The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 1, 2025

COMPARISON OF PREVALENCE OF URINARY INCONTINENCE IN WOMEN FOLLOWING SPONTANEOUS VAGINAL DELIVERY AND CESAREAN DELIVERY

[*1]Ayesha Ali Butt, [2]Habiba Sharaf Ali, [3]Paras Golo, [4]Wafa Memon

[1]Postgraduate Resident, Obstetrics & Gynaecology, Ziauddin Medical University & Hospital, Karachi
[2]Professor, Obstetrics & Gynaecology, Ziauddin Medical University & Hospital, Karachi
[3]Postgraduate Resident, Obstetrics & Gynaecology, Ziauddin Medical University & Hospital, Karachi
[4]Postgraduate Resident, Obstetrics & Gynaecology, Ziauddin Medical University & Hospital, Karachi

[*1]doc.aisha99@gmail.com

DOI: https://doi.org/10.5281/zenodo.20086378

Keywords:
Cesarean section, Postpartum period, Prevalence, Urinary incontinence, Vaginal delivery

Article History
Received on 22 Nov, 2024
Accepted on 26 Dec, 2024
Published on 03 Jan, 2025

Corresponding Author:
Ayesha Ali Butt

Abstract

Objective: To determine and compare frequency of urinary incontinence in women following spontaneous vaginal delivery and cesarean delivery.Study Design: Descriptive study. Place and Duration of Study: Department of Obstetrics and Gynaecology at Ziauddin Medical University and Hospital, Karachi, over a period of six months from May 2024 to October 2024. Methodology: Total 81 women aged 18 to 45 years with gestational age more than 37 weeks (by last menstrual period) underwent for delivery irrespective of vaginal and cesarean delivery were included. Women were followed at 6 weeks and 12 weeks after delivery for assessment of urinary incontinence. Data was analysed using statistical package for social sciences 27. Results: Mean age was 32.44 ± 8.33 years and mean body mass index was 28.86 ± 3.48 kg/m2. Urinary incontinence was present in 39 (48.1%) women. Vaginal delivery was seen in 56 (69.1%) and cesarean delivery in 25 (30.9%). Among vaginal delivery, 33 (58.9%) had urinary incontinence while in cesarean delivery 6 (24.0%) had urinary incontinence. Significant association was found between urinary incontinence and mode of delivery (p = 0.004). Conclusion: Urinary incontinence is common and it is more frequent in women having spontaneous vaginal delivery as compared to cesarean delivery.

Introduction:

Incontinence of urine among pregnant ladies is a frequent condition that can be regarded as an essential health concern for mothers.[1] This term refers to the unintentional release of urine and occurs frequently during pregnancy because of the effect of hormones and physiological changes.[2] The expanding uterus exerts additional pressure on the bladder, resulting in weakened pelvic floor muscles that do not provide adequate support for the urethra.[3] Leakage of urine may occur during coughing, sneezing, or exercise, known as stress incontinence of urine.[4] The condition is common among middle-aged women, but young pregnant women are equally affected by this condition.

The mode of delivery plays an important part in causing urinary incontinence. It is linked with vaginal deliveries due to damage to the muscles and connective tissues as well as nerves caused by stretching during the delivery process.[5] A long period of labour, instrumental delivery, and trauma of the perineum are contributing factors that increase the chance of incontinence.[6] Cesarean delivery, on the other hand, may help protect women from developing incontinence because no direct damage occurs to the pelvic floor.[7] But again, it does not rule out the chances of developing incontinence in these women. Different studies indicate different prevalences of incontinence among those delivered vaginally and through cesarean operations.[8]

The treatment for urinary incontinence in pregnant and post-delivery women relies mostly on conservative approach. Among the various techniques employed to manage the problem, pelvic floor exercises seem to be more successful and are commonly prescribed for women as they enable them to strengthen their pelvic muscles and increase support to their urethra.[9] Some other useful techniques include changes in lifestyle, such as maintaining normal body weight, controlling constipation, and limiting caffeine intake.[10] Bladder training can prove helpful in improving the management of urine. Most often, the problem resolves itself after delivery; however, in some women, further treatment may be required.

In our community, there is no data regarding the frequency of urinary incontinence among pregnant women particularly in terms of mode of delivery. Women rarely complain about this issue because they find themselves embarrassed with their condition due to ignorance about it. The economic background and nutritional status of women could play an important role in this aspect, therefore the study should be conducted in order to know the prevalence of this condition between vaginal and caesarian deliveries.

Methodology:

This descriptive study was carried out at the Department of Obstetrics and Gynecology of Ziauddin Medical University & Hospital, Karachi, over a period of six months from May 2024 to October 2024. Approval was taken from College of Physicians and Surgeons Pakistan before start of data collection and study was conducted according to institutional ethical standards. Sample size was calculated as 81 by taking expected prevalence of urinary incontinence in cesarean delivery as 15.9%,[11] with confidence level 95% and margin of error 8%.

Pregnant women aged 18 to 45 years who were undergoing delivery either by vaginal or cesarean route were included. Women having gestational age more than 37 weeks calculated by last menstrual period and with any parity were taken in study. Women having systemic illnesses like diabetes mellitus or previous urinary tract infection were excluded. Patients with neurological disorders causing urinary symptoms were not included. Also, those having prior history of urge, overflow or mixed incontinence and urogenital fistulae were excluded based on medical record.

Written informed consent was taken from each patient before enrolment and admission for delivery. Baseline demographic details were recorded on a structured proforma including age (years), height (m), weight (kg), gestational age at delivery (weeks), parity, booking status (booked/un-booked), socio-economic status, educational status, residential status, occupational status and mode of delivery (C-section/vaginal). Spontaneous vaginal delivery was considered as delivery without use of any instrumentation, while cesarean delivery was defined as delivery of baby through surgical incision in anterior abdominal wall and uterus.

All patients were managed according to standard obstetric protocols and delivery was conducted either as spontaneous vaginal delivery or cesarean delivery depending upon clinical indication. After delivery, the subjects were followed up in the OPD at 6 weeks and 12 weeks intervals. At each follow-up visit, there was clinical assessment for urinary symptoms, which were then recorded by the investigator. All the data were collected within 24 hours from delivery and those collected later at follow-ups were also included. The definition of urinary incontinence used in the study was involuntary leaking of urine due to physical activity like coughing, sneezing, laughing, lifting weight, performing household duties, and also leaking due to urge.

All collected data was entered and analysed using IBM SPSS 27. Quantitative variables including age, gestational age at delivery (weeks), height (m), weight (kg), BMI and parity was assessed by mean and standard deviation. Qualitative variables such as booking status, socio-economic status, educational status, residential status, occupational status, mode of delivery and urinary incontinence were expressed as frequency and percentage. Effect modifiers including booking status, socio-economic status, educational status, mode of delivery and residential status were controlled by stratification. Post stratification Chi-square test was applied to compare urinary incontinence between all these variables. P-value ≤ 0.05 was taken as statistically significant.

Results:

The mean age of the participants was 32.44 ± 8.33 years, with a mean gestational age of 38.53 ± 1.14 weeks. The mean height, weight, and BMI of the study population were recorded as 1.59 ± 0.06 m, 73.38 ± 10.14 kg, and 28.86 ± 3.48 respectively, whilst mean parity was 2.42 ± 1.58. With regard to booking status, the majority of patients were booked, accounting for 54 (66.7%), whilst 27 (33.3%) were un-booked. In terms of residential status, urban and rural distribution was nearly equal, with 40 (49.4%) and 41 (50.6%) respectively. The majority of women were housewives, comprising 56 (69.1%), whereas working women constituted 25 (30.9%). Regarding educational level, illiterate and primary educated women each accounted for 15 (18.5%), secondary educated for 20 (24.7%), intermediate for 10 (12.3%), graduate for 10 (12.3%), and above graduate for 11 (13.6%). As regards socioeconomic status, poor women were 31 (38.3%), middle class were 40 (49.4%), and high class were 10 (12.3%). The mode of delivery showed that 56 (69.1%) of the women had vaginal delivery whilst 25 (30.9%) underwent caesarean section (Table-I).

Table- I: ***Patient Demographics***

Demographics	**Mean ± SD**
Age (years)	32.44 ± 8.33
Gestational Age (weeks)	38.53 ± 1.14
Height (m)	1.59 ± 0.06
Weight (kg)	73.38 ± 10.14
BMI	28.86 ± 3.48
Parity	2.42 ± 1.58
Booking Status	
Booked n (%)	54 (66.7%)
Un-Booked n (%)	27 (33.3%)
Residence	
Urban n (%)	40 (49.4%)
Rural n (%)	41 (50.6%)

Occupation	
Working Women n (%)	25 (30.9%)
Housewife n (%)	56 (69.1%)
Education	
Illiterate n (%)	15 (18.5%)
Primary n (%)	15 (18.5%)
Secondary n (%)	20 (24.7%)
Intermediate n (%)	10 (12.3%)
Graduate n (%)	10 (12.3%)
Above Graduate n (%)	11 (13.6%)
Socioeconomic Status	
Poor n (%)	31 (38.3%)
Middle n (%)	40 (49.4%)
High n (%)	10 (12.3%)
Mode of Delivery	
Vaginal n (%)	56 (69.1%)
C-section n (%)	25 (30.9%)

The frequency of urinary incontinence amongst the study participants revealed that 39 (48.14%) of the women did experienced urinary incontinence, whilst 42 (51.86%) did not (Table-II).

Table- II: ***Frequency of Urinary Incontinence Among Patients***

Urinary Incontinence	Frequency	% age
Yes	39	48.14%
No	42	51.86%
Total	81	100%

Regarding the association of urinary incontinence with mode of delivery, a statistically significant association were found, whereby 33 (58.9%) of women who had vaginal delivery experienced urinary incontinence as compared to only 6 (24.0%) of those who underwent caesarean section ($p = 0.004$) (Table-III).

Table- III: ***Association of Urinary Incontinence with Demographic Factors***

Demographic Factors	Subgroups	Urinary Incontinence		p-value
		Yes n(%)	No n(%)	
Booking Status	Booked	24 (44.4%)	30 (55.6%)	0.345
	Un-Booked	15 (55.6%)	12 (44.4%)	
Residence	Urban	20 (50.0%)	20 (50.0%)	0.742
	Rural	19 (46.3%)	22 (53.7%)	

Occupation	Working Women	11 (44.0%)	14 (56.0%)	0.618
	Housewife	28 (50.0%)	28 (50.0%)	
Education	Illiterate	4 (26.7%)	11 (73.3%)	0.561
	Primary	8 (53.3%)	7 (46.7%)	
	Secondary	11 (55.0%)	9 (45.0%)	
	Intermediate	6 (60.0%)	4 (40.0%)	
	Graduate	5 (50.0%)	5 (50.0%)	
	Above Graduate	5 (45.5%)	6 (54.5%)	
Socioeconomic Status	Poor	14 (45.2%)	17 (54.8%)	0.712
	Middle	19 (47.5%)	21 (52.5%)	
	High	6 (60.0%)	4 (40.0%)	
Mode of Delivery	Vaginal	33 (58.9%)	23 (41.1%)	0.004*
	C-section	6 (24.0%)	19 (76.0%)	

*Statistically Significant

Discussion:

In present study mean age of the study subjects was 32.44±8.33 years, which represents reproductive age group wherein childbearing and problems associated with childbearing occur most frequently. Mean body mass index (BMI) was observed to be 28.86±3.48, implying that majority of the subjects were overweight. As being overweight increases the intra-abdominal pressure, it may lead to pelvic floor dysfunction.

Out of the total study population, 48.14% (n=39) reported suffering from urinary incontinence, which indicates relatively high prevalence of this problem amongst reproductive women. This can be attributed to the fact that pregnancy itself, irrespective of delivery method, causes stretch and weakness of muscles in pelvic floor area as well as pudendal nerve responsible for urinary continence.

The most important and statistically significant finding of this study was the association between mode of delivery and urinary incontinence (p = 0.004). Urinary incontinence was found to be considerably more prevalent amongst women who had spontaneous vaginal delivery, where 33 (58.9%) reported the condition, as compared to only 6 (24.0%) of women who underwent caesarean section. This is most probably because of the mechanical trauma being done on the body during childbirth in particular the pulling, compressing and even rupturing of the muscle and nerves of the levator ani and the pudendal nerve which have an important role to play in the urethral sphincter control. The caesarean birth avoids any trauma to these structures since the baby does not have to pass through the vagina during delivery, thus reducing urinary incontinence.

The overall prevalence of urinary incontinence in the present study was found to be 39 (48.14%), which is considerably higher than several previously reported figures. Gilani Z *et al.* [12] reported a prevalence of 28.64% in postpartum women in Hayatabad, Peshawar, and Borges JB *et al.* [13] reported 23.5% in Brazilian women, both of which is lower than the findings of present study. Similarly, Bal R *et al.* [14] reported stress urinary incontinence incidence of 23.42% in primiparous women, which is again lower. These differences may be explained by the variation in study populations, parity, and the definitions used for urinary incontinence across studies. The present study included multiparous women with mean parity of 2.42 ± 1.58, and higher parity is well known to cause cumulative damage to pelvic floor

structures, which may has contributed to the relatively higher prevalence observed. However, Dafalla MA *et al.* [15] reported prevalence ranging from 31–60% during pregnancy, which is more comparable to the present findings, and this similarity may reflects the shared risk factors of multiparity and vaginal delivery in both populations.

The most significant finding of present study was the higher prevalence of urinary incontinence amongst women with spontaneous vaginal delivery, where 33 (58.9%) reported the condition as compared to only 6 (24.0%) in caesarean section group (p = 0.004). This finding is in agreement with several studies. MacArthur C *et al.* [16] demonstrated a significantly reduced risk of persistent urinary incontinence in women with exclusive caesarean delivery (OR 0.42; 95% CI 0.33–0.54) when compared to spontaneous vaginal delivery over a 12-year follow-up, which strongly supports the present results. Likewise, Bal R *et al.* [14] also reported significantly higher rates of stress urinary incontinence after vaginal and forceps delivery as compared to caesarean section, and Gachon B *et al.* [17] concluded through cumulative epidemiological evidence that pre-labour caesarean section does reduces the risk of pelvic floor disorders including urinary incontinence. The biological explanation for this consistent finding across studies is that vaginal delivery causes direct mechanical trauma to the levator ani muscle, pubourethral ligaments, and pudendal nerve, all of which is critical for urethral sphincter function and pelvic floor support. Caesarean section, by bypassing the birth canal entirely, is largely preserving these structures. In contrast, Ali HS *et al.* [18] reported that mode of delivery was not a strong predictor of urinary incontinence at 3 months postpartum (adjusted RR 2.20; 95% CI 0.6–7.28), which is differ from the present findings, and this discrepancy may be due to the fact that their study was conducted exclusively on primigravidas, where cumulative pelvic floor damage from repeated deliveries was absent.

Ahmad B *et al.* [19] reported a prevalence of 15.8% urinary dysfunction in post-caesarean women in Peshawar, which is lower than the 6 (24.0%) caesarean section group in present study. This difference may be attributed to the fact that their study focused exclusively on post-caesarean women and assessed broader urinary dysfunction rather than incontinence alone, and also included specific risk factors such as emergency caesarean section and operative time exceeding 60 minutes. Poomalar GK *et al.* [20] reported overall prevalence of 34.1% with significant impact on quality of life (p = 0.000), and Rajalaxmi V *et al.* [21] similarly observed that urinary incontinence prevalence was highest in vaginal delivery group followed by caesarean group, both of which is consistent with the trend observed in present study and further supports that vaginal delivery remain a predominant risk factor for urinary incontinence regardless of the study setting or population characteristics.

Limitations exist in the current study that have to be mentioned. First, it was a single-center study carried out in one particular hospital; therefore, the results can only be generalized to a small population. Second, the number of patients used in the study was small – there were only 81 women included in the analysis. Third, the study did not assess the degree and nature of urinary incontinence, which could include stress incontinence, urge incontinence, or mixed incontinence.

Conclusion:

In summary, the findings from the current research indicate that UI is very common among women of reproductive age and is strongly related to type of delivery. Spontaneous vaginal delivery emerges to be one of the greatest risk factors for UI in comparison with C-section. The data suggests that the traumatic impact of the vagina delivery on the structures of the pelvic floor contribute to this phenomenon.

Disclaimer:

None

Acknowledgment:

The author thankful to the medical staff of department, their hard work in keeping records and proper handling of patient data make this study possible and helpful.

Conflict of Interest:

Author declare there is no any conflict of interest related to this study.

REFERENCES:

1. Wang X, Jin Y, Xu P, Feng S. Urinary incontinence in pregnant women and its impact on health-related quality of life. *Health Qual Life Outcomes*. 2022;**20**(1):13. DOI: https://doi.org/10.1186/s12955-022-01920-2
2. Beyazıt A, Hakverdi AU, Gözükara KH. The effect of pregnancy on urinary symptoms. *Cureus*. 2023;**15**(8):e44232. DOI: https://doi.org/10.7759/cureus.44232
3. Tsinisizeli N, Bothou A, Gourounti K, Deltsidou A, Lykeridou A, Kyrkou G. Analysis of the multifactorial risks of postpartum urinary incontinence: a systematic review. *Healthcare (Basel)*. 2026;**14**(3):418. DOI: https://doi.org/10.3390/healthcare14030418
4. Sims L, Hay-Smith J, Dean S. Pelvic floor exercises and female stress urinary incontinence. *Br J Gen Pract*. 2022;**72**(717):185-187. DOI: https://doi.org/10.3399/bjgp22X719033
5. DeLancey JOL, Masteling M, Pipitone F, LaCross J, Mastrovito S, Ashton-Miller JA. Pelvic floor injury during vaginal birth is life-altering and preventable: what can we do about it? *Am J Obstet Gynecol*. 2024;**230**(3):279-294.e2. DOI: https://doi.org/10.1016/j.ajog.2023.11.1253
6. Gommesen D, Hjorth S, Nohr EA, Qvist N, Rasch V. Obstetric perineal tears, birth characteristics and the association with urinary incontinence among primiparous women 12 months postpartum: a prospective cohort study. *Int Urogynecol J*. 2024;**35**(10):2033-2044. DOI: https://doi.org/10.1007/s00192-024-05920-2
7. Torres CS, Esparza KG, Celi VA. Urinary incontinence and its relationship with obstetric, age, and ethnic factors: a cross-sectional study. *Healthcare (Basel)*. 2025;**13**(24):3254. DOI: https://doi.org/10.3390/healthcare13243254
8. Danesh Shahraki A, Hajhashemi M, Movahedi M, Abbasi F. Correlation between delivery type and pelvic floor dysfunction: a case-control study. *Adv Biomed Res*. 2025;**14**:37. DOI: https://doi.org/10.4103/abr.abr_548_24
9. Cuesta-Paredes M, Labata-Lezaun N, Orts-Ruiz C, López-de-Celis C, Estébanez-de-Miguel E. Effectiveness of exercise therapy for postpartum urinary incontinence: systematic review. *J Clin Med*. 2026;**15**(2):810. DOI: https://doi.org/10.3390/jcm15020810
10. O'Connor E, Nic An Riogh A, Karavitakis M, Monagas S, Nambiar A. Diagnosis and non-surgical management of urinary incontinence: a literature review with recommendations for practice. *Int J Gen Med*. 2021;**14**:4555-4565. DOI: https://doi.org/10.2147/IJGM.S289314
11. Rortveit G, Daltveit AK, Hannestad YS, Hunskaar S. Urinary incontinence after vaginal delivery or cesarean section. *N Engl J Med*. 2003;**348**:900-907.
12. Gilani Z, Darain H, Aziz S, Orakzai MJ, Raheem L, Jabeen M. Prevalence of urinary incontinence in post-partum females in Hayatabad, Peshawar. *J Islamabad Med Dent Coll*. 2017;**12**(2):106-110.
13. Borges JBR, Guarisi T, Camargo ACM, Gollop TR, Machado RB, Borges PCG. Urinary incontinence after vaginal delivery or caesarean section. *Einstein (Sao Paulo)*. 2010;**8**(2):192-196.
14. Bal R, Saha S, Krishnamurthy P, Talukdar A. Postpartum urinary stress incontinence—its relation with the mode of delivery. *J Obstet Gynaecol India*. 2006;**56**(4):337-339.
15. Dafalla MAA, Al Madan A, Abdulmajid T, Aladwani RM, Alonze SK, Alsudairi AA, *et al.* Postpartum urinary incontinence in women undergoing caesarean section or vaginal delivery: systematic review. *Acta Sci Womens Health*. 2025;**7**(5):28-33.

16. MacArthur C, Wilson D, Herbison P, Lancashire RJ, Hagen S, Toozs-Hobson P, *et al.* Urinary incontinence persisting after childbirth: extent, delivery history and effects in a 12-year longitudinal cohort study. *BJOG*. 2015. DOI: https://doi.org/10.1111/1471-0528.13395
17. Gachon B, De Tayrac R, Schmitz T, Mahmood T, Nizard J, Fritel X. Should we advise women that pre-labor caesarean section prevents pelvic floor dysfunction? *Eur J Obstet Gynecol Reprod Biol*. 2019.
18. Ali HS, Lakhani NA, Sarwar NG. Urinary incontinence three months after delivery: prevalence and risk factors. *Prof Med J*. 2013;**20**(4):530-536.
19. Ahmad B, Safdar S, Heema H, Hassan H, Inayat Z, Karim SB. Prevalence and risk factors of urinary dysfunction in post-caesarean patients. *Pak J Health Sci*. 2025;**6**(6):273-277. DOI: https://doi.org/10.54393/pjhs.v6i6.3147
20. Poomalar GK, Priyadharshini M. Prevalence of urinary incontinence in reproductive women and its impact on quality of life. *Int J Reprod Contracept Obstet Gynecol*. 2015;**4**(5):1353-1358. DOI: https://doi.org/10.18203/2320-1770.ijrcog20150710
21. Rajalaxmi V, Sutharsika P, Senthilnathan CV, Yuvarani G, Subramanian SS. Prevalence of urinary incontinence among females with vaginal delivery, LSCS, diabetes and hypothyroidism. *J Clin Diagn Res*. 2018;**12**(7):QC05-QC08. DOI: https://doi.org/10.7860/JCDR/2018/34081.11743