., 2007, p.4).

4.4.6.2. Experience of AOL on future births

Experiencing an augmented labour made women reflect and seek different alternatives for future childbirths such as home births, water births or elective caesarean sections (Kjaergaard et al., 2007; McKenna & Symon, 2014; Westergren et al., 2019). In one study, a woman also described several methods that she would rather try first:

‘(...) If we need to speed up labour I’d rather try moving around, standing up, jumping, whatever’ (Westergren et al., 2019, p.5).

4.4.7. Theme 3 – Cause and effect of AOL

Eighteen of the included studies contributed to the theme of Cause and effect of AOL and its two subthemes: the loop of AOL, and supportive and discouraging roles.

4.4.7.1. The loop of AOL

Women consistently associated AOL with increased pain (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Carlton et al., 2005; Cipolletta & Sperotto, 2012; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; McCallum & dos Reis, 2008; McCourt, 2014; McKenna & Symon, 2014; Pimenta et al., 2014; Turan et al., 2006; Westergren et al., 2019). Characteristics of the sensations experienced were fundamentally described in negative terms such as *'outrageous'*, *'unnatural'*, *'traumatic'*, *'disempowering'* and *'overwhelming'*. In some cases, it was difficult to identify whether the experience of AOL itself or the experience of labour dystocia, including AOL, led to these negative feelings (Cipolletta & Sperotto, 2012; Hatamleh et al., 2013; Kjaergaard et al., 2007; McCourt, 2014; Niles et al., 2021; Nystedt et al., 2006). In others, AOL was clearly pointed out as the cause of a negative childbirth experience (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Carlton et al., 2005; Happel-Parkins & Azim, 2016; McCourt, 2014; Pimenta et al., 2014; Westergren et al., 2019). In relation to pain, the concept of loss of control emerged in four studies (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007; McCourt, 2014; Nystedt et al., 2006). Women struggled to cope because of the intensity of the contractions and/or the short time they had to rest in between contractions:

'It was really shocking because [the contractions] came on profusely and in a very short time; you hadn't the power to count them' (Cipolletta & Sperotto, 2012, p.7).

This strongly resonated with the topic of epidural analgesia which appeared to go hand in hand with AOL in several studies (Bielinski-Blattmann et al., 2016; Blix-Lindstrom et al., 2004; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; Malacrida & Boulton, 2014; McCourt, 2014). Augmentation of labour with synthetic oxytocin acquired a dual meaning as cause and effect. Although the pain caused by AOL led to most women requesting an epidural, having an epidural resulted in having AOL afterwards for other women. The decision to have an epidural could add an extra cause of concern as some women thought that it was *'unnatural'* to augment labour while *'anesthetising'* it at the same time. Nonetheless, epidural often signified relief and being able to rest (Bielinski-Blattmann et al., 2016; Kjaergaard et al., 2007):

'It worked [the epidural] and that was fantastic ...I was so tired. It was an extreme relief to get rid [of the pain]' (Kjaergaard et al., 2007, p.6).

In spite of the fact that the definition of labour dystocia was only provided in three studies (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007; Nystedt et al., 2006), it became evident

that AOL was performed without clinical indication in several studies. Women talked about having AOL upon admission to hospital (Happel-Parkins & Azim, 2016; Hatamleh et al., 2013) or routinely, with no previous diagnosis of labour dystocia (Deepak et al., 2013; McCallum & dos Reis, 2008; McCourt, 2014; Pimenta et al., 2014):

McCallum & Dos Reis noted that *'obstetricians at the facility frequently speed up labor by applying an intravenous infusion of oxytocin ... women expect its use but fear its effects'* (McCallum & dos Reis, 2008, p.6).

4.4.7.2. Supportive and discouraging roles

Women who felt supported by their healthcare professionals, regardless of their knowledge and expectations, were more likely to have an overall more positive childbirth experience when undergoing AOL (Blix-Lindstrom et al., 2004; Kjaergaard et al., 2007; McCourt, 2014). In contrast, the lack of support was linked to experiencing feelings of losing control and to having doubts regarding the clinical decisions that were made (Blix-Lindstrom et al., 2004; Collins et al., 2021; Davis, 2019; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007; Koski et al., 2014; Niles et al., 2021). Feeling listened to, receiving information, guidance and emotional support were decisive elements in building up confidence and trust with the healthcare providers:

'The women were satisfied with decisions made when they also experienced good support and guidance from midwives and they had confidence in the midwives' assessments' (Blix-Lindstrom et al., 2004, p.7).

Mothers, perinatal support providers and doulas, but mostly partners embodied other sources of support for women undergoing AOL (Blix-Lindstrom et al., 2004; Collins et al., 2021; Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007). In the absence of a good support from women's healthcare providers, the companion's support became especially relevant (Happel-Parkins & Azim, 2016; Kjaergaard et al., 2007). Advocating for women's wishes was also sensed as a caring companion:

'Experience of positive interaction included the partner's ability to offer caring and loving support. When the interaction with the midwife was negative the partner was the emotional centre point' (Kjaergaard et al., 2007, p.6).

4.4.8. Confidence in the review findings

Twenty discrete findings underwent GRADE-CERQual confidence assessment. [Table 9](#) presents an evaluation and rationale for each of the four components, together with the overall assessment. Fourteen findings were graded as high confidence, four as moderate and two as low. All findings were judged to have no or very minor, or minor concerns on methodological limitations. Most of the downgrading in confidence related to coherence were in findings related to women's beliefs and knowledge of AOL, which varied broadly across studies. Although data depth and quantity varied, the qualitative design employed in most of the studies provided adequate data to support the findings. Most of the primary studies were not well-aligned with the review question, aims and population because they examined many different aspects of women's experiences of childbirth. However, a decision was made *a priori* not to downgrade the relevance of the studies based on this point alone as AOL was integrated in women's childbirth experiences.

The findings of this QES informed phases 2, 3 and 4. Key discrete findings were shared with the PPI collaboration group in order to co-design the interview guide for Phase 2. For instance, regarding pain, the PPI collaboration group acknowledged its importance in the context of AOL but agreed that it would naturally arise during the interviews, allowing it to be omitted from the final interview guide. Conversely, the PPI collaboration group emphasised prioritising other aspects, particularly the informed consent process and its impact on women's experiences of AOL. This aligned with some discrete findings deemed to have low or moderate confidence, as assessed using GRADE-CERQual, which helped highlight gaps that needed further exploration in Phase 2. Moreover, the findings of this QES refined the outcome variables collected in phases 3 and 4. For example, women talked about the 'cascade of interventions', which prompted the inclusion of additional variables such as internal fetal monitoring or episiotomies, which had initially been overlooked.

Table 9: GRADE-CERQual confidence assessment in order of appearance in the text

Finding	Contributing records	Methodological limitations: <i>quality of the studies which are contributing to finding</i>	Coherence: <i>extent of support for review finding from the underlying data</i>	Adequacy: <i>richness of data; depth and quantity contributing to the finding; includes design</i>	Relevance: <i>inclusion criteria for studies should closely mirror the review question; study aim, population and focused on AOL</i>	Overall Confidence
Analytical theme 1: Feeling stuck						
Women valued being involved in the decision to have their labour augmented; however, the meaning of this involvement varied widely among women	Blix-Lindstrom et al. 2004, Kjaergaard et al. 2007, McCourt 2014	Minor concerns: Two of the studies were considered of high quality, though McCourt 2014 met only 6 quality criteria	Minor concerns: The definition of involvement varied broadly (i.e., from being informed to actively participating in the decision-making process)	No or very minor concerns: One study contributed with particularly rich data, but overall, the data was of good quality in the three of them. Two studies were qualitative, and one was mixed methods	No or very minor concerns: Two of the studies were well-aligned with the QES question, though McCourt 2014 focused on women's experiences of birth according to whether they were attended by a caseload midwife and whether they received a high or low level of technological intervention	High
The decision to augment labour was fundamentally made by the healthcare providers	Blix-Lindstrom et al. 2004, Cipolletta & Sperotto 2012, Deepak et al. 2013,	Minor concerns: Most of the studies were of high quality,	Minor concerns: Although Kjaergaard et al. 2007 and Blix-	Minor concerns: Blix-Lindstrom et al. 2004 contributed with	Minor concerns: The contributing studies aims, and population	High

	DeSisto et al. 2016, Happel-Parkins & Azim 2016, Hatamleh et al. 2013, Kjaergaard et al. 2007, Koski et al. 2014, McCallum & Dos Reis 2008, Pimenta et al. 2014	Happel-Parkins & Azim 2016 met 8 quality criteria, McCallum & Dos Reis 2008 and Pimenta et al. 2014 met 4 only criteria	Lindstrom et al. 2004 provided some examples of women participating in the decision-making process regarding AOL, this finding was consistent across the studies	a lot more data, as it focused on women's participation in decision-making regarding AOL. But all studies provided rich data to this finding	were not well-aligned with the QES question apart from Blix-Lindstrom et al. 2004 and Kjaergaard et al. 2007, however, they all focused on women's views and experiences of childbirth, including AOL	
The cascade of interventions signified a loss autonomy over AOL and other childbirth interventions where women felt they could no longer choose but accept the interventions presented	Bielinski-Blattmann et al. 2016, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, Malacrida & Boulton 2014, McCourt 2014, McKenna & Symon 2014, Regan & McElroy 2013	No or minor concerns: Four contributing studies were of high quality, Happel-Parkins & Azim 2016 and McKenna & Symon 2014 met 8 quality criteria, and McCourt 2014 met only 6 criteria	No or very minor concerns: This finding was consistent across the studies	Minor concerns: Malacrida & Boulton 2014 provided more in-depth data to this finding compared to the other 6 studies. Five studies had qualitative designs and two were mixed methods	Minor concerns: None of the studies aims, and populations were well-aligned with the QES research question. However, they all focused on women's views and experiences of childbirth, including AOL	High
Women narrated either having their labour augmented without consent, feeling intimidated to comply and consent, or giving consent without	Blix-Lindstrom et al. 2004, Cipolletta & Balasso 2011, Cipolletta & Sperotto 2012, Collins et al. 2021, Davis 2019, Deepak	Minor concerns: Eight contributing studies were of high quality, though Happel-Parkins & Azim 2016 and	No or very minor concerns: All of the studies contributed to this finding consistently	No or very minor concerns: Blix-Lindstrom et al. 2004 contributed with	Minor concerns: The contributing studies aims, and population were not well-aligned with the QES question apart from Blix-	High

receiving enough information to give genuine informed consent	et al. 2013, DeSisto et al. 2016, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, Koski et al. 2014, McCallum & Dos Reis 2008, McCourt 2014, Niles et al. 2021, Pimenta et al. 2014	Cipolletta & Balasso 2011 met 8 quality criteria; Davis 2019, McCallum & Dos Reis 2008, Pimenta et al. 2014 met 4 or less criteria only		more in-depth data, as it focused on women's participation in the decision of AOL. The other authors approached this topic indirectly, but also provided sufficient and rich data to this finding. Most of the studies had qualitative designs, except McCallum & Dos Reis 2008, McCourt 2014 that were mixed methods and Niles et al. 2021 that provided data from a survey with open-ended questions	Lindstrom et al. 2004 and Kjaergaard et al. 2007. However, they all focused on women's views and experiences of childbirth, including AOL	
Analytical theme 2: Past and present shaping the future						
Some women thought that AOL was part of a	Blix-Lindstrom et al. 2004, Deepak et	Minor concerns:	Moderate concerns:	Minor concerns:	Minor concerns:	Moderate

normal childbirth and even expected to be augmented	al. 2013, Koski et al. 2014, McCallum & Dos Reis 2008	Three of the contributing studies were of high quality, though McCallum & Dos Reis 2008 met only 4 quality criteria	This finding was related to women's knowledge on AOL, which varied broadly across women. Consequently, there many contradictory cases arose	All studies contributed with relatively similar but small amounts of data to this finding. Only Koski et al. 2014 explored possible explanations. Three had a qualitative design and one was mixed methods	The contributing studies aims, and population were not well-aligned with the QES question. Only Blix-Lindstrom et al. 2004 focused specifically on women who underwent AOL. However, they all focused on women's views and experiences of childbirth, including AOL	
Some women believed that AOL would shorten time experiencing pain	Deepak et al. 2013, Koski et al. 2014, Raven et al. 2015, Turan et al. 2006	No or very minor concerns: All the contributing studies were of high quality	Minor concerns: This finding was consistent across the contributing studies	Moderate concerns: All studies contributed with relatively similar but small amounts of data to this finding. Three had a qualitative design and one was mixed methods	Minor concerns: None of the studies aims, and population were well-aligned with the QES research question. However, they all focused on women's views and experiences of childbirth, including AOL	Moderate
Women acquired knowledge about AOL from formal sources such as healthcare providers to informal sources like magazines or friends	Blix-Lindstrom et al. 2004, Happel-Parkins & Azim 2016, Raven et al. 2015, Regan & McElroy 2013	No or very minor concerns: Three of the contributing studies were of high quality, though Happel-	Minor concerns: The data were varied, but did not explore preferences or the availability of these sources of knowledge	Minor concerns: Studies contributed with varying amounts of data. All the studies had a qualitative design	Minor concerns: The contributing studies aims, and population were not well-aligned with the QES question. Only Blix-Lindstrom et al.	High

		Parkins & Azim 2016 met 8 quality criteria	(i.e., educational programmes)		2004 focused specifically on women who underwent AOL. However, they all focused on women's views and experiences of childbirth, including AOL	
Having previous knowledge about childbirth, and specifically about AOL, could enhance the communication between women and their healthcare providers	Blix-Lindstrom et al. 2004	No or very minor concerns: The contributing study was of high quality	Moderate concerns: Several contradictory cases were found	Moderate concerns: Although rich data was provided, only one study contributed to this finding	No or very minor concerns: The contributing study was well-aligned with the QES research question	Low
Having previous knowledge about childbirth, and specifically about AOL, could worsen the relationship between women and their healthcare providers for being seen as "too knowledgeable". Women felt that challenging the healthcare providers'	Cipolletta & Sperotto 2012, Davis 2019, Happel-Parkins & Azim 2016	Minor concerns: Cipolletta & Sperotto 2012 was of high quality, Happel-Parkins & Azim 2016 met 8 quality criteria, and Davis 2019 met 2 criteria only	No or very minor concerns: This finding was consistent across the studies	Moderate concerns: Data depth and quantity varied widely across studies. The three studies used a qualitative design	Moderate concerns: The contributing studies' aims, and population were not well-aligned with the QES question	Low

decision regarding the need of AOL could translate into negative consequences in their care						
Women with limited knowledge about childbirth, and specifically about AOL, appeared more likely to be augmented	Blix-Lindstrom et al. 2004, Cipolletta & Balasso 2011, DeSisto et al. 2016, Kjaergaard et al. 2007, Koski et al. 2014	No or very minor concerns: Four of the studies were of high quality, Cipolletta & Balasso 2011 met 8 quality criteria	No or very minor concerns: This finding was consistent across the contributing studies	Minor concerns: Data depth and quantity varied across studies, but overall, was rich. All the studies employed a qualitative design	Minor concerns: Although relevant to this finding, most of the contributing studies' aims, and population were not well aligned with the QES question. However, they all focused on women's views and experiences of childbirth, including AOL	High
Experiencing AOL was frequently recounted as an example of unmet childbirth expectations	Blix-Lindstrom et al. 2004, Collins et al. 2021, Davis 2019, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, McCourt 2014, McKenna & Symon 2014, Niles et al. 2021, Westergren et al. 2019	Minor concerns: Five studies were of high quality, Happel-Parkins & Azim 2016 and McKenna & Symon 2014 and McCourt 2014 met 8 and 6 quality criteria, respectively. Davis 2019 only 2 criteria	Minor concerns: Although some women met their childbirth expectations when undergoing AOL, this finding was fairly consistent across studies	No or very minor concerns: Data depth and quantity varied but, overall, rich data supported this finding. Most studies used a qualitative design, though McCourt 2014 was mixed methods and Niles et al. 2021	Minor concerns: Most of the contributing studies' aims, and population were not well aligned with the QES question. However, they all focused on women's views and experiences of childbirth, including AOL	High

				employed a survey design with open-ended questions.		
Women who experienced AOL reflected on different alternatives for future childbirths (i.e., home births, water births or elective caesarean births)	Kjaergaard et al. 2007, McKenna & Symon 2014, Westergren et al. 2019	Minor concerns: Two studies were of high quality, McKenna & Symon 2014 met 8 quality criteria	No or very minor concerns: The finding was consistent across studies	Minor concerns: Not an expansive amount of data. It may lack depth. All studies used a qualitative design	Minor concerns: Only Kjaergaard et al. 2007 matched the aims and population relevant to the QES. However, they all explored women's experiences of childbirth, including AOL	Moderate
Analytical theme 3: Cause and effect of AOL						
Women consistently associated AOL with increased pain	Bielinski-Blattmann et al. 2016, Blix-Lindstrom et al. 2004, Carlton et al. 2005, Cipolletta & Sperotto 2012, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, McCallum & Dos Reis 2008, McCourt 2014,	Minor concerns: Seven of the contributing studies were of high quality, Happel-Parkins & Azim 2016 and McKenna & Symon 2014 met 8 quality criteria, McCourt 2014 met 6, and McCallum & Dos Reis	No or very minor concerns: This finding was consistent across the studies	No or very minor concerns: Despite disparities in data quantity and depth, overall, data was rich. Most studies employed a qualitative design and 4 were mixed methods	Minor concerns: The contributing studies aims, and population were not well-aligned with the QES question apart from Blix-Lindstrom et al. 2004 and Kjaergaard et al. 2007. However, they all explored women's	High

	McKenna & Symon 2014, Pimenta et al. 2014, Turan et al. 2006, Westergren et al. 2019	2008 and Pimenta et al. 2014 met 4 criteria only			experiences of childbirth, including AOL	
For some women, it was unclear whether the experience of labour dystocia or AOL on itself was the cause of their negative childbirth experience	Cipolletta & Sperotto 2012, Hatamleh et al. 2013, Kjaergaard et al. 2007, McCourt 2014, Niles et al. 2021, Nystedt et al. 2006	Minor concerns: All contributing studies were of high quality except McCourt 2014 that met 6 quality criteria only	Minor concerns: This finding was consistent across the studies, although some contradictory cases arose	Minor concerns: Varying quantity and data depth contributed to this finding. Four studies used a qualitative design; one was mixed methods and one collected data from a survey with open-ended questions	Minor concerns: The contributing studies aims, and population were not well aligned with the QES question. Only Nystedt et al. 2006 explored AOL indirectly by focusing on women's experiences of labour dystocia. However, they all explored women's views and experiences of childbirth, including AOL	High
Some women clearly identified AOL as the cause of their negative childbirth experience	Bielinski-Blattmann et al. 2016, Blix-Lindstrom et al. 2004, Carlton et al. 2005, Happel-Parkins & Azim 2016, McCourt 2014, Pimenta et al. 2014,	Minor concerns: Four of the studies were of high quality, Happel-Parkins & Azim 2016 met 8 quality criteria, and McCourt 2014 and Pimenta et al. 2014	Minor concerns: This finding was consistent across the studies, although some contradictory cases arose	Minor concerns: Rich data supported this finding, although Blix-Lindstrom et al. 2004, Happel-Parkins & Azim 2016 and McCourt 2014 contributed with more	Minor concerns: The contributing studies aims, and population were not well aligned with the QES question apart from Blix-Lindstrom et al. 2004. However, they all	High

	Westergren et al. 2019	met 6 and 4 criteria, respectively		in-depth data. Five studies employed a qualitative design and 2 were mixed methods	explored women's views and experiences of childbirth, including AOL	
For most women, the pain caused by AOL led them to request an epidural. For others, having an epidural resulted in being augmented afterwards	Bielinski-Blattmann et al. 2016, Blix-Lindstrom et al. 2004, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, Malacrida & Boulton 2014, McCourt 2014	Minor concerns: Four of the studies were of high quality, Happel-Parkins & Azim 2016 met 8 quality criteria and McCourt 2014 met 6 criteria	No or very minor concerns: This finding was consistent across studies	No or very concerns: Although varying quantity and depth, rich data contributed to this finding. Four studies used a qualitative design and 2 were mixed methods	Minor concerns: Although relevant to this finding, most of the contributing studies' aims, and population were not well aligned with the QES question. However, they all explored women's views and experiences of childbirth, including AOL	High
When women underwent AOL with supportive healthcare providers, the overall childbirth experience was more positive	Blix-Lindstrom et al. 2004, Kjaergaard et al. 2007, McCourt 2014	Minor concerns: Two studies were of high quality, McCourt 2014 met 6 quality criteria	No or very minor concerns: This finding was consistent across studies	No or very minor concerns: Although only 3 studies contributed to this finding, the data supporting this finding was rich. Two had a qualitative design and one was mixed methods	Minor concerns: Two of the studies were well-aligned with the QES question, though McCourt 2014 focused on women's experiences of birth according to whether they were attended by a caseload midwife and whether they received a high or	High

					low level of technological intervention	
Undergoing AOL with non-supportive healthcare providers made women bring into question the need of AOL. Women's overall childbirth experience was also more negative	Blix-Lindstrom et al. 2004, Collins et al. 2021, Davis 2019, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007, Koski et al. 2014, Niles et al. 2021	Minor concerns: Most contributing studies were of high quality. Happel-Parkins & Azim 2016 met 8 quality criteria, and Davis 2019 met only 2 criteria	No or very minor concerns: This finding was consistent across studies	Minor concerns: Data supporting to this finding was rich but varied in depth. All studies used qualitative designs except Niles et al. 2021 that provided data from open-ended questions from a survey	Minor concerns: The contributing studies aims, and population were not well-aligned with the QES question apart from Blix-Lindstrom et al. 2004 and Kjaergaard et al. 2007. However, they all explored women's views and experiences of childbirth, including AOL	High
Fundamentally partners, but also mothers, perinatal support providers and doulas were other sources of support for women undergoing AOL	Blix-Lindstrom et al. 2004, Collins et al. 2021, Happel-Parkins & Azim 2016, Kjaergaard et al. 2007	No or very minor concerns: Three of the contributing studies were of high quality. Happel-Parkins & Azim 2016 met 8 quality criteria	No or very minor concerns: This finding was consistent across studies	Minor concerns: Relatively superficial data contributed to this finding. All the studies used a qualitative design	Minor concerns: Only Blix-Lindstrom et al. 2004 and Kjaergaard et al. 2007 aims and population were well aligned with the QES question. However, they all explored women's views and experiences of childbirth, including AOL	High
The companion's role was especially relevant in the absence of a	Happel-Parkins & Azim 2016,	No or very minor concerns:	No or very minor concerns:	Moderate concerns:	Minor concerns:	Moderate

supportive healthcare provider	Kjaergaard et al. 2007	Happel-Parkins & Azim 2016 met 8 quality criteria, Kjaergaard et al. 2007 met 10 criteria	This finding was consistent across the two studies	Two studies contributed to this finding with relatively superficial data. Both employed a qualitative design	Kjaergaard et al. 2007 study was well aligned with the QES question, but both studies included women's experiences of childbirth, including AOL	

4.5. Conclusions

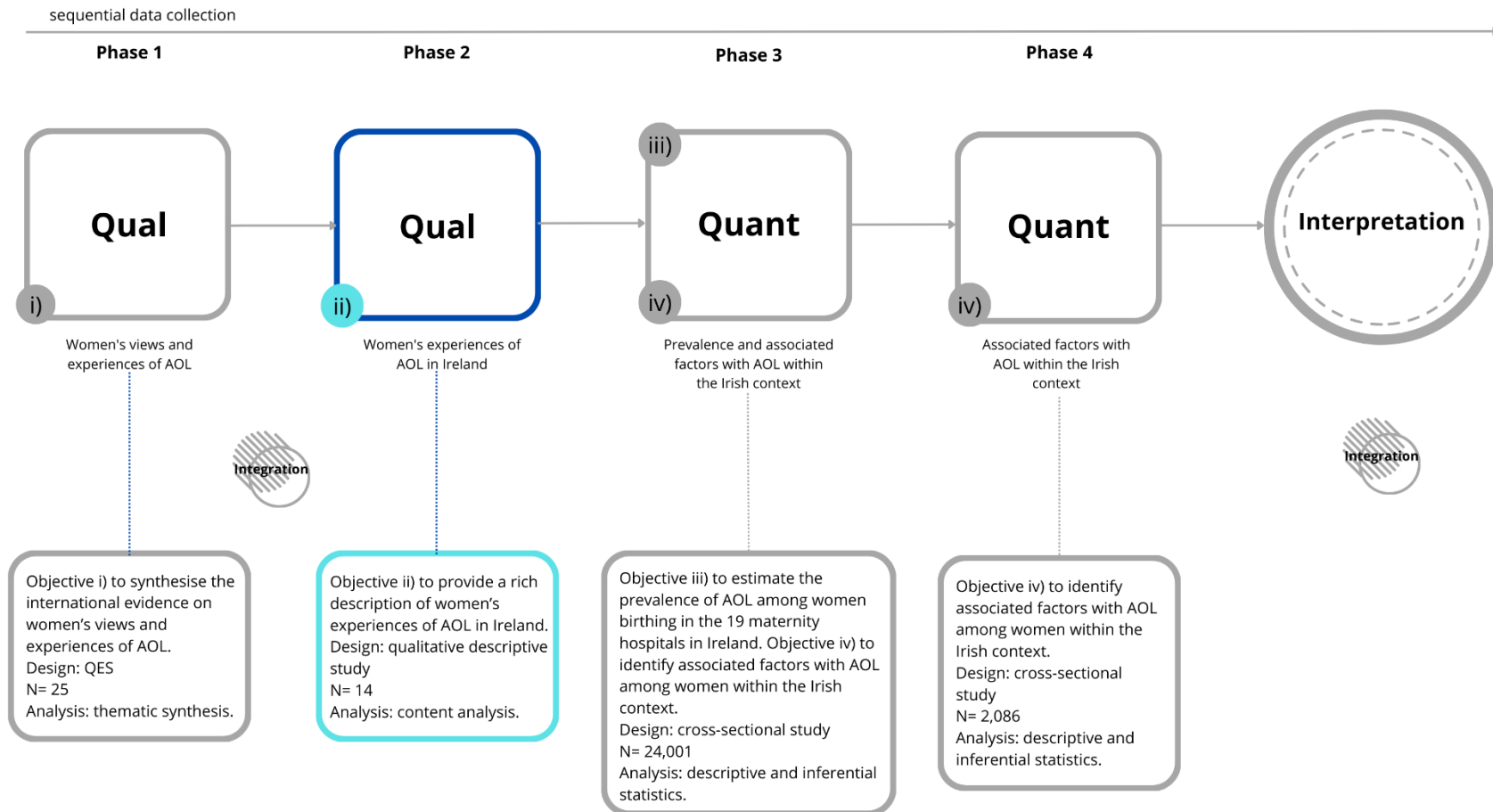
Phase 1 aimed to synthesise the international evidence on women's views and experiences of AOL – objective i). A QES on women's views and experiences of AOL was conducted. The SPIDER acronym was used to develop the search terms and determine the inclusion criteria. Six bibliographic databases and grey literature sources were searched in October 2021. Methodological quality of included studies was assessed using the EPPI Centre assessment tool. Data were synthesised thematically. The confidence of each review finding was assessed using the GRADE-CERQual. The QES included data from twenty-five studies conducted across fourteen different countries. Three principal analytical themes emerged: Feeling stuck, Past and present shaping the future, and Cause and effect of AOL. In the theme 'Feeling stuck' women narrated how much they valued and wanted to feel involved regarding AOL. However, the meaning of feeling involved varied according to their knowledge and trust towards their healthcare professionals. Concerning findings emerged in relation to informed consent where women described having their labour augmented without their consent, feeling intimidated to comply and acquiesce or giving consent without receiving enough information to give informed consent. In the theme 'Past and present shaping the future', knowledge appeared as a determinant factor in women's views and experiences of AOL. Women with limited knowledge of AOL and women from countries with underdeveloped maternal healthcare services (Brazil, Ghana, India) expressed a more favourable attitude towards having their labour augmented and seemed to accept AOL more easily. Some even thought that AOL was part of having a 'normal' birth. On the other hand, some women with knowledge of AOL were more able to communicate with their healthcare professionals. This knowledge prompted them to challenge the decision to undergo AOL, which could negatively impact their relationship with healthcare professionals, as they were often perceived as defiant or insubordinate. Experiencing an augmented labour made some women seek different alternatives for future childbirths such as home births, water births or elective caesarean sections. In the theme 'Cause and effect of AOL' women consistently described the augmented contractions in negative terms, highlighting the intense pain they experienced and many pointing to AOL as the cause of their negative birth experience. For most women, the pain caused by AOL led them to request epidural analgesia although for others, having epidural analgesia resulted in having their labour augmented afterwards. Regardless of how women felt about their experience of AOL, those who felt supported by their healthcare professionals throughout their birth experience had a more positive experience overall.

5. Chapter 5: Phase 2 - Women's experiences of augmentation of labour with oxytocin in Ireland: a qualitative descriptive study

5.1. Introduction

This chapter presents the aim, ethical considerations, methods and findings of Phase 2: a qualitative descriptive study on women's experiences of AOL in Ireland. The QES on women's views and experiences of AOL (Phase 1) revealed the need to further investigate women's experiences of AOL. Whilst data from twenty-five studies were included in the QES, there was a scarcity of qualitative studies investigating women's experiences of AOL. Most of the included studies focused on different aspects of women's birth experiences with only two focusing exclusively on women's experiences of AOL and with no studies conducted in Ireland. A qualitative descriptive study was deemed as the most appropriate approach to continue to investigate women's experiences of AOL due to its straightforwardness in describing a phenomenon. Qualitative descriptive studies are particularly useful for informing practice and policy, and ensuring that the complexities of the phenomenon under study are accurately portrayed and contextually grounded (Doyle et al., 2020). As outlined in the methodology of the present thesis (Chapter 3), this qualitative study was underpinned by PPI. Three online meetings were held with the PPI collaboration group during the conduct of Phase 3. At the outset, the PPI collaboration group co-developed the interview guide, supported the recruitment of participants and gave feedback on the emerging findings. After this thesis submission, the PPI collaboration group will be invited to a third meeting to co-design the dissemination strategy. An explanation of how PPI was threaded throughout the study is included in this chapter. [Figure 5](#) shows where this study fits within the thesis as a whole.

Figure 5: Diagram of the study design. Chapter focusing on Phase 2



5.2. Objective

To provide a rich description of women's experiences of AOL in Ireland – objective ii).

5.3. Ethical considerations

Following Research Ethics Committee (REC) approval from the Faculty of Health Sciences Research Committee, Trinity College Dublin in March 2023 (Appendix 3), the study information was shared with women through the social media of associations and entities based in Ireland: the School of Nursing and Midwifery, Trinity College Dublin; Gentlebirth; and Rollercoaster. Despite efforts to recruit women from different backgrounds and ethnic groups through associations such as the National Women's Council of Ireland, Association for Improvement of Maternity Services (AIMS) – Ireland, Midwives Association of Ireland, Bainne Beatha and Amal Women's Association, no women were recruited through any of these sources. Women who were interested in participating were invited to contact the author of this thesis by email or phone and were then sent the documentation relating to the study (Appendix 4). The study documentation was designed in compliance with the General Data Protection Regulation (EU) 2016/679 (GDPR) and the Data Protection Act 2018 (Section 36(2)) Health Research Regulations. Specifically, it ensured that written consent was freely given, specific, informed, unambiguous and recorded by a clear affirmative action. If women wished to proceed in participating, they returned the completed consent form to the author, and a date and time for the interview was scheduled. As childbirth is considered a sensitive topic, women were informed about the potential risk of becoming upset during the interview and their right to stop the interview at any point without providing an explanation.

5.4. Methods

5.4.1. Design

A qualitative descriptive study design was employed. Findings from qualitative descriptive studies offer a well-elaborated synthesis of an experience by staying close to participants' narratives and using the language with which the experience took place (Sandelowski,

2000b). As a research design, the aim is to analyse data from those who have experienced the phenomenon of interest (Bradshaw et al., 2017) i.e. women who have experienced AOL for this study. As opposed to phenomenology or grounded theory, qualitative descriptive studies entail a lower level of interpretation which is *'likely to result in easier consensus among researchers'* (Sandelowski, 2000b, p.2). However, it is important not to see qualitative descriptive studies as less robust as *'there is nothing easy about getting the facts, and the meaning participants give to those facts, right and then conveying them in a coherent and useful manner'* (Sandelowski, 2000b, p.3). Their relative straightforwardness is the reason why they are gaining popularity among the healthcare sciences, including midwifery and nursing, as they are particularly useful in informing health policy and practice (Doyle et al., 2020).

The present study consisted of one-to-one semi-structured interviews with fourteen women who had their labour augmented in Ireland within the last five years.

5.4.2. Recruitment and Sampling

Recruitment commenced in April 2023 and finished in January 2024. A combination of recruitment methods to reach eligible participants were employed. Several associations and entities based in Ireland were contacted and asked if they would be willing to disseminate the recruitment poster through their social media (Appendix 5). Recruitment was also supported by women from the PPI collaboration group and by some of the participants themselves who forwarded the study poster to friends and relatives. Therefore, although the original sampling strategy was planned to select participants based on specific inclusion and exclusion criteria, it evolved to using a combination of purposive and snowball sampling (Rapley, 2014).

Women aged 18 years and older, of any parity and cultural background who had undergone AOL within the last five years in an Irish maternity hospital were invited to participate. [Table 10](#) provides details of the inclusion and exclusion criteria.

Table 10: Inclusion and exclusion criteria for participation in Phase 2

Inclusion criteria	Exclusion criteria
Personal history of AOL	Oxytocin use in the context of an induced labour (i.e. no spontaneous onset of

Birtherd a live baby in Ireland from April 2018 until April 2023	labour), including prelabour rupture of the membranes with no uterine contractions when the oxytocin infusion was started.
≥18 years old	Membrane sweeping was not considered an induction of labour method.
Able to communicate sufficiently in English or Spanish languages to give consent and take part in one-to-one interviews	AOL in the context of a woman's baby being stillbirth
Willingness to participate in the study	

Women interested in participating contacted the author of this thesis by email or phone. After confirming that they met the inclusion criteria, women were sent the study documentation by post or email depending on their preference. If they wished to proceed, a date and time for the interview was then scheduled.

In qualitative research, the adequacy of the sample size depends on the nature of the research itself and its objectives (Sandelowski, 1995). For planning purposes, a theoretical sample size of 15-20 women was estimated. This *a priori* number was based on a systematic review of qualitative studies in which most studies with homogenous populations reported reaching data saturation within a range of nine to seventeen interviews (Hennink & Kaiser, 2022). Data saturation as a criterion to stopping recruitment or analysis is defined as '*informational redundancy*' (Sandelowski, 2008, p.875) or the stage at which '*the researcher begins to hear the same comments again and again (...)*' (Grady, 1998, p.26). For the purposes of this study, data saturation was defined as the point at which no further categories emerged from the data and the findings provided some degree of generalisability (Boddy, 2016). Accordingly, sampling was constantly reevaluated throughout data collection and analysis. Notwithstanding that data saturation has been subject of intense debate among scholars, it is an universally accepted methodological principle for determining sample size in qualitative research (Saunders et al., 2018; Sebele-Mpofu, 2020), and it was successfully adopted in the present study.

5.4.3. Interviews

The PPI collaboration group co-developed the interview guide (Appendix 6) during two online meetings held in March 2023. During these meetings, I shared some of the relevant

findings from the QES (Phase 1). This triggered conversations about women's own birth experiences and questions that they thought it would be worth including in the interview guide. The document was employed as a schematic guide to cover some core topics and to help to (re-)focus the interview if needed. Successful interviewing depends on several factors such as the topic being discussed, timing, location and researcher's skills (Dempsey et al., 2016). Creating an intimate and confidential environment which would enable women to feel safe and comfortable to talk was the priority. Childbirth is a sensitive topic that can evoke potentially distressing emotions in women while narrating their stories. Traumatic childbirth is known to be relatively prevalent in Ireland; almost one in five women may experience their childbirth as traumatic (Nagle et al., 2022). Individual semi-structured interviews were therefore selected as the most appropriate method for data collection. Interviews could be either in person (in an office in Trinity College Dublin) or online (in Microsoft Teams® or Zoom®) according to each woman's preference. Giving both options was key to ensuring inclusion of women from geographically diverse locations across the country.

In preparation for the interviews, I attended a masterclass on qualitative interviewing by Dr Jean Morrissey in the School of Nursing and Midwifery, Trinity College Dublin and I also got advice from both of my supervisors who have extensive experience in qualitative research in the field of women's health. The online meetings with the PPI collaboration group were also key to building up my confidence as an interviewer. Above all, my professional background as a midwife (both in the labour ward and in the community) supported me to be open and comfortable when talking with women about difficult birth experiences and delving into their experiences of AOL, as well as adjusting the pace of the interviews when necessary.

5.4.4. Choosing the method for data analysis

At the beginning of this phase, I chose to use reflexive thematic analysis by Braun and Clarke (2021c). Reflexive thematic analysis is a method for analysing data that includes a six-phase process in which the researcher's subjectivity is valued as a core component of the analysis (Braun & Clarke, 2021a). It is rooted in the critical reflection and questioning of the researcher role, inherently subjective and continuously interactive while engaged with the data. Its flexibility has been subject of debate and criticism from two main antagonist viewpoints; for lacking rigour and transparency, and for falling into '*proceduralism and*

methodolatry' (Cassell et al., 2018, p.231). In other words, to be intended to be used as a recipe book (Braun & Clarke, 2021b).

I attended several webinars on thematic analysis and read Braun and Clarke's articles and their most recent book '*Thematic analysis: a practical guide*' (Braun & Clarke, 2021c). The more I read, the more I questioned whether this method suited my data and my profile as a mixed method researcher in midwifery. Acknowledging the intrinsic subjectivity of qualitative research, this research study aimed to understand women's experiences of having their labour augmented as precisely and accurately as possible. At the time, I had already decided that I would use women's words as much as I could in order to ensure that I stayed close to what they wanted to tell, and to support me in remaining as objective as possible. Braun and Clarke (2023) have a very critical view on this in that they refuse to accept the value or the concept of objectivity within qualitative research. Moreover, their method was defined as a creative and artful way of analysing data, not a scientific and systematic one. This did not sit well with the philosophical and epistemological underpinnings of this thesis. There were facts and objective sequences of events that women described in their experiences of AOL. In alignment with pragmatism and as discussed in Chapter 3, there was an objective reality independent of the meaning that women attributed to those experiences.

On the other hand, Braun and Clarke (2021c) dismissed the idea of the data being potentially misinterpreted and argued that any and every interpretation was subjective in the first place. Although I could understand the basis of this argument, as a Spanish-speaking researcher conducting a qualitative study in a different language and culture, it was obvious to me that there was potential for misinterpretations. Occasionally, I asked to my supervisors and Irish friends about the meaning or connotation of certain words and expressions that women employed during the PPI meetings with the collaboration group and the interviews. For example, I received an email from one of the women after the first PPI meeting outlining had she had forgotten to tell me one thing that was perhaps relevant for my research. In the west coast of Ireland, some midwives and women used the term 'jungle juice' to refer to sOT. Immediately, this word acquired a negative connotation for me: 'jungle' sounded wild and messy, and therefore had to be something negative. Without sharing my own thoughts on this, I asked one of my Irish friends to tell me what 'jungle juice' meant to her, both in general and specifically applied to an infusion used in birth. She shared a completely different meaning which was more related to a guilt-free mixture of something

even with a playful connotation. For me, misinterpretations were therefore real and something that I had to be cautious about.

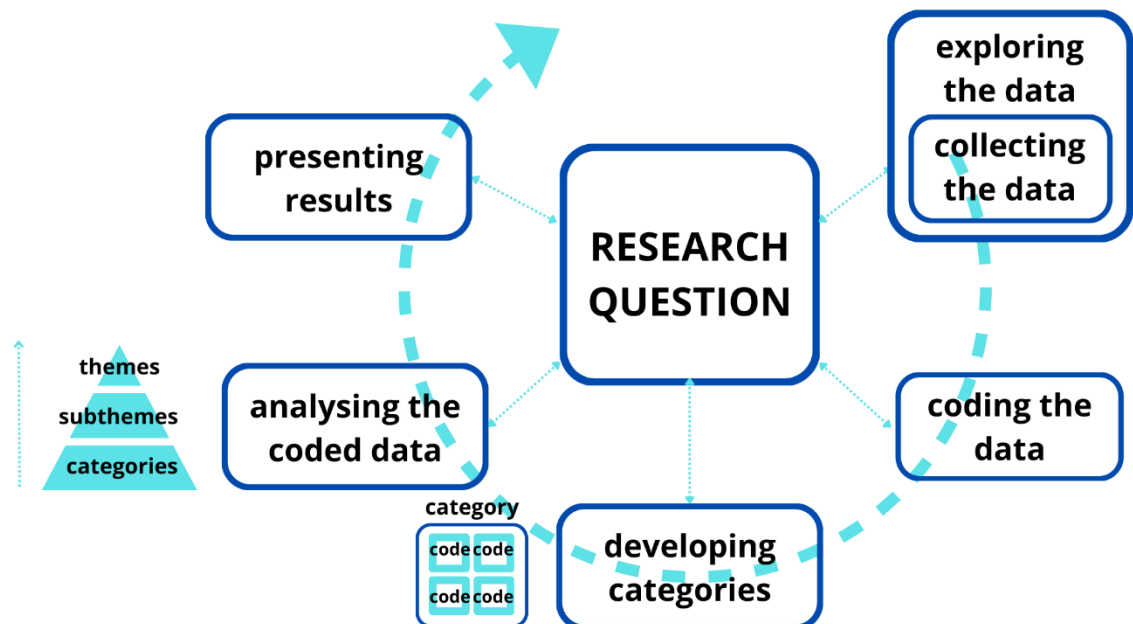
Another issue was that Braun and Clarke (2021c) had a rigid view on the use of language to demonstrate that their method was being employed. For example, you had to use 'data generation' instead of 'data collection', 'developing/producing' rather than 'finding', 'creating' instead of 'searching' and so on. However, all these language nuances could be applied to any other type of qualitative research. These were the only means of representing ideas and actions: words, metaphors, or expressions to enrich the analysis. Nuances that did not add any value, in my view, to the interpretation of the data. I found myself having to constantly revisit terms that I was using to be 'loyal' to their method. Thematic analysis as per Braun and Clarke (2021c) started feeling too prescriptive and was distracting me from my main objective which was to provide a rich description of women's experiences of AOL in Ireland. Similarly, their method was also restrictive in the sense that only data that represented an idea in the same direction (they called it 'constellations') could be clustered together in a sub-theme. This disregarded the inclusion of deviant or contrary data in the same sub-theme. However, there was some data that was not 'big enough' to become a sub-/theme by itself but was nonetheless reflective of women's experiences of AOL. I wanted to be able to report on those data and to present them with the main pattern that was emerging. Presenting all themes and sub-themes (including contrary opinions and experiences), rather than those that fitted with unidirectional patterns of meaning, seemed the most appropriate way to approach this.

Finally, Braun and Clarke (2023) almost exclusively evaluated trustworthiness from reflexivity and thick description. My understanding about the creation of knowledge could not accept that trustworthiness could be achieved only by using these two strategies. Other strategies such as peer debriefing or intercoder agreement were seen as 'not qualitative enough' but I could certainly see the benefit of applying both of those to my research while still trying to balance my data analysis. The International Summer School of the School of Nursing and Midwifery, Trinity College Dublin precipitated my interest in learning more on this issue. A session on trustworthiness got me to reading Lincoln and Guba (1985a; 1986), and then to ultimately looking for another qualitative method to analyse my data that resonated more with both my data and my profile as a mixed methods researcher.

5.4.5. Data analysis

A conventional approach to qualitative content analysis was employed. Conventional qualitative content analysis is particularly useful in research studies in which the literature on the phenomenon of interest is limited (Hsieh & Shannon, 2005). As highlighted in the QES on women's views and experiences of AOL (Phase 1) (Alòs-Pereñíguez et al., 2023b), there was a scarcity of qualitative studies investigating women's experiences of AOL and most of the studies of the QES focused on women's birth experiences (in general) or on the experiences of labour dystocia, rather than on AOL itself. Moreover, qualitative content analysis fitted perfectly with the philosophical and epistemological underpinnings of this thesis: there were facts (e.g., AOL) that occurred independently of the meaning women attributed to those (e.g., positive/negative), and with the descriptive nature of the qualitative study on women's experiences of AOL. Accordingly, the strategies used to ensure trustworthiness (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004; Lindgren et al., 2020) resonated with my understanding of bringing women's voices to the surface and describing their experiences of AOL by staying close to their narratives. All of the above justified the adoption of a conventional approach to qualitative content analysis which can be represented as follows:

Figure 6: Conventional approach to qualitative content analysis. Adapted from Udo & Stefan (2023, p.81)



1. Exploring and collecting the data: Interviewing women allowed me to immerse myself in the study from the very beginning and to explore ideas and insights that I was developing

while collecting data. Immediately after each interview, I took time to write down my first impressions while still in the *heat of the moment* ('en caliente'). The following day, I titled each interview with something that remained in my mind from that woman's experience of AOL with a cool head ('en frío'). Within the messiness of conducting qualitative research, this forced me to organise and elaborate on my thoughts. This is an extract of one of my post-interview reflections ('en frío'):

Reflexive journal: 16/5/23 – Post-interview 3

Grieving

I'm so glad we've done this interview in person. This woman had had her baby only a few months ago. She is still healing physically, and emotionally. Kind and transparent. Upset about what could've been and wasn't her birth experience. Grief. This word has quickly come to my mind while listening to her story. This woman is grieving. Her eyes filled with tears when she was getting close to her baby's birth... and I couldn't help but to get emotional too. It was nice to be there, in person.

I've noted that she is the third participant that uses sentences like 'not being allowed to', 'they made me'...P01 pointed this out and reflected on it. I'm starting to be particularly interested in the language, the wording women use when recalling their birth experiences. She has also said that she didn't expect to be 'so compliant'. Why do women comply? Fear, tiredness...mostly fear in her case. She has finished the interview with a very powerful sentence: Next time, it is either going to be a homebirth or an elective caesarean section.

How (much) can AOL influence a subsequent pregnancy?

Some of the interviews were remarkably challenging and I soon became aware that this was partly because I was facing a cultural barrier. Some women did not want to sound as if they were 'giving out' about healthcare professionals. While listening back to the interviews, I wrote notes about how I could use different words and adapt my language to a 'less direct' style more in tune with the Irish culture.

Interviews were uploaded on Sonix® for transcription and checked for accuracy twice against the audio recordings. To preserve anonymity, each participant's name was replaced with a

number (e.g. 'P03'). Partners', babies' and hospitals' names were also replaced. Transcripts were then uploaded into NVivo 12 and the original recordings were deleted. Immersion in the study continued with a reading and re-reading the transcripts in soft copies, and continued throughout until the end of the study.

2. Coding the data: Coding is an evolving and systematic process in which the researcher engages with data in a rigorous way by labelling the data according to the research objectives. Coding involves condensing the data while keeping the meaning of it (Lindgren et al., 2020). A more manifest and inductively-oriented approach of coding was adopted (Udo & Stefan, 2023). Staying close to women's narratives kept me focused on their language which was consistent with qualitative content analysis. Having conducted the QES on women's views and experiences of AOL (Phase 1) (Alòs-Pereñíguez et al., 2023b) inevitably influenced my coding. I read some sentences and immediately felt a sense of *déjà vu*. The words, or the 'wrapping', were different but the meaning or the essence was the same. Far from being a hindrance, I embraced this as a natural matter of course. In codes that resembled my previous work I questioned myself: does this label or code capture the same meaning? Is there a nuance that deserves to be highlighted with a new label code?

My background in midwifery and my expertise in AOL strengthened the coding of the data in unexpected ways. For example, I was able to appreciate particular features in women's narratives that flagged fetal malpositions. This had not been identified in my previous work (Phase 1) and was key in determining areas of further research and potential improvement for midwifery practice. On the other hand, my midwifery background allowed me to fully understand women's birth stories, the rationale for having their labour augmented and even how their labours were augmented (e.g. one woman recounted the dosages that she had seen on the screen and the timings at which the midwife was turning the oxytocin infusion up), as well as to code accordingly.

Three interviews were independently coded by my supervisors and I. Crosschecking the coding between two experienced qualitative descriptive researchers (Daly et al., 2022a; O'Malley et al., 2022; Panda, Daly, et al., 2018; Panda et al., 2021) added rigour to the research process. After several discussions within the research team and verifying agreement in the coding approach, I continued to code the remaining interviews and discussed the data coding during supervision meetings. My supervisors advised me to pace

the coding of the data and to, not to jump to conclusions too quickly, while writing down preliminary thoughts and impressions.

In relation to the unit of analysis, a decision was initially made to code specifically what was relevant to the research objectives. That meant not coding what women said about their experiences of early labour at home and/or within the hospital. Nonetheless, as data analysis advanced, some women were linking their experience of having their labour augmented to, an early admission to hospital, for example:

I wish I didn't... This is silly, but I wish I'd been let go home before I was brought to the antenatal ward. Because I feel like if I had been allowed to go home and my labour had started at home. I don't know. It probably could have ended the same way, but that's kind of where I feel like... Umm it all started to go wrong when I was admitted to the antenatal ward and I was kind of told I couldn't go home when I was in... After my waters broke. And I wish I could have gone home and just at least gotten some rest. Maybe things would have gone differently (P03).

Likewise, several women talked about their early days of motherhood. Although this data seemed to deviate from the research objective, some women were clearly connecting their experience of AOL with having challenges during the early days of motherhood and there was supporting literature in the field (Tenne et al., 2023):

But I also feel high likelihood was that some of it was also contributed to by the amount of hormones that were put into my system that we know leave women at risk of anxiety and depression. And I had never experienced either of those things in my life before. I never want to experience either of them again (P04).

Overall, it became increasingly difficult to discern what was data, and what to code. Following Lindgren et al.'s advice (Lindgren et al., 2020) and after discussing this issue in one of the Research Support and Educational Days in the School of Nursing and Midwifery, a decision was made to code the interviews entirely. At a later stage, only those codes that did not fit in any category were excluded from further analysis if they did not unveil any relevant information to the research aim.

As data analysis progressed, codes were merged, separated, and relabelled. For example, 'one option' and 'no choice', in essence, represented the same idea and were merged into

one label code 'the only option'. For practical reasons, several pieces of data were coded with the prefix 'AOL-', facilitating the identification of those narratives specifically focused on AOL (e.g. 'AOL – should be presented as an option').

3. Developing categories: This process consists of organising and clustering the data in categories that share commonality. It is a core element of qualitative content analysis. Categories allow an integral understanding of the data according to the research aim and they are characterised by a low level of interpretation (Graneheim & Lundman, 2004). The tentative categories were discussed and refined in supervision meetings. Consensus was reached on how to organise the codes into the categories. At an early stage during these meetings, inferential leaps which are categories made prematurely during the data analysis (Vears & Gillam, 2022), were addressed. For example, the categories 'pain' and 'loss of control' were separated and brought down to a lower level of abstraction. Likewise, the category 'another pregnancy or birth' was deconstructed and became several different categories which enabled a more detailed description of how women's experiences of AOL had influenced subsequent pregnancies or births (e.g. 'another birth - I said no to everything'). At this stage, codes that did not fall into any of the categories were considered alongside the research aim and objectives. I asked myself: does this code inform or contribute to capturing women's experiences of AOL? If not, these were eliminated from further analysis.

4. Analysing the coded data: Once the data were clustered into categories, I merged and read all of the data associated with each category to get a sense of the meaning. This allowed me to further elaborate on my insights and to re-consider whether some codes truly belonged to a category or had to be relocated. I kept notes of the questions and ideas that I had throughout this process and discussed these with my supervisors going back to the raw data. These back-and-forth steps were key during the interpretation process. At this stage, categories were further converted into sub-themes and later into themes. Sub-themes and themes were categories with a higher level of abstraction and interpretation (Graneheim & Lundman, 2004; Lindgren et al., 2020) in which the underlying meaning of women's experiences of AOL truly emerged from the data. This process of abstraction and interpretation involved taking into consideration the idiosyncrasy of giving birth in an Irish maternity hospital, women's personalities, the person who they were talking to (a female Spanish midwife conducting research on AOL) and my positionality within the data. While noting the nuances of women's experiences of AOL, I agreed with my supervisors to move

away from individual stories and tried to get a broader view of the raw data that encapsulated the essence of that sub-theme. In brief, analysing the coded data entailed moving from pure description and fragmentation to interpretation and wholeness.

5. Presenting results: Women's experiences of AOL in Ireland are presented through a combination of narrative descriptions and graphics. For ease of reading, and as the real interpretation and abstraction of the data occurred within the development of sub-themes and themes, the findings are presented with mention to these two only. The reader is referred to Appendix 7, where an NVivo example of the hierarchy between codes, sub-themes and themes can be found. Acknowledging the particularities of each individual woman's experience of AOL, the themes and sub-themes were labelled with the dominant pattern that arose from the data. Discrepant data that contrasted with the dominant pattern are also presented in the corresponding section. Direct quotes from women's narratives are intertwined in the text to support the interpretation of the findings. Additional quotes supporting each theme and sub-theme representing women's experiences of AOL may be found in Appendix 8.

5.4.6. Trustworthiness or Rigour

In this qualitative descriptive study on women's experiences of AOL, trustworthiness or rigour was ensured according to Lincoln and Guba's criteria (1985b; 1986). The concept of trustworthiness refers to methodological robustness and adequacy of the research process in qualitative studies. It is how the researcher persuades the reader that the findings of a qualitative study '*are worth paying attention to, worth taking account of*' (Lincoln, 1985a, p.290). Hereunder, each of the criteria is defined and applied to the present study:

- **Credibility:** level of representation of the participants' narrations and meanings. It refers to how much the participants recognise the findings as true or compatible in their context (Lincoln, 1985a). Although study participants '*may have very different views concerning what a fair account is*' (Sandelowski, 1993, p.5), member validation has typically been considered one the most appropriate strategies to demonstrate credibility. I used member validation with both the women who were interviewed and with the PPI collaboration group. Firstly, I shared some of the emerging findings with the PPI collaboration group in November 2023 while I was still collecting data. I asked them if the findings represented the reality of women who undergo AOL in Ireland and if the experiences resonated with their own. While acknowledging the

individuality of each woman's birth experience, the PPI collaboration group expressed a sense of ownership towards those findings as they recognised their own birth experiences or that of friends or family members, in the findings. In May 2024 when the data analysis was finished, I shared the findings with the fourteen women who had participated in the study. For each sub-theme, I wrote a summary with three supporting quotes and asked them: do you recognise your views in the above descriptions? Do you recognise the views of others that you may have heard of even if you don't hold those views, or don't agree with them? Each of these two questions had a scale in which they were asked to tick from 'not true at all' to 'yes, very true' and space for open-ended comments was given. Three women got back to me and agreed with the findings: one responded to all the questions for each sub-theme, the other two sent me informal feedback, validating the findings of the study. Moreover, peer debriefing, the process of discussing the analysis of the data out loud with PhD peers and in supervision meetings contributed to keeping me aware of my positionality and to clearing the feelings that could '*be clouding good judgment or preventing emergence of sensible next steps*' (Lincoln, 1985a, p.308).

- Dependability: consistency and accuracy of the data analysis. It is attainable through credibility (Lincoln, 1985a). A detailed explanation of all the decisions made throughout the research study is provided, from the design stage until dissemination of the findings, facilitating auditability. Tables and figures which strengthen dependability in content analysis (Elo et al., 2014), are also presented. Other strategies such as prolonged engagement with the data were also employed (this descriptive qualitative study started in April 2023 with the co-design of the interview guide with the PPI collaboration group and was finished in July 2024, when it was written up as a thesis chapter).
- Transferability: relevancy of the findings to other contexts (Lincoln, 1985a). The generalisation of the findings to other settings is of great importance for any research conducted in the healthcare field (Holloway & Wheeler, 2002). Therefore, sections 2.9. and 2.10. offer a comprehensive contextualisation of the study within the Irish maternity system and on the use of sOT in Ireland, respectively. These may facilitate the extrapolation of the findings of women's experiences of AOL to similar contexts or participants, especially but not limited to European countries.

- Confirmability: objectivity within the subjectivity of qualitative data analysis (Lincoln, 1985a). According to Morse (2015), there are three main sources of bias that can threaten confirmability in qualitative research:
 - The ‘pink elephant bias’ or confirmation bias happens when the researcher tends to interpret the data supporting a preconceived view of the phenomenon under study (Morse & Mitcham, 2002).
 - The bias linked to participants refers to the potential bias of self-selection. The included participants should not include the views of those extreme cases only, but neither represent the ‘average’ situation where the focus of the study gets blurred (Morse, 2015).
 - The bias linked to the research design is inherent to the phenomenon under study and the data collection methods, e.g., the questions that are asked during the interviews (Morse, 2015).

To overcome these biases, several strategies were put in place *a priori*. Firstly, the interview guide was co-developed with the PPI collaboration group. Secondly, excerpts from the raw data to illustrate and support interpretations are presented throughout the findings section and in Appendix 8. Thirdly, three interviews were independently coded by my supervisors and I. The purpose of this was to gain a richer understanding of the data, to see ‘what each other saw’ and trigger conversations around the data. Extensive discussions and refinement of the data analysis with my supervisors continued throughout. Reflecting out loud both on the emerging categories and my own written notes allowed me to constructively question and balance the data analysis. Fourthly, section 5.4.7.1. provides a reflexivity statement situating my positionality openly to the reader. Finally, the Consolidated Criteria for Reporting Qualitative Research (COREQ) which is a formal guideline to improve the quality of reporting qualitative studies (Tong et al., 2007), was employed .

In summary, this descriptive qualitative study used peer debriefing, thick description, audit trail, intercoder agreement, reflexivity and a formal reporting guideline for qualitative studies as key strategies in demonstrating trustworthiness (Holloway & Galvin, 2017; Holloway & Wheeler, 2002). This was to ensure a solid representation of the phenomenon of study: women’s experiences of AOL in Ireland.

5.4.7. Reflexivity

Reflexivity is an integral component of conducting all qualitative research. In some cases, it has become standard practice to include a section in the manuscript with the subheading 'reflexivity' or 'positionality' where the author provides a brief paragraph about his/her social identities and philosophical stance before presenting the findings. Sections like these are helpful and serve to provide the reader with context into how the research was conducted. Reflexivity is about more than just one's positionality; it is about the role of the researcher as an active agent in the production of knowledge from data collection to writing up (Holloway & Galvin, 2017; Holloway & Wheeler, 2002).

5.4.7.1. Reflexivity statement – the researcher

My starting point for reflecting on this study begins with my professional background. I am a midwife. For as long as I can remember, this is who I wanted to become. My experience as a midwife who supported women undergoing AOL meant that this topic was a very familiar one. However, my insider role was and still is from the other side of the fence as I have no first-hand experience with AOL or childbirth. My professional experience enabled me to focus on the research objective of providing a rich description of women's experiences of AOL without having to spend too much time in deciphering clinical scenarios that women narrated (although this was not always the case). On the other hand, as a Spanish female researcher living in Ireland, the immersion in a different culture strengthened my outsider role and kept me in a quiet alert state⁶. I cannot think of a better metaphor to explain this. Conducting research mostly in English helped to keep in this naïve and curious position throughout. Terminology, jargon, hospital routines and interventions mentioned in the study were well-known to me but acquired a different meaning now in a new context and from a different role. After conducting the first six interviews, I started working in the labour ward of one of the Dublin maternity hospitals. The experience was mind-blowing. With different 'actors/actresses' and nuances, I saw women's birth stories through my own eyes: the 'drip', the clock ticking against women, the partograph. I also understood the rationale behind some of the healthcare professionals' behaviours that women narrated in their birth stories: the 'busy stuff' and the paperwork that kept midwives' focus away from women.

Some may argue that this experience may have shaped the research towards a less 'sterile' description of women's experiences of AOL in Ireland. I did too. Although the experience

⁶ State in which babies start to get used to their environment immediately after birth. If kept skin-to-skin, they focus on seeing and hearing their mother, in a very calm manner.

was enriching, I did not want to compromise the neutrality of my qualitative research with my own experiences in the hospital. Those were and had to be women's experiences of AOL. At the time, it was crucial for me to reflect on my work experience and my immersion in the Irish system as a midwife educated in Spain. Writing about it kept me in a balanced outsider-insider position:

Reflexive journal: 24/8/23 – 4 weeks since I started working in xxxx [hospital].

Work has added an extra layer of stress on top of the PhD but it's also motivating me to keep on going. I've finally understood what some women meant in their stories. The 'busy stuff' that women kept talking about in their stories when talking about midwives in the labour ward... I kept wondering, what were they doing? Now I understand...Midwives are buried in paperwork here. Hand-writing notes, deciphering other peoples' notes... I did not expect to find this in Ireland. All this work keeps us distracted from the important part, the midwifery. And this is what some women were trying to tell me.

Even though I don't want to 'contaminate' my analysis, I feel that I've already benefit from this experience. It's weird, but I feel my research coming to life in front of me. I'm shocked to recall so much from women's birth stories at work.

5.5. Findings

A total of forty-four women expressed interest in taking part in the study. Of those, thirty were excluded for the following reasons: twenty-one had received sOT in the context of an induction of labour, six did not answer the email to confirm participation, two had given birth over five years ago and one was unsure about the medication that she had been given in the 'drip'.

Finally, a total of fourteen women participated in this descriptive qualitative study which involved sixteen birth experiences of AOL. Five interviews were conducted face-to-face and nine online. The length of the interviews ranged between 45 minutes and 1 hour 25 minutes, with an average duration of one hour. All of them were conducted in English apart from one which was conducted in Spanish.

All women had third level education, and all were Irish, except one who was originally from South America. All women were married and were supported by their husbands throughout labour from admission to the labour ward. Most women had their labour accelerated in their first birth experience. Women gave birth between August 2018 and February 2023 (i.e. the baby's age at the time of the interview varied from three months old to four and a half years old), with five women giving birth while COVID-19 restrictions were in place in Irish maternity services. In relation to the care model, ten chose public and four chose private care. Out of the fourteen women who participated, seven had an instrument-assisted birth, three had a caesarean section (one of them with a prior trial of instrument) and four had a spontaneous vaginal birth. [Table 11](#) presents the characteristics of the women who took part in the study.

Table 11: Characteristics of the women included

Woman's identifier	Occupation	Number of children	Birth in which woman underwent AOL	Care model	COVID restrictions	Mode of birth
P01	Lecturer	2	1 st	Public	No	vacuum-assisted
P02	School teacher	3	3 rd	Public	Yes	spontaneous vaginal
P03	Accountant	1	1 st	Private	No	caesarean section (with previous vacuum trial)
P04	Psychologist	3	2 nd	Public	Yes	spontaneous vaginal
P05	Sales manager	2	1 st	Public	No	vacuum-assisted
P06	Civil servant	3	2 nd	Public	No	spontaneous vaginal
P07	Teacher	1 (pregnant of her 2 nd at the time of the interview)	1 st	Public	No	vacuum-assisted
P08	Quality manager	1	1 st	Public	Yes	caesarean section

P09	Doctor	4	1 st , 2 nd , and 3 rd	Private	No	spontaneous vaginal
P10	Lecturer	1	1 st	Public	No	forceps-assisted
P11	Pharmacist	2	1 st	Public	Yes	forceps-assisted
P12	School teacher	2	1 st	Private	Yes	forceps-assisted
P13	Housewife	2	1 st	Public	No	caesarean section
P14	Human resources manager	2	2 nd	Private	No	vacuum-assisted

Data saturation was reached at interview twelve. As previously defined, this was the point at which no new categories in relation to women's experiences of AOL emerged from the data. Two more interviews were conducted for confirmatory purposes.

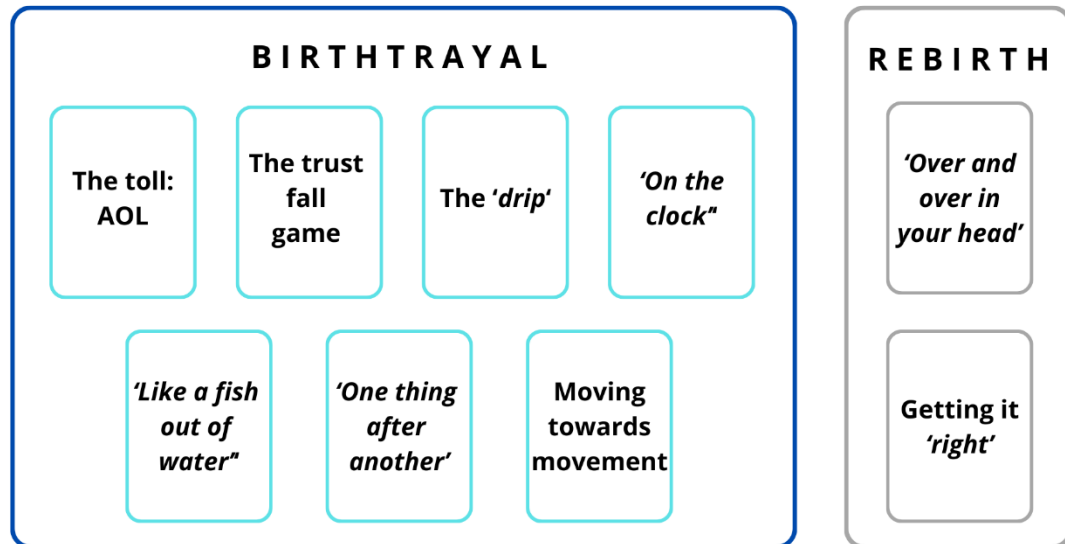
A total of 383 codes were sorted into nine categories. From their abstraction and interpretation, two themes and seven sub-themes representing women's experiences of AOL in Ireland subsequently emerged.

5.5.1. Theme 1 – Birthtrayal

The over-arching theme 'Birthtrayal' captures the essence of women feeling betrayed by their experiences of AOL. In tones of sensitivity and vulnerability, women shared how exhaustion, loneliness, pressure, lack of knowledge or even trust turned into their labour being augmented. Acquiescence, rather than consent, appeared in women's narrations. Women talked about what led them to having their labour augmented, how they felt about it, whom they had relied upon for accepting to undergo AOL, the pain they experienced and what having their labour augmented meant for their overall birth experience. Women's 'in hindsight' added an extra layer to their reflections. Over time, the understanding of events and the input from other mothers made women rethink their own experiences of AOL. Within the uniqueness of each woman's experience, an underlying sense of commonality emerged. Women questioned how and why did so many women had had such a similar experience of AOL. Understanding that their experiences of AOL had been highly influenced by factors beyond their control made women's discourses move from self-blame to feeling betrayed by their healthcare professionals and '*the system*'.

Birthtrayal encompassed 7 sub-themes: the toll: AOL, the trust fall game, the 'drip', 'on the clock', 'like a fish out of water', 'one thing after another', and moving towards movement.

Figure 7: Themes and sub-themes of Phase 2. Section focusing on the theme Birthtrayal and its sub-themes



5.5.1.1. The toll: augmentation of labour with synthetic oxytocin

In the sub-theme 'the toll: AOL', women explained how they felt pressured into accepting AOL in different ways. Gaining access to the labour ward was one of the most cited reasons. The antenatal ward was recounted as a hostile environment where the needs of early labour could not be met due to the limited support, privacy and space available. Women felt 'unhappy' and 'stuck' in a stressful atmosphere, with no possibility of being able to create the safe and calm environment that they had envisioned for their birth experience. Several suggested that this environment had hindered their labour progression. By accepting to have their labour accelerated, they secured a way out of the antenatal ward. To them, AOL was presented as a bargaining chip:

They said to me... 'No, unless you consent to going on syntocinon [AOL], we won't let you into the labour ward'. So, I said, I don't want to do that. I waited another 2 or 3 hours and then I was so exhausted... So, I said fine. Because I hadn't planned on any kind of augmentation or anything, you know, I didn't want that (P03).

For those who were admitted to hospital with COVID-19 restrictions in place or outside of visiting hours, women's sense of being manipulated became further aggravated by feelings of loneliness and isolation as their husbands were only allowed in the labour ward. When reflecting upon their birth experience, women talked about choosing what felt like the least worst option. They renounced their original wishes and plans of having a non-medicalised birth in order to have their husbands with them. In these circumstances, some women who challenged the need to undergo AOL once in the labour ward encountered resistance and more pressure from their healthcare professionals:

[the midwife said] 'Oh no, this room is booked for induction (...). So, either you go back to where you were or else, we do this', basically. So, I thought... I don't want to go back to that dark ward on my own where like, everyone's asleep and I'm... my husband's not there (P11).

Some other women who were indecisive about having their labour augmented felt that their emotional needs of support were turned against them or dismissed:

I'm not sure about this [AOL] and I just want to phone my husband because he can't come in yet. And like, the doctor had a mask and everything, but she rolled her eyes when I said that which made me feel really upset and kind of... it was... just felt really condescending (P02).

Another form of pressure that women felt subjected to in order to accept AOL was through threats over their baby's safety. These ranged from fabricating potential risks like the baby 'going into distress' if they did not comply with the recommendation of having their labour accelerated, to exaggerating factual risks. To these women, AOL was presented as the best means to ensure a healthy baby. When faced with this dilemma between their own birth wishes and the baby's needs as presented by healthcare professionals, all women acquiesced:

There was no decision. I was told it [AOL] was my only option, that there was no... it wasn't presented to me like a choice. It was presented to me like this is absolutely what has to be done because of the meconium (P01).

Some women raised doubts about whether the rationale behind AOL was legitimate. Driven by fear in case anything happened to the baby, women ultimately placed themselves in the hands of healthcare professionals, sometimes assuming, others hoping, that they had their 'best interests at the heart':

They just said 'it's going to take too long' (...) And I did argue at the time like so what if it takes hours? But they said 'we don't have the time. It wouldn't be good for you or the baby'. So, they proceeded, and I just said, okay (P06).

In more subtle ways, some women felt tricked into believing that there were no alternatives available to AOL. To them, AOL was introduced as the next intervention that had to be performed for the baby to be born. The lack of sleep, the physical and emotional exhaustion as well as the difficulties of processing information inherent to labour repeatedly emerged in women's narrations as having played an important role in complying with AOL. Women used metaphors such as feeling 'like a cog in the machine' or 'on a track' where they had 'no other option' but to consent:

They gave me the impression that if I didn't have it [AOL]. Like, do we stay here all day? Like this baby is just not descending. Like they kind of said, like, you've tried everything, and it hasn't changed (...) The baby hasn't moved down at all, so they sort of offered it to me as the only way to get the baby moving down (P07).

When reflecting upon these forced-choice situations, women expressed feelings of anger, disillusionment and betrayal towards 'the system' and their healthcare professionals. They felt they had had to constantly fight their corner during labour. Women wondered about the validity of their consent when it was not informed or freely given:

The word consent feels terribly blurred in that situation. Umm.. Because I was told it had to be done umm.. Because my waters had now been broken. So, the thing they'd done before was kind of used as a reason because I couldn't just have my waters broken indefinitely. But they'd done that. So I was like.. Now that's being used against me for the next intervention? But that was never given to me as a risk for the first intervention (P04).

These feelings of betrayal seemed to be even more pronounced in women who underwent AOL under the care of a Domino midwife. The four women in the study who chose the Domino Care pathway felt that they had done everything they could to avoid interventions and achieve a non-medicalised birth:

I thought that that [choosing a Domino midwife] was your best kind of advocate if you wanted a physiological delivery, midwife-led care. That it was the best way to get that. (...)

And I suppose when you have time to think about it [birth experience] and start questioning why, you do start kind of feeling a bit betrayed and a bit, you know... Disappointed (P07).

Within this sub-theme, another finding that emerged from the data was women's different levels of their sense of agency. When presented with AOL, some women reported having an unclear understanding of their rights in terms of autonomy and decision-making. These women's wording included sentences such as not being 'allowed to', 'they let me' or 'this is the rule', presenting themselves passively. By contrast, other women with a high sense of agency did not expect to be 'so compliant' and found it hard to recognise themselves in their own birth stories and accepting and undergoing AOL. Regardless, a homogenous sense of external control arose in women's experiences of AOL:

I don't want to say that.... You don't feel like you can say no, but like... I suppose... I just went with the flow, trusted everything, you know, like I never probably realised beforehand or during it that like, oh, actually, you know, you can ask or you can say, look, this is my wishes (P10).

I asked to get off the bed. I wasn't allowed. And I know that sounds bizarre because I'm obviously... I was allowed because I could do what I want. I'm an adult. But at the time I was told I wasn't allowed (P01).

Two women who participated in this study underwent AOL with major complications during the course of their pregnancy and labour. P09 had a rare complication of pregnancy⁷ which meant that her labour and birth were deemed to be of high-risk and P14 had fever of unknown origin during labour. Like all women who participated in this study, concerns over the wellbeing of the baby were used to justify any medical intervention, including AOL. However, in contrast to the dominant pattern of this sub-theme, the way in which these women narrated their birth stories was lensed by risk and the importance of safety stood out in their stories. For instance, this is how P09 recalled being informed about the increased risk of complications, including having a caesarean section:

[Translated from Spanish] I said to her [obstetrician], no problem. As long as the baby is born healthy... Ummm... Apart from that, I remember even telling her that maybe if I was in theatre, I'd be a little more relaxed because I knew that, if something happened, if there was

⁷ Not disclosed on data protection grounds.

a haemorrhage... everybody would be ready to transfuse me immediately (P09).

Awareness of risk was crucial in readjusting their plans to the reality that they had to face. These two women's stories of having their labour augmented entailed no regrets or feelings of frustration or failure. In spite of the presence of additional stressful circumstances, they voiced their experiences in a more conciliatory tone:

I think he would have been delivered, you know, without any assistance, even without the suction. I think, you know, had I not been so sick, and my temperature been so high...and he being in distress... I think labour would have just progressed. I would have gotten the epidural, and I probably would have delivered him naturally without any, you know, intervention or augmentation. But I think just because he was in distress, um... he obviously needed that little bit of speed and push along (P14).

5.5.1.2. The trust fall game

The sub-theme 'the trust fall game' included women's perceptions of self-trust and their overall sense of trust during their augmented labour which was mainly shaped by their interactions with healthcare professionals. With a secondary role, this sub-theme also encompassed the support and trust women had or had expected from their husbands. In general, women trusted their own capacity to give birth and saw birth as a '*normal*' or '*physiological*' experience. Having a healthy pregnancy, keeping active and fit, reading about birth or attending antenatal classes contributed to building up women's self-trust. Having had a previous birth experience was perhaps one the most determinant events influencing positively women's self-trust:

For the vast majority of people, there's a really happy end to your hospital stay. And it's about like... the prime of your health as a woman to be able to carry a baby and deliver a baby (P02).

On the other hand, trust in healthcare professionals was a strong factor in women's experiences of AOL. For most women, this was decisive in accepting to have their labour accelerated. Some women, particularly first-time mothers, felt that they '*needed to*' or '*had to*' trust their healthcare professionals showing mixed sentiments of reluctance or contentment about it:

I kind of just put my trust in them and... which is probably a bit naive, but I think you kind of listen to the professionals at the end of the day (P08).

Women who had further complications in their birth experience (e.g., an instrument-assisted birth or a caesarean section) questioned whether they had been *'too trusting'*. The word *'naïve'* appeared a total of twenty-two times in the study data and often illustrated how women's limited understanding of AOL had played a major role in trusting healthcare professionals:

I think there was a level of me just being completely naive. Like, I don't know much about oxytocin even now. They like... You just put all your trust in the midwife that's with you. Um...so you kind of like... It's something I feel I know really nothing about it. You do... You really put your trust in them (P13).

Women expressed a wide range of opinions about their healthcare professionals, from *'negative'* and *'rough'*, to *'professional'* and *'incredibly kind'*. Reading women's medical records and birth plan, being open to their questions and providing reassurance were some of the ways that women recalled building trust with their healthcare professionals:

So I was like, my fear is that when I'm trying to push, I'll vomit. And she [private obstetrician] just said 'don't worry'. She said, 'I'll be there to help you'. She was like, 'we'll take it as it comes' (P14).

Having a good rapport with, feeling respected by and trusting healthcare professionals made women more comfortable about the decision to augment their labour. This became more evident in women who opted for private care. Having had another birth experience with the same obstetrician and/or relationship building through pregnancy appointments resulted in greater trust:

[Translated from Spanish] *Amazing. I can't say anything else about her [private obstetrician]. Umm...She is a great person and a great professional. I always felt very comfortable with her (P09).*

Having a *'business like'* attitude, talking about *'random things'*, using *'patronising'* language, not providing options or being *'cagey'* with clinical information during labour were some other examples that women used to show what led them to distrust their healthcare professionals:

She [the midwife] would say stuff like 'Oh, baby doesn't really like that the way you're sitting or the way you're moving', you know, little things like that. Like I felt she was treating me like a child umm... Maybe that's just her way of... It was kind of in a like a cheerful way. But I just it didn't sit well with me (P02).

Staff workloads also appeared to have indirectly influenced women's trust in their healthcare professionals. Some women acknowledged that the 'pressure' that healthcare professionals were experiencing translated into less time to build up a trusting relationship with them, especially when talking about midwives:

I felt like the midwives on the antenatal ward were very different than the ones in the labour ward, which I get as well, because you get one on one care in the labour ward because you need it there. And it's so intense... and they're, you know, they are just short staffed like they are so busy that on the antenatal ward they just couldn't give me the time I needed (P05).

Another finding that emerged within this sub-theme was the bidirectional character of trust. Women lamented when they perceived healthcare professionals as less trusting or confident about their ability to have a vaginal birth when undergoing AOL. On the contrary, women felt more confident when their healthcare professionals trusted them:

But because I trusted her and because she, um, because she had my history, I kind of felt like, okay, she thinks I can do this. She was obviously confident that between myself and herself, I could deliver the baby with the oxytocin (P14).

Finally, the 'trust fall game' sub-theme included data on women's views about their husbands in the context of their augmented labour. All women who participated in the study were supported by their husbands throughout labour, from admission to the labour ward. Globally, there was a common feeling of sorrow for husbands. While 'trying to be supportive', women used adjectives such as 'clueless', 'confused', or 'scared' to describe them during their birth experience undergoing AOL:

He just completely felt helpless and, um... I suppose he didn't even know what was going on [giggles nervous] (P08).

With their 'best intentions', husbands were deemed not to have been informed enough to fulfil the role of advocating for women's wishes and 'protecting the space'. While some

women thought that their husbands could only go along with their decisions and ‘*back them up*’, others regretted not having asked them to be more ‘*vocal*’:

In hindsight, I should have educated him and involved him more in the process and what happens, and the interventions, and what can happen there... And just to be a bit more, just to have someone in your corner to be more vocal for you when you’ve... you know, to be able to say to him, this is what I want to happen and I might lose confidence, so can you be my voice? (P06).

From being ‘*vaguely present*’ to ‘*asking more questions*’, there were broad variations in women’s narrations when recounting their husbands’ behaviour during their augmented labour. Personality traits seemed to have shaped substantially this level of involvement as women often referred to these during the interviews. For instance, some women whose husbands seemed to have had a less active role defined them as ‘*quiet*’. However, the data did not allow to analyse this in more depth:

My husband, like, is quiet enough, you know? And he wouldn’t... would never interfere or be asking what’s going on or anything like that. And he’d really just sit there quietly (P10).

Other women suggested that the atmosphere, mainly influenced by the interactions with healthcare professionals, prevented their husbands from having a more active stance while undergoing AOL:

But in retrospect, like, there was so much more that he would have liked to have done that day that he didn’t... he didn’t think of in the time. It was, it was a very disempowering day (...) the environment was not one where he felt like he could participate (P01).

Nevertheless, the presence alone of husbands was one of the pillars of support for women undergoing AOL. Women’s narrations included plenty of examples to illustrate this, for instance ‘*standing beside*’, ‘*holding hands*’, or letting her ‘*squeeze his hand*’:

I did want sips of water and he... he just gave me the water, even though one midwife didn’t want him to do that. But he kept doing that because he was a great support (P02).

5.5.1.3. The ‘*drip*’

The sub-theme the ‘*drip*’ encompassed the knowledge that women had about AOL

interwoven with the information given by healthcare providers when AOL was indicated. There was a wide range in the level of perceived knowledge on AOL. Overall, though, women had a limited understanding about AOL when it was presented to them during the course of their birth experience:

What I knew was that it could be given in labour to help progress. But other than that, I didn't really know anything else about it (P08).

Pregnancy books, homebirth blogs, mobile apps, or Instagram were some of the information sources that women had consulted to learn about birth. Specifically in relation to sOT, some women recalled having heard about it in friends' and relatives' birth stories. However, antenatal courses attended within the hospital or privately appeared to be the main source of information for women, with mixed opinions about the usefulness and applicability of these courses:

[AOL] it's covered in those classes, which is great (P05).

You're bombarded with a lot of unnecessary information from my perspective (...) I don't know if I was told about oxytocin and what it does and all that... I could well have, but it just doesn't stand out in my head because it was just overload of information in general (P12).

Some women pointed out a significant dissonance between what they had learnt about labour and birth in the antenatal classes and the reality they faced in their birth experience. These women thought that the antenatal classes had mainly focused on 'normal' birth and things to go 'naturally'. Several women deplored the fact that interventions, including AOL, had been poorly explained or not mentioned at all:

I was doing the, um, education videos on YouTube with the [hospital], um.. it was all about, you know, the first stage, second stage... Like it was nothing about...I don't think there was anything about the oxytocin (P11).

In a different manner, the antenatal classes seemed to set up higher expectations in relation to the amount of information that some women believed they were going to receive during labour if any interventions, like AOL, were indicated:

We went to the antenatal class. They told us they would provide the benefits and risks and the alternatives, and they didn't (P04).

Experience-based knowledge emerged as a key source of information for other women, particularly in terms of pain and pain relief. Women felt that having had a previous experience with sOT set more 'realistic' expectations when undergoing AOL:

[translated from Spanish] *I felt a lot more prepared because I knew what to expect. I knew how oxytocin worked in terms of that it was going to increase the frequency of the contractions, and that it was going to make them very intense (...) what helped me the most was having had that previous experience (P09).*

Women shared a unanimous sense of insufficient explanations regarding the information they received about AOL. This was independent from their overall satisfaction with the birth experience. Women labelled the information they received about AOL with words like 'little' or 'simple'. Some speculated that this lack of information could have been with good intentions in an effort not to worry them unnecessarily. While acknowledging the difficulties of balancing the amount of information that women in labour should be provided with, they also wanted to be informed:

I don't know if they don't keep you informed on purpose not to panic you in any way because of obviously, when you're in labour, they want to keep my mommy as calm as possible but... I still think we have the right to be informed as well, even if it does make us a bit anxious, you know? (P13).

Another view expressed by women was that healthcare professionals' language used around AOL had purposefully trivialised the risks of sOT. One woman, for instance, commented that when she agreed to have her labour augmented, healthcare professionals had been 'playing it up as a great thing'. Other women stated that the word 'oxytocin' had not been named during the conversations about AOL. Instead, healthcare professionals had employed the word 'drip' or 'synt' (from Syntocinon®), contributing to downplaying the relevance and implications of AOL. By posing AOL as 'without risk' or as 'the standard', women underestimated the potential impact of AOL on their birth experience:

They just said that, um... that they needed to do it to make the contractions come quicker, to dilate me more. I think that that was it (P12).

These language nuances were decisive in several women's birth experiences who accepted to have their labour augmented without understanding what they were consenting to. With

a general feeling that it would not make 'such a difference', AOL resulted to have a huge relevance in some women's birth experiences:

And then she [the midwife] also said, 'oh, and we can put you on a drip and it will help speed things up' and, and I didn't know what that was. Umm so I said oh yeah... If it speeds it up, sure. Um, and she goes, 'Yeah, okay, so I'll just pop you on'. So, I said okay. And then I was put on the oxytocin and, honestly, that was like.. [cries] that was the worst decision I made. It really was. And I don't even feel like I made the decision because I didn't know what I was saying yes to. I just followed their advice. I thought, look, they're professionals. I'll just listen. I'll just do what they say (P05).

One of the women, P09, thought that her professional background could have influenced healthcare professionals' information-giving about AOL:

[translated from Spanish] Umm.. I think that because I'm a doctor, that that made the explanations that I was given shorter or not as detailed compared to what other patients may be provided (P09).

Knowledge and information barriers concerning AOL left women in a vulnerable position in which they 'had to' comply not only with AOL but also with the regimen in which AOL was going to be performed. This idea was reinforced by comments on 'dosages' and 'different ways' of augmenting labour that some women had subsequently learnt about, when searching for information about AOL:

I think that they...strong words... took advantage of the fact that I didn't realize that I had to...that I could have stopped them from turning the drip up. They turned the drip up again and again. And again, and again (P01).

Epidural analgesia was repeatedly employed by women as means for highlighting the disparity between the rich information they had received on it, compared to the limited information on AOL during pregnancy and labour:

It's funny because epidural is discussed, umm... and obviously because of the risks associated with it. But then there's no same conversation really around oxytocin (P14).

In this same regard, several women wondered about written informed consent for AOL:

Because you sign all like the declaration of the um... the epidural and everything, but I don't know. Do you sign something for oxytocin? I couldn't remember signing anything anyways (P08).

Many women expressed that they would not have consented to AOL if they had known or received more information about it and its implications beforehand:

I do feel that.. had I done it again... I would have asked more questions about the oxytocin, and I wouldn't have gone on it (P11).

5.5.1.4. 'On the clock'

The sub-theme 'on the clock' emerged as a central sub-theme in women's experiences of AOL. In it, women explained how they felt pressured into giving birth within a certain time frame once they were in the hospital. Time constraints caught some women by surprise. Failure to meet the 'limit' or 'deadline' meant that AOL and other interventions would follow. Women felt they were 'on the clock':

It's just the clock that you're put on and everything after, after you come into hospital (P11).

Slow progress in labour appeared as the most frequent rationale behind AOL for the women included in the present study. Women talked about 'not progressing very fast' or being 'stuck' at a certain cervical dilation. Some other women were told that AOL would compensate the slow down effect of the epidural:

They just really told me that with the epidural, it slows labour down. And then the oxytocin then in return will... Will speed things up. And, um, whether it sped things up or not now... I don't really know (P13).

To support the rationale behind why they had their labour accelerated, two women narrated their birth stories with a copy of their health record which provided meticulous details about the sequence and timings of events:

Umm... and around 12, I was nine centimetres at that stage, and her head was still sideways at that point. (...) Umm... but at 1:00 I was still at nine centimetres. So at that point then they started the syntocinon... the oxytocin (P10).

Within this sub-theme, several women referred to the ‘partogram’, hospital’s ‘management of labour protocol’ and ‘policy’, reinforcing the time constraints they had faced in their birth experiences:

Umm for the hospital that I was in where management of labour and time of labour is a massive part of the practice... And obviously, that's not based on best practice for the health and well-being of my child or me. That's based on hospital policy and procedure, and management, and trying to maintain throughput (P04).

Retrospectively, many women wished they had been ‘let go’, ‘left alone’ and given more time to labour on their own. During the interviews, some expressed strong negative feelings towards their healthcare professionals as they felt they had rushed them unnecessarily, prioritising the needs of ‘the system’ over theirs:

And then afterwards I felt, no, that was just because they wanted to hurry up. They just wanted to get me delivered and onto back onto a ward to get the next person in. That was kind of like... I still feel like that was why. You know? (P07).

Some other women showed sentiments of sorrow and disappointment towards their healthcare professionals, especially towards midwives. Women felt that midwives were ‘disempowered’ and could not genuinely advocate for them as they were ‘beholden to the same system’. ‘The clock’ was also ticking against them:

I feel like they're [the midwives] on the clock, and they have to get you out by a certain hours because, like, in both of them [birth experiences], they said I'd have the baby by 9:00 just say. And I'd say how would... You know, how do they know that? (P06).

5.5.1.5. ‘Like a fish out of water’

Within the sub-theme ‘like a fish out of water’, women provided a comprehensive picture about their experiences of labour pain. There was a clear distinction between women who had their labour augmented with and without epidural analgesia, and this experience was shaped by the expectations women had hoped for in terms of pain relief. In the absence of epidural analgesia, women who had their labour accelerated expressed strong negative feelings towards AOL. [Figure 8](#) is a word cloud made solely with direct references to the pain experienced with augmented contractions i.e. it does not include data regarding non-augmented contractions:

train and, you know, I was just there and it was fine. (...) In it the first time [AOL], it was something that was happening to me. Um, and it was very out of control. It was very panicked (P01).

As a result, most women requested epidural analgesia for pain relief. In some instances, this sentiment of loss of control led to dissociation responses in which women disconnected from their actual experience. They 'gave up' or 'shut down' emotionally, and even observed themselves as from 'outside' their body, particularly if their need for pain relief was postponed or dismissed:

I really felt so unheard and so unseen that I felt I had no choice than to completely just shut down and just play through and just get to the end of this because no one was going to help me anyway umm.. which is horrendous. Umm.. That's a horrendous position to be in, especially when you're supposed to be in a place of care (P04).

One woman's narration contradicted this general pattern identified in the data. The uncertainty of not knowing how long her labour would be gave P09 an extra layer of concern. Although she also described the experience of having her labour augmented as painful, for her AOL entailed gaining a sense of control by making her labours quicker. She elaborated upon this idea as follows:

[Translated from Spanish] *I think it has to do with my personality and my need of... I feel calmer when situations are under my control or when I have a lot of knowledge about the situation. So, then I knew that oxytocin would speed up labour and that more or less within two hours my baby would be born. To me, in my mind, that I'm an anxious person that likes to have things under control, that helped (P09).*

For women who had planned on having a non-medicalised birth and had specifically planned on avoiding epidural analgesia during labour, AOL signified that those wishes had to be abandoned. Fear of pain or the intense pain of the augmented contractions itself made women redraw their birth plan and request epidural analgesia. Despite several women had an initial sense of failure, epidural analgesia generally meant relief and regaining control:

Part of me was really disappointed because it was what I had come in hoping to avoid. But on the other hand, I was completely not managing it at all. So, once I got the epidural, it

worked mostly. Like I could feel it down one side still. But like the pain, the crazy pain was gone, and I was able to talk again and I was able to calm down (P05).

Prior experiences with sOT also, in the context of an induced or an augmented labour, emerged as an underlying reason why some women decided to request epidural analgesia as soon as AOL was presented to them. Their prior experiences in terms of pain shaped the decision of requesting pain relief earlier on in their subsequent births even when they had not planned on doing so:

Naively, I thought that I'd be able to do that... I'd be able to bear it [sOT] naturally without an epidural on the first child. But I remember then it all came back to me, and I said I want the epidural straight away. So I didn't even... I didn't even go through the contractions then (...) I still wasn't going to be able to be in control of my body. So what was the point? (P06).

For women who had planned on or who were more open to requesting epidural analgesia for pain relief and did so, AOL was less dominant in their narratives. In spite of knowing that the primary focus of the study was their experiences undergoing AOL, women's discourse deviated often from the research aim and tended to focus more on other parts of their birth experience, particularly on the mode of birth. This characteristic became a finding in itself. However, having opted for epidural analgesia did not always translate into getting rid of all the negative sensations associated to AOL. Several women still described the contractions as 'intense' or 'bad':

[AOL with epidural analgesia] *It was awful. Like, I know they say you can't remember the pain of labour and I can't really remember the contraction stage. I don't remember that being sore, but I really remember pushing being bad (P03).*

5.5.1.6. 'One thing after another'

The sub-theme 'one thing after another' comprised numerous regrets and mistakes that, 'in hindsight', women wished they had avoided because they led to having their labour accelerated. These included having consented to being continuously monitored (continuous cardiotocography), frequent vaginal examinations (two-hourly, even hourly) or having their membranes ruptured:

And she [midwife] suggested breaking my waters and I feel like that was where I made the first mistake (P07).

Women talked about the ‘*knock-on*’ impact that all these interventions, including AOL, had on their birth experience. Some knew about and referred to the commonly known ‘*waterfall*’ or ‘*cascade of interventions*’ during the interview. As previously mentioned in this thesis, this concept refers to the snowball effect that interventions have during labour, requiring further interventions (Simpson & Thorman, 2005):

And I knew about kind of, you know, the cascade of interventions and all of that (...) I knew that once intervention started that it was more likely that more interventions would happen because... That's just how it works. And that's why I didn't really want any interventions (P03).

For other women, this snowball effect caught them by surprise. All of a sudden, everything became ‘*very medical*’:

With the oxytocin obviously, you get the ummm...it comes with everything else. So the monitoring and the, um.. the catheter and.. And he kind of said, 'oh, like most people can't tolerate it. I suggest an epidural' (...) So before I knew it, I was like... you know, couldn't move on the bed and had everything going (P11).

‘*Baby going into distress*’ was one of the most cited adverse effects in women’s experiences of AOL. In turn, this led to performing other interventions to check or ensure the baby’s wellbeing, further contributing to the ‘*one thing after another*’. These ranged from fetal scalp blood sampling or electrode application to emergency instrument-assisted births. Some women clearly pointed AOL as the cause of these events:

So, um, regarding the oxytocin the only kind of issue it caused was from...from what I can remember was for xxx [baby’s name] when they were... when they had the concern about his pH balance and what they had to do the little tests [fetal scalp blood sampling] and all that. It was... It was concerning at the time (P13).

Some women did not make a link between AOL and the presence of further complications in their birth experience, while others were uncertain if AOL had been the cause leading to a postpartum haemorrhage, neonatal resuscitation or NICU admission:

The cord was wrapped twice around her neck, she was born not breathing... Ummm... Which I do blame on the whole process of the augmented labour. It was so, so powerful I suppose...

Umm... I don't know, like, you can think of it both ways. It's probably lucky that she was born as well because it was... She needed to be resuscitated at birth, and, um...I don't know (P06).

Similarly, uterine hyperstimulation was raised by many women undergoing AOL. Women described having 'overstimulated', 'hyperstimulated' or 'very long' contractions in which there was mention of the sOT infusion being stopped or decreased:

I suppose they wanted me to contract more regularly, but because, like, the coupling of the contractions and her heart rate... they stopped it then. Um, and the contractions were lasting really long time. They were really, really intense, and lasted for a long time (P10).

Other adverse effects of AOL that women reported during the interviews included excessive vomiting, maternal bradycardia and oedema:

I just remembered that when the doctor... When the consultant came in because I was on the oxytocin for so long, I was so swelled down below that the doctor was like, 'Oh my God. Like, Oh my God, you've obviously had so much oxytocin' (P08).

Several women stated that they did not know that there were 'different ways' of undergoing AOL at the time and they wondered whether their birth experience could have taken a different route if lower dosages and/or longer increasing intervals had been employed:

I also didn't know that there was, um... That there was different amounts of Syntocinon that can be administered. I didn't understand that when I consented to it, I... or almost certainly could have told them not to keep turning it up, which they did. And I was contracting a lot and they became very worried about the rate of contractions and then the baby's heart rate (P01).

5.5.1.7. Moving towards movement

This sub-theme related to baby malpositions, and alternatives to AOL that women tried or wished they had tried during their birth experiences. In women's experiences of AOL, several explicit references to baby malpositions were found. Women talked about baby's head being 'sideways', 'transverse', 'posterior', or 'asynclitic':

It was decided then that xxx [baby's name] himself had decided to turn and face the other way. So, he was... He was what they call a stargazer (P13).

Women also shared other more subtle references suggesting a baby malposition during labour. Having an early urge to push (i.e., before full cervical dilatation), back pain or a disproportionately long and/or painful labour were some examples that women recalled. These have all been described as signs of fetal malposition (Desseauve et al., 2017):

I went five centimetres and seven centimetres really quickly. And at one point I like, I actually felt like, oh my God... Like the baby is nearly like pushing herself, you know, that sort of way. (...) But then like, it was like my body was nearly like pushing. I, I don't know how to explain it, if that makes sense (P10).

One woman provided a comprehensive description of the uncomfortable sensations that she experienced due to a baby malposition. She was critical of the usefulness and risks of AOL in cases like hers where malposition is the underlying cause of an abnormal labour progression:

That was when the oxytocin was started. Umm and at that point, like my contractions were, they were already every two minutes, every you know, they were already incredibly frequent and lasting 60s, umm.. So they just ramped that up with oxytocin, which is mad. And now as I look back, I'm like... This process, this process of contracting my uterus to get my baby down was not working effectively for some reason. And instead of looking for the reason that it wasn't working effectively... And I was giving really good cues and feedback as to what that might be, because I was saying: 'all of the pressure is at my back. I feel like I want to push already. You know, why do I feel like that?' So I was giving lots of information that to me now screams this baby is malpositioned. So then the logic to just increase the intensity of the process [with AOL] that's already not working very well, blows my mind. Like, that's just nonsense (P04).

Similarly, some other women wondered whether having done some exercises during pregnancy or labour, or having had the expertise of a midwife who knew how to support a malpositioned baby would have made any difference to their birth experience. They lamented that no alternatives to AOL beforehand were presented to them and that their midwives did not have the skills to supporting women with a malpositioned baby:

Where there positions I could have taken or movements I could have done to try before we move to the oxytocin? Because I feel like nobody explained to me that, you know, there could have been things we could have done before the oxytocin... Like I was pottering about. If I

had squatted in a certain way or tried different moves or had someone with the expertise, a midwife who knew if he did this or that, he maybe he would get unstuck. Could we have tried that first rather than going straight onto the oxytocin? (P03).

Some women also suggested that their bladder being full could have potentially contributed to undergoing AOL:

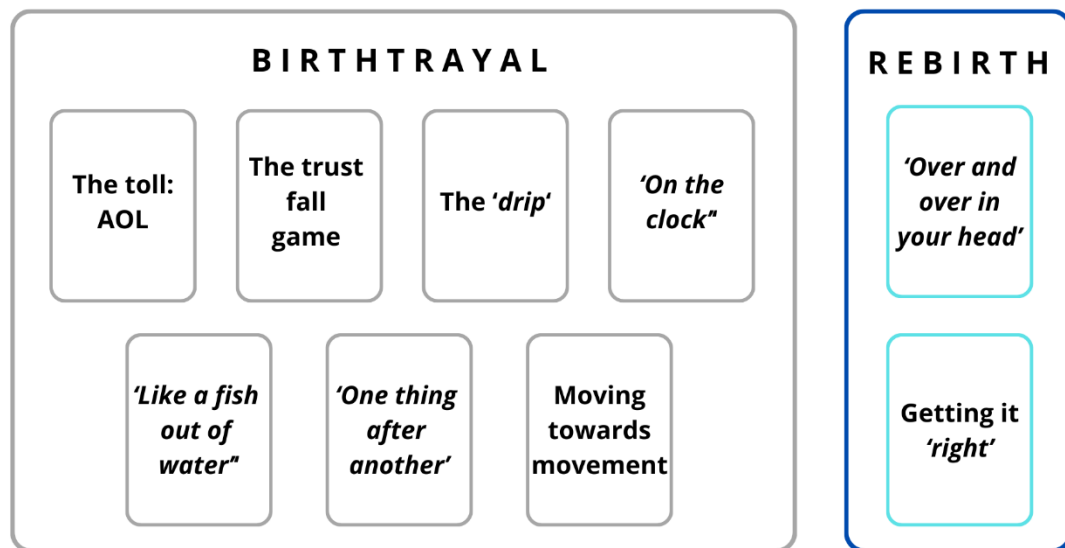
And then I was wondering, like, I wonder why I couldn't urinate. Like was that.. Was my bladder so full that it was like blocking her? They did actually catheterise my bladder at one point, before I started pushing (P07).

5.5.2. Theme 2 – Rebirth

The theme 'Rebirth' captures the essence of grief and recovery from women's experiences of AOL. This ranged from guilt and sadness to peace and a sense of accomplishment. Women navigated a rollercoaster of emotions while trying to make sense of what happened and ensuring that they were not going to have a similar experience again. Women talked about trauma and about emerging into motherhood while recovering from birth physically and emotionally. In 'Rebirth', subsequent pregnancies gave women a second opportunity of having the birth experience they did not have in their augmented labour. Women's 'in hindsight' materialised into taking different actions, choosing different care pathways, being less trusting of healthcare professionals and being more trusting of themselves.

Rebirth was composed by 2 sub-themes: '*Over and over in your head*' and '*Getting it right*'.

Figure 9: Themes and sub-themes of Phase 2. Section focusing on the theme Rebirth and its sub-themes



5.5.2.1. 'Over and over in your head'

Women who had their labour augmented navigated a multiplicity of emotional stages afterwards. Immediately after birth, several women shared a view of failure towards their own bodies for not having been able to give birth the way they had foreseen. Women's narratives were tinged of guilt and blame:

As a woman, when you're in labour and your one job is... your one job is to... is to get your baby out into the world safe. And I felt that... I think I was just so tired. I was just.. Everything was... Every emotion was happening for me at that time that... I just felt defeated that I couldn't do the one thing my body was supposed to do. (...) Ummm... I just felt...I really just felt defeated that I couldn't bring him into the world the way I wanted to bring him into the world, you know? (P13).

Women shouldered responsibility for not having been prepared 'for things to go wrong', not having asked more questions, not having educated themselves enough and having been 'too trusting', 'too compliant' or 'too naïve'. Women went 'with the flow', did not want to 'be a bother' or 'cause a fuss'. These negative feelings towards themselves appeared accentuated in women who, after having their labour accelerated, had a caesarean section:

I was not prepared for it [caesarean section] and probably traumatised me to this day... that I wasn't prepared. And it kind of annoys me that, yeah, I should have been more prepared for it (P08).

Consequently, this triggered compensatory responses in some women. Breastfeeding was a good example of this. Women were 'full on' on getting this 'right':

So, I went and felt that because the birth hadn't gone like... Like I hadn't done as... Personally, I had a bit of feelings of failure. I thought, okay, I'm going to really get onto this breastfeeding (P11).

On the other hand, some other women who were more 'on the fence' in relation to feeding opted to bottle feed their babies. Fear of not meeting the baby's demands with breastfeeding 'only' after a difficult birth experience and/or separation from their babies during the first hours after giving birth arose as underlying reasons why they did not breastfeed:

I suppose I hummed and hawed and, you know, then when I was gone, ummm... I just sort of was like... if you have to give a bottle, like, give a bottle. I think I, you know, I was just maybe all over the place at that stage, but I wasn't dead set on breastfeeding anyway. (...) In the end, then, I suppose after everything... we just went with the bottle and... Yeah. Yeah. You know. Sometimes I do think, why did I not (P10).

Out the fourteen women who participated in this study, five reported symptoms used in the literature on posttraumatic stress such as hypervigilance, anxiety, flashbacks, or insomnia (Martinez-Vázquez et al., 2021):

I was incredibly traumatised. The smell of the hospital, like it's proper trauma stuff. The smell of the hospital would set me off crying...And I was on the domino scheme again. So, I was able to do all my visits with my GP or with the Domino's midwives in a primary care centre. But the couple of times I had to go into the hospital, I found it very difficult (P01).

Several women highlighted the relevance that AOL played in the development of their stress symptoms:

If my labour had not been augmented at all and in the way that it was... So both, the nature of how it was augmented in terms of the communication around that, in terms of the consent

around that, in terms of the risks not being adequately explained. So that one intervention led to another but I was not informed in advance of how that was possible, so that then I was left feeling somehow responsible at each stage for where for my forced choice situation. Like that just is completely traumatising and leaves people open to things like I had with the traumatic reaction of not sleeping (P04).

Several women entered what could be defined as a numbness or a state of denial in which they delayed thinking or talking about their birth experiences, such was their sense of overwhelm. This has been described in the literature as a defence response to traumatic events (Ginter et al., 2022) and can vary from days to months:

And it wasn't probably until we were in the car on the way home that I probably even realised what had happened, you know, that sort of a way or even like, I suppose, how traumatic it was in the end (P10).

Some women believed that their traumatic experience had triggered 'overprotective' behaviours towards their babies and others reported having had major struggles to bond with their babies:

It's terrible, but I didn't have any connection or feelings towards my first until she was about one, which is a really long time (...) but I was like, no... I have this object that like... I feel like I just have to keep alive. But there was literally, like, nothing (P12).

Several women expressed concerns about the impact of AOL on their mental health postpartum. These women posited that having their labour accelerated caused a hormonal imbalance which in turn led them to develop mental health problems:

My mental health suffered. (...) Lack of awareness there really on how the hormone crash, I think from not... well, this is what I think anyway. Ummm... when you don't give birth naturally, the hormones... When you're forced to give birth without your body naturally doing it. I think there's just such a hit. Such a crash (P06).

On the other hand, some other women felt grateful and happy for having a healthy baby and moved into motherhood with an overall sense of contentment. Despite complications, they and their babies were fine:

A good ending in the end, but... But definitely scary for certain parts of it (P02).

Irrespective of whether women considered their birth experiences undergoing AOL as being traumatic or not, they expressed the need to talk about their birth experiences at some point in time with others, especially with other women. Some thought that they became 'obsessed' with it. Talking about their experiences out loud and comparing their experiences to those of relatives and friends helped women to make sense about what had happened:

I did what every person who has a traumatic birth is. I told my birth story again and again. And again and again. Um, and I, thankfully have a lot of friends who'd had babies before me, so they knew exactly what was happening and they sat and listened to it as opposed to the men that I know who are like, really stop telling that story (P01).

Searching statistics and information online also appeared as a resource that women used to understand their birth experiences undergoing AOL. Setting aside the differences, awareness of commonality made some women feel less frustrated and more 'normal'. To other women, this sparked further feelings of mistrust and deception towards 'the system':

Comparing stories... Umm... A lot of people had had augmented labours as well. So, that's why you start feeling then it's hospital policy. Because how we all experienced it? (...) So yeah, you get you get annoyed at the system (P06).

While making sense of the events, several women who underwent AOL contacted their healthcare services back through different channels. Requesting a copy of their medical record, making a comment or complaint to the hospital or attending the birth reflections service were some examples of this. They reported mixed views on their usefulness. For some women, these felt like a 'rebuttal'. For others, these helped them to 'move on' while for others, it triggered further questions in relation to their care, including AOL:

It clarified a lot... but it also made me think like that really having the oxytocin and the forceps was not essential when it, when it was... When it was given. That there could have been... That I could have been let go longer, more naturally (P12).

5.5.2.2. Getting it 'right'

At the time of the interview, eight women had had a subsequent baby after having their labour accelerated, three expressed a wish of (potentially) having another baby, two had fulfilled their family size and one was pregnant. In general, undergoing AOL did not seem to influence women's desire of having a subsequent baby. However, it did seem to have a major

impact on the timing of getting pregnant, the preparation during pregnancy and the preferred place and mode of birth. Some women saw the opportunity to healing their experience of labour and birth with AOL by giving birth to another baby and having a different birth experience. These women wanted to get pregnant soon after and see whether they could 'do it differently':

I wouldn't have been able to talk about my birth like this this time last year. I would have been like, roaring, crying and like it just completely like... It was, it was really bad. And whereas now I'm at peace at it, which is actually, weirdly enough, why I wanted to have another baby really quickly because I wanted to kind of heal that process, which is a bit weird (P12).

For other women, their experience of AOL triggered fear of childbirth and they delayed getting pregnant again for this reason:

To be honest, I was really scared to go again, and I said I wouldn't do it again for a long time. And then, you know, your memories start to fade, and you start to wonder. And then I said, okay, look, we will try for a second [baby] (P05).

Women's experiences of AOL tilted the balance towards opposite directions in their following pregnancies. Six women opted for a complete 'natural' birth (i.e., spontaneous onset of labour, no AOL, no epidural analgesia, and spontaneous vaginal birth), two women opted for an elective caesarean section and three more were uncertain about what to choose:

I'd say to my husband, um, in my next pregnancy I'd either go for a completely natural home birth, nothing at all... Or an elective section. Nothing in between (P03).

Planning a homebirth, giving birth in a midwifery-led care unit or delaying admission to hospital 'as much as possible' illustrated some of the different strategies that women used to ensure a 'natural' birth in their subsequent pregnancy and to avoid AOL. Delaying admission to hospital resulted in three women being admitted in second stage of labour with one giving birth in the ambulance on her way to the hospital as she left it 'too late':

I just laboured away at home, and it was so nice. And I said to my husband, look, we'll only go in when I'm, you know, when I'm in real pain, you know, when I'm really ready to go. So... I was waiting for the oxytocin kind of pain. The intense pain. And that never happened. And

I was managing it. And I mean, it was it was tough going, but it was fine. It was really nice (P05).

Women who believed that their augmented labour had been the result of a malpositioned baby, learned and did exercises to facilitate positioning in their subsequent pregnancy and birth:

I tried to, you know, no reclining and all that was after, for the second time. After 32 weeks, I was like sitting forward all the time. I was just trying, you know, as much as I can try a better experience (P11).

Other women regretted not having had the support of an additional person during their experience of AOL. In their subsequent pregnancies, one of them hired a doula who is a non-medically trained woman who provides support during pregnancy and birth while another hired a ‘*spinning-babies-trained midwife*’:

So that's what I did in delivering my second. I armed myself with a private midwife who was spinning-babies trained and understood how to support women through that (P04).

5.6. Conclusions

Phase 2 aimed to provide a rich description of women’s experiences of AOL in Ireland – objective ii). A qualitative descriptive study was conducted. Following ethical approval, data from fourteen women’s experiences of AOL was analysed through qualitative content analysis. Two themes emerged: Birthtrayal and Rebirth. In the theme ‘Birthtrayal’, women explained how they felt betrayed by their experiences of AOL. Women described how they underwent AOL as a result of exhaustion, loneliness, pressure, lack of knowledge or even trust in their healthcare professionals. In many instances, AOL was presented to women as their only option. Women complained about receiving poor or no information about AOL and its potential implications. Many stated that healthcare professionals had presented AOL as being without risks or had deliberately trivialised these risks so that they accepted the decision to have their labour augmented. References to time constraints and pressure to give birth within a certain time frame appeared repeatedly. Women felt they were put ‘*on the clock*’ with strict protocols and policies on labour duration that translated into undergoing AOL. Consequently, this triggered sentiments of disappointment towards their

healthcare professionals who they thought they had rushed them unnecessarily. Regardless of parity, women consistently defined the augmented contractions as extremely painful. Women used other birth experiences or earlier moments of the same birth experience to make clear comparisons between the severity of the pain in augmented and non-augmented contractions. For many, this signified requesting epidural analgesia even when they had not planned to use this type of pain relief method. By contrast, women who had their labour augmented after epidural analgesia did not seem to have such strong negative memories associated to AOL. Retrospectively, women wished they had not given consent to childbirth interventions such as frequent vaginal examinations because they felt these interventions had led them to having their labour augmented. Moreover, they explained how having had AOL raised additional concerns in relation to adverse effects such as uterine hyperstimulation and the need for further childbirth interventions such as instrument-assisted births to ensure the safety of their babies.

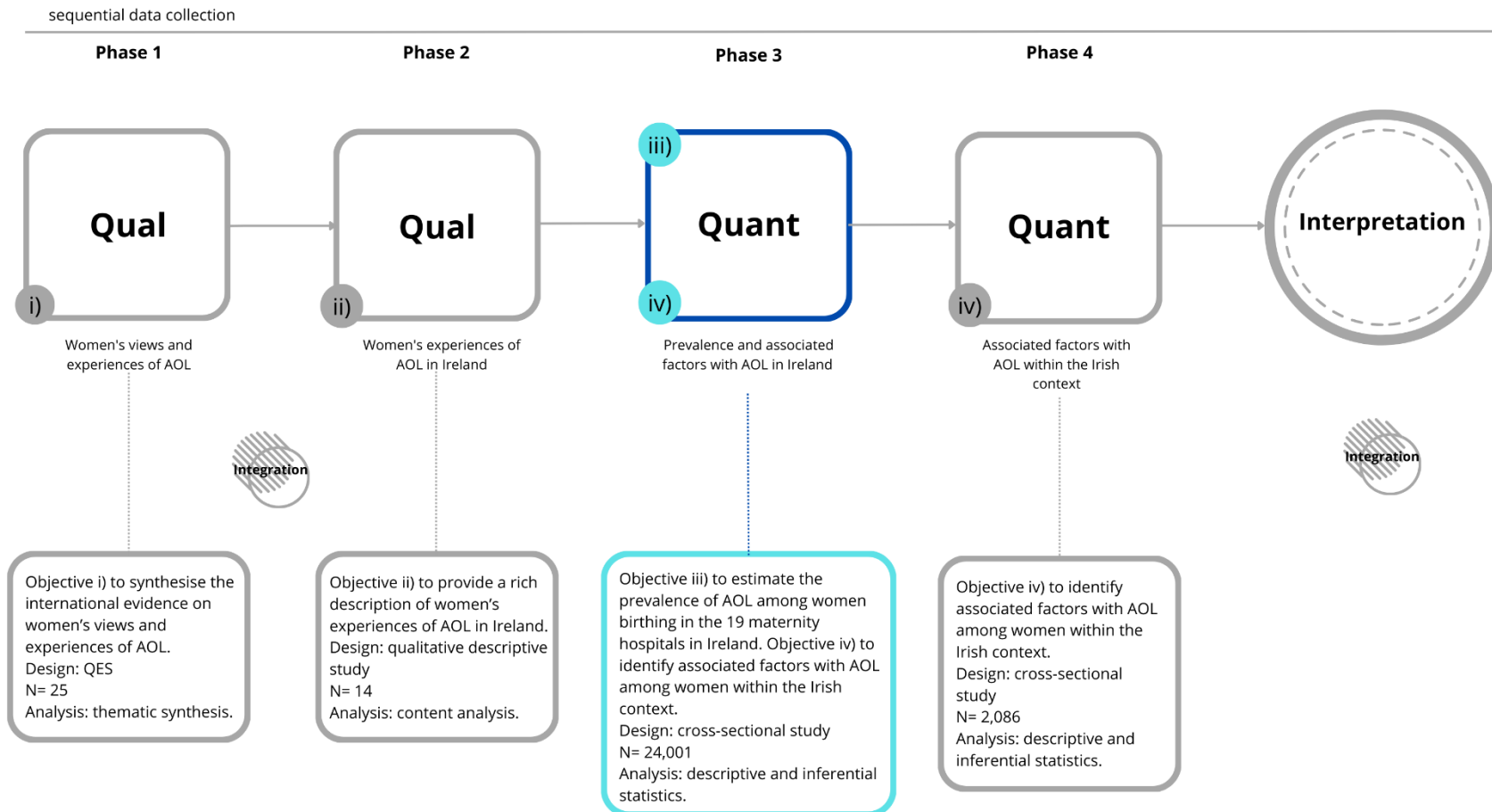
Over time, women's understanding of events and the input from other mothers made women rethink their own experiences of AOL and move from self-blame towards feeling betrayed by their healthcare professionals and 'the system'. In the theme 'Rebirth' women talked about their experiences of AOL in tones of grief and recovery. Women talked about trauma and about emerging into motherhood with an overall sense of failure. They tried to make sense of what had happened by talking about their experiences of AOL with other women and by contacting their healthcare services back through different channels. Subsequent pregnancies were seen as an opportunity to heal and finally have the birth experience they did not have when their labour was augmented. Women shifted their trust from healthcare professionals to themselves and took different strategies to ensure that this time there were '*getting it right*'.

6. Chapter 6: Phase 3 – Prevalence and associated factors with augmentation of labour with synthetic oxytocin within the Irish context

6.1. Introduction

This chapter presents the objectives, ethical considerations, and methods of Phase 3: a national cross-sectional study on the prevalence and associated factors with AOL within the Irish context. Unlike other childbirth interventions such as induction of labour, AOL is not routinely reported in maternity statistics in Ireland. The national rate of AOL is currently unknown. Hence, Phase 3 of this study. A cross-sectional study was deemed as the most appropriate approach as it provides a snapshot of a certain population at a single point in time and it is a useful research design in examining the prevalence of a certain attribute or intervention and in generating new hypotheses by analysing relationships between variables (Capili, 2021). Unfortunately, the data reliability issues encountered during the analysis of this phase made it impossible to answer the research objectives. This gave rise to an additional and final phase to the thesis (Phase 4). [Figure 10](#) shows where Phase 3 fits within the thesis as a whole.

Figure 10: Diagram of the study design. Chapter focusing on Phase 3



6.2. Objectives

To estimate the prevalence of AOL among women birthing in the nineteen maternity hospitals in Ireland and to identify associated factors with AOL among women birthing within the Irish context – objectives iii) and iv).

6.3. Ethical considerations

A request was made to the Healthcare Pricing Office (HPO) on 23rd March 2022 for disaggregated anonymised data on a range of variables related to pregnancy and birth. After several meetings with the coding manager and one of the data analysts from the HPO, and after completing a detailed application, the HPO agreed to share all the existing diagnoses and interventions associated with women's pregnancy records which met the inclusion criteria. The HPO deemed that it was not necessary to obtain approval from a REC as the dataset would be shared in anonymised format and no identifiable health-related data would be shared; hence falling outside the scope of the of the Directive (EU) 2016/680 and the General Data Protection Regulation (GDPR) (2018). Instead, a data sharing agreement was signed between the author of this thesis and the HPO.

6.4. Methods

6.4.1. Design

This is a national cross-sectional study. Although cross-sectional studies are mainly descriptive, relationships between variables were analysed which contributed to the generation of new hypotheses and the identification of suitable starting points for future research studies on AOL.

6.4.2. Sampling

With the aim of generating evidence based on the most up-to-date data, a decision was made to request data from the year 2020 from the Hospital In-Patient Enquiry Scheme (HIPE) which is managed by the HPO. Data from all women who gave birth at ≥ 37 weeks' gestation from 1st January to 31st December 2020 were retrieved.

Although the aim was to retrieve data at a national level from the outset of this research, a theoretical sample size was taken into consideration. A minimum sample size of 1,524 women was estimated to be necessary for conducting a prevalence study on AOL in Ireland according to Daniel's formula (1999). The formula is presented below, where Z is the statistic for a level of confidence (1.96 for a 95% CI), P is the expected prevalence of AOL (8.5% for multiparous women based on the data from a multinational cross-sectional study conducted in high income countries by Seijmonsbergen-Schermer et al. (2020)), and d is the precision or effect size (0.01):

$$n = \frac{Z^2 P(1 - P)}{d^2}$$

6.4.3. Setting

Please refer to Section 2.9. for further details on the setting.

6.4.4. Data collection

Data were collected from the HIPE scheme which is a health information system that stores demographic, clinical and administrative information from all acute public hospitals, including the nineteen maternity hospitals in Ireland. These data are then integrated in a national database in the HPO (Health Information and Quality Authority (HIQA), 2022).

Clinical diagnoses and interventions assigned to each individual's health record are coded using the ICD-10-AM (The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification), the ACHI (Australian Classification of Health Interventions) and the ACS (Australian Coding Standards) 10th Edition. Under request, the HPO (2022) provides these types of data for research and organisational purposes.

The ICD-10-AM is an alphanumeric list of diseases and conditions based on the WHO International Statistical Classification of Diseases and Related Health Problems (ICD-10) which allows for the analysis and comparison of morbidity and mortality across countries. Specifically for this phase of the study, the focus was placed on chapter 15 *Pregnancy, childbirth and the puerperium* (codes O00-O99) (The International Statistical Classification of Diseases and Related Health Problems, Australian Modification (ICD-10-AM), 2017). The ACHI is a numeric list of procedures based on the Commonwealth Medicare Benefits

Schedule (MBS). The focus for this study was on *Obstetric procedures* (block 1330-1347) within chapter 15 (Australian Classification of Health Interventions (ACHI), 2017).

Accurate coding depends on each woman’s health record which is the main source of information for coders. Therefore, the responsibility of accurate documentation lies with the clinician, in the first instance (HPO, 2023). Administrative personnel who work for the HPO then go through health records and assign codes of diagnoses and interventions accordingly.

6.4.5. Variables

The primary variable of interest in this research study is AOL (ACHI block 1335), codes 904600 – *Medical augmentation after onset of labour* and 9046602 – *Medical and surgical augmentation of labour*. These are recorded as categorical variables (yes/no). No data on oxytocin infusion rates, escalation rates or total dosages administered are available. As previously discussed in this thesis, the Irish national guideline on sOT use during labour recommends adding 10UI of sOT in 1 litre of normal saline (NaCl) 0.9%. The starting infusion rate is set up at 1-5mU/min (6-30ml/h) which can be increased at 1-5mU/min every 15-30 minutes depending on the fetal heart rate and frequency of the contractions (Institute of Obstetricians and Gynaecologists et al., 2016). Although there could be an assumption that most women who underwent AOL had their labour accelerated accordingly, not all maternity hospitals subscribe to this guideline yet.

For the purposes of analysis, several variables were recoded/grouped into new variables. For example, ‘maternity hospital’ was recoded into a three-category variable: ‘maternity size’. Each of the clinical variables that were collected as well as the new variables created purposively for this phase of the study are detailed in Appendix 9. [Table 12](#) shows the final variables that were analysed with AOL:

Table 12: Variables in Phase 3 by order of appearance in the text

Age	Mode of birth
Parity	Suspected fetal hypoxia
Multiple pregnancy	Shoulder dystocia

Medical insurance	3 rd or 4 th degree perineal tear
Maternity size	Postpartum haemorrhage
Hypertensive disorders	Uterine rupture
Pre-gestational diabetes type I	Cord prolapse
Pre-gestational diabetes type II	Fetal scalp blood sampling
Gestational diabetes	Internal fetal monitoring
Excessive fetal growth	Epidural analgesia
Poor fetal growth	Episiotomy

6.4.6. Data cleaning and preparation

The dataset was retrieved in Microsoft Excel® and downloaded into SPSS® Statistics 29 in November 2022. Each row represented an individual woman with up to thirty diagnoses and twenty interventions randomly presented (i.e. each diagnosis and intervention could appear in any of the columns). The dataset was cleaned and variable recoding took place via the creation of dummy variables to make it suitable for analysis. Dummy variables are variables that take two numerical values, coded with zero and one, to represent categorical data and the presence or absence of the variable being researched (e.g., AOL no = 0 / AOL yes = 1). Each variable was individually 'searched' in all the columns, recorded into a dummy variable (e.g. the presence or absence of AOL) and then grouped into one single variable (i.e., all the columns indicating presence or absence of AOL were merged in one single column). Other variables were transformed into new variables for analyses purposes. For example, the variable 'parity' (nulliparous/multiparous) was created from the variable 'number of previous live births'.

The dataset was checked for completeness. Missing data was identified in the variables 'mode of birth' (n=103): four were coded as 'failed vacuum' but had no further codes and eleven had been miscoded as both 'spontaneous vaginal birth' and 'failed vacuum' (in single pregnancies); 'parity' (n=61), 'maternity hospital' (n=5), and 'medical insurance' (n=1). As missing data were randomly scattered and represented a very small proportion of the dataset (<1%), a decision was made to exclude cases pairwise. This option excludes those cases only if their missing data are required for that particular analysis involved (Kim

et al., 2020a; Pallant, 2016). Outliers, observations abnormally extreme compared to the other values, were identified in the variable 'length of stay'. There are different ways of dealing with outliers depending upon the circumstances (i.e. whether they are legitimate outliers, errors in the data collection process, and/or the number of outliers implicated). In this study, a decision was made to exclude those cases with a value ≥ 10 days from the analysis ($n=293$), as 99.5% of the sample was distributed within nine days or less.

6.4.7. Data analysis

Descriptive statistics (frequencies and percentages) were used to describe the baseline clinical characteristics of the women included. The dataset mainly contained categorical variables.

To examine the relationship between AOL and the outcome 'mode of birth', multinomial logistic regression analyses were performed. Multinomial logistic regression provides specific associations from a base category and it is more efficient in estimating the likelihood of an event according to different variables compared to separate logistic regressions (Pampel, 2021). For this outcome, parity, maternal age, excessive fetal growth and epidural analgesia were identified as potential confounders based on previous studies (Bizuayehu et al., 2023; Hure et al., 2017) and clinical expertise. The 'pretreatment criterion' principle was applied. In accordance with this principle, the analyses were controlled for those variables that preceded the exposure only (VanderWeele, 2019), in this case, that preceded AOL. The use of epidural analgesia frequently occurs on the pathway from AOL to the mode of birth as demonstrated in the QES on women's views and experiences of AOL (Phase 1) i.e. AOL $\rightarrow$ increased pain $\rightarrow$ epidural analgesia $\rightarrow$ instrument-assisted birth. As there was no data in relation to the timings of epidural analgesia administration (i.e. whether it preceded or followed AOL), a decision was made not to include this variable in the multinomial logistic regressions. The other confounders were included in each logistic regression if they showed a statistically significant association with the outcome being assessed.

In order to conduct a multinomial logistic regression analysis, there were three assumptions that had to be met: that the dependent variable ('mode of birth') was categorical with three or more categories, that there were no significant outliers in the data and that there was no important multicollinearity. For the outcome 'mode of birth', two different analyses were conducted in which the outcome was defined as a categorical

variable with three or six possible categories respectively: spontaneous vaginal birth/instrument-assisted birth/CS or spontaneous vaginal birth/forceps-assisted/vacuum assisted/vacuum and forceps-assisted/instrument-assisted and CS/CS. There were no outliers in the data. Using the variance inflation factor (VIF), a multicollinearity test was conducted (Pallant, 2016). The variable 'maternal age' was recoded into 7 dummy variables (one for each of the categories) and in order to avoid the so-called *dummy variable trap*, all of these with the exception of one, (the reference category 'less than 20 years old') were included together with the variables 'AOL', 'parity' and 'excessive fetal growth' in the multinomial logistic regressions. The multicollinearity test showed low correlation between each other (Max VIF = 2.83, Min VIF = 1) which confirmed their suitability for analysis. All four variables (AOL, parity, excessive fetal growth and maternal age) showed a statistically significant association with 'mode of birth'. Thus, analyses comparing 'mode of birth' in relation to AOL were adjusted by parity, excessive fetal growth and maternal age.

To explore associations between AOL and binary categorical variables, Chi-square test was employed. To run this test, the two variables of interest needed to be categorical and each variable had to have at least two mutually exclusive categories (e.g. AOL yes / AOL no and epidural yes / epidural no). No cells could have an expected value less than zero and no more than 20% of the cells could have expected values <5. When analysing the relationship between two variables with two categories each (2 by 2 contingency tables), Yate's correction for continuity results were reported to compensate the overestimation of the Chi-square value (Pallant, 2016). Fisher's exact test was employed for cases in which the expected frequency in any cell was <5.

All p -values were two-sided and statistical significance was set as $p < 0.05$. The strength of association was expressed as crude and adjusted Odds Ratio (OR/aOR) with 95% Confidence Intervals (CI). Moreover, acknowledging that Relative Risk (RR) might be better translated into clinical scenarios and that the value of the OR can exaggerate the strength of association if the dependent variable is relatively frequent (i.e. typically >10%) (Bowers et al., 2021; Kim et al., 2020b), RRs were also calculated and are presented in the results section. Below are the formulae that were used to calculate ORs and RRs when analysing the relationship between two variables with two categories each (2 by 2 contingency tables):

	Event	No event
AOL (exposed)	A	b
No AOL (non-exposed)	C	d

$$OR = \frac{Odds^{Exposed}}{Odds^{Non-exposed}} = \frac{a/b}{c/d}$$

$$RR = \frac{Probability^{Exposed}}{Probability^{Non-exposed}} = \frac{a/a+b}{c/c+d}$$

Adverse perinatal outcomes and childbirth interventions were adjusted for the same confounders (parity, maternal age and excessive fetal growth) if they showed a statistically significant association with the outcome being studied. For example, maternal age and excessive fetal growth did not show a statistically significant association for the interventions ‘fetal scalp blood sampling’ and ‘internal fetal monitoring’ and the analyses were therefore adjusted according to parity only. When more than one variable was associated with the outcome, the multicollinearity test was performed beforehand to confirm its suitability for analysis.

In multinomial logistic regressions (when analysing the relationship between AOL and ‘mode of birth’), RRs with 95% CI were estimated from ORs by using the Zhang-Yu method (Zhang & Yu, 1998). The formula is presented below where P_0 is the prevalence of the outcome being evaluated (e.g., forceps-assisted birth) in the reference group (i.e., non-exposed to AOL):

$$RR = \frac{OR}{(1 - P_0) + (P_0 * OR)}$$

All analyses were conducted in SPSS® Statistics 29. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline was followed in conducting and writing this research (von Elm et al., 2007).

6.5. Data reliability issues of Phase 3

The results of the statistical analysis of Phase 3 are shown in Appendix 11. Unfortunately, no conclusions could be drawn from this phase. Despite reporting several statistically significant associations between AOL and birth outcomes, all of the study data was deemed at high risk of bias. The evident data reliability issues that were encountered in Phase 3 made it impossible to estimate the prevalence of AOL among women birthing in the 19 maternity hospitals in Ireland and to identify associated factors with AOL among women birthing within the Irish context – objectives iii) and iv).

Substantial variation in the use of AOL across maternity hospitals was observed. While some variation in the use of AOL between maternity hospitals has been previously observed in other countries like Germany or the Netherlands (Helbig et al., 2019; Seijmonsbergen-Schermer et al., 2018), the remarkably low numbers reported in several maternity hospitals raised doubts about the data reliability. In a multinational cross-sectional study, Seijmonsbergen-Schermer et al. (2020), found that 26.2% and 8.5% of nulliparous and multiparous women had their labour augmented in Ireland in 2013. The reported rates of AOL of the present phase were comparable to theirs but an overall prevalence of 12.4% of AOL seemed disproportionately low when compared to data from Nordic countries. For example, the reported rates of AOL were 54.2% for nulliparous and 20.3% for multiparous women in Norway, and of 70.9% and 38.3% in Finland, respectively. Moreover, their study used the same source for data collection in Ireland (the HPO) that was used in this phase (Seijmonsbergen-Schermer et al., 2020). Moreover, at this stage I was collecting data from Phase 2. Women frequently emphasised the high number of women in Ireland who undergo AOL, often referencing friends and family members who had also experienced AOL.

Other contradictory findings added to concerns about the data reliability. Maternity hospitals 'C' and 'F' which reported the lowest proportions of AOL (1.47% and 3.32%) had 22.67% and 21.88% of instrument-assisted births, respectively. From a clinical perspective, the marked disparity between these two variables is highly unlikely. Most women who have an instrument-assisted birth have a sOT infusion ongoing which is further evidence regarding the hypothesis of improper record of AOL. In 2013, the HIQA undertook a national investigation into safety quality in Irish maternity hospitals and concluded that due the *'concerns in relation to the lack of accessible, consistent and reproducible data relating to the quality of the various maternity services (...), it was impossible to assess the*

performance and quality of the maternity service nationally' (HIQA, 2013, p.16). Five years later, Clarke (2018) explored errors, inaccuracies, and omissions in birth data in Ireland and identified several barriers to accurate entry by coders such as lack of training, time constraints, and gaps in clinical knowledge.

I expressed my concerns in relation to data reliability to the HPO. The HPO acknowledged that some of the data that coders collect is systematically reported and regularly assessed for quality e.g. data in the annual perinatal statistics reports such as the onset of labour or mode of birth (HPO, 2021, 2022). However, other data such as AOL do not undergo such rigorous quality checks. Additionally, that other factors like suboptimal legibility and the frequent use of abbreviations and acronyms could challenge the accuracy of record-keeping and result in underreporting. I also specifically asked about those Irish maternity hospitals which have standardised data collection through electronic health records with the Maternal and Newborn Clinical Management System (MN-CMS) (eHealth & Disruptive Technologies, 2014). Contrary to expectations, no advantage in terms of reporting AOL was noted between the maternity hospitals that have the MN-CMS in place and those that do not. The HPO confirmed that even if the maternity hospitals have the MN-CMS in place, the data that the HPO retrieve at a national level is still dependent on what coders report manually. After significant correspondence with the HPO, we decided to co-develop an information leaflet for coders (Appendix 10) in order to improve the data collection of AOL. This leaflet was added into a quarterly bulletin that is distributed to all coders nationally known as 'Coding Notes' (HPO, 2023).

6.6. Adding Phase 4 to the thesis

Research integrity is based on the pillars of reliability, honesty, respect, and accountability (Research Integrity National Forum, 2019; Trinity College Dublin, 2024). Despite this author's willingness and commitment to investigating AOL from a national perspective, the data reliability issues that were encountered in Phase 3 compromised the accuracy, reproducibility and ethical standards of research and the knowledge being sought. Presenting the findings of Phase 3 as being accurate is likely to have led to incorrect and misleading conclusions, and ultimately damage scientific reputation.

In light of the above, several discussions with my supervisors were held and a thorough assessment of the implications of Phase 3 in the overall quality of this mixed methods

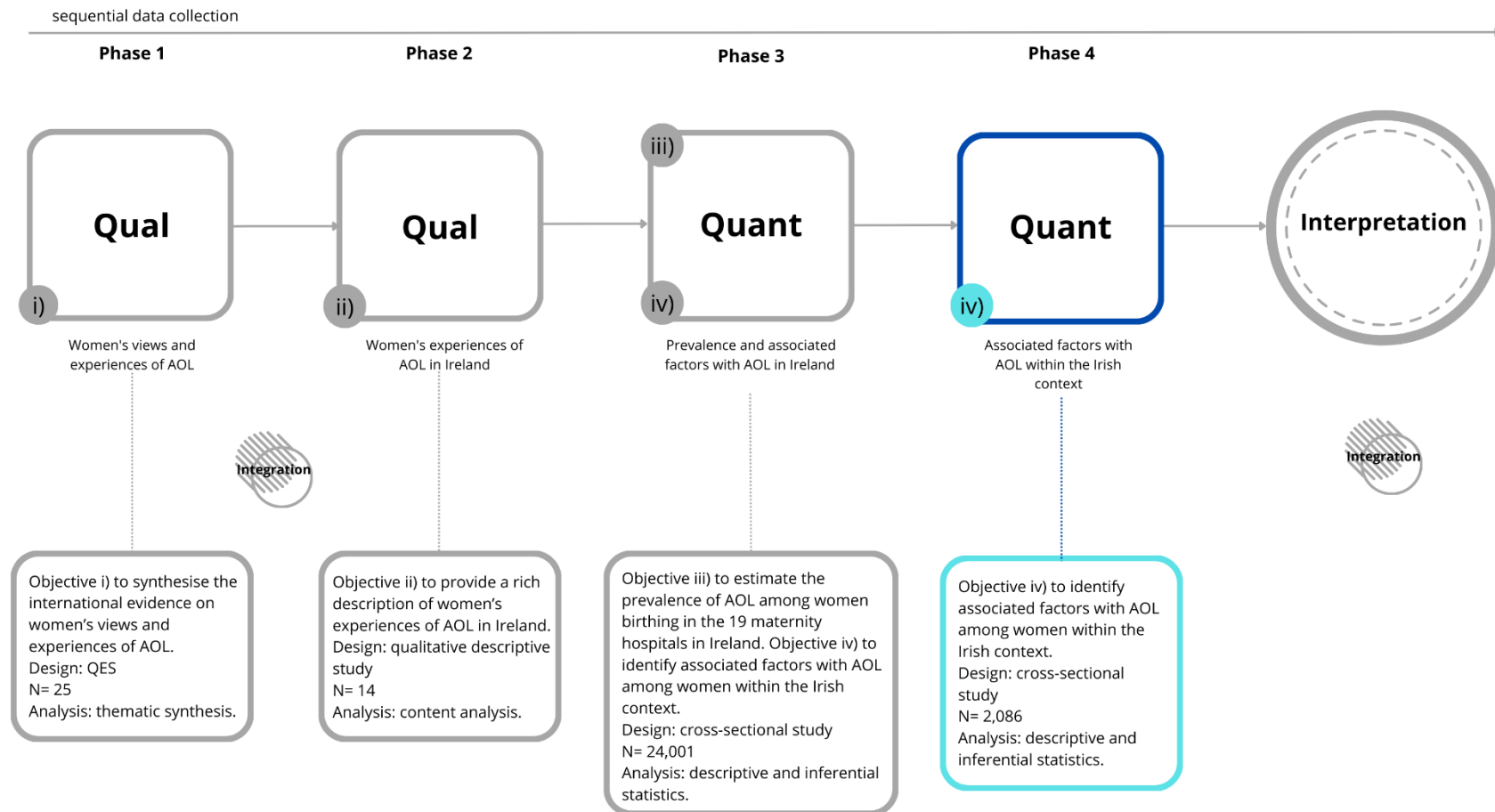
study was conducted. After consulting with a statistical expert, the option of eliminating outliers from the analysis was considered, i.e., eliminating those maternity hospitals that reported the lowest rates of AOL. However, this approach was ultimately disregarded as it did not adequately address the underlying issue of data reliability and the question of whether the remaining data were accurate remained unresolved. After a careful consideration of the timelines of the PhD programme, a decision was made to include an additional phase to the study (Phase 4). This phase of the study involved collecting data directly from one of the Dublin maternity hospitals in which the use of sOT along with other variables of interest in this study are routinely collected in their internal electronic system. More details are provided in the next section.

7. Chapter 7: Phase 4 – Associated factors with augmentation of labour with synthetic oxytocin within the Irish context

7.1. Introduction

This chapter presents the objective, ethical considerations, methods and results of Phase 4: a single-site cross-sectional study on associated factors with AOL. The national cross-sectional study on the prevalence and associated factors with AOL (Phase 3) revealed the need to further investigate AOL through a different source of data. Therefore, data in Phase 4 was collected from K2 electronic clinical management system from one tertiary maternity hospital in Dublin. As the reader will see, data analyses are very similar to those conducted in Phase 3. Nonetheless, some variables that were not available in the previous phase were added to Phase 4 given their availability and their relevance to the topic such as maternal BMI, birthweight or type of infant feeding at discharge. [Figure 11](#) shows where Phase 4 fits within the thesis as a whole.

Figure 11: Diagram of the study design. Chapter focusing on Phase 4



7.2. Objective

To identify associated factors with AOL among women birthing within the Irish context – objective iv).

7.3. Ethical considerations

Research Ethics Committee approval was obtained from The Coombe Hospital in September 2023 (Appendix 12) and from the School of Nursing and Midwifery REC Trinity College Dublin in February 2024 (Appendix 13). This study fell outside the scope of the of the Directive (EU) 2016/680 and the General Data Protection Regulation (GDPR) (2018) as the dataset was anonymised and no access to identifiable health-related data was given.

7.4. Methods

7.4.1. Design

This is a single-site cross-sectional study. A cross-sectional study design was considered the most appropriate design in order to answer the research objective and suggest a starting point for future research studies on this topic within the Irish context. As previously explained, cross-sectional studies are mainly descriptive but they are also useful in analysing relationships between variables. By changing the source of data collection and reviewing the rigorous checks of data entry in this particular maternity hospital, it was deemed feasible and pertinent to include this last quantitative phase to the study.

7.4.2. Sampling

With the aim of creating the most up to date evidence and providing a more accurate and reliable analysis, data from all women who started labour spontaneously with a singleton pregnancy in cephalic presentation at ≥ 37 weeks' gestation and who gave birth in The Coombe Hospital from the 1st January to the 31st December 2022 were included.

7.4.3. Setting

The Coombe Hospital is a tertiary maternity hospital in Dublin and it is one of the largest hospitals providing care to women and their babies in Europe. As a tertiary maternity

hospital, it receives maternal and neonatal transfers from other maternity hospitals in Ireland and provides maternity, gynaecology and neonatology services.

7.4.4. Data collection

The data were available and extracted from the hospital's computerised internal system which is K2 electronic clinical management system. This system enables the collection of data throughout pregnancy, labour, birth and up to the discharge of women and their babies. Consequently, K2 facilitates clinical audits and the generation of annual reports.

Data in K2 are entered by both clerical staff and midwives. Specifically for this study, most of the variables were extracted from labour and birth variables. After a baby is born, the midwife responsible for that woman and baby completes the 'Summary of labour'. This is a paper-based record form available in all maternal healthcare records of the hospital that includes each of the relevant variables. Once complete, this record alongside the full healthcare record of the woman and the baby is handed to a member of the clerical staff who then enters all the variables into K2. Clerical staff in the hospital receive training on K2 from the IT midwife (Clarke, 2018). Before the final version is recorded into the system, the midwife confirms that all of the data has been entered correctly i.e. that the record is accurate and that no errors have been made. This enhances data collection for several reasons. Firstly, the 'Summary of labour' is a standardised form that is entered into the computer system in full (i.e. no blank answers are allowed). Augmentation of labour with synthetic oxytocin is one of the pre-defined items to be completed in this form and in the computer system. Secondly, this form is completed by midwives with clinical expertise who have been involved in the labour and birth of that particular woman and baby. Thirdly, once the clerk has computerised the form, there is a final additional accuracy review by midwives.

7.4.5. Data analysis

All of the data analyses performed in Phase 4 are very similar to those conducted in Phase 3. The main difference is that Phase 4 included data on some neonatal variables that are systematically filled in when completing the 'Summary of labour' record. I decided to include some of these because they emerged in the data of the descriptive study on women's experiences of AOL in Ireland (Phase 2). For example, women talked about their babies being malpositioned, about their babies being admitted to NICU and about breastfeeding. Therefore, fetal malposition (defined as birth in occipitoposterior or

occipitotransverse), admission to NICU and type of feeding at discharge were added for analysis in Phase 4. Other additional variables such as birthweight, sex, Apgar score at 5 minutes, maternal BMI and cervical dilation at the time when sOT was started were included due to their relevance as highlighted in the literature (Chapter 2).

The dataset was received in Microsoft Excel® and downloaded into SPSS® Statistics 29 for analysis. The dataset was checked for completeness. Missing data were identified in the variables 'sex' (n=1), 'Apgar score' (n= 22), 'maternal BMI' (n=6), 'cervical dilation at the time when sOT was started' (n=1) and 'blood loss' (n=13). As in Phase 3, a decision was made to exclude cases pairwise (Kim et al., 2020a; Pallant, 2016). There were four cases of stillbirth in the dataset which were kept in all the analyses except for the outcome 'type of infant feeding at discharge'.

Descriptive statistics (frequencies and percentages) were used to describe the clinical characteristics of the women included. The dataset mainly contained categorical variables. Associations between AOL and binary categorical variables were analysed by using the Chi-square test. When analysing the relationship between two variables with two categories each (2 by 2 contingency tables), Yate's correction for continuity results were reported to compensate the overestimation of the Chi-square value (Pallant, 2016). Fisher's exact test was employed for cases in which the expected frequency in any cell was <5. For estimating the association between AOL and maternal age as well as AOL and maternal BMI (continuous variables not normally distributed), Mann-Whitney U test was employed.

To examine the relationship between AOL and the outcome 'mode of birth', multinomial logistic regression analyses were performed. As previously mentioned, multinomial logistic regression provides specific associations from a base category and is more efficient in estimating the likelihood of an event according to different variables compared to separate logistic regressions (Pampel, 2021).

In order to conduct a multinomial logistic regression analysis, there were three assumptions that had to be met: that the dependent variable (e.g. 'mode of birth') was categorical with three or more categories, that there were no significant outliers in the data and that there was no important multicollinearity. In order to check for outliers in the data, the dependant variable was recoded into dummy variables. Then, a binary logistic regression analysis for each dummy variable was conducted. Most of these variables did not present any outliers. When outliers were found (maximum seven cases in one

analysis), a decision was made to keep them in the analysis as the sample size of the study was large enough for them not to have a relevant impact on the results. Afterwards, a multicollinearity test using the VIF was conducted. The variables 'parity', 'maternal age', 'maternal BMI' and 'fetal growth $\geq 4,000\text{gr}$ ' were identified as potential confounders. The binary and multinomial logistic regressions examining the relationship between AOL and different interventions or events were adjusted for these confounders if they showed a statistically significant difference with the dependent variable being examined. The multicollinearity tests showed low correlations among the variables (all VIF <10) thus confirming their suitability for analysis.

Finally, to examine the relationship between AOL and some other outcomes, some continuous variables were recoded into categorical variables and some three-category variables were recoded into binary categorical variables. For example, to determine the association between AOL and 'fetal growth $\geq 4,000\text{gr}$ ', the variable 'birthweight' was recoded into a binary categorical variable (fetal growth $\geq 4,000\text{gr}/<4,000\text{gr}$). Likewise, the three-category variable 'type of infant feeding at discharge' was recoded into a binary variable (exclusive breastfeeding/no exclusive breastfeeding).

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guideline was followed in conducting and writing Phase 4 (von Elm et al., 2007).

7.5. Results

7.5.1. Baseline characteristics of the women included

In 2022, a total of 6,786 women gave birth in The Coombe maternity hospital. Of these women, 2,086 met the inclusion criteria. At the time of giving birth, women's mean age was ~ 32 years old and over a third were aged between 30-34. The proportion of nulliparous and multiparous women was 39.21% ($n=818$) and 60.79% ($n=1,268$) respectively. The vast majority 81.83% ($n=1,707$) opted for public care. In relation to health problems potentially complicating pregnancy, the most frequently reported complication was obesity ($\text{BMI} \geq 30\text{kg/m}^2$) which affected 13.8% of the women included ([Table 13](#)). The mean postnatal length of stay was ~ 2 days ($M\ 2.01$, $SD\ 1.12$).

Table 13: Baseline characteristics of the women included in Phase 4

Characteristics		Total (n)	%
Age	Less than 20	34	1.63
	20-24	184	8.82
	25-29	413	19.80
	30-34	730	35
	35-39	625	29.96
	40-44	95	4.55
	45 and over	5	0.24
Parity	Nulliparous	818	39.21
	Multiparous	1,268	60.79
Medical insurance	Public	1,707	81.83
	Semi-private	188	9.01
	Private	191	9.16
Health problems complicating pregnancy	Hypertensive disorders	28	1.34
	Pre-gestational diabetes	6	0.29
	Gestational diabetes	148	7.09
	Obesity	288	13.81
	Previous caesarean section	167	8

7.5.2. Baseline characteristics of the babies included

A total of 77.51% (n=1,617) of the babies included had a birthweight between 3,000-3,999 gr and ~11% (n=235) had a birthweight below 2,500 or above 4,000 gr. A total of 51.92% (n=1,083) of the women included gave birth to a male baby. At discharge, 35.81% (n=747) of the babies were exclusively breastfed. A total of 2.78% (n=58) were transferred to the NICU after birth and 0.63% (n=13) had an Apgar score <7 at 5 minutes ([Table 14](#)).

Table 14: Baseline characteristics of the babies included

Characteristics	Total (n)	%
Less than 2,500	15	0.72

Birthweight (Grammes)	2,500-2,999	234	11.22
	3,000-3,499	809	38.78
	3,500-3,999	808	38.73
	4,000-4,499	192	9.20
	Over 4,500	28	1.34
Sex	Female	1,002	48.03
	Male	1,083	51.92
Type of feeding on discharge	Breastfeeding	747	35.81
	Combined breast-formula	621	29.77
	Bottle-feeding	714	34.23
Admission to NICU	Yes	58	2.78
Apgar score at 5 minutes	< 7	13	0.63
	≥ 7	2,051	99.37

A total of 75.02% (n=1,565) of women had a spontaneous vaginal birth followed by 11.94% (n=249) who had a vacuum-assisted birth and 8.53% (n=178) who had a caesarean section. [Table 15](#) presents the mode of birth of the women included. Note that the category 'instrument-assisted and caesarean section' includes attempts of forceps-assisted and/or vacuum-assisted with a final caesarean section.

Table 15: Mode of birth of the women included

		Total (n)	%
Mode of birth	Spontaneous vaginal birth	1,565	75.02
	Forceps-assisted	64	3.07
	Vacuum-assisted	249	11.94
	Vacuum- and forceps-assisted	18	0.86
	Instrument-assisted and caesarean section	12	0.58
	Caesarean section	178	8.53

7.5.3. Prevalence and predisposing factors of augmentation of labour with synthetic oxytocin

The overall prevalence of AOL was 18.70% (n=390). For nulliparous and multiparous women, the prevalence of AOL was 37.41% (n=306) and 6.62% (n=84) respectively. At the time when sOT infusion was started, 58.35% (n=227) of the women had a cervical dilation of 0-4cm and 41.65% (n=162) of ≥ 5 cm.

In relation to predisposing factors, nulliparity significantly increased the likelihood of undergoing AOL (OR 8.42, 95% CI 6.48-10.96; RR 2.60, 95% CI 2.37-2.84; $p < 0.001$). Choosing private care also increased the risk of undergoing AOL (OR 1.67, 95% CI 1.19-2.35; RR 1.58, 95% CI 1.17-2.14; $p = 0.004$). Maternal age was statistically significantly lower in women who underwent AOL (Median=32 years) compared to women who did not (Median=33 years) (U 293,451.00, $z = -3.48$; $p < 0.001$). There were no differences in maternal BMI between women who underwent AOL (Median=24.50kg/M²) compared to women who did not (Median=24.45kg/M²) (U 333,811.50, $z = 0.40$; NS). Neither were there any differences between having a baby with a birthweight $< 4,000$ gr and having a baby with a birthweight $\geq 4,000$ gr in the likelihood of undergoing AOL (OR 1.06, 95% CI 0.75-1.51; RR 1.05, 95% CI 0.77-1.45; NS). These results are not shown in tabular form.

7.5.4. Augmentation of labour with synthetic oxytocin and mode of birth

[Table 16](#) shows the results of the unadjusted multinomial logistic regression analysis for the outcome 'mode of birth' with three possible categories. As displayed, AOL showed a statistically significant association with having an instrument-assisted birth (OR 5.40, 95% CI 4.15-7.05; RR 1.54; 95% CI 1.48-1.58; $p < 0.001$) and a caesarean section (OR 3.08 95% CI 2.18-4.35; RR 1.25; 95% CI 1.19-1.3; $p < 0.001$) compared to the reference category (spontaneous vaginal birth).

Table 16: Unadjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (three possible categories)

Mode of birth		Total (n)	OR	95% CI	P-value	RR	95% CI
Spontaneous vaginal birth	Ref	1,565	—	—	—	—	—
Instrument-assisted birth	No AOL	189	Ref	—	—	—	—
	AOL	142	5.40	4.15-7.05	< 0.001	1.54	1.48-1.58
Caesarean section	No AOL	133	Ref	—	—	—	—
	AOL	57	3.08	2.18-4.35	< 0.001	1.25	1.19-1.3

[Table 17](#) shows the results of the adjusted multinomial regression analysis for the outcome ‘mode of birth’ with three possible categories, taking spontaneous vaginal birth as the reference category. After adjustment by parity, having a baby with a birthweight $\geq 4,000\text{gr}$, maternal age and maternal BMI, AOL remained statistically significantly associated with having an instrument-assisted birth (aOR 2.62, 95% CI 1.95-3.52; RR 1.36; 95% CI 1.26-1.44; $p < 0.001$) and a caesarean section (aOR 1.99, 95% CI 1.36-2.90; RR 1.17; 95% CI 1.09-1.24; $p < 0.001$).

Table 17: Adjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (three possible categories)

Mode of birth		Total (n)	OR	95% CI	P- value	aRR	95% CI
Spontaneous vaginal birth	Ref	1,565	—	—	—	—	—
Instrument-assisted birth	No AOL	189	Ref	—	—	—	—
	AOL	142	2.62	1.95-3.52	<0.001	1.36	1.26-1.44
	Multiparous	65	Ref	—	—	—	—
	Nulliparous	266	8.92	6.44-12.36	<0.001	—	—
	No excessive fetal growth	301	Ref	—	—	—	—
	Excessive fetal growth	30	1.16	0.73-1.84	NS	—	—
	Maternal age	—	1.05	1.02-1.08	<0.001	—	—
	Maternal BMI	—	0.94	0.91-0.97	<0.001	—	—
Caesarean section	No AOL	133	Ref	—	—	—	—
	AOL	57	1.99	1.36-2.90	<0.001	1.17	1.09-1.24
	Multiparous	87	Ref	—	—	—	—
	Nulliparous	103	2.97	2.09-4.24	<0.001	—	—

No excessive fetal growth	160	Ref	—	—	—	—
Excessive fetal growth	30	1.79	1.16-2.77	<0.001	—	—
Maternal age	—	1.04	1.01-1.08	0.009	—	—
Maternal BMI	—	1.04	1.01-1.07	0.023	—	—

[Table 18](#) presents the results of the unadjusted multinomial logistic regression analysis for the outcome ‘mode of birth’ with six possible categories. Compared to the reference category (spontaneous vaginal birth), AOL showed an increased risk for having a forceps-assisted birth (OR 7.66, 95% CI 4.58-12.79; RR 1.81, 95% CI 1.67-1.91; $p<0.001$), a vacuum-assisted birth (OR 4.99, 95% CI 3.72-6.70; RR 1.49, 95% CI 1.43-1.53; $p<0.001$), a vacuum- and forceps-assisted birth (OR 4.58, 95% CI 1.75-11.95; RR 1.44, 95% CI 1.20-1.55; $p=0.002$), an instrument attempt with a final caesarean section (OR 10.07, 95% CI 3.16-32.05; RR 2.11, 95% CI 1.67-2.30; $p<0.001$) and a caesarean section (OR 2.81, 95% CI 1.96-4.03; RR 1.22, 95% CI 1.16-1.27; $p<0.001$).

Table 18: Unadjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (six possible categories)

Mode of birth		Total (n)	OR	95% CI	P- value	RR	95% CI
Spontaneous vaginal birth	Ref	1,565	Ref	—	—	—	—
Forceps-assisted	No AOL	31	Ref	—	—	—	—
	AOL	33	7.66	4.58-12.79	<0.001	1.81	1.67-1.91
Vacuum-assisted	No AOL	147	Ref	—	—	—	—
	AOL	102	4.99	3.72-6.70	<0.001	1.49	1.43-1.53
Vacuum- and forceps- assisted	No AOL	11	Ref	—	—	—	—
	AOL	7	4.58	1.75-11.95	0.002	1.44	1.2-1.55

Instrument and caesarean section	No	5	Ref	—	—	—	—
	AOL						
	AOL	7	10.07	3.16-32.05	<0.001	2.11	1.67-2.30
Caesarean section	No	128	Ref	—	—	—	—
	AOL						
	AOL	50	2.81	1.96-4.03	<0.001	1.22	1.16-1.27

[Table 19](#) shows the results of the adjusted multinomial regression analysis for the outcome ‘mode of birth’ with six possible categories, taking spontaneous vaginal birth as the reference category. After adjustment by parity, having a baby with a birthweight $\geq 4,000$ gr, maternal age and maternal BMI, AOL remained statistically significant for having a forceps-assisted birth (aOR 3.37, 95% CI 1.95-5.83; aRR 1.57; 95% CI 1.33-1.75; $p < 0.001$), a vacuum-assisted birth (aOR 2.52, 95% CI 1.82-3.49; aRR 1.33; 95% CI 1.23-1.41; $p < 0.001$), an instrument attempt with a final caesarean section (aOR 5.08, 95% CI 1.49-17.31; aRR 1.88; 95% CI 1.24-2.22; $p = 0.009$) and a caesarean section (aOR 1.84, 95% CI 1.24-2.73; aRR 1.15; 95% CI 1.06-1.22; $p = 0.003$).

Table 19: Adjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (six possible categories)

Mode of birth		Total (n)	aOR	95% CI	P- value	aRR	95% CI
Spontaneous vaginal birth	Ref	1,565	Ref	—	—	—	—
Forceps-assisted	No AOL	31	Ref	—	—	—	—
	AOL	33	3.37	1.95-5.83	<0.001	1.57	1.33-1.75
	Multiparous	9	Ref	—	—	—	—
	Nulliparous	55	11.87	5.50-25.63	<0.001	—	—
	No excessive fetal growth	56	Ref	—	—	—	—
	Excessive fetal growth	8	1.67	0.75-3.71	NS	—	—
	Maternal age	*	1.03	0.98-1.09	NS	—	—

	Maternal BMI	*	0.97	0.91-1.03	NS	—	—
Vacuum-assisted	No AOL	147	Ref	—	—	—	—
	AOL	102	2.52	1.82-3.49	<0.001	1.33	1.23-1.41
	Multiparous	54	Ref	—	—	—	—
	Nulliparous	195	7.95	5.56-11.37	<0.001	—	—
	No excessive fetal growth	228	Ref	—	—	—	—
	Excessive fetal growth	21	1.08	0.65-1.82	NS	—	—
	Maternal age	*	1.05	1.02-1.08	0.001	—	—
	Maternal BMI	*	0.93	0.89-0.96	<0.001	—	—
Vacuum- and forceps- assisted	No AOL	11	Ref	—	—	—	—
	AOL	7	1.86	0.69-5.06	NS	1.22	0.85-1.45
	Multiparous	2	Ref	—	—	—	—
	Nulliparous	16	22	4.68-103.50	<0.001	—	—
	No excessive fetal growth	17	Ref	—	—	—	—
	Excessive fetal growth	1	0.72	0.09-5.57	NS	—	—
	Maternal age	*	1.09	0.99-1.20	NS	—	—
	Maternal BMI	*	0.96	0.86-1.08	NS	—	—
Instrument and caesarean section	No AOL	5	Ref	—	—	—	—
	AOL	7	5.08	1.49-17.31	0.009	1.88	1.24-2.22
	Multiparous	2	Ref	—	—	—	—
	Nulliparous	10	7.32	1.39-38.39	0.019	—	—
	No excessive fetal growth	10	Ref	—	—	—	—
	Excessive fetal growth	2	2.42	0.50-11.60	NS	—	—
	Maternal age	*	0.99	0.88-1.11	NS	—	—
	Maternal BMI	*	0.90	0.76-1.05	NS	—	—
Caesarean section	No AOL	128	Ref	—	—	—	—
	AOL	50	1.84	1.24-2.73	0.003	1.15	1.06-1.22
	Multiparous	85	Ref	—	—	—	—

Nulliparous	93	2.86	1.99-4.13	<0.001	—	—
No excessive fetal growth	150	Ref	—	—	—	—
Excessive fetal growth	28	1.76	1.13-2.76	0.013	—	—
Maternal age	*	1.05	1.01-1.08	0.006	—	—
Maternal BMI	*	1.04	1.01-1.08	0.007	—	—

7.5.5. Augmentation of labour with synthetic oxytocin and adverse perinatal outcomes

[Table 20](#) presents the results of the unadjusted binary logistic regression analyses exploring the relationships between AOL and different adverse perinatal outcomes. Women who underwent AOL were more likely to have suspected fetal hypoxia during labour as per CTG trace or scalp pH results (OR 3.80, 95% CI 2.97-4.86; RR 2.75, 95% CI 2.30-3.27; $p<0.001$), of having their baby admitted to NICU (OR 2.36, 95% CI 1.36-4.10; RR 2.29, 95% CI 1.35-3.89; $p=0.003$) and of having a postpartum haemorrhage (OR 2.11, 95% CI 1.60-2.80; RR 1.86, 95% CI 1.50-2.34; $p<0.001$). No statistically significant association was observed between AOL and shoulder dystocia (OR 0.87, 95% CI 0.19-3.98; RR 0.87, 95% CI 0.19-3.27; NS) nor between AOL and having a 3rd or 4th degree perineal tear (OR 1.36, 95% CI 0.64-2.89; RR 1.35, 95% CI 0.64-2.82; NS). Note that due to the frequency of ‘Apgar score at 5 minutes <7’, statistical analysis was not possible for this outcome.

Table 20: Unadjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and adverse perinatal outcomes

Adverse perinatal outcomes	No AOL (n)	AOL (n)	Total (n)	OR	95% CI	P-value	RR	95% CI
Suspected fetal hypoxia	233	147	380	3.80	2.97-4.86	<0.001	2.7 5	2.30-3.27
Shoulder dystocia	10	2	12	0.87	0.19-3.98	NS	0.8 7	0.19-3.95

Admission to NICU	38	20	58	2.36	1.36-4.10	0.003	2.2 9	1.35-3.89
3 rd or 4 th degree perineal tear	29	9	38	1.36	0.64-2.89	NS	1.3 5	0.64-2.82
Postpartum haemorrhage	200	86	286	2.11	1.60-2.80	<0.001	1.8 6	1.50-2.34

[Table 21](#) contains the results of the adjusted binary logistic regression analyses comparing AOL and the abovementioned adverse perinatal outcomes. Note that the analyses have been adjusted for the confounders that showed a statistically significant difference for the adverse perinatal outcome under study. Women who underwent AOL showed a ~20% increase in the risk of having suspected fetal hypoxia during labour as per CTG trace or scalp pH results (aOR 1.81, 95% CI 1.37-2.38; aRR 1.21, 95% CI 1.12-1.29; p<0.001) and of having their baby admitted to NICU (aOR 2.01, 95% CI 1.09-3.71; aRR 1.21, 95% CI 1.03-1.34; p=0.026). There were no significant differences in shoulder dystocia (aOR 0.85, 95% CI 0.19-3.92; aRR 0.97, 95% CI 0.58-1.14; NS), in having a 3rd or 4th degree perineal tear (aOR 0.95, 95% CI 0.42-2.14; aRR 0.99, 95% CI 0.75-1.14; NS) nor in having a postpartum haemorrhage (aOR 1.44, 95% CI 1.05-1.96; aRR 1.10, 95% CI 1.01-1.17; NS).

Table 21: Adjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and adverse perinatal outcomes

Adverse perinatal outcomes		Total (n)	aOR	95% CI	P-value	aRR	95% CI
Suspected fetal hypoxia	No AOL	233	Ref	—	—	—	—
	AOL	147	1.81	1.37-2.38	<0.001	1.21	1.12-1.29
	Multiparous	79	Ref	—	—	—	—
	Nulliparous	301	7.59	5.64-10.20	<0.001	—	—
	Maternal age	*	1.02	0.99-1.04	NS	—	—
	Maternal BMI	*	0.96	0.94-0.99	0.012	—	—
Shoulder dystocia	No AOL	10	Ref	—	—	—	—
	AOL	2	0.85	0.19-3.92	NS	0.97	0.58-1.14

	No excessive fetal growth	7	Ref	—	—	—	—
	Excessive fetal growth	5	6.19	1.95-19.66	0.002	—	—
Admission to NICU	No AOL	38	Ref	—	—	—	—
	AOL	20	2.01	1.09-3.71	0.026	1.21	1.03-1.34
	Multiparous	27	Ref	—	—	—	—
	Nulliparous	31	1.41	0.79-2.52	NS	—	—
3 rd or 4 th degree perineal tear	No AOL	29	Ref	—	—	—	—
	AOL	9	0.95	0.42-2.14	NS	0.99	0.75-1.14
	Multiparous	16	Ref	—	—	—	—
	Nulliparous	22	2.19	1.10-4.39	0.026	—	—
Postpartum haemorrhage	No AOL	200	Ref	—	—	—	—
	AOL	86	1.44	1.05-1.96	0.022	1.10	1.01-1.17
	Multiparous	120	Ref	—	—	—	—
	Nulliparous	166	2.35	1.77-3.11	<0.001	—	—
	No excessive fetal growth	236	Ref	—	—	—	—
	Excessive fetal growth	50	2.29	1.60-3.26	<0.001	—	—
	Maternal BMI	*	1.03	1-1.06	0.035	—	—

7.5.6. Augmentation of labour with synthetic oxytocin and childbirth interventions

[Table 22](#) contains the results of the unadjusted binary logistic regression analyses comparing AOL and several childbirth interventions. During labour, women who had their labour augmented were almost four times more likely to undergo fetal scalp blood sampling (OR 3.99, 95% CI 2.36-6.78; RR 3.79, 95% CI 2.28-6.28; $p < 0.001$), three times more likely to have epidural analgesia before or after its administration (OR 19.81, 95% CI 14.23-27.58; RR 3.12; 95% CI 2.87-3.38; $p < 0.001$) and over twice as likely to have an episiotomy (OR 3.75, 95% CI 2.98-4.72; RR 2.37, 95% CI 2.07-2.72; $p < 0.001$) compared to women who did not undergo AOL.

Table 22: Unadjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and childbirth interventions

Childbirth interventions	No AOL (n)	AOL (n)	Total (n)	OR	95% CI	P- value	RR	95% CI
Fetal scalp blood sampling	31	27	58	3.99	2.36-6.78	<0.001	3.7 9	2.28- 6.28
Internal fetal monitoring	15	3	18	0.87	0.25-3.02	NS	0.8 7	0.25- 2.99
Epidural analgesia	482	346	828	19.81	14.23-27.58	<0.001	3.1 2	2.87- 3.38
Episiotomy	357	195	552	3.75	2.98-4.72	<0.001	2.3 7	2.07- 2.72

[Table 23](#) contains the results of the adjusted binary logistic regression analyses comparing AOL and the abovementioned childbirth interventions. Women who underwent AOL showed a 34% increase in the risk of undergoing fetal scalp blood sampling during labour (aOR 2.22, 95% CI 1.25-3.94; aRR 1.34, 95% CI 1.10-1.53; p=0.007) and a 63% increase of having epidural analgesia (aOR 14.09, 95% CI 10.02-19.80; aRR 1.63; 95% CI 1.60-1.66; p <0.001). Note internal fetal monitoring has been omitted from the table as none of the potential confounders showed a statistically significant association.

Table 23: Adjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and childbirth interventions

Childbirth interventions		Total (n)	aOR	95% CI	P- value	aRR	95% CI
Fetal scalp blood sampling	No AOL	31	Ref	—	—	—	—
	AOL	27	2.22	1.25-3.94	0.007	1.34	1.10-1.53
	Multiparous	14	Ref	—	—	—	—
	Nulliparous	44	3.92	2.03-7.57	<0.001	—	—
	Maternal BMI	*	1.06	1-1.11	0.40	—	—
Epidural analgesia	No AOL	482	Ref	—	—	—	—

	AOL	346	14.09	10.02-19.80	<0.001	1.63	1.60-1.66
	Multiparous	337	Ref	—	—	—	—
	Nulliparous	491	2.48	1.98-3.11	<0.001	—	—
	No excessive fetal growth	726	Ref	—	—	—	—
	Excessive fetal growth	102	1.65	1.19-2.28	0.002	—	—
	Maternal age	*	1	0.98-1.02	NS	—	—
Episiotomy	No AOL	357	Ref	—	—	—	—
	AOL	195	1.72	1.32-2.24	<0.001	1.17	1.09-1.24
	Multiparous	131	Ref	—	—	—	—
	Nulliparous	421	8.67	6.71-11.21	<0.001	—	—
	Maternal age	*	1.03	1.01-1.05	0.008	—	—
	Maternal BMI	*	0.94	0.91-0.96	<0.001	—	—

Two final analyses were performed. A bivariate analysis showed a positive relationship between AOL and fetal malpositions (OR 2.66, 95% CI 1.97-3.58; RR 2.32, 95% CI 1.81-2.32; $p<0.001$). After adjustment by parity, AOL remained statistically significant (aOR 2.20, 95% CI 1.58-3.05; RR 1.23, 95% CI 1.15-1.30; $p<0.001$). Another bivariate analysis showed an inverse relationship between AOL and exclusive breastfeeding at discharge (OR 0.66, 95% CI 0.52-0.84; RR 0.76, 95% CI 0.64-0.90; $p<0.001$). After adjustment by parity, maternal age and maternal BMI, AOL remained statistically significant although it was borderline (aOR 0.76, 95% CI 0.58-0.99; RR 0.95, 95% CI 0.90-1; $p=0.044$). These results are not shown in tabular form.

7.6. Conclusions

Phase 4 aimed to identify associated factors with AOL among women birthing within the Irish context – objective iv). A single-site cross-sectional study was conducted. Following ethical approval, data from 2,086 women were analysed through descriptive and inferential statistics in SPSS® Statistics 29. The overall prevalence of AOL was 18.70% (n=390). A total of 37.41% (n=306) of nulliparous women underwent AOL compared to 6.62% (n=84) of multiparous women. At the time when sOT infusion was started, 58.35% of the women had a cervical dilatation of 0-4cm. Nulliparity (OR 8.42, 95% CI 6.48-10.96; RR 2.60, 95% CI 2.37-2.84; $p<0.001$) and private care (OR 1.67, 95% CI 1.19-2.35; RR 1.58, 95% CI 1.17-2.14; $p=0.004$) significantly increased the likelihood of undergoing AOL. Maternal age was significantly lower in women who underwent AOL (Median=32 years) compared to women who did not (Median=33 years) (U 293,451.00, z -3.48; $p<0.001$) while no differences in maternal BMI nor in having a baby with a birthweight $\geq 4,000$ gr were observed between women who underwent AOL compared to women who did not. A crude multinomial regression analysis showed that AOL was significantly associated with having an instrument-assisted birth (OR 5.40, 95% CI 4.15-7.05; RR 1.54; 95% CI 1.48-1.58; $p<0.001$) and a caesarean section (OR 3.08 95% CI 2.18-4.35; RR 1.25; 95% CI 1.19-1.3; $p<0.001$) compared to the reference category (spontaneous vaginal birth). After adjustment by parity, having a baby with a birthweight $\geq 4,000$ gr, maternal age and maternal BMI, AOL remained statistically significantly associated with having an instrument-assisted birth (aOR 2.62, 95% CI 1.95-3.52; RR 1.36; 95% CI 1.26-1.44; $p<0.001$) and a caesarean section (aOR 1.99, 95% CI 1.36-2.90; RR 1.17; 95% CI 1.09-1.24; $p<0.001$). When exploring the relationships between AOL and different adverse perinatal outcomes, crude binary logistic regression analyses indicated that women who underwent AOL were more likely to have suspected fetal hypoxia during labour as per CTG trace or fetal scalp pH results (OR 3.80, 95% CI 2.97-4.86; RR 2.75, 95% CI 2.30-3.27; $p<0.001$), of having their baby admitted to NICU (OR 2.36, 95% CI 1.36-4.10; RR 2.29, 95% CI 1.35-3.89; $p=0.003$) and of having a postpartum haemorrhage (OR 2.11, 95% CI 1.60-2.80; RR 1.86, 95% CI 1.50-2.34; $p<0.001$). After adjustment for potential confounders, only the risk of having suspected fetal hypoxia during labour as per CTG trace or scalp pH results (aOR 1.81, 95% CI 1.37-2.38; aRR 1.21, 95% CI 1.12-1.29; $p<0.001$) and of having their baby admitted to NICU (aOR 2.01, 95% CI 1.09-3.71; aRR 1.21, 95% CI 1.03-1.34; $p=0.026$) remained statistically significant. In regard to childbirth interventions, women who had their labour augmented were more likely to undergo fetal scalp blood sampling (OR 3.99, 95% CI 2.36-

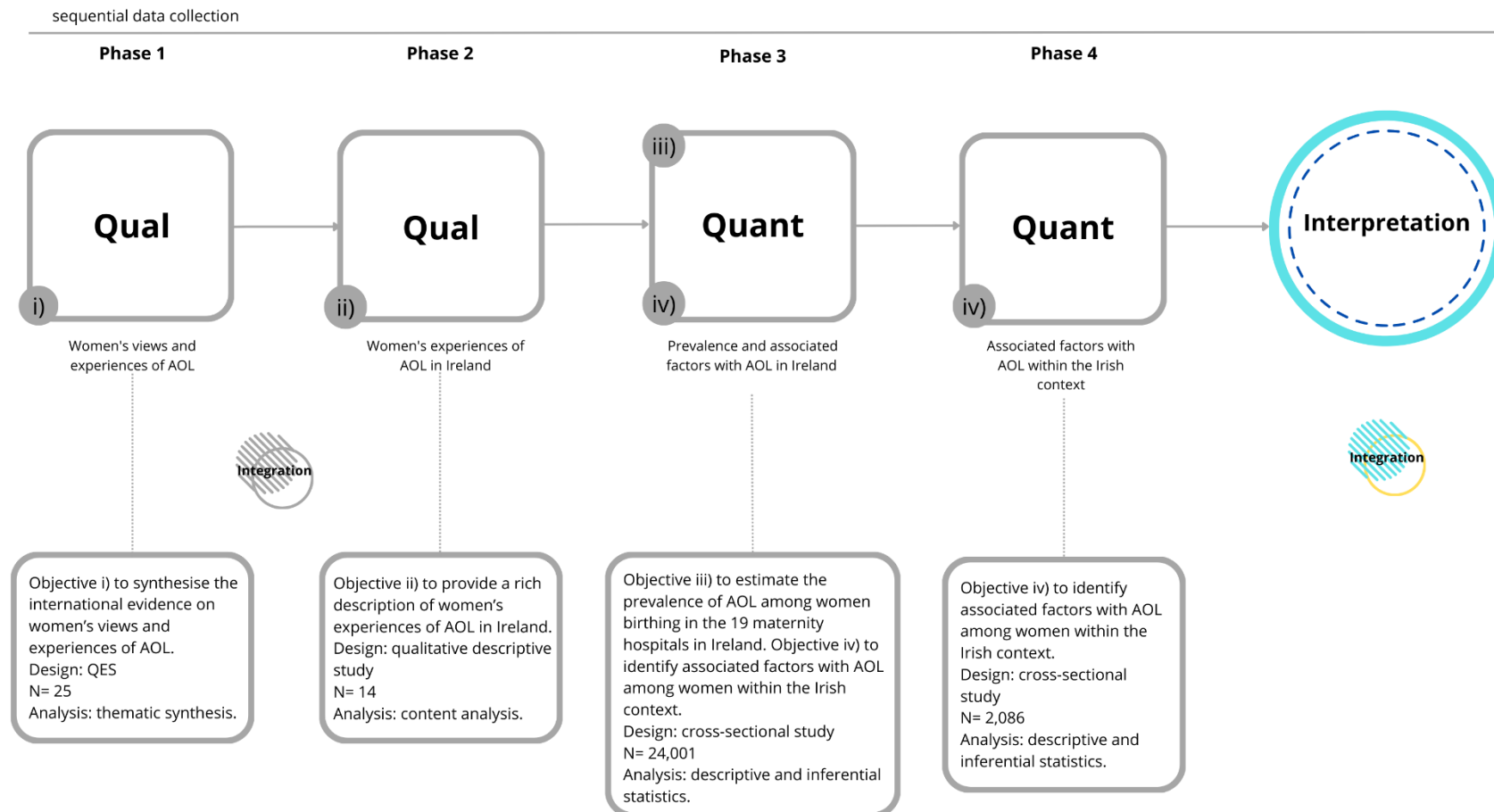
6.78; RR 3.79, 95% CI 2.28-6.28; $p<0.001$) to have epidural analgesia (OR 19.81, 95% CI 14.23-27.58; RR 3.12; 95% CI 2.87-3.38; $p<0.001$) and to have an episiotomy (OR 3.75, 95% CI 2.98-4.72; RR 2.37, 95% CI 2.07-2.72; $p<0.001$). The adjusted binary logistic regression analyses comparing AOL and the abovementioned childbirth interventions found that the risks of undergoing fetal scalp blood sampling during labour (aOR 2.22, 95% CI 1.25-3.94; aRR 1.34, 95% CI 1.10-1.53; $p=0.007$) and of having epidural analgesia (aOR 14.09, 95% CI 10.02-19.80; aRR 1.63; 95% CI 1.60-1.66; $p<0.001$) remained statistically significant.

8. Chapter 8: Discussion

8.1. Introduction

This chapter presents the discussion of the present study. The chapter begins with the key meta-inferences of this mixed methods study, overall understandings resulting from the integration of the qualitative and the quantitative components. These are shown in a joint display and then discussed in relation to the wider scientific literature. Other findings from the qualitative or quantitative components of the study according to each phase are also discussed afterwards. Finally, strengths and limitations of the study are outlined. [Figure 12](#) shows where the discussion fits within the thesis as a whole.

Figure 12: Diagram of the study design. Chapter focusing on the overall interpretation and discussion



8.2. Integration and discussion of the mixed methods findings

A joint display has been chosen to visually integrate and report the mixed methods findings of the present study. In it, supporting findings from Phases 1, 2, and 4 are brought together to draw meta-inferences and develop overall understandings of the study with a higher level of interpretation (Fetters & Freshwater, 2015). Meta-inferences are then discussed in the context of the wider international literature, strengthening the understanding of AOL from a global perspective.

Table 24: Joint display of the integrated study findings

Meta-inference	Supporting qualitative findings from Phases 1 and 2	Supporting quantitative findings from Phase 4
Augmentation of labour with synthetic oxytocin is overused in clinical practice	- Many women shared the view that AOL was often performed routinely or for non-clinically indicated reasons. - Some women thought that AOL was part of having a 'normal' birth and even expected their labour to be augmented. - Some women thought that by having their labour augmented, they were being 'rushed' to give birth within a certain time frame and, retrospectively, they wished they had been given more time to labour on their own. - Many women who were satisfied with the decision to have their labour augmented at the time, felt betrayed when reading, sharing, and comparing their birth experience to other women's birth experiences afterwards and realising that many others had had a similar experience. - Most women underwent AOL during their first birth experience. Women who had a subsequent birth experience used strategies to avoid having their labour augmented again.	- The prevalence of AOL was 18.70%. A total of 37.41% and 6.62% of nulliparous and multiparous women underwent AOL respectively. - Nulliparity was the most determinant predisposing factor that significantly increased the likelihood of undergoing AOL (OR 8.42, 95% CI 6.48-10.96; RR 2.60, 95% CI 2.37-2.84; $p < 0.001$). - A total of 58.35% of the women who underwent AOL had a cervical dilation of 0-4cm which is before it is clinically recommended to intervene due to active labour having not commenced.

Augmentation of labour with synthetic oxytocin is painful	• Women consistently described AOL as atypically painful. They identified a clear shift in the intensity of the pain between non-augmented and augmented contractions. • For many, this intense pain caused by AOL meant requesting epidural analgesia, even when they had not planned on using this pain relief method. • Many women pointed to the pain of AOL as a significant cause of their negative birth experience.	• There was a strong association between AOL and epidural analgesia (OR 19.81, 95% CI 14.23-27.58; RR 3.12; 95% CI 2.87-3.38; $p < 0.001$) that remained statistically significant after adjustment for potential confounders (aOR 14.09, 95% CI 10.02-19.80; aRR 1.63; 95% CI 1.60-1.66; $p < 0.001$). However, this result should be interpreted with caution as no data was available on whether women underwent AOL before or after its administration.
Augmentation of labour with synthetic oxytocin is related to further childbirth interventions	• Women linked their experience of AOL to having further childbirth interventions subsequently performed during their labour in order to ensure their baby's safety and wellbeing. • The 'cascade of interventions' was used by women to describe these further childbirth interventions. • Women also used the 'cascade of interventions' to illustrate a loss of autonomy during their birth experiences when they underwent AOL. After having their labour augmented, women felt that they had no other option but to accept the subsequent childbirth interventions that were presented to them in order to ensure their baby's safety and wellbeing. In the	• An association was found between AOL and suspected fetal hypoxia (OR 3.80, 95% CI 2.97-4.86; RR 2.75, 95% CI 2.30-3.27; $p < 0.001$) that remained statistically significant after adjustment by potential confounders (aOR 1.81, 95% CI 1.37-2.38; aRR 1.21, 95% CI 1.12-1.29; $p < 0.001$). From a clinical point of view, this association could explain the need to perform further childbirth interventions to assess or ensure the baby's safety and wellbeing. • A positive association between AOL and undergoing fetal scalp blood sampling was found in crude (OR 3.99, 95% CI 2.36-6.78; RR 3.79, 95% CI 2.28-6.28; $p < 0.001$) and adjusted analyses (aOR 2.22, 95% CI 1.25-3.94; aRR 1.34, 95% CI 1.10-1.53;

	women's stories, fetal scalp blood sampling, internal fetal monitoring, episiotomy, instrument-assisted birth and caesarean section were spoken about.	p=0.007), but no statistically significant difference was found in the risk of having internal fetal monitoring (OR 0.87, 95% CI 0.25-3.02; RR 0.87, 95% CI 0.25-2.99; NS). Given the low absolute numbers of these two variables, these results should be interpreted with caution. • Women who underwent AOL showed an increased risk of having performed an episiotomy (OR 3.75, 95% CI 2.98-4.72; RR 2.37, 95% CI 2.07-2.72; p <0.001) that remained statistically significant after adjustment by potential confounders (aOR 1.72, 95% CI 1.32-2.24; aRR 1.17, 95% CI 1.09-1.24; p<0.001). • An association was found between AOL and instrument-assisted births (OR 5.40, 95% CI 4.15-7.05; RR 1.54; 95% CI 1.48-1.58; p <0.001) and caesarean sections (OR 3.08 95% CI 2.18-4.35; RR 1.25; 95% CI 1.19-1.3; p <0.001). After adjustment by potential confounders, the association remained statistically significant for both instrument-assisted births (aOR 2.62, 95% CI 1.95-3.52; RR 1.36; 95% CI 1.26-1.44; p <0.001) and caesarean sections (aOR 1.99, 95% CI 1.36-2.90; RR 1.17; 95% CI 1.09-1.24; p <0.001).

Augmentation of labour with synthetic oxytocin is related to some adverse perinatal outcomes	Some women wondered whether there was a link between AOL and some further complications that they had in their birth experiences. These included having a postpartum haemorrhage or having their baby admitted to NICU.	- An association between AOL and postpartum haemorrhage was observed (OR 2.11, 95% CI 1.60-2.80; RR 1.86, 95% CI 1.50-2.34; $p<0.001$). This remained statistically significant after adjustment by potential confounders (aOR 1.44, 95% CI 1.05-1.96; aRR 1.10, 95% CI 1.01-1.17; $p=0.022$). - A positive correlation was found between AOL and admission to NICU (OR 2.36, 95% CI 1.36-4.10; RR 2.29, 95% CI 1.35-3.89; $p=0.003$) that remained statistically significant after adjustment by parity (aOR 2.01, 95% CI 1.09-3.71; aRR 1.21, 95% CI 1.03-1.34; $p=0.026$).
Augmentation of labour with synthetic oxytocin is linked to fetal malpositions	- Some women thought that their labour was augmented because of a baby malposition and wondered about alternatives to AOL that could have supported them in giving birth in the case of fetal malpositions. - Several women subsequently learned about mechanical alternatives that can be used to prevent and correct a fetal malposition during labour.	An association was found between AOL and fetal malpositions (OR 2.66, 95% CI 1.97-3.58; RR 2.32, 95% CI 1.81-2.98; $p<0.001$). After adjustment by parity, this difference remained statistically significant (aOR 2.20, 95% CI 1.58-3.05; RR 1.23, 95% CI 1.15-1.30; $p<0.001$).

Augmentation of labour with synthetic oxytocin may influence breastfeeding outcomes	• Women expressed different views in relation to AOL and breastfeeding. While some women saw breastfeeding as an opportunity to compensate for their negative birth experience undergoing AOL, others opted to bottle feed their babies to avoid any potential additional complications related to breastfeeding.	• An inverse association between AOL and exclusive breastfeeding was found (OR 0.66, 95% CI 0.52-0.84; RR 0.76, 95% CI 0.64-0.90; $p < 0.001$). However, after adjustment by potential confounders, AOL remained statistically significant but borderline (aOR 0.76, 95% CI 0.58-0.99; RR 0.95, 95% CI 0.90-1; $p = 0.044$).

8.3. Discussion of the meta-inferences

8.3.1. Augmentation of labour with synthetic oxytocin is overused in clinical practice

Qualitative findings of this study demonstrate that women shared the view that AOL is being overused in clinical practice. Women commented negatively about time constraints to give birth and referred to hospital routines, protocols and policies to elaborate on the overuse of AOL. In their experiences of AOL, women narrated how they felt under pressure to accept having their labour augmented and were subjected to several forms of coercion such as an insistence on the need of performing the intervention or a magnification of the risks to the baby's safety and wellbeing. As reported elsewhere (Beck, 2004; Greenfield et al., 2022), a global sense of betrayal emerged from women's experiences of AOL. After reading, sharing and comparing their birth experience to other women, they too often realised that they had had a similar experience. Retrospectively, many women wished that they had been given more time to labour on their own and regretted having undergone AOL. Another qualitative finding that supported the overuse of AOL was that some women with limited knowledge on AOL or from countries with underdeveloped maternal healthcare services thought that AOL was part of having a 'normal' birth, adding compelling evidence that women's perceptions of normality in childbirth are shaped by the environment in which they give birth in (Pazandeh et al., 2017). Viewing AOL as part of having a 'normal birth' and expecting labour to be augmented can be understood as a symptom of the overmedicalisation of childbirth as a global phenomenon. In countries such as India or Iran where over 70% of women have their labour augmented (Miller et al., 2016), it is no surprise that beliefs about the usefulness of AOL for a successful childbirth may be becoming engrained in society. Arguably, the implementation of specific guidelines and clear thresholds for interventions such as AOL as well as unburdened maternity hospitals, may facilitate steps towards minimising unnecessary childbirth interventions (Maaløe et al., 2023) and, shift the public perception of childbirth over time.

The overuse of AOL was particularly noticeable in women's first birth experience. These women explained how they chose different strategies in their subsequent pregnancies such as opting for a homebirth, a waterbirth, or an elective caesarean section. These are consistent with previous studies (Hauck et al., 2020; Jackson et al., 2020; Keedle et al., 2023; Panda, 2020). Likewise, it was remarkable to hear that in order to avoid AOL, several women delayed admission to hospital until the very last moment of their subsequent birth experience. Feeling rushed to give birth within a strict time frame, feeling pressured to

accept AOL among other interventions, not being properly informed about the risks of these and going home with doubts and regrets regarding the decisions that were made resulted in women subsequently trying to protect themselves by distancing themselves from healthcare professionals. This is a concerning finding. To prefer giving up on assistance during labour, even for a determined period of time, is a clear symptom of a loss of trust in the healthcare system and the professionals working within it. Narratives from women's experiences of AOL provided examples where they felt that healthcare professionals disregarded their needs in order to satisfy the needs of '*the system*'. Similar findings were reported by Gregory et al. (2023) in a mixed methods study comparing women's experiences of giving birth in maternity hospitals versus homebirths in Ireland. Women's attitude irretrievably shifted from being passive and trusting of to becoming active and sceptical towards healthcare professionals as a result of their experiences undergoing AOL. For these women, subsequent pregnancies were seen as a second chance and an opportunity to heal from their experiences of AOL. To do so, it was imperative to fully analyse and understand their rights in terms of autonomy, the rationale behind having their labour augmented and the other childbirth interventions that were performed, and the available alternatives for each of these. In their subsequent pregnancies, women birthed with significantly more information. Mirroring these findings, an Australian survey-based study that gathered qualitative data (n=6,101) summarised comparable findings under the label '*Next time I'll be ready*' (Keedle et al., 2023, p.8). While this may be interpreted as a logical course of action for women wanting to have a different birth experience, healthcare professionals and policy makers must listen to women's experiences of AOL and seek ways to improve maternity services.

Quantitative findings of this study found that, while AOL is occasionally performed among multiparous women with a rate of 6.62%, it is used among 37.41% of nulliparous women within the Irish context. In other words, over one in three women who start labour spontaneously undergo AOL in their first birth experience. Indeed, nulliparity emerged as the most determinant factor with a 2.60-fold increase in the risk⁸ for undergoing AOL. Therefore, this study contributed to the body of knowledge pointing to AOL as one of the most frequently performed childbirth interventions among nulliparous women with spontaneous onset of labour (Oscarsson et al., 2006; Selin et al., 2009; WHO, 2014). These findings are in line with the National Maternity Hospital (2023), another Irish tertiary

⁸ Note risk refers to results in RR.

maternity hospital, in which the most recently reported rates of AOL were 3.8% and 44.2% among multiparous and nulliparous women respectively. To the best of this author's knowledge, no other maternity hospital in Ireland reports on AOL rates (Ireland South Women & Infants Directorate, 2022; The Rotunda Hospital, 2023; Women's & Children's Managed Clinical & Academic Network, 2023). In contrast, other European studies observed considerable differences in the use of AOL between maternity hospitals within the same country (Helbig et al., 2019; Seijmonsbergen-Schermer et al., 2018). For instance, Johnson et al. (2024) found that the use of AOL ranged from 10% to 33% among multiparous women and from 47% to 73% among nulliparous women across forty maternity hospitals in Sweden. It is worth referring to the rationale behind the substantial difference in AOL rates noted between multiparous and nulliparous women. Literature on labour duration demonstrated that, on average, multiparous women spend less than half time in the active phase compared to nulliparous women (4.6 hours vs 11.9 hours), with nulliparous women being more likely to have their labour augmented when their labour progression is still within normal ranges (Tilden et al., 2022).

Noteworthy, considerable differences depending on other factors were also observed such as cervical dilation at the time when sOT infusion was started. A total of 58.35% women had a cervical dilatation of 0-4cm (i.e. before active labour had commenced) compared to 41.65% who had cervical dilatation of ≥ 5 cm. Accelerating labour is only clinically indicated in women in active labour with an abnormal labour progression (WHO, 2018). Indeed, several studies have suggested delaying admission to hospital until women are in active labour as a strategy to avoid potentially unnecessary childbirth interventions such as AOL after observing an increased risk of these in women admitted in early labour (Miller et al., 2020; Rota et al., 2018). For instance, Iobst et al. (2019), in a large cross-sectional study (n=21,858) found that women admitted to hospital at 0-3cm cervical dilatation had a five-fold increased risk of undergoing AOL compared to women admitted at 6-10cm cervical dilatation, after adjusting by maternal characteristics. Although no specific data on cervical dilation at admission to hospital was available in the current study, the fact that more than half of the women who underwent AOL were not in active labour point to similar conclusions. It also emphasises the need to move towards a more conservative, wait-and-see approach that enables women to labour for longer periods before AOL is considered, perhaps while also exploring other ways to support them in early labour.

8.3.2. Augmentation of labour with synthetic oxytocin is painful

Qualitative findings of this study showed how women strongly reported on the pain of the augmented contractions when recalling their birth experiences and presented strong similarities irrespective of the country, context, or parity. Women recounted the experience of having their labour augmented as being atypically painful and pointed to AOL as a cause of negative childbirth experiences, related or not to the experience of labour dystocia. Women clearly identified a shift in the intensity of the pain from non-augmented to augmented contractions and used adjectives like *'outrageous'*, *'unnatural'*, *'blinding'* or *'unbearable'* to describe the pain of AOL. This finding contradicts the foundations of active management of labour in which labour dystocia was said to be the root of women's negative childbirth experiences, and AOL was said to be the solution (O'Driscoll & Meagher, 1986). Quantitative findings of the present study corroborated that AOL is painful by showing a strong association between AOL and epidural analgesia (OR 19.81, 95% CI 14.23-27.58; RR 3.12; 95% CI 2.87-3.38; $p < 0.001$) which remained statistically significant after adjustment by potential confounders (aOR 14.09, 95% CI 10.02-19.80; aRR 1.63; 95% CI 1.60-1.66; $p < 0.001$). Although caution should be taken when interpreting these findings as there were no data on whether epidural analgesia preceded or followed commencement of AOL, these findings suggest that this was at least partially the case.

Labour pain has been identified as a key component in women's birth experiences (Chabbert et al., 2021). Indeed, Junge et al. (2021) found that severe recalled labour pain may double the odds of preferring an elective caesarean section in a subsequent pregnancy after adjusting for relevant confounders such as educational level, previous mode of birth or OASI (aOR 2.12, 95% CI 1.24-3.62; $p < 0.01$). Several secondary studies attempted to investigate the nature and implications of labour pain, briefly discussing induction of labour and/or prolonged labour as potential modulators of women's birth experiences (Chabbert et al., 2021; Van der Gucht & Lewis, 2015; Whitburn et al., 2019). Yet, AOL was systematically overlooked in these studies. Some more recent primary qualitative studies on this topic did report on AOL when defining the birth outcomes of the participants but failed to discuss how AOL shaped women's experiences of labour pain (Häggsgård et al., 2022; Whitburn et al., 2019) while other studies failed to mention AOL at all. The lack of consideration of the impact of childbirth interventions such as AOL on labour pain is likely to have significant consequences. Firstly, it may be unfairly contributing to the perpetuation of a blaming discourse that women are not able to cope with labour pain rather than the interventions themselves making labour more difficult for

women. For instance, Sutton et al. (2023) in a study on women's expectations regarding pain relief in labour (n=15) argued that despite a substantial number of first-time mothers in Australia not wishing to use pharmacological pain relief methods, their expectations seemed unrealistic as most of them did end up using some kind of analgesia such as nitrous oxide or epidural. However, the Australian Institute of Health and Welfare data show that in 2021, only 41% of first-time mothers started labour spontaneously and 39% of these had their labour accelerated with an amniotomy, AOL or a combination of both (AIHW, 2023). This overuse of childbirth interventions may at least partially explain the discrepancy between women's expectations and their actual use of pharmacological pain relief methods, emphasising the need to shift the research focus towards these interventions when addressing this issue. In Ireland, the national rate of epidural analgesia in 2021 was ~42% (National Women and Infants Health Programme, 2024) which is comparable to the study sample. Secondly, it may inadvertently be misinterpreting labour pain. Acknowledging that the experience of labour pain is highly subjective, undergoing childbirth interventions like AOL may justify to some degree the wide differences in women's descriptions of labour pain from '*the sweetest pain in the world*' to '*pain of death*' (Whitburn et al., 2019, p.4). Thirdly, it may mislead women into believing that sOT causes comparable contractions to those observed in physiological birth in terms of pain, as stated in several summary of product characteristics and patient information leaflets (FDA, 2023; HPRA, 2021a; Vademecum, 2018).

For many women, having their labour augmented resulted in requesting epidural analgesia for pain relief. This was true even for women who had planned on giving birth without epidural analgesia in line with previous quantitative studies (Kpéa et al., 2015; Quach et al., 2020). For instance, a large cohort study (n=23,272) noted that 75% of women who had their labour augmented used epidural analgesia compared to ~20% who did not (Høtoft & Maimburg, 2021). With regard to pain, the concept of losing control emerged in several women's experiences of AOL, echoing the findings of Kjaergaard et al. (2007) and Nystedt et al. (2006). Similar to these studies, epidural analgesia meant relief and regaining control, highlighting the importance of discussing pain relief methods before AOL. It is noteworthy that women who had a previous experience with sOT requested an epidural as soon as AOL was presented to them, and that women who got epidural analgesia before, with or very soon after starting AOL did not express such strong negative memories about pain compared to women who did not. In contrast, and as a result of the pain of AOL, many women identified AOL as a significant factor in their negative birth experience,

particularly if their need for pain relief was postponed or dismissed by the healthcare professionals. This further validates the crucial role that pain and pain relief play in women's birth experiences (Junge et al., 2021; Thomson et al., 2019).

Acknowledging the challenges of examining AOL and labour dystocia as separate entities, not discussing AOL systematically as a potential confounder in negative birth experiences may have important implications. For example, a cross-sectional study (n=459) concluded that women with a labour duration >12 hours were at a higher risk of a negative childbirth experience compared to those who had a labour duration ≤12 hours. However, almost all the participating women in the first group (>12 hours) underwent AOL (Gaudernack et al., 2020a). More recently, a randomised controlled trial comparing a policy of early (n=120) versus delayed AOL (n=120) after amniotomy demonstrated no differences in the mode of birth. Nonetheless, the authors recommended early AOL because it showed a reduction by 72 minutes in labour duration (Upawi et al., 2022). While shortening labour duration may seem appealing, pursuing time as a goal *per se* overlooks the fact that AOL in itself may result in a negative childbirth experience.

8.3.3. Augmentation of labour with synthetic oxytocin is related to further childbirth interventions

Qualitative findings of this study explained how women related their experience of AOL to having further childbirth interventions performed during their labour. Women narrated how AOL resulted in adding an extra layer of risk for their babies. Childbirth interventions like AOL present the possibility of unintended consequences that make it necessary to perform additional tests or interventions to assess or ensure fetal wellbeing (Page et al., 2017). Although the observational character of most studies in the field of childbirth does not allow causal relationships to be established, studies repeatedly show that childbirth interventions are strongly associated to each other (Petersen et al., 2013; Westergren et al., 2021). Several references to the 'cascade' or 'waterfall' of interventions were made by women to name this spiral in which they were caught after having their labour augmented, where they felt they had no other option but to accept the subsequent interventions that were presented to them.

Common risks associated with AOL also emerged in women's birth experiences with uterine hyperstimulation being the most frequently cited. Women complained about contractions being too frequent, too long or too strong, and about having little time to rest

in between them. All of these have been described in the literature, particularly when high-dose regimens of sOT are employed (Selin et al., 2019). Although no differences in women's birth experiences have been found between low-dose and high-dose regimens of sOT for AOL in quantitative terms (Selin et al., 2021), several women in the present study expressed that they would have preferred to undergo AOL in a different way in retrospect, and spoke about lower rates of sOT and longer increasing intervals. The current Irish guideline on sOT use falls under the definition of high-dose regimen (Institute of Obstetricians and Gynaecologists et al., 2016). The increasing evidence suggesting higher risks when high-dose regimens are employed (Aboshama et al., 2021; Buckley et al., 2023; Selin et al., 2019; Uvnäs-Moberg, 2024), together with the qualitative findings of the present study, suggest that it may be beneficial to update current practice guidelines with a more conservative stance on sOT dosages where the minimum effective dose principle becomes the norm.

As noted previously in other childbirth scenarios (Nieuwenhuijze et al., 2013), the degree to which women wanted to be involved in the decision to have their labour augmented varied substantially from one woman to another. In fact, some preferred to hand the decisions to their healthcare professionals. However, others experienced AOL and these subsequent childbirth interventions as no-choice situations with the consequential experience of a loss of autonomy. In contrast to other qualitative studies that discussed these no-choice situations as being intrinsically tied to the experience of labour dystocia (Kissler et al., 2020), it is argued that these situations were not intrinsic but rather imposed on women when AOL, as well as other childbirth interventions, were presented as their only option. Previous studies underscored the magnitude of women's perceptions of autonomy and loss of autonomy on their birth experiences (Chabbert et al., 2021; Green & Baston, 2003; Vedeler et al., 2023). In the present study, women reported on their reluctant acceptance of interventions to ensure a good outcome for their babies in the form of internal fetal monitoring, fetal scalp blood sampling, episiotomy, instrument-assisted birth or caesarean section.

The quantitative component of this study partially supported this finding by showing associations between AOL and further childbirth interventions. This study revealed that women who underwent AOL almost tripled the risk of having suspected fetal hypoxia as per CTG trace or fetal scalp pH results (OR 3.80, 95% CI 2.97-4.86; RR 2.75, 95% CI 2.30-3.27; $p < 0.001$), although this increased risk was reduced to ~20% after adjustment by

relevant confounders (aOR 1.81, 95% CI 1.37-2.38; aRR 1.21, 95% CI 1.12-1.29; $p<0.001$). The effects of sOT lead to a higher risk of hyperstimulation, reduced placental blood supply (i.e., reduced oxygenation), fetal heart rate abnormalities in the CTG trace, acidaemia and, if the hypoxic stress progresses further, to fetal compromise with neurological damage or death (Bugg et al., 2013; Chandrachan & Spring, 2017; Verspyck & Sentilhes, 2008). Wiberg and Källén (2017) provided a good illustration of this. In a study exploring lactate values in fetal scalp blood sampling ($n=253$), they observed that pathological CTG traces were significantly more common in women with AOL and that their babies presented with higher lactate⁹ values. Consequently, and from a clinical point of view, this could explain all of the subsequent abovementioned childbirth interventions although some discordant findings were also found in the quantitative component of the study. While there was an increased risk of undergoing fetal scalp blood sampling for women with AOL in crude (OR 3.99, 95% CI 2.36-6.78; RR 3.79, 95% CI 2.28-6.28; $p<0.001$) and adjusted analyses (aOR 2.22, 95% CI 1.25-3.94; aRR 1.34, 95% CI 1.10-1.53; $p=0.007$), no statistically significant difference in the risk of having internal fetal monitoring was found (OR 0.87, 95% CI 0.25-3.02; RR 0.87, 95% CI 0.25-2.99; NS) unlike some studies previously reported (Harper et al., 2013). This discrepancy could be attributed to the limited number of women who underwent this intervention during the study period, to differences or changes in policies and practices between hospitals or to technological improvements in cardiotocographs better recording the fetal heart rate.

In alignment with previous studies (Bączek et al., 2022; Espada-Trespalacios et al., 2021), women who had their labour augmented were also more likely to have an episiotomy performed after adjustment for potential confounders (aOR 1.72, 95% CI 1.32-2.24; aRR 1.17, 95% CI 1.09-1.24; $p<0.001$). One study observed that this link between AOL and episiotomy was stronger in those women who underwent AOL without labour dystocia i.e. without a clear indication (Bernitz et al., 2014). Whilst no data on indications for AOL was available in the current study, over half of the women included had their labour augmented with a cervical dilatation 0-4cm (i.e before active phase of labour). Performing AOL before active labour is not recommended. In fact, it is discouraged (WHO, 2018). The high proportion of women who had an episiotomy after AOL may also be due to the greater proportion of instrument-assisted births among them. However, this argument could be

⁹ Lactate is a metabolite that reflects tissue hypoxia and it is used for the detection of fetal compromise during labour.

questioned in light of other research. For example, Gaudernack et al.'s before and after study that aimed to optimise the use of AOL among nulliparous women through an educational programme found no differences in the rates of episiotomy despite a reduction in the rates of AOL and instrument-assisted births (Gaudernack et al., 2018). Overall, the rate of spontaneous vaginal births in women included in this study was relatively high but it is hard to draw any comparisons with national data as no statistics according to the onset of labour are provided (HPO, 2022; National Women and Infants Health Programme, 2024). However, this study found an association between AOL and instrument-assisted births (OR 5.40, 95% CI 4.15-7.05; RR 1.54; 95% CI 1.48-1.58; $p < 0.001$) and caesarean sections (OR 3.08 95% CI 2.18-4.35; RR 1.25; 95% CI 1.19-1.3; $p < 0.001$). After adjustment by parity, having a baby with a birthweight $\geq 4,000$ gr, maternal age and maternal BMI, AOL remained statistically significant for both outcomes; instrument-assisted births (aOR 2.62, 95% CI 1.95-3.52; RR 1.36; 95% CI 1.26-1.44; $p < 0.001$) and caesarean sections (aOR 1.99, 95% CI 1.36-2.90; RR 1.17; 95% CI 1.09-1.24; $p < 0.001$). This partially resonated with the findings of Espada-Trespalcios et al.'s observational study ($n=322$) which showed a ~40% increase in the odds of having an instrument-assisted birth for women who underwent AOL after adjusting for parity (aOR 1.39, 95% CI 1.18-1.65; $p < 0.01$) but no significant difference for having a caesarean section (aOR 1.21, 95% 0.85-1.74; NS) (Espada-Trespalcios et al., 2021). Previous observational studies reported analogous results (Bernitz et al., 2014; Kjaegaard et al., 2009; Tracy et al., 2007) but experimental studies dissented. For instance, Bugg et al.'s systematic review (8 randomised controlled trials, 1,338 women) concluded that early AOL led to no difference in caesarean section rates or instrument-assisted births when compared to no treatment or delayed AOL (Bugg et al., 2013). It may be the case that these variations according to research designs correspond to differences in the diagnostic criteria of labour dystocia, regimens of sOT and management of complications such as uterine hyperstimulation.

8.3.4. Augmentation of labour with synthetic oxytocin is related to some adverse perinatal outcomes

Qualitative findings of this study revealed that some women wondered whether AOL had an impact on having other adverse perinatal outcomes in their birth experience. This was illustrated by women talking about the potential influence of AOL on having a postpartum haemorrhage or having their baby admitted to NICU. The quantitative component of this thesis indicated a relationship between AOL and postpartum haemorrhage that persisted after adjustment by parity, having a baby with a birthweight $\geq 4,000$ gr and maternal BMI,

(aOR 1.44, 95% CI 1.05-1.96; aRR 1.10, 95% CI 1.01-1.17; p=0.022). This is in line with earlier studies. For instance, Erickson & Carlson (2020), in an observational study that analysed the clinical characteristics of 1,052 women who had a postpartum haemorrhage found an association between AOL and postpartum haemorrhage. Further, they observed that those who had their labour augmented for >4 hours presented a higher risk compared to those whose labour was augmented ≤2 hours after adjusting for maternal characteristics (aOR 2.36, 95% CI 1.64-3.40; p<0.01). Two recently published cohort studies with larger sample sizes demonstrated this same association, that is, postpartum haemorrhage was more pronounced with prolonged exposure to sOT and greater dosages (Bernitz et al., 2023; Brüggemann et al., 2024) but another cohort study did not (Zhu et al., 2024). The different and cumulative dosages and/or the duration of AOL may have particular relevance in explaining the mixed results when analysing this outcome (Brüggemann et al., 2024; Son et al., 2023), as the desensitisation of the oxytocin receptors occurs according to these factors (Phaneuf et al., 2000; Robinson et al., 2003). In other words, women exposed to prolonged exposures and/or higher dosages of sOT might be at a higher risk of having a postpartum haemorrhage compared to women exposed to shorter exposures and/or lower dosages of sOT. In Ireland, there were 166 cases of major obstetric haemorrhage¹⁰ in 2020 but whether these cases were related to sOT administration or not was unreported (National Perinatal Epidemiology Centre, 2020).

On the other hand, women who underwent AOL showed a higher risk of having their baby admitted to NICU which remained statistically significant after adjustment by parity (aOR 2.01, 95% CI 1.09-3.71; aRR 1.21, 95% CI 1.03-1.34; p=0.026) in contrast with recent previous studies with smaller sample sizes (Espada-Trespalcacios et al., 2021; Son et al., 2023). However, given the low absolute numbers of this variable, this result should be interpreted with caution as it may not be generalisable to larger populations.

8.3.5. Augmentation of labour with synthetic oxytocin is linked to fetal malpositions

One unexpected finding was the number of references that women made about fetal malpositions in the qualitative component of this thesis. Several women pointed out that this had been the reason why their labour had been augmented. Retrospectively, these

¹⁰ Major obstetric haemorrhage is defined as an estimated blood loss ≥ 2,500ml and/or a transfusion of five or more units of blood.

women questioned AOL as a reasonable solution for their babies' malposition as they believed it was contrary to the mechanical logic of the problem. The quantitative component supported the qualitative findings by showing that women who had a fetal malposition were indeed at a higher risk of undergoing AOL (OR 2.66, 95% CI 1.97-3.58; RR 2.32, 95% CI 1.81-2.98; $p < 0.001$). After adjustment by parity, this risk remained statistically significant (aOR 2.20, 95% CI 1.58-3.05; RR 1.23, 95% CI 1.15-1.30; $p < 0.001$). Philip Steer, Consultant Obstetrician and Professor Emeritus at Imperial College London has used a parallelism to illustrate this idea strongly criticising the widespread use of sOT in maternity hospitals: *'It's like somebody saying the screw is stuck, let's hit it with a hammer'* (Koppel, 2012, p.1). Traditionally, labour progress and labour dystocia have been assessed under four influential components which are also known as the '4 Ps': power, passenger, passage and psyche. Power refers to the strength of uterine contractions, passenger refers to the fetus and its position, passage refers to the pelvis and psyche refers to the emotional state of the woman in labour (Swier, 2021). When labour dystocia is suspected, its aetiology may be in one or more of those components. Traditionally, clinical guidelines have focused almost exclusively on power to treat labour dystocia, with a recommended management of amniotomy followed by AOL. However, women in the present study wondered if movements and positions during pregnancy and/or labour could have potentially helped to alleviate their passenger-passage problem. Literature on alternatives to AOL to treat labour dystocia is relatively new but there is a growing interest on its treating via a mechanical approach (Barrowclough et al., 2022; Ghi & Dall'Asta, 2022; Menichini et al., 2022). To date, hands-and-knees and lateral postures demonstrated little or no effect on correcting fetal malpositions (Barrowclough et al., 2022), but others like the maternal modified Sims position have shown promising results. For example, Bueno-López et al. (2018), in a randomised controlled trial ($n=119$) which assessed the effectiveness of the maternal modified-Sims position on the side of the fetal spine in rotating occiput posterior positions to anterior in women with epidural analgesia demonstrated an increased rate of vaginal births in women who adopted this position in comparison with the control group (84.7% vs 68.3%, $p=0.04$). From qualitative research, Iversen et al. (2017) described how women positively experienced the rebozo technique which is a mechanical intervention rooted in Mexican culture, used treat babies' malpositions during labour with several women asserting that symptoms such as having an early urge to push disappeared after undergoing this mechanical intervention. Other alternatives such as manual rotation of the fetal head during labour (Bertholdt et al., 2022) or preventive exercises during

pregnancy may be useful (Hofmeyr & Moreri-Ntshabele, 2024) but there is not enough evidence to date to make any specific recommendations.

8.3.6. Augmentation of labour with synthetic oxytocin may influence breastfeeding outcomes

Qualitative findings of this study offered mixed results regarding the influence of AOL on breastfeeding. After having a negative experience undergoing AOL, women adopted two opposite stances. For some, this resulted in a determination to breastfeed their babies successfully. They talked about breastfeeding as a way of making amends and compensating their negative birth experience. For some other women, this triggered a fear of not meeting their babies' demands. These women talked about bottle feeding as a way of compensating for this fear and as a way to avoid any additional complications into their already difficult transition to motherhood. The question as to how and to what extent birth experiences influence breastfeeding initiation and continuation remains unknown (Davis & Sclafani, 2022). The qualitative findings of this study suggested that this is a complex issue in which an amalgamation of feelings and responses occur and differ from one woman to another. Neither can conclusions be drawn from the quantitative component of this study. Despite an inverse association being found between AOL and exclusive breastfeeding (OR 0.66, 95% CI 0.52-0.84; RR 0.76, 95% CI 0.64-0.90; $p < 0.001$), AOL remained statistically significant but borderline (aOR 0.76, 95% CI 0.58-0.99; RR 0.95, 95% CI 0.90-1; $p = 0.044$) after adjustment for potential confounders. In the scientific literature, several previous studies observed an association between intrapartum sOT infusion and poor breastfeeding outcomes (Andrew et al., 2022; Gomes et al., 2018). However, others have differed (Fernández-Cañadas Morillo et al., 2019; Takahashi et al., 2021) or found that there were no statistically significant results after adjustment for potential confounders such as obesity (Gomes et al., 2018). Analysing the independent effect of AOL on breastfeeding may be too challenging from a research perspective because of its close link with other childbirth interventions and negative birth experiences, as demonstrated in the current study. Other factors like the cumulative dosage of sOT infused, mode of birth, epidural analgesia use, skin-to-skin contact and early initiation of breastfeeding (Brüggemann et al., 2024; Fernández-Cañadas Morillo et al., 2019; Moore et al., 2016; Takahata et al., 2023) may also be key in answering this question. Overall, though, the proportion of women who exclusively breastfed their babies in the study sample was low. Only ~36% of women doing so at discharge from hospital, which is consistent with the national rate (National Women and Infants Health Programme, 2024).

8.4. Discussion of other findings of Phase 1

Informed consent regarding the decision to have women's labour augmented was absent or seemed tokenistic rather than authentic. This is not new in maternity care. Regularly performed childbirth interventions such as induction of labour, episiotomy and caesarean sections have repeatedly been associated with dubious informed consent processes (Djanogly et al., 2022; Fenwick et al., 2003; Henderson & Redshaw, 2013). Women's sense of responsibility towards the safety of their baby, along with forms of coercion such as insisting on/repeating the need to perform the intervention, have emerged here and elsewhere as an underlying reason why many women ultimately accepted the decision to have their labour augmented, despite initial resistance (Meyer et al., 2022; O'Brien et al., 2017). Other forms of coercion such as magnifying risks, exaggerating benefits or withholding information relevant to the intervention being recommended have also been reported in midwifery and obstetrics (Kotaska, 2017).

Examining the appropriate use of AOL was not central to the research question. Yet, it is noteworthy that many of the women included in this QES had their labour augmented routinely or based on an obsolete theory of labour progression. The rigid time limits that justify AOL still in place in clinical practice, may no longer apply and further raise questions about the informed consent processes (Lundborg et al., 2020; Oladapo, Diaz, et al., 2018).

Women with limited knowledge of AOL and women from countries with underdeveloped maternal healthcare services seemed to express a more favourable attitude towards AOL and accepted the intervention more readily. These findings match those observed by Benyamini et al. (2017) who found that women with lower levels of education and immigrant women from countries with poor healthcare systems showed a positive inclination towards medical childbirth interventions, even when interventions were unnecessary. This 'doing more is better' belief emerged in several of the contributing studies which also outlined the need to tackle misconceptions (e.g. that AOL relieves labour pains) and enhance public awareness about the risks associated with AOL (Deepak et al., 2013; Koski et al., 2014; McCallum & dos Reis, 2008; Turan et al., 2006). Unfortunately, these misconceptions do not seem to be restricted to the lay public only. Forna et al. (2020) described alarming rates of highly-concentrated sOT use for induction and AOL among healthcare professionals in Sierra Leone. Among other reasons, healthcare

professionals reported using it to help women with pain, give birth faster or even accelerate labour when there are concerns about fetal wellbeing. Similar practices have been also noted in Nepal (Mullany et al., 2013), Bangladesh (Day et al., 2016) and India (Jeffery et al., 2007). Conceivably, this may help explain why neonatal morbidity and mortality associated with AOL in lower- and middle-income countries are most pronounced (Kujabi et al., 2022). Some educational interventions aimed at promoting the appropriate use of AOL among healthcare professionals have demonstrated promising results in such contexts. For example, an eight-month coaching-based intervention succeeded in reducing AOL rates from ~78% to ~32% in northern India although the rate increased to ~48%, after one year in the study (Marx Delaney et al., 2021).

On the other hand, it became apparent in women's views and experiences of AOL that partners and healthcare providers, mainly midwives, were their main sources of support. Building connection and rapport with healthcare providers enhanced women's sense of trust and led to an overall more positive childbirth experience in line with findings from previous studies (Almorbaty et al., 2023; O'Brien et al., 2018). Partners' support emerged as crucial for women who underwent AOL, particularly when women's interactions with their healthcare providers were of poor quality. However, caution is advised in the interpretation of these findings, as references to partners' support appeared in only two out of the twenty-five studies.

8.5. Discussion of other findings of Phase 2

In the theme 'Birthtrayal', women spoke about feeling betrayed in their birth experiences and undergoing AOL. Women posited several reasons why they felt trapped into consenting to have their labour augmented. One of them was being exposed to comments questioning the safety of their baby if they did not comply with AOL. Not without controversy, this has been reported in the international literature as playing the 'dead baby card' in which healthcare professionals hold women responsible for a hypothetical risk regardless of whether the baby is in fact at risk (Ballesteros, 2022; van der Waal & van Nistelrooij, 2024). There are numerous accounts of this type of coercion in quantitative and qualitative research, from Canada (Niles et al., 2021; Stoll et al., 2021), the US (McLemore et al., 2018; Vedam et al., 2019) and Australia (Keedle et al., 2024; Keedle et al., 2022), to Switzerland (Oelhafen et al., 2021), the Netherlands (van der Waal & van Nistelrooij, 2024; Vogels-Broeke et al., 2022) and the UK (Feeley et al., 2020). In Ireland, in

a qualitative study on women's decision-making during pregnancy and birth, Huschke (2022) narrated how women found it very difficult to challenge interventions presented by healthcare professionals, particularly if any concerns about the baby were flagged. Another qualitative study by O'Brien et al. (2018) described similar experiences of Irish maternity care with women experiencing feelings of resignation and defeat when they felt pressured into complying with healthcare professionals' advice to ensure a good outcome for their babies. In a mixed methods study, Panda et al. (2020) highlighted concerns over the baby's safety and health as one of the main reasons why women in Ireland often agreed to have a caesarean section. Mirroring the findings of these three studies, fear and concerns about the baby's wellbeing systematically overruled women's initial birth plans, leading them to reluctantly accept AOL.

Another form of pressure that made some women consent to AOL was gaining access to the labour ward, especially for those who were admitted outside visiting hours or during the COVID-19 pandemic. Panda et al. (2021), in a qualitative study described how imposed partner separation in Irish maternity hospitals during COVID-19 put women in a vulnerable position of anxiety and stress, resonating with the findings of the present study. Furthermore, in this study AOL was used as a bargaining chip for women to secure their partner's continued presence and support in the hospital. According to a subgroup analysis of a systematic review involving 12,833 women, having a support person during labour did not seem to change the risk of undergoing AOL (RR 0.97, 95% CI 0.91-1.03; NS) (Bohren et al., 2017). Nonetheless, contrary evidence has also been noted (Buerengen et al., 2022; WHO, 2018). Since behaviours such as hugs or affectionate touch reduce stress and cortisol levels (Grewen et al., 2005; Schneider et al., 2023), it is likely that having a support person facilitates oxytocin release during labour. Currently, most maternity hospitals in Ireland still restrict visiting hours, allowing partners to be present only during daytime in the antenatal wards. This is contrary to the WHO's recommendations where continuous companionship is advised (WHO, 2018).

Lack of privacy and midwifery support in the antenatal ward also emerged as a concern. Women lamented feeling exposed in busy, noisy and cramped wards which did not provide a calm environment for early labour nor allow for sufficient guidance and support from midwives. This made some women reluctantly consent to having their labour augmented as it was presented to them as their only way out of the antenatal ward. In an Irish survey-based study (n=736), Hannon et al. (2023), emphasised the negative impact that

inadequate hospital infrastructure had on women's experiences of maternity care, most notably in their experiences of privacy. Literature on single rooms in maternity hospitals highlighted improvements in women's satisfaction, noise levels, quality of sleep and privacy (Ali et al., 2020). Increased satisfaction was also reported by partners (Stelwagen et al., 2021). Unfortunately, this option is only available in Ireland for those women who pay for private care (HSE, 2023).

Another important finding that emerged from women's experiences of AOL was that the risks of AOL were barely discussed, if mentioned at all. Alternative options such as a wait-and-see approach were not presented. This lack of information made some women consent to AOL and, even if this was with good intentions from the healthcare professionals as some women suggested, this is not a valid reason under any circumstances for withholding information (Health Service Executive, 2022). Blix-Lindstrom et al. (2004) in a qualitative study on women's satisfaction with decision-making related to AOL concluded that all women wanted and expected to receive sufficient information about AOL but that their level of involvement and satisfaction varied according to their knowledge about AOL. Twenty years later, the findings of this study resonate strongly with theirs albeit with some differences. For example, women's satisfaction and contentment with their experience of AOL was not static in this current study. As time went by and as women developed their knowledge through different sources, several who trusted their healthcare professionals in accepting to undergo AOL and were satisfied with it at the time, developed a more critical view about the decision afterwards. The rationale behind AOL and the lack of information during the informed consent process emerged as the main reasons why women later questioned their healthcare professionals' advice. The time gap between giving birth and being interviewed could be key in explaining why these evolving views were not observed by Blix-Lindstrom et al. (2004) who interviewed women (n=20) before their discharge from hospital. In contrast, women in the current study had from three months up to four and a half years to reflect on their experiences of AOL. In Ireland's National Maternity Experience Survey (n=3,204), informed consent was indirectly addressed when women were asked about their level of involvement in the decision-making during labour and birth. A total of 65% responded that they always felt involved, 25% responded that they sometimes felt involved and 10% responded that they did not feel involved (HIQA, 2020). These findings differ from women's experiences of AOL represented in the present qualitative study in which the majority of women reported issues with informed consent. A potential

explanation is that women who had a more negative experience undergoing AOL may have been more inclined to take part in this study, overrepresenting 'bad care' examples in Irish maternity hospitals, as those with a negative experience in their care may be more motivated to participate in qualitative studies (Peel et al., 2006). Another explanation could be attributed to the level of education of the women who participated. Pijl et al. (2023), in a cross-sectional survey found that, among all women who underwent AOL (n=2,786), 23.8% (n=662) did so without prior consent. They also observed that women with third level education were more likely to report unconsented AOL (aOR 2.18, 95% CI 1.40-3.39) compared to women with lower educational attainment, suggesting that awareness of their rights led to higher expectations which were more difficult to meet. As all women who participated in this qualitative study had third level education, this could explain why they had a more critical view on how AOL was presented to them. According to the National Consent Policy in Ireland, informed consent by definition needs to be informed, freely given and by a person that is capable of making a decision (Health Service Executive, 2022). When these principles are applied to AOL, they mean that women must receive sufficient information about AOL, its potential risks and benefits and the alternatives, including not performing AOL. Whilst written consent for much of midwifery care is not necessary, there is a professional and legal duty to document a woman's agreement to any intervention that carries a significant risk (Health Service Executive, 2022; Nursing and Midwifery Board of Ireland, 2015). As sOT is a high-alert medication (ISMP, 2007) that has received a 'black box warning', the strictest medication labelling requirement from the FDA due to its potential risk of harm (DeLong & Preuss, 2022; FDA, 2023), it seems reasonable to suggest that written informed consent should be obtained.

It was no surprise that women's experiences of AOL were closely intertwined with their experiences of labour progression. Women talked about frequent vaginal examinations and feeling rushed into giving birth within predefined timeframes. Not meeting the 'deadline' as per the partogram, meant that many women's labour had to be augmented. Women provided sufficient information about their labour progression and the timings of events to reveal that current midwifery and obstetric practice in Ireland is still largely based on Friedman's curve (Friedman, 1954). Despite scientific evidence refuting this theory of labour progression and numerous attempts to implement more flexible approaches, clinical practice continues to resist change (Bakker et al., 2024; He et al., 2023). In 2018, the WHO published fifty-six intrapartum care recommendations for a positive childbirth experience. Among others, key recommendations included ceasing the

use of Friedman's curve and the partograph alert line to identify abnormal progress, tailoring labour timings to each woman individually and performing four-hourly vaginal examinations for assessing labour progress (WHO, 2018). This is far from what women narrated in their experiences undergoing AOL. Kieran O'Driscoll, the creator of active management of labour, defended restricting labour duration to a maximum of twelve hours as the only way *'to provide every patient with personal attention'* (O'Driscoll et al., 1973, p.3). Restricting women's labour at the expense of one-to-one care is not only unethical but it also poses unnecessary risk of harm to women and their babies.

In the theme 'Rebirth', women shared notable findings about the consequences of having their labour augmented extending beyond labour and birth. Predominantly after giving birth, women held a sense of failure towards themselves for deviating from the normal and desired birth. Initially, their discourse focused on their bodies not doing what they were supposed to, in alignment with Kjaergaard et al.'s descriptions of first-time mothers' experiences of non-progressive and augmented labours (Kjaergaard et al., 2007). Over time, women focused on having delegated too many decisions in labour to their healthcare professionals when they reflected further on their experience. Phrases such as *'too trusting'* or *'too compliant'*, capture the regrets women had about not having sufficient knowledge to have taken a more active role in their birth experience. This finding implies that women had an expectation that healthcare professionals could be relied upon to act in good faith and that they trusted them in relation to their experiences of undergoing AOL. After reflecting and gaining more knowledge about childbirth, they came to the conclusion that this expectation had not been met. As noted in previous studies (Beck, 2004; Greenfield et al., 2022), a common pattern in women's experiences of AOL was that trust was given and then betrayed. This finding emerged intertwined with traumatic childbirth of which the prevalence is estimated to be ~18% in Ireland (Nagle et al., 2022). Evidence evaluating the relationship between AOL and traumatic childbirth is scarce. While some studies highlighted AOL as an influential factor (Waldenström, 1999; Waldenström et al., 2004), others only compared differences between induced and spontaneous onset of labour, omitting AOL in their analyses (Nagle et al., 2022). Traumatic childbirth may have devastating consequences for women such as the development of fear of childbirth, posttraumatic stress symptoms or mother-baby bonding difficulties (Horsch et al., 2024; Simpson & Catling, 2016). All of these consequences appeared in the present study.

To the best of this author's knowledge, this is the first study that provides qualitative evidence on a novel line of research: the implications of AOL on maternal mood. Some women believed that undergoing AOL had caused a hormonal imbalance that disrupted their mental health postpartum. Recently, Tenne et al. (2023) in a preliminary cohort study (n=386) found that the odds of scoring substantial posttraumatic stress symptoms at two months postpartum were three times higher in women who underwent AOL compared to women who did not (OR 3.29, 95% CI 1.08-10.03, p=0.036), after controlling for relevant confounders such as parity, mode of birth and satisfaction with healthcare professionals, among others. Some previous observational studies reported comparable results when analysing the association between sOT administration and depressive and anxiety symptoms (Gu et al., 2016; Prevost et al., 2014), but others did not (Takács et al., 2019; Thul et al., 2020).

8.6. Discussion of other findings of Phase 4

Choosing private care significantly increased the risk of undergoing AOL which adds to a growing body of knowledge suggesting an increased risk of childbirth interventions in women who avail of private health care both nationally (Craven et al., 2020; Lutomski et al., 2014; Moran et al., 2020; Panda et al., 2022) and internationally (Dahlen et al., 2012; Fox et al., 2019), and also irrespective of their risk profiles (Roberts et al., 2000). This increased risk can be attributed to several factors such as being more convenient for healthcare professionals or women's preferences. For example, as AOL shortens labour by ~2 hours (Bugg et al., 2013), some obstetricians may find it an appealing option to attend the birth earlier. On the other hand, women who opt for private care may be more inclined to use epidural analgesia for pain relief (Larkin et al., 2017; Roberts et al., 2000) which is strongly associated with AOL as shown in the present study. While acknowledging that private care may be preferred by some women due to factors such as continuity of care, women should be also aware that this care pathway tends to involve more childbirth interventions including AOL.

Maternal age tended to be lower in women who underwent AOL which is in contrast to previous research that suggests that labour dystocia affects older women more severely (Waldenström & Ekéus, 2017). There were no differences in the risk of undergoing AOL according to maternal BMI or having a baby with a birthweight $\geq 4,000\text{gr}$ with both correlated to each other as fetal growth is also significantly greater in women with obesity

(BMI $\geq 30\text{kg/m}^2$) (Zhang et al., 2018). Conversely, Subramaniam et al. (2018), in a cohort study (n= 1,204) reported that 28% of women with a normal BMI had their labour augmented compared to 62% of women with a BMI $\geq 40\text{kg/m}^2$ (p=0.01) and that the latter women received higher dosages of sOT, potentially due to a higher volume of distribution. Similarly, others have observed higher dosages of sOT in women with obesity but with no statistically significant difference after adjusting by relevant confounders (Ramö Isgren et al., 2021). A potential explanation for these different results might be that, BMI was treated as a categorical variable in these studies, as opposed a continuous variable in this present study. Moreover, women's BMI was calculated at the end of pregnancy in contrast to the current study when it was calculated in women's first antenatal visit which is the recommended best practice (McAuliffe et al., 2020).

In relation to adverse perinatal outcomes, no women who underwent AOL had a baby with an 'Apgar score at 5 minutes <7' and therefore statistical analysis was not possible for this outcome. Others such as shoulder dystocia or having a 3rd or 4th degree perineal tear showed no association with AOL. However, infrequent events such as these may be better studied using other research designs such as case-control studies or systematic reviews with meta-analyses that analyse aggregated data.

8.7. Strengths

This is the first mixed methods study examining AOL conducted in Ireland. It is striking that there had been such little research into AOL given that Ireland was the country in which active management of labour was first popularised (i.e. routine artificial rupture of the membranes, AOL if labour is progressing <1cm per hour, and one-to-one care). Therefore, a strength of this study is the contribution it makes to the knowledge about the relevance of AOL in women's birth experiences and the need for ongoing investigation of same. Far from seeking closure, this study lays a solid foundation for future research on AOL.

The mixed methods research design utilised in this study is another of its strengths. Using both quantitative and qualitative approaches enabled a comprehensive account of AOL to be developed which highlighted how women experience AOL nationally and internationally using primary and secondary data. It also allowed for the identification of associated factors with AOL within the Irish context. In addition, the incorporation of the PPI collaboration group in Phase 2 ensured that the study remained meaningful to women

and that it stayed close to what aspects of AOL women wanted to be explored qualitatively.

Despite the fact that it was not possible to estimate the prevalence of AOL among women birthing in the nineteen maternity hospitals in Ireland – objective iii), the addition of Phase 4 and its large study sample is another strength of this study. Moreover, the calculation of RRs as measures of association in this phase as well as ORs, facilitates the applicability of the results into clinical scenarios. Unlike ORs that tend to overestimate the magnitude of certain associations, RRs directly convey the likelihood of a certain outcome occurring (e.g. risk of having an instrument-assisted birth in women who undergo AOL compared to women who do not). Thus, clinicians may find the interpretation of the results of Phase 4 more straightforward and practical.

Finally, despite some divergent results between the qualitative and quantitative components being found in the integration of the findings, these were restricted to those analyses exploring the association of AOL and infrequent events. This resulted in wide CIs, making the uncertainty easily identifiable. The vast majority of the integrated findings presented a complementary character, further strengthening the robustness of the study.

8.8. Limitations

The present mixed methods study presents a number of limitations that need to be considered when interpreting the findings. Analysing and interpreting findings from different study samples and at different points in time; that is from women who underwent AOL in fourteen different countries between 2004 and 2021 (Phase 1), in different maternity hospitals within Ireland between 2018 and 2023 (Phase 2) and in one single tertiary maternity hospital in Dublin in 2022 (Phase 4), was a complex task that required extensive work and reflexive practice. This mix of idiosyncrasies and their influences on the findings may have benefitted from further analysis by an international multidisciplinary research team, particularly in regard to Phase 1. However, women's experiences of AOL strongly resonated with each other regardless of the context and time. Additionally, most of the findings of Phase 4 complemented and supported women's stories in Phases 1 and 2, and vice versa. They are also well-aligned with the existing literature on AOL. This congruence between phases and other research is reassuring.

Perhaps one of the most important limitations of this mixed methods study is the data reliability issues encountered in Phase 3. This meant that it was not possible to estimate

the prevalence of AOL among women birthing in the 19 maternity hospitals in Ireland – objective iii), nor to identify associated factors with AOL among women birthing within the Irish context – objective iv) as initially planned. To overcome this limitation, Phase 4 was added to the original study design and was successfully conducted. Fitting Phase 4 within the time constraints of the PhD programme was a remarkable accomplishment that finally enabled the identification of associated factors with AOL among women birthing within the Irish context – objective iv). Yet the prevalence of AOL in Ireland remains unknown.

In Phase 1, despite the search strategy being comprehensively designed with the support of a subject librarian, AOL was not an index term in any of the databases consulted and was often (mis)used as a synonym for induction of labour. Some studies may have not been captured for this reason but the exhaustive search of reference lists may have counteracted this limitation. Another limitation in Phase 1 lies in the fact that most of the included studies were conducted more than ten years ago. Nonetheless, findings from Phase 2 gave a more updated picture of women's experiences of AOL, confirming that those findings were still valid and applicable to contexts like Ireland. On the other hand, including studies in Spanish language in addition to English in Phase 1 did not offer any advantage against language bias, contrary to expectations. Fourteen studies, most of them in Portuguese, were excluded based on this criterion and may have potentially contributed data to the evidence synthesis.

In Phase 2, recall bias which is participants having difficulty in remembering their experiences accurately due to distortion or memory gaps, may have been a potential limitation by influencing women's narrations when describing their experiences of AOL. Of note, the relevance that birth plays in women's lives makes it a long-lasting memory with several studies outlining that it persists vividly after several years (Simkin, 1991; Takehara et al., 2014). If a limitation existed in this regard, it is hard to believe that it impacted significantly in the findings. Further, the fact that women had time to process and reflect on their experiences of AOL opened up great opportunities to understand how women subsequently felt about them, and how their experiences of AOL impacted future pregnancies and births. This could have not been otherwise investigated and it added valuable insights to the study. On the other hand, all women except one who participated in Phase 2, were Irish, and although their childbirth-related knowledge differed, they all had third level education. Given that ~25% of women who give birth in Ireland are originally from abroad (Healthcare Pricing Office (HSE), 2022) and that 50% of women in Ireland have third level education (Central Statistics Office, 2023), the

underrepresentation of women with other nationalities and lower education levels limits the ability to generalise the findings broadly. Five of the women in Phase 2 gave birth with COVID-19 restrictions in place in Irish maternity hospitals, and five women subsequently presented with posttraumatic stress symptoms such as hypervigilance, or insomnia. Therefore, some might argue that women with particularly negative experiences of AOL may have been overrepresented in the sample. However, it is more likely that Phase 2 accurately reflects the reality and context of Irish maternity hospitals between 2018 and 2023 when the prevalence of childbirth trauma has been relatively high (~18%) (Nagle et al., 2022) and COVID-19 restrictions had major implications for women accessing maternity care (Panda et al., 2021).

Finally, the cross-sectional design in Phase 4, provides a snapshot of AOL in one tertiary maternity hospital in Dublin in 2022. The nature of the design limits the ability to investigate the full complexity of AOL and its relationships with the mode of birth, childbirth interventions and adverse perinatal outcomes. However, adjusting the analyses for potential confounding variables might have partially ameliorated this limitation. This last phase provides an excellent starting point for future quantitative research studies on AOL at a national and international level. Causality, however, cannot be established.

9. Chapter 9: Recommendations, dissemination and impact, and conclusions

9.1. Introduction

This final chapter presents the recommendations, the dissemination and impact, as well as the conclusions of the study. Recommendations are made for clinical practice, policymakers and research. The dissemination and impact section includes the milestones that have already been accomplished and the future plans for reaching a wider audience. Finally, a number of conclusions close this thesis.

9.2. Recommendations

9.2.1. Recommendations for clinical practice

Findings from this study indicate that there are several strategies that could be implemented to optimise the use of AOL in clinical practice.

It is recommended that:

- Continuous education and training are provided to healthcare professionals on AOL and normal progress in labour, with an emphasis on the need to abandon the use of Friedman's curve and active management of labour as an evidence-based basis for practice. The implementation of the WHO recommendations for assessing labour progression based on 95th percentile thresholds could lead to positive changes.
- National guidelines on sOT are revised and updated in accordance with the best current evidence on AOL, including clear indications for AOL, the associated risks and alternatives to be discussed with women during the informed-consent process. It is essential that pain and pain relief methods are part of these discussions, and that epidural analgesia is offered to all women before undergoing AOL as recommended in NICE (2023) guidelines.
- Written informed consent is implemented as a mandatory requirement for undergoing AOL in Ireland, concordant with the Irish State Claims Agency suggestion in 2015 (Godfrey, 2015). The concerning findings identified in relation to the informed consent process of AOL emphasises the urgent need to standardise the information that women receive, at the very least, during labour before AOL is performed.

- Monthly internal audits within each maternity hospital and yearly external audits of clinical practice are held to ensure adherence to national guidelines on sOT use for all women, nulliparous and multiparous, and to identify areas of improvement. This could enhance the optimal use of AOL and foster a culture of accountability and continuous improvement.

9.2.2. Recommendations for policymakers

This study identified several strategies at policy level that could optimise the use of AOL and improve the overall maternity care provision.

It is recommended that:

- Augmentation of labour with synthetic oxytocin is included in annual perinatal statistic reports. Automated recording rather than manual input is recommended. The inclusion of AOL as a mandatory field to be completed in MN-CMS could be a straightforward way of starting to record AOL in Irish maternity hospitals accurately. In the meantime, while some maternity hospitals continue to use paper-based health records, education and training for HPO coders should continue to improve data collection of AOL.
- Policymakers become involved in reviewing the use of AOL rates across maternity hospitals. If unjustifiable AOL rates are still observed in maternity hospitals after providing adequate training to healthcare professionals, timely responses such as administrative sanctions should be imposed. Putting women at unnecessary risk by routinely performing AOL cannot and should not occur.
- Restrictions on visiting hours are lifted. Having a chosen partner throughout labour and birth, including while on the antenatal ward, is an effective and low-cost intervention that enhances a positive childbirth experience. While it is not yet a reality in many countries, it is internationally advised (WHO, 2020a; 2018) and is required by law in some countries such as Spain (Boletín Oficial del Estado, 2003).
- Single rooms in maternity hospitals are introduced and available for all women in Ireland. Single rooms would contribute to meeting the physical, emotional and privacy needs of women who are in early labour. This could favour optimal admission to the labour ward (once the active phase of labour has been established) and in turn reduce unnecessary AOL as evidenced in previous studies (Gjærum et al., 2022; Iobst et al., 2019).

9.2.3. Recommendations for research

The findings and discussion of the current study have identified several areas of AOL that would benefit from further research.

It is recommended that:

- Augmentation of labour with synthetic oxytocin becomes an index term in databases to facilitate further research on this topic. This could contribute to the clear distinction between induction and AOL, and reduce the number of studies that (mis)use these terms interchangeably.
- Classification systems to compare birth outcomes between women, such as the Robson Ten Group Classification system, take AOL into consideration. Any research conducted that compares spontaneous versus induced onset of labour should, at the very least, acknowledge the proportion of women who underwent AOL in the spontaneous onset group as this may be a relevant source of bias.
- Future research considers the sequence and timings of AOL and other childbirth interventions (e.g. epidural analgesia). This could offer a more comprehensive picture of how interventions interact and further unravel associations between each other.
- If further studies exploring differences between high- and low-dose regimens of AOL are conducted, mixed methods designs should be employed. These may provide additional valuable insights into women's perceived differences between the two. Meanwhile and outside the research field, the minimum-effective dose principle should prevail.
- Future enquiries and research on maternal morbidity in Ireland explore the role of intrapartum sOT administration rather than only focusing on the onset of labour (i.e. spontaneous versus induced). This is particularly important given that the aetiology behind the upward trend of some adverse perinatal outcomes such as postpartum haemorrhage in Ireland continues to be poorly understood (Greene et al., 2021).
- Additional research investigating the relationship between sOT administration and depressive and anxiety symptoms is conducted. There is a need to better understand whether a relationship exists and, if so, its physiopathological basis.
- Additional research exploring alternatives to manage labour dystocia beyond AOL continues to be conducted. This is in response to the needs women's expressed in

the qualitative study (Phase 2) and could potentially increase women's overall satisfaction with their birth experience.

- Further research investigating the potential effect of AOL on breastfeeding outcomes considers important maternal baseline characteristics such as educational level, infant feeding preference before birth or mode of birth. This would be particularly relevant in Ireland which is a country with one of the lowest rates of exclusive breastfeeding in Europe (HPO, 2022; Theurich et al., 2019).

9.3. Dissemination and Impact

Dissemination of the findings of the present study has commenced and is ongoing. To date, two papers have been published in peer-reviewed journals (Alòs-Pereñíguez et al., 2022a; Alòs-Pereñíguez et al., 2023b) from the QES on women's views and experiences of AOL (Phase 1). I have also presented three oral communications at the School of Nursing and Midwifery Trinity College Dublin (Alòs-Pereñíguez et al., 2022b; Alòs-Pereñíguez et al., 2023a; Alòs-Pereñíguez et al., 2024). Future dissemination plan includes:

v) Three more papers:

- Title: Women's experiences of augmentation of labour with synthetic oxytocin in Ireland: a qualitative descriptive study. Planned submission in December 2024.
- Title: Associated factors with augmentation of labour with synthetic oxytocin among women birthing within the Irish context. Planned submission in June 2025.
- Title: Augmentation of labour with synthetic oxytocin: a literature review. Planned submission in December 2025.

vi) Presentations at national and international conferences:

- Two abstracts have been accepted at the FAME congress 2024 (the national congress organised by the Federation of Associations of Midwives in Spain):
 - Women's experiences of augmentation of labour with synthetic oxytocin in Ireland (oral presentation), and
 - Associated factors with augmentation of labour with synthetic oxytocin among women birthing within the Irish context (poster presentation).

- Participation in future midwifery and obstetric conferences as opportunities arise.

vii) Press releases in national newspapers:

- Two press releases on the study findings have been published to date: one from Trinity College Dublin (O'Shea, 2023) and another one from Irishhealthpro, a health professionals' website (Condon, 2023).
- Future press releases in national newspapers after publication of study findings in peer-reviewed journals.

viii) Other dissemination strategies:

- Two blog entries on the study findings have been published to date: one in 'El parto es nuestro', a non-profit organisation that aims to improve maternity services in Spain (Alòs-Pereñíguez, 2022), and another in Dr Sara Wickham's website (Wickham, 2022). Dr. Wickham is a renowned midwife that actively publishes on maternity- and midwifery-related content.
- One information leaflet for coders working for the HPO was designed and disseminated through their internal newsletter in order to improve the data collection of AOL at a national level.
- Dissemination of the findings to the women from the PPI collaboration group. Subsequent co-design of other dissemination strategies to reach the broader public (e.g. mommy talks, information leaflets, podcasts).
- Dissemination of the findings through midwifery-related channels, parenting and birth-related associations and bodies.
- Dissemination of the findings to healthcare professionals involved in maternity care including midwives, midwifery students, obstetricians and mental health professionals linked to maternity services.
- Dissemination through social media channels.

9.4. Conclusions

Augmentation of labour with synthetic oxytocin is one of the most frequently performed childbirth interventions among women with spontaneous onset of labour, particularly among nulliparous women. The findings from this mixed methods study synthesised the international evidence on women's views and experiences of AOL, provided a rich

description of women's experiences of AOL in Ireland and identified associated factors with AOL among women birthing within the Irish context.

Women described AOL as having a significant impact on their birth experiences, often recalling it in negative terms regardless of their country or context. Whilst the pain of AOL played a major role in shaping these negative experiences, issues relating to the informed consent process also emerged as being of importance, both nationally and internationally. Women recounted having their labour augmented without consent, feeling pressured to comply and acquiesce, or giving consent without receiving adequate information to give genuine informed consent. Often, AOL was presented to them as their only option. References to time constraints and pressure to give birth within a certain time frame emerged repeatedly in women's experiences of AOL. Over time, understanding that their experiences of AOL had been highly influenced by factors beyond their control made women move from self-blame towards feeling betrayed by their healthcare professionals and '*the system*'. Subsequent pregnancies and births were seen as opportunities to have the birth experience women did not have in their augmented labour, and they adopted several strategies to avoid undergoing AOL for a second time.

The prevalence of AOL in Ireland remains unknown. Over one in three nulliparous women experienced AOL in the single-site cross-sectional study (Phase 4). This reinforces the fact that AOL is indeed a prevalent childbirth intervention among women with spontaneous onset of labour. Nulliparity and private care appeared as the two main predisposing factors of AOL. Both crude and adjusted analyses demonstrated that women who underwent AOL were significantly more likely to have an instrument-assisted birth and a caesarean section. With regard to adverse perinatal outcomes, crude analyses showed that women who underwent AOL were more likely to have suspected fetal hypoxia during labour as per CTG trace or fetal scalp pH results, more likely to have their baby admitted to NICU and more likely to have a postpartum haemorrhage. However, after adjusting for potential confounders, only the risk of having suspected fetal hypoxia during labour as per CTG trace or scalp pH results and of having their baby admitted to NICU remained statistically significant. In relation to childbirth interventions, crude analyses indicated that women who underwent AOL were more likely to undergo fetal scalp blood sampling, to have epidural analgesia and to have an episiotomy. After adjusting for potential confounders, only the risk of fetal scalp blood sampling and epidural analgesia remained statistically significant.

The widespread use of AOL among women with spontaneous onset of labour together with its potential key implications on women's birth experiences, mode of birth, further childbirth interventions and adverse perinatal outcomes highlights the need for further investigation on this topic. Future research studies should prioritise investigating AOL over labour dystocia, especially as the diagnostic criteria for defining labour dystocia are being increasingly questioned. The need to integrate women's views and experiences in research, policies and guidelines on AOL is overdue and essential. This might be one important way to ensure that evidence-based practice is meaningful to women. Reassessment of current practices and policies on AOL is also recommended. Greater efforts aimed at enhancing awareness and knowledge of AOL may help women to be more active in the decision to have their labour augmented or not.

10. References

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Appendix 1: Search strategy and retrievals of Phase 1

Concept 1: **Women**

MEDLINE: (MH "Women") OR (MH "Mothers") OR (MH "Pregnant Women") OR (MH "Parturition") OR (MH "Labor, Obstetric+") OR (MH "Peripartum Period") OR (MH "Postpartum Period+")

CINAHL Index Term: (MH "Women") OR (MH "Mothers+") OR (MH "Expectant Mothers") OR (MH "Nulliparas") OR (MH "Multiparas") OR (MH "Childbirth+") OR (MH "Labor+") OR (MH "Postnatal Period+") OR (MH "Puerperium")

EMBASE: 'named groups by pregnancy'/exp OR 'mother'/de OR 'expectant mother'/exp OR 'birth'/exp OR 'childbirth'/exp OR 'perinatal period'/exp OR 'puerperium'/exp OR 'labor'/exp OR 'nullipara'/exp OR 'multipara'/exp

PsycINFO: DE "Mothers" OR DE "Human Females" OR DE "Adolescent Mothers" OR DE "Primipara" OR DE "Single Mothers" OR DE "Expectant Mothers" OR DE "Labor (Childbirth)" OR DE "Birth" OR DE "Intrapartum Period" OR " OR DE "Postnatal Period"

MIDIRS: -

Web of Science: -

Keywords: women* OR woman* OR mother* OR parturit* OR matern* OR pregnan* OR nullipar* OR multipar* OR postnatal* OR perinatal* OR post-natal* OR peri-natal* OR childbirth* OR birth* OR postpartum*

Concept 2: **Views/experiences**

MEDLINE: (MH "Perception") OR (MH "Thinking") OR (MH "Attitude") OR (MH "Emotions+") OR (MH "Comprehension") OR (MH "Awareness") OR (MH "Self Report")

CINAHL Index Term: (MH "Thinking") OR (MH "Perception") OR (MH "Attitude") OR (MH "Emotions+") OR (MH "Personal Values") OR (MH "Self-Awareness") OR (MH "Self Report")

EMBASE: 'experience'/exp OR 'experiences'/exp OR 'perception'/exp OR 'attitude'/exp OR 'attitudes'/exp OR 'belief'/exp OR 'beliefs'/exp OR 'perspective'/exp OR 'thinking'/exp OR 'feeling'/exp OR 'reaction'/exp OR 'emotion'/exp OR 'comprehension'/exp OR 'standing'/exp OR 'personal value'/exp OR 'awareness'/exp OR 'self report'/exp

PsycINFO: DE "Experiences (Events)" OR DE "Perception" OR DE "Attitudes" AND DE "Expressed Emotion" OR DE "Emotions" OR DE "Thinking" OR DE "Comprehension" OR DE "Personal Values" OR DE "Awareness" OR DE "Self-Report"

MIDIRS: -

Web of Science: -

Keywords: Experien* OR view* OR percept* OR perceiv* OR attitud* OR believ* OR belief* OR perspective* OR opinion* OR express* OR thought* OR think* OR feel* OR reaction* OR emotion* OR comprehen* OR understand* OR stance* OR "personal valu*" OR awar* OR approach* OR "self report*" OR self-report* OR emote*

Concept 3: Augmentation of labour with synthetic oxytocin

MEDLINE: (MH "Oxytocin")

CINAHL Index Term: (MH "Oxytocin")

EMBASE: 'oxytocin'/exp

PsycINFO: DE "Oxytocin"

MIDIRS:

Web of Science: -

EMBASE keywords: ((augment* OR accelerat* OR stimulat* OR speed*) NEAR/4 (labor* OR labour* OR birth* OR parturit* OR childbirth* OR 'child birth*')) OR oxitoc* OR oxytoc* OR ocytoc* OR ocitoc* OR Pitocin* OR syntocinon* OR 'oxytocin-induce*' OR 'oxytocin prepar*'

EBSCO Keywords: (augment* OR accelerat* OR stimulat* OR speed*) N4 (labor* OR labour* OR birth* OR parturit* OR childbirth* OR "child birth*") OR oxitoc* OR oxytoc* OR ocytoc* OR ocitoc* OR pitocin OR syntocinon OR "oxytocin-induce*" OR "oxytocin prepar*"

Concept 4: Qualitative studies

MEDLINE: (MH "Qualitative Research+") OR (MH "Hermeneutics") OR (MH "Grounded Theory") OR (MH "Focus Groups") OR (MH "Interviews as Topic") OR (MH "Personal Narratives as Topic") OR (MH "Interview, Psychological")

CINAHL Index Term: (MH "Qualitative Studies+") OR (MH "Phenomenological Research") OR (MH "Naturalistic Inquiry") OR (MH "Grounded Theory") OR (MH "Ethnonursing Research") OR (MH "Ethnological Research") OR (MH "Ethnographic Research") OR (MH "Action Research") OR (MH "Focus Groups") OR (MH "Interviews+") OR (MH "Semi-Structured Interview") OR (MH "Structured Interview") OR (MH "Unstructured Interview") OR (MH "Triangulation") OR (MH "Narratives") OR (MH "Phenomenology") OR (MH "Purposive Sample") OR (MH "Theoretical Sample") OR (MH "Thematic Analysis") OR (MH "Content Analysis") OR (MH "Discourse Analysis") OR (MH "Constant Comparative Method") OR (MH "Open-Ended Questionnaires")

EMBASE: 'qualitative research'/exp OR 'qualitative analysis'/exp OR 'qualitative methods'/exp OR 'focus group'/exp OR 'focus group discussion'/exp OR 'focus group interview'/exp OR 'interview'/exp OR 'psychological interview'/exp OR 'triangulation'/exp OR 'narrative'/exp OR 'narratives'/exp OR 'naturalistic inquiry'/exp OR 'grounded theory'/exp OR 'hermeneutics'/exp OR 'phenomenology'/exp OR 'ethnography'/exp OR 'ethnographic research'/exp OR 'ethnonursing research'/exp OR 'purposive sample'/exp OR 'purposive sampling'/exp OR 'theoretical sample'/exp OR 'thematic analysis'/exp OR 'content analysis'/exp OR 'discourse analysis'/exp OR 'action research'/exp OR 'participatory research'/exp OR 'constant comparative method'/exp

OR 'mixed model'/exp OR 'mixed method study'/exp OR 'mixed methods study'/exp OR 'mixed methods'/exp OR 'mixed methods research'/exp OR 'multimethod study'/exp OR 'open ended questionnaire'/exp

PsycINFO: (((((((DE "Qualitative Methods" OR DE "Focus Group" OR DE "Grounded Theory" OR DE "Interpretative Phenomenological Analysis" OR DE "Narrative Analysis" OR DE "Semi-Structured Interview" OR DE "Thematic Analysis") OR (DE "Focus Group Interview")) OR (DE "Interviewing")) OR (DE "Narratives")) OR (DE "Hermeneutics")) OR (DE "Phenomenology")) AND (DE "Ethnography" OR DE "Content Analysis" OR DE "Discourse Analysis")) OR (DE "Action Research")) OR (DE "Mixed Methods Research"))

MIDIRS:

Web of Science: -

Keywords: "Qualitativ*" OR "qualitative stud*" OR "qualitative analysis" OR "qualitative method*" OR "focus group*" OR interview* OR "triangulat*" OR "narrative*" OR "naturalistic inquir*" OR "feminist research*" OR "grounded theor*" OR "hermeneutic*" OR "phenomenol*" OR "ethnograph*" OR "ethnonurs*" OR "ethnological research" OR "ethnomethodolog*" OR "purposive sampl*" OR "theoretical sampl*" OR "thematic analysis" OR "content analysis" OR "discourse analysis" OR "action research" OR "participatory research" OR "constant comparative method" OR "mixed model" OR "mixed method*" OR "mixed design*" OR "multiple method*" OR multimethod* OR "open-ended question*" OR "open-ended survey*" OR "open-ended interview*"

Keywords: qualitativ* or 'qualitative stud*' or 'qualitative analysis' or 'qualitative method*' or 'focus group*' or interview* or triangulat* or narrative* or 'naturalistic inquir*' or 'feminist research*' or 'grounded theor*' or hermeneutic* or phenomenol* or ethnograph* or ethnonurs* or 'ethnological research' or ethnomethodolog* or 'purposive sampl*' or 'theoretical sampl*' or 'thematic analysis' or 'content analysis' or 'discourse analysis' or 'action research' or 'participatory research' or 'constant comparative method' or 'mixed model' or 'mixed method*' or 'mixed design*' or 'multiple method*' or multimethod* or 'open-ended question*' or 'open-ended survey*' or 'open-ended interview*'

CINAHL

Combination	Retrievals
Women + AOL + experiences	2329
Women + AOL + qualitative studies	744
Women + AOL + qualitative studies OR experiences	2508

MEDLINE

Combination	Retrievals
Women + AOL + experiences	4632
Women + AOL + qualitative studies	328
Women + AOL + qualitative studies OR experiences	5020

EMBASE

Combination	Retrievals
Women + AOL + experiences	7763
Women + AOL + qualitative studies	509
Women + AOL + qualitative studies OR experiences	7953
+ “human” filter	5896

PSYCINFO

Combination	Retrievals
Women + AOL + experiences	1113
Women + AOL + qualitative studies	62
Women + AOL + qualitative studies OR experiences	1133

MATERNITY AND INFANT CARE (MIC)

Combination	Retrievals
Women + AOL + experiences	1019
Women + AOL + qualitative studies	137
Women + AOL + qualitative studies OR experiences	1060

Web of Science

Combination	Retrievals
Women + AOL + experiences	3676
Women + AOL + qualitative studies	248
Women + AOL + qualitative studies OR experiences	3782

Appendix 2: Illustrative quotes supporting the thematic synthesis of Phase 1

Theme 1: Feeling stuck	
Sub-theme: Feeling involved in the decision to augment labour	<i>'The women in our study, however, were less actively involved in decisions related to induction or augmentation than they were in decisions about method of delivery' (DeSisto 2016, p.12)</i>
	<i>'I could have coped better without the infusion, or if I hadn't had as many contractions as I had. ... The women in this group were dissatisfied with the decisions that had been made for them' (Blix-Lindstrom et al. 2004, p.5)</i>
	<i>'A number of women had assisted deliveries by forceps or ventouse, many of whom had also had both epidural anaesthesia and augmented labours. Generally women were accepting of such deliveries because they felt they were important for the safety of a baby, particularly if there were signs of distress' (McCourt 2014, p.7)</i>
Sub-theme: Flaws with informed consent	<i>'I am against oxytocin. And put me in the serum oxytocin and I said 'but why put, for I am almost giving birth? Just to give me a stronger pain? 'And I really got it" (Pimenta et al. 2014, p.9)</i>
	<i>'I refused for a couple of hours. The midwives kept saying, "Don't you want to get this over with sooner?" Of course, I wanted to, but that did not seem like a good enough reason to get oxytocin . . . Eventually I just got tired of saying no, so I agreed. . . .'</i> (Niles et al. 2021, p.7)
	<i>'Jessica felt abandoned, left in the hands of the hospital's medical staff who undermined her autonomy to give birth the way she envisioned. Medical staff attached Jessica to a fetal monitor,</i>

	<i>which limited her mobility, and she was given Pitocin: “None of this was what I wanted”</i> (Davis 2019, p.8)

Theme 2: Past and present shaping the future	
Sub-theme: Knowledge, beliefs and their influence on expectations	<i>‘Their perceptions of risk about childbirth originated from their beliefs about the female body’s physiological capacity to give birth, specifically to go into spontaneous labor, progress to full dilatation, and birth a child without the need for clinical—or medical—interventions such as oxytocin, amniotomy, or epidural anesthesia’</i> (Regan & McElroy 2013, p.3)
	<i>‘Many women did have oxytocin infusions. Some women reported requesting a CS or oxytocin infusion because of severe pain but said the doctors refused this’</i> (Raven et al. 2015, p.5)
	<i>‘In Stephanie’s case, her self-education seemed to negatively influence how she was treated at the hospital. She believed that the nurses were mean and purposely disempowering because they thought she acted too knowledgeable and self-assured’</i> (Happel-Parkins & Azim 2016, p.6)
Sub-theme: Experience of AOL on future births	<i>‘For some it had made sense to consider a future mode of delivery, for instance elective caesarean delivery and home delivery’</i> (Kjaergaard et al. 2007, p.5)
	<i>‘The women attempted to minimise the medicalisation of childbirth by limiting medical staff input. Opting for Water VBAC [Vaginal Birth After Caesarean] was a means of avoiding the ‘cascade of obstetric interventions’</i> ” (McKenna & Symon 2014, p.5)

Theme 3: Cause and effect of AOL	
Sub-theme: Cause and effect of AOL	<i>'One woman, for example, compared her nine hour augmented labour very negatively compared to a previous 19-hour slow but happy labour and birth as nine hours of hell' (McCourt 2014, p.5)</i>
	<i>'It worked well at the beginning, then the cervix did not open ... induced labour [AOL] followed and then this intense pain caused by oxytocin. I defended myself against the labour pains until great exhaustion occurred. Consequently, an epidural anaesthesia followed. This gave my birth certain momentum' (Bielinski-Blattmann et al. 2016, p.14)</i>
	<i>'I was informed by my midwife that the contractions could slow down after getting epidural analgesia. During labour they said that they would give an infusion, I was satisfied with that, because I wanted it to come to an end, I was totally exhausted and thought it was a good idea' (Blix-Lindstrom et al. 2004, p.5)</i>
Sub-theme: Supportive and discouraging roles	<i>'They were very kind, the three midwives that I had. They were sweet, helpful, assisting and understanding' (Kjaergaard et al. 2007, p.6)</i>
	<i>'So I felt like it would've been perfect, if they hadn't been rushing. When they rush you or make you feel like 'Something can go wrong, if this goes on too much longer,' that's a point of anxiety, and that is how I was feeling when I wasn't dilating ...' (Collins et al. 2021, p.7)</i>
	<i>'As mentioned earlier, her mother met her at the hospital and attempted to advocate for her, even in the face of explicit negativity and judgement from the nurses. Stephanie described feeling very supported by her mother ...' (Happel-Parkins & Azim 2016, p.6)</i>



Appendix 3: Ethical approval for Phase 2

Silvia Alòs Pereñíguez,
School of Nursing & Midwifery,
No 2 Clare Street,
Trinity College Dublin
Dublin 2

8th March 2023

Ref: 230101 - 2135

Title of Study: Women's experiences of augmentation of labour with synthetic oxytocin in Ireland

Dear Silvia,

Further to a meeting of the Faculty of Health Sciences Ethics Committee held in March 2023. We are pleased to inform you that the above project has ethical approval to proceed.

This study has been ethically approved. We would advise you to seek review and comments on your DPIA from the DPO if required prior to study commencement.

As a researcher you must ensure that you comply with other relevant regulations, including DATA PROTECTION and HEALTH AND SAFETY.

We wish you every success with this study and should you require any assistance in the future please do not hesitate to contact us.

Yours sincerely,

Prof. Jacintha O'Sullivan
Chairperson
Faculty Research Ethics Committee

Appendix 4: Participant Information Leaflet

Name of Study: Women's experiences of augmentation of labour with synthetic oxytocin in Ireland

Site	Trinity College Dublin
Principal Investigator(s) and Co-Investigator(s)	Principal Investigator: Silvia Alòs Phone: 089 6159906 Email: alsperes@tcd.ie Supervisor: Prof Deirdre Daly Email: dalyd8@tcd.ie Supervisor: Dr Deirdre O'Malley Email: deirdre.omalley@dkit.ie
Data Controllers	Trinity College Dublin
Data Protection Officer	Data Protection Officer, Trinity College Dublin: Data Protection Officer, Secretary's Office, Trinity College Dublin, Dublin 2, Ireland. Email: dataprotection@tcd.ie. Website: www.tcd.ie/privacy.

You are invited to take part in a research study that is being done by Silvia Alòs as part of her Ph.D academic qualification.

Before you decide whether you wish to take part, you should read the information provided in this leaflet carefully. Please feel free to ask any questions you may have. Take time to read the information and don't feel rushed or under any pressure to make a decision to participate.

You should understand the risks and benefits of taking part in this study so you can make a decision that is right for you.

There are the following parts in this leaflet:

- Part 1: The Study
- Part 2: Data Protection
- Part 3: Costs, Funding and Approval
- Part 4: Further Information

Part 1 – The Study

Why is this study being done?

This study aims to understand the experiences of **women who went into labour spontaneously (started contractions on their own) and whose labour was speeded up with an oxytocin infusion (a drip to accelerate labour) at the hospital.**

There is very little research about how this intervention may affect women's childbirth experiences. We are doing this study to better understand the experiences of those women whose labour was speeded up with oxytocin and how to improve care for women undergoing this intervention.

This study may help other women to make informed decisions about their childbirth, and inform hospitals' policies on augmentation of labour in Ireland, and within the international community.

Who can participate?

We want to hear the experiences of women who underwent augmentation of labour with oxytocin in an Irish maternity setting within the last 5 years (from January 2018 until the present).

I'm not sure if I was augmented or induced - What is augmentation of labour?

When we say that your labour was augmented, we mean that you started labour (contractions) at home without any medication and then, when you went to hospital, your labour was speeded up with an oxytocin drip.

If you are not sure whether your labour was augmented or induced, please feel free to contact Silvia Alòs who will be happy to clarify this with you. (Contact details are on page 1 above).

What does taking part involve?

This study will be carried out between January 2023 and January 2024. We are conducting the research study by interviews (one-to-one conversations) which can either be in person or online, whichever suits you best. The in-person interview can be conducted in an office in Trinity College Dublin.

The interview will be held at a time that suits you. It will take approximately one hour. At the start of the interview, I (Silvia) will bring you through the purpose of the study, answer any questions you may have and ensure you understand the study. You will be asked not to disclose information that may make a third person identifiable (i.e., names of healthcare professionals involved in your childbirth). If by accident, this happens during an interview, this will be deleted from the study transcript.

During the interview you will be asked questions about your experience of labour and birth, and what improvements you would suggest for professionals and hospitals to improve the care for women who have this intervention.

With your permission, the interview will be audio recorded and transcribed. Once your interview has been transcribed, the transcript will have any identifiable information (i.e., names and locations) removed to protect your identity.

This interview is about *your* childbirth experience and there are no right or wrong answers.

There might be some questions that are sensitive to you as recalling a memory of your childbirth experience might be upsetting, and a face-to-face interview is recommended. However, this choice is entirely up to you.

You will be free to stop the interview at any time without providing a reason. You may also request a transcript (paper copy of the audio recording) of the interview to review it if you wish to do so.

In the week following the interview, you can contact me (by text, phone or email) to rectify any information you have provided if you wish to do so.

Do I have to take part? Can I withdraw?

Participation in this research is entirely voluntary. If you decide not to take part, it will not affect you in any way. You can change your mind about taking part in the study and opt out at any time even if the study has started. If you decide to opt out, it will not affect your current or future medical care. You do not have to give a reason for not taking part or for opting out. If you wish to withdraw, please contact Silvia Alòs on 089 6159906 or email her at alsperes@tcd.ie who will be able to organise this for you. **Please note that it will not be possible to withdraw your data after publication of the results.**

What are the potential risks for me or others if I take part?

This is described as a low-risk study. However, there is a potential risk that the interview might be distressing for you. If this occurs, you may stop the interview at any point and withdraw from the study if you wish. At the end of this document, you will find the contact details of different sources of help and support services.

There is also a potential risk that your identity could be revealed in case of a data breach. This risk is considered very low and I have taken great care will be taken to ensure that confidentiality is guaranteed throughout.

What are the potential benefits for me?

Taking part in this study will not directly benefit you. However, we hope that this research helps us to better understand women's experiences of having their labour speeded up with oxytocin. By participating you may help other women to make informed decisions about this intervention and inform policy makers and professionals about what and how can be done to improve the care of women undergoing this intervention.

Will I be told the findings of the study?

The results of the study will be reported in the PhD thesis, scientific journals, and

conferences. No information which reveals your identity will be disclosed. Silvia Alòs will also disseminate the findings through social media, including Twitter at @SilviaMidwife

Part 2 – Data Protection

What information about me (personal data) will be used as part of this study?

We will collect personal data such as your contact details, consent form and interview recording and transcript. A record of your contact details will be kept safely and securely on a password protected TCD School of Nursing and Midwifery secure server and will only be accessible to the principal investigator Silvia Alòs and Prof Deirdre Daly in her duties of supervision.

You will be given an ID code (a number of made-up name) which will replace your personal details (such as your name) in both the audio-recordings and transcripts. For example, it is likely that your first name will be used during the interview. When transcribing the recording, Silvia Alòs will replace your name by an ID code every time that it appears during the interview. This is called pseudonymisation and it adds an extra protection to keep your data safe.

Your personal details (including the ID code that will be assigned to you) will be kept in a different file, separate from your consent form, audio-recording and transcript, in a secure location. Access to this code is restricted to the principal investigator Silvia Alòs and her PhD supervisor Prof Deirdre Daly only. Dr Deirdre O'Malley, Silvia Alòs' co-supervisor, will have access to pseudonymised data, that means that will be able to read the transcripts of your interview with nothing that could identify you.

All the data that could make you identifiable will be permanently deleted 3 months after Silvia Alòs has completed her PhD thesis (due approximately September 2024), except the consent forms which need to be kept for 7 years, in compliance with Trinity College Dublin's best practice policy for data retention.

The consent forms will be stored securely in Onedrive (cloud storage in Trinity College Dublin). The interview recording and transcript will be stored on TCD-provided systems (which are password protected with restricted access). The recordings of the interviews will be transcribed by Sonix, a software for audio-transcription. When the interview transcripts have had identifiable information removed and been checked for accuracy, the audio recording will be deleted.

The hardcopy of your consent form will be scanned and saved in a password-protected file within a maximum of 2 weeks. Immediately after, the hardcopy of will be destroyed in confidential paper shredding (within Trinity College Dublin). Access to the scanned copies of your consent form will be restricted to Silvia Alòs and Prof Deirdre Daly only.

The audio-recordings will be deleted once the data transcripts have been checked for accuracy. All personal data generated as a result of this research will be kept until three months after Silvia Alòs has submitted her PhD thesis (due approximately September 2024), except your consent form that will be kept during 7 years in compliance with TCD policy on data retention. At this point, all your data linked to this research will be destroyed.

Who will access and use my personal data as part of this study?

- The principal investigator, Silvia Alòs, and Prof Deirdre Daly, her supervisor, will have access to all the data you have provided.
- Dr Deirdre O'Malley, Silvia Alòs' co-supervisor, will have access to pseudonymised data, that means that will be able to read the transcripts of your interview with nothing that could identify you.

Will my personal data be kept confidential? How will my data be kept safe?

Your privacy is important to us. We take many steps to make sure that we protect your confidentiality and keep your data safe. Here are some examples of how we do this:

- Access to your identifiable personal data will be restricted to the principal investigator and her supervisor.
- We will replace your name with a code to protect your identity. Only the principal investigator and her supervisor will have access to the key to the code to re-identify participants.
- The key to the code to identify individuals will be stored separately and securely from the other research data
- The research information will be stored securely on Trinity College Dublin Microsoft Office 365 systems. These require two factor authentication to access and have anti-virus software installed.

Confidentiality may be breached in circumstances in which:

1. The research team has a strong belief or evidence exists that there is a serious risk of harm or danger to either the participant or another individual. This may relate to issues surrounding physical, emotional and/or sexual abuse, concerns for child protection, rape, self-harm, suicidal intent or criminal activity.
2. Disclosure may be required as part of a professional code and/or legal process, or Garda investigation. In such instances, information may be disclosed to significant others or appropriate third parties without permission being sought. Where possible, a full explanation will be given to the participant regarding the necessary procedures and the intended actions that may need to be taken.

If, during the interview you disclose any concerning information about yourself, your child or the care you have received, the interview will be suspended and, with your consent and participation, a resolution sought. This may involve consultation with third parties such as the Data Protection Officer in Trinity College Dublin, the Faculty of Health Science Research Ethics Committee, hospital personnel or HSE services.

If, during an interview, you disclose information that indicates that a child is being harmed, Silvia Alòs is obliged to report such disclosures to the appropriate authorities in compliance with the National Guidance for the Protection and Welfare of Children.

What is the lawful basis to use my personal data?

By law¹¹, we can use your personal information for scientific research¹² (in the public interest¹³). We will also ask for your explicit consent to use your data as a requirement of the Irish Health research Regulations.

What are my rights?

As a participant you will be entitled to:

- The right to access to your data and receive a copy of it
- The right to restrict or object to processing of your data
- The right to object to any further processing of the information we hold about you
- The right to have inaccurate information about you corrected or deleted
- The right to request deletion of your data

By law you can exercise the above rights in relation to your personal data and you don't have to give a reason for exercising any of them. Please contact Silvia Alòs on 089 6159906 or email her at alsperes@tcd.ie who will be able to help you with this. **Please note that it will not be possible to withdraw your data after publication of the results.**

Part 3 – Costs, Funding and Approval

Has this study been approved by a research ethics committee?

Yes, this study has been approved by The Faculty of Health Sciences Research Ethics Committee. Approval was granted on 8th March 2023.

Who is organising and funding this study? Will the results be used for commercial purposes?

The study will be conducted by Silvia Alòs in partial fulfilment of the requirements for a degree of Doctor of Philosophy, with the School of Nursing & Midwifery, Trinity College

¹¹ The European General Data Protection Regulation (GDPR)

¹² Article 9 (2) (j)

¹³ Article 6(1) (e)

Dublin. Silvia Alòs holds a full-time scholarship from the School of Nursing & Midwifery.

No part of this study will be used for commercial purposes.

Is there any payment for taking part?

No, you will not be paid for taking part in this study. However, you will be reimbursed (up to 20 €) for transport expenses if there are any.

Part 4 – Further Information

Who should I contact for information or concerns?

If you have any concerns or questions, you can contact:

- Principal Investigator: Silvia Alòs
Phone: 089 6159906
Email: alsperes@tcd.ie
- Data Protection Officer, Trinity College Dublin: Data Protection Officer,
Secretary's Office, Trinity College Dublin, Dublin 2, Ireland.
Email: dataprotection@tcd.ie.
Website: www.tcd.ie/privacy.

Under the General Data Protection Regulation, if you are not satisfied with how your data is being processed, you have the right to lodge a complaint in:

- Office of the Data Protection Commission, 21 Fitzwilliam Square South, Dublin 2, Ireland.
Phone number: 057 8684800
Website: www.dataprotection.ie

How do I take part in the study?

- Please contact Silvia Alòs at 089 6159906 call/text or at alsperes@tcd.ie to confirm that you are interest in participating.
- You have received a pre-addressed envelope and two copies of the consent form. Complete both consent forms, keep one copy for your own records and return the other in the freepost pre-addressed envelope to Silvia Alòs.
- Once Silvia Alòs receives your completed consent form, she will contact you within 7 days (from receipt) to schedule a date, time and place that best suits you for the interview.

Where can I seek for help? - Support and Information Services

Mental Health Services in Ireland	
Post Natal Depression Ireland: www.pnd.ie Cork: 021 492 2083 Kerry: 086 787 2107	Email: support@pnd.ie
Mental health services by location in Ireland: www.hse.ie/eng/services/list/4/mental-health-services	
GROW Mental Health: www.grow.ie/	Phone: 0 818 474 474
Psychological Society of Ireland (PSI): www.psychologicalsociety.ie	
Irish Association for Counselling and Psychotherapy: www.iacp.ie	
National Counselling Service: www.hse.ie/eng/services/list/4/mental-health-services/national-counselling-service/	
Pregnancy & Birth	
The Birth Trauma Association (BTA): www.facebook.com/groups/TheBTA	Email: @birthtraumaassociation.org.uk
AIMS Ireland Birth Healing support group: aimsireland.ie/ www.facebook.com/aims.ireland	Email: support@aimsireland.com
Family & Parenting	
Parentline: www.parentline.ie	Lo-Call 1890 927 277 or 01 873 3500 Monday - Thursday 10am- 9pm, Friday 10am- 4pm
One Family: onefamily.ie	Phone: 01 662 9212 Lo-Call: 1890 662212 Email: info@onefamily.ie
Treoir - Informing Unmarried Parents: www.treoir.ie	Phone: 01 6700 120 Lo-Call: 1890 252 084 Email: info@treoir.ie
Doras Buí - Parents Alone Resource Centre: dorasbui.ie	Phone: 01 848 4811



Intimate Partner Violence Services	
Women's Aid Ireland: www.womensaid.ie	Phone: 1800 341 900
Safe Ireland: www.safeireland.ie	
Sexual Assault Treatment Unit (SATU): www.hse.ie/eng/services/list/5/sexhealth/satu	
Legal Aid Board: www.legalaidboard.ie/en	
FLAC (Free Legal Advice Centres): www.flac.ie	
Support Resources for Minority Groups	
Cairde: cairde.ie City Centre Office: 19 Belvedere Place, Dublin 1. Phone: 01 855 2111 Email: info@cairde.ie .	Balbriggan Office: Old St. Georges School, Hampton St., Balbriggan, Co. Dublin. Balbriggan Phone: 01 8020785 Email: balbriggan@cairde.ie sarah@cairde.ie marianna@cairde.ie .
Irish Refugee Centre: www.irishrefugeecouncil.ie	Drop-In Centre: 37 Killarney Street, Dublin 1 Phone: 01 764 5854 Email: info@irishrefugeecouncil.ie
Doras Luimní: doras.org	Advice & Information centre Mon: 9:30am - 12:30pm & 2pm - 4:30pm Tues: 10:30am - 12:30pm & 2pm - 4:30pm Thurs: 9:30am to 12:30pm & 2pm to 4:30pm
Migrants4Migrants: www.women4women.ie	Wed: from 10am-1pm. Phone: 087 7203665 Email: rafika.kelly@sspship.ie
Pavee Point Traveller & Roma Centre: www.paveepoint.ie Phone: 01 878 0255 Email: info@pavee.ie	Pavee Point Traveller & Roma Centre 46 Charles Street Great Dublin 1 Ireland
Patient Advocacy	
Patient Advocacy Service: www.patientadvocacyservice.ie Phone: 0818 293 003 Email: info@patientadvocacyservice.ie	



HSE Advocacy Support List: www.hse.ie/eng/services/yourhealthservice/feedback/services

Irish Patients Association: www.irishpatients.ie

Phone: 087 659 4183

Email: info@irishpatients.ie

Irish Advocacy Network:

Phone: 01 547 0510

Email: admin@irishadvocacynetwork.com

Appendix 5: Recruitment poster for Phase 2



Women's experiences of augmentation of labour with oxytocin in Ireland

RESEARCH STUDY SEEKING PARTICIPANTS FOR INTERVIEWS

Was your labour speeded up with oxytocin?
Did you give birth in Ireland within the last five years?

I'm not sure whether I underwent augmentation of labour



For more information or to take part, please contact Silvia Alòs

✉ alsperes@tcd.ie
☎ 089 6159906

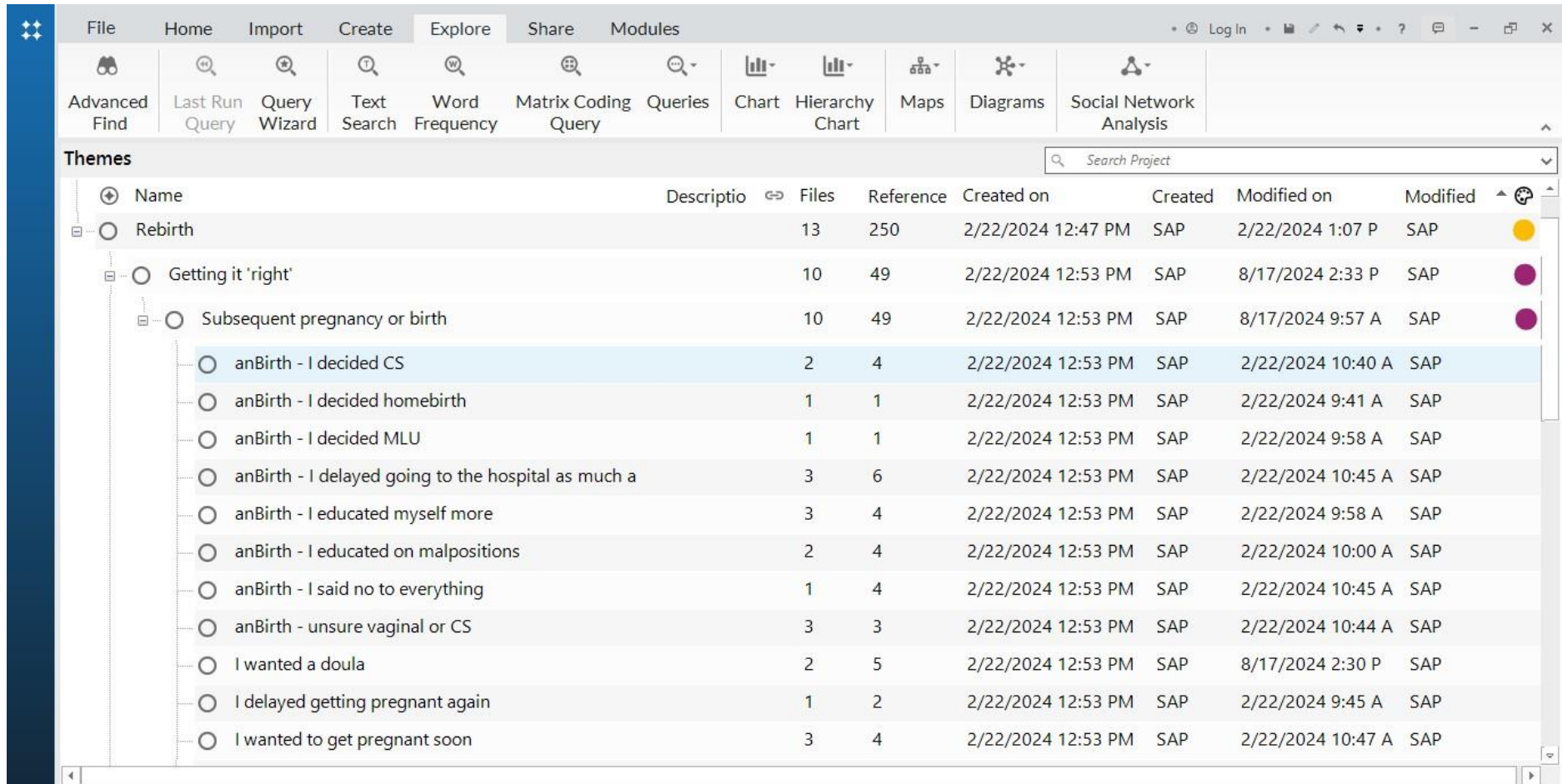


Trinity College Dublin
The University of Dublin

Appendix 6: Interview guide employed in Phase 2

- How did you feel about having to have your labour accelerated with oxytocin?
- Who was involved in the decision-making process?
- What information were you given beforehand?
- If you went back in time, is there anything that you would've liked to ask/know and you didn't?
- If yes, at what stage during your pregnancy or labour do you think it would be appropriate to receive information about augmentation of labour with oxytocin?
In what format (i.e., online course, in-person course, women's stories, from a healthcare provider, others)?
- (If you have/plan to have more children), how did your experience with augmentation of labour with oxytocin impact on your next pregnancy/birth?
- How could we improve women's experiences of augmentation of labour with oxytocin in Irish maternity settings?

Appendix 7: Example of data analysis from NVivo (theme, sub-theme, and codes)



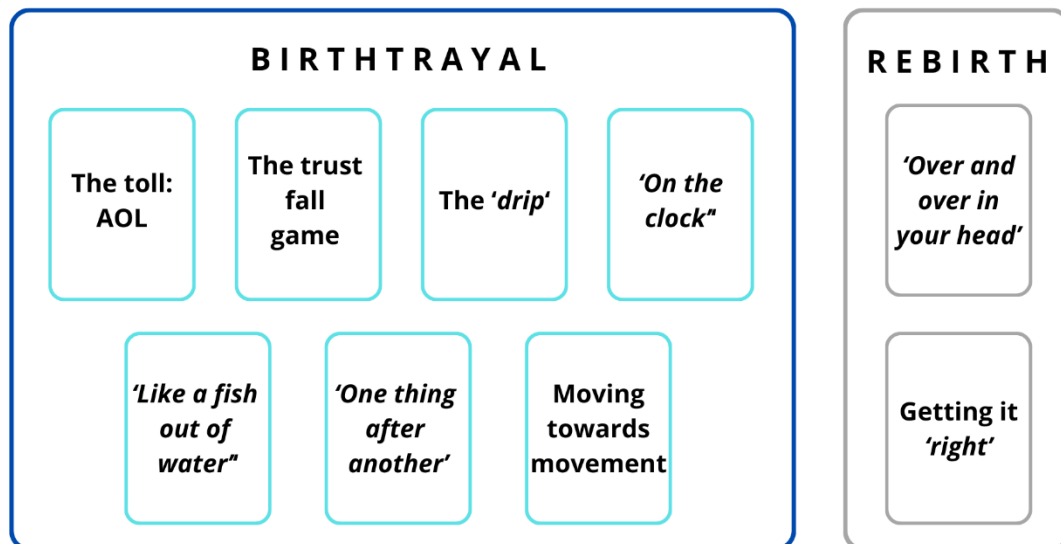
The screenshot shows the NVivo software interface with the 'Themes' list expanded. The list is organized hierarchically, showing themes, sub-themes, and codes. The 'Rebirth' theme is selected, and its sub-themes and codes are visible. The table below represents the data shown in the 'Themes' list.

Name	Description	Files	Reference	Created on	Created	Modified on	Modified
Rebirth		13	250	2/22/2024 12:47 PM	SAP	2/22/2024 1:07 P	SAP
Getting it 'right'		10	49	2/22/2024 12:53 PM	SAP	8/17/2024 2:33 P	SAP
Subsequent pregnancy or birth		10	49	2/22/2024 12:53 PM	SAP	8/17/2024 9:57 A	SAP
anBirth - I decided CS		2	4	2/22/2024 12:53 PM	SAP	2/22/2024 10:40 A	SAP
anBirth - I decided homebirth		1	1	2/22/2024 12:53 PM	SAP	2/22/2024 9:41 A	SAP
anBirth - I decided MLU		1	1	2/22/2024 12:53 PM	SAP	2/22/2024 9:58 A	SAP
anBirth - I delayed going to the hospital as much a		3	6	2/22/2024 12:53 PM	SAP	2/22/2024 10:45 A	SAP
anBirth - I educated myself more		3	4	2/22/2024 12:53 PM	SAP	2/22/2024 9:58 A	SAP
anBirth - I educated on malpositions		2	4	2/22/2024 12:53 PM	SAP	2/22/2024 10:00 A	SAP
anBirth - I said no to everything		1	4	2/22/2024 12:53 PM	SAP	2/22/2024 10:45 A	SAP
anBirth - unsure vaginal or CS		3	3	2/22/2024 12:53 PM	SAP	2/22/2024 10:44 A	SAP
I wanted a doula		2	5	2/22/2024 12:53 PM	SAP	8/17/2024 2:30 P	SAP
I delayed getting pregnant again		1	2	2/22/2024 12:53 PM	SAP	2/22/2024 9:45 A	SAP
I wanted to get pregnant soon		3	4	2/22/2024 12:53 PM	SAP	2/22/2024 10:47 A	SAP

Appendix 8: Additional quotes supporting data analysis of women's experiences of augmentation of labour with synthetic oxytocin in Ireland

Figure 7: themes and sub-themes representing women's experiences of AOL in Ireland.

Section focusing on the theme Birthtrayal and its sub-themes



The toll: AOL

They said so there was an infection risk if it would have broken for longer than 48 hours. So they needed to accelerate it. But, um, it wasn't really presented as a choice because, well.. I guess it was a choice. But, um. Like. Looking subsequently like the infection risk is it's, you know, there's only a percentage risk. It's not a definite. So I could have waited longer and I think, um, different guidelines advocate different, you know, times. So umm... If I'd do it again, I definitely would have just waited because it all seemed to be fine. But you never know (P11).

But when you're in it, and a doctor or an expert is telling you or your midwife is telling you, 'this is what you should do'... I didn't expect that I would be so compliant, but because I was in it and I was scared and I wanted the best for the baby and, you know, I just did what I was told, you know? (P03).

Everything was like seeking permission to want to have it a certain way that should just be the given umm, the given way. You know... I suppose I still feel that women in any medical setting, you know, are not given maybe the respect that they are due, you know (P02).

And like I say, I, I was naive. I thought that being on the domino scheme would mean I was out of that... Because they make a big hoo-ha about that. And they make a big hoo-ha about 'we do things differently'. But they don't (P04).

The trust fall game

But the, the, the midwife in the morning, like she would not, wouldn't stop talking. I was like, don't talk to me like unless you really. I just, I, I actually just remember that just, just talking about such random things and I was just like, what? How is this relevant? Please, just let me just be in this moment. And I'll never forget that my husband, even he was like, 'God, she talks so much like' (P08).

And I'm really grateful for all the staff there as well. Like, everybody was so nice. Midwives are brilliant, you know. And they've a lot to contend with themselves. There's a lot of pressure on them (P06).

My husband was getting really annoyed because he, he was like, you know, we're trying to, he's set up the room really nice and we had music and everything and he was trying to protect me a little bit and people coming in to kind of have a chat and see what was going on (P03).

I probably should have had a good chat with my husband as well and say like, you know, look, you probably need to be an advocate for me now, and I'm umm...maybe not 100% in the moment or do you know? That sort of a way...(P10).

The 'drip'

There was little information given. I kind of had to ask a bit more, you know (P02).

We all know what an epidural does. It's a spinal tap, and it numbs you from the waist down. But, like, yeah, I'd probably like to know a bit more like. Yeah, why they do it, you know, you know, um, like, obviously the epidural. I think I'm fairly clued in on an epidural, but I think with the likes of oxytocin and other things that they're putting into you to speed a labour up, we should probably know a little bit more about it. At the end of the day, it's a drug getting pumped into our own bodies that we don't know much about at all (P13).

I remember signing a consent form for the epidural, but I don't remember, you know, kind of being a... kind of signing any consent form or anything in terms of the oxytocin and the, um, the fact that, like, it was just explained that it was a synthetic hormone (P14).

I would have loved to know everything about what it does [AOL] and what the risks are and what the chances are of it needing an assisted birth. And if I could go back in time, I would not have any of it (P12).

'On the clock'

I was like, oh dear...I can be here all day. But no, there's... there's a limit (P08).

So then like I had the one hour to push and then I felt, I felt so much pressure because they told me that in advance... I didn't know there was a deadline and the clock was right in front of me. So I was watching the clock while trying to push and trying to work really hard (P05).

And then another two hours later she checked me again and I was still five. So the partogram or whatever it's called was obviously an issue.. Like she was kind of saying, you know, you're... Things aren't progressing like the way they should be (P07).

They start you on the time clock. Once you're... Once you're in for how long you can go before assisted from active labour (P12).

'Like a fish out of water'

You know, in my case, really gentle contractions. And then all of a sudden it just becomes really intense (P02).

Like the felt sense of being on a runaway train that you've no control over and that no one has any control over and that no one is helping you with. It was horrendous (P04).

Once I was on the drip, it was so much worse. It was completely unbearable. I couldn't handle anything. And then I just gave up as well. I was just like, look, whatever.. Just whatever we need to do, just do it to me because I just need this finished. [cries] And, um, and then, um, honestly, like, that pain was like, so bad. It was.. I felt like it was like, blinding pain (P05).

[Translated from Spanish] *I remember that, at that time, we discussed this with my obstetrician, that if this happened again in the future with other pregnancies, that they were going to give me the epidural first and then the oxytocin. So, this is what happened in my following births. They gave me the epidural first and then the oxytocin (P09).*

‘One thing after another’

I was very keen to avoid it [AOL] (...) Because I had learned so much about hyperstimulation and contractions and people being unable to... That it just leads to one thing leading to another (P01).

Actually, they put a clip [internal fetal monitoring] in [baby's] head just before the delivery. And anyway, the questions are like... At no point when they were giving me oxytocin did they say that babies are more likely to become distressed, and then that they're more likely to need to use other means of monitoring or, you know, those kinds of things (P04).

I remember that there wasn't much of a break. It was like... I was expecting there to be, you know, a minute or two of a break. And there wasn't. It was very intense. It was up and down and up again and up again.... You know, there was very little time between them [augmented contractions] (P03).

And that probably took 30 to 40 minutes. Um, and then once the oxytocin kicked in, um, it was very much like that's when his heart rate dropped. And that's when, like, it just all happened so fast after that, like the... the stirrups came out (...) and I remember... I would say it was probably about 5 to 6 pushes with him and obviously the help [vacuum] (P14).

Moving towards movement

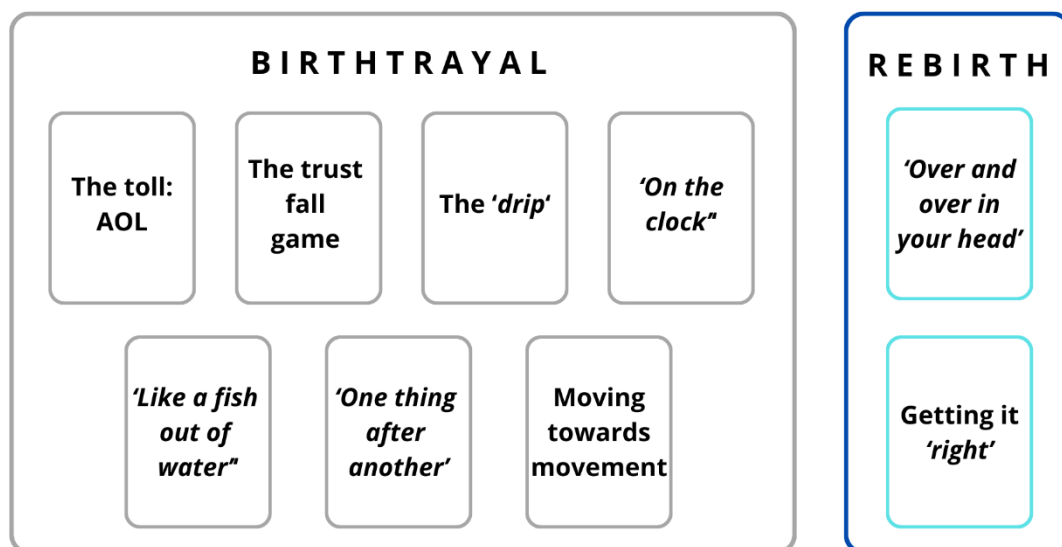
My first baby was posterior, and I could feel. I could feel all the hands and legs and was like, oh, this is lovely. But actually, you know, it was probably not the, you know, so this is... My second baby wasn't actually, he was kind of halfway between the two. Which is better, but, um. Yeah. So I tried to, you know, you know, no reclining and all that was after for the second time, after 32 weeks, I was like, sitting forward all the time. I was just trying, you know, as much as I can try a better experience. But no, there's not really it's not really things that was mentioned the first time around (P11).

I mean, based on what I know now as opposed to what I knew then, I'm like, she the poor puppet. I think she was just very asynclitic and none of the pressure was going on the right place (P04).

it was a very slow and long labour. Um, I think it was the second day, so, like, it was like a full 24 hours I waited and tried to sleep and then... Then, they started becoming closer and I wasn't able to sleep through it though. The second day when we were five minutes apart, we went to the hospital thinking it was ready. (...) I got in, they said I wasn't dilated at all yet. Umm.. I was very disappointed because I was already exhausted day in and I couldn't believe I hadn't started yet. So, I had a real feeling like, um... Just what's wrong with me and why? (P05).

I had what they what they call a deep transverse arrest. So I suppose the baby's head was at a difficult angle (P08).

Figure 9: Themes and sub-themes representing women's experiences of AOL in Ireland.
Section focusing on the theme Rebirth and its sub-themes



'Over and over in your head'

I planned to breastfeed or try at least, but I had just gone through so much... I was just so tired. I just said I couldn't, and then I felt guilty that I wasn't breastfeeding then, you know, and that I had decided to bottle feed, but, um... (P13).

I went after them to do the birth reflections. I suppose I was probably thinking I was doing something wrong. (...) I was probably blaming myself that like, I couldn't get her out (P10).

I didn't feel kind of dissatisfied until yeah, probably 2 or 3 months later when I just kind of started feeling like, Oh...did I make a mistake? Like, should I've just stayed at home longer or should I have not let them break my waters? Should I have just said 'no' when they said about the oxytocin? (P07).

I'm really concerned about the mental health. I'm... I'm really concerned about the mental health implications of augmenting labour (P04).

Getting it 'right'

And I'd love to... and this is really not a reason to have children, but I'd love to try again with the labour and see if I could do it differently next time. Because it was.. it wasn't. You know, people talk about their child being born, being such a happy moment. It was not a happy, happy time. And I'd love to have another go of it and see if I could do it differently (P03).

I was still very traumatised and I was I had just returned to work for five days when I found out I was pregnant again and I was very adamant I wanted to get pregnant again quickly so that I could be at home with my first baby. I did not want anyone near him or not anyone, but I didn't want to leave him with anyone (P01).

But as soon as I was pregnant, I got a birth doula. And for support the whole way through and I started... I read different kind of books (P05).

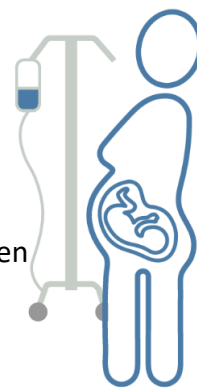
I specifically went for a midwife led, you know, to try and avoid interventions. And this time my waters broke. It was... It was like the night of 40 plus five for my second baby. And I was like, okay, I'm not going to hospital until I have to. And actually, we went in like an hour before he was born because... umm... [giggles] I might have left it a bit too long (P11).

Appendix 9: Collection and recoding of variables of Phase 3

Diagnosis (ICD-10-AM)	Interventions (ACHI)	Other variables (HIPE)
O680 Labour and delivery complicated by fetal heart rate anomaly O682 Labour and delivery complicated by fetal heart rate anomaly with meconium in amniotic fluid O683 Labour and delivery complicated by biochemical evidence of fetal stress O688 Labour and delivery complicated by other evidence of fetal stress O689 Labour and delivery complicated by fetal stress, unspecified → Labour and delivery complicated by fetal stress O660 Labour and delivery affected by shoulder dystocia O690 Labour and delivery complicated by prolapse of cord O711 Rupture of uterus during labour O720 Third-stage haemorrhage O721 Other immediate postpartum haemorrhage O722 Delayed and secondary postpartum haemorrhage O723 Postpartum coagulation defects → Postpartum haemorrhage O366 Excessive fetal growth	16520-00 Elective classical caesarean section 16520-02 Elective lower segment caesarean section 16520-04 Elective caesarean section, not elsewhere classified → Elective caesarean section 90465-00 Medical induction of labour, oxytocin 90465-01 Medical induction of labour, prostaglandin 90465-02 Other medical induction of labour 90465-03 Surgical induction of labour by artificial rupture of membranes (ARM) 90465-04 Other surgical induction of labour 90465-05 Medical and surgical induction of labour → Induction of labour 90466-00 Medical augmentation after onset of labour 9046602 Medical and surgical augmentation of labour → Augmentation of labour 16606-00 Fetal Blood Sampling 16514-00 Internal fetal monitoring 90472-00 Episiotomy	Maternity hospital → Maternity size Length of stay Number of previous live births → Parity Public / Private care Age (in groups)

O365 Poor fetal growth O100 Pre-existing essential hypertension complicating pregnancy, childbirth and the puerperium O101 Pre-existing hypertensive heart disease complicating pregnancy, childbirth and the puerperium O102 Pre-existing hypertensive renal disease complicating pregnancy, childbirth and the puerperium O103 Pre-existing hypertensive heart and renal disease complicating pregnancy, childbirth and the puerperium O104 Pre-existing secondary hypertension complicating pregnancy, childbirth and the puerperium O109 Unspecified pre-existing hypertension complicating pregnancy, childbirth and the puerperium O140 Mild to moderate pre-eclampsia O141 Severe pre-eclampsia O142 HELLP syndrome O149 Pre-eclampsia, unspecified O151 Eclampsia in labour O159 Eclampsia, unspecified as to time period O16 Unspecified maternal hypertension → Hypertensive disorders	16573-00 Suture of third or fourth degree tear of perineum 92506-XX or 92507-XX Epidural analgesia 90467-00 Spontaneous vertex delivery 90470-00 Spontaneous breech delivery 90470-01 Assisted breech delivery → Spontaneous vaginal birth 90468-00 Low forceps delivery 90468-01 Mid-cavity forceps delivery 90468-02 High forceps delivery 90468-03 Forceps rotation of fetal head 90468-04 Forceps rotation of the fetal head with forceps delivery 90468-05 Failed forceps 90468-06 Forceps delivery, unspecified 90470-02 Assisted breech delivery with forceps to after-coming head → Forceps-assisted birth 90469-00 Vacuum assisted delivery 90469-01 Failed vacuum assisted delivery → Vacuum-assisted birth → Instrument-assisted birth	

O300 Twin pregnancy O301 Triplet pregnancy O302 Quadruplet pregnancy O308 Other multiple gestation O309 Multiple gestation, unspecified → Multiple pregnancy O240 Pre-existing type 1 diabetes mellitus O241 Pre-existing type 2 diabetes mellitus O243 Pre-existing diabetes mellitus, unspecified O244 Diabetes mellitus arising in pregnancy O249 Diabetes mellitus in pregnancy, unspecified → Diabetes	16520-01 Emergency classical caesarean section 16520-03 Emergency lower segment caesarean section 16520-05 Emergency caesarean section, not elsewhere classified → Caesarean birth	



Augmentation of labour

Augmentation of labour is a procedure that is used to speed up labour in women who went into labour spontaneously (i.e., women who started contractions on their own), causing effacement and dilation of the cervix. Augmentation of labour makes uterine contractions longer, stronger and more frequent and, therefore, it accelerates labour.

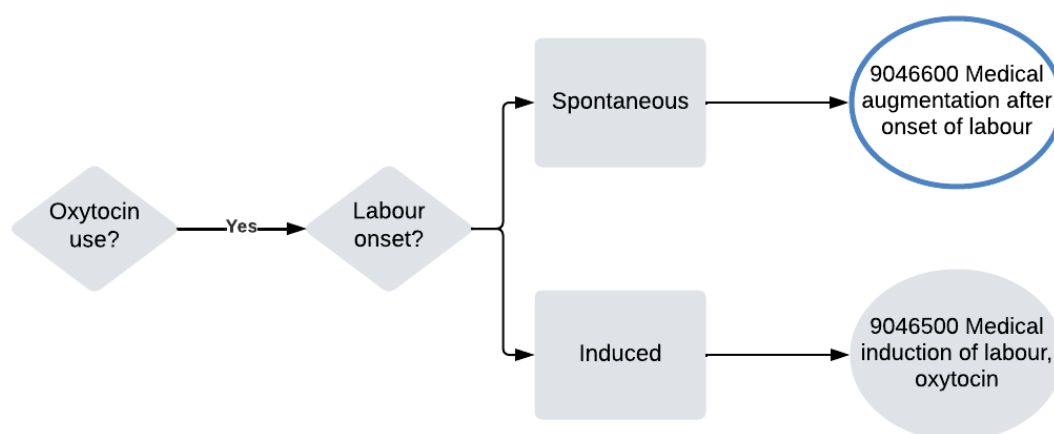
In ACHI-10th edition, augmentation of labour is coded in Chapter 14: *Obstetric procedures – block [1335]*:

- 90466-00 Medical augmentation after onset of labour
- 90466-01 Surgical augmentation of labour
- 90466-02 Medical and surgical augmentation of labour

Important points to note when coding augmentation of labour:

- **Only women with spontaneous onset of labour can have an augmentation of labour** - induction of labour and augmentation of labour are mutually exclusive.
- Surgical augmentation of labour refers to artificial rupture of the membranes (i.e., breaking the waters artificially). Sometimes you will find artificial rupture of membranes written as 'ARM' or 'AROM' in clinical records.
- **Medical augmentation refers to the infusion of oxytocin (Syntocinon®)** during labour. Sometimes you will find it written as 'synt' in clinical records.

Oxytocin (Syntocinon®) administration is not without risk. In fact, this medication has the highest safety warning label from the FDA. It is especially important that its use is properly recorded. Consider the following diagram for Oxytocin use:



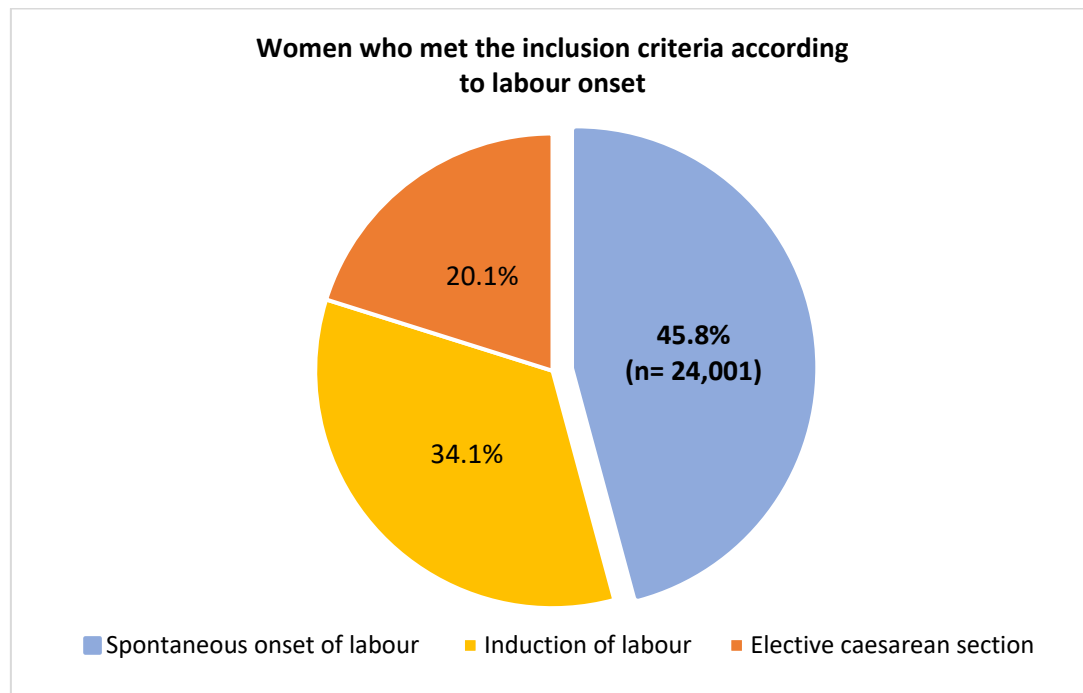
Note: oxytocin can also be given for the third stage of labour (i.e., for delivering the placenta, after the baby has been born) – this is not augmentation of labour.

Appendix 11: Statistical analysis of Phase 3

Results

Data from all women who gave birth from 1st January to 31st December 2020 in Irish maternity hospitals at equal to or greater than 37 weeks' gestation were retrieved in Microsoft Excel® (n=52,400) and downloaded into SPSS® Statistics 29. Of these, 17,844 (34.1%) women underwent induction of labour and 10,555 (20.1%) had an elective caesarean section. Both of these groups of women therefore, excluded from further analysis. This left a dataset with records from 24,001 women with spontaneous onset of labour.

Figure 13: Women who met the inclusion criteria of Phase 3 according to labour onset



Baseline characteristics of the women included

The majority of women (n=15,589, 64.96%) were aged between 30 and 39 years and 40.05% (n=9,612) were nulliparous. The prevalence of health problems complicating pregnancy was 9.4% with gestational diabetes being the most frequently reported complication (6.01%). The proportion of women with a multiple pregnancy was 0.4%. Most women used the public health service to give birth (n=20,335, 84.73%). The mean length

of stay was ~2 and a half days (M 2.41, SD 1.33). [Table 25](#) shows the characteristics of the women included.

Table 25: Baseline characteristics of the women included

Characteristics		Total (n)	%
Age	Less than 20	469	1.95
	20-24	2,127	8.86
	25-29	4,609	19.20
	30-34	8,613	35.89
	35-39	6,976	29.07
	40-44	1,153	4.80
	45 and over	54	0.22
Parity	Nulliparous	9,612	40.05
	Multiparous	14,328	59.70
Multiple pregnancy	—	97	0.40
Medical insurance	Public	20,335	84.73
	Private	3,665	15.27
Health problems complicating pregnancy	Hypertensive disorders	51	0.21
	Pre-gestational diabetes type I	13	0.05
	Pre-gestational diabetes type II	64	0.27
	Gestational diabetes	1,442	6.01
	Excessive fetal growth	312	1.30
	Poor fetal growth	357	1.49

Mode of birth

A total of 66.89% (n=15,985) of women included had a spontaneous vaginal birth, followed by 14.29% (n=3,415) and 13.84% (n=3,308) who had a caesarean section and a vacuum-assisted birth respectively. [Table 26](#) displays the mode of birth of the women included. Note that the category ‘instrument-assisted and caesarean section’ includes attempts of forceps-assisted and/or vacuum-assisted with a final caesarean section.

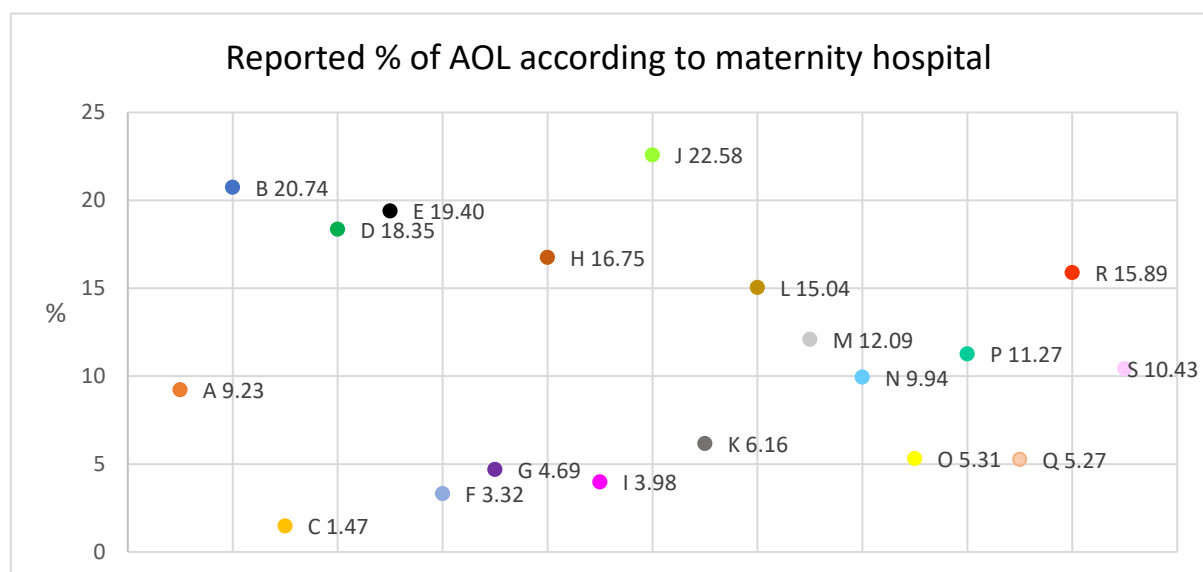
Table 26: Mode of birth of the women included

		Total (n)	%
Mode of birth	Spontaneous vaginal birth	15,985	66.89
	Forceps-assisted	750	3.14
	Vacuum-assisted	3,308	13.84
	Vacuum- and forceps-assisted	314	1.31
	Instrument-assisted and caesarean section	126	0.53
	Caesarean section	3,415	14.29

Prevalence and predisposing factors of augmentation of labour with synthetic oxytocin

The overall prevalence of AOL among women in Ireland was 12.40% (n=2,976). Wide variation was observed across maternity hospitals, ranging from 1.47% to 22.58%. [Figure 14](#) shows the reported percentages of AOL in each maternity hospital. In compliance with the data sharing agreement between the HPO and the author of this thesis regarding reporting data anonymously, each hospital has been given a fictitious letter from 'A' to 'S' so that they cannot be identified.

Figure 14: Reported percentage of augmentation of labour with synthetic oxytocin in each Irish maternity hospital



The prevalence of AOL was 22.36% (n=2,149) in nulliparous women and 5.77% (n=827) in multiparous women. Nulliparity (OR 4.70, 95% CI 4.32-5.12; RR 2.04, 95% CI 1.96-2.08; $p<0.001$) and excessive fetal growth (OR 2.43, 95% CI 1.87-3.14; RR 2.38; 95% CI 1.85-3.12; $p<0.001$) significantly increased the likelihood of undergoing AOL. Taking maternal age <20 years old as the reference category, being 25-29 (OR 9.08, 95% CI 1.25-65.87; RR 1.14; 95% CI 1.03-1.16; $p=0.03$), 30-34 (OR 8.64, 95% CI 1.19-62.58; RR 1.13; 95% CI 1.02-1.15; $p=0.03$) and 35-39 (OR 8.06, 95% CI 1.11-58.34; RR 1.10; 95% CI 1.01-1.11; $p=0.04$) showed a statistical significant relationship with undergoing AOL. Private medical insurance was a protective factor against AOL (OR 0.74, 95% CI 0.66-0.84; RR 0.77, 95% CI 0.69-0.85; $p<0.001$). No relationship was found between AOL and poor fetal growth, hypertensive disorders, twin pregnancies or diabetes (type I, II and gestational). These results are not shown in tabular form.

Augmentation of labour with synthetic oxytocin and mode of birth

[Table 27](#) displays the results of the multinomial logistic regression analysis for the outcome 'mode of birth' with three possible categories. Augmentation of labour with sOT showed a statistically significant association with having an instrument-assisted birth (OR 2.86, 95% CI 2.62-3.13; RR 1.17, 95% CI 1.16-1.18; $p<0.001$) and a caesarean section (OR 1.57, 95% CI 1.41-1.75; RR 1.05, 95% CI 1.04-1.06; $p<0.001$) compared to the reference category (spontaneous vaginal birth).

Table 27: Unadjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (three possible categories)

Mode of birth		Total (n)	OR	95% CI	P-value	RR	95% CI
Spontaneous vaginal birth	Ref	15,956	—	—	—	—	—
Instrument-assisted birth	No AOL	3,376	Ref	—	—	—	—
	AOL	988	2.86	2.62-3.13	<0.001	1.17	1.16-1.18
Caesarean section	No AOL	3,030	Ref	—	—	—	—
	AOL	487	1.57	1.41-1.75	<0.001	1.05	1.04-1.06

[Table 28](#) shows the results of the adjusted multinomial regression analyses for the outcome 'mode of birth' with three possible categories. After adjustment by parity,

maternal age and excessive fetal growth, AOL remained statistically significant for having an instrument-assisted birth (aOR 1.55, 95% CI 1.41-1.71; aRR 1.08, 95% CI 1.07-1.10; $p<0.001$) but there was no significant difference in the risk of having a caesarean section compared to the reference category (spontaneous vaginal birth) (aOR 1.05, 95% CI 0.94-1.18; aRR 1.01, 95% CI 0.99-1.02; NS).

Table 28: Adjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (3 possible categories)

Mode of birth		Total (n)	OR	95% CI	P- value	aRR	95% CI
Spontaneous vaginal birth	Ref	15,956	—	—	—	—	—
Instrument-assisted birth	No AOL	3,376	Ref	—	—	—	—
	AOL	988	1.55	1.41-1.71	<0.001	1.08	1.07-1.10
	Multiparous	1,102	Ref	—	—	—	—
	Nulliparous	3,262	8.08	7.44-8.77	<0.001	—	—
	Less than 20 years old	96	Ref	—	—	—	—
	20-24	419	1.41	1.09-1.83	0.009	—	—
	25-29	843	1.77	1.38-2.26	<0.001	—	—
	30-34	1,758	2.40	1.89-3.05	<0.001	—	—
	35-39	1,086	2.50	1.95-3.19	<0.001	—	—
	40-44	157	2.89	2.14-3.91	<0.001	—	—
	45 and over	5	3.87	1.33-11.20	0.013	—	—
	No excessive fetal growth	4,315	Ref	—	—	—	—
	Excessive fetal growth	49	1.26	0.89-1.77	—	—	—
Caesarean section	No AOL	3,030	Ref	—	—	—	—
	AOL	487	1.05	0.94-1.18	NS	1.01	0.99-1.02
	Multiparous	1,635	Ref	—	—	—	—
	Nulliparous	1,882	3.63	3.34-3.93	<0.001	—	—
	Less than 20 years old	43	Ref	—	—	—	—

20-24	253	1.78	1.25-2.52	0.009	—	—
25-29	595	2.38	1.71-3.33	<0.001	—	—
30-34	1,264	3.13	2.25-4.35	<0.001	—	—
35-39	1,092	3.91	2.80-5.44	<0.001	—	—
40-44	237	6.05	4.22-8.65	<0.001	—	—
45 and over	33	37.3 0	18.64-74.65	<0.001	—	—
No excessive fetal growth	3,405	Ref	—	—	—	—
Excessive fetal growth	112	3.65	2.82-4.72	<0.001	—	—

[Table 29](#) displays the results of the multinomial logistic regression analysis for the outcome ‘mode of birth’ with six possible categories. Compared to the reference category (spontaneous vaginal birth), AOL showed an increased risk for having a forceps-assisted birth (OR 3.33, 95% CI 2.80-3.96; RR 1.21, 95% CI 1.19-1.23; $p<0.001$), a vacuum-assisted birth (OR 2.73, 95% CI 2.48-3.02; RR 1.16, 95% CI 1.15-1.16; $p<0.001$), a vacuum- and forceps-assisted birth (OR 3.18, 95% CI 2.44-4.13; RR 1.20, 95% CI 1.16-1.23; $p<0.001$), an instrument attempt with a final caesarean section (OR 3.33, 95% CI 2.22-4.99; RR 1.21, 95% CI 1.16-1.25; $p<0.001$) and a caesarean section (OR 1.52; 95% CI 1.35-1.70; RR 1.04, 95% CI 1.03-1.06; $p<0.001$).

Table 29: Unadjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (6 possible categories)

Mode of birth		Total (n)	OR	95% CI	P- value	RR	95% CI
Spontaneous vaginal birth	Ref	15,956	Ref	—	—	—	—
Forceps-assisted	No AOL	555	Ref	—	—	—	—
	AOL	189	3.33	2.80-3.96	<0.001	1.21	1.19-1.23
Vacuum-assisted	No AOL	2,584	Ref	—	—	—	—
	AOL	722	2.73	2.48-3.02	<0.001	1.16	1.15-1.17
Vacuum- and forceps- assisted	No AOL	237	Ref	—	—	—	—

	AOL	77	3.18	2.44-4.13	<0.001	1.20	1.16-1.23
Instrument and caesarean section	No AOL	94	Ref	—	—	—	—
	AOL	32	3.33	2.22-4.99	<0.001	1.21	1.16-1.25
Caesarean section	No AOL	2,936	Ref	—	—	—	—
	AOL	455	1.52	1.35-1.70	<0.001	1.04	1.03-1.06

[Table 30](#) shows the results of the adjusted multinomial regression analysis for the outcome ‘mode of birth’ with six possible categories. After adjustment by parity, maternal age, and excessive fetal growth, AOL remained statistically significant for women who had a forceps-assisted birth (aOR 1.69, 95% CI 1.41-2.02; aRR 1.11, 95% CI 1.08-1.14; $p<0.001$), a vacuum-assisted birth (aOR 1.53, 95% CI 1.38-1.70; aRR 1.08, 95% CI 1.06-1.10; $p<0.001$), a vacuum- and forceps-assisted birth (aOR 1.58, 95% CI 1.21-2.07; aRR 1.10, 95% CI 1.04-1.14; $p<0.001$) and an instrument attempt with a final caesarean section (aOR 1.68, 95% CI 1.11-2.54; aRR 1.11, 95% CI 1.02-1.18; $p<0.014$), but not for having a caesarean section (aOR 1.03, 95% CI 0.91-1.15; aRR 1.01, 95% CI 0.99-1.02; NS) compared to the reference category (spontaneous vaginal birth). Note that the categories ‘less than 20 years old’ and ‘20-24’ were merged into the age category ‘maternal age 24 or less’ to ensure minimum of five cases in each age group.

Table 30: Adjusted multinomial logistic regression analysing augmentation of labour with synthetic oxytocin and mode of birth (6 possible categories)

Mode of birth		Total (n)	aOR	95% CI	P- value	aRR	95% CI
Spontaneous vaginal birth	Ref	—	—	—	—	—	—
Forceps-assisted	No AOL	555	Ref	—	—	—	—
	AOL	189	1.69	1.41-2.02	<0.001	1.11	1.08-1.14
	Multiparous	135	Ref	—	—	—	—
	Nulliparous	609	12.29	10.08-14.99	<0.001	—	—
	Maternal age 24 or less	93	Ref	—	—	—	—
	25-29	137	1.25	0.95-1.64	NS	—	—
	30-34	302	1.82	1.43-2.33	<0.001	—	—

	35-39	187	2.03	1.56-2.65	<0.001	—	—
	40 and over	25	2.23	1.40-3.54	<0.001	—	—
	No excessive fetal growth	735	Ref	—	—	—	—
	Excessive fetal growth	9	1.36	0.68-2.71	NS	—	—
Vacuum-assisted	No AOL	2,584	Ref	—	—	—	—
	AOL	722	1.53	1.38-1.70	<0.001	1.08	1.06-1.10
	Multiparous	912	Ref	—	—	—	—
	Nulliparous	2,394	7.12	6.51-7.29	<0.001	—	—
	Maternal age 24 or less	387	Ref	—	—	—	—
	25-29	637	1.33	1.15-1.54	<0.001	—	—
	30-34	1,334	1.81	1.58-2.06	<0.001	—	—
	35-39	819	1.83	1.59-2.12	<0.001	—	—
	40 and over	129	2.20	1.75-2.77	<0.001	—	—
	No excessive fetal growth	3,272	Ref	—	—	—	—
	Excessive fetal growth	34	1.14	0.77-1.68	NS	—	—
Vacuum- and forceps- assisted	No AOL	237	Ref	—	—	—	—
	AOL	77	1.58	1.21-2.07	<0.001	1.10	1.04-1.14
	Multiparous	55	Ref	—	—	—	—
	Nulliparous	259	12.93	9.53-17.55	<0.001	—	—
	Maternal age 24 or less	35	Ref	—	—	—	—
	25-29	69	1.68	1.11-2.55	NS	—	—
	30-34	122	1.97	1.34-2.90	<0.001	—	—
	35-39	80	2.34	1.55-3.53	<0.001	—	—
	40 and over	8	1.93	0.88-4.22	NS	—	—
	No excessive fetal growth	308	Ref	—	—	—	—
	Excessive fetal growth	6	2.20	0.95-5.06	NS	—	—

Instrument and caesarean section	No AOL	94	Ref	—	—	—	—
	AOL	32	1.68	1.11-2.54	0.014	1.11	1.02-1.18
	Multiparous	25	Ref	—	—	—	—
	Nulliparous	101	12.44	7.87-19.67	<0.001	—	—
	Maternal age 24 or less	7	Ref	—	—	—	—
	25-29	26	3.15	1.36-7.28	0.007	—	—
	30-34	45	3.61	1.62-8.05	0.002	—	—
	35-39	44	6.37	2.84-14.29	<0.001	—	—
	40 and over	4	4.75	1.37-16.48	0.014	—	—
	No excessive fetal growth	125	Ref	—	—	—	—
	Excessive fetal growth	1	0.89	0.12-6.47	NS	—	—
Caesarean section	No AOL	2,936	Ref	—	—	—	—
	AOL	455	1.03	0.91-1.15	NS	1.01	0.99-1.02
	Multiparous	1,610	Ref	—	—	—	—
	Nulliparous	1,781	3.45	3.18-3.75	<0.001	—	—
	Maternal age 24 or less	289	Ref	—	—	—	—
	25-29	569	4.13	3.39-5.03	<0.001	—	—
	30-34	1,219	2.36	2.03-2.73	<0.001	—	—
	35-39	1,048	1.91	1.66-2.21	<0.001	—	—
	40 and over	266	1.45	1.24-1.69	<0.001	—	—
	No excessive fetal growth	3,280	Ref	—	—	—	—
	Excessive fetal growth	111	3.73	2.88-4.82	<0.001	—	—

Augmentation of labour with synthetic oxytocin and adverse perinatal outcomes

[Table 31](#) presents the results of the binary logistic regression analyses comparing AOL and different adverse perinatal outcomes. Women who had suspected fetal hypoxia during labour (OR 2.20, 95% CI 2.02-2.39; RR 1.77, 95% CI 1.68-1.88; $p < 0.001$), experienced

shoulder dystocia (OR 2.09, 95% CI 1.51-2.90; RR 2.07, 95% CI 1.51-2.86; $p<0.001$), a third- or fourth-degree perineal tear (OR 1.53, 95% CI 1.18-1.97; RR 1.51, 95% CI 1.18-1.94; $p=0.001$), or a postpartum haemorrhage (OR 1.81, 95% CI 1.61-2.04; RR 1.70, 95% CI 1.54-1.89; $p<0.001$) were more likely to have undergone AOL. Given the low frequency of cord prolapse and uterine rupture, this study lacked statistical power to analyse differences between the groups.

Table 31: unadjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and adverse perinatal outcomes

Adverse perinatal outcomes	No AOL (n)	AOL (n)	Total (n)	OR	95% CI	P-value	RR	95% CI
Suspected fetal hypoxia	4,139	1,043	5,182	2.20	2.02-2.39	<0.001	1.77	1.68-1.88
Shoulder dystocia	163	48	211	2.09	1.51-2.90	<0.001	2.07	1.51-2.86
3 rd or 4 th degree perineal tear	344	74	418	1.53	1.18-1.97	0.001	1.51	1.18-1.94
Postpartum haemorrhage	1,663	402	2,065	1.81	1.61-2.04	<0.001	1.70	1.54-1.89
Uterine rupture	4	0	4	1	1-1	1	—	—
Cord prolapse	34	4	38	0.83	0.29-2.33	1	—	—

[Table 32](#) presents the results of the binary logistic regression analyses comparing AOL and different adverse perinatal outcomes adjusted by parity. Note that, due to the frequencies presented in ‘uterine rupture’, statistical analysis was not possible for this outcome. After adjusting for confounders, AOL remained statistically significant for having suspected fetal hypoxia during labour (aOR 1.39, 95% CI 1.27-1.52; aRR 1.06, 95% CI 1.04-1.07; $p<0.001$), shoulder dystocia (aOR 1.88, 95% CI 1.34-2.64; aRR 1.12, 95% CI 1.06-1.16; $p<0.001$) and postpartum haemorrhage (aOR 1.56, 95% CI 1.38-1.76; aRR 1.07, 95% CI 1.06-1.09; $p<0.001$). No association was observed between AOL and having a 3rd or 4th degree perineal tear (aOR 1.07, 95% CI 0.82-1.38; aRR 1.00, 95% CI 0.98-1.03; NS).

Table 32: Adjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and adverse perinatal outcomes

Adverse perinatal outcomes		Total (n)	aOR	95% CI	P-value	aRR	95% CI
Suspected fetal hypoxia	No AOL	4,122	Ref	—	—	—	—
	AOL	1,043	1.39	1.27-1.52	<0.001	1.06	1.04-1.07
	Multiparous	1,660	Ref	—	—	—	—
	Nulliparous	3,505	4.43	4.13-4.75	<0.001	—	—
	Maternal age 24 or less	596	Ref	—	—	—	—
	25-29	1,000	1.22	1.08-1.37	0.001	—	—
	30-34	1,995	1.43	1.28-1.59	<0.001	—	—
	35-39	1,349	1.48	1.32-1.67	<0.001	—	—
	40 and over	225	1.64	1.37-1.96	<0.001	—	—
Shoulder dystocia	No AOL	163	Ref	—	—	—	—
	AOL	48	1.88	1.34-2.64	<0.001	1.12	1.06-1.16
	Multiparous	110	Ref	—	—	—	—
	Nulliparous	101	1.21	0.91-1.61	NS	—	—
	No excessive fetal growth	200	Ref	—	—	—	—
	Excessive fetal growth	11	3.91	2.10-7.28	<0.001	—	—
3 rd or 4 th degree perineal tear	No AOL	342	Ref	—	—	—	—
	AOL	74	1.07	0.82-1.38	NS	1.00	0.98-1.03
	Multiparous	138	Ref	—	—	—	—
	Nulliparous	278	3.05	2.46-3.79	<0.001	—	—
	Maternal age 24 or less	47	Ref	—	—	—	—
	25-29	78	1.13	0.78-1.63	NS	—	—
	30-34	177	1.47	1.06-2.04	0.03	—	—
	35-39	94	1.16	0.81-1.66	NS	—	—
	40 and over	15	1.17	0.65-2.12	NS	—	—
	No AOL	1,660	Ref	—	—	—	—

	AOL	402	1.56	1.38-1.76	<0.001	1.07	1.06-1.09
Postpartum haemorrhage	Multiparous	1,002	Ref	—	—	—	—
	Nulliparous	1,060	1.52	1.38-1.67	<0.001	—	—
	No excessive fetal growth	2,022	Ref	—	—	—	—
	Excessive fetal growth	40	1.49	1.06-2.08	0.021	—	—
Uterine rupture	No AOL	4	Ref	—	—	—	—
	AOL	0	—	—	—	—	—
	Multiparous	3	Ref	—	—	—	—
	Nulliparous	1	0.60	0.06-5.80	NS	—	—
Cord prolapse	No AOL	34	Ref	—	—	—	—
	AOL	4	0.79	0.27-2.30	NS	0.97	0.77-1.06
	Multiparous	22	Ref	—	—	—	—
	Nulliparous	16	1.12	0.58-2.18	NS	—	—

Augmentation of labour with synthetic oxytocin and childbirth interventions

[Table 33](#) presents the crude results of the binary logistic regression analyses comparing AOL and several childbirth interventions. During labour, women who had their labour augmented had a five-fold increase in the risk of undergoing fetal scalp blood sampling (OR 5.83, 95% CI 4.90-6.93; RR 5.43, 95% CI 4.62-6.41; $p<0.001$) and a three-fold increase in having internal fetal monitoring (OR 3.62, 95% CI 3.25-4.03; RR 3.12, 95% CI 2.85-3.42; $p<0.001$). Women who underwent AOL were twice as likely to have epidural analgesia (OR 6.95, 95% CI 6.30-7.66; RR 2.05, 95% CI 2.00-2.10; $p<0.001$) and an episiotomy (OR 2.63, 95% CI 2.43-2.85; RR 1.98, 95% CI 1.88-2.09; $p<0.001$) compared to women who did not undergo AOL.

Table 33: Unadjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and childbirth interventions

Childbirth interventions	No AOL (n)	AOL (n)	Total (n)	OR	95% CI	P-value	RR	95% CI

Fetal scalp blood sampling	313	241	554	5.83	4.90-6.93	<0.001	5.4 3	4.62-6.41
Internal fetal monitoring	1,279	566	1,845	3.62	3.25-4.03	<0.001	3.1 2	2.85-3.42
Epidural analgesia	8,436	2,450	10,886	6.95	6.30-7.66	0.001	2.0 5	2.00-2.10
Episiotomy	4,208	1,183	5,391	2.63	2.43-2.85	<0.001	1.9 8	1.88-2.09

[Table 34](#) presents the results of the adjusted binary logistic regression analyses comparing AOL and several childbirth interventions. Women who underwent AOL showed an almost 50% increase in the risk of undergoing fetal scalp blood sampling during labour (aOR 3.86, 95% CI 3.23-4.62; aRR 1.47, 95% CI 1.43-1.51; $p < 0.001$), ~25% increase of having internal fetal monitoring placement (aOR 2.79, 95% CI 2.49-3.12; aRR 1.24, 95% CI 1.22-1.26; $p < 0.001$), ~10% increase of episiotomy (aOR 1.52, 95% CI 1.39-1.65; RR 1.08, 95% CI 1.06-1.09; $p < 0.001$) and a 5% increase of epidural analgesia use (aOR 5.22, 95% CI 4.72-5.77; aRR 1.05, 95% CI 1.05-1.05; $p < 0.001$).

Table 34: Adjusted binary logistic regressions analysing augmentation of labour with synthetic oxytocin and childbirth interventions

Adverse perinatal outcomes		Total (n)	aOR	95% CI	P-value	aRR	95% CI
Fetal scalp blood sampling	No AOL	313	Ref	—	—	—	—
	AOL	241	3.86	3.23-4.62	<0.001	1.47	1.43-1.51
	Multiparous	125	Ref	—	—	—	—
	Nulliparous	429	3.85	3.12-4.74	<0.001	—	—
Internal fetal monitoring	No AOL	1,279	Ref	—	—	—	—
	AOL	566	2.79	2.49-3.12	<0.001	1.24	1.22-1.26
	Multiparous	690	Ref	—	—	—	—
	Nulliparous	1,155	2.18	1.97-2.42	<0.001	—	—
Epidural analgesia	No AOL	8,417	Ref	—	—	—	—

	AOL	2,450	5.22	4.72-5.77	<0.001	1.05	1.05-1.05
	Multiparous	4,881	Ref	—	—	—	—
	Nulliparous	5,986	2.64	2.49-2.79	<0.001	—	—
	Maternal age less than 20	250	Ref	—	—	—	—
	20-24	1,104	1.15	0.93-1.42	NS	—	—
	25-29	2,155	1.08	0.88-1.32	NS	—	—
	30-34	4,048	1.15	0.94-1.40	NS	—	—
	35-39	2,896	1.11	0.91-1.36	NS	—	—
	40-44	407	0.91	0.72-1.15	NS	—	—
	45 and over	7	0.23	0.10-0.52	<0.001	—	—
	No excessive fetal growth	10,685	Ref	—	—	—	—
	Excessive fetal growth	182	1.47	1.15-1.87	0.002	—	—
Episiotomy	No AOL	4,201	Ref	—	—	—	—
	AOL	1,183	1.52	1.39-1.65	<0.001	1.08	1.06-1.09
	Multiparous	1,356	Ref	—	—	—	—
	Nulliparous	4,028	6.72	6.25-7.23	<0.001	—	—
	Maternal age less than 20	149	Ref	—	—	—	—
	20-24	568	1.08	0.86-1.35	NS	—	—
	25-29	1,039	1.10	0.89-1.36	NS	—	—
	30-34	2,130	1.39	1.13-1.71	NS	—	—
	35-39	1,321	1.37	1.11-1.70	NS	—	—
	40-44	171	1.22	0.93-1.59	NS	—	—
	45 and over	6	0.62	0.25-1.55	NS	—	—
	No excessive fetal growth	5,332	Ref	—	—	—	—
	Excessive fetal growth	52	0.62	0.45-0.85	0.003	—	—

Appendix 12: Ethical approval for Phase 4 (maternity hospital)



Ms Silvia Alos
PhD Candidate
Trinity College Dublin
(alsperes@tcd.ie)

12th September 2023

Re: Study No. 21 – 2023 - Augmentation of labour with oxytocin: predisposing and associated factors

Dear Ms Alos,

Thanks for clarification of your credentials (you are employee of the Coombe Hospital). It would be strongly recommended to involve Midwifery and/or Clinical Lead from the Delivery Suite in the Coombe Hospital in your study.

Your study is now fully approved by the Research Ethics Committee (REC) in the Coombe Hospital. You should submit the Application with amended credentials to me for the REC records.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Jan Miletin', is written over a faint, larger signature.

Professor Jan Miletin (IMC 241348)
Consultant Neonatologist, Chair of the Research Ethics Committee
The Coombe Hospital (jan.miletin@ucd.ie)

Cc.: Prof Deirdre Daly, Associate Professor in Midwifery, Trinity College Dublin
(dalyd8@tcd.ie)
Dr Deirdre O'Malley, Lecturer in Midwifery, Dundalk Institute of Technology
(deirdre.omalley@dkit.ie)

**Appendix 13: Ethical approval for Phase 4 (School of Nursing and Midwifery,
Trinity College Dublin)**

23/02/2024

Title: Augmentation of labour with synthetic oxytocin: a cross-sectional study

REAMs No: 2985

Dear Silvia Alós Pereñíguez,

Your application has been reviewed by the relevant Research Ethics Committee (REC) and we are pleased to inform you that the above project has been approved.

Please note that any documents submitted for GDPR purposes in association with your ethics application are approved by the REC from an ethical perspective only (GDPR compliance is assumed, as per your uploaded letter of approval from the DPO).

It is the responsibility of the researcher/research team to ensure that, if applicable, all aspects of the study are executed in compliance with the General Data Protection Regulation (GDPR), the Health Research Regulations, Data Protection Act 2018, particularly regarding the storage and destruction of data arising from the research, and adhere to any relevant Health & Safety regulations.

Please note the reporting requirements outlined, in particular the need for:

- An immediate report of any serious or unexpected adverse event should be sent immediately to your REC via email. The Procedures for Reporting Adverse Events are outlined in the application. The Adverse Event form are available [here](#).
- Any other unforeseen events should also be reported using this form and sent to your REC via email. The Adverse Event form are available [here](#).
- An end of project report is due one year from the end of project date. The form is available [here](#). This should be sent to your REC via email.
- If the data collection period is longer than 1 year, an annual report should be submitted. The form is available [here](#). This should be sent to your REC via email.

You, and your research team (where applicable), are responsible for conducting the research strictly in the manner outlined in your application and supporting documentation, and in compliance with it. Proposed changes or amendments to the approved study must be submitted to the REC for approval in advance of any changes or amendments being implemented. In the event that the changes or amendments are significant, the REC may require a new submission. This ethical approval expires with the end dates of the project as stated in the application.

If you have any queries regarding this decision, please contact the Chair of your REC.

We wish you all the very best with your research project.

Kind Regards,

The REC

NB. If your study is to be conducted outside TCD, e.g. in a hospital site, please note that Trinity College REC approval does not of itself entitle you to conduct research in an external site. In this regard, the onus is upon you - the researcher, to ensure that all

permissions have been obtained, and that any other requirements of the study site have been satisfied

NB. If your study involves a trial of medicinal products or medical devices, apps on humans you must provide a copy of your Clinical Trial Sponsorship from TCD - indicating that you have the appropriate trial insurance and sponsor oversight".