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RESEARCH PAPER

Unreported urinary incontinence: population-based prevalence and factors associated with non-reporting of symptoms in community-dwelling people ≥ 50 years

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Key summary points

Aim To ascertain the prevalence of unreported urinary incontinence (UI) in a large sample of older adults, to profile factors associated with under-reporting of UI and the association of unreported UI with self-rated quality of life.

Findings Almost 40% of older people with UI had not reported their symptoms to a healthcare professional. On average those who did not report UI had visited their GP 4 times in the prior 12 months. Unreported UI was independently associated with poorer quality of life.

Message This study highlights the importance of asking specifically about symptoms of UI as part of comprehensive assessment of the older adult in and emphasises the need for increased education and awareness for older people around the importance of seeking help and reporting UI.

Abstract

Purpose Concerns exist around under-detection and under-treatment of urinary incontinence (UI) in specific patient groups, particularly older people. The aim of this study is to ascertain the prevalence of unreported UI in a large sample of older adults, to profile factors associated with under-reporting of UI and the association of unreported UI with quality of life (QOL).

Methods This study was embedded within the Irish Longitudinal Study on Ageing, involving a population-representative sample of almost 7,000 older adults (55% female, mean age 65 years). UI was defined as involuntary loss of urine from the bladder occurring on average at least twice per month. Unreported UI had not yet been reported to a healthcare professional. QOL was measured using the Control, Autonomy, Self-realisation and Pleasure-19 Scale (CASP-19).

Results Almost 40% (285/750) of participants with UI had not reported symptoms to a healthcare professional despite visiting their general practitioner (GP) on average over 4 times in the last year. Logistic regression modelling demonstrated that under-reporting of UI was associated with female sex, taking <5 medications, less severe symptoms and lower number of GP visits. Linear regression models show that unreported UI was associated with significantly lower CASP-19 ($\beta = -1.20$ (95% CI: -2.19 to -0.20)).

Conclusion Only 40% of older people with UI report symptoms to a healthcare professional despite frequent symptoms, and a significant association with poorer QOL. This highlights the need to educate older people around seeking help for UI, as well as opportunistically addressing UI as part of comprehensive age-attuned care.

Keywords Urinary incontinence · Depression · Quality of life

Background

Urinary incontinence (UI) is one of the 'giants' of care of the older person [1]. It has been shown to increase the risk of falls [2], length of stay in hospital and mortality [3] and is associated with sedentary behaviours [4] and depression in later life [5].

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Estimates of the prevalence of UI in an older population range widely, from 15–50% depending on the population sampled, and studies vary considerably in terms of recruitment, design and definition used for incontinence [6–9].

Common causes include stress UI, the involuntary leakage of urine during effort or exercise and urge UI, where urinary leakage occurs in the context of urgency. Prevalence is higher in females owing to pregnancy, childbirth and menopause. In males, benign prostatic hypertrophy may also contribute. While age-related changes in the urinary system predispose to UI, other co-existing factors such as polypharmacy and multimorbidity further increase the risk, making management more complex [10]. Important reversible causes in later life include urinary tract infections, urinary retention and constipation.

Despite this, UI improves with treatment [11], and it is therefore concerning that some studies have demonstrated significant under-detection of UI in specific patient groups [12, 13]. Potential reasons suggested for this include reluctance amongst older people to report symptoms and stigma around the condition [14].

The aim of this study therefore is to ascertain the prevalence of unreported UI in both males and females in a large well-described population-representative sample of older adults utilising data from the Irish Longitudinal Study on Ageing (TILDA) and then examine factors associated with under-reporting of UI, as well as the association of unreported UI with QOL.

Methods

This is a cross-sectional study examining the prevalence and clinical characteristics of participants with UI in a large population-representative sample of community-dwelling adults aged ≥ 50 years.

Study design

This study is embedded within TILDA, a large population-based study of a nationally representative sample of community dwelling older adults aged ≥ 50 years. The TILDA study was designed to investigate how the health, social and economic circumstances of the older Irish population interact in the determination of 'healthy' ageing.

The TILDA study design has been outlined previously [15] but in short; participants were recruited using a stratified clustered procedure to randomly sample postal addresses from the Irish Geo-Directory (a listing of all residential addresses in the Republic of Ireland). All postal addresses in Ireland were assigned to one of 3155 geographic clusters; using RANSAM (a random sampling design for Ireland), a sample of 640 of these clusters was selected stratified by socioeconomic group and geography, where all household residents aged ≥ 50 years were eligible to participate. Data from Wave 2, collected between 2011 and 2012, were used for this analysis. Participants were excluded at baseline if they had a doctor's diagnosis of dementia.

Urinary incontinence

UI was defined based on the International Continence Society Definition, i.e. involuntary loss of urine from the bladder [16]. We used a cut-off frequency of symptoms occurring on average at least twice per month over the last 12 months to define cases of UI.

Participants were asked 'During the last 12 months, have you lost any amount of urine beyond your control?' Those that said yes asked about frequency of symptoms.

Further questions asked to those who reported UI were:

- Have you ever mentioned this problem to a doctor, nurse or other health professional?
- Do you ever limit your activities, for example, what you do or where you go, because of UI?
- How many times have you visited your general practitioner (GP) in the last 12 months?

Quality of life

QOL was measured using the Control, Autonomy, Self-realisation and Pleasure 19 Scale (CASP-19), which has been validated for use specifically in an older population [17]. This involves a self-reported questionnaire with 19 statements under four life domains (control, autonomy, self-actualisation and pleasure). Participants were asked to rank their response as either often, sometimes, not often, or never to each statement and an allocated score of 0 to 3 was assigned, with a total possible score of 57. A higher CASP-19 score therefore indicates greater QOL.

Other measures

Detailed social and biological data were collected at Wave 2. Educational attainment and smoking status were elicited by self-report. Alcohol excess was assessed using the CAGE Alcohol Scale. Polypharmacy defined as being prescribed 5 or more medications. Chronic disease burden was assessed by eliciting self-report of the following chronic conditions: lung disease, liver disease, cancer, Parkinson's disease, arthritis, eye disease (age-related macular degeneration, cataracts or glaucoma). Participants were also asked regarding diabetes, hypertension and stroke. Cardiovascular disease was defined as self-report of angina, congestive cardiac failure or prior myocardial infarction. Depressive symptoms were defined as a score of ≥ 16 on the 20-item

Centre for Epidemiological Studies Depression Scale [18] while cognitive impairment was defined as a score of ≤ 24 on the Mini Mental State Examination. Number of children was included as a surrogate marker for parity in the logistic regression models stratified by sex.

Statistical analysis

Data were analysed using Stata (Statacorp).

Normally distributed continuous variables were compared using Student's t-test. Chi-square test was used for categorical variables.

Logistic regression models reporting odds ratios with unreported UI as dependent variable were used to analyse the association of variables of interest with unreported UI. The comparison group was individuals who had UI and had reported symptoms. Variables were chosen a priori based on their likely probability of association with UI.

Linear regression models with CASP-19 as the dependent variable were used to analyse the association of UI with QOL. Variables added to the model were again chosen a priori based on their likelihood of impacting on QOL.

A p value ≤ 0.05 was considered statistically significant.

Ethics

The TILDA study was approved by the Faculty of Health Sciences research ethics committee at Trinity College Dublin and all participants gave informed written consent. All experimental procedures adhered to the Declaration of Helsinki.

Results

Prevalence of urinary incontinence

Over 10% (750/6,995) of participants had UI; 6% (180/3162) of males and 15% (570/3,833) of females. As shown in Table 1, participants with UI were older, more likely to be female, had higher rates of polypharmacy, higher chronic and cardiovascular disease burden and were more than twice as likely to have significant depressive symptoms when compared to participants without UI.

Overall, participants with UI had a higher number of GP visits within the preceding 12 months when compared to those without UI. Participants who had not yet reported UI to a healthcare professional had an average of more than four GP visits in the last year. Almost 8% of participants with unreported UI (22/285) had not visited their GP within the prior 12 months, compared to 4% of those with reported UI (18/465). See Table 1.

Reporting of symptoms

Almost 40% (285/750) of participants with UI had not reported their symptoms to a healthcare professional, while almost 30% (212/750) reported that UI limited their everyday activities in some way. Over one fifth (51/240) of those with 'limiting' UI had not reported their symptoms to a healthcare professional. Figure 1 demonstrates prevalence of UI, as well as the rate of reporting of symptoms to a healthcare professional, by age and sex.

As shown in Table 1, when compared to those with unreported UI, participants who had not yet reported symptoms to a healthcare professional were more likely to be female with lower rates of polypharmacy and cerebrovascular disease and less 'limiting' UI. Logistic regression models demonstrated that unreported UI symptoms were independently associated with female sex and symptoms that were less likely to impact on daily activities. Polypharmacy and having more than 4 visits to a general practitioner within the last year were associated with lower likelihood of unreported UI. Age, cognitive impairment and depressive symptoms were not significantly associated with reporting of UI. See Table 2.

Quality of life

As shown in Table 3, linear regression models show that both reported and unreported UI were associated with significantly lower self-rated quality of life.

Unreported UI (Unadjusted $\beta = -2.26$ (95% CI -3.36 to -1.17)) had a stronger association with the CASP-19 than diabetes (Unadjusted $\beta = -2.21$ (95% CI -2.97 to -1.44)) in unadjusted models. Other conditions associated with quality of life were prior stroke, depression, cognitive impairment, as well as chronic disease burden. Advancing age was not associated with a lower CASP-19; age range 65–74 years was associated with higher scores in the CASP-19 when compared to the 50–64-year-old age range.

Discussion

This study demonstrates that almost 1 in 10 people aged ≥ 50 years have UI, and that this figure rises to 1 in 6 of those aged ≥ 75 years. Over 40% of participants with UI in our study had not yet reported their symptoms to a healthcare professional, despite visiting their GP on average 4 times within the last 12 months, representing a missed opportunity to address UI.

While we have shown that participants with more severe UI are more likely to report symptoms, over one fifth of those with 'limiting' UI did not report symptoms and in this study, UI involved a considerable symptom burden of

Table 1 Baseline characteristics by reporting of urinary incontinence symptoms

	No UI *N* = 6245	UI, Reported *N* = 465	UI, Not Reported *N* = 285
Age: Mean (SD), years	64.6 (64.4–64.8)*	68.3 (10.0)	66.6 (10.1)****
Female: % (*n*)	52 (3263)*	73 (339/465)	81 (231)****
Educational attainment: % (*n*)			
Primary	27 (1689)*	34 (160)	30 (85)
Secondary	40 (2475)	38 (176)	44 (125)
Tertiary	33 (2081)	28 (129)	26 (75)
Current Smoker: % (*n*)	17 (1040)	18 (84)	18 (52)
CAGE Alcohol Scale: % (*n*)			
CAGE < 2	55 (3425)*	47 (219)	52 (149)****
CAGE ≥ 2	11 (690)	8 (39)	12 (35)
Did not complete	34 (2130)	45 (207)	35 (101)
Polypharmacy: % (*n*)^{A}	26 (1618)*	51 (239)	34 (97)***
No. of chronic diseases: % (*n*)^{B}			
0 chronic diseases	57 (3529)*	29 (136)	37 (106)
1 chronic disease	31 (1952)	39 (183)	39 (111)
2 chronic diseases	10 (623)	22 (103)	18 (50)
≥ 3 chronic diseases	2 (141)	9 (43)	6 (18)
Diabetes: % (*n*)	9 (548)**	14 (63)	10 (27)
Hypertension: % (*n*)	41 (2584)*	51 (235)	45 (128)
Cardiovascular disease: % (*n*)^{C}	9 (567)**	14 (65)	11 (30)
Stroke: % (*n*)	2 (105)*	4 (18)	2 (6)****
Depressive symptoms: % (*n*)^{D}	8 (470)*	19 (88)	18 (50)
Cognitive impairment: % (*n*)^{E}	5 (323)	8 (35)	5 (15)
No. of GP visits in last year (SD)	3.5 (6.6)*	6.1 (11.2)	4.7 (8.7)
UI limiting activities: % (*n*)	NA	36 (167)	16 (45)****

Baseline characteristics of study sample by UI. UI defined as involuntary loss of urine from the bladder occurring on average at least twice per month. Reported = reported symptoms to healthcare professional

Student's *t* test used for continuous variables; Chi-square test used for categorical variables

UI urinary incontinence, *SD* standard deviation, *No* number, *GP* general practitioner

*Denotes $p < 0.001$ for comparison between participants with no UI and all participants with UI; **Denotes $p < 0.05$ for comparison between participants with no UI and all participants with UI; ***Denotes $p < 0.001$ for comparison between participants with unreported UI and those with reported UI; ****Denotes $p < 0.05$ for comparison between participants with unreported UI and those with reported UI

^{A}Polypharmacy defined as being prescribed 5 or more medications; ^{B}Number of the following chronic conditions: lung disease, liver disease, cancer, Parkinson's disease, arthritis, eye disease (age-related macular degeneration, cataracts or glaucoma); ^{C}Self report of angina, congestive cardiac failure or prior myocardial infarction; ^{D}Score of ≥ 16 on the 20-item Centre for Epidemiological Studies Depression Scale; ^{E}Score of ≤ 24 on the Mini Mental State Examination

at least 2 episodes of incontinence per month. While underreporting of UI symptoms is established in studies involving specific patient groups, particularly females [19–21], this is the first study to quantify the prevalence of unreported UI across both sexes in a population-based sample of older adults. Prior studies involving specific cohorts of female participants have shown that more bothersome UI symptoms and more regular physician visits were associated with reporting of UI symptoms [22], while older age, less functional impairment, lower BMI and the absence of cerebrovascular disease or asthma have also been associated with under-reporting of symptoms in a Korean-based study [21].

We have shown that older people, even those with UI that limits day-to-day activities, often do not report symptoms to a healthcare professional despite having the opportunity to do so. There are several reasons for under-reporting of UI symptoms, many of which could be addressed with appropriate educational and awareness campaigns. For example, the most commonly cited reasons in a survey of women who did not report UI were that symptoms weren't severe enough, that they felt UI was an inevitable part of ageing or that they were not asked directly about UI [23].

Maintaining QOL is a primary goal in care of the older person. When we consider under-reporting and

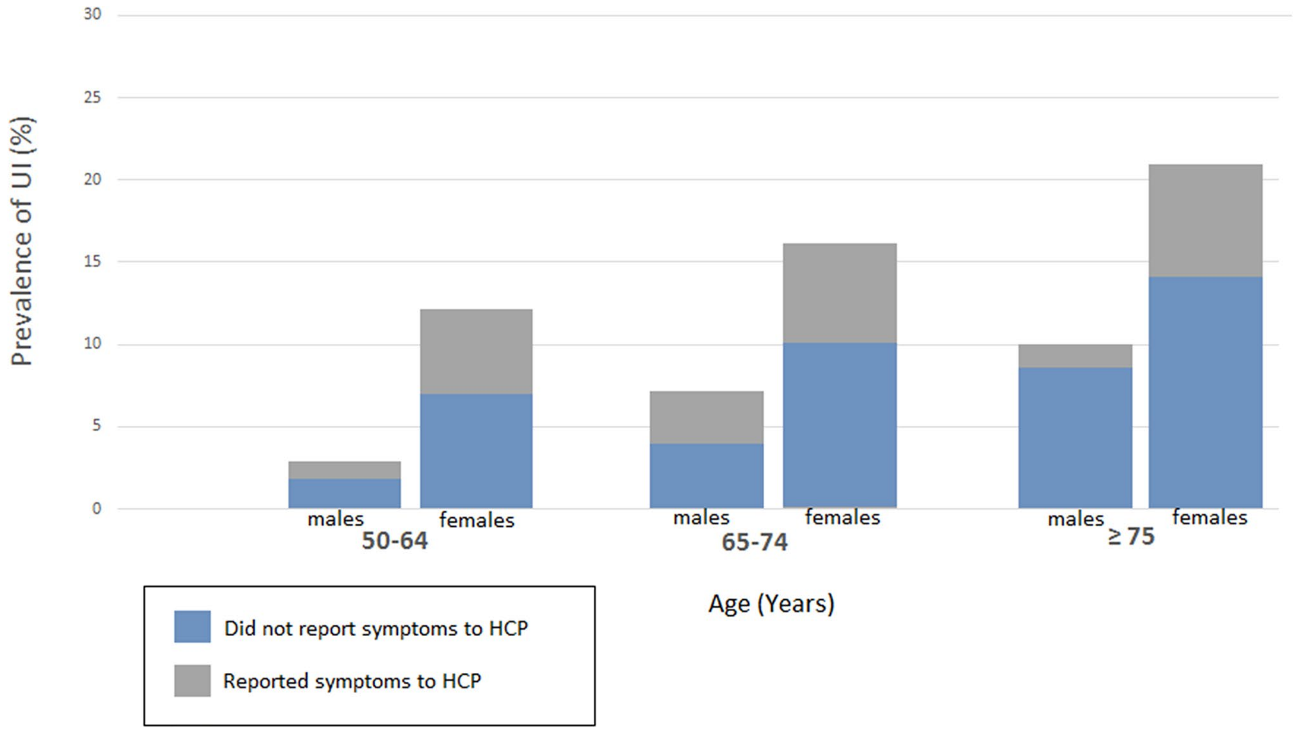

Fig. 1 Prevalence of UI and symptom reporting by age and sex. *UI* urinary incontinence, *HCP* healthcare professional. UI defined involuntary loss of urine from the bladder occurring on average at least twice per month

under-treatment of UI, the close association of UI with QOL scores we have demonstrated in this study is particularly relevant. Rather than addressing UI directly, many older people adapt using lifestyle modifications such as limiting their fluid intake, frequent toileting and wearing protective pads, which can restrict independence and have further negative consequences such as dehydration and increased risk of urinary tract infection. Specific treatment for UI has been shown to significantly improve symptoms and QOL however [11].

These findings also highlight that healthcare professionals should opportunistically ask about UI, particularly in at-risk groups. Our study demonstrates that, apart from females in general, specific groups with a higher likelihood of UI include those with a higher chronic disease burden, depression and polypharmacy. These associations, as well as existing evidence linking UI with frailty [24] and walking speed [25] highlight the importance of addressing UI as part of comprehensive care of the older person [26].

There are some limitations of this study which should be noted. UI was defined by self-reported symptoms only, and not by a clinical assessment but was based on International Continence Society definitions. Additionally, data on chronic diseases such as cardiovascular disease, diabetes and stroke was also elicited by self-report and may therefore be subject to reporting bias. Similarly, participants with minor UI symptoms may not recall discussing them with their GP. Specific strengths of this study include the large population-representative nature of the large cohort involved, as well as the comprehensive dataset including a broad range of sociodemographic and biological information included in the study. This is the first population-based study examining under-reporting of UI amongst older people with GP visit data.

In conclusion, 1 in 10 people aged ≥ 50 years have UI. UI is closely associated with polypharmacy, chronic disease and depression and is negatively associated with QOL. Despite this, only 40% of those with UI symptoms report them to a healthcare professional despite visiting their general practitioner on average 4 times over the last 12 months. This highlights the importance of asking specifically about symptoms of UI as part of comprehensive assessment of the older adult in and emphasises the need for increased education and awareness for older people around the importance of seeking help and reporting UI.

Table 2 Logistic regression reporting odds ratios with unreported urinary incontinence as dependent variable

	Odds ratio (95% CI)	*z*	*p*
Age (Ref: 50–64 years)			
Age 65–74 years	0.96 (0.65–1.41)	− 0.21	0.837
Age ≥ 75 years	0.83 (0.53–1.31)	− 0.78	0.433
Male Sex (Ref: female)	1.69 (1.14–2.50)	2.63	0.008
Educational Attainment (Ref: primary)			
Secondary	0.96 (0.65–1.42)	− 0.21	0.837
Tertiary	0.75 (0.48–1.17)	− 1.26	0.209
Current Smoker	1.09 (0.71–1.68)	0.41	0.682
CAGE Alcohol Status (Ref: CAGE 0–1)			
CAGE 2–4	1.38 (0.80–2.38)	1.17	0.240
Did not complete	0.78 (0.55–1.10)	− 1.41	0.159
No. of chronic diseases (Ref: 0 chronic diseases)[A]			
1 chronic disease	0.98 (0.67–1.42)	− 0.12	0.903
2 chronic diseases	0.98 (0.61–1.57)	− 0.10	0.923
≥ 3 chronic diseases	1.03 (0.52–2.07)	0.09	0.929
Polypharmacy[B]	0.64 (0.45–0.91)	− 2.45	0.014
Depressive symptoms[C]	1.30 (0.84–2.00)	1.19	0.232
Cognitive impairment[D]	1.06 (0.53–2.12)	0.17	0.865
‘Limiting’ UI[E]	0.34 (0.23–0.50)	− 5.41	< 0.001
> 4 GP visits in last year	0.48 (0.34–0.68)	− 4.13	< 0.001

N = 750

Logistic regression model with unreported urinary incontinence (*n* = 285) as dependent variable and comparison group of those with reported urinary incontinence (*n* = 465)

Ref reference value, *CI* confidence interval, *GP* general practitioner

[A] Number of the following chronic conditions: lung disease, liver disease, cancer, Parkinson’s disease, arthritis, eye disease (age-related macular degeneration, cataracts or glaucoma); [B] Prescribed 5 or more medications; [C] Score of ≥ 16 on the 20-item Centre for Epidemiological Studies Depression Scale; [D] Score of ≤ 24 on the Mini Mental State Examination; [E] Urinary incontinence that impacts on day-to-day activities

Table 3 Linear regression with self-rated quality of life as dependent variable (CASP-19)

	Beta-Coefficient (95% CI)	*t*	*p*
Urinary Incontinence (Ref: No UI)			
‘Reported’ UI	– 1.69 (– 2.51 to – 0.88)	– 4.07	<0.001
‘Unreported’ UI	– 1.20 (– 2.19 to – 0.20)	– 2.35	0.019
Age (Ref: 50–64 years)			
Age 65–74 years	1.13 (0.66 to 1.59)	4.74	<0.001
Age ≥ 75 years	0.39 (– 0.24 to 1.02)	1.22	0.222
Female Sex	0.62 (0.21 to 1.02)	3.00	0.003
Educational Attainment (Ref: primary)			
Secondary	0.39 (– 0.13 to 0.91)	1.49	0.137
Tertiary	1.25 (0.70 to 1.79)	4.51	<0.001
Current smoker	– 1.87 (– 2.42 to – 1.32)	– 6.70	<0.001
CAGE alcohol status (Ref: CAGE = 0)			
CAGE 1–2	– 0.82 (– 1.43 to – 0.21)	– 2.64	0.008
CAGE 2–4	– 2.63 (– 3.23 to – 2.02)	– 8.51	<0.001
Did not complete	– 0.93 (– 1.43 to – 0.42)	– 3.61	<0.001
Polypharmacy^{A}	– 1.83 (– 2.36 to – 1.31)	– 6.86	<0.001
No. of chronic diseases (Ref: 0 chronic diseases)^{B}			
1 chronic disease	– 1.17 (– 1.62 to – 0.73)	– 5.18	<0.001
2 chronic diseases	– 2.16 (– 2.85 to – 1.47)	– 6.13	<0.001
≥ 3 chronic diseases	– 2.58 (– 3.87 to – 1.29)	– 3.92	<0.001
Diabetes	– 0.41 (– 1.13 to 0.31)	– 1.13	0.260
Hypertension	– 0.41 (– 0.82 to 0.01)	– 1.92	0.054
Cardiovascular disease^{C}	– 0.55 (– 1.26 to 0.19)	– 1.47	0.142
Stroke	– 2.39 (– 4.00 to – 0.79)	– 2.93	0.003
Depressive symptoms^{D}	– 9.21 (– 9.95 to – 8.47)	– 24.35	<0.001
Cognitive impairment^{E}	– 2.25 (– 3.87 to – 1.29)	– 3.92	<0.001

Linear regression model with CASP-19 score as dependent variable

CASP-19 Control, Autonomy, Self-realisation and Pleasure 19 Scale, *Ref* reference value; *CI* confidence interval, *UI* urinary incontinence

UI defined as involuntary loss of urine from the bladder occurring on average at least twice per month. Reported = reported symptoms to healthcare professional, Unreported = not yet reported to a healthcare professional

^{A}Polypharmacy defined as being prescribed 5 or more medications; ^{B}Number of the following chronic conditions: lung disease, liver disease, cancer, Parkinson’s disease, arthritis, eye disease (age-related macular degeneration, cataracts or glaucoma); ^{C}Self report of angina, congestive cardiac failure or prior myocardial infarction; ^{D}Score of ≥ 16 on the 20-item Centre for Epidemiological Studies Depression Scale; ^{E}Score of ≤ 24 on the Mini Mental State Examination

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Compliance with ethical standards

Conflict of interest None.

Ethical approval The TILDA study was approved by the Faculty of Health Sciences research ethics committee at Trinity College Dublin.

Informed consent All participants gave informed written consent.

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