



# Prevalence and Risk Factors of Urinary/Anal Incontinence and Pelvic Organ Prolapse in Healthy Middle-Aged Iranian Women

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**Objectives:** Urinary incontinence (UI) and anal incontinence (AI) cause concern, social exclusion, and ultimately reduced quality of life in women. The aim of present study was to assess the prevalence and related risk factors of UI, AI, and pelvic organ prolapse (POP).

**Methods:** The present study recruited 340 menopausal women living in Tabriz in northwest Iran. The data collection tools included the Pelvic Floor Distress Inventory-20 and a personal and social information questionnaire. POP was diagnosed via clinical examination using the simplified pelvic organ prolapse quantification system.

**Results:** The prevalence of UI and POP was approximately 50%, and approximately 16% of participants reported AI. Based on the odds ratios, the most remarkable risk factor of urinary stress incontinence was the number of vaginal deliveries, whereas that of urinary urge incontinence was obesity. Episiotomy and age were the most major risk factors of AI and POP, respectively.

**Conclusions:** The results of the present study showed that the prevalence of POP, UI, and AI is remarkably high among postmenopausal women, warranting the need to prioritize the assessment of POP and various incontinences in middle-aged women in the primary health care system. Furthermore, increased emphasis should be put on modifiable risk factors.

**Key Words:** Fecal incontinence, Pelvic organ prolapse, Postmenopause, Urinary incontinence

## INTRODUCTION

Pelvic organ prolapse (POP) is a common menopausal problem, which is defined as protrusion or projection of pelvic organs into or out of vagina. POP causes such problems as urinary, anal and gas incontinence [1]. Incontinence is a common health problem in societies and increases with aging [2]. Urinary incontinence (UI) refers to leakage of urine due to increased pelvic pressure as a result of coughing or sneezing, and also urgency in expulsion of urine [3]. Anal incontinence (AI)

refers to the inability to control defecation or flatus [4]. Generally, UI and AI have common pathophysiology, as the prevalence of AI increases with increasing UI. Pelvic floor denervation during childbirth is the most prevalent pathophysiology of incontinence [5]. Many other social and personal factors, associated with UI and AI, including aging and parity, menopause, obesity, diabetes, chronic constipation, hypertension, occupational stressors, smoking, and genetic factors [6,7].

UI and AI causes concern, social exclusion, and ultimately affect quality of life in negative way [8]. In their

Received: May 10, 2019 Revised: August 19, 2019 Accepted: February 17, 2020

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This manuscript is extracted of Elham Aminian's MSc thesis from Tabriz University of Medical Science.

study, Yip et al. [9] showed that incontinence is significantly associated with feeling of isolation and anxiety in older women, while women often refrain from expressing their AI due to fear or embarrassment [10]. In addition to the pain, it incurs living cost such as daily use of pads or medical cost for diagnosis and treatment for incontinence [2].

A review study has reported the prevalence of UI as between 7% to 30.3%, based on self-report in various countries in women older than 40 years [2]. The main cause of UI is weakness of neuromuscular system in advanced ages [11]. In a study conducted by Demir et al. [12] on women older than 60 years in Turkey, the prevalence of AI was reported 10.2%. They also reported the prevalence of mixed UI-AI 7.4%.

POP has strong correlation with incontinence. Owing to different measurement systems and different definition, prevalence of POP among different societies is not consistent. Prevalence of symptom base POP among Emirati women estimated 26.9% by Elbis et al. [13]. While Horst et al. [14] showed that prevalence of POP with using of pelvic organ prolapse quantification (POP-Q) measurement system is more than 50%.

Due to different prevalence and risk factors extracted from different studies, the present study aimed to assessment prevalence and defining risk factor of UI/AI as well as POP among healthy postmenopausal women.

## MATERIALS AND METHODS

### Study design and participants

This was a cross-sectional population base study. Study population consisted of menopausal women living in the city of Tabriz, North-west Iran. Following approval by the ethics committee of Tabriz University of Medical Sciences (with ethic code: 5.4.4976), sampling was started. The sampling method was multi stage random sampling. In the first stage, we randomly selected 11 health centers out of 33 urban health centers existed in Tabriz. In the second stage, using records of households in each center, eligible women were identified, of whom, suitable proportion was randomly selected.

In line with international consistence society criteria, stress incontinence (SI) was defied to involuntary urine leakage during sneezing, coughing or laughing as well, urgent leak of urine considered as urinary urgency incontinence (UUI) [3]. AI refers to involuntary defecation and expulsion of flatus [4].

Inclusion criteria were naturally menopausal women

aged between 45 and 60 years old and having no mental retardation. A urine sample was taken from all participants to rule out urinary infection. Women with more than three white blood cells in mid-stream urine sample were considered ineligible. Written informed consent was obtained from women willing to take part.

### Sample size

Using Terauchi study [15], and given the prevalence of SI 35% among menopausal women, considering  $\alpha = 0.05$ ,  $\beta = 0.2$  and  $d = 0.05$ , and ultimate sample size was determined 340 women.

### Data collection

Data collection tools included demographic, and medical/midwifery history questionnaire, Pelvic Floor Distress Inventory-20 (PFDI-20) questionnaire, clinical examination. Demographic, medical/midwifery questionnaire composed of 25 question about age, menopause duration, number of pregnancies, last delivery mode, and systematic disease like hypertension, diabetes and chronic caught. Weight and height were measured with standard method. Body mass index was calculated as weight (kg)/height (m<sup>2</sup>) and categorized according to the World Health Organization classification as normal (< 25.0 kg/m<sup>2</sup>), over weight (25.1–29.9 kg/m<sup>2</sup>), and obese ( $\geq 30.0$  kg/m<sup>2</sup>).

POP was determined through clinical examination using simplified POP-Q, such that participants were placed in lithotomy position and requested to perform the Valsalva maneuver. In this system, the hymenal remnant is taken as a fixed reference point, and prolapse is assessed accordingly, such that prolapse was considered as first stage if the lowest prolapsed part was 1 cm above the reference point. If prolapse descent to 1 cm above to 1 cm below the hymenal remnants defines to stage 2. In the stage 3 prolapse point descends greater than 1 cm past the hymenal remnants during maximum push. This method is a practical and acceptable method which can replace to POP-Q [16].

We used of PFDI-20 questionnaire for assessment of incontinency and POP. It was already translated in Persian language by standard forward-backward method, Cronbach's alpha coefficient for each sub domain of PFDI-20 was more than 0.65 [17].

To assess the reliability of diagnosis of POP, 10 women were examined by first author and a gynecologist, after that, we calculated inter-rater reliability using by kappa-Cohen coefficient.

## Data analysis

Data were analyzed using by IBM SPSS software ver. 19 (IBM Corp., Armonk, NY, USA). Quantitative data were reported as mean  $\pm$  standard deviation (SD), and qualitative data were reported as frequency. For determining risk factors of UI/AI and POP we used of multivariate logistic regression with backward strategy, and in this part, data were reported as odds ratio and confidence interval.  $P \leq 0.05$  considered as significant.

## RESULTS

The present study was conducted between March 2016 and September 2017. Out of 393 women, met the inclusion criteria 86.5% (340 women) agreed to participate in the study. Participants' mean  $\pm$  SD age was 54.3  $\pm$  4.0 years; 99.4% were housewives, 89.9% were illiterate or had elementary education (less than 5 years formal education), and 204 cases (60.0%) reported having an average income (Table 1). The prevalence of SI was 50.9%, UUI was 49.8%, and AI was 15.6%. One hundred eighty-seven participants (55.0%) had one type of POP grade II or III.

**Table 1.** Sociodemographic and medical characteristics (n=340)

Characteristic	n (%)
Age (y)	
45–49	40 (11.7)
50–54	132 (38.8)
55–60	162 (47.6)
Body mass index (kg/m <sup>2</sup> )	
< 25.0	41 (12.05)
25.1–29.9	106 (31.1)
$\geq$ 30.0	193 (56.7)
Parity	
0–1	13 (3.8)
2–4	107 (31.5)
$\geq$ 5	220 (64.7)
Mode of recent delivery	
Vaginal delivery with episiotomy	68 (20.0)
Vaginal delivery without episiotomy	203 (59.7)
Cesarean section	63 (18.5)
Exercise <sup>a</sup>	26 (7.6)
Hot flash	235 (69.1)

<sup>a</sup>Aerobic exercise/fast walking 10–30 minutes 3 times per weeks.

Table 2 shows frequency UI/AI and POP according to age groups.

## Binary logistic regression

The multivariate analysis results showed that 2nd and 3rd degree prolapses are among risk factors for all types of incontinence, except for urge incontinence. Obesity is a risk factor for SI and UI. Other risk factors are also shown in Table 3.

## DISCUSSION

The present study conducted on 340 healthy menopausal women for assessment of any types of incontinence and POP prevalence. The results showed that almost half of participants suffered from UI and POP. About 1 in 7 women reported AI. Prevalence of SI in our participants was slightly higher than UUI.

In a systematic review of 50 studies Milsom et al. [2] reported the prevalence of UI 1.8% to 30.5% among European and 1.5% to 15.2% among Asian populations. Schreiber Pedersen [18] in a cross sectional study estimated that prevalence of UI among German and Danish women was about 45%. Similar incontinence, the range of POP frequency is vary from 3% to 54% [19].

It was difficult to compare the prevalence of POP and incontinence across the studies. Different methods for measurement as well as different population (according to age, sex, and comorbidities) are the most important causes of different results between the studies.

POP and incontinence are multifactorial. In line with other studies [19-21] we found several risk factors for them. Taken account to adjusted odds ratio, age and number of vaginal childbirths among the most significant risk factors of POP. With increasing 1 year, the odd of POP increases up to 10% as well as increasing every vaginal delivery leads to increasing odd of POP 4%. Other risk factors of POP was including obesity and episiotomy. It should be noted that according to the nature of study design we could not distinguish episiotomy from perianal tears during vaginal delivery.

In line with other studies [11,16], the present studies showed that UI/AI and POP have a common causes. POP was a remarkable risk factor for SI and AI. Gyhagen et al. [20] showed AI and UI were more seen in people with POP compared to those without. We found that obesity was risk factors of SI, UUI and POP and number of vaginal delivery was a risk factor for both SI and POP.

**Table 2.** Prevalence of incontinences and POP according to age of participants

Variable	Age group (y)		
	45–49 (n=42)	50–54 (n=136)	55–60 (n=161)
UUI	20 (47.6)	63 (46.3)	85 (52.5)
SI	22 (52.4)	66 (48.5)	85 (58.5)
AI	7 (16.6)	16 (11.8)	30 (18.6)
POP anterior (grade II/III)	22 (52.3)	53 (39.0)	83 (51.2)
POP middle (grade II/III)	15 (35.7)	33 (24.2)	60 (37.2)
POP posterior (grade II/III)	5 (11.9)	17 (12.5)	46 (28.5)

Values are presented as number (%).

POP: pelvic organ prolapse, UUI: urinary urgency incontinence, SI: stress incontinence, AI: anal incontinence.

**Table 3.** Multivariate regression model of risk factors of incontinences

Risk factor	Adjusted OR (95% CI), <i>P</i> -value			
	SI	UUI	AI	POP
POP	5.07 (2.71 to 10.21), < 0.05	-	2.92 (1.01 to 4.81), <0.001	-
Exercise	-3.21 (-1.12 to -5.22), 0.021	-	-	-
BMI $\geq$ 30 kg/m <sup>2</sup>	3.37 (2.11 to 8.32), 0.001	4.22 (2.91 to 10.32), 0.001	-	2.11 (1.21 to 3.67), 0.012
Hot flash	2.37 (1.71 to 4.51), 0.034	-	-	-
Age	-	-	-	9.83 (6.51 to 14.48), < 0.001
No. of vaginal delivery	-	-	-	4.17(2.09 to 8.72), 0.001
Episiotomy	-	-	3.12 (2.01 to 5.22), 0.011	3.71(2.55 to 7.34), 0.012
Diabetes	-	-	-	2.01 (1.01 to 2.97), 0.037

OR: odd ratio, CI: confidence interval, SI: stress incontinence, UUI: urinary urgency incontinence, AI: anal incontinence, POP: pelvic organ prolapse, BMI: body mass index.

In this study, exercise was protective factor against SI, which disagrees with the results obtained in a study by Shaw and Nygaard [22]. In a systematic review study, Bo et al. [23] concluded that there is no solid evidence for effectiveness of various types of exercise, such as breathing exercise, yoga, fitness, and Tai Chi yoga on UI. Yet, a study by Wu et al. [11] showed that lack of aerobic exercise increased UI and AI.

Hot flash was a risk factors for SI. Generally, the lack of estrogen is a risk factor for SI, and estrogen-therapy is an accepted treatment [24]. Therefore, it is acceptable to consider hot flash as a main sign of lack of estrogen and among predictors of SI.

There are some limitations in the present study. The study design was cross sectional. Probably we could not identified all risk factors of POP and UI/ AI according to the nature of study design.

This study was community base and participants recruited from healthy middle age women. It could be

leads to avoid from overestimation of incontinency and POP frequency. The POP was identified both of questionnaire and clinical exam and this is another strength for our study.

## CONCLUSION

The present study results showed that the prevalence of POP and UI and AI cannot be overlooked. It shows that women in middle age prefer to tolerate disorders especially disorders related with reproductive system.

Given the damaging effects of prolapse and incontinence on the quality of life and burden of the disease, assessment of POP and various incontinence in women, especially middle-age women should be on the agenda of family doctors and other health care providers in the primary health services system. Owing to present study results, the emphasis on modifiable risk factors including regular exercise, weight loss, should

be considered.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

## ACKNOWLEDGMENTS

This study was funded by Tabriz University of Medical Science (grant number: 5/4/4976).

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