

Prevalence and Associated Factors of Urinary Incontinence During Third Trimester of Pregnancy



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ABSTRACT

Background: Urinary incontinence is any involuntary passage of urine, which commonly prevalent health problems globally among pregnant women with varying between 6-75%. **Aim of the study:** The current study aimed to determine prevalence and associated factors of urinary incontinence during third trimester of pregnancy. Study Subjects and design: A descriptive cross-sectional study design was used on 233 pregnant women who chosen by systematic random sampling technique. **Setting:** The study was conducted at an Outpatient Antenatal Clinic of New Obstetric and Gynecological Hospital, Mansoura University, Egypt. Tool of data collection: Structured Interviewing Questionnaire which consists of four parts as demographic characteristics of pregnant women, obstetric and gynecological data, elimination habits and caffeine drinking and action taken when pregnant women have urinary incontinence. Results: The current study showed that less than half the studied pregnant women had urinary incontinence, more than two third of them who had urinary incontinence suffered in silence and ate high fiber diet and around half of them avoided laxatives for long time, treat cough, maintain healthy weight, empty bladder completely and decrease performance of domestic activity. Regarding associated factors, The present study showed that age $25 \geq 30$, gravidity >3 , parity 2-3, caesarean section, baby weight at last delivery 2.5-3kg, bronchial asthma, chronic cough and sneeze, lower segment caesarean section, constipation, caffeine drinking are common associated factors of urinary incontinence Conclusion: Urinary incontinence was prevalent among studied pregnant women and previous caesarean section, baby weight, bronchial asthma, constipation are associated factors of urinary incontinence. Recommendations: All pregnant women should be screened for UI during antenatal follow up. Also, development of educational program for the pregnant women with urinary incontinence about drinking plenty of fluid, eat high fiber diet, exercise regularly, proper toilet habits and healthy lifestyle choices

Keywords: Associated Factors, Prevalence, Third Trimester, Urinary Incontinence

Introduction

Urinary incontinence (UI) is the complaint of involuntary loss of urine. The International Continence Society (ICS) categorized the urinary incontinence into three distinct subtypes. Stress urinary incontinence (SUI) occurs when there is leakage of urine during activities requiring physical exertion, such as sneezing or coughing. Urgency urinary incontinence (UUI) is characterized by the involuntary loss of urine, typically accompanied or immediately preceded by a sudden urge to urinate. Mixed urinary incontinence (MUI) is diagnosed when a patient exhibits symptom that align with both stress and urgency urinary incontinence (Shaikh et al., 2024).

Urinary incontinence is a common condition affects 17–45% of women worldwide and represents 27.7% in Egypt. UI Overall UI prevalence rates among the Middle East countries, Qatar, United Arab Emirates and Riyadh in Saudi Arabia were 20.6%, 20.3%, 41.4%, and 29%,

respectively. Many pregnant women do not seek medical attention as they do not aware that UI is treatable. often pregnant women are shy to discuss it, thinking it is culturally sensitive (Elattar et al., 2022).

There are some factors that increase the susceptibility to incontinence throughout pregnancy include previously compromised pelvic floor muscles, constipation which exerts pressure on the pelvic floor, urinary tract infection, diabetes, obesity and heart disease, multiple pregnancies, smoking, sedentary lifestyle, having a large baby, for more than one pregnancy (Rajavuori et al., 2022).

2.1 Significance of the Study

Urinary incontinence was a significant problem during pregnancy. It does not cause mortality but morbidity is increased in the form of constant skin irritation and local infection along with distressing psychological consequences (Ting

& Cesar, 2020). Even though UI is not a fatal condition, it can cause social isolation and erode one's confidence in social interactions. Many pregnant women suffer in silence as a result of the dearth of knowledge on UI, and the shame attached to the condition often prevents it from being reported (Erkal Aksoy, Akin & Dereli Yilmaz, 2021).

The prevalence of UI increases with pregnancy lengthening and peaks, typically, in the third trimester (Caruso, Schreiner, Todescatto, Crivelatti & Oliveira, 2021). The prevalence of UI during pregnancy in Europe is between 36-76%, North & South America 53-68% and in Pakistan 55% (Mostafaei et al., 2020). The prevalence of UI during pregnancy in developing countries (Egypt) is about 27.7% and almost women feel ashamed and embarrassed in reporting urinary incontinence due to the social norms (Wasfy, Soltan, Abdelwahab, & Salama, 2021).

Due to the risk factors that include multiparity, inadequate health infrastructure, lack of UI intervention, and a negative attitude about UI, women in low-income countries are more susceptible to these issues. Pregnant women may experience UI more frequently than reports indicate which could have a more negative impact on their daily lives (Ting & Cesar, 2020). Due to limited local data on urinary incontinence especially during pregnancy and we need to know magnitude of the problem in local community. So this study was conducted.

2.2 Aim of the Study

The present study aimed to determine prevalence and associated factors of urinary incontinence during third trimester of pregnancy.

2.3 Research question

What are the prevalence and associated factors of urinary incontinence during third trimester of pregnancy?

3. subjects and Method

3.1 Design

A descriptive cross-sectional study was used to define a population at a specific point of time without attempting to draw any interference (Polit, Beck & Owen, 2022).

3.2 Setting

The study was conducted at an Outpatient Antenatal Clinic of New Obstetric and Gynecological Hospital. That is affiliated to Mansoura University Hospital and the Ministry of Higher Education. It is on the first floor and comprises of a waiting hall with around 30 chairs, a

laboratory, and three rooms. One room is dedicated to 4D ultrasound; while the other two are used for routine examinations of pregnant women (consist of coach, 3 chairs, weight scale, sphygmomanometer and Doppler ultrasound). The Outpatient Antenatal Clinic is open for five days per week from Saturday to Wednesday, from 9 a.m. to 2 p.m. There were about 50 follow-up cases per day.

Sample

A systematic random sample was used.

Study subjects

The study sample consisted of (233) pregnant women who were attending to Outpatient Antenatal clinic of New Obstetric and Gynecological hospital from the beginning of March 2022 to the end of August 2022 according to the following criteria.

Inclusion criteria

- Healthy pregnant women.
- Pregnant women in third trimester.

Exclusion criteria

- Pregnant women who complain from any kidney disease or urethral infection that causing UI.

Sample size calculation:

Based on data from literature (Yaqub, Habib & Shaheen, 2019) to calculate the sample size with precision/absolute error of 5% and type 1 error of 5%, the sample size for the study is 233. Sample size = $[(Z1-\alpha/2)^2 \cdot P(1-P)]/d^2$

Where,

$Z1-\alpha/2$ = is the standard normal variate, at 5% type 1 error ($p < 0.05$) it is 1.96.

P = the expected proportion in population based on previous studies.

d = absolute error or precision.

So,

Sample size = $[(1.96)^2 \cdot (0.321) \cdot (1-0.321)] / (0.06)^2 = 232.6$

Based on the above formula, the sample size required for the study is 233 pregnant women.

3.4 Data Collection Tools

Tool of data collection

One tool was utilized for data collection: Structured Interviewing Questionnaire. This tool was developed by the researcher after reviewing national and international relevant literature (Nigam et al., 2016 Ibrahim, Abd-Elmoneim & Mohamady, 2020). It is a simplified, valid form. It consisted of four parts:

Part (1):Demographic characteristics of the studied pregnant women, such as: Age, educational level, residence, occupation and Body Mass Index.

Part (2): Obstetric and Gynecological data of the studied pregnant women, such as: gravidity, parity, previous abortion, mode of last delivery, baby weight at last delivery, previous perineal tear /laceration, previous dilation &curettage, previous medical history, previous surgical history, types of previous surgery , onset and number of initial AN visits in current pregnancy, presence of urinary incontinence, pre-pregnancy urinary incontinence, types of urinary incontinence & onset of urinary incontinence.

Part (3): Elimination habits and drinking of the studied pregnant women, such as: constipation, caffeine drinking, types of drinking& amounts of drinking per day.

Part (4): Action taken when pregnant women have urinary incontinence, such as: Suffering in silence UI, engaged in regular pelvic floor muscle exercise, decrease fluid intake, decrease performance of domestic activity, using perineal pad, empty bladder completely when voiding, timely voiding, maintain healthy body weight, eat high fiber diet, treat cough early as possible and avoid laxative for long period of time.

Validity of the study tool

The tools were reviewed by three juries of woman's health and midwifery nursing experts from the faculty of nursing, Mansoura University. These experts assessed the tools for clarity, relevance, application, comprehensive, and understanding. According to their comment's modification was considered as certain sentences were simplified to be easily understood by the women.

Reliability of the tools

The tool II was tested for its reliability by using Cronbach's α (alpha) test; The Cronbach's α value (internal consistency) was (0.893) which indicate high reliability.

Ethical consideration

Ethical approval was obtained from the head of woman's health and midwifery nursing department followed by approval from the Research Ethics Committee at the Faculty of Nursing, Mansoura University to implement the study. Official permission was obtained from the director at the previously mentioned study setting after explaining the study's aim. Prior to data collection, verbal consent was obtained from all

studied pregnant women after explaining the nature and aim of the study. The studied pregnant women were reassured about anonymity, privacy, safety and confidentiality of the collected information throughout the whole study. The studied pregnant women were informed about their rights to refuse or withdraw from the study at any time. Code numbers instead of the names of studied pregnant women were used for identifications. The studied pregnant women were informed that result would be used as components of the necessary research for Master study as well as for publication and education. After finishing data collection all sheets were burned.

Date Collection Process

The actual field work of the study was conducted over a period of six months from the beginning of March 2022 to the end of August 2022. It was carried out through two stages: Preparatory stage which included three phases (administrative phase, reviewing literature & developing tools and pilot phases) and operating stage which included two phases (data collection and data analysis).

I. Preparatory stage

- 1. Administrative phase:** This phase was started by obtaining all forms of approval from the concerned authorities, head of department, Research Ethics Committee at the Faculty of Nursing, Mansoura University and an official letter from the Faculty of Nursing, Mansoura University was directed to the director in the previous mentioned study setting after explaining the study's aim.
- 2.Reviewing literature and developing the tool:** Tools for data collection were designed after reviewing the national and international related literatures. The review collected was a guide for developing the tool for data collection.
- 3. Pilot study:** After preparing the tool, a pilot study was conducted prior to data collection on (24) pregnant women 10% of the sample size to evaluate the clarity and applicability of tool, ensure that questions were consistently delivered to pregnant women and that they carry out intended meaning that were designed to achieve. It also helped to estimate what was needed to complete the questionnaire to be clear and relevant. The pilot study was excluded from the study sample.

II. Operating stage

1. Data collection phase

- The researcher started data collection from the outpatient antenatal clinic of the new obstetrics and gynecology hospital, which affiliated at Mansoura university hospitals.
- The researcher attended the previously mentioned setting three days (Saturday, Monday and Wednesday) weekly from 9 A.M. to 1 P.M. until the end of data collection of studied women.
- The researcher introduced herself to the women, explained the aim of the study and obtained the women's consent to participate in the study after assuring the confidentiality of data.
- The researcher selected pregnant women by systematic random sampling technique where select one from three pregnant women according to inclusion & exclusion criteria. After those pregnant women who had inclusion criteria was interviewed individually for about 30 - 45 minutes in a comfortable room to collect data by using the data collection tool.
- The researcher started first by asking the studied pregnant woman about demographic data, obstetric data, elimination habits and drinking history and action taken when pregnant women had urinary incontinence.
- Pregnant women were permitted to ask for any interpretation and explanation.
- The researcher asked the pregnant woman and recorded her answers in the data collection sheet.
- Data was gathered by the researcher until the required sample was obtained.
- The collected data was coded then stored.
- The results were then assessed and analyzed.

Statistical Analysis

All statistical analyses were performed using SPSS for windows version 20.0 (SPSS Chicago, IL) version 20.0. Continuous data were expressed in Mean \pm standard deviation (SD). Categorical data were expressed in number and percentage. Chi-square test was used for comparison of variables with categorical data. Cronbach's alpha test was performed to test for the internal consistency of the tool used in the study. Statistical significance was set at $p < 0.05$.

4. Results

Table 1 Shows that 57.5% of the studied pregnant women aged from $25 \geq 30$ years with Mean \pm SD 26.3 ± 6.0 . 40.3% of studied pregnant women had intermediate education, 71.7% of them were housewives, 50.6% of studied pregnant women were from rural area and 69.1% had normal body mass index.

Table 2 Shows that 53.2% of the studied pregnant women had 2–3 gravidity, 42.9% of them had 2 – 3 parity, 81.9% of them had caesarean section and 15.9% had baby weight 3.5 kg & more, Also 8.6% of them had previous perineal tear or laceration & 30% of them had previous dilation and curettage.

Figure 1 Shows that 21.9% of the studied pregnant women had hypertension, followed by 18.0% of them had history of chronic cough & sneeze in last pregnancy followed by 12.4% of them had bronchial asthma. As regarding to previous surgical history 70.4% of them had surgery in which 90.9% of them had lower segment caesarean section.

Table 3 Shows that 58.8% of the studied pregnant women had constipation, 66.1% of them drink caffeine in which 52.6% drink cola for 3-4 cups of drinking per day.

Figure 2: Demonstrates that 41.2% of the studied pregnant women were had urinary incontinence.

Table 4 Shows that 67.7% & 66.7% respectively of the studied pregnant women who had urinary incontinence suffered in silence from urinary incontinence and ate high fiber diet, followed by 52.1% & 49% of them avoided laxative for long period of time and treated cough respectively. 44.8%, 41.7% & 39.6% respectively of studied pregnant women maintained healthy body weight, emptied bladder completely when voiding, decreased performance of domestic activity and used perineal pads, while only 37.5%, 27.1% & 16.7% respectively of them made timely voiding, engaged in regular pelvic floor muscle exercise and decreased fluid intake.

Table 5 Shows that the age $25 \geq 30$, gravidity > 3 , parity 2-3, C.S, baby weight at last delivery 2.5-3kg, previous dilation and curettage and previous perineal tear/ laceration were associated factors of urinary incontinence.

Table 6 Shows that initial antenatal visit in current pregnancy, pregnant women suffer from bronchial asthma, chronic cough and sneeze, lower segment caesarean section surgery, constipation,

caffeine drinking and amount of drinking were also associated factors of urinary incontinence.

Table 1. Number and Distribution of the Studied Pregnant Women According to Their Demographic Characteristics

	N=233	%
Age (Years)		
<20	28	12.0
20 < 25	71	30.5
25 ≥ 30	134	57.5
Mean ±SD	26.3±6.0	
Educational Level		
Can't read and write	14	6.0
Basic education	18	7.7
Secondary education	56	24.0
Intermediate education	94	40.3
University education and more	51	22.0
Occupation		
Employee	66	28.3
Housewife	167	71.7
Residence		
Rural	118	50.6
Urban	115	49.4
BMI		
Normal (18 – 24.9)	161	69.1
Overweight (25 – 29.9)	58	24.9
Obese (30 and above)	14	6.0
Mean ±SD	25.4 ±3.7	

Table 2: Number & percentage distribution of the studied pregnant women according to their obstetric data

Items	n = (233)	%
Gravidity		
Primigravida	51	21.9
2 – 3	124	53.2
>3	58	24.9
Parity		
Nulliparous	51	21.9
Primiparous	52	22.3
2 – 3	100	42.9
> 3	30	12.9
Previous abortion		
Yes	21	9.1
No	212	90.9
Mode of last delivery (n=182)		
Spontaneous vaginal delivery (SVD)	6	3.3
vaginal delivery with episiotomy	27	14.8
Caesarean section (C.S)	149	81.9
Baby weight at last delivery (n=182)		

2.5 < 3 kg	97	53.3
3 < 3.5 kg	56	30.8
3.5 > 4 kg	29	15.9
Previous perineal tear/ laceration		
Yes	6	8.6
No	176	91.4
Previous dilation and curettage		
Yes	70	30.0
No	163	70.0

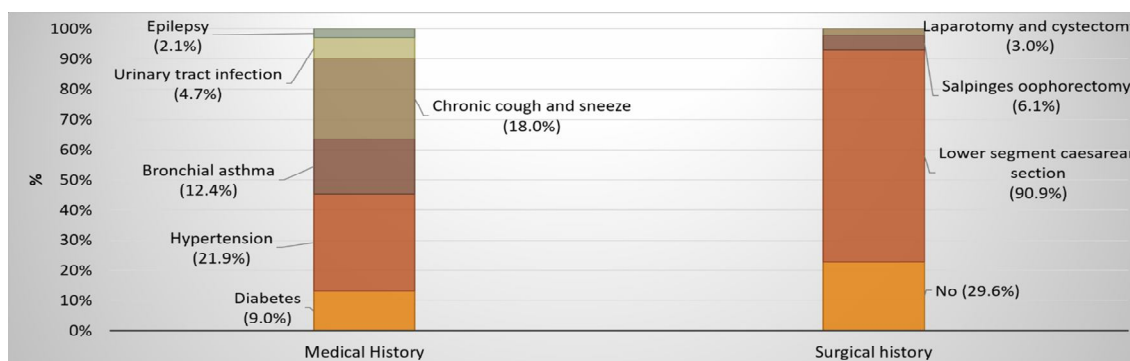


Figure 1. Distribution of the Previous Medical History (n=233), Surgical History (n=233) and its Types (n=164)

Figure 1. Number & percentage distribution of the studied pregnant women according their medical and surgical history (n=233).

Table 3. Number & percentage Distribution of the Studied Pregnant Women According to their Elimination Habits and Drinking.

Items	(n=233)	%
Constipation		
-Yes	137	58.8
-No	96	41.2
Caffeine drinking		
-Yes	154	66.1
-No	79	33.9
Type of drinking (n=154)		
-Tea	8	5.2
-Chocolate	37	24.0
-Cola	81	52.6
-Nescafe	28	18.2
Amount of drinking per day (n=154)		
- 1 – 2 cups	57	37.0
- 3 – 4 cups	83	53.9
- More than 4 cups	14	9.1

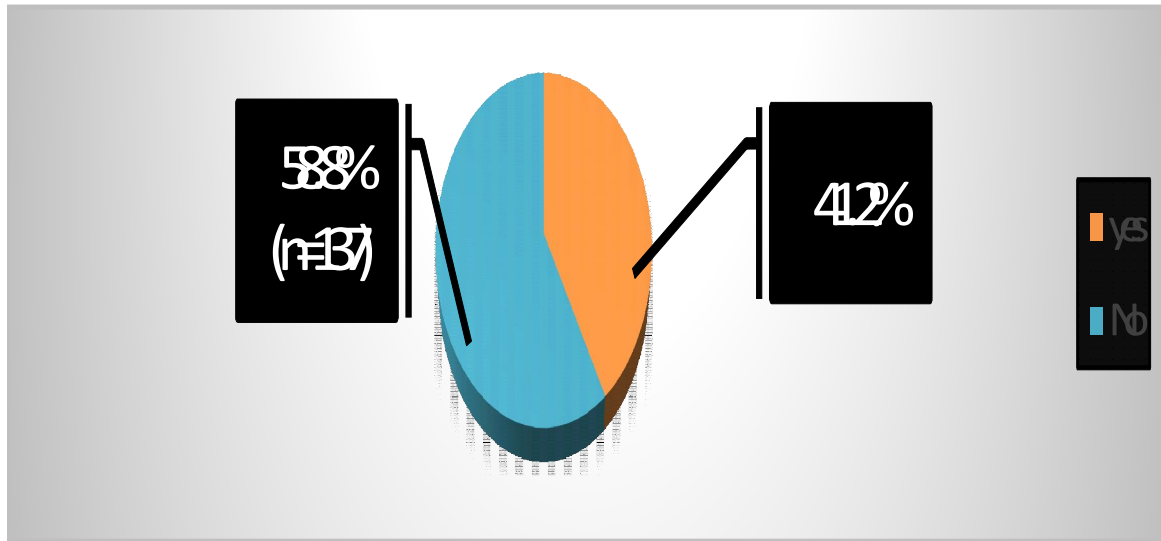


Figure 2. Prevalence of Urinary Incontinence Among the Studied Pregnant Women (n=233)

Table 4. Number & Percentage Distribution of the Studied pregnant Women According to their Action taken When they are Having Urinary Incontinence.

Items (*)	n= (96)	%
- Suffering in silence UI	65	67.7
- Engaged in regular pelvic floor muscle exercise	26	27.1
- Decrease fluid intake	16	16.7
- Decrease performance of domestic activity	40	41.7
- Using perineal pads	38	39.6
- Empty bladder completely when voiding	43	44.8
- Timely voiding	36	37.5
- Maintain healthy body weight	43	44.8
- Eat high fiber diet	64	66.7
- Treat cough early as possible	47	49.0
- Avoid laxative for long period of time	50	52.1
Note (*) Multiple choices are possible.		

Table 5. Associated Factors of Urinary Incontinence Among the Studied Pregnant Women.

Associated factors	Prevalent (n=96)		Not Prevalent(n=137)		Significance test	
	n	%	n	%	X ²	P
Age (years)						
20	0	0.0	28	20.4		
20 < 25	9	9.4	62	45.3		
25 ≥ 30	87	90.6	47	34.3	101.747	<0.001**
Gravidity						
Primigravida	0	0.0	51	37.2		
2 - 3	42	43.8	82	59.9		
>3	54	56.2	4	2.9	102.981	<0.001**
Parity						
Nulliparous	0	0.0	51	37.2		
Primiparous	19	19.8	33	24.1		
2 - 3	47	49.0	53	38.7		
>3	30	31.3	0	0.0	80.404	<0.001**
Mode of last delivery (n=182)						
Spontaneous vaginal delivery (SVD)	1	1.2	5	5.2		
Spontaneous vaginal delivery with episiotomy	27	31.4	0	0.0		
Caesarean section (C.S)	58	67.4	91	94.8	36.536	<0.001**
Baby weight at last delivery (n=182)						
2.5 < 3 kg	30	31.3	67	69.8		
3 < 3.5 kg	27	28.1	29	30.2		
3.5 > 4 kg	29	30.2	0	0.0	42.764	<0.001**
Previous perineal tear/ laceration						
Yes	20	20.8	0	0.0		
No	76	79.2	137	100.0	31.222	<0.001**
Previous dilation and curettage						
Yes	66	68.8	4	2.9		
No	30	31.3	133	97.1	116.389	<0.001**

* Statistically Significance p≤ 0.001

Table 6. Continue, Associated Factors of Studied Pregnant Women with Urinary Incontinence

	Prevalent (n=96)		Not Prevalent(n=137)		Significance test	
Initial AN visit in current pregnancy						
First trimester	69	71.9	78	56.9		
Second trimester	7	7.3	41	29.9		
Third trimester	20	20.8	18	13.1	18.085	<0.001**
Medical history						
Diabetes	13	13.5	8	5.8	4.083	0.043*
Hypertension	22	22.9	29	21.2	0.101	0.750
Bronchial asthma	22	22.9	7	5.1	16.425	<0.001**
Chronic cough and sneeze	29	30.2	13	9.5	16.399	<0.001**
Surgical history						
Yes	90	93.8	74	54.0		
No	6	6.3	63	46.0	42.757	<0.001**
Types of previous Surgeries (n=164)						
Lower segment caesarean section	60	85.8	89	94.7		
Salpinges oophorectomy	5	7.1	5	5.3		
Laparotomy and cystectomy	5	7.1	0	0.0	7.288	0.026*
Constipation						
Yes	70	72.9	67	48.9		
No	26	27.1	70	51.1	13.434	<0.001**
Caffeine drinking						
Yes	92	95.8	62	45.3		
No	4	4.2	75	54.7	64.435	<0.001**
Type of drinking (n=154)						
Tea	42	67.7	60	65.2	0.106	
Chocolate	14	22.6	23	25.0	0.119	
Cola	39	62.9	42	45.7	4.421	
Nescafe	11	17.7	17	18.5	0.013	0.035*
Amount of drinking per day (n=154)						
1 – 2 cups	17	27.4	40	43.5		
3 – 4 cups	45	72.6	38	41.3		
More than 4 cups	0	0.0	14	15.2	18.738	<0.001**

Discussion

The present study aimed to determine prevalence and associated factors of urinary incontinence during the third trimester of

pregnancy. The results of the study answered the study question that were less than half of studied pregnant women had urinary incontinence & it's associated factors during third trimester of pregnancy were age,

gravidity, parity, previous abortion, mode and baby weight of last delivery, previous perineal tear or laceration, previous dilation and curettage, initial antenatal visits in current pregnancy, medical history as bronchial asthma, chronic cough and sneeze, constipation and caffeine drinking.

The current study findings show that more than half of the studied pregnant women had 2–3 times gravidity. In accordance to study done by **Ibrahiem, Abd-Elmoneim & Mohamady (2020)** who assess the urinary incontinence's risk factors among pregnant women in Helwan and found that about more than half of the pregnant women were 3 times gravidity. This may be due to more than half of the studied sample was aged from 25-30 years old and reproductive age in Egypt is about 25 to 45 years.

While the present study results were in contrary to study done by **Aydin, Kocaoz & Kara (2020)** who study the prevalence of lower urinary tract symptoms in pregnant adolescents and the influencing factors, it found that the majority of the studied pregnant women had 1 times gravid. This may be due to cultural differences between developing countries as Egypt and developed countries.

The current study findings showed that the majority of the studied pregnant women had a history of caesarean section. In accordance with study done by **Jaffar et al. (2020)** who study urinary incontinence and its association with pelvic floor muscle exercise among pregnant women attending a primary care clinic in Malaysia and found that more than three quarter of the studied pregnant women had a history of caesarean section among the multi-gravida women. This may be due to the number of caesarean section (C-section) deliveries has been growing rapidly in many countries such as Egypt with rate of (72.2%) that is an emerging global epidemic.

While the current study findings were disagreeing with study done by **Yaqub, Habib & Shaheen (2019)** who assess the frequency of urinary incontinence (UI) and its associated risk factors in pregnant population in Pakistan and found that the majority of the studied pregnant women were parous women with vaginal delivery. This may be due to differentiation of sample size between current and other study.

The current study findings showed that most of the studied pregnant women hadn't previous perineal tear or laceration. This study findings in agreement with study done by **Aydin, Kocaoz & Kara (2020)** who found that the majority of the studied pregnant women were had episiotomy and had no laceration. This may be regarded as urinary incontinence caused by to weakness of internal bladder sphincter or weakness of pelvic floor muscle but perineal tear or laceration occur in external vaginal orifice.

As well as less than one third of the studied pregnant women had previous dilation and curettage. Dissimilarly with study done by **Chang et al. (2023)** who studied factors determining the persistence of prenatal stress urinary incontinence, 12 months postpartum in Taiwan and revealed that the majority of the studied pregnant women were had previous dilation and curritage. This may be regarding to the dilation and curettage may be used as therapeutic procedure for abortion, and the least of studied pregnant women in current study were previous abortion.

The current study findings showed that less than one quarter of the studied pregnant women had hypertension, followed by history of chronic cough & sneeze in last pregnancy then bronchial asthma. The present study results were inagreement with study done by **Ibrahiem, Abd-Elmoneim & Mohamady (2020)** who found that nearly one quarter of the studied pregnant women had essential hypertension during pregnancy, chronic cough & sneeze and bronchial asthma.

While the present study results were disagree with study done by **Syeda, Aldobashi, Kapadia & Boodili (2022)** who study prevalence of urinary incontinence among pregnant women in Al-Ain hospital in United Arab Emirates and found that the majority of the studied pregnant women not had hypertension or diabetes. This may be regarded to decrease percentage of pregnant women with obesity in this study and as it known that obesity is considered a risk factor for hypertension.

Concerning the previous surgical history; the current study findings revealed that more than two third of studied pregnant women had previous surgical history which most of them had lower segment caesarean section. The present study results were inagreement with study done by **Khan et al.**

(2023) who conduct a study on Frequency of urinary incontinence and its risk factors among pregnant women in Pakistan and found that less than three quarter of the studied pregnant women were had undergone pelvic surgery history. This may be due to majority of studied pregnant women were delivered by caesarean section.

Concerning elimination habits and drinking, the current study results showed that more than half of the studied pregnant women had constipation. This is in accordance with study done by **Maeda et al. (2017)** who showed that female functional constipation was associated with overactive bladder symptoms and urinary incontinence and found that functional constipation was related to overactive bladder with UI in female women. This may be due to increased baby weight during third trimester may affect external anal sphincters and peristaltic movement thus lead to accumulation of stool inside intestine causing constipation.

The current study findings revealed that two third of studied pregnant woman drink caffeine in which more than half drink cola for 3-4 cups per day. This study findings were agreement with study done by **Yusoff, Awang & Kueh (2019)** who study urinary incontinence among pregnant women attending an antenatal clinic at a tertiary teaching hospital in North-East Malaysia and found that two third of studied pregnant women were caffeinated drink consumption.

While the present study findings were disagreement with study done by **Morsy & Alhady (2019)** who study nutritional status and socio-economic conditions influencing prevalence of urinary incontinence in pregnant women in Egypt and found that less than one third of studied pregnant woman drink caffeine as cola frequently per day.

The current study showed that less than half of studied pregnant women had prevalence of urinary incontinence. The study findings were agree with study done by **Ghani et al. (2022)** who study the prevalence of urinary incontinence in pregnant women and found that the prevalence of urinary incontinence was nearly half studied pregnant women.

While the present study findings were in contrast with study done by **Wuytack, Moran and Begley (2021)** who studied

prevalence of urinary incontinence and association between multiple deliveries and obesity during pregnancy and they found that prevalence of UI was less than one fourth of total sample.

Regarding to action taken when the studied pregnant woman had urinary incontinence, the current study findings revealed that two third of studied pregnant women suffered in silence from urinary incontinence followed by ate high fiber diet, then more than one third had used perineal pad and decrease fluid intake. This may be due to more than half of studied pregnant women lived in rural area with intermediate level of education and were embarrassed. The present study findings similarly with study done by **Erkal, Aksoy, Akin, Dereli & Yilmaz (2021)** who study urinary incontinence experiences of pregnant women in Turkey and found that strategies to take precautions consists of social isolation, using pads/ changing clothes and reducing fluid intake.

While the present study results were dissimilarly with study done by **Yusoff, Awang, & Kueh (2019)** and found that the most strategies used by female to minimize the occurrence of urine leakage were having timely schedule for going toilet and emptying the bladder completely when voiding then use absorbent. This may be due to cultural differences.

Regarding associated factors of urinary incontinence among studied pregnant women, the present study findings revealed that there was highly statistical significance relation between age of studied pregnant women and prevalence of urinary incontinence. In accordance with **Abufaraj et al. (2021)** who study the prevalence and trends in urinary incontinence among women in Austria, they found that there was a relation between age and prevalence of UI. This may be due to weakness of bladder sphincter with age and less than one third of studied pregnant women had practice exercise.

While, the present study findings were disagree with study done by **Huebner, Ma & Harding (2022)** who study sport-related risk factors for moderate or severe urinary incontinence in master female weightlifters in United States and found that the age was not associated with moderate or severe UI.

Also, the current study shown that there was highly statistical significance relation between the prevalence of urinary incontinence and gravidity, the present study findings were in agreement with study done by **Fareed et al. (2023)** who study prevalence ratio of urinary incontinence and its association with parity and gravidity and found that there was a statistically relation between the prevalence of UI and gravidity.

While, a contrary study done by **Elserafy, Shaheen, Khalil & Abdelrahman (2019)** who study urinary incontinence among pregnant women attending a rural family health center in Gharbiya Governorate, Egypt and found that there was no statistically significant relationship between urinary incontinence and gravidity.

Moreover, the present study results revealed that there was a highly statistical significance relation between the prevalence of urinary incontinence and parity. The current study findings were dissimilarly with study done by **Torgbenu, Aimakhu, Morhe & Ameyaw (2023)** they found that the parity ≥ 3 times was independent risk factors for new onset of urinary incontinence. This may be due to difference of sample size of parous women ≥ 3 in two studies.

Furthermore, the present study results revealed that there was a highly statistical significance relation between the prevalence of urinary incontinence and mode of last delivery. In accordance with **Chen, Luo, Chen, Xjin & Cai (2020)** who study development of predictive risk models of antepartum urinary incontinence for primiparous and multiparous women and found that there was a relation between urinary incontinence and mode of delivery.

While the present study findings were dissimilarly with study done by **Fareed et al. (2023)** who found that the vaginal delivery was independent risk factors for postoperative new-onset UI. Also the study findings disagree with study done by **Tahtinen et al. (2019)** who study long-term risks of stress and urgency urinary incontinence after different vaginal delivery modes and found that there was no association of urinary incontinence with mode of delivery.

Also, the present study results revealed that there was a highly statistical significance relation between the prevalence of urinary

incontinence and baby weight at last delivery. In agreement with study done by **Xu et al. (2023)** who study establishment and validation of a simple mamogram for predicting early postpartum stress urinary incontinence among women with vaginal delivery in China and found that there was statistical significance relation between the prevalence of urinary incontinence and baby weight at last delivery. This may be regarded to baby weight at time of delivery cause pelvic floor stretch and remain stretched for some time. In addition to, the combination of hormones and stretched muscles means the muscles that control of bladder are weakened. This can lead to an accidental leak of urine.

The present study findings revealed that there was highly statistical significance relation between the prevalence of urinary incontinence and previous perineal tear/laceration. In accordance with study done by **Alshehri et al. (2022)** who study patterns of urinary incontinence among pregnant women and found that urinary incontinence strongly related with the presence of preceding perineal tear. this may be due to perineal tear can affect the strength of pelvic floor muscle and weakened the internal urethral sphincter then lead to loss of control and scape of urine occur.

The present study findings revealed that there was highly statistical significance relation between the prevalence of urinary incontinence and previous dilation and curettage. These findings were similarly with study done by **Citak & Demirturk (2021)** who study urinary incontinence during pregnancy and determination of the factors affecting urinary incontinence in Turkey and found that there was a relation between urinary incontinence and mechanical factors such as dilation and curettage. This may be due to dilation and curritage may interrupt the normal anatomical structure of pelvic floor muscle.

The present study results revealed that there was highly statistical significance relation between prevalence of urinary incontinence and bronchial asthma, chronic cough and sneeze. In accordance with **Abufaraj et al. (2021)** who study the prevalence and risk factors of urinary incontinence in pregnant females in India and found that there was a strong relation between urinary incontinence and chronic cough. This

may be due to chronic cough causing an irritation to myofascial muscle of the diaphragm, intercostal muscles, and transverse abdominal muscle and thus, may cause the intra-abdominal pressure increases which will pressurize the pelvic floor and overload PFM producing involuntary urine leakage.

While the present study finding was dissimilarly with study done by **Ajith et al. (2019)** who study prevalence and factors of urinary incontinence among postmenopausal women attending the obstetrics and gynecology outpatient service in a tertiary health care center in Indian and found that chronic cough, recurrent urinary tract infections (UTI) and prolonged duration of labor were independent risk factors associated with urinary incontinence.

The present study results found that there was a highly statistical significance relation between prevalence of urinary incontinence and constipation, this was in accordance with study done by **Lian et al. (2019)** who study constipation and risk of urinary incontinence in women in China and found that the constipation was significantly associated with the risk of urinary incontinence in women. Also, study done by **Ural, Gucuk, Ekici & Topcuoglu (2021)** who study prevalence and risk factors of urinary incontinence among pregnant women in Sydney and found that the constipation was risk factors associated with urinary incontinence. This may be due to increased intra-abdominal pressure resulting from bearing down during constipation thus enhancing occurrence of urinary incontinence.

The present study revealed that there was a highly statistical significance relation between prevalence of urinary incontinence and caffeine drinking specially cola and amount of drinking specially 3 – 4 cups per day. In accordance with **Razzaq et al. (2022)** who studied prevalence of urinary incontinence in pregnant women study in Pakistan and found that there was a highly statistical significance relation between prevalence of urinary incontinence and drinking cola and with nearly one liter per day. This may be due to caffeine being able to irritate the bladder and increase in flow rate and frequency of urination.

Conclusion

Less than half of studied pregnant women had prevalence of urinary incontinence, which the age, gravidity, parity, lower segment caesarean section, baby weight at last delivery, previous dilation and curettage, previous perineal tear/ laceration, bronchial asthma, chronic cough and sneeze, constipation, caffeine drinking and amount of drinking, are associated factors of urinary incontinence.

Recommendation

- All pregnant women should be screened for urinary incontinence during antenatal follow up.
- Increase awareness of the pregnant women with urinary incontinence about factors that increase occurrence of urinary incontinence.
- Encourage pregnant women with urinary incontinence to express about complain by visiting her doctor without embarrassment.
- Providing health education for the pregnant women with urinary incontinence about drinking plenty of fluid, eat high fiber diet, exercise regularly, proper toilet habits and healthy lifestyle choices.
- Training program for pregnant women with urinary incontinence about pelvic floor muscle exercise.

Further study

- Explore the effect of C. section on prevalence of urinary incontinence.
- Assessment the knowledge about UI and behaviors among pregnant women.
- Effect of applying self-management mobile App on urinary incontinence in pregnant women.

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Conflict of Interests

- The authors state that there is no conflict of interests regarding this study.

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