



Original Article

Urinary incontinence among pregnant women attending an antenatal clinic at a tertiary teaching hospital in North-East Malaysia



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المخلص

أهداف البحث: السلس البولوي شائع بين النساء الحوامل. وهي مشكلة صحية متنامية تؤثر على سلامة الضحية الجسدية والعاطفية والاجتماعية. تهدف هذه الدراسة إلى تحديد مدى الانتشار والعوامل المرتبطة بالسلس البولوي بالإضافة إلى متطلبات الكشف عنه.

طرق البحث: تمت تعبئة استبانة من قِبل ٣٣٠ امرأة حامل زرن عيادة الحوامل بمستشفى سينز ماليزيا الجامعي. جُمعت البيانات من خلال استبانة ذاتية وتم تحليلها باستخدام النسخة ٢٢.٠ من "البرنامج الإحصائي للعلوم الاجتماعية".

النتائج: من بين الكل، واجه ٨٤.٥% (n = 279) من النساء الحوامل السلس البولوي. تم تحديد الانحدار المتعدد ومؤشر كتلة الجسم ووجود أمراض أخرى واستهلاك القهوة كمسببات مصاحبة رئيسة للسلس البولوي. غالبية النساء الحوامل فضلن الكشف المبكر عن السلس البولوي.

الاستنتاجات: واجهت غالبية عظمى من النساء الحوامل في هذه الدراسة السلس البولوي. ارتفاع مؤشر كتلة الجسم ووجود أمراض أخرى هما عاملان الخطورة المهيمنان للإصابة بالسلس البولوي، والكشف المبكر عنه مطلوب. هناك ما يبرر الحاجة إلى تثقيف شامل حول السلس البولوي وممارسة تمارين عضلات أرضية الحوض، والذي من الممكن أن يحول دون حدوث السلس البولوي في فترة ما بعد الولادة وفي الحياة المستقبلية.

الكلمات المفتاحية: سلس البول؛ النساء الحوامل؛ الانتشار؛ العوامل المرتبطة؛ الفحص

Abstract

Objectives: Urinary incontinence (UI) is common among pregnant women. This growing health problem affects physical, emotional, and social well-being. This study determined the prevalence of UI and associated factors, and evaluated screening needs.

Methods: A total of 330 pregnant women visiting the antenatal clinic in Hospital Universiti Sains Malaysia (USM) were surveyed. Data were collected through a self-administered questionnaire and analysed with SPSS software version 22.0.

Results: Overall, 84.5% (n = 279) of the pregnant women had experienced UI. Multiple logistic regression identified body mass index (BMI), presence of other illness, and consumption of coffee as major risk factors for UI. The majority of pregnant women preferred early screening for UI.

Conclusion: A great majority of pregnant women in this study experienced UI. Higher BMI and the presence of other medical conditions are significant risk factors for UI and early screening is required. The need for universal education about UI and pelvic floor muscle exercise is warranted and can potentially prevent postnatal UI and UI later in life.

Keywords: Associated factors; Pregnant women; Prevalence; Screening; Urinary incontinence

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Introduction

Urinary incontinence (UI) is defined as any involuntary leakage of urine.¹ It is a growing health problem that affects millions of people worldwide, and can affect physical, emotional, and social well-being.^{1–4}

It has been reported that 348 million people worldwide experienced some form of UI in 2008 and this number is projected to increase to 423 million by 2018.⁵ Of this number, UI has affected a total of 250 million women in South America, Africa, and Asia, and these numbers are expected to increase to approximately 303 million by 2018.⁵ Generally, UI is more common in women than in men, and the burden of this condition is highest in developing countries.^{5–8}

Among the female population, those of child-bearing age (15–49 years old)⁹ are commonly affected, especially during the third trimester of pregnancy.¹⁰ A study in a Western country reported that 10.8% of women in their first pregnancy had experienced symptoms of urinary leakage more than once a month in the 12 months prior to pregnancy. This then increased to 17% during early pregnancy at gestational week 18–22 in women with weaker pelvic floor muscles and to 55.9% in late pregnancy.^{6,11} The prevalence of UI in Asian countries showed a similar rate. For example, it was reported that 26.7% of pregnant women had UI of some form in Hong Kong,¹² 55% in Hong Kong,¹³ and 45% in Karachi.¹⁴

Pregnant women are at a higher risk of UI mainly because of the temporary disruption to the pelvic floor caused by a growing foetus that pushes down on the bladder.¹⁵ Mechanical and hormonal changes during pregnancy can also affect the strength of the pelvic floor muscles. Accordingly, the urethra has no ‘backboard’ to support it because of the disruption of the endopelvic fascia; therefore, intra-abdominal pressure exceeds urethral pressure, and leads to involuntary loss of urine.¹⁶ UI is often temporary and can resolve after delivery,¹⁷ but in some women, UI during pregnancy can persist after delivery and becomes chronic.¹⁸ The relationship between UI, pregnancy, and childbirth has been recognized for several decades. It is reported that those who had UI during pregnancy with a history of urinary leakage before the first pregnancy are at risk of developing postnatal UI.¹⁹ Moreover, the risk of developing UI is higher at 3 and 6 months postnatally in women who developed UI as early as 20 weeks of gestation but were not treated.²⁰ This proves that untreated UI during pregnancy can lead to postpartum UI or UI in later years.

Although UI is not a life-threatening problem, it can weaken and undermine confidence and social activities, and can lead to social isolation. Due to the lack of information available on UI, many patients suffer in silence, as the problem is often underreported because of the associated stigma.²¹

The common types of UI in women in the general population are stress UI (SUI), urge UI (UII), and mixed UI (MUI).²² Of these 3 main types, the most common type in advanced pregnancy is SUI.^{22–24} SUI refers to leakage of urine when coughing, sneezing, exercising, laughing, lifting heavy things, or moving in a way that places pressure on

the bladder.²² During pregnancy, some women may experience at least some degree of UI.²⁵ The symptoms may be mild and infrequent in some women, but can be more severe in others. UI, however, can be treated and sometimes cured.²⁶

Therefore, early detection of UI among this population is crucial to avoid future complications such as postnatal UI or UI later in life.²⁵ A study conducted among postnatal women indicated that screening for early detection should be done during the first visit to the antenatal clinic for those at risk of postnatal UI. This is because pre-pregnancy UI and UI during pregnancy are known risk factors for postnatal UI, and postnatal UI itself is a risk factor for long-term UI in women.²¹

Screening or first-line assessment for UI among women has been widely practiced in other countries, with well-established continence care management in the UK.²⁵ This was typically carried out in primary care settings. Practice nurses may ask specific questions related to UI symptoms in women of childbearing age during Pap smear consultation and routine antenatal/postnatal visits to the clinic.²⁷ This is aimed at management of UI as well as early detection to help preserve quality of life.

Women of childbearing age are known to be vulnerable to UI, and UI has been successfully managed at the primary care level in other countries.²⁸ However, this service has not been available in every health setting in Malaysia, and many women were unaware of this service. Researchers reported emphasis on UI in older people but overall found a lack of printed or electronic material available that outlined UI as a preventable and treatable condition in younger women. Furthermore, women were rarely asked whether they had urinary symptoms during their visit to either the antenatal or postnatal clinic.²⁹

Specific studies on UI screening needs among pregnant women have not been widely assessed, and few studies have investigated UI among pregnant women in Malaysia.^{21,30–32}

Materials and Methods

Study subjects

Participants were selected based on a systematic random sampling method. Based on records obtained from the antenatal clinic, an estimated 680 pregnant women came to the clinic between January and March 2015, and the estimated sample size for this study was 330. Thus, the sampling interval was approximately 2 ($680/330 \approx 2$). The starting point was randomly selected from the potential participant list at the antenatal clinic. This study included pregnant women who came for their first booking for antenatal care at the clinic and were aged between 15 and 45 years (child-bearing aged according to the World Health Organization, 2015). Then, every second pregnant woman who came to the clinic before seeing the physician on the list would be approached for the study.

Access to patients, permissions, and ethics

This was a cross-sectional study. The study was conducted among pregnant women at the antenatal clinic in

Hospital USM during the study period, and was performed in accordance with the principles established by the Declaration of Helsinki, with direct contact between the patients and research team. Approval to conduct the study was obtained from the Human Research Ethics Committee, Universiti Sains Malaysia.

Questionnaire design

A self-administered questionnaire was used in this study and combined the 3 main sections of the Revised Urinary Incontinence Scale (RUIS): Parts A, B, and C.

Part A contained 6 items for sociodemographic data

Part B contained 8 items for data on medical, obstetric, and surgical history, as well as smoking and drinking history and elimination habits.

Part C consisted of 10 questions related to UI including the RUIS.

Question no. 1 was used to identify any form of UI by asking the participant to self-rate whether they had any experience of urine leakage. Question no. 2 was used to identify the onset of UI symptoms, and Questions no. 3 to 7 (5 questions) were mainly adopted from the RUIS with the purpose of confirming the data obtained in Question no. 1 as well as to determine the types of UI experienced by the participants.

The RUIS consisted of questions from both the Urogenital Distress Inventory³³ and the Incontinence Severity Index.³⁴ The first 3 questions pertained to the types of UI, and the last 2 questions pertained to the frequency of UI and volume of urine lost with each episode of UI.

Each question was scored using an ordinal scale, and the total score out of 16 was determined by summing all 5 questions. A score of 0–3 indicated that the patient had no UI or very mild UI symptoms. A score of 4–8 indicated mild UI and the possible need for further assessment. A score of 9–12 was considered moderate UI, and a score of 13–16 was considered severe UI.³⁵

Validity and reliability

The original version of the RUIS is in English³⁵ and was translated to Bahasa Malaysian and validated by Dariah.²⁹ A pilot study was carried out prior to the actual study on 30 pregnant women who fulfilled the inclusion criteria of this study. The Cronbach's alpha was 0.79. The result showed that the Malay RUIS instrument was valid and reliable in this study.

Statistical analysis

The data collected were analysed descriptively and inferentially using IBM Statistical Package for Social Science (SPSS) software, version 22.0. Frequency (f), percentage (%), and mean and standard deviation were used to determine the prevalence of UI and the need for early UI screening. Simple logistic regression and multiple logistic regression were used to identify factors associated with UI.

The significance level was set at $\alpha = 0.05$, and a 95% confidence interval (CI) was applied in this study.

Results

Participant characteristics

Altogether, 330 pregnant women participated in this study, and the response rate was 100%. Of these, 45.2% (n = 149) were first-time bookings and had not been seen by the physician, and 54.8% (n = 181) were first bookings and referrals from other clinics.

Table 1 shows the participants divided into 4 groups by age: 15–19 years, 20–29 years, 30–39 years and 40–49 years. The majority of participants were in the age group between 30 and 39 years (n = 148, 44.8%). The mean age was 30.79 (SD: 5.75). Most women were Malays (n = 327, 99.1%). The results also showed nearly equal numbers of employed (n = 166, 50.3%) and unemployed (n = 164, 49.7%) participants. Most had a monthly family income of less than RM 2000 (n = 160, 48.5%). The mean number of family members staying with the participants was 3.78 (SD: 1.64). Most participants had tertiary education (n = 168, 50.9%).

Table 2 shows that most pregnant women were overweight (n = 140, 42.4%) and healthy without any diseases (n = 199, 60.3%). Common health problems (n = 131, 39.7%) included diabetes mellitus (n = 43, 13%), hypertension (n = 28 8.5%), constipation (n = 23, 7.0%), and asthma (n = 22, 6.7%). Prior pelvic surgery had been performed in 27.3%, including lower segment caesarean section (n = 87, 26.4%).

The majority of participants were multiparous (n = 242, 73.3%), with a mean of 2.76 pregnancies (SD: 1.76) (Table 2). Most were in the second trimester (n = 272, 82.4%) and most had a singleton pregnancy (n = 328, 99.4%). Mean new-born weight was 2.30 kg (SD: 1.48). Half of the participants (n = 120, 36.4%) reported a perineal tear during spontaneous vaginal delivery in a previous pregnancy (Table 3).

Table 1: Sociodemographic characteristics (n = 330).

Variables	Mean (SD)	Frequency (%)
Age		
15–19 years old		6 (1.8)
20–29 years old		147 (44.5)
30–39 years old	30.79 (5.75)	148 (44.8)
40–49 years old		29 (8.8)
Ethnic		
Malay		327 (99.1)
Non-Malay		3 (0.9)
Occupation		
Employed		166 (50.3)
Unemployed		164 (49.7)
Family Income per Month		
Less than RM 2000		160 (48.5)
RM 2000 – RM 2999		61 (18.5)
RM 3000 above		109 (33.0)
Family living together	3.78 (1.64)	
Level of education		
Higher (Diploma, Masters, PhD)		168 (50.9)
Lower (Primary, secondary)		162 (49.1)

Table 2: Medical and surgical history (n = 330).

Variables	Frequency (%)
BMI	
Normal or underweight	124 (37.6)
Overweight	140 (42.4)
Obese	66 (20.0)
Medical illness	
No	199 (60.3)
Yes	131 (39.7)
Illness	
Diabetes mellitus	43 (13.0)
Hypertension	28 (8.5)
Constipation	23 (7.0)
Asthma	22 (6.7)
Urinary tract infection	4 (1.2)
Eye ptosis	4 (1.2)
Renal problems	3 (0.9)
Allergy	2 (0.6)
Epilepsy	2 (0.6)
Thalassemia	2 (0.6)
Colon cancer	1 (0.3)
Hypothyroidism	1 (0.3)
Rheumatoid arthritis	1 (0.3)
Stroke	1 (0.3)
Back pain	1 (0.3)
Gastric disorder	1 (0.3)
Hyperlipidaemia	1 (0.3)
Hypotension	1 (0.3)
Pelvic surgery	
No	240 (72.7)
Yes	90 (27.3)
Lower segment caesarean section	87 (26.4)
Left salpingo-oophorectomy	1 (0.3)
Laparotomy and cystectomy	1 (0.3)
Teratoma and right ovarian cyst	1 (0.3)

Table 3: Obstetric and gynaecologic history (n = 330).

Variables	Mean (SD)	Frequency (%)
First booking		
New cases (first booking)		149 (45.2)
Referral from other clinics		181 (54.8)
Number of pregnancies	2.76 (1.76)	
Pregnancy number		
First		88 (26.7)
Second and above		242 (73.3)
Trimester		
First		58 (17.6)
Second		272 (82.4)
Pregnancy		
Singleton		328 (99.4)
Twin		2 (0.6)
Heaviest baby weight	2.30 (1.48)	
Perineal tear		
Yes		120 (36.4)
No		122 (37.0)

Table 4 shows that more than half of the pregnant women consumed caffeinated drinks (n = 194, 58.8%).

Prevalence of UI

Table 5 shows UI characteristics based on the RUIS. UI was present in 279 (84.5%), with onset mostly during pregnancy (n = 217, 65.8%).

Factors associated with UI

The findings indicate that higher BMI, the presence of other medical conditions, and Nescafe intake had a significant association with UI in pregnant women (Table 6). Pregnant women who were obese (BMI ≥ 30.0 kg/m²) during the study period had a 9-fold higher risk of UI compared to pregnant women who were normal or underweight (BMI <25.0 kg/m²; adjusted odds ratio [OR] = 9.29, 95% CI = 2.09, 41.37, p = 0.003). Pregnant women who were overweight (BMI: 25–29.99 kg/m²) during the study period had a 2-fold higher risk of having UI compared to pregnant women who were normal or underweight (BMI <25.0 kg/m²; Adjusted OR = 1.96, 95% CI = 1.01, 3.78, p = 0.047). In addition, pregnant women with other illnesses (diabetes mellitus, hypertension, constipation, asthma) had a 2.5-fold higher risk of UI compared to pregnant women without other illnesses (adjusted OR = 2.53, 95% CI = 1.19, 5.39, p = 0.016). However, pregnant women who consumed

Table 4: Caffeinated drink consumption (n = 330) history.

Variables	Frequency (%)
Caffeine drink	
Yes	194 (58.8)
No	136 (41.2)
Nescafe	
Yes	105 (31.8)
No	225 (68.2)
Tea	
Yes	129 (39.1)
No	201 (60.9)
Chocolate/Milo	
Yes	164 (49.7)
No	166 (50.3)

Table 5: Prevalence and Onset of UI (n = 330).

Variables	Frequency (%)
UI based on RUIS	
Yes	279 (84.5)
No	51 (15.5)
Onset of UI	
Before pregnancy	32 (9.7)
In pregnancy	217 (65.8)
After pregnancy/delivery	26 (7.9)

Table 6: Factors associated with UI.

Variable	Regression coefficient (b)	Adjusted Odd Ratio (95% CI)	Wald statistic	p-value
BMI				
Underweight or normal (Reference group = 0)	–	–	–	–
Overweight versus 0	0.67	1.96 (1.01, 3.78)	3.96	0.047
Obese versus 0	2.23	9.29 (2.09, 41.37)	8.57	0.003
Other health problems	0.93	2.53 (1.19, 5.39)	5.82	0.016
Nescafe	–1.07	0.34 (0.18, 0.5)	10.64	0.001

Multicollinearity and interactions were checked and not found, Hosmer–Lemeshow test ($p = 0.888$), Classification table (overall correctly classified percentage = 84.5%) and area under the receiver operating characteristic curve (74.4%) indicated model fit.

Nescafe had a 66% lower risk of UI during the study period compared to pregnant women who did not consume Nescafe (adjusted OR = 0.34, 95% CI = 0.18, 0.5, $p = 0.001$).

The need for early UI screening

Table 7 shows the majority of participants agreed that early screening for UI is required ($n = 310$, 93.9%). Most preferred screening to be done by a female doctor ($n = 258$, 78.2%) or female nurse ($n = 236$, 71.5%). Most also agreed that screening is important for UI prevention ($n = 247$, 74.8%).

Discussion

UI was common among pregnant women in this study, with a higher occurrence rate compared to other studies.^{14,36,37} In a Norwegian study, the overall prevalence of UI in women who had antenatal care in various health clinics in 3 administrative city districts was 41.7%.³⁶ The finding however, varied between different ethnic groups: 26% were African, 36% were of Middle Eastern origin, 40% were of East Asian origin, 43% were of South Asian origin, and 45% were of European/North American origin. Similarly, a study in Karachi reported the prevalence rate of UI was 45%.¹⁴ However, in a Spanish study, the prevalence was 58.2%.³⁷

The possible explanation for the higher prevalence of UI in the current study could be that most participants also had other illnesses besides UI, such as diabetes mellitus,

hypertension, constipation, and asthma, that worsen the symptoms.³⁸ Furthermore, most of the women were not aware that UI was actually a health problem and that treatment was available. This can lead to poor treatment-seeking behaviour and leaves the problem untreated. The same phenomenon was observed in a Sri Lankan study when a higher prevalence of UI (70.97%) was reported among local women in a tertiary hospital.³⁹ The study concluded that the majority of women were not aware of the risk of UI during pregnancy or the importance of UI screening, as only 12.9% sought medical care.³⁹ These figures were in line with the findings of other studies in Australia and China.^{40,41}

Various factors are associated with UI in pregnant women, as reported in the literature. The most common factors include older age, lower education level, presence of other diseases, higher BMI, multiparity, constipation, chronic cough due to smoking, intake of caffeinated drinks, and the type of toilet used.^{39,42,43}

All of these factors were examined in the current study. However, only 3 variables were identified as significantly associated with UI in pregnant women in this study. These include higher BMI, consumption of caffeinated drinks, and the presence of other illnesses. This finding is parallel to the findings in a study by Oliveira et al., who found that women with higher BMI had a higher chance of developing loss of bladder control, particularly during pregnancy, because body weight increases as the foetus grows.⁴⁴

Although pregnancy and vaginal birth are considered the main cause of UI in women, these factors did not entirely explain the origin and development of UI in this study. In fact, nearly half of the participants did not experience any symptom of UI, even though many were in the second trimester of pregnancy.

The majority of participants in this study consumed caffeinated drinks. Among the types of caffeinated drinks, Nescafe was found to be associated with UI in pregnant women. Nescafe is the most popular and affordable type of coffee in Malaysia and almost all households stock this instant coffee brand in their homes. Caffeinated drinks, particularly coffee, have been identified as risk factors for UI in other studies from Northern Europe, Canada, and the USA.^{46,45,46} However, different findings were reported in another study in which women with higher intake of caffeine such as Nescafe had a lower risk of any incontinence (OR 0.78, 95% CI 0.64 to 0.98).⁴⁷

Table 7: The need for early UI screening.

Variables	Frequency (%)
Need for UI screening:	
Yes	310 (93.9)
No	20 (6.1)
Prefer UI screening by:	
Female doctor	258 (78.2)
Female nurse	236 (71.5)
Male doctor	4 (1.2)
Male nurse	4 (1.2)
Reason for early UI screening:	
Prevention of UI	247 (74.8)
Early treatment	169 (51.2)
Disease detection	1 (0.3)

The presence of other medical conditions is thought to be a risk for UI in pregnant women. These include diabetes, chronic cough, constipation, and acute urinary tract infection.^{3,48,49} An Ethiopian study by Bekele et al. in 422 pregnant women found that constipation, asthma, allergies, and sinusitis were associated with UI.⁴⁸ The results of the current study are consistent with their findings.

Most participants in this study agreed that early screening for UI is important and should be done during the first booking for the purpose of prevention, early treatment, and detection of UI. Early screening can also be a part of the routine initial evaluation for UI and might serve as a vital component for further referral and management.⁴⁹ In the clinic, screening should be performed as early as possible for all women, for example, during the first booking. This can simply be done using a form with several questions pertaining to UI symptoms from a validated screening tool such as the RUIS³⁵ to identify unreported UI. It is important to rule out the symptoms at an earlier stage, so that suitable treatment can be offered based on the available options in the clinic. As UI and its assessment involve the genitals, with reticence about open discussion,^{39,41} screening should be conducted by a female doctor or female nurse.

Although early screening for UI is important, the main issue is that symptoms are unavoidable during pregnancy and must not be ignored. It is also understood that the symptoms may resolve gradually, but some may experience persistent UI. Considering that the aim is to prevent UI during the postnatal period or later in life and reduce the high percentage of UI among pregnant women in this study, a proactive approach should be taken through regular health education on UI for all pregnant women who visit the clinic. It is crucial to increase their awareness of the risk of UI and at the same time teach them the correct way of performing effective pelvic floor muscle exercises on a daily basis. Pelvic floor muscle exercise is frequently recommended for women as the first line treatment for UI because of efficacy and cost effectiveness.^{20,50–52}

Strength and limitation of the study

The objectives of this study were achieved with an adequate sample size. The data were collected through a validated and reliable questionnaire, and data were analysed using inferential statistics to identify factors associated with UI during pregnancy.

The study also had some limitations. The population of this study was mainly selected from an antenatal clinic. Thus, the findings are not representative of all pregnant women in Kelantan. Furthermore, the presence of UI was mainly determined with a questionnaire alone, without an objective measure of confirmation, and this may reduce the accuracy of UI diagnosis.

Conclusions and recommendations

The prevalence of UI among pregnant women who visited the antenatal clinic in Hospital USM for their first booking was higher (84.4%) than in other studies. This finding clearly indicates that UI is common and requires attention from health care providers and hospital management. Significant

risk factors for UI in this study were higher BMI and the presence of other health problems (diabetes mellitus, hypertension, asthma, constipation). Early UI screening should be performed for all pregnant women at their first booking and during every antenatal follow-up. Pregnant women should be informed about the risk of UI through proper health education to raise their awareness and encourage them to seek early treatment for UI.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval and consent to participate

Approval to conduct this study was obtained from the Human Research Ethics Committee, Universiti Sains Malaysia (USM/JEPeM/15100437). Permission to conduct this study was also obtained from the Director of Hospital USM, the Coordinator of the Antenatal Clinic, and the author of the RUIS (Professor Jan Sansoni).

Authors' contributions

DMY, SA, and KYC designed the study, conducted data collection and performed data analysis. DMY and SA provided logistical support and KYC performed the final review of results. DMY wrote the initial and final draft of the article. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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References

1. International Continence Society. Fact sheets: a background to urinary and faecal incontinence 2013 (Google Books Version). Retrieved August 20, 2015, from, www.ics.org/public/factsheets.
2. Kocak I, Okyay P, Dundar M, Erol H, Beser E. Female urinary incontinence in the West of Turkey: prevalence, risk factors and impact on quality of life. *Eur Urol* 2005; 48: 634–641.
3. Kocaöz S, Talas MS, Atabekoğlu CS. Urinary incontinence in pregnant women and their quality of life. *J Clin Nurs* 2010; 19: 3314–3323.

4. Valeton CT, do Amaral VF. Evaluation of urinary incontinence in pregnancy and postpartum in Curitiba mothers program: a prospective study. *Int Urogynecol J* 2011; 22: 813–818. <https://doi.org/10.1007/s00192-011-1365-8>.
5. Irwin DE, Kopp ZS, Agatep B, Milsom I, Abrams P. World-wide prevalence estimates of lower urinary tract symptoms, overactive bladder, urinary incontinence and bladder outlet obstruction. *British J Urology Int* 2011; 108: 1132–1139.
6. Brown SJ, Donath S, MacArthur C, MacDonald EA, Krastev AH. Urinary incontinence in nulliparous women before and during pregnancy: prevalence, incidence and associated risk factors. *Int Urogynecol J* 2010; 21: 193–202. <https://doi.org/10.1001/s00192-1011-x>.
7. Sharma A. Clinical practice: female urinary incontinence – primary care management. *Br J Med Pract* 2010; 3(3): 329.
8. Wesnes SL, Hunskaar S, Bo K, Rortveit G. Urinary incontinence and weight change during pregnancy and postpartum: a Cohort study. *Am J Epidemiol* 2010; 1–11. <https://doi.org/10.1093/aje/kwq240>.
9. World Health Organization. *Sexual and reproductive health*; 2015. Retrieved August 20, 2015 from, www.who.int/reproductivehealth/topics/infertility/definitions/en/7/; 2015.
10. Dolan LM, Walsh D, Hamilton S, Thompson K, Ashe RG. A study of quality of life in primigravidae with urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct* 2004; May–Jun; 15(3): 160–164.
11. Hilde G, Ster-Jensen J, Ellstrom Engh M, Braekken IH, Be K. Continence and pelvic floor status in nulliparous women at midterm pregnancy. *Int Urogynecol J* 2012; 23: 1257–1263. <https://doi.org/10.1007/s00192-012-1716-0>.
12. Zhu L, Li L, Lang JH, Xu T. Prevalence and risk factors for peri-and postpartum urinary incontinence in primiparous women in China: a prospective longitudinal study. *Int Urogynecol J* 2012; 23(5): 563–572.
13. Chan VWY, Cheon YK, Yiu AKW. Urinary incontinence after caesarean section in Hong Kong Chinese women. *Hong Kong J Gynecol Obstet Midwifery* 2014; 14(1): 101–107.
14. Azra J, Riffat S, Sarah F, Quratulain. The prevalence of urinary incontinence in pregnancy. *Pak J Surg* 2013; 29(1): 66–69.
15. Lukacz ES, Lawrence JM, Contreras R, Nager C, Lubner KM. Parity, mode of delivery and pelvic floor disorders. *Obstet Gynecol* 2006; 107(6): 1253–1260.
16. Newman DK, Wein AJ. *Managing and treating urinary incontinence*. 2nd ed. Baltimore: Health Professions Press; 2009.
17. Boyles S, Li H, Mori T, Osterweil P, Guise J. Effect of mode of delivery on the incidence of urinary incontinence in primiparous women. *Obstet Gynecol* 2009; 113(1): 134–141.
18. Hvidman L, Foldspang A, Mommensen S, Nielsen J. Postpartum urinary incontinence. *Acta Obstet Gynecol Scand* 2003; 82(6): 556–563.
19. Stainton MC, Strahle A, Fethney J. Leaking urine prior to pregnancy: a risk factor for postnatal incontinence. *Aust N Z J Obstet Gynaecol* 2005; 45: 295–299.
20. Hay-Smith J, Morkved S, Fairbrother KA, Herbison GP. Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev* 2008; 8(4). <https://doi.org/10.1002/14651858>.
21. Dariah MY, Lily X, Belan I, Paterson J, Ho SE, Christopher CK. Postnatal urinary incontinence: prevalence and factors associated with it in a Malaysian population. *Med Health* 2014; 9(1): 22–32.
22. Milsom I, Altman D, Lapitan M, Nelson R, Sillen U, Thom D. Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP). In: Abrams P, Cardozo L, Khoury S, Wein A, editors. *Incontinence*. 4th ed. Paris: Health Publication Ltd; 2009. pp. 37–111.
23. Mc Gourty J. Obstetric risk factors for the development of urinary incontinence after vaginal delivery. *J Assoc Chart Physiother Women's Health* 2006; 99: 3–13.
24. Glazener C, Herbison G, MacArthur C, Lancashire R, McGee M, Grant A, Wilson P. New postnatal urinary incontinence: obstetric and other risk factors in primiparae. *BJOG Int J Obstet Gynaecol* 2006; 113(2): 208–217.
25. Griffiths AN, Makam A, Edwards GJ. Should we actively screen for urinary and anal incontinence in the general gynaecology outpatients setting? – a prospective observational study. *J Obstet Gynaecol* 2006; 26(5): 442–444. <https://doi.org/10.1080/01443610600747272>.
26. Subak L, Van Den Eeden S, Thom D, Creasman J, Brown J. Urinary incontinence in women: direct costs of routine care. *Am J Obstet Gynecol* 2007; 197: 596.e1-9.
27. Greenham H, Moran P. Pathways to managing female urinary incontinence. *Women's Health Med* 2005; 2(6): 10–14.
28. Getliffe K, Dolman M. *Promoting continence: a clinical and research resource*. London: Bailliere Tindall; 2000.
29. Dariah MY. *Postnatal Urinary Incontinence in Kelantan, Malaysia: a mixed methods study*. PhD unpublished. Flinders University Adelaide Australia; 2011.
30. Samiah Yasmin AK, Al-Jashamy Karim, Rohaini M, Pathak R, Vinothini A, Aye Aye Mon. Prevalence of urinary incontinence and associated risk factors among Married women. *Indian J Appl Res* 2013; 3(7). ISSN - 2249-555X.
31. Loh KY, Sivalingam N. Urinary incontinence in the elderly population. *Med J Malaysia* 2006; 61(4): 506–511.
32. Sherina MS. The prevalence of urinary incontinence among the elderly in a rural community in Selangor. *Malays J Med Sci* 2010; 17(2): 18–23.
33. Shumaker SA, Wyman JF, Uebersax JS, McClish D, Fantl JA. Health-related quality of life measures for women with urinary incontinence: the incontinence impact questionnaire and the urogenital distress inventory. Continence Program in Women (CPW) research group. *Qual Life Res* 1994; 3: 291–306.
34. Sansoni J, Marosszeky N, Sansoni E, Hawthorne G. *Refining continence measurement tools (final report)*. Centre for Health Service Development, University of Wollongong and Department of Psychiatry, the University of Melbourne; 2006. pp. 1–105.
35. Sansoni J, Hawthorne G, Marosszeky N, Moore K, Fleming G, Owen E. *Validation and clinical translation of the revised continence and patient satisfaction tools: final report*. Centre for Health Service Development, University of Wollongong; 2011.
36. Bø K, Pauck Øglund G, Sletner L, Mørkrid K, Jenum AK. The prevalence of urinary incontinence in pregnancy among a multi-ethnic population resident in Norway. *BJOG* 2012; 119: 1354–1360. <https://doi.org/10.1111/j.1471-0528.2012.03435.x>.
37. Gorbea Chávez V, Navarro Salomón K, Escobar del Barco L, Rodríguez Colorado S. Prevalence of urinary incontinence in pregnant women with prenatal care at the National Institute of Perinatology Isidro Espinosa de los Reyes. *Ginecolog Obstet Mex* 2011; 79(9): 527–532.
38. Botlero R, Davis SR, Urquhart DM, Shortreed S, Bell RJ. Age-specific prevalence of, and factors associated with, different types of urinary incontinence in community-dwelling Australian women assessed with a validated questionnaire. *Maturitas* 2009; 62: 134–139.
39. Perera J, Kirthinanda DS, Wijeratne S, Wickramarachchi TK. Descriptive cross sectional study on prevalence, perceptions, predisposing factors and health seeking behaviour of women with stress urinary incontinence. *BMC Women's Health* 2014; 14(78).
40. St. John W, Griffiths S, Wallis M, McKenzie S. Women's management of urinary incontinence in daily living. *J Wound, Ostomy Cont Nurs* 2013; 40(5): 524–532.

41. Wan X, Wang C, Xu D, Guan X, Sun T, Wang K. Disease stigma and its mediating effect on the relationship between symptom severity and quality of life among community-dwelling women with stress urinary incontinence: a study from a Chinese city. *J Clin Nurs* 2014. <https://doi.org/10.1111/jocn.12482>.
42. Gleason JL, Richter HE, Redden DT, Goode PS, Burgio KL, Markland AD. Caffeine and urinary incontinence in US women. *Int Urogynecol J* 2013; 24(2): 295–302. <https://doi.org/10.1007/s00192-012-1829-5>.
43. Rane A. *Does posture affect micturition?*. PhD Thesis. James Cook University; 2011. Retrieved August 25, 2015, from, <http://eprints.jcu.edu.au/29819/>.
44. Oliveira C, Seleme M, Cansi PF, Consentino RF, Kumakura FY, Moreira GA, Berghmans B. Urinary incontinence in pregnant women and its relation with socio-demographic variables and quality of life. *Rev Assoc Med Bras* 2013; 59(5): 460–466. <https://doi.org/10.1016/j.ramb.2013.08.002>.
45. Kirss F, Lang K, Toompere K, Veerus P. **Prevalence and risk factors of urinary incontinence among estonian postmenopausal women**, vol. 2. Springer Plus; 2013. p. 524. <https://doi.org/10.1186/2193-1801-2-524>.
46. Swanson J, Kaczorowski J, Skelly J, Finkelstein M. Urinary incontinence: common problem among women over 45. *Can Fam Physician* 2005; 51(1): 84–85.
47. Tettamanti G, Altman D, Pedersen N, Bellocco R, Milsom I, Iliadou A. Effects of coffee and tea consumption on urinary incontinence in female twins. *BJOG* 2011; 118: 806–813.
48. Bekele A, Adefris M, Demeke s. Urinary incontinence among pregnant women, following antenatal care at University of Gondar, North West Ethiopia. *BMC Pregnancy Childbirth* 2016; 16: 333. <https://doi.org/10.1186/s12884-016-1126-2>.
49. Demircan N, Ozmen U, Kokturk F, Kucuk H, Ata S, Harma M, Ankan II. What are the probable predictors of urinary incontinence during pregnancy? *Peer Rev Open Access* 2016; 4: e2283.
50. Alappattu M, Neville C, Beneciuk J, Bishop M. Descriptive cross sectional study on prevalence, perceptions, predisposing factors and health seeking behaviour of women with stress urinary incontinence. *Physiother Theory Pract* 2016; 32(2).
51. Morkved S, Bo K. Effect of pelvic floor muscle training during pregnancy and after childbirth on prevention and treatment of urinary incontinence: a systematic review. *Br J Sports Med* 2014; 48: 299–310.
52. Weiis B. Selecting medications for the treatment of urinary incontinence. *Am Fam Physician* 2005; 71(2): 315–322.

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