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The Association of Urinary Incontinence and Disability Among a Diverse Sample of Mid-life SWAN Women

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Abstract

Objective: To examine whether urinary incontinence type, frequency and amount are associated with self-reported disability in a racially/ethnically diverse cohort of community dwelling midlife women.

Methods: Data was from longitudinal analyses of questionnaires from the multi-center, prospective cohort Study of Women's Health Across the Nation (SWAN). We used multivariable ordinal logistic regression to examine whether urinary incontinence type, frequency and amount at the 13th follow-up were associated with the World Health Organization Disability Assessment Schedule (WHODAS) at the 15th follow-up controlling for other factors (menopause status, BMI, lifestyle and psychosocial factors, and disability at Follow-up 13).

Results: UI was associated with subsequent reports of disability in participants, particularly in the WHODAS domains of mobility (p<.0001), communication (p=.0057), and life activities (p=.0407). Associations were strongest for mixed UI type compared to stress UI or urgency UI [OR=1.66, 95% CI=1.26-2.17, (p<.001)], daily frequency of UI compared to monthly or less than weekly frequency of UI [OR=1.61, 95% CI=1.04-2.47 (p<.001)], and larger amounts of urine leakage compared to drops of leakage [OR=2.98, 95% CI=1.58-5.62 ((p<.0001] for mobility/ getting around domain.

Conclusion: UI appears to have a strong association with multiple domains of disability, including mobility and interacting with others, after approximately 3.7 years. Thus, UI may be an important factor limiting social engagment among women. Screening for mixed UI and UI that

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occurs greater than weekly and in amounts requiring pads may yield better information regarding an individual's future disability risk and may preserve social interaction.

Keywords

Urinary Incontinence; Disability; WHODAS

Introduction

Urinary incontinence (UI)affects 30 to 50 percent of women in the United States.[1] The economic burden of incontinence is significant due to the cost of absorbent pads and medical and surgical treatments, as is the psychological and physical distress related to UI.[1] The prevalence and severity of UI increases with age.[1,2]

Considerable evidence documents a strong cross-sectional association between UI and disability.[3–13]The odds ratio of women over 65 years old needing assistance with activities of daily living for those with UI compared to continent groups ranged from 2.0[8] to 2.57.[6] Several studies show a strong association between UI and cognition, mental health, and quality of life (QOL) limitation.[3,4,5,9]

The majority of studies of the association between UI and disability have focused on women over 65, as well as those residing in hospitals, nursing homes, and residential facilities.[11,12,13] More recently, community based studies have been conducted. In a cross-sectional analysis of the Health-ABC Study, urgency UI was associated with decreased physical performance.[13] Omli et al, in an eleven-year longitudinal analysis of home-dwelling 70-80 year old Norwegian women, found UI to be an independent predictor of decline in activities of daily living and those with UI to be twice as likely to experience functional decline compared to continent peers.[8] However, few studies have examined the association between UI and disability for women in midlife and into early old age.

Women enrolled in the Study of Women's Health Across the Nation (SWAN) are community-dwelling, and have been followed across the midlife into old age for over two decades. Using SWAN data provides a unique opportunity to investigate the relationship between self-reported type, frequency, and amount of UI and six domains of disability characterized by the World Health Organization Disability Assessment Schedule (WHODAS)[14] in a multi-ethnic population of midlife women.

Subtyping stress UI versus urgency UI may lead to a better understanding of differential impact early in the disablement trajectory. Three previous studies suggest a differential in disability based on type of UI, with urgency UI and mixed UI contributing to more significant physical and mental health declines,[5,9,10] but this relationship has not been explored longitudinally in a racially diverse population. Daily frequency of UI has been associated with work disability[15] and greater QOL disruption.[7] Greater amount of UI has been associated with low back pain and worse balance,[16] as well as more functional disability and lower QOL.

The objective of this research was to investigate the prospective longitudinal association between UI type, frequency, and amount and the six domains of disability measured using the WHODAS 3.7 years later.

Methods:

Participants

Participants were from the Study of Women Across the Nation (SWAN), a multi-site, multi-racial/ethnic, longitudinal study of women's health and aging, conducted at seven sites in the United States. IRB approval was obtained by the seven sites, and women provided informed consent at each study visit to participate. Each study site recruited both non-Hispanic White women (47% of original recruitment sample) and women from a single racial/ethnic minority group, including Black (28% of original recruitment sample), Chinese (8%), Japanese (9%) and Hispanic (8%). Inclusion criteria at study baseline were females aged 42-52 years, not pregnant or breastfeeding, not taking exogenous hormones, having an intact uterus and at least one ovary, reporting menstrual bleeding within the prior 3 months (premenopausal), and not currently using medications known to affect pituitary or ovarian function. Participants completed approximately annual visits for the first 10 years of the study, and then every 3-5 years after that, in their preferred language of English, Cantonese, Japanese, or Spanish. Self- and interviewer-administered questionnaires assessing social, economic, behavioral, psychological, medical health, functional health, and lifestyle characteristics were completed.

Methods for recruitment of the SWAN cohort have been published elsewhere.[17] The baseline examination enrolled 3,302 women in 1996 and 1997. At the 15th Follow-up visit, overall retention in SWAN was 66% of the surviving participants. This analysis includes participants with UI data at visit 13 and disability data at both visit 13 and visit 15. Women were excluded from the analytic sample if they had missing visit 13 UI data, missing visit 15 WHODAS data, and missing visit 13 WHODAS data.

Study Variables

UI and disability data for the current study were obtained from self-administered questionnaires at the 13th and 15th follow-up visits that were conducted 3.7 (2.4-5.3) years apart. UI data included type, frequency and amount of urine loss. For UI type: 1) Urge UI was defined by a positive response to "In the last month have you leaked urine when you have the urgency to void and can't reach the toilet fast enough?" 2) Stress UI was defined by affirmative response to "In the last month have you lost urine due to coughing, laughing, sneezing, jogging, jumping, with physical activity, or picking up an object from the floor?" 3) Mixed UI was defined by afffirmative responses to both urgency and stress UI questions. UI frequency is defined as self-report responses of none, less than weekly/monthly, weekly and daily. UI amount is defined as none, a drop, pad and through clothes/on the floor.

We used the six domains of the WHODAS to assess disability including 1) Cognition: understanding/communicating, 2) Mobility: moving and getting around, 3) Self-care: attending to hygiene, dressing, eating, and independence while alone, 4) Getting along:

interacting with people, 5) Life activities: domestic activities, leisure, work, school, and 6) Participation: engagement in community and societal activities. The WHODAS was collected at visits 13 and 15. Our primary outcomes were the six domains of disability at visit 15, controlling for these domains assessed at visit 13.

Time-invariant covariates collected at baseline included: site; race/ethnicity [self identification as Black/African American, Chinese, Hispanic, Japanese or non-Hispanic White], age, education [achieving less than a high school diploma, high school diploma, some college, college degree, through post-graduate education], and financial strain [not at all, somewhat, very]. Time-varying covariates collected in our study included: history of hysterectomy [yes/no], measured body mass index (BMI) [weight per stadiometer in kilograms divided by height by calibrated scale in meters squared], smoking [never, past, current], total physical activity score [Kaiser Physical Activity Scale[18]], , vaginal dryness days [0, 1-5, 6+ per week], exogenous hormone therapy [yes, no],Co-morbid conditions that could affect disability between visit 13 and visit 15 included self-reported or physician-diagnosed cancer [never, past, current], hypertension [ever self-reported], presence of diabetes [reported diabetes medications and/or blood glucose ≥ 126 mg/dL], depressive symptoms [≥16 on Center for Epidemiological Studies Depression], elevated anxiety score for the prior two weeks [self-reported on a 15 item checklist with four domains of anxiety[19]], stroke, self-reported osteoarthritis, and myocardial infarction/angina. Covariates were based on previous SWAN literature and biological plausibility for confounding the main association of interest.

Statistical Analyses

Characteristics of the analytic sample were summarized using mean, standard deviation, and minimum and maximum for continuous variables, and frequencies and percentages for categorical variables. We estimated unadjusted associations of type, frequency, and amount of UI at visit13 with each visit15 WHODAS domain using cross tabulations and chi-square tests as well as ordinal logistic regression. With the exception of self-care, which was dichotomized as any disability versus none due to the low prevalence of all cell counts, each WHODAS domain was categorized as none (score 0-4), mild (5-24), and moderate or higher (25-100); the categories severe (50-94) and extreme (95-100) were combined with moderate (25-49) due to small cell counts for the severe and extreme categories, described in previous SWAN studies using the WHODAS.[20] Corresponding adjusted associations of visit13 UI with visit15 WHODAS domains were estimated by adding covariates, including the corresponding value from the visit13 WHODAS domain, to the ordinal logistic regressions. We employed partial proportional odds, i.e., allowing unequal slopes for covariates not satisfying the proportional odds assumption.[21]

Results

There were 1801 participants in the analytic sample (See Figure 1). Comparing the analytic sample with those excluded (N=1501), at baseline participants in the former subset were more likely to be Non-Hispanic White, Chinese, or Japanese, had a higher educational level,

were less likely to report anxiety or CES-D depressive symptoms, and had lower BMI, higher physical activity, and were less likely to smoke.

In the analytic sample, participants were aged 61.8 (±2.7) years of age (range 56.8-68.9) at visit13, and 49% identified as Non-Hispanic White (See Table 1). The majority reported it was not hard to pay for basics (73%), had some college and greater educational attainment (80%), and were overweight (BMI ≥ 25 kg /m2) (68%), while few reported histories of hysterectomy (11%) or exogenous hormone use (7%). Nearly two-thirds (64%) of the analytic sample reported urinary incontinence at visit13 (See Table 1a). There were statistically significant differences in UI type (stress versus urgency versus mixed) reported by population characteristics, most significant related to race/ethnicity, BMI, physical activity score, prevalent diabetes, hypertension and osteoarthritis and elevated anxiety, all p<.0001 (See Table 1) Similarly, there were statistically significant differences in UI frequency (less than weekly versus weekly versus daily) reported, related to race/ethnicity, difficulty paying for basics, BMI, presence of diabetes, osteoarthritis and elevated depressive symptoms, (p<.0001) and statistically significant differences in UI amount (drop, pad, clothes/floor) reported related to race/ethnicity, difficulty paying for basics, BMI, diabetes, hypertension, osteoarthritis, MI/angina, and elevated depressive symptoms (p<.0001).

Type of UI: Table 2 displays the results from the adjusted ordinal multivariable logistic regression models evaluating the association between UI type and domain-specific disability after after about 3.7 years. . After adjustment for covariates and visit13 WHODAS responses, compared with no UI, there were higher levels of disability in three WHODAS domains (getting around, p <.0001; understanding and communicating, p=.0057; and life activities, p=.0407). Stress UI compared to no UI was associated with higher levels of disability in the WHODAS mobility/ getting around domain [OR=1.77,95% CI=1.32-2.36, (p<.0010]). Urgency UI compared with no UI was associated with higher levels of disability in the understanding and communicating domain [OR=1.41, 95% CI= 1.03-1.93, (p=.00570]. Mixed UI compared with no UI was also associated with higher levels of disability in the understanding and communicating domain [OR=1.60, 95% CI=1.22-2.09, (p=.0057)], the getting around domain [OR=1.66, 95% CI=1.26-2.17), (p<.0001)], the self care domain [OR=1.70, 95% CI=1.2-2.40), (p=.0269)] and the life activities domain [OR=1.45, 95% CI=1.11-1.89), (p=.0407)].

Frequency of UI: Table 3 displays the results from the adjusted multivariable ordinal logistic regression models with UI frequency and domain-specific disability after about 3.7 years. .After adjustment, compared to women with less than weekly UI, women with weekly or more UI had higher odds of reporting disability in the understanding/ communicating domain [OR=1.33, 95% CI=1.03-1.71, (p<.0001)] and the getting around domain [OR=1.32, 95% CI=1.03-1.69, (p<.0001)]. Women with weekly or more UI had higher levels of disability in the domains of understanding and communicating, getting around, life activities, and participation in society compared to those with no UI (p= .0001, p= .0001, p=.0039, and p=.0293 respectively).

Amount of UI: Table 4 displays the results from the adjusted ordinal multivariable logistic regression models evaluating the association between amount of UI and the six domains of

disability after about 3.7 years. Amount of UI was strongly associated with higher levels of disability in four domains after adjustment. Using pairwise comparisons, women who reported greater amounts than drops of UI had higher odds of reporting disability in the domains of understanding and communicating [OR=1.37, 95% CI=1.07-1.74, (p<.0001)] and getting around [OR=1.36, 95% CI=1.67-1.73, (p<.0001)] compared to those with drops or less amount of UI. Pad-size amounts of urine leakage and leakage going through clothing or to the floor were associated with higher levels of disability in the understanding and communicating, mobility, life activities and participation in society domains compared to those with no UI (p=<0001, p<.000s, p=.0120 and p=.0020 respectively). We found the highest odds of disability for leakage through clothing/to floor for understanding and communcating [OR=2.97, 95% CI=1.57-5.61, (p<.0001)] and mobility domains [OR=2.98, 95%CI=1.58-5.62, (p<.0001)].

Discussion

This study is among the first to evaluate the prospective, longitudinal associations between multiple facets of UI and the various domains of disablity in a racially diverse group of women at midlife into early old age. The majority of participants experienced some form of UI. Our findings indicate that larger amounts of UI, greater frequency of UI, and mixed UI type have a stronger longitudinal associations with multiple domains of disability measured about 3.7 years later.

This is one of the first longitudinal studies evaluating the various aspects of both the predictor (UI) and the outcome (disability). Similar to previous literature,[8] our research showed higher levels of disability at the end of an almost 4 year span associated with any type of UI versus no UI. Consistent with previous cross-sectional studies,[5,9,10] our study found that the highest odds ratios for disability were for MUI as compared to SUI and UUI. Participants reporting MUI also documented more comorbid medical issues, which may contribute more greatly to their UI symptoms. Some of these are potentially modifiable, including high levels of anxiety and high BMI.

We were able to look at more specific facets of UI in our population compared to most studies, offering clinically meaningful information about how type, frequency and amount of UI impacts disability prospectively. More frequent UI or high leakage amounts were both associated with higher odds of disability across multiple domains including moblity and communcation. These disabilities are often seen during clinical evaluation of women with UI, as they are more likely to seek care for UI only when the symptoms become bothersome or limit function physically or socially.[22]

The present study has many strengths. Most importantly, SWAN is a multi-racial/ethnic sample and because of the longitudinal nature of the study, we were able to control for important covariates and adjust for previous disability status (i.e., V13 WHODAS measurements). Other notable strengths of the study include the large sample size of more than 1,800 participants in the analytic sample and the focus on midlife women, who are less well-studied than older adult women. Limitations of this analysis include the use of self-reports and questionnaires for both the predictor and outcome variables and the lack of

WHODAS data throughout the SWAN follow-up (as measures were only available for later visits).

It was expected that the self care WHODAS domain would be the most associated with UI as it relates to managing hygiene, however the small associations observed may be reflective of the low percentage of participants with self-care disability, perhaps related to the relatively young age of our participants. However, our study revealed strong associations of UI with the understanding and communicating, mobility, life activities, and participation in life domains of disability. Based on classic disablement models, [23, 24] impairments at the organ level (in this case, the bladder) can lead to subsequent disability in physical function limitations, in our study evidenced by disability in the mobility domain. Our findings indicate that this is the case, and disablement likely occurs earlier than expected based on previous studies in older adults.[25, 26] However, more contemporary models of the disablement process, such as the International Classification of Functioning, Disability and Health[27] suggest an important synergy between impairments, limitations and restrictions, which collectively impact one's body functions and structures, activities, and participation, respectively. As observed in our study's findings, UI not only impacts functional impairments, but also one's ability to participate in activities to the degree desired, as evidenced by associations with disability in the domains of understanding and communicating, life activities, and participation in life. As such, UI may be one important mechanism leading to social isolation and reduced social interaction. Given the importance of social interaction across the lifespan,[28] as most recently amplified by the US Surgeon General's recent attention to the public health crisis of loneliness, isolation, and lack of connection,[29] efforts to identify and treat UI may be beneficial to limit social isolation, preserve social interaction, and reduce disability in these domains.

This greater understanding of UI-related risk factors for disablity is important for midlife women and their healthcare providers, especially in the domains of communication, mobility, life activities, and participation in society. Future reseach should consider how and why UI impacts mobiilty, communication, and societal participation. The authors theorize that it could be related to desire for proximity to clean, dry clothes, embarassment regarding their incontinence, and lack of socialization over time leading to difficulty communicating with others.

Conclusion

It is critical to better understand the relationship between UI and disability for women as they age. Our findings establish a significant longitudinal association between UI and disability, especially in the domains of mobility, life activities, participation, and communication, in midlife women. The association remained even after adjusting for numerous covariates and V13 WHODAS measures. It is important for clinicians to address UI earlier in symptom ons. Screening for MUI and UI that occurs more frequently or in larger amounts more specifically may yield better information regarding an individual's future disability risk. Future research should include expoloration of the trend of the UI and disability association over time, the impact of interventions for UI on subsequent disability risk, and to explore the mechanism underpinning the association between UI and disability.

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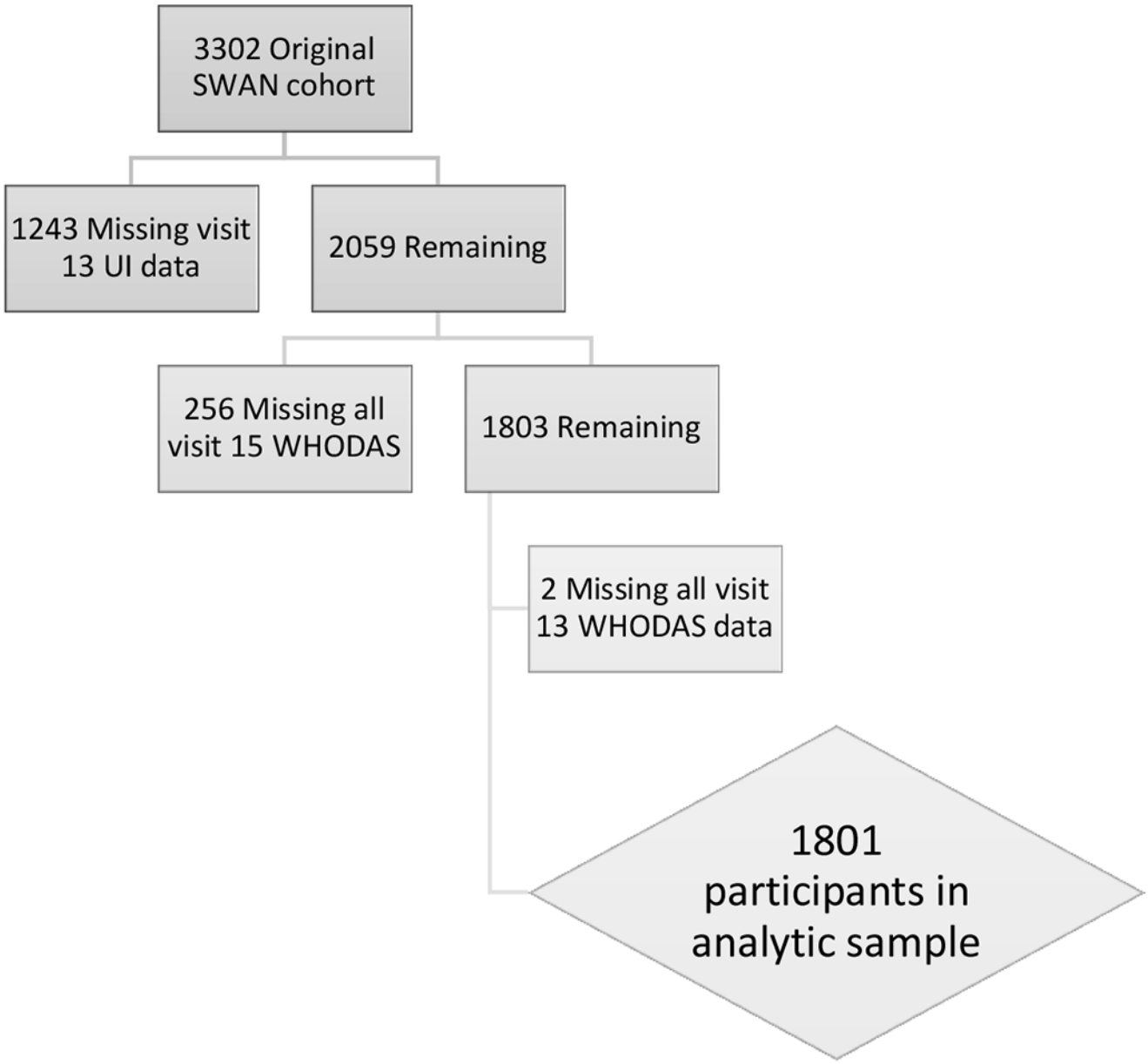

Figure 1.
Analytic Sample

Table 1:

Participant characteristics, full analytic sample and by Visit 13 UI type

Characteristic	% (N) or Mean (Standard Deviation)					
Race/ethnicity: % (N)	**All Participants (N=1801)**	**No UI (N=649)**	**Stress UI (N=358)**	**Urgency UI (N=294)**	**Mixed UI (N=500)**	**p-value**
White	48.8 (878)	39.9 (259)	57.0 (204)	55.4 (163)	50.4 (252)	
Black	25.9 (466)	27.1 (176)	14.3 (51)	34.0 (100)	27.8 (139)	
Hispanic	5.3 (95)	8.2 (53)	2.2 (8)	1.0 (3)	6.2 (31)	
Chinese	10.1 (181)	12.9 (84)	13.4 (48)	4.1 (12)	7.4 (37)	
Japanese	10.1 (181)	11.9 (77)	13.1 (47)	5.4 (16)	8.2 (41)	
Age in years, V13: Mean (SD)	61.8 (2.7)	61.8 (2.7)	61.8 (2.7)	62.1 (2.8)	61.9 (2.7)	.4527
Educational level: % (N)						.0016
Less than high school	4.9 (87)	6.5 (42)	2.8 (10)	1.4 (4)	6.2 (31)	
High school	15.3 (274)	16.6 (107)	15.2 (54)	10.8 (31)	16.5 (82)	
Some college	32.5 (580)	33.1 (214)	31.8 (113)	35.1 (101)	30.6 (152)	
College	21.6 (386)	22.3 (144)	21.1 (75)	24.7 (71)	19.3 (96)	
Post-graduate study	25.7 (459)	21.5 (139)	29.0 (103)	28.1 (81)	27.4 (136)	
Missing	15	3	3	6	3	
Difficulty paying for basics, V13: % (N)						.0036
Not at all hard	73.2 (1294)	74.3 (470)	80.3 (281)	72.5 (211)	67.2 (332)	
Somewhat hard	22.1 (390)	21.6 (137)	16.3 (57)	22.7 (66)	26.3 (130)	
Very hard	4.8 (84)	4.1 (26)	3.4 (12)	4.8 (14)	6.5 (32)	
Missing	33	16	8	3	6	
Body mass index (kg/m^2), V13: % (N)						<.0001
< 25	32.4 (583)	40.8 (265)	34.6 (124)	23.8 (70)	24.8 (124)	
25 – 29.9	28.9 (520)	27.7 (180)	36.6 (131)	26.2 (77)	26.4 (132)	
30 – 34.9	18.3 (330)	16.8 (109)	17.3 (62)	22.8 (67)	18.4 (92)	
35 – 39.9	10.9 (197)	8.3 (54)	8.1 (29)	14.6 (43)	14.2 (71)	
40+	9.5 (171)	6.3 (41)	3.4 (12)	12.6 (37)	16.2 (81)	
Smoking status, V13:						.5508
Never	59.8 (1058)	60.6 (385)	60.5 (213)	59.9 (175)	58.0 (285)	

Characteristic	% (N) or Mean (Standard Deviation)					
Race/ethnicity: % (N)	**All Participants (N=1801)**	**No UI (N=649)**	**Stress UI (N=358)**	**Urgency UI (N=294)**	**Mixed UI (N=500)**	**p-value**
Past	32.5 (576)	32.3 (205)	33.5 (118)	32.5 (95)	32.2 (158)	
Current	7.7 (136)	7.1 (45)	6.0 (21)	7.5 (22)	9.8 (48)	
Physical activity score, V13: Mean (SD)	7.6 (1.8)	7.7 (1.8)	7.9 (1.7)	7.3 (1.9)	7.4 (1.9)	<.0001
Hysterectomy, with or without bilateral salpingo-oophorectomy: % (N)	11.0 (197)	8.7 (56)	10.6 (38)	12.2 (36)	13.4 (37)	.0665
Missing	3	2	0	0	1	
Exogenous hormone use, V13: % (N)	6.7 (121)	6.2 (40)	5.9 (21)	6.8 (20)	8.0 (40)	.5616
Missing	3	2	0	0	1	
Cancer status, V15: % (N)						.1918
Never	87.6 (1575)	90.1 (585)	87.9 (313)	84.4 (248)	85.8 (429)	
Past	8.2 (148)	6.5 (42)	8.4 (30)	9.9 (29)	9.4 (47)	
Current	4.2 (76)	3.4 (22)	3.7 (13)	5.8 (17)	4.8 (24)	
Missing	2	0	2	0	0	
Prevalent diabetes, V15: % (N)	17.7 (319)	14.5 (94)	13.7 (49)	18.4 (54)	24.4 (122)	<.0001
Self-reported hypertension, V15: % (N)	55.0 (990)	53.9 (350)	45.5 (163)	60.5 (178)	59.8 (299)	<.0001
Self-reported arthritis, V15: % (N)	64.0 (1152)	57.9 (376)	62.3 (223)	67.4 (198)	71.0 (355)	<.0001
Self-reported MI/angina, V15: % (N)	7.7 (139)	6.9 (45)	7.5 (27)	6.8 (20)	9.4 (47)	.4060
Self-reported stroke, V15: % (N)	3.9 (70)	3.2 (21)	2.8 (10)	4.1 (12)	5.4 (27)	.1735
Center for Epidemiologic Studies- Depression Scale (CES-D), V15: % (N)	13.1 (233)	9.3 (60)	14.7 (52)	12.9 (37)	17.1 (84)	.0013
Missing	21	4	3	6	8	
Anxiety, V15: % (N)	12.4 (219)	9.1 (58)	11.3 (40)	9.8 (28)	19.1 (93)	<.0001
Missing	35	8	5	9	13	

Table 1a-

Participant UI Characteristics:

Type of UI	**N (%)**
No UI	649 (36.04)
Stress UI	358 (19.88)
Urgency UI	294 (16.32)
Mixed UI	500 (27.76)
Frequency of UI	
None	649 (36.04)
Less than weekly	589 (32.70)
Weekly	413 (22.93)
Daily	150 (8.33)
Amount of UI	
None	649 (36.04)
Drop	631 (35.04)
Pad	451 (25.04)
Floor/through clothing	70 (3.89)

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Table 2:

Visit 13 UI type vs. Visit 15 WHODAS

Visit 15 WHODAS Domain	No UI	Stress UI only	Urgency UI only	Mixed UI	p-value
Understanding / communicating: % (N)					<.0001
None	59.9 (381)	46.9 (167)	49.7 (146)	38.0 (189)	
Minimal	30.5 (197)	39.0 (139)	38.8 (114)	42.2 (210)	
Moderate or higher	10.5 (68)	14.0 (50)	11.6 (34)	19.9 (99)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.34 (0.996-1.79)	1.41 (1.03-1.93)	1.60 (1.22-2.09)	.0057
Mobility / getting around: % (N)					<.0001
None	49.0 (316)	32.1 (114)	33.1 (97)	25.5 (127)	
Minimal	31.3 (202)	43.7 (155)	34.1 (100)	33.7 (168)	
Moderate or higher	19.7 (127)	24.2 (86)	32.8 (96)	40.9 (204)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.77 (1.32-2.36)	1.14 (0.83-1.56)	1.66 (1.26-2.17)	<.0001
Self-care: % (N)					.0254
None	89.5 (579)	86.0 (307)	86.0 (251)	83.4 (416)	
Any	10.5 (68)	14.0 (50)	14.0 (41)	16.6 (83)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.36 (0.84-2.22)	1.25 (0.75-2.09)	0.93 (0.60-1.46)	.3832
Getting along with people: % (N)					.0003
None	56.3 (359)	45.1 (160)	52.9 (154)	44.9 (223)	
Minimal	30.1 (192)	36.9 (131)	29.6 (86)	33.0 (164)	
Moderate or higher	13.6 (87)	18.0 (64)	17.5 (51)	22.1 (110)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.25 (0.95-1.66)	1.16 (0.85-1.58)	1.15 (0.88-1.50)	.4317
Life activities: % (N)					<.0001
None	54.6 (354)	45.9 (164)	39.6 (116)	32.5 (152)	
Minimal	20.4 (132)	20.2 (72)	23.2 (68)	22.4 (112)	
Moderate or higher	25.0 (162)	33.9 (121)	37.2 (109)	45.1 (225)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.29 (0.97-1.72)	1.30 (0.96-1.77)	1.45 (1.11-1.89)	.0407
Participation in society: % (N)					<.0001
None	57.4 (363)	49.1 (172)	50.0 (144)	38.9 (191)	

Visit 15 WHODAS Domain	No UI	Stress UI only	Urgency UI only	Mixed UI	p-value
Minimal	29.4 (186)	35.1 (123)	31.6 (91)	34.0 (167)	
Moderate or higher	13.1 (83)	15.7 (55)	18.4 (53)	27.1 (133)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.32 (0.98-1.77)	1.16 (0.84-1.60)	1.40 (1.07-1.83)	.0753

[a]Covariates: Age, anxiety, BMI by category, cancer, depression, diabetes, educational level, exogenous hormone use, financial strain, hypertension, hysterectomy, MI or angina, osteoarthritis, physical activity, race, site, smoking status, stroke, vaginal dryness, WHODAS at visit 13.

Table 3:

Visit 13 UI frequency vs. Visit 15 WHODAS

Visit 15 WHODAS Domain	No UI	< Weekly	Weekly	Daily	p-value
Understanding / communicating: % (N)					<.0001
None	59.0 (381)	48.7 (286)	38.9 (160)	37.3 (56)	
Minimal	30.5 (197)	40.2 (236)	42.3 (174)	35.3 (53)	
Moderate or higher	10.5 (68)	11.1 (65)	18.7 (77)	27.3 (41)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.33 (1.03-1.71)	1.90 (1.43-2.51)	1.61 (1.05-2.48)	.0001
Mobility / getting around: % (N)					<.0001
None	49.0 (316)	36.0 (211)	24.6 (101)	17.3 (26)	
Minimal	31.3 (202)	39.8 (233)	35.3 (145)	30.0 (45)	
Moderate or higher	19.7 (127)	24.2 (142)	40.2 (165)	52.7 (79)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.32 (1.03-1.69)	1.89 (1.43-2.50)	1.61 (1.04-2.47)	.0001
Self-care: % (N)					<.0001
None	89.5 (579)	88.1 (517)	83.0 (342)	77.3 (116)	
Any	10.5 (68)	11.9 (70)	17.0 (70)	22.7 (34)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.12 (0.73-1.73)	1.20 (0.76-1.90)	1.00 (0.54-1.85)	.8552
Getting along with people: % (N)					.0037
None	56.3 (359)	49.1 (287)	44.4 (182)	45.6 (68)	
Minimal	30.1 (192)	32.0 (187)	35.1 (144)	33.6 (50)	
Moderate or higher	13.6 (87)	18.8 (110)	20.5 (84)	20.8 (31)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.25 (0.97-1.60)	1.24 (0.94-1.62)	0.83 (0.55-1.24)	.0810
Life activities: % (N)					<.0001
None	54.6 (354)	44.9 (264)	32.6 (134)	29.3 (44)	
Minimal	20.4 (132)	22.8 (134)	21.4 (88)	20.0 (30)	
Moderate or higher	25.0 (162)	32.3 (190)	46.0 (189)	50.7 (76)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.17 (0.91-1.51)	1.63 (1.23-2.14)	1.52 (1.01-2.29)	.0039
Participation in society: % (N)					<.0001
None	57.4 (363)	51.6 (298)	41.0 (166)	29.5 (43)	

Visit 15 WHODAS Domain	No UI	< Weekly	Weekly	Daily	p-value
Minimal	29.4 (186)	33.2 (192)	34.8 (141)	32.9 (48)	
Moderate or higher	13.1 (83)	15.2 (88)	24.2 (98)	37.8 (55)	
V13 WHODAS- and covariate-adjusted OR (95% CI)[a]	Reference	1.20 (0.92-1.55)	1.39 (1.05-1.84)	1.71 (1.14-2.56)	.0293

[a]Covariates: Age, anxiety, BMI by category, cancer, depression, diabetes, educational level, exogenous hormone use, financial strain, hypertension, hysterectomy, MI or angina, osteoarthritis, physical activity, race, site, smoking status, stroke, vaginal dryness, WHODAS at visit 13.

Table 4:

Visit 13 UI amount vs. Visit 15 WHODAS

Visit 15 WHODAS Domain	No UI	Drop	Pad	Floor / Clothing	p-value
Understanding / communicating: % (N)					<.0001
None	59.0 (381)	49.0 (308)	38.9 (175)	27.1 (19)	
Minimal	30.5 (197)	38.4 (241)	43.3 (195)	38.6 (27)	
Moderate or higher	10.5 (68)	12.6 (79)	17.8 (80)	34.3 (24)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.37 (1.07-1.75)	1.72 (1.29-2.28)	2.97 (1.57-5.61)	<.0001
Mobilty / getting around: % (N)					<.0001
None	49.0 (316)	35.6 (223)	24.0 (108)	10.0 (7)	
Minimal	31.3 (202)	40.4 (253)	33.6 (151)	27.1 (19)	
Moderate or higher	19.7 (127)	24.1 (151)	42.4 (191)	62.9 (44)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.36 (1.06-1.73)	1.71 (1.29-2.27)	2.98 (1.58-5.62)	<.0001
Self-care: % (N)					<.0001
None	89.5 (579)	88.2 (554)	82.5 (372)	70.0 (49)	
Any	10.5 (68)	11.8 (74)	17.5 (79)	30.0 (21)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.02 (0.67-1.57)	1.27 (0.81-1.99)	1.20 (0.54-2.65)	.7202
Getting along with people: % (N)					.0003
None	56.3 (359)	49.6 (310)	45.4 (204)	33.3 (23)	
Minimal	30.1 (192)	32.2 (201)	34.3 (154)	37.7 (26)	
Moderate or higher	13.6 (87)	18.2 (114)	20.3 (91)	30.0 (20)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.19 (0.93-1.51)	1.15 (0.87-1.50)	1.55 (0.90-2.65)	.3031
Life activities: % (N)					<.0001
None	54.6 (354)	46.7 (293)	29.1 (131)	25.7 (18)	
Minimal	20.4 (132)	21.8 (137)	22.6 (102)	18.6 (13)	
Moderate or higher	25.0 (162)	31.5 (198)	48.3 (218)	55.7 (39)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.23 (0.96-1.57)	1.58 (1.20-2.08)	1.45 (0.82-2.55)	.0120
Participation in society: % (N)					<.0001
None	57.4 (363)	53.5 (331)	37.2 (164)	17.4 (12)	

Visit 15 WHODAS Domain	No UI	Drop	Pad	Floor / Clothing	p-value
Minimal	29.4 (186)	31.2 (193)	36.3 (160)	40.6 (28)	
Moderate or higher	13.1 (83)	15.4 (95)	26.5 (117)	42.0 (29)	
V13 WHODAS and covariate-adjusted OR (95% CI)[a]	Reference	1.11 (0.86-1.43)	1.59 (1.20-2.10)	2.08 (1.17-3.70)	.0020

[a]Covariates: Age, anxiety, BMI by category, cancer, depression, diabetes, educational level, exogenous hormone use, financial strain, hypertension, hysterectomy, MI or angina, osteoarthritis, physical activity, race, site, smoking status, stroke, vaginal dryness, WHODAS at visit 13.