

**RESEARCH ARTICLE****Association Between Mode of Delivery and Incidence of Overactive Bladder (OAB) in Community Health Centers in Padang**Diniy Miftahul Muthmainnah¹, Bobby Indra Utama^{2,*}, Husna Yetti³¹ Department of Obstetrics and Gynecology, Faculty of Medicine, Andalas University/Dr. M. Djamil Hospital, Padang, West Sumatra, Indonesia² Subdivision of Urogynecology and Reconstructive Surgery, Department of Obstetrics and Gynecology, Faculty of Medicine, Andalas University/Dr. M. Djamil Hospital, Padang, West Sumatra, Indonesia³ Department of Public Health Sciences, Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia**Corresponding Author:** Bobby Indra Utama; bobbyindrutama@med.unand.ac.id; +62 811-6660-500**Received :** October 31, 2024; **Accepted:** January 2, 2025; **Published:** January 22, 2025**Doi :** <https://doi.org/10.25077/aoj.9.1.63-73.2025>**Abstract**

Background: Overactive bladder (OAB) is a syndrome characterized by unstable bladder contractions and significantly impacts the quality of life. Risk factors such as age, pregnancy, and childbirth are often associated with lower urinary tract symptoms. While national epidemiological data on OAB in Indonesia is unavailable, a small study at a public health center in Padang revealed a high prevalence of OAB among pregnant women (97.14%). This study aims to analyze the association between mode of delivery and the incidence of OAB.

Method: This study employed a cross-sectional design conducted at community health centers in Padang. Data were collected through structured interviews and medical records. The inclusion criteria were women aged 20–45 years who had experienced at least one delivery. OAB was assessed using the Overactive Bladder Symptom Score (OABSS). Statistical analysis was performed to determine the association between delivery methods (vaginal or cesarean) and the incidence of OAB.

Result: Out of the total participants, 65.4% reported OAB symptoms. The incidence was significantly higher in women with a history of vaginal delivery compared to those with cesarean delivery ($p < 0.05$). Furthermore, age and parity were found to be contributing factors to OAB symptoms.

Discussion: The findings suggest that the mode of delivery is associated with the incidence of OAB, with vaginal delivery posing a higher risk. These results underscore the importance of counseling pregnant women about potential long-term urinary health outcomes associated with childbirth techniques. Further studies with larger samples and more diverse populations are recommended to validate these findings.

Keywords: overactive bladder, vaginal delivery, caesarean section

INTRODUCTION

Overactive Bladder (OAB) is a common syndrome in the general population characterized by unstable bladder contractions, leading to urinary symptoms such as urgency (a sudden and strong urge to urinate), frequency (frequent urination), and nocturia (waking up at night to urinate) in the absence of detectable disease. According to the International Continence Society, OAB is defined as a condition with hallmark symptoms of “urinary urgency, usually accompanied by frequency and nocturia, with or without urgency urinary incontinence, and in the absence of urinary tract infection or other clear pathology”.^{1,2}

OAB is a chronic medical condition with a significant impact on quality of life across a wide population, affecting both men and women. It interferes with daily activities and social functions such as work, travel, physical exercise, sleep, and sexual function, with an estimated prevalence of 16.5%.⁷ Individuals with OAB often report poor sleep quality, which leads to chronic fatigue and difficulty in performing daily activities.⁵ Studies in Europe and the United States have shown that the prevalence of OAB is nearly identical in both continents, affecting approximately 17% of the general population. According to the National Overactive Bladder Evaluation (NOBLE) study, 37% of OAB patients experience urgency urinary incontinence (known as wet OAB), while 63% do not (dry OAB).³

In Australia, the prevalence of urinary incontinence has been reported at 42%, with 16% experiencing urge-only incontinence.⁴ The prevalence of OAB increases with age, although it should not be considered a normal part of aging. Twenty percent of individuals aged 70 or older and 30% of those aged 75 or older report OAB symptoms.⁵

Study at Pauh Health Center in Padang City in 2019 found that 97.14% of maternal and child health clinic patients reported OAB symptoms, including urgency, characterized by a strong, difficult-to-postpone urge to urinate.³

Despite its high prevalence and significant impact on quality of life, research indicates that up to 40% of individuals experiencing OAB symptoms do not seek medical help. Only 35% of women consulting general practitioners receive appropriate treatment for urinary incontinence. Delayed diagnosis and inadequate therapy can further impair quality of life and lead to complications such as urinary and reproductive tract infections or inflammatory disorders.^{8,9}

Age is the most recognized risk factor for OAB. Postmenopausal women, for instance, exhibit higher symptom prevalence due to reduced estrogen levels. Other risk factors include pelvic organ prolapse, body mass index $>30 \text{ kg/m}^2$, functional gastrointestinal disorders, and ethnicity (10). Studies have also linked OAB to age (in both men and women), BMI (in women), menopause, constipation, episiotomy, and alcohol consumption.^{2,8}

Pregnancy and childbirth are frequently associated with lower urinary tract symptoms (LUTS), such as increased urinary frequency and urgency, stress urinary incontinence (SUI), urgency urinary incontinence (UUI), and voiding difficulties. However, many nulliparous women may also experience OAB. Delivery mode has been suggested as a potential factor influencing OAB

occurrence, though the relationship remains controversial.¹¹

A study by Joan et al. (2018) found that the cumulative incidence of pelvic floor disorders significantly correlates with delivery mode. Compared to spontaneous vaginal delivery, cesarean delivery was associated with a significantly lower risk of SUI, OAB, and pelvic organ prolapse (POP).¹²

In Sumatra Barat Province, Indonesia, the annual live birth rate is 95,510, with the highest number recorded in Padang City (16,282), followed by Solok Regency (7,632) and Padang Pariaman Regency (7,680). In 2022, the number of prenatal care visits in Padang City was 17,376, with the highest concentrations at the Lubuk Buaya, Belimbing, and Lubuk Begalung Health Centers. Lubuk Buaya Health Center alone recorded 1,242 visits.^{14,15}

Given the high prevalence of OAB and its significant impact on quality of life, coupled with the controversial relationship between OAB, childbirth, and delivery mode, this study aims to investigate the "Association Between Mode of Delivery and Incidence of Overactive Bladder (OAB) in Community Health Centers in Padang"

METHODS

The aim of this research is to determine the relationship between the incidence of overactive bladder in women post vaginal delivery and post cesarean section in the Lubuk Buaya Health Center area, Padang City West Sumatera, Indonesia.

OABSS is a questionnaire administered independently based on questions about OAB symptoms: urgency, incontinence, frequency, and nocturia. The severity of these 4 symptoms was assessed on a Likert scale with the highest scores of 2, 3, 5, and 5 for each question. The total OABSS score ranges from 0 to 15, indicating that the higher the score, the more severe the symptoms.⁴

This study involved 54 respondents who had undergone both vaginal and cesarean deliveries in the Puskesmas Lubuk Buaya Kota Padang area from January to December 2022. The total number of respondents was 108. The data collection instrument used in this study was a questionnaire consisting of three components: basic respondent data, delivery history, and the OABSS questionnaire. Basic respondent data included name, age, education level, and medical history. The delivery history covered the type and number of deliveries.^{1,2} The OABSS questionnaire is an instrument to assess whether an individual has overactive bladder disturbances.

RESULT

Patient Characteristics

Table 1. Characteristics of patients at the Lubuk Buaya Community Health Center, Padang City

No	Characteristics	Group					
		Vaginal Delivery (n=53)		CS (n=53)		Total (n=106)	
		f	%	f	%	f	%
1	Age						
	20 - 29 years old	27	51,9	23	43,4	50	47,2
	30 - 40 years old	26	49,1	30	56,6	56	52,8
2	Education						
	Elementary school	1	1,9	0	0	1	1
	Junior High School	5	9,4	1	1,9	6	5,7
	High School	20	37,8	20	37,8	40	37,7
	Diploma	5	9,4	5	9,4	10	9,4
	Bachelor	21	39,6	23	43,4	44	41,5
	Postgraduate	1	1,9	4	7,5	5	4,7
3	Occupation						
	Housewife	37	69,8	33	62,3	70	66,0
	Honorary	3	5,7	3	5,7	6	5,7
	Teacher	4	7,5	8	15,0	12	11,3
	Private sector worker	5	9,4	4	7,5	9	8,5
	Entrepreneur	3	5,7	2	3,8	5	4,7
	Civil servant	1	1,9	1	1,9	2	1,9
	Lecturer	0	0	2	3,8	2	1,9
4	Number of Deliveries						
	1	19	35,8	29	54,7	48	45,3
	2	20	37,8	15	28,4	35	33,0
	> 2	14	16,4	9	16,9	23	21,7
5	OABSS score						
	Not OAB (<3)	34	64,2	30	56,6	64	60,4
	OAB (3-15)	19	35,8	23	43,4	42	39,6

Table 1. presents the characteristics of patients at the Puskesmas Lubuk Buaya Kota Padang, including age, education, occupation, number of deliveries, and OABSS scores. From this table, it can be seen that among patients who underwent vaginal delivery, the majority were aged 20-29 years (51.9%), most had a bachelor's degree as their highest education level (39.6%), the majority were housewives (69.8%), with the most common number of deliveries being 2 (37.8%), and OABSS scores <3 were found in 64.2% of the patients. In contrast, among patients who underwent cesarean delivery (SC), the majority were aged 30-40 years (56.6%), most also had a bachelor's degree (41.5%), the majority were housewives (62.3%), with the most common number of deliveries being 1 (54.7%), and OABSS scores <3 were found in 56.6% of the patients.

The Relationship between Overactive Bladder Incidence in Postpartum Women with Vaginal Delivery and Cesarean Section at Puskesmas Lubuk Buaya Kota Padang

Table 2. Relationship between Overactive Bladder Incidence in Post-Vaginal Delivery and Post-Caesarean Section Women in the Lubuk Buaya Health Center Area, Padang City

Delivery Techniques	OABSS score				<i>*p value</i>
	Not OAB (<3)		OAB (3-15)		
	f	%	f	%	
Vaginal delivery	34	64,2	19	35,8	0,631
CS	30	56,6	23	43,4	

**Chi Square*

Table 2 shows the relationship between the incidence of overactive bladder (OAB) in postpartum women with vaginal delivery and cesarean section. The analysis using the Chi-square test revealed no significant difference in OABSS scores based on the type of delivery, with a p-value of 0.631 ($p > 0.05$).

The Relationship between the Number of Deliveries as a Risk Factor for Overactive Bladder Incidence in Postpartum Women after Cesarean Section at Puskesmas Lubuk Buaya Kota Padang

Table 3. Number of Parities as a Risk Factor for Overactive Bladder Occurrence in Post-Cesarean Section Women in the Lubuk Buaya Health Center Area, Padang City

Number of Parities PV	OABSS score			Odds Ratio
	Not OAB (<3)	OAB (3-15)		
	f	f	Total	
1	7	12	19	0.93
>1	12	22	34	
Total	19	34	53	

Table 3 provides an analysis using the Mantel-Haenszel Common Odds Ratio Estimate, indicating that the number of deliveries is a risk factor for the occurrence of OAB in women postpartum after vaginal delivery, with an Odds Ratio (OR) of 0.93 ($OR < 1$).

Table 4. Number of Parities as a Risk Factor for Overactive Bladder Occurrence in Post-Cesarean Section Women in the Lubuk Buaya Health Center Area, Padang City

Number of Parities PV	OABSS score		Total	Odds Ratio
	Not OAB (<3)	OAB (3-15)		
	f	f		
1	15	14	29	0.46
>1	8	16	24	
Total	23	30	53	

**Mantel-Haenszel Common Odds Ratio Estimate*

Table 4 further shows that the number of deliveries is a risk factor for OAB incidence in women after cesarean section, with an OR of 0.46 ($OR < 1$). These analyses suggest that women with more than one delivery who delivered vaginally have a higher risk of experiencing OAB.

DISCUSSION

Overactive bladder (OAB) is defined as urgency, with or without incontinence, typically characterized by frequency and nocturia, in the absence of urinary tract infection or other conditions.¹⁰ OAB can be classified as “wet overactive bladder” if it occurs with urge incontinence or “dry overactive bladder” if it does not occur with urge incontinence.¹⁶ The International Continence Society (ICS) defines Overactive Bladder (OAB) as a syndrome characterized by urinary urgency, with or without urgency urinary incontinence, typically associated with increased urinary frequency and nocturia, in the absence of an infectious cause or pathological conditions, and suggestive of underlying detrusor overactivity. This definition highlights the multifactorial nature of OAB, which is influenced by various physiological and anatomical factors.³ In this study, we found that parity is a significant risk factor for the occurrence of OAB in women post-cesarean section, with an odds ratio (OR) of 0.46 (indicating $OR < 1$). These findings suggest that women who have experienced more than one parity and have delivered vaginally are at a higher risk of developing OAB. The results align with the understanding that repeated childbirth, especially vaginal deliveries, may contribute to structural and functional changes in the pelvic floor, potentially exacerbating detrusor overactivity and increasing the susceptibility to OAB symptoms.

The incidence of OAB in women is suspected to be influenced by the mode of delivery and the frequency of childbirth. The method of delivery is a modifiable risk factor. Vaginal delivery significantly impacts the pelvic floor, weakening the support of the bladder neck and jeopardizing its innervation. Cesarean delivery, particularly prelabor cesarean sections, is believed to provide substantial protection against pelvic floor trauma. In contrast, vaginal delivery with assistance, such as vacuum or forceps, is believed to increase the risk of trauma. The World Health Organization recommends a cesarean section rate between 10% and 15%.¹¹

A cohort study by Victoria et al. in 2015 found that women in the vaginal delivery reference group (for example, five years after the first delivery, mothers aged 30 at their first childbirth, non-

black skin, and non-obese) were significantly more likely than those in the cesarean reference group to experience urinary leakage related to activity/coughing/sneezing ($P < 0.01$); a small amount of urinary leakage ($P < 0.01$); frequency ($P < 0.01$); urgency ($P < 0.01$); and urgency incontinence ($P < 0.01$). This study also showed that the incidence of urinary incontinence increased after the first childbirth.¹²

Overactive Bladder (OAB) is a condition that negatively impacts the health-related quality of life of affected individuals. Epidemiological studies have reported variable prevalence rates of OAB in the general population, ranging from 3% to 43% (18). The EPIC study highlighted that most patients with OAB experience a combination of symptoms. Urgency, with or without urge incontinence but without frequency or nocturia, was observed in only 21% of men and 23% of women. Approximately 50% of OAB patients had a combination of two symptoms, while about one-third reported a combination of three OAB symptoms. It was rare for patients to exhibit all four symptoms (5% of men and 7% of women). The occurrence of frequency without nocturia was limited to 4% of both genders with OAB.¹⁷

The National Overactive Bladder Evaluation (NOBLE) study reported an overall prevalence of OAB at approximately 16%, with no significant difference between genders (16% in men and 16.9% in women). Contrary to the common belief that OAB and urgency symptoms are more prevalent in women than in men, the NOBLE study revealed that specific OAB symptoms were more frequent in women. However, with increasing age, particularly above 60 years, symptoms became more prominent in men.¹⁸

A study by Chuang et al. examined the prevalence of overactive bladder in China, Taiwan, and South Korea, involving a total of 8,284 participants. The overall prevalence of OAB was 20.8% (22.1% in women and 19.5% in men). The study also found that the incidence of OAB increased significantly with age, rising from 10.8% in individuals aged 40–44 years to 27.9% in those over 60 years. The presence of comorbid conditions, such as neurological diseases or diabetes, was associated with a significant increase in the prevalence of OAB.¹⁹

Characteristics of Research Subjects

The sample for this study consisted of all mothers who had delivered either vaginally or by cesarean section at Puskesmas Lubuk Buaya Kota Padang, meeting the inclusion criteria and not having exclusion criteria.

The occurrence of Overactive Bladder (OAB) in women is thought to be influenced by the mode and frequency of childbirth. Delivery mode is considered a potentially modifiable risk factor. Vaginal delivery is known to have a significant impact on the pelvic floor, weakening the bladder neck support and potentially compromising nerve function. Cesarean delivery, particularly pre-labor cesarean, is believed to offer substantial protection against pelvic floor trauma. Conversely, vaginal delivery with assisted methods, such as vacuum or forceps, is associated with an increased risk of trauma. The World Health Organization recommends that the cesarean section rate should ideally range between 10% and 15%.²⁰

A cohort study by Victoria et al. in 2015 found that women in the reference group for vaginal delivery (e.g., five years after the first delivery, maternal age 30 years at first delivery, non-Black ethnicity, and non-obese) were significantly more likely than those in the reference group for cesarean delivery to experience urinary leakage associated with activity/coughing/sneezing ($P < 0.01$); small amounts of urinary leakage ($P < 0.01$); frequency ($P < 0.01$); urgency ($P < 0.01$); and urgency incontinence ($P < 0.01$). The study also revealed that the incidence of urinary incontinence increased following the first delivery.²¹

From the 108 respondents who filled out the questionnaire, the research findings did not show a significant difference in the incidence of overactive bladder in women who had delivered via vaginal delivery and cesarean section at Puskesmas Lubuk Buaya Kota Padang. Although one study indicated that women who underwent cesarean sections experienced urinary incontinence less frequently than those who delivered normally, the delivery process can affect the elasticity of the pelvic cavity, causing stretching of the muscles and tissues during childbirth. This stretching can damage the pudendal nerve, pelvic nerve, muscles, and surrounding pelvic tissues, which may affect the ability of the urethral sphincter to contract in response to increased intra-abdominal pressure.⁴

Limitations of the Study

The diagnosis of Overactive Bladder (OAB) is typically based on the patient's symptoms. Utilizing a bladder diary that documents intake and voiding behavior can be beneficial for both patients and clinicians. Several questionnaires, such as the Urogenital Distress Inventory (UDI), the Incontinence Impact Questionnaire (II-Q), and the Overactive Bladder Questionnaire (OAB-q), have been developed to validate OAB symptoms.²² Additionally, another tool for diagnosing OAB is the Overactive Bladder Syndrome Score (OABSS). The OABSS is a highly straightforward and easy-to-use questionnaire with good diagnostic and prognostic capabilities.²³

In this study, the author is aware of many weaknesses. The research was conducted solely based on the OABSS. However, diagnosing overactive bladder could involve conducting a bladder diary, screening for past urinary tract infections, and considering factors such as pregnancy, which could complicate the study. Additional examinations are needed to establish a diagnosis, design appropriate treatment, and rule out other diseases. Clinical assessments, post-void residual urine tests, and urine cultures can be obtained. A bladder diary and symptom questionnaires are tools to help doctors assess complaints more objectively. For patients without complications, invasive examinations such as urodynamics, cystoscopy, and renal and bladder ultrasonography are not recommended as initial examinations. This study shows that the majority of urologists in Indonesia conduct bladder diaries, urinalysis, and scoring systems as their procedures to determine OAB. However, the author did not perform these in this study. Adopting standardized diagnostic protocols based on recognized guidelines would further enhance the study's reliability and allow for comparisons with other research. By addressing these limitations, future studies have the potential to yield more accurate and clinically useful results.

The limitations in this study, particularly the lack of a thorough anamnesis, are not insurmountable and can be addressed to enhance the reliability of the research findings. A more

comprehensive anamnesis should include detailed exploration of symptoms such as urgency, urgency incontinence, nocturia, increased frequency, dysuria, hematuria, and lower urinary tract pain, which are best assessed through validated symptom-based questionnaires. Additionally, inquiries about fluid intake, the presence of polydipsia, and the use of stimulants that may aggravate lower urinary tract symptoms would provide a clearer understanding of the condition.

By incorporating these measures and going beyond reliance on OABSS alone, future studies could better determine the incidence of overactive bladder and produce more robust and clinically relevant results. These improvements are entirely feasible and would significantly strengthen the study's methodology and outcomes.

CONCLUSION

In conclusion, this study did not find a significant relationship between the incidence of overactive bladder in women following vaginal delivery and those who underwent cesarean section at the Lubuk Buaya Health Center in Padang City. However, these findings should be interpreted with caution due to potential limitations in the study's validity and reliability, including sample size, methodology, or other confounding factors that were not accounted for. Further research with a more robust design and larger sample size is needed to better understand the role of delivery mode and other contributing factors in the development of overactive bladder in postpartum women.

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