

ORIGINAL ARTICLE

Urinary incontinence type, symptoms, and quality of life: A comparison between grand multipara and non-grand multipara women aged ≥ 50 years

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Abstract

Aim: Parity and age are risk factors for urinary incontinence (UI). The aim of this study was to compare grand multipara women (GMP) to non-grand multipara (NGMP) women concerning UI types (stress urinary incontinence [SUI], urge urinary incontinence [UUI]), symptoms, and quality of life.

Methods: This correlation–comparative study used three tools: a demographic/health questionnaire, Questionnaire for Urinary Incontinence Diagnosis (QUID), and Incontinence Quality of Life (I-QOL).

Results: The sample included 132 women, from 50–88 years of age: 65 NGMP women (mean age: 67.23 years) and 67 GMP women (mean age: 65.04 years). The GMP group had a higher score, compared to the NGMP group, for UI type (by QUID) and a lower QOL (by I-QOL), with none of the scores found to be statistically significant. By dividing the sample into age groups, 50–59 and ≥ 60 years, the interaction between the parity and the age groups was found to be significant for both the SUI and UUI.

Conclusion: The innovation of this study is the in-depth insight into the association between parity and age regarding UI type.

Key words: grand multipara, non-grand multipara, urinary incontinence.

INTRODUCTION

Urinary incontinence (UI), an involuntary leakage of urine, can be categorized into several types, based on symptoms: “complaint of involuntary leakage on effort or exertion or on sneezing or coughing,” defined as “stress urinary incontinence” (SUI); “complaint of involuntary leakage accompanied by, or immediately preceded, by urgency,” defined as “urge urinary inconti-

nence” (UUI); and both of them, “complaint of involuntary leakage associated with urgency and also with effort, exertion, sneezing, and coughing,” defined as “mixed urinary incontinence” (MIXED) (Abrams *et al.*, 2010). The SUI is the most common type of UI (50%), followed by the UUI (11%), MIXED (36%), and other types (3%) (Hannestad, Rortveit, Sandvik, & Hunskaar, 2000). The UI has a major impact on the quality of life (QOL) and sexual function as it can lead to feelings of shame, social isolation, and depression (Abrams *et al.*; Liebergall-Wischitzer *et al.*, 2009, 2012; Melville, Katon, Delaney, & Newton, 2005; Patrick *et al.*, 1999).

Urinary incontinence in women is affected by age. A recent European study reported that almost one-quarter (24%) of women who were aged 40–59 years suffered from UI, with an increase to 34% in women

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aged ≥ 60 years (Kogan, Zachoval, Ozyurt, Schafer, & Christensen, 2014). In a large Norwegian survey, between the years of 1995–1997 and 2006–2008, UI was found in ~27–30% of women who were aged 50–59 years old, increasing to 26–40% at 60– ≥ 80 years of age (Ebbesen, Hunskaar, Rortveit, & Hannestad, 2013). It needs to be highlighted that the median age of menopause is 50.5 years (Weinstein *et al.*, 2003), with the mean age being 51.5 years of age (Carwile, Will-ett, & Michels, 2013). Over 97.5% of women will be in menopause by 57 years of age (de Bruin *et al.*, 2001).

The incidence of UI rises in women with perimenopause and menopause (Hannestad *et al.*, 2000). It is believed that the decline in estrogen levels that occurs in menopause might cause uro-genital impairment. Estrogen depletion leads to the decline in the elasticity of the connective tissue secondary to collagen reduction, with a decrease in bladder vascularity and a thinning of the urethra (Norton, 1996). Nevertheless, in a recent publication, researchers claimed that there is no clear evidence that the duration of menopause and lack of estrogen affects UI prevalence and/or worsening of its symptoms. In addition, the role of estrogens as hormonal therapy for UI is currently controversial (Robinson & Cardozo, 2011).

Pregnancy and vaginal delivery are the most common risk factors for the development of UI (Altman *et al.*, 2006; Faundes, Guarisi, & Pinto-Neto, 2001; Robinson & Cardozo, 2011; Rortveit, Daltveit, Hannestad, & Hunskaar, 2003). The gravid uterus increases the intra-abdominal pressure throughout the pregnancy, causing weakening of the pelvic floor musculature, primarily the levator ani muscle (Shafik & El-Sibai, 2002). Pregnancy itself affects the levator ani, which ultimately can be evidenced by UI (Faundes *et al.*). Rortveit *et al.* found the prevalence of incontinence to be the highest in those women who had vaginal deliveries, though women post-Cesarean section had more UI, as compared with nulliparous women (Rortveit *et al.*).

Decades ago, Solomons (1934) first postulated that the rate of potential complications increases with each delivery. His aim was to change the belief that the first delivery is the damaging one to the pelvic floor. He coined the term “grand multipara” (GMP) and claimed that the mean maternal mortality rate is increased in the fifth delivery and the mean mortality rate is increased fivefold in the 10th delivery. Over the years, the definition of GMP has evolved. The current literature refers to Young’s criterion of five deliveries or more (Omole-Ohonsi & Ashimi, 2011; Simonsen, Lyon, Alder, & Varner, 2005; Young, 1964).

Parity and age are risk factors for UI in women who are <65 years old (Rortveit, Hannestad, Daltveit, & Hunskaar, 2001). The older age and high parity are some of the significant risk factors for UI. An association has been reported between age (>45 years), GMP (>5 children), menopause, and UI (Altaweel & Alharbi, 2012). The literature reports mixed results concerning the association between UI and the number of vaginal deliveries in menopausal women. No association between parity or vaginal deliveries and UI was found in menopausal women in Taiwan (Hsieh *et al.*, 2012). Other data did support the association between UI prevalence, parity, and menopause or age (Altaweel & Alharbi; Ham *et al.*, 2009; Nygaard *et al.*, 2008; Rortveit *et al.*, 2001; Zhu *et al.*, 2009). As the data are limited regarding the prevalence of UI types and the QOL of GMP women, as compared with non-grand multipara (NGMP) women, aged >50 years, it was decided to explore if there are different expressions of UI (the most common types are SUI and UII) by different parity group, in older women. The aim of this study was to compare GMP women to NGMP women (aged >50 years) concerning the UI types (SUI, UII), UI symptoms, and QOL.

METHODS

Design and sample

This correlational-comparative study used a convenience sample from three uro-gynecological clinics (in three academic teaching hospitals in the center of the country, two under the same administration). All sites were located in the same geographical area. Ethical approval was obtained from the institutional ethical review boards at both hospitals. There was a release from signing informed consent in the two hospitals, while a request for written informed consent was required in one hospital.

Women who presented to the uro-gynecologic clinics for their care were invited to participate in the study if they met the following inclusion criteria: women who found their UI annoying (bothered by the UI), Hebrew-speaking, with at least one delivery over 24 weeks, and within the designated age range (≥ 50 years old). The researcher (a uro-gynecology nurse) approached the patients in each clinic, explained the research objectives, and administered the questionnaires. She remained in close proximity to offer assistance if needed. The women were assigned to the GMP group if they had experienced five or more deliveries, while the NGMP group consisted of women with one-to-four deliveries.

The participants completed the study questionnaires, which were collected by the research team.

Measurement

Demographic and health questionnaire

This tool consisted of 28 questions that included basic demographic data, such as age, education, family status, and income. The previous medical history can affect UI, specifically past operations, chronic illness, and medication use. There were questions about the participants' medical history and chronic conditions, such as asthma, multiple sclerosis, or other illnesses. Medication usage was documented as well. Information relating to past gynecologic procedures and obstetric history, along with questions regarding UI, such as the number of daily pads used and comfort with discussing UI with the physician were included. This questionnaire was a shortened version of a comprehensive questionnaire that has been used in two prior clinical trials (Liebergall-Wischnitzer *et al.*, 2005, 2009).

Questionnaire for Urinary Incontinence Diagnosis

This tool consists of six questions that are used to discern between the SUI (three questions e.g.: “Do you leak urine when you walk quickly, jog, or exercise?”) and the UUI (three questions e.g.: “Do you have to rush to the bathroom because you get a sudden, strong need to urinate?”) and is comprised of a six-point Likert scale (0 = “None of the time;” 5 = “All of the time”). Mixed UI is defined as the sum of the SUI and UUI scores (all six questions). Higher scores indicate UI severity. There was a moderate correlation of the Questionnaire for Urinary Incontinence Diagnosis (QUID) stress score with the Urogenital Distress Inventory (UDI) stress score ($r = 0.68$, $P < 0.0001$) and a moderate correlation of the QUID urge score with the UDI-irritative score ($r = 0.68$, $P < 0.0001$) and diary urge UI episodes ($r = 0.45$, $P < 0.0001$) (Bradley *et al.*, 2009). The questionnaire was translated by using a modified Brislin method, including forward- and back-translation from English to Hebrew, with an evaluation of the retention of the original meaning and content (Brislin, 1970). The Cronbach's alpha in the present research (Hebrew version) for the total score was 0.74, 0.75 for the SUI, and 0.86 for the UUI.

Incontinence Quality of Life

This tool consists of 22 items, subdivided into three scores: avoidance and limiting behaviors (ALB) (eight

items e.g.: “I worry about coughing and sneezing”), psychosocial impact (PS) (nine items e.g.: “I feel depressed”), and social embarrassment (SE) (five items e.g.: “I worry about others smelling urine on me”), with a Likert scale ranging from “Extremely” (1 point) to “Not at all” (five points); that is, higher scores mean a better QOL (Patrick *et al.*, 1999). The Cronbach's alpha was 0.95 for the English and 0.93 for the Hebrew versions, respectively (Liebergall-Wischnitzer *et al.*, 2012; Patrick *et al.*). The Cronbach's alpha for this tool in the present research of the Hebrew version was 0.94 for the total score, 0.81 for the ALB-QOL, 0.91 for the PS-QOL, and 0.83 for the SE-QOL.

Sample size

It was determined that 64 participants were needed in each group (GMP; NGMP) in order to detect a significant difference of 0.5 (a medium clinical effect size) (Cohen, 1992) on the score of the UI type (by QUID) between the GMP and NGMP women, with a power of 80% and $\alpha = 5\%$.

Statistical analysis

The analysis was done with the IBM SPSS Statistics for Windows v. 22.0 (IBM Corporation, Armonk, NY, USA) statistical software package. An independent *t*-test was used to test for differences between the two groups in the continuous variables, while the χ^2 -test or Fisher's exact test were used to test for associations between the categorical variables. Correlations were assessed by using the Pearson's correlation coefficient.

A MANOVA was used to test for differences in all the factors of each questionnaire (together simultaneously) for differences between the GMP and NGMP women in the SUI and UUI combined, adjusted for income and past operations that can affect UI.

An ANOVA was conducted to test for differences between the GMP and NGMP women in the total scores (QUID; I-QOL), adjusted for income and past operations that can affect UI. A *P*-value of <0.05 was considered to be statistically significant. All the reported *P*-values were two-tailed.

RESULTS

Demographic characteristics and health data of the participants

In total, 147 women were recruited for the study, with 15 not meeting the inclusion criteria. The sample

included 132 women from 50–88 years of age: 65 women (mean = 67.23 [standard deviation, SD: ± 11.08]) in the NGMP group and 67 women (mean = 65.04 [SD: ± 9.24]) in the GMP group, with no significant difference in age ($P = 0.22$). The groups did have significant differences in several variables: religiosity, household income, and family status (Table 1), and past deliveries (parity) (Table 2). Of note, 79.7% of the NGMP group self-reported as being secular or traditional, in contrast to 25.4% in the GMP group. Women in the NGMP group had a higher income and were less likely to be married than the women in the GMP group (see Table 1). The women in the NGMP group had a

lower rate of vaginal and Cesarean deliveries (mean = 2.78 [SD: ± 0.93]), compared to the GMP group (mean = 7.42 [SD: ± 2.31]) ($P < 0.001$) (see Table 2).

There was no significant difference between the NGMP and GMP groups regarding the number of women with past operations, chronic illness, and medication use. There were 15 (23.1%) women in the NGMP group and 12 (17.9%) women in the GMP group who had past operations that can affect UI, 18 (27.7%) with a chronic illness in the NGMP group and 17 (25.3%) in the GMP group, and there were 13 (20.0%) in the NGMP group and 11 (16.4%) in the GMP group who took medication that can affect UI.

Table 1 Demographic and general health data

Variable	NGMP ($n = 65$) Mean (SD)	GMP ($n = 67$) Mean (SD)	<i>P</i> -value
Mean (SD) age (years)	67.23 (+11.08)	65.04 (+9.2)	0.220
Mean (SD) years of education	14.09 (+3.84)	12.81 (+5.63)	0.130
Religiosity: N (%)			<0.001
Orthodox/ultra-orthodox	13.00 (20.30)	50.00 (74.60)	
Secular/traditional	51.00 (79.70)	17.00 (25.40)	
Family status: N (%)			0.020
Married	42.00 (64.60)	55.00 (82.10)	
Single/widowed/divorced	23.00 (35.40)	12.00 (17.90)	
Yearly income: [†] N (%)			0.020
≤\$ Below	18.00 (28.10)	23.00 (35.40)	
Average	14.00 (21.90)	25.00 (38.50)	
Upper	32.00 (50.00)	17.00 (26.20)	
Duration of urinary incontinence			0.500
≤2 years	28.00 (43.10)	25.00 (37.30)	
≤3 years	37.00 (56.90)	42.00 (62.70)	
Illness prevalence			
Diabetes			0.460
Yes	13.00 (20.00)	17.00 (25.40)	
No	52.00 (80.00)	50.00 (74.60)	
Hypertension			0.850
Yes	29.00 (44.60)	31.00 (46.30)	
No	36.00 (55.40)	36.00 (53.70)	
Cardiac disease			0.260
Yes	10.00 (15.40)	6.00 (9.00)	
No	55.00 (84.60)	61.00 (91.00)	
Hormonal therapy			
Vaginal			0.742
Yes	5.00 (7.70)	4.00 (6.00)	
No	60.00 (92.30)	63.00 (94.00)	
Systemic			1.000
Yes	3.00 (4.60)	3.00 (4.50)	
No	62.00 (95.40)	64.00 (95.50)	

[†] One Israeli shekel = ~US\$3.8 in 2011–2012.

GMP, Grand multipara; NGMP, non-grand multipara.

Table 2 Gynecology and obstetric data

Variable	NGMP Mean (SD)	GMP Mean (SD)	P-value
Pregnancies	4.09 (+1.85)	8.64 (+2.90)	<0.001
Abortions	1.35 (+0.48)	1.39 (+0.49)	0.640
Total deliveries (vaginal and Cesarean)	2.78 (+0.93)	7.42 (+2.31)	<0.001
Vaginal deliveries	2.78 (+1.02)	7.06 (+2.38)	<0.001
Cesarean section	0.05 (+0.21)	0.36 (+0.62)	<0.001
Deliveries of babies ≥ 4 kg	0.23 (+0.55)	0.84 (+1.43)	0.002

GMP, Grand multipara; NGMP, non-grand multipara; P, difference between groups.

Urinary incontinence: Type, symptoms, and quality of life

The GMP group had a higher score on the severity of UI types; that is, mixed UI, according to the QUID (mean = 14.71 [SD: ± 6.31], as compared to the NGMP group (mean = 13.15 [SD: ± 6.63]). Only five (7.5%) in the GMP group did not have the SUI and only one (1.5%) did not have the UUI. In the NGMP group, 12 (18.5%) did not have the SUI and three (4.6%) did not have the UUI. They also showed a lower level of QOL, according to the I-QOL (mean = 72.73 [SD: ± 22.14]), as compared to the NGMP group (mean = 76.17 [SD: ± 20.53]). These differences, however, were not statistically significant (see Table 3).

Including or excluding the age in the models showed different results and significance. This study's population ranged in age from 50 to 88 years of age and, based on the latest epidemiological surveys, the data also were

analyzed by dividing the participants into two main age groups, 50–59 years and ≥ 60 years (understanding that some of the group might be premenopausal, perimenopausal, or menopausal). There were 39 women in the young group, with 18 (46.2%) with NGMP and 21 (53.8%) with GMP. There were 93 women in the elderly group of ≥ 60 years old (considering possible post-menopausal status, there were 47 (50.5%) in the NGMP group and 46 (49.5%) in the GMP group). This analysis was conducted to explore the possible associations between the UI type and parity in different age groups.

Among the women who were in the 50–59 years age group ($n = 39$), parity was negatively associated with the UI type; that is, the NGMP group was associated with a higher UI score (mean = 17.66 [SD: ± 7.0]), compared to the GMP group (mean = 12.76 [SD: ± 5.58]) ($P = 0.038$). However, in the women who were aged ≥ 60 years ($n = 93$ in the GMP group), they showed higher UI scores (mean = 15.6 [SD: ± 6.48]), compared to the NGMP women (mean = 11.42 [SD: ± 6.66]) ($P = 0.005$) (Table 3). The interaction between the parity and the age groups was found to be significant for the UI types, SUI and UUI ($F[2,121] = 8.56$, $P < 0.001$, $\text{Eta}^2 = 0.12$). The interaction between the parity and the age groups for the subscales were: SUI ($F(1,122) = 16.41$, $P < 0.001$, $\text{Eta}^2 = 0.12$) and UUI ($F(1,122) = 2.52$, $P = 0.115$, $\text{Eta}^2 = 0.02$) (see Figs 1–2).

DISCUSSION

The overall analysis of the differences between the GMP women and the NGMP women (aged ≥ 50 years)

Table 3 Differences between the parity status and study variables (by QUID and I-QOL), as per age group distribution

Variable	Variable group (years)	NGMP Mean (SD)	GMP Mean (SD)	P-value*
QUID	All ages	13.15 (+6.63)	14.71 (+6.31)	0.755
	50–59	17.66 (+7.00)	12.76 (+5.58)	0.038
	≥ 60	11.42 (+5.66)	15.60 (+6.48)	0.005
Stress urinary incontinence	All ages	4.69 (+4.27)	5.58 (+4.06)	0.701
	50–59	8.33 (+4.55)	4.71 (+3.32)	0.006
	≥ 60	3.29 (+3.25)	5.97 (+4.33)	0.001
Urge urinary incontinence	All ages	8.36 (+4.29)	9.07 (+4.11)	0.900
	50–59	9.33 (+4.83)	8.05 (+3.74)	0.503
	≥ 60	8.00 (+4.07)	9.54 (+4.22)	0.327
I-QOL total	All ages	76.17 (+20.53)	72.73 (+22.14)	0.586
I-QOL ALB	All ages	25.95 (+7.50)	24.28 (+7.94)	0.876
I-QOL PS	All ages	33.95 (+9.23)	32.75 (+10.21)	0.575
I-QOL SE	All ages	16.27 (+5.82)	15.81 (+5.92)	0.352

* P-value from the MANOVA model, adjusted for income and past operations.

ALB, avoidance and limiting behaviors; IQOL, Incontinence Quality of Life; PS, psychosocial impact; QUID, Questionnaire for Urinary Incontinence Diagnosis; SE, social embarrassment.

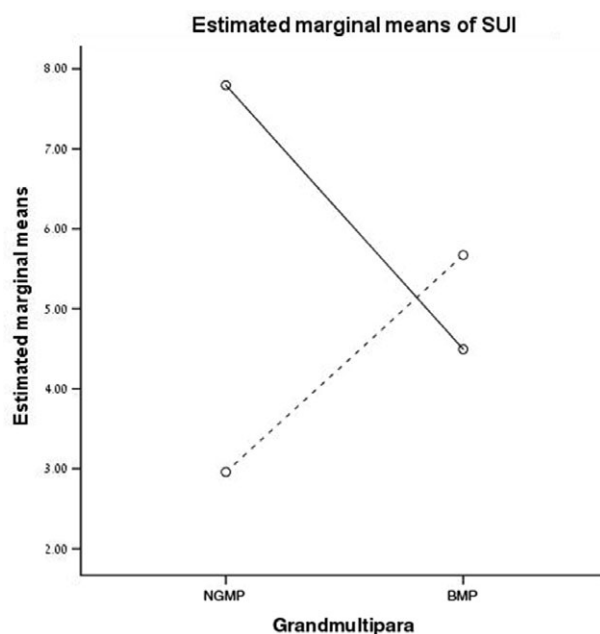


Figure 1 Interaction between stress urinary incontinence (SUI) and parity in the two age groups. (—) 50–59 years; (----) ≥60 years. GMP, Grand multipara; NGMP, non-grand multipara. NGMP with SUI, ages 50–59, show higher scores, having more severity than those age 60 and up. In the GMP group, the older women present with higher SUI severity compared with the younger women.

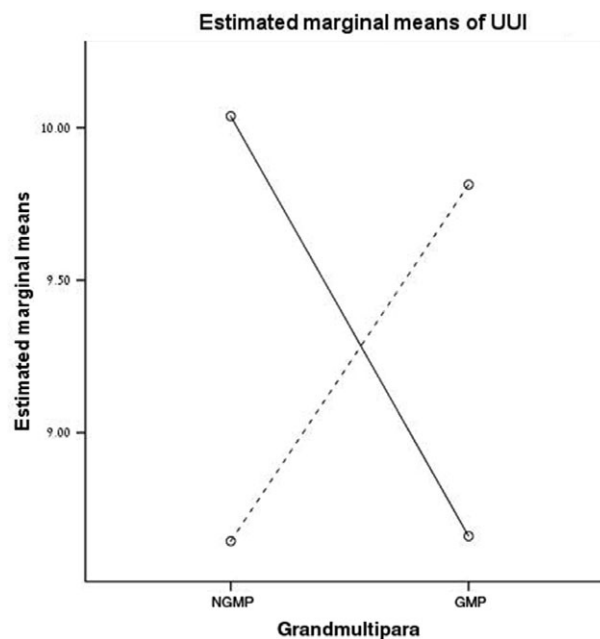


Figure 2 Interaction between urge urinary incontinence (UII) and parity in the two age groups. (—) 50–59 years; (----) ≥60 years. GMP, Grand multipara; NGMP, non-grand multipara. NGMP with UII, ages 50–59, show higher scores, Having more severity of UII than those age 60 and up. In the GMP group, the older women present with higher UII severity compared with the younger women.

showed that there was no statistically significant difference between groups in the mean score on the QUID and the I-QOL. This could be related to the large range of ages included in the study. As a result of the dearth of studies on this topic, it would be hard-pressed to claim that this is supported or not by the literature. When the multivariate analyses were conducted, interesting significant findings were noted. The results showed that age is a significant modifier between parity and the UI type. Parity was found to have a different effect in each age group, according to the UI type. The NGMP younger age group showed a higher level of UI, including the SUI and UII, compared to the GMP group, whereas in the older age group, an opposite direction of the association was seen. In the literature, there is a positive association between the number of vaginal births and the prevalence of UI (Ham *et al.*, 2009; MacArthur *et al.*, 2015; Nygaard *et al.*, 2008; Rortveit *et al.*, 2001; Zhu, Lang, Wang, Han, & Huang, 2008). Strong associations between UI prevalence and parity in groups of women who are aged 20–34 years and weaker associations in groups of 35–64 year olds, with no significant association in

women who were >65 years of age, have been reported (Rortveit *et al.*, 2001).

In the present study, the women in the GMP group had a trend of a lower QOL, compared to the NGMP women. This finding is supported by the literature, which reports that an older age and/or women with a higher parity show risk factors for UI, as can be seen in various cultures and several countries (Al-Badr, Brasha, Al-Raddadi, Noorwali, & Ross, 2012; Ebbesen *et al.*, 2009; Fiegen *et al.*, 2012; Jokhio, Rizvi, Rizvi, & Macarthur, 2013). Other literature has found that older women had a better QOL, compared to younger women (Patrick *et al.*, 1999).

One is behooved to ask about age vis-à-vis hormonal status. What plays a key role in the UI symptoms, age alone? Estrogen status alone or a combination of both? Does a reduction in estrogen accelerate the SUI and UII? In this study, there was no direct question ascertaining the patients' estrogen status in the previous 12 months, leaving the estrogen status to be self-defined. In general, there might have been a variability in the estrogen status across parity groups. It is possible that some of the younger women were

still menstruating, as well as the possibility that most of the NGMP women in the young group were in menopause, with most of the GMP women in pre- or perimenopause. All of these possibilities could influence the UI type. This possibility needs to be addressed in future research.

Another parameter was measured on the scale that related to the UI being “bothersome,” an extremely subjective measure (El-Azab, Mohamed, & Sabra, 2007). As this sample included only women who were bothered by their UI, it is not surprising that UI prevalence variability was not detected.

Limitations of the study

By using a convenience sample, in three clinical sites, in one urban area, the generalizability of the results was reduced. Another parameter that was mentioned as an open question in the letter to the woman or was measured on the scale related to the UI being “annoying,” an extremely subjective measure. Furthermore, the sample consisted of primarily Jewish women residing in Israel. This study needs to be replicated in other ethnic groups and countries.

Implications of the findings

This research suggests that the association between parity and UI can differ by age group. Further research with larger study populations is necessary to confirm this finding. Women’s healthcare providers from the medical and nursing fields should identify women with UI through a comprehensive health history, physical assessment, and reliable and valid tools for intake. Multiple treatment options are available, such as pelvic floor exercises, the Paula method, pharmacology, and elective surgery. Exercise is recommended as an uninvase first-line intervention for UI (Abrams *et al.*, 2010; Hay-Smith, Herderschee, Dumoulin, & Herbison, 2011; Liebergall-Wischnitzer *et al.*, 2013).

Urology healthcare providers are encouraged to provide patient education on a regular basis (Lajiness, Wolfert, Hall, Sampselle, & Diokno, 2007). Patients who require more specific muscle training and exercises should be referred to uro-gynecological physiotherapists and specialized advanced practice nurses for advanced pelvic floor rehabilitation. This health promotion intervention can be initiated in the younger GMP population before their menopausal years.

CONCLUSION

This study compared the UI types, symptoms, and QOL of GMP women, as compared to the NGMP women who were aged ≥ 50 years, with UI. The innovation of this study is its in-depth insight into the association between parity and age regarding the UI type.

DISCLOSURE

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

A. W. W. and M. L.-W. contributed to the conception and design of the study, interpretation of the data, drafted the manuscript, revised it critically, and gave final approval of the version to be published; I. S. and Y. L. contributed to the conception and design of the study, acquisition of the data, and interpretation of the data; D. S. contributed to the conception and design of the study and the acquisition of the data; R. A. contributed to the acquisition of the data. All the authors read and approved the final manuscript.

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