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Epidemiology of constipation and its associated factors in an ageing population of people with an intellectual disability in Ireland: A cross-sectional study

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ABSTRACT

Background: Constipation impacts health-related quality of life with a burden similar to other chronic conditions. This study characterises the prevalence of constipation and its associated factors in older adults with intellectual disability.

Methods: Data from the Intellectual Disability Supplement of The Irish Longitudinal Study on Ageing was analysed using bivariate and multivariate approaches.

Results: Constipation affected 43.5% of this cohort and was more common in females, those in residential settings, and those with a severe/profound level of intellectual disability. The type of residence, level of intellectual disability, a low fat diet, high cholesterol, multimorbidity and, physical activity predicted constipation status with 67.7% accuracy. Physical activity was associated with lower constipation prevalence, where minimal activity was sufficient to observe this effect.

Conclusions: Constipation is a common health concern in older people with intellectual disability. This analysis reveals characteristics that should inform the careful monitoring of bowel health in this population.

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KEYWORDS
Constipation; intellectual disability; older people; multimorbidity; physical activity; diet

Constipation presents clinically as a symptom or cluster of symptoms, which may include the passage of hard or infrequent stools, straining during defecation, an incomplete feeling of evacuation or the need to digitally remove faeces (Chatoor & Emmnauel, 2009; Lembo & Camilleri, 2003). Constipation has multiple possible aetiologies, which are classified as primary constipation, e.g., idiopathic slow transit or secondary constipation, which can be multifactorial in nature, e.g., neurological disorders, metabolic disorders and medication (Lembo & Camilleri, 2003). The complications of constipation are numerous and include haemorrhoids, faecal incontinence, faecal impaction, anal fissure, bowel perforation and death (Robertson et al., 2018). Studies that have examined the effect of constipation on health-related quality of life (HRQoL) report that constipation both negatively impacts HRQoL (Wald et al., 2007) and is comparable to other chronic conditions such as diabetes, osteoarthritis, back pain and systemic lupus in terms of its effect on HRQoL (Belsey et al., 2010).

Constipation is commonly reported as a symptom by older populations, however, its prevalence among older people with intellectual disability has been reported as more than twice that of those without intellectual disability (17.2% compared to 7.8%) in a study comparing both populations (Peklar et al., 2017). The broader literature presents variable estimates of constipation prevalence among older people with intellectual disability, e.g., 7.6% in adults aged 40 and over with an intellectual disability in residential centres in Israel (Morad et al., 2007) and 56.5% for a similar population in Scotland (Robertson et al., 2017; Starr & Marsden, 2008). The variability of such estimates may be attributed to factors such as the study sample sizes and differing definitions of constipation used in different studies (Robertson et al., 2017).

People with intellectual disability present with unique concerns compared to the general population. It is well established in the literature that this population experiences multiple health inequalities (Emerson & Baines, 2011), a higher prevalence of multimorbidity (Hussain et al., 2020; McCarron et al., 2013) and often encounters obstacles communicating healthcare concerns (Ali et al., 2013). Constipation is usually

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diagnosed by the individual's reporting of symptoms (Robertson et al., 2018). Communication challenges may pose obstacles for people with intellectual disability self-reporting their symptoms and therefore reliant on nursing or care staff to recognise symptoms and report concerns on their behalf (Marsh & Sweeney, 2008). Patterns of medication usage and levels of polypharmacy also differ in this population. People with intellectual disability are more likely to be prescribed antipsychotic and anticonvulsant medications, and have higher rates of polypharmacy and excessive polypharmacy (Lonchampt et al., 2021; O'Connell et al., 2018; O'Dwyer, Maidment, et al., 2016; O'Dwyer, Peklar, et al., 2016; Peklar et al., 2017). Furthermore, medications that have an anticholinergic mode of action have been linked to higher constipation prevalence in older people with intellectual disability (O'Dwyer, Maidment, et al., 2016; O'Dwyer, Peklar, et al., 2016). Studies also indicate that adults with intellectual disability tend to have poorer diets (Humphries et al., 2009), higher rates of obesity (O'Leary et al., 2018; Ryan et al., 2021) and lead more sedentary lives (Lynch et al., 2021).

To date, most studies have attempted to characterise factors associated with constipation in people with intellectual disability using a bivariate approach to analysis. These report that a severe or profound level of intellectual disability, mobility limitations, cerebral palsy and use of antiepileptic, psychotropic or proton pump inhibitor medications have some association with constipation (Böhmer et al., 2001; Chadwick & Jolliffe, 2009; Evenhuis, 1997; Morad et al., 2007). Studies that employ a multivariate approach to modelling associated factors in this population are few. Morad et al. (2007) report mobility, exercise and neurological disease as significant factors associated with constipation prevalence. More recently, AlMutairi et al. (2020) report living in a residential setting, use of anticholinergics and a soft/liquidised diet as factors associated with laxative use.

Using data drawn from wave three of the Intellectual Disability Supplement to The Irish Longitudinal Study in Ageing (IDS-TILDA), we aim to characterise the epidemiology of constipation with respect to demographics, morbidity, and lifestyle in an older population of people with varying levels of intellectual disability and with various living circumstances in Ireland.

Methods

Study design and participants

IDS-TILDA is a national longitudinal study, based in Ireland, which aims to understand ageing and its effects on the health and wellbeing of people with intellectual disability. The study design has been previously described (McCarron et al., 2017). In brief, the first wave of IDS-TILDA commenced in 2009, where 753 people aged over 40 years and representing varying levels of intellectual disability and living arrangements were randomly selected from the National Intellectual Disability Database (Kelly & O'Donohoe, 2013) and invited to participate. Informed consent was sought from all participants. Of these 753, 609 people participated in wave 3 and are the sample of interest here. The primary reason for attrition of participants over time was death (McCarron et al., 2022).

Data collection

A two-pronged data collection strategy was implemented. Firstly, participants were asked to complete a pre-interview questionnaire (PIQ) one week prior to engaging in a face-to-face interview. The PIQ afforded participants the time to gather information and seek support if required. Questions regarding doctor's diagnoses, medication use, and healthcare services utilisation were one focus of the PIQ. Next, face-to-face interviews were conducted by field researchers using computer assisted personal interviewing (CAPI) software on encrypted laptops. Questions addressed a comprehensive suite of modules such as accommodation, social inclusion and connectedness, physical activity, activities of daily living and physical and mental health. Participants could complete the interview independently, with the support of a person of their choosing e.g., a key worker or by proxy, i.e., where someone known to the participant for at least six months answered the interview questions on their behalf. To strengthen the reliability of self-report measures, all field researchers have educational backgrounds in health and social care of people with intellectual disability, field researchers undergo in-house training in the execution of interviews by expert clinical staff and individuals with life experience of intellectual disability, the CAPI is not time-sensitive and can be completed over multiple sessions should a participant prefer and for certain variables like doctor's diagnoses, participants are invited to confirm data collected from the previous wave and provide corrections as necessary. Additionally, CAPI questions are supported by "showcards", which are easy read/pictorial representations of the questions to support understanding.

Ethics

Ethical approval was obtained from both Trinity College Dublin (FHS TCD REF 151208 – IDS-TILDA) and all

service providers involved with the study. Each participant received an initial information pack, which included easy-read information on the study and easy-read consent forms.

Study sample

Of the 609 participants in IDS-TILDA wave 3, 602 reported the presence or absence of a doctor's diagnosis of constipation during the CAPI portion of data collection. A demographic description is given in Table 1. In brief, the study cohort comprised 44.2% males and 55.8% females with ages ranging from 48 to 95 years old (M = 59.2, SD = 8.8). All participants reported their living circumstances and 92.2% of participants reported their level of intellectual disability.

Measurements and assessment tools

Morbidity

The co-occurrence of constipation with 28 other conditions representing cardiovascular, neurological, ophthalmological, gastrointestinal, respiratory, psychiatric, musculoskeletal and endocrine disorders was determined and examined for statistical associations. Additionally, total morbidity burden per participant was computed by summing the number of reported conditions for that participant. The distribution of total morbidity was divided into terciles, where 30.2% ($n = 75$) of participants had constipation and 0–2 additional conditions, 46.7% ($n = 98$) had constipation and 3–4 additional conditions, and 61.7% ($n = 87$) had constipation and more than 4 additional conditions. The terciles were designated as low, medium and high burden of morbidity respectively, and investigated for associations with constipation.

Physical Activity, Mobility & BMI

Physical activity was categorised using the Rapid Assessment of Physical Activity (RAPA) and the International Physical Activity Questionnaire (IPAQ). Using the RAPA assessment protocol participants were categorised as sedentary, under-active or active with respect to physical activity (Topolski et al., 2006). Similarly, the IPAQ assessment protocol was used to categorise participants as engaging in no activity, being inactive, minimally active or active (Vandelanotte et al., 2005). Additionally, participants were asked in the CAPI if they limited their activities (what they do or where they go) because of constipation. Mobility was assessed based on self-reported difficulty walking 100 yards. Additionally, where a participant's height and weight were measured, body mass index (BMI) was computed as the weight in kilogrammes divided by height in metres squared. BMI was subsequently categorised as underweight, normal, overweight and obese.

Table 1. Demographic profile of study participants.

Variable		*n*	%	Total
Gender	Male	266	44.2	602
	Female	336	55.8	
Age (years)	40–49	72	12.0	602
	50–64	375	62.3	
	65+	155	25.7	
Level of ID	Mild	136	24.5	555[a]
	Moderate	256	46.1	
	Severe/Profound	163	29.4	
Living Circumstance	Independent/Family	92	15.3	602
	Community Group Home	243	40.4	
	Residential Setting	267	44.3	

[a]47 participants did not identify their level of ID.

Diet & hydration

The IDS-TILDA wave 3 study asked participants if they were on a special diet in the CAPI. Where a participant answered yes, they were then asked which type of diet, i.e., low-fat, diabetic, phenylketonuria, weight-loss, low sodium, low potassium, high calorie, gluten free, lactose free, soft and/or liquidised foods, thickened fluids or other. Where at least 5 participants had constipation and were on a special diet, pairwise associations were investigated. Additionally, as part of the PIQ, participants were asked to report their typical fluid consumption for a typical day where participants reported the number of 200ml cups of various beverages, e.g., water, tea, coffee, squash, etc., that they consume per day. Data was gathered as a categorical variable, i.e., participants estimated the number of cups as a range, e.g., 1–3 cups of water, 4–8 cups of tea, etc. Using these ranges, the total minimum number of 200 ml cups consumed per person was computed and used as a proxy for total fluid intake. The distribution of total fluid intake was divided into terciles, and fluid intake categorised as low (<8 cups), medium (8–10 cups) and high (>10 cups).

Statistical analysis

Data analysis was carried out using R v 4.2.1 (R Core Team, 2021). Where data conformed to a 2×2 contingency structure, initial tests for association between constipation status and demographic, health and lifestyle categories were carried out using Fisher's Exact Test. Otherwise, X^2 statistics were used, followed by post-hoc pairwise comparisons using Fisher's Exact Test. Differences in the age distribution of participants with various levels of mobility and physical

activity were tested using the *wilcox.test()* implementation of the unpaired two-sample Wilcoxon-Test in R. Correction for multiple hypothesis tests was computed using the Benjamini-Hochberg method from the *p.adjust()* function in R. A bivariate hypothesis test was considered significant if it had a false discovery rate of less than 5%. Multivariate logistic regression was implemented using the *glm()* function in R. A two-stage process was employed. Firstly, a full model was computed incorporating all demographic, health and lifestyle variables with a significant association in the bivariate analysis. This full model was then subjected to a step-wise variable selection procedure based on the Akaike Information Criteria (AIC) using the *step()* function in R. The final curated model was this same model but with sex and age reinstated as demographic covariates. The model was evaluated using McFadden's pseudo R^2 and predictive accuracy determined using 10-fold cross validation.

Results

Prevalence, demographics and characteristics

The prevalence of constipation in this cohort was 43.5% ($n = 262$). Constipation prevalence differed with respect to sex, type of residence and level of intellectual disability but not with age or aetiology of intellectual disability (Table 2). Constipation was more common in females compared to males, in people who reside in residential settings compared to community or independent settings, and in those with a severe/profound level of intellectual disability (Table S1). 10.9% ($n = 28$) of participants with constipation restricted their activities because of the condition. Of the participants who reported constipation, 39.7% ($n = 100$) managed the condition with laxatives only, 14.7% ($n = 37$) used lifestyle interventions only and 45.6% ($n = 115$) used a combination of approaches. There was no association between those who used a laxative regime only and level of intellectual disability ($X^2(2) = 3.87$, $p = 0.14$) or type of residence ($X^2(2) = 0.41$, $p = 0.81$). Participants who reported experiences of encopresis were more likely to also report constipation (OR = 2.82, $p = 5.59 \times 10^{-7}$).

Morbidity

Multimorbidity was common in this cohort with 78.8% of participants reporting two or more conditions (Median Morbidity = 3, Range 0–13). Participants who reported osteoporosis, psychiatric conditions, high cholesterol, epilepsy, gastroesophageal reflux, stomach ulcers, scoliosis, dementia or cerebral palsy were more likely to also report constipation (Table 2). Constipation prevalence also differed with respect to morbidity burden (Table 2) where participants who have a high morbidity burden are almost at least two times more likely to have constipation compared to those with a medium (OR = 1.84 [1.17–2.91], $p = 6.44 \times 10^{-3}$) or low (OR = 3.7 [2.35–5.88], $p = 1.68 \times 10^{-9}$) morbidity burden (Table S1). Likewise, those with a medium morbidity burden were more likely to have constipation than those with a low burden (OR = 2.02 [1.35–3.02], $p = 3.44 \times 10^{-4}$) (Table S1).

Physical activity and mobility

Physical inactivity was common in this cohort. Using the RAPA criteria, 85.7% ($n = 497/580$) of the participants were sedentary or inactive. Likewise, using the IPAQ criteria, 62.6% ($n = 375/599$) had no activity or were inactive. Limited mobility was also a feature of this cohort with 23.9% ($n = 143/599$) reporting that they were either unable or have a lot of difficulty walking 100 yards. However, 62.6% ($n = 375/599$) reported no difficulty in completing this task. Physical activity using both the RAPA and IPAQ classifications, and mobility were associated with the prevalence of constipation (Table 2). Participants who were less active or mobile were more likely to report constipation (Table S1). Considering those with constipation only, there is no difference in the age distribution of those with no mobility issues and those unable to walk 100 yards ($p = 0.60$) (Figure S1a). Similarly, there is no difference in age distribution between those who have no activity and those who are minimally active ($p = 0.93$) (Figure S1b). The sample size of those who are both constipated and active using IPAQ criteria was too small ($n = 4$) for meaningful comparison of ages. There was no association between BMI and constipation in this cohort.

Diet and hydration

Participants who report being on a soft/liquidised diet, a low-fat diet or who use thickened fluids, were at least two times more likely to report constipation compared to their peers on non-modified diets (Table 2). The level of fluid intake was associated with constipation prevalence (Table 2) where those with a higher fluid intake were also more likely to report constipation (Table S1).

Table 2. Prevalence of constipation stratified by demographics, health and lifestyle factors with corresponding tests for association.

		n	Prevalence (%)	Test statistic[a]	*P*-value
Age	< 50	31	43.1	$X^2(2) = 4.1$	0.13
	50–64	153	40.8		
	65+	78	50.3		
Sex	Male	98	36.8	OR = 1.63 [1.16–2.3]	3.75×10^{-3}*
	Female	164	48.3		
Level of ID	Mild	42	30.9	$X^2(2) = 22.74$	1.15×10^{-5}*
	Moderate	112	42.8		
	Severe/Profound	95	54.7		
Living Circumstance	Independent/Family	12	13.0	$X^2(2) = 48.35$	3.17×10^{-11}*
	Community	104	42.8		
	Residential	146	54.7		
Aetiology	Down Syndrome	45	42.1	OR = 0.93 [0.59–1.44]	0.75
	Other	217	43.8		
Morbidity	Osteoporosis	77	29.5	OR = 2.31 [1.53–3.51]	3.62×10^{-5}*
	Psychiatric Condition	162	61.8	OR = 1.99 [1.41–2.81]	3.80×10^{-5}*
	High Cholesterol	119	45.6	OR = 1.97 [1.39–2.81]	8.25×10^{-5}*
	Epilepsy	115	44.1	OR = 1.81 [1.34–2.72]	2.12×10^{-4}*
	Gastroesophageal Reflux	57	21.8	OR = 2.03 [1.28–3.24]	1.74×10^{-3}*
	Stomach Ulcers	23	8.8	OR = 3.17 [1.42–7.62]	2.04×10^{-3}*
	Scoliosis	31	11.9	OR = 2.27 [1.21–4.36]	7.08×10^{-3}*
	Dementia	31	11.9	OR = 2.14 [1.5–4.08]	1.17×10^{-2}*
	Cerebral Palsy	27	10.3	OR = 2.18 [1.12–4.37]	1.71×10^{-2}*
	Parkinson's Disease	6	2.3	OR = 7.93 [0.96–366.23]	0.05
	Lung Disease	15	5.7	OR = 2.23 [0.9–5.89]	0.06
	Cancer	8	3.1	OR = 3.52 [0.83–20.89]	0.06
	Arthritis	59	22.6	OR = 1.44 [0.94–2.22]	0.08
	Abnormal Heart Rhythm	28	10.7	OR = 1.64 [0.89–3.07]	0.10
	Irritable Bowel Syndrome	11	4.2	OR = 2.08 [0.72–6.44]	0.15
	Thyroid Disease	65	24.9	OR = 1.29 [0.87–1.94]	0.20
	Coeliac Disease	7	2.7	OR = 2.30 [0.58–10.86]	0.22
	Age-Related Macular Degeneration	17	6.5	OR = 1.50 [0.69–3.29]	0.28
	Spina Bifida	5	1.9	OR = 2.18 [0.42–14.19]	0.30
	Cataracts	46	17.6	OR = 1.26 [0.79–2]	0.31
	Glaucoma	10	3.8	OR = 1.64 [0.57–4.86]	0.34
	Stroke	10	3.8	OR = 1.64 [0.57–4.86]	0.34
	Heart Failure	7	2.7	OR = 1.83 [0.49–7.41]	0.38
	Alzheimer's Disease	10	3.8	OR = 1.46 [0.52–4.12]	0.48
	Heart Murmur	18	6.9	OR = 1.24 [0.6–2.56]	0.61
	Diabetes	26	9.9	OR = 1.13 [0.63–2.04]	0.67
	Transient Ischaemic Attack	11	4.2	OR = 1.09 [0.44–2.71]	0.83
	Asthma	17	6.5	OR = 0.95 [0.47–1.91]	0.99
Morbidity Burden	High	75	61.7	$X^2(2) = 37.62$	6.78×10^{-9}*
	Medium	98	46.7		
	Low	87	30.2		
Mobility (difficulty walking 100 yards)	No Difficulty	133	35.5	$X^2(3) = 31.098$	8.10×10^{-7}*
	Some Difficulty	39	48.1		
	A lot of Difficulty	29	54.7		
	Unable	59	65.6		
RAPA	Sedentary	61	59.8	$X^2(2) = 18.16$	1.14×10^{-4}*
	Under Active	170	43		
	Active	24	28.9		
IPAQ	No Activity	88	56.8	$X^2(3) = 29.78$	1.54×10^{-6}*
	Inactive	105	47.8		
	Minimal Activity	62	30.4		
	Active	5	25		
BMI	Underweight	1	–	$X^2(2) = 4.84$	0.09
	Normal	27	48.2		
	Overweight	38	36.2		
	Obese	39	31.2		
Diet	Soft/Liquidised	76	29.5	OR = 3.19 [2.05–5.05]	6.04×10^{-8}*
	Thickened Fluids	27	10.5	OR = 2.70 [1.33–5.70]	3.06×10^{-3}*
	Low Fat	66	25.6	OR = 2.49 [1.59–3.93]	3.63×10^{-5}*
	Weight Loss	10	3.9	OR = 0.71 [0.29–1.67]	0.44
	Low Sodium	9	3.5	OR = 2.40 [0.71–9.24]	0.17
	High Calorie	11	4.2	OR = 2.10 [0.73–6.49]	0.15
	Diabetic	18	7.0	OR = 1.13 [0.56–2.29]	0.74
Fluid Intake	High	71	53.4	$X^2(2) = 29.07$	4.87×10^{-7}*
	Medium	77	54.6		
	Low	62	29.5		

[a]Where more than two categories existed, X^2 statistics were used. Degrees of freedom are given in parentheses. Where there were two categories, Fisher's Exact Test was used. OR = Odds Ratio. 95% confidence intervals are given in square brackets.

*Denotes *p*-values significant after controlling for False Discovery Rate (FDR 5%).

Multivariate modelling of associated factors

Multivariate logistic regression was used to model factors associated with constipation while accounting for potential confounders. The initial model fitted all variables that showed association in the bivariate analyses except for RAPA which were omitted owing to the proportion of missing values (Table S2). IPAQ categories were instead used as the measure of physical activity. The initial model was subjected to a stepwise variable selection procedure to produce a parsimonious model aimed at minimising the number of independent variables and information loss based on AIC. Demographic covariates were retained regardless of significance. In the final model, residence type, level of intellectual disability, high cholesterol, a low-fat diet, total morbidity and physical activity significantly contributed to the prevalence of constipation (Table 3). Participants who resided in community or residential settings, had a severe/profound level of intellectual disability, high cholesterol, a low-fat diet, and multimorbidity were more likely to report constipation. Conversely, participants who were minimally active using IPAQ criteria, had a reduced prevalence of constipation. The model provided a good fit for the data (McFadden's pseudo $R^2 = 0.17$). Using 10-fold cross validation, the final model predicted constipation status with an accuracy of 67.7%.

Table 3. Multivariate logistic regression model. Using 10-fold cross validation, the model predicts constipation status with 67.7% accuracy. McFadden's adjusted $R^2 = 0.17$.

Risk Factor		Odds Ratio	95% CI	*P*-Value
Sex	Male			
	Female	1.28	0.85–2.09	0.271
Age	<50			
	50–64	0.67	0.33–1.37	0.264
	65+	0.77	0.34–1.73	0.527
Residence	Independent			
	Community	**3.93**	**1.67–10.47**	**3.10×10^{-3}**
	Residential	**5.11**	**2.13–13.84**	**5.46×10^{-4}**
Level of ID	Mild			
	Moderate	1.18	0.67–2.12	0.564
	Severe/ Profound	**1.96**	**1.02–3.80**	**0.044**
Soft/Liquid Diet		1.61	0.91–2.85	0.101
Low Fat Diet		**1.76**	**1.00–3.10**	**0.048**
High Cholesterol		**1.73**	**1.07–2.83**	**0.026**
Total Morbidity		**1.22**	**1.09–1.38**	**6.34×10^{-4}**
IPAQ	No Activity			
	Inactive	0.88	0.51–1.51	0.636
	Minimally Active	**0.50**	**0.28–0.90**	**0.021**
	Active	0.25	0.05–0.98	0.062

P-Values in bold are statistically significant at a nominal significance threshold of $p < 0.05$.

Discussion

This study aimed to describe the epidemiology of constipation and to identify demographic, health and lifestyle related factors associated with constipation prevalence in an older population of people with intellectual disability in Ireland. Constipation in this cohort is highly prevalent, frequently managed by medication alone, impacts social participation and may lead to potentially embarrassing consequences such as encopresis. Estimates of the prevalence of constipation in people with an intellectual disability reported in the literature are variable. However, the observation of a 43.5% prevalence rate in people over 40 years of age is consistent other studies (Robertson et al., 2017). The measure of constipation used in this study was the self-reported presence or absence of a doctor's diagnosis of constipation. Self-report measures in general and in the context of intellectual disability require consideration as to their accuracy, e.g., interviewer effects, the tendency to acquiesce and social desirability, have been observed to occur in research interviews with people with intellectual disability (Finlay & Lyons, 2001). These limitations notwithstanding, the self-report paradigm explicitly values the right of people with intellectual disability to participate with their voice in research about them. In particular, self-report measures collected in a time-sensitive manner are problematic in the context of intellectual disability (Anrooij et al., 2018). Both data collection tools utilised by IDS-TILDA are not time sensitive, viz., the PIQ portion is completed in the week prior to the CAPI and the CAPI can be completed over multiple sessions should participants prefer. This accommodation coupled with the use of expertly trained field-researchers with health and social care backgrounds is intended to mitigate the potential uncertainties arising from self-report while simultaneously valuing the contributions of the participants.

Despite this upward trend in prevalence estimates across waves and consistent with previous studies (Morad et al., 2007), age is not associated with the occurrence of constipation in this cohort. Constipation is however associated with age in the general population (Gallagher & O'Mahony, 2009). That constipation prevalence was positively associated with the level of intellectual disability, being most prevalent in those people with a severe/profound level, is a possible explanation for this distinction. A person's level of intellectual disability is not an age-related phenomenon.

Multimorbidity is a characteristic of older populations both with and without intellectual disability (Hernández et al., 2019; McCarron et al., 2013). Bivariate analyses revealed associations between constipation and osteoporosis, a psychiatric condition, high cholesterol, epilepsy, gastroesophageal reflux, stomach ulcers, scoliosis,

dementia and cerebral palsy. However, in a multivariate analysis, only high cholesterol remained significant. Although this study does not examine medication usage explicitly, statin usage to treat high cholesterol can contribute to constipation (Li et al., 2018; Pearlman et al., 2017). The other reported associations between morbidity and constipation did not have predictive value in a multivariate model, nonetheless, plausible mechanisms may underlie these associations. In the case of dementia, scoliosis and cerebral palsy, mobility, exercise and the ability to actively participate in activities of daily living may be limited. Additionally, certain medications used in the treatment of psychiatric conditions and epilepsy have anticholinergic effects that can affect constipation status (AlMutairi et al., 2020).

Moving from the consideration of constipation and a single additional morbidity, total morbidity also showed positive associations with constipation prevalence. Those individuals with a high morbidity burden (>4 conditions) were the most likely to also report constipation. In this regard, constipation is a common additional feature of the complex health profiles of people with intellectual disability. That multimorbidity (>2 conditions) is associated with higher prevalence of constipation should inform and increase the assessment and monitoring of bowel health in clinical practice. This study was concerned only with individuals over 40 years of age, the majority of whom already exhibited multimorbidity. Although determining age of onset of multimorbidity was not possible in this study, it may be an explanation for constipation not being associated with age in older people with intellectual disability in this cohort. However, a comprehensive understanding of the role of age in the aetiology of constipation would be best served by a longitudinal approach capable of modelling the effects of age in the context of other contributing variables such as multimorbidity.

Diet, hydration and physical activity are potentially modifiable factors for constipation that have received some attention in the literature. In a study of Turkish adults, multivariate modelling demonstrated that fibre intake, hydration and physical activity had a protective effect against constipation (Yurtdaş et al., 2020). Another study of American adults, also employing a multivariate approach, reported that both dietary fibre and hydration have an impact on stool consistency, but exercise did not have a significant impact on either stool frequency or consistency (Wilson, 2020). In a similar study of American adults, dietary fibre but not hydration had a protective effect against constipation (Shen et al., 2019). The current study did not explicitly address dietary fibre. However, bivariate analysis did indicate that certain modified diets, i.e., soft/liquid, thickened fluids and low-fat, were associated with increased constipation prevalence. Owing to the prevalence of dysphagia among people with an intellectual disability, dietary modifications are a common intervention used in this population, which can contribute to dehydration and poor nutrition making bowel assessment and monitoring a necessary feature of dietary modification for this population (Chadwick & Jolliffe, 2009). That a low-fat diet was associated with constipation has some support in the literature, e.g., in a study of 1431 adults in Luxembourg, a lipid rich diet coupled with grains, total fat and starch had a protective effect against constipation (Rollet et al., 2021).

Regarding hydration, the findings reported here appear counterintuitive. Constipation was more prevalent in the most hydrated subgroup of this cohort. This finding may be an artefact of how total fluid intake was computed but may also suggest that people with intellectual disability and/or their caregivers are aware of the potential for adequate hydration to help ameliorate constipation. Fluid intake is not currently considered a special diet under the current data collection protocol. However, future iterations of IDS-TILDA will gather fluid intake data as a quantitative variable, thus allowing for the identification of participants with inadequate hydration based on weight and a more granular exploration of the effects of hydration on various outcomes.

In both the bivariate and multivariate analysis of physical activity, the degree of physical activity was associated with a reduced prevalence of constipation with this effect being seen in those who are minimally active (Table 3). The degree of activity required to be considered minimally active is 3 or more days of vigorous activity for 20 min per day or 5 or more days of walking or moderate intensity activity for 30 min per day (Vandelanotte et al., 2005). These findings suggest that where possible, adequate physical activity is an important factor in the management of constipation that may serve to reduce the reliance on laxatives common in this cohort. However, certain considerations are required where mobility deficits are due to other factors, e.g., age related multimorbidity. In this cohort, age is not a factor that differentiates the degree of mobility or physical activity in those with constipation (Figure S1). Other factors such as institutional barriers to implementing suitable exercise programs or health promotion initiatives more generally may require attention (O'Leary et al., 2018). In an Irish context, efforts are being made to support older people with intellectual disability to become physical activity leaders in their communities (McDermott et al., 2023). Given the benefits of exercise in maintaining overall health, this factor is worthy of more comprehensive study in the context of older people with intellectual disability.

Conclusion

This study demonstrated that constipation is a common concern of older people with intellectual disability. Broadly, the analysis here reveals a clinical profile where careful bowel monitoring, and management is important. The prevalence of constipation was greater for those individuals with a severe/profound level of intellectual, multimorbidity, low activity levels and/or with certain modified diets. Interestingly, the analysis also suggested that even modest increases in physical activity may reduce the prevalence of constipation.

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