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ORIGINAL ARTICLE

Prevalence and Determinants of Urinary Incontinence among Female Staff in a Public University in Malaysia

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ABSTRACT

Introduction: Urinary incontinence (UI) is a common problem that has become a significant health issue, significantly impacting the daily life of affected individuals. The prevalence of UI in women globally seem to vary widely. This may be due either to the diagnostic criteria used or to under-reporting. Much, therefore, still remains to be reported on the prevalence of urinary incontinence in the various communities around the world. Thus, this study determines the prevalence of urinary incontinence and its associated factors among female staff at Universiti Putra Malaysia (UPM), consisting of a study sample that was derived from the community in the state of Selangor, Malaysia. **Methods:** A cross-sectional study was conducted among female staff in UPM from 5 – 25, August 2020. A pretested, self-administered questionnaire comprising of two sections was given to the respondents through convenient sampling. The socio-demographic and behavioral characteristics were described using descriptive analysis. Chi-square test or Fisher's Exact Test were used to analyze the association between risk factors of urinary incontinence and its prevalence. **Results:** A total of 179 respondents were recruited in the study. The prevalence of urinary incontinence among female staff in UPM was 0.274 (27.4%). There was no significant association between age (p=0.285), body mass index (p=0.968), parity (p=0.330) and mode of delivery (p=0.912) for normal vagina delivery, for caesarean section delivery (p=0.413), for assisted vagina delivery (p=0.614) and menopause status (p=0.346) with urinary incontinence among female staff in UPM. **Conclusion:** The present study suggests that the prevalence of urinary incontinence among female staff in UPM is similar to that in the worldwide population.

KEYWORDS: Urinary, incontinence, female, prevalence, risk factors

INTRODUCTION

Urinary incontinence (UI) is a common problem that has become a significant health issue that hugely impacts the daily life of affected individuals. International Urogynecological Association (IUGA) and the International Continence Society (ICS) define the two main subtypes of UI as stress urinary incontinence (SUI), which is the leakage of urine due to excessive physical activities, coughing or sneezing, and urge urinary incontinence (UUI), which is the leakage of urine due to sudden urge to void that is difficult to hold. A mixture of both subtypes of urinary incontinence is called mixed urinary incontinence (MUI). They also mentioned some rare subtypes of UI, including postural UI - leakage of urine due to change of body position that often occurs during standing up or bending, nocturnal enuresis - urine leak during sleep, continuous incontinence - caused by vesical fistula, and coital incontinence - loss of urine during sexual intercourse [1].

The reported prevalence rates of UI seem to vary widely. The Scientific Committee of the International Continence Society has estimated that about 200 million adults worldwide are incontinent [2]. In a review of population studies from numerous countries, the prevalence of UI ranged from 5 to 70%,

with most studies reporting a prevalence of any type of UI in the range of 25–45% [3]. In Malaysia, the reported prevalence also appears to be wide and varied, and the reason/s for this remains unclear. A review done in 2016 documented the prevalence rates of UI in the Malaysian population that ranged from 9.9 to 44% [4].

UI can occur in both sexes, but it usually affects women more than men. It has been associated with a lot of risk factors that include menopause, high BMI, pregnancy, childbearing, and mode of delivery. Compared with normal BMI, overweight was associated with one third increased risk of UI while the risk doubled in women with obesity [5]. Parity was positively associated with incontinence. Women with two previous births are 67% more likely to develop UI than women with no births. Caesarean delivery prevents trauma to the muscles and connective tissue in the pelvic floor, pudendal and pelvic nerve injuries that are associated with vaginal birth and is thus associated with a lower risk for UI [6]. The detection of risk factors of UI, early diagnosis and treatment are important for prevention and better management of UI. Thus, this study aimed to determine the prevalence of UI and risk factors associated with urinary incontinence among female staff at Universiti Putra Malaysia.

MATERIALS AND METHODS

This cross-sectional study was conducted among 179 female staff in Universiti Putra Malaysia using convenient sampling. The data were collected using self-administered questionnaire that was made into a Google Form and sent by email to UPM female staff, whose email addresses were readily available on the official website, from the 5th of August 2020 to the 25th of August 2020. Ethical approval was obtained from JKEUPM (Ethics Committee for Research Involving Human Subject) prior to the start of the study. Written informed consent was obtained from each of the respondents for this research.

The sample size was calculated using the formula by Kish L, $n = (Z(1-\alpha/2))2 \times (P(1-P) / D2)$, where n = sample size, $Z(1-\alpha/2)$: level of confidence = 95%. Hence, $Z(1-\alpha/2) = 1.96$, P = prevalence of urinary incontinence =17.3% = 0.173, D = Precision = 5% or 0.05. Based on this, the calculated sample size was 261. With a 20% drop-off percentage, the final sample size was calculated as 313 [7, 8].

The questionnaire that was sent to the respondents comprised of two sections. Section A was designed to determine the personal information of the respondents including age, weight, height, BMI, ethnicity, religion, level of education, parity, mode of delivery, sexual activity and menopause status. Section B was the Michigan Incontinence Symptom Index questionnaire that is used to screen for clinically relevant urinary incontinence with high sensitivity and specificity among women aged 35-64 years. It has two domains, one determines the symptoms (question 1-8) and the other determines the impact of UI on quality of life (question 9-10) [9]. However, for this study, only the first domain was used to measure the symptoms. To determine the prevalence of urinary incontinence among female staff in UPM, the total score of questions 1 to 8 in section B was summed up. For those who got a total score that was equal or more than 7 were considered positive for urinary incontinence while those that scored below 7 were considered negative for urinary incontinence.

To determine the association between risk factors (age, menopause status, BMI, parity and mode of delivery) and urinary incontinence among female staff in UPM, either the Chi-square test or Fisher's Exact test was used to compare between two categorical variables and association between the risk factors and urinary incontinence. The level of significance was set as $\alpha = 0.05$ and a p-value of less than 0.05 was considered significant. Descriptive analysis was performed on the data to determine the frequency and percentage of the sociodemographic and behavioural characteristics.

RESULTS

Response Rate

In this study, the questionnaire was distributed to 1100 female staff of UPM via email. A total of 194 responses were received and only 179 of these were eligible. The response rate was 17.64%.

Socio-demographic and Behavioural Characteristics

Table 1 shows the socio-demographic and behavioural characteristics of the respondents. Majority of the respondents were aged 31-40 years (45.3%), had

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optimal body mass index that ranged between 18.5-25 kg/m^2 (68.2%), had parity that ranged between 1-4 (64.8%) and had tertiary education (95%). In terms of the mode of delivery, majority had normal vaginal delivery (75%) and for menopause status, 90.5% of respondents were pre-menopause.

Prevalence of Urinary Incontinence

Table 2 shows the prevalence of urinary incontinence among female staff at Universiti Putra Malaysia. The prevalence of urinary incontinence was determined by summation of the scores of questions 1 to 8 in section B (M-ISI) of the questionnaire. Total score that was equal or more than 7 was considered positive and if less than 7 then it was considered negative. Majority of the respondents were in the negative on urinary incontinence (72.6%). Thus, the prevalence of urinary incontinence was 27.4%.

Association between the risk factors with urinary incontinence

Table 3 shows the association between the risk factors (age, body mass index, parity, mode of delivery and menopause status) with urinary incontinence among female staff in UPM. The results showed that there were no significant associations between urinary incontinence and age, body mass index, parity, mode of delivery and menopause status.

Table 1 Sociodemographic and behavioural characteristics

Socio-demographic and behavioural characteristics	Categories	Frequency	Percentage (%)
Age (years)	21-30	52	29.1
	31-40	81	45.3
	41-50	36	20.1
	51-60	9	5.0
	61-70	1	0.6
	>70	0	0.0
BMI (kg/m^2)	<18.4	4	2.2
	18.5-25	122	68.2
	25.1-30	38	21.2
	>30.1	15	8.4
Parity	0	51	28.5
	1-4	116	64.8
	⩾5	12	6.7
Level of Education	Tertiary/Diploma	170	95.0
	Secondary	8	4.5
	Primary/None	1	0.6
Normal Vagina (Note: only 128 respondents are applicable)	Yes	96	75.0
Caesarean Section (Note: only 128 respondents are applicable)	Yes	49	38.3

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Assisted Vagina (vacuum or forceps) (Note: only 128 respondents are applicable)	Yes	23	18.0
Menopause status	Natural	15	8.4
	Surgical / Medical	2	1.1
	Non-menopause	162	90.5

Table 2 Prevalence of urinary incontinence

Prevalence of Urinary Incontinence	Frequency	Percentage (%)
Negative (<7)	130	72.6
Positive (≥7)	49	27.4

Table 3 Association between the risk factors with urinary incontinence

Risk Factors	Categories	Positive urinary incontinence N (%)	Negative urinary incontinence N (%)	x^2	p-value
Age (years)	21-30	9 (17.3)	43 (82.7)	4.884	0.285
	31-40	27 (33.3)	54 (66.7)		
	41-50	10 (27.8)	26 (72.2)		
	51-60	3 (33.3)	6 (66.7)		
	61-70	0 (0.0)	1 (100)		
	>70	0 (0.0)	0 (0.0)		
BMI (kg/$m2$)	18.4 <	1 (25.0)	3 (75.0)	0.490	0.968
	18.5-25	35 (28.7)	87 (71.3)		
	25.1-30	9 (23.7)	29 (76.3)		
	30.1>	4 (26.7)	11 (73.3)		
Parity	0	10 (19.6)	41 (80.4)	2.218	0.330
	1-4	35 (30.2)	81 (69.8)		
	⩾5	4 (33.3)	8 (66.7)		
Normal vagina delivery	Yes	29 (30.2)	67 (69.8)	0.012	0.912
Caesarean section delivery	Yes	17 (34.7)	32 (65.3)	0.669	0.413
Assisted vagina delivery	Yes	6 (26.1)	17 (73.9)	0.254	0.614
Menopause status	Natural	2 (13.3)	13 (86.7)	1.875	0.346
	Surgical / Medical	0 (0.0)	2 (100)		
	Non-menopause	47 (29.0)	115 (71.0)		

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DISCUSSION

Response Rate

We had used google form-based questionnaire in this study. The questionnaire was sent to respondents through email. Some 1100 emails were sent but we were only able to get 194 responses from which only with 179 were eligible. The low response rate (17.64%) was probably due to the COVID-19 pandemic, in which MCO (Movement Control Order) was launched and this led to the temporary closure of the university. Many staff in UPM had to work online from home and thus were limited in the way of communication between researchers and participants. Only those that had the habit of checking official emails regularly during the study time frame to answer the questionnaire. Thus, this resulted in the low response rate. The precise reason for the low response rate is uncertain and it considerably limits the power of the study.

Prevalence of Urinary Incontinence

Analysis of the data revealed a prevalence of urinary incontinence of 27.4% among female staff in UPM. This corresponded to within the values reported in a review by Dhillon HK et al, who found that the prevalence of UI in Malaysia reported in a number of studies ranged between 9.9-44%. They suggested that the variation in prevalence rates may be attributed to lack of congruency among the prevalence studies, particularly in the usage of terminologies, definition of UI, demographics of the study population, survey and study design [4].

Association between the Risk Factors with Urinary Incontinence

The results showed no association between urinary incontinence and age (p=0.285), BMI (p=0.968), parity (p=0.330), mode of delivery (p=0.912.0.413,0.614) and menopause (p=0.346) in the population we studied.

In a population-based study on the correlation between age and the prevalence of urinary incontinence, it had been found that the prevalence of urinary incontinence increased with age up to 55 years or more until a slight decline is observed after that [10]. A report published in 2021, stated the prevalence rates of urgency and mixed urinary incontinence were higher in women aged 60 years and older compared to that in those aged 20-59 years [11]. However, the majority of our respondents were middle aged (31-40 years) instead of older age, and the results therefore did not show a significant association between age and urinary incontinence (p=0.285). It would have been more obvious if the age range had been much wider.

Obesity is the best established and most potentially modifiable risk factor in the development of UI. In Malaysia, the prevalence of overweight and obesity among adults has increased from 50.1% in 2019 to 54.2% in 2020 [12]. Many studies have shown a positive correlation between BMI and risk of urinary incontinence. A study by Nygaard et al, found that urinary incontinence affected more than half (53.4%) of patient with obesity [13]. A systematic review and meta-analysis done in 2018 found that when compared with normal BMI, obesity doubled the risk of urinary incontinence [5]. The review by Dhillon et al also mentions that obesity, increased body mass index (BMI) and weight gain have been identified as risk factors for UI, in which every 5-unit increment in BMI can increase the risk of UI by 60%. [4]. Increased weight may aggravate or cause pelvic floor disorders by increasing both intra-abdominal pressure and chronic pressure on ligaments and nerves, leading to excessive stretching and poor bladder control [14,15].

Despite these studies reporting a clear association between BMI and UI, our study found that there was no significant association between body mass index (BMI) and the prevalence of urinary incontinence (p=0.968). The lack of association between BMI amd UI in this study may be due to the small sample size and a small number of overweight and obese (21.2% and 8.4%) women as compared with those with normal BMI (68.2%).

Our study showed that there was no significant association between parity and the prevalence of urinary incontinence. This is in contrast to the results from an earlier study where women with more than five deliveries were found more likely to develop urinary incontinence [10]. Also, another study found a strong correlation between UI and parity in which women with five or more children had a hazard ratio (HR) of 1.80 (95% CI 1.68–1.94) compared to HR of 1.37 (95% CI 1.33–1.41) for women with one vaginal delivery [16].

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A meta-analysis of case-control and cohort studies by Zhou HH et al also reported that parity of two or more may increase the overall risk of UI for women compared with women who are nulliparous as the odds ratio (OR) was 1.68 (95% CI: 1.39–2.03; $I^2 = 0\%$; n = 4) [17]. The discrepancy between the results in our study and those previous studies, could be due to the small sample size, making it difficult to stratify the data or correlate parity with UI and given the narrow age range the duration between the last delivery and occurrence of UI may be short.

Vaginal childbirth is known to have a major impact on the pelvic floor, weakening bladder neck support and compromising nerve innervation. Caesarean delivery, particularly done before labour, is believed to offer substantial protection against pelvic floor trauma. In contrast, assisted vaginal delivery, with vacuum or forceps, is believed to carry increased risk of trauma. A systematic review and meta-analysis in 2016 reported that compared with caesarean section, vaginal delivery is associated with almost twofold increase in the risk of long-term SUI with an absolute increase of 8% and UUI with an absolute increase of approximately 3% [18]. Kasikçi et al., had also reported that vaginal deliveries were one of the most apparent risk factors among women with urinary incontinence [19]. While for different vaginal delivery modes, Tahtinen et al found that for women aged younger than 50 years, forceps delivery is associated with significant increased long-term risk of SUI [20]. However, our study found that there was no association between mode of delivery (normal vagina, caesarean section, and assisted vagina) and the prevalence of urinary incontinence. Once again, the reason for the discrepancy between our results and those in the literature is unclear, except that the sample size in our study was somewhat smaller than most of the other studies. Perhaps, as majority of our respondents had tertiary education (95%), they probably were aware of the pelvic floor exercise post-delivery and that may have contributed to lesser prevalence or urinary incontinence. Information on their knowledge of UI was however not collected and it is therefore difficult to confirm this.

Although the findings of our study seem to contradict the findings of some of the previous studies correlating parity and mode of delivery with the prevalence of urinary incontinence, there are, however, studies that have also found no significant association between UI and these two risk factors [21,22,23,24]. Our is, therefore, not an isolated study that has found no association between UI and parity and mode of delivery. Clearly, more larger scale studies are necessary to precisely determine the link between parity, mode of delivery and urinary incontinence.

Lastly, our results also showed no association between menopause status and urinary incontinence (p=0.346). A study done in India reported prevalence of 55% of UI in postmenopausal women [25]. Khan et al also found that the increasing number of years spent in menopause had a significant association with the presence of UI in which for 1-5, 5-10, 11-15 and >15 years spent in menopause by a woman, the odds for the presence of UI were found to be 1.329 (95% CI 0.850-2.078), 0.510 (95% CI 0.309-0.842) and 0.873 (95% CI 0.509-1.496) respectively [26]. The difference between the results in our study with those from previous study is probably due to the skewness of menopausal status among female staffs in our study where an extremely high portion of respondents were non-menopause (90.5%).

Limitations

Overall, our study found that there was no association between age, BMI, parity, mode of delivery and menopause with urinary incontinence. This might be due to the small sample size and perhaps the age distribution of the study population. Adequate sample size and with an appropriate age distribution is necessary when investigating the prevalence and the risk factors associated with urinary incontinence.

CONCLUSION

Our study suggests that the prevalence of urinary incontinence among female staff in UPM is similar to that in the worldwide population. Most of the female staff in UPM were aged 31-40 years, had optimal BMI, had parity of 1-4 and normal vaginal deliveries and were non-menopausal. There was no significant association between age, BMI, parity, mode of delivery and menopause status with urinary incontinence among female staff in UPM between this age range.

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Conflict of interest

Authors declare none.

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Authors' Contribution

Literature review and manuscript was done by PJG, NHH, LE. The manuscript was edited by RAD and NIB.

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