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Lack of psychological resilience: an important correlate for urinary incontinence

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Abstract Our study evaluated medical conditions, level of physical functioning, and psychological health as correlates of urinary continence (UI) for four different age groups of women. Survey questions from the 1996 MIDUS survey were used in three domains of health: medical conditions, physical functioning, and psychological health. Mean questionnaire scores or prevalence percentages for individual and total medical conditions, physical functioning, and psychological health were computed. Two-sample independent t tests or chi-square tests were used to compare women with UI to those without. Prevalence of UI was as follows: 25–39 years: 13.3%, 40–49 years: 24.0%, 50–59 years: 32.7%, and 60–74 years: 32.8%. Lower psychological resilience scores were significantly associated with UI in all age groups. Significant correlates ($p<0.02$) for women 25–39 years were hysterectomy, weak core muscles, and lack of psychological resilience. In older women, more chronic conditions and parity were significantly ($p<0.01$) associated with UI. Although each age group had specific medical associations with UI, lack of resilience and poor core muscle strength are particularly correlated with UI in young women.

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Introduction

Urinary incontinence is a common and often distressing problem among women of all ages. Epidemiological studies in older adults report the prevalence of UI can range from 30–55% while rates for those women residing in nursing homes approaches 50% [1]. Few studies have exclusively looked at young and middle-aged women, but reported prevalence rates among these groups range from 6–39% [2] with the prevalence increasing in each decade. The wide variation in prevalence rates is dependent upon how UI was defined in the studies, method of data collection, and population characteristics.

UI has been related to poor health or decreased physical function, specifically mobility and impairments of mental functioning [3]. Various other factors have been associated with an increased prevalence of UI, including obesity, gynecologic operations, such as a hysterectomy, chronic respiratory illnesses, parity, and jobs involving heavy lifting [4]. Reports evaluating individuals with UI and associating this condition with functional loss have demonstrated that women with UI and functional loss were more likely to have psychological distress [5]. Psychological distress seen in those women may be due to greater feelings of depression and anxiety as well as decreased social interaction or isolation.

The purpose of this study was to evaluate the prevalence of UI in four different age groups: 25–39, 40–49, 50–59, and 60–74 years of age, and correlates with UI for each age group. Correlates were in three broad areas of personal health: chronic medical conditions, levels of physical

functioning, and psychological health. We developed a model for possible increased risk of UI for each age group and across all three domains of health.

Materials and methods

The National Survey of Midlife Development in the United States (MIDUS) (http://webapp.icpsr.umich.edu/cocoon/ICPSR-STUDY/02760.xml) was a collaborative, interdisciplinary investigation of patterns, predictors, and consequences of midlife development in the areas of physical health, psychological well-being, and social responsibility with over 2,000 variables administered in 1995–1996. Respondents were drawn from a nationally representative random-digit-dial sample of noninstitutionalized, English-speaking adults, aged 25–74, selected from working telephone banks in the coterminous United States. The response rate was 70.0% for the telephone interview, 86.8% for the completion of the main questionnaire among the telephone respondents with 3,032 people completing both surveys. More details on the MIDUS design, field procedures, and sampling weights are available [6]. Female respondents ($n=1,520$) formed our sample. Exemption from the Institutional Review Board approval was obtained for this study.

Measurement methods

Urinary incontinence To evaluate any history of incontinence, respondents were asked, "During the past 30 days, have you ever experienced leakage of urine?" Any positive responses were then graded the severity from 1–5 with 1 being the most severe. Women were divided into two groups: those that experienced any UI versus those that did not.

Medical conditions Twenty-eight individual medical complaints (Table 1) were assessed by asking "In the past 12 months, have you experienced or been treated for any of the following?" The number of chronic conditions was computed by summing the "yes" responses. Menopausal status was assessed by asking "Have your menstrual periods stopped permanently—not counting a temporary stop because of such things as pregnancy, birth control, extreme dieting or medications?". Yes or no responses were used. Parity indicated the number of live born biological children. Body mass index (BMI) was calculated and obesity was defined as BMI$\geq$30 kg/m^2.

Physical functioning The physical functioning component of the validated SF-36 Health Survey [7] consisted of ten items asking respondents about basic, moderate, and

Table 1 List of 28 medical conditions in survey with response labeled as yes or no

Medical complaints
Respiratory
Asthma, bronchitis, emphysema
Tuberculosis
Other lung problems
Musculoskeletal
Arthritis, rheumatism
Sciatica, lumbago, recurring backache
Persistent foot trouble
Recurrent Skin trouble
Endocrine
Thyroid disease
Diabetes/high blood sugar
Lupus or other autoimmune
Circulatory
High blood pressure
Heart trouble
Neurologic
Anxiety, depression other emotional
Migraine
Stroke
Multiple Sclerosis
Epilepsy
Other neurologic
Digestive
Trouble with mouth or gums
Persistent trouble with teeth
Ulcer
Recurring stomach trouble
Indigestion, diarrhea, constipation
AIDS or HIV Infection
Chronic sleeping problems
Hay fever
Hemorrhoids
Alcohol or drug problems

vigorous levels of activities with a scale from 1 (health limits physical functioning) to 4 (not at all). BADL (basic activities of daily living) [8], a measure of disability or dependency, consisted of two questions focused on bathing, dressing, or walking one block. Interactive activities of daily living (iADL) addressed a more active level of physical activity [8]. Two questions measuring core muscle function, lifting, carrying, bending, or kneeling were also totaled to create the variable "core muscle function".

Psychological health Questions corresponding to scales from the Composite International Diagnostic Interview Short Form in the National Comorbidity Survey were used to determine the possibility of depression or generalized anxiety among our respondents [9]. Resilience has been defined as the tendency to "rebound or recoil" to "spring back" or the "power of recovery" [10]. Our variable

Table 2 Prevalence of women with UI for each age group

Age (years)	Number of women	Proportion with UI	95% CI
25–39	67/503	0.13	(0.10, 0.16)
40–49	87/362	0.24	(0.20, 0.28)
50–59	108/330	0.33	(0.28, 0.38)
60–74	110/325	0.34	(0.29, 0.39)

"resilience" was a weighted sum based on four constructs (1) control over one's life ("at present, how much control do you have over your life in general?"), (2) satisfaction with self ("Overall, how satisfied are you with your self?"), (3) contribution to others ("when you think about your life as a whole up to the present, how would you rate your contributions to the welfare and well-being of other people"), and (4) ability to solve life's problems ("there is really no way I can solve the problems I have" and "I often feel helpless in dealing with the problems of life"). Therefore "resilience" as described in this paper is a total score of this weighted sum, created in this report specifi-

cally to relate to symptoms of UI. A higher score indicates better function.

Prevalence proportions for women with UI were computed for four age groups: 25–39, 40–49, 50–59, and 60–74 years. Means or percentages for individual medical conditions, total number of medical conditions, measures of physical functioning (both BADL and iADL), and measures for psychological health (resilience and depression) were computed for each of the four age groups. Means or percentages of women with and without UI were tested for significance using either an independent two-sample t test for continuous variables or two-way chi-square analysis for categorical variables.

Logistic regression models with a dependent variable of incontinence or continence with independent variables, number of chronic conditions, no menstrual bleeding, obesity, resilience, core muscle function, and parity were tested for each age group. Odds ratios and p-values for each categorical or continuous independent variable were estimated.

Table 3 Comparison of comorbid and reproductive medical conditions from Table 1 by UI and age

Medical conditions	Age (years)											
	25–39			40–49			50–59			60–74		
	UI	No UI	p-value	UI	No UI	p-value	UI	No UI	p-value	UI	No UI	p-value
Respiratory conditions												
Asthma, bronchitis, or emphysema	25.9	14.3	0.02	23.0	12.7	0.02	23.4	14.0	0.03	23.1	13.6	0.03
Musculoskeletal conditions												
Arthritis, rheumatism, other bone joint	12.1	5.8	0.05	25.6	15.3	0.03	40.6	31.7	NS	59.4	36.4	0.00
Sciatica, lumbago, or recurring backache	28.4	13.1	0.00	33.3	18.9	0.01	34.6	20.1	0.00	39.3	24.5	0.01
Circulatory conditions												
High blood pressure or hypertension	9.1	5.3	NS	20.7	11.3	0.03	35.1	21.7	0.01	41.8	30.0	0.03
Heart trouble suspected or confirmed	9.0	6.7	NS	14.9	8.4	NS	15.0	12.6	NS	26.9	16.7	0.03
Digestive/excretory conditions												
Recurring indigestion or diarrhea	28.9	20.5	NS	27.9	19.6	NS	37.4	19.9	0.00	33.6	19.8	0.01
Constipation	14.9	11.0	NS	8.1	8.5	NS	8.3	8.6	NS	14.6	7.5	0.04
Endocrine conditions												
Thyroid disease	6.1	3.0	NS	3.5	5.1	NS	16.2	7.7	0.02	13.0	11.6	NS
Diabetes or high blood sugar	1.5	1.8	NS	3.4	3.3	NS	8.3	5.0	NS	11.1	9.8	NS
Obesity, BMI≥30	31.3	15.3	0.00	32.1	20.6	0.03	34.3	25.1	NS	34.7	21.7	0.02
Reproductive conditions												
Hysterectomy	11.1	2.8	0.00	26.9	13.2	0.01	32.9	26.6	NS	30.7	23.9	NS
Parity>1	48.8	51.1	NS	80.4	74.7	NS	80.8.	75.7	NS	87.7	73.9	0.01
Menopause	17.2	5.4	0.00	44.6	29.3	0.01	83.0	75.7	NS	97.9	93.6	NS
Mean number of chronic conditions												
Number present of 28 queried	1.4	1.4	NS	2.1	2.0	NS	2.7	2.4	NS	3.2	2.5	0.00

All values are in percent except for mean number of chronic conditions

Results

Prevalence of women with UI was 0.13, 0.24, 0.33, and 0.34 for women of ages 25–39, 40–49, 50–59, and 60–74, respectively (Table 2). This was a linear increase until the age of 50 when the proportion of women with UI stabilized. Table 3 shows the comparisons by age groups for significant medical conditions from the list of 28 medical conditions presented in Table 1. Table 3 also displays data regarding reproductive conditions such as hysterectomy, parity, menopause, and obesity. Respiratory conditions were significantly associated with UI ($p \leq 0.03$) in all age groups. Arthritis was significant ($p \leq 0.05$) for all age groups except women in their 50s. High blood pressure became a significant medical condition ($p \leq 0.03$) after the age of 40, while suspected or known heart trouble was seen in the older group (60–74) as a significant correlate with UI. Digestive excretory conditions were significant ($p \leq 0.01$) after 50. Reproductive issues of hysterectomy and menopause were significant ($p \leq 0.01$) for women younger than 50. Parity or having more than one child was not a significant correlate until much later in life, after 60 and the total number of medical conditions was not significant until the women was in her 60s and 70s. Obesity, a known risk for incontinence, was significant in all age groups ($p \leq 0.03$) except women in their 50s, though BMI in women with UI in that group was greater than that of those with no UI.

Physical functioning is measured at two levels, basic activities (BADL) such a bathing or dressing oneself and intermediate activity of daily living (iADL) such a climbing stairs and moderate activity. BADL is also a measure of whether a person is considered disabled. All groups showed significant ($p \leq 0.01$) differences for lower levels of moderate activity in the UI compared to No UI groups. Difficulty with core muscle function is significant ($p \leq 0.03$) for all age groups (Table 4).

The traditional measures of psychological health, depression and anxiety, are only significant in women younger than 50 as shown in Table 5. Depression is significantly associated with UI ($p \leq 0.05$) in the 25–39 and 40–49 groups. The 25- to 39-year-old women with UI are the only age group with a significant association with having generalized anxiety ($p \leq 0.01$). Resilience is significantly less present ($p \leq 0.04$) in all age groups with the younger groups having lower resilience scores than those 50 and over (Table 5). Of the four constructs making up resilience, only "solution of life problems" is significant ($p \leq 0.05$) for all age groups. "Control over one's life" is significant ($p \leq 0.02$) for women under 50 only.

Overall, for young women aged 25–39, significant associations with UI are having a hysterectomy ($p<0.01$), weak core muscles ($p<0.01$), and lack of resilience ($p<0.02$). For women 40–49 years of age, only lack of resilience is significantly associated ($p<0.05$) with having UI. Older women over the age of 50 with UI have more chronic conditions ($p<0.05$) and women over the age of 60 also have number of children as a significant factor ($p<0.00$).

Table 4 Comparison of physical functioning by UI and age

Measures of physical functioning	Age (years)											
	25–39			40–49			50–59			60–74		
	UI	No UI	p-value	UI	No UI	p-value	UI	No UI	p-value	UI	No UI	p-value
Basic activity of daily living (BADL) Mean score	7.3	7.7	0.01	7.5	7.6	NS	7.5	7.6	NS	6.6	7.5	0.00
Percentage with health limiting bathing or dressing	13.4	5.3	0.01	10.5	9.5	NS	10.3	5.4	NS	24.6	7.9	0.00
Percentage with health limiting walking one block	22.4	9.6	0.00	18.4	10.2	0.04	19.6	14.5	NS	44.0	19.1	0.00
Intermediate activity of daily living (iADL) mean score	22.0	25.2	0.00	22.0	24.0	0.01	20.9	23.0	0.00	17.1	21.2	0.00
Percentage with health limiting climbing several flights stairs	53.0	25.2	0.00	39.5	29.8	NS	56.5	36.0	0.00	74.6	50.2	0.00
Percentage with health limiting walking >1 mile	50.8	23.2	0.00	39.5	26.9	0.03	51.8	35.3	0.00	67.3	47.6	0.00
Percentage with health limiting moderate activity	37.3	14.7	0.00	32.6	25.9	NS	43.9	28.6	0.01	70.0	44.4	0.00
Core muscle function												
Percentage with health limiting lifting, carrying, bending, kneeling	47.8	21.3	0.00	46.0	30.9	0.01	58.3	42.5	0.01	80.9	56.5	0.00

Table 5 Comparison of psychological health by UI and age

Measures of psychological health	Age (years)											
	25–39			40–49			50–59			60–74		
	UI	No UI	p-value	UI	No UI	p-value	UI	No UI	p-value	UI	No UI	p-value
Resilience (mean score)												
Control over life	3.3	3.6	0.00	3.4	3.6	0.02	3.7	3.7	NS	3.7	3.8	NS
Satisfaction with self	3.2	3.4	0.01	3.4	3.5	NS	3.3	3.6	0.00	3.5	3.6	NS
Solution of life problems	2.2	2.6	0.00	2.2	2.7	0.00	2.4	2.7	0.05	2.2	2.5	0.01
Contribution to other	2.7	2.7	NS	2.8	2.9	NS	2.9	2.9	NS	2.7	2.9	NS
SUM	11.4	12.4	0.00	11.7	12.7	0.00	12.3	12.9	0.02	12.0	12.7	0.04
Emotional problems												
Percentage with probable cause for depression	32.8	21.6	0.04	25.3	16.0	0.05	17.6	12.6	NS	10.9	8.8	NS
Percentage with probable cause for anxiety	11.9	4.4	0.01	3.4	5.4	NS	2.8	4.5	NS	2.7	1.4	NS
Quality of life (mean score)												
Overall, rate your life (1–10)	7.0	7.5	0.08	6.9	7.6	0.00	7.4	7.8	0.06	7.8	8.2	0.06

Conclusions

This study included a large cohort and used standardized questionnaires to evaluate chronic medical conditions, physical functioning, and psychological health for a wide range of ages. Our UI prevalence rates reported in this dataset are similar to those that have been previously reported across various age groups [11]. We found that incontinent women, regardless of age group, rated their current health as significantly worse than those women who were continent and had significantly more chronic medical conditions along with a reduced level of physical functioning. In addition, incontinent women had significantly more musculoskeletal complaints, weaker core muscle function, and all groups stated that their health limits physical functioning. These findings are similar to those others have reported [3, 12, 13], suggesting that chronic conditions and musculoskeletal conditions limit physical functioning and are associated with UI. Early intervention with physical therapy not only for the pelvic floor but other core muscles may help prevent the development of UI or decrease the severity of UI. Unfortunately, previous studies of physical therapy for UI have demonstrated a decrease in muscle strength and increase in UI over time after cessation of exercise [14], supporting the concept that physical conditioning must be maintained. An alternative interpretation of our data, however, is that UI itself is a preexisting condition that is subsequently associated with decreased musculoskeletal functioning and poorer overall health. This interpretation raises the question of whether UI should be treated in order to prevent future loss of musculoskeletal health and conditioning. These are hypotheses that merit further testing.

Psychological health has previously been shown to be associated with urinary incontinence. Herzog et al. [15] found UI was weakly related to psychological well being. Dugan et al. [16] found that depressive symptoms were more likely to be reported by adults with UI and the degree of depression was linked to the severity of incontinence. Nygaard et al. [17] reported on a cohort of 5,000 middle-aged women and found that women with severe and mild–moderate incontinence were 80 and 40% more likely, respectively, to have depression than continent women. Our study also showed probable cause for depression for women less than 50 years in age who had UI. Younger women ages 25–39 having UI also had more generalized anxiety.

The most important finding of this study is the association of lack of resilience with UI in women of all age groups. Resilience is a term indicating one's ability to adapt to negative life events and stressed environments. While the differences in resilience scores between those with UI and no UI were small, they were statistically significant results from the large MIDUS dataset. We do not
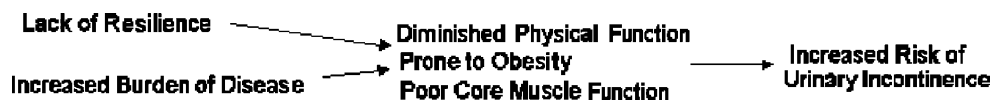

Fig. 1 Conceptual model of resilience, burden of disease, and measures of functioning relating to risk of UI

know the actual clinical significance of the differences in these scores, but the consistency of the findings across age groups is striking. It is possible that developing UI actually leads to lower resilience, but in our study, higher resilience scores seem associated with never developing UI especially if women endorse these characteristics before 50 years of age. A possible model showing the relationship between resilience and burden of disease is presented in Fig. 1. Is it possible that women who have more resilience can make the necessary life style changes to avoid incurring urinary incontinence? The most important factor in resilience in our study was the belief that one had solutions to life problems. Teaching resilience and educating patients on developing proper coping mechanisms to manage their medical conditions may help lessen severity or avoid the development of UI.

Potential limitations of the study are that the survey did not characterize the type of incontinence, nor did it use severity or UI longevity measures routinely assessed in other studies. However, the focus of this study was to determine if any incontinence regardless of mechanism, correlated with health factors. Second, information on medical conditions and physical functioning were self-reported. For instance, we did not demonstrate an association of obesity with UI in all age groups in this study, and this could possibly be related to inaccurate self-report of weight. However, there have been several reports that support the reliability of information on reported health status [18, 19].

Despite these limitations, our research provides insight into the physical and psychological comorbidities of women with UI. In the case of UI, it may not be the nature of the condition that determines psychological distress, but instead, the severity of the underlying functional disability and an individual's lack of resilience in dealing with the condition.

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