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ABSTRACT

Objective: To investigate the quality of intra-partum care provided to women with an expected normal birth at a university hospital in Nepal.

Methods: A prospective cross-sectional study was conducted during three weeks in November 2013. Nurses at the labor ward collected data from 292 consecutive births. Of these, 164 women of low risk were expected to have a normal birth and were included in the study; 107 (65%) were primiparous. The self-administered questionnaire covered; maternal characteristics, previous pregnancies and births, current pregnancy, labor and birth. Nine items assessed care management, five of which comprised the Bologna score with a total possible score of 5: presence of a companion, use of partograph, non-use of augmentation, non-supine position, and skin-to-skin contact.

Results: The women were assisted by physicians (56%), nurses (42%) or students under supervision (2%). All were in good health after birth. Two had a postpartum hemorrhage >500 ml and 49% had an episiotomy. Apgar score in all neonates was ≥7 at five minutes. Mean Bologna score was 1.43 (variance 0-3).

Conclusions: The management of care in normal birth could be improved in the studied setting, and there is a need for more research to support such improvement.

Keywords: Intra-partum care; Quality of Health Care; Bologna Score; Nepal; survey.

Introduction

The overall objective of intra-partum care is for a healthy mother to give birth to a healthy child, with the minimum of intervention compatible with medical safety (1). Although childbirth is a normal physiological process, complications in pregnancy and birth constitute the majority of causes of death and disability among women of reproductive age in low-income settings (2), and they are some of the leading causes of neonatal mortality (3). Optimal maternity care providing the best outcomes for mother and child must be based on scientific evidence to allow the physiological process of birth to be as undisturbed as possible. Although medical or technical intra-partum care interventions are indispensable when needed, they will cause negative effects when overused (4-6). The World Health Organization [WHO] advocates that normal birth should be de-medicalized, since a medicalization of childbirth may induce a wide range of negative effects, some of which have serious consequences. Unnecessary intervention may harm mother and child (1), and there is an increase in operative birth with each intervention introduced in labor, particularly in primiparous women (7).

The most critical time for maternal and neonatal survival is labor, birth and the immediate post-partum period, yet most women and newborns in low- and middle-income settings do not receive the care required during this period (8).

In Nepal the maternity care available is limited by inequality, and location and economic status are important barriers to improving maternal health. Only 36% of women are assisted by a so called skilled birth attendant (9), which in Nepal is an auxiliary nurse-midwife, a nurse or a physician with an additional two months training in selected midwifery skills. Thus there are no professional midwives fulfilling international standards (10). The maternal and child health situation is however improving, and between 1990 and 2013 the national maternal mortality ratio [MMR] was reduced by 76%, from 790 to 190 in 100 000 live births (11). Infant mortality ratio reduced from 99 in 1990 to 34 in 2012 (12). This development is at least partially contributed to strategies introduced by the government of Nepal to increase the availability of family planning, safe abortion, antenatal care, and skilled attendance as well as medical care in childbirth (13). Although the government has issued a clinical

protocol for safe motherhood including care in normal labor and birth (14), no initiative has been found that focusses on improving the normal, physiological process of childbirth: Since this is an important measure to reduce the risk of complications, it is of importance to study the care provided in normal birth in Nepal.

The aim of this study was to investigate the quality of intra-partum care provided to women with an expected normal birth at a university hospital in Nepal.

Materials and Methods

The study was conducted at the labor ward of a university hospital in Nepal, with approximately 4800 births per year. A prospective, cross-sectional design was chosen as it is considered a suitable method to describe a situation as it appears at a fixed point in time (15).

Sample size: The sample size was calculated using the formula: $n = (Z^2 \times P(1 - P))/e^2$, where Z is the value of the normal distribution corresponding to 85% CI, P is the expected true proportion and e is desired precision (+ or − 0.5). The proportions used were those expected for no skin-to-skin contact (80%), use of a partograph (80%), and rates of augmentation of labour (70%), based on anecdotal evidence of existing hospital figures. The estimated sample size required was 130, 130 and 169 for those three conditions, respectively. With an estimated birth rate of between 90 and 100 births per week, a three week study period was deemed adequate to reach an appropriate sample size.

Setting: The labor ward consisted of one labor room with five beds that could be separated with curtains, one delivery room with three gynecology chairs placed next to each other in an open area, and one operation theatre. Caregivers, i.e. auxiliary nurse-midwives, nurses or physicians were based in the different rooms and women moved between the rooms and got new caregivers as their labor progressed. Thus one-on-one care was not practiced. Fifteen nurses worked exclusively at the ward; three in the day shift, and two in the evenings and nights. Of these about one third had completed a two month "Skilled Birth Attendance" course. There was a team of 16 physicians employed at the clinic, and their shifts were evenly distributed over the 24 hours. The nurses were

responsible for intra-partum care, which was provided by themselves, physicians, or medical or nursing students under supervision. Fetal status was evaluated by a nurse or a physician, listening to the fetal heart rate with a Doppler every half-hour and observing amniotic fluid passed for meconium. Maternal well-being was initially assessed by a physician, measuring temperature, pulse and blood pressure. Palpations of contractions were performed regularly by a physician, and the nurses or a physician examined the women vaginally every fourth hour or more often when needed. One cardiotocograph machine was available at the ward, but it was not routinely used. Nurses, physicians, and medical and nursing students under supervision, all assisted the women in vaginal births. Only physicians performed vacuum extractions [VE] and cesarean sections [CS]. This intra-partum care was based on the national clinical protocol issued by the Ministry of Health and Population in Nepal (14).

Measurements: A self-administered questionnaire, previously developed and validated (16, 17), was further developed for this study. The authors tested the questionnaire on a group of registered nurses and registered nurse-midwives at a Masters seminar at the University of Gothenburg. The questionnaire was further reviewed by an associate professor at the university connected to the hospital where the study took place. To minimize the risk of misinterpretations, and to achieve a chronological order of questions, the questionnaire was re-designed to consist of four different sections. Section one; maternal characteristics, included maternal age, gestational age and level of education. Section two described the outcome of previous pregnancies and births, and section three described the current pregnancy, including obstetric risk factors and use of maternity health care. The information collected in these sections was used to distinguish the women included in further analysis.

The fourth section described current labor and birth. It included nine items describing intra-partum care, and four items measuring the outcome of expected normal birth. Five of the intra-partum care variables were part of the Bologna score, an instrument developed by WHO to evaluate the management of care in normal birth (18). The score, which has been tested and validated in both high- and low-income settings (16, 17), consisted of five variables: presence of a companion at birth; use of partograph; absence of labor augmentation (i.e. no medical augmentation, amniotomy, fundal pressure,

forceps, VE, or emergency CS); use of non-supine position for birth; and skin-to-skin contact of mother and child for at least 30 minutes within the first hour after birth. Each affirmative answer was assigned one point, and a total score of five was assessed as representing effective management of care in normal birth (18). The other four items assessing intra-partum care were: use of pharmacological and/or non-pharmacological pain management, episiotomy, and prevention of post-partum hemorrhage. The four outcome measures were; rupture of anal sphincter (yes/no), post-partum hemorrhage (no/500-1000 ml/>1000 ml), Apgar score at five minutes, and mother in health after birth (yes/no).

Inclusion and exclusion criteria: The inclusion criterion was: an expected normal birth, i.e. women assessed to be of low risk, who received skilled attendance in childbirth. Low risk was defined as: no obstetric risk factors in previous pregnancies, childbirths or current pregnancy; no maternal chronic illness that may affect the outcome of the birth; singleton full-term pregnancy, i.e. gestational age 37 weeks and 0 days – 41 weeks and 6 days; cephalic position; spontaneous start of labor; in active labor; and fetal heart rate of 110-150 beats per minute on arrival to the ward. Both adolescent pregnancy (19) and pregnancy late in life (20) have been found to correlate with higher risk, and maternal age <20 years and >35 years was therefore an exclusion criterion from the low risk category.

Conduct of the study: Data were collected by the 15 nurses employed at the labor ward. Before the study commenced explanation sessions were held with all the nurses, after which they all opted to participate and gave informed written consent. A pilot study was conducted over three consecutive day and evening shifts, to test the questionnaire and the design of data collection. The nurses who worked during any of those shifts also took part in the pilot study. Subsequently, two questions were modified to avoid misunderstandings; a question regarding active labor on admission was simplified to a yes/no variable to avoid misconceptions, and a question regarding amniotic fluid was modified to request the status of amniotic fluids in general, and not only if the membranes ruptured spontaneously. During the study period, the nurses filled in questionnaires for all consecutive births. The first and second author visited the ward daily, to collect the completed questionnaires and answer questions regarding the study.

All questionnaires were collected in a closed envelope and kept safe by the first and second author.

Statistics: Data were processed using SPSS version 21.0. Level of significance was defined as 0.05. Differences in age between primi- and multipara were analyzed with Independent-Sample T-tests. Their educational level and frequency of episiotomy was analyzed with a Pearson Chi-square test.

Author contributions: The first and second authors modified the questionnaire used in the study and were responsible for obtaining the ethical approval, the acquisition, processing, analysis, and interpretation of the data, and manuscript writing. The third author developed the analysis and assisted in interpretation of data and manuscript writing. The fourth author developed the research design and protocol, and contributed to the analysis and manuscript writing. All authors agreed the final version of the paper.

Ethical approval for this study was granted by the Institutional Review Board at the Institute of Medicine at Tribhuvan University, Nepal (ID no 87/070/071 and ID no 88/070/071).

Results

A total of 292 women gave birth at the hospital during the time of the study. Of them, 44 (15.1%) were excluded from further analysis due to elective CS and 19 (6.5%), due to induced labor. The remaining 229 women (78.4%) were admitted in spontaneous labor. Among them, 65 women (28.4%) were excluded from the low-risk category due to; pre-term delivery (n=24), not in active labor (n=19), maternal age <20 years (n=7), previous CS (n=4), premature rupture of membranes (n=2), maternal age >35 years (n=2), oligohydramnios (n=2), meconium stained liquor on arrival (n=2), placenta previa (n=1), obstetric cholestasis (n=1) and post-term delivery (n=1).

All women and infants included in the study survived labor, birth and the immediate post-partum period. They received skilled attendance in childbirth from a physician (n=92/56.1%), a nurse (n=68/41.5%), or a medical or nursing student under supervision (n=4/2.4%).

Maternal characteristics: Of the 164 women included in the study, 107 (65.2%) were primiparas and 57 (34.8%) were multiparas. The median number of previous births among multiparous women was 1 (range 1-3). The median level of education in both groups was secondary school. Maternal characteristics are further described in Table 1.

Table 1. Maternal characteristics

	All, n=164(%)	Primipara n=107(%)	Multipara n=57(%)	p-Value
Mean age (SD)	26 (3.7)	24 (3.2)	28 (3.4)	0.049[†]
Educational level				0.14[‡]
< Primary school	7 (4.3)	1 (0.9)	6 (10.5)	
Primary school	19 (11.6)	12 (11.2)	7 (12.3)	
Secondary school	90 (54.9)	59 (55.1)	31 (54.4)	
University	48 (29.3)	35 (32.7)	13 (22.8)	
Maternity healthcare	164 (100.0)	107 (100.0)	57 (100.0)	

[†]Independent-Sample T-Test [‡]Chi-square=3.914, d.f=2, p=0.14 (NB: >20% of the cells have expected frequencies of <5).

Bologna score: No woman received care rated with the full 5 point score. The mean score was 1.43, with a minimum of 0 (n=5/3.0%) and a maximum of 3 (n=9/5.5%) (Table 2). At least one of the six types of augmentation defined in the Bologna score (see above) was used in 116 births (70.7%). Two types of augmentation were used to augment the process of labor; medical augmentation (n=87/53.0%), and amniotomy (n=47/28.7%). Either one or both of these were administered to 94 women (57.3%), and the most common reasons were: poor contractions (n=71/75.5%), to progress labor (n=45/47.9%), and fetal distress (n=8/8.5%), with some women requiring augmentation for more than one reason. The types of augmentation to complete the birth included: fundal pressure (n=8/4.9%), and instrumental births (Table 3). The main reason for emergency CS was fetal distress (n=23/71.9%).

Table 2. Outcomes on the Bologna score items

	n=164	%
Presence of a companion during labor and birth	3	1.8
Use of a partograph	156	95.1
Absence of labor augmentation	48	29.3
Non-supine position	0	0.0
Skin-to-skin contact of mother and baby ≥ 30 minutes	27	16.5

Table 3. Delivery outcomes in women with expected normal childbirths

	All n=164(%)	Primipara n=107(%)	Multipara n=57(%)
Spontaneous vaginal birth	124 (75.6)	76 (71.0)	48 (84.2)
Vacuum extraction	8 (4.9)	8 (7.5)	0 (0.0)
Emergency cesarean section	32 (19.5)	23 (21.5)	9 (15.8)
Rupture of anal sphincter	2 (1.5)[§]	2 (2.4)[§]	0 (0.0)
Post-partum hemorrhage 500-1000 ml	2 (1.2)	0 (0.0)	2 (3.5)
Apgar score ≥7 at 5 min	164 (100.0)		

[§]Percentage computed from vaginal births only.

Pain management: Pharmacological analgesia was administered to 85 women (51.8%), the most common being local anesthesia for episiotomy or repair after episiotomy or lacerations (n=54/32.9%). Other types of analgesia were; spinal anesthesia (n=25/15.2%), anti-spasmodic (n=6/3.7%), and general anesthesia (n=1/0.6%). Non-pharmacological pain management was given to 55 women (33.5%), the most common being massage (n=32/19.5%), and support (n=22/13.4%). Both pharmacological and non-pharmacological pain management were administered to 37 women (22.6%), whereas n=61 (37.2%) received neither. *Episiotomy:* Episiotomy was performed on 80 women (48.8%), the main reasons being; tight perineum (n=64/80.0%), fetal distress (n=7/8.8%), primipara (n=4/5.0%), for vacuum extraction (n=7/8.8%), and to hasten delivery (n=4/5.0%). A significant difference was found between primiparas (n=73/86.9%) and multiparas (n=7/14.58%), with a p-value of <0.001 (chi-square= 66.92, d.f.=1).

Prevention of post-partum hemorrhage: Interventions to prevent post-partum hemorrhage were implemented in 143 births (87.2%). 'As per national protocol' or

'active management of third stage' were cited in n=67 cases (40.9%). Other specified interventions were; oxytocin intra-muscular injections or oxytocin in Ringers Lactate given intravenously (n=83/50.6%), uterine massage (n=60/36.6%), controlled cord traction (n=43/26.2%), emptying of bladder or catheterization (n=16/9.8%), rectal misoprostol tablets (n=13/7.9%), and methylergometrine injections (n=3/1.8%). Two women (1.2%) had a post-partum hemorrhage greater than 500 ml but less than 1000 ml.

Delivery outcome: All women were perceived to be in good health after childbirth. This was a yes/no question, and further explanation of this assessment was only provided in two cases; one mother was described as looking cheerful, and another one as feeding her baby. No women included in the study were treated in the intensive care unit after birth. The mean Apgar score at five minutes was 8 (min 7 – max 9). Delivery outcome is further presented in Table 3. There were no missing data in this section.

Discussion

In this prospective study at a university hospital in Nepal, 164 (56%) of the 292 women were assessed to have an expected normal birth. The results revealed that intra-partum care at the labor ward, for these low-risk women, achieved the overall objective of a healthy mother giving birth to a healthy child. However, there were higher rates of medico-technical interventions than expected and low levels of measures promoting normal birth. The low Bologna score (mean 1.43) may indicate that the intra-partum care in normal labor and birth, based on the criteria of WHO, is not well managed, or that the labors of the women included in the study deviated from their expected normal progress (18).

Labor augmentation: This study revealed high levels of amniotomy and medical augmentation of labor. Considering the potential risks of amniotomy, WHO suggests that there should be a valid reason to interfere with the spontaneous rupture of membranes in normal labor (1). A Cochrane review found that early amniotomy and medical augmentation did not affect maternal or neonatal outcome, although there was a slight reduction in CS rates (21). The present study, however, revealed a high rate of emergency CS in expected normal birth (19.5%) despite the high levels of amniotomy

and medical augmentation of labor. A Cochrane Review of maternal positions and mobility in the first stage of labor found that, in 25 studies involving over 5000 women, upright and ambulant positions resulted in a first stage that was on average one hour and 22 minutes shorter (22). This is a similar degree of shortening of labor to that found in the review of early amniotomy and medical augmentation of labor (21). Upright positions were also shown to reduce CS rates and use of analgesia (22). The need for interventions to augment labor could thus be reduced if women were allowed and encouraged to labor and birth in non-supine positions.

Presence of a companion during labor and birth: The vast majority of women (98.2%) had no companion with them during labor and birth. In combination with the lack of one-on-one professional care, this suggests that continuous support was not a part of the intra-partum care at the labor ward. This may be due to the setup of care at the ward, with the women moving between different caregivers throughout labor and birth, as well as to the restrictive setting with several women birthing simultaneously in the same rooms. The result differs from a similar study using the Bologna score in Sweden (16), where 98.7% of the women had a companion present as part of the routine care. Previous research has found continuous support, especially by non-clinicians, to shorten labor, reduce CS and instrumental birth rates as well as improve maternal satisfaction and neonatal Apgar scores (23). Continuous support in labor is also recommended by a number of key authors (24, 25). Allowing birthing women the presence of a companion throughout labor and birth could therefore be beneficial to the outcome of the intra-partum care provided at the ward. Simple measures, such as separating the gynecology chairs with screens or curtains to protect the privacy of the women, could be a cost effective way to make this possible, granting women continuous support in a situation where the staffing of the ward does not allow the staff to provide such care.

Position in labor and birth: All women in this study gave birth in supine positions, which is similar to the findings both in Cambodia (17) and Sweden (16). It is, however, contrary to the scientific evidence that demonstrates that women should be freely allowed to choose positions in childbirth (1, 25, 26) and that they should be discouraged from spending long periods lying on their backs (1, 22). Several positive effects of upright positions in labor and birth have been found for both mother and child (1, 22,

26), and women who birth in upright positions tend to experience fewer interventions and report greater satisfaction with their birthing experience (26).

Pain management: The results of this study indicate that the focus of pain management at the ward was not to relieve labor pain, as it mainly consisted of preventive analgesia prior to interventions such as episiotomy or CS. The women were routinely left to handle labor pain alone, contrary to evidence-based practice and international recommendations (1, 23, 27). Anxiety and fear may increase the negative experience of labor pain. Aside from the psychological aspects, pain may also cause complications both for the mother and the unborn child (27). WHO rank helping women to cope with labor pain as one of the most central aspects of intra-partum care, and non-pharmacological strategies are considered the most important measures to do so (1). Freedom to move around in labor may help to alleviate pain (1, 22, 26), and women who receive continuous one-on-one support in childbirth tend to use less analgesia and anesthesia (23). An overview of systematic reviews on pain relief in labor concluded that epidurals and inhaled analgesia were effective in reducing pain, and that immersion in water, relaxation, acupuncture, and massage may also help (28). Although not all of these may be available at the study site, massage and educating women in relaxation techniques should be possible, and should be used.

Episiotomy: Of the primiparas having a vaginal birth, a majority (86.9%) was subject to an episiotomy; this is contrary to the national clinical protocols for reproductive health in Nepal (14), the WHO recommendations (1) and the scientific evidence (29), which stipulates the procedure should be used restrictively. Multiparous women also had a very high rate (14.6%), far above accepted norms. Liberal or routine use of episiotomy has been shown to be inefficient and possibly harmful (25) and a more restrictive use is recommended (29).

Mode of delivery: Only three-quarters of the women had a spontaneous vaginal birth and almost one fifth (19.5%) had an emergency CS. No infants had an Apgar score <7 at five minutes, which may suggest that the labors were terminated in time to ensure the well-being of the infants. On the other hand, such a high rate of CS may be due to the limited means available to assess the fetal status, and the fact that all infants had an Apgar score of ≥ 7 may indicate that at least some of them would have benefited from a

vaginal birth. Adding the emergency CS to the elective CS at the labor ward reveals a total CS rate of 26% during the time of the study, from the total population of 292 women. This can be compared to a national rate of 4.6% in Nepal in 2011 (12). There is no evidence of any benefits for mother or child when CS rates exceed 15% (30), so measures to decrease the rate would be appropriate. Continuous support in labor and birth (23), introducing and implementing evidence-based guidelines, insisting on a mandatory second opinion before CS, peer review of all CSs on a monthly basis by the multidisciplinary team, and nurse-led relaxation and birth preparation classes (31) may all help to reduce the rate of emergency CS.

Skin-to-skin contact of mother and child: Although skin-to-skin contact is stipulated in national recommendations in Nepal (14), 83.5% (n=134) of the women in this study had no skin-to-skin contact with their child after birth. This result differs from previous studies using the Bologna score in Cambodia (17) and in Sweden (16), where skin-to-skin care was used in 74.3% and 92.3% of births, respectively. A Cochrane review found early skin-to-skin contact between mother and child to have a positive impact on infant blood glucose levels and maintenance of infant temperature, as well as on breast feeding and interaction between mother and child. There were no adverse effects found, nor was there evidence of any positive effects of separating mother and child (32).

De-medicalization of intra-partum care is an important measure to reduce the risk of complications (1, 4-7). A simple and cost-effective means to promote the normal, physiological process of childbirth at the ward may be to adjust the routines to include continuous support in labor, preferably from non-clinicians, non-pharmacological pain management such as massage, relaxation and use of baths if feasible, upright laboring and birthing positions, and skin-to-skin contact between mother and child after birth. This would contribute to safe-guarding maternal and neonatal well-being and achieving an optimal normal outcome. The results of this study suggest that a medicalized perspective on childbirth is prevalent at the study site. The personnel responsible for the intra-partum care were nurses rather than registered midwives [RM], and the majority of the women in the study were assisted by physicians in childbirth. It is possible that the lack of RMs could be a contributing factor to the medicalization of intra-partum care at the ward. WHO deem midwifery to be the profession best suited to care for women in

normal pregnancy and birth (1), and midwife-led care has been shown to reduce both interventions (24, 33) and costs (24, 34) compared with routine obstetric involvement in normal birth. Previous research has also found positive effects of midwifery-led care in Nepal (35). It may therefore be suggested that the introduction of midwife-led care at the labor ward would be cost-effective and would optimize the intra-partum care provided to women with an expected normal birth. However, midwifery is not authorized as an autonomous profession in Nepal as yet (10).

Strengths and limitations: The questionnaire incorporated an instrument developed by prominent experts in the field (18), which had been evaluated and validated in different settings (16, 17). This strengthened the validity of the study. Further expert review of the questionnaire before the study was conducted enhanced both the validity and the reliability of the survey tool. The questionnaire was written in English, which is not an official language in Nepal. However, the English skills among the data collectors were high, as they had completed their nursing education in English and the patient records were documented in English. Furthermore, the risk of inaccurate responses was minimized by using short and simple sentences with precise questions, and avoiding negatives. The pilot study revealed no linguistic misunderstandings and the data collectors expressed that the questions were easy to understand, which indicates a high reliability.

One weakness of the questionnaire was that it did not allow respondents to specify whether the membranes had ruptured before or after admission to the labor ward. As a result, it was not possible to exclude women who were admitted with meconium-stained liquor from the low-risk category, unless the respondents had added this information by their own accord. However, with an average of 14 births a day at the ward during the time of the study, the nurses had a heavy work-load. It was therefore considered a priority to keep the questionnaire short and simple, to ensure that they were able to complete them. There was no drop-out and very few missing data in the study, which suggests that this may have been a reasonable trade-off. The question regarding medical pain management was a yes/no variable asking whether the women had received pharmacological pain relief during labor and birth, and a request to specify what type of medication had been administered. The medication specified was given in connection

with episiotomy, suturing and CS, and there were no missing data. It may be considered a weakness of the questionnaire that it did not ask if the women had received any medication specifically aimed to alleviate labor pain. However, in this setting, the only such medication available was epidural anesthesia, which was provided only to women with a heart condition. Since they were not included in the study, it may be assumed that the findings would have been the same even if this question had been formulated differently. Questionnaires were collected for all births during time of the study. The missing data thus concerned a few questions in selected questionnaires, which may be seen as a strength of the study. The high attendance of the first and second author at the ward during the study period contributed positively to the success of data collection. If the study were to be repeated, the same results may not be achieved without such presence.

The study was conducted at a university hospital in a major city where the women had the privilege of expert care and facilities. This was not representative for most women in Nepal (9), which made it difficult to generalize conclusions to different settings. The ward received referred complicated cases, which may have affected the intra-partum care as well as the view of childbirth in this specific group of personnel. This may be seen as a weakness of the study. Since the Bologna score was designed to measure the improvement of different aspects of intra-partum care over time (18), the results of this study could be used for comparison in a follow-up study. The results also provide practical clinical implications which could be useful to improve intra-partum care at this specific labor ward.

Conclusion: In 2008 the government of Nepal issued a clinical protocol for safe motherhood (14), which included care in normal labor and birth. However, none of their measures initiated to combat maternal and neonatal mortality has focused specifically on improving the intra-partum care provided in births with an expected normal progress, and until this study no research had investigated this subject. In order to safe-guard the normal, physiological process of childbirth for the health of both mother and child, it is important to continuously assess and reflect on how care is provided to women with a high probability of having a normal childbirth. It was satisfying that all women and

infants in this study survived. However, routines in place at the labor ward indicate a medicalized perspective on childbirth and an over-use of medical technical intervention.

There is a need for more research as a basis to support positive changes in the provision of care, such as qualitative interview studies with health care professionals to gain understanding of their thoughts on how to perform intra-partum care. An action research project may also be fruitful to achieve sustainable improved care routines. The women's perception of their intra-partum care is another area of interest, which could offer important perspectives on the care provided at the ward. Finally, research into the need for education to provide staff with midwifery competencies is also recommended.

The clinical implications of this study are that there are simple and cost-effective measures to optimize the intra-partum care provided to women with an expected normal birth. A reduction of harmful interventions such as episiotomy, and established routines for continuous one-on-one support, upright positions in labor and birth, non-pharmacological pain management, and early skin-to-skin contact between mother and child, would improve the care for these women and infants in order to achieve a normal outcome.

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Disclosure

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