ORIGINAL RESEARCH

Gestational weight gain as a factor associated with urinary incontinence and quality of life

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ABSTRACT

Objective: Urinary incontinence (UI) frequently occurs in pregnancy, primarily caused by increased intra-abdominal pressure. If left unmanaged, UI can lead to both physical and psychological discomfort, potentially reducing a pregnant woman's quality of life. This research aims to examine the relationship between gestational weight gain and the occurrence of urinary incontinence, along with its effects on quality of life.

Materials and Methods: A cross-sectional study was carried out among 50 pregnant women in their third trimester residing within the catchment area of Lebaksiu Primary Health Care, Tegal Regency, Central Java. Pre-pregnancy weight was extracted from the Handbook of Maternal and Child Health (MCH), while current weight was measured directly. measured using the validated Indonesian version of the ICIQ-UI SF questionnaire, while quality of life was assessed with the Indonesian version of the WHOQOL-BREF. Both instruments were administered through face-to-face interviews. Correlation was tested using Spearman's rank correlation, with statistical significance set at $p<0.05$.

Results: The results showed a statistically significant positive correlation between maternal weight gain and the incidence of urinary incontinence ($p=0.001$; $r=0.462$), and a significant negative correlation between urinary incontinence and quality of life ($p=0.000$; $r=-0.614$). 70% of pregnant women experience urinary incontinence, and 46% report a decreased quality of life.

Conclusion: These findings suggest that greater maternal weight gain is associated with a higher risk of UI, and that UI negatively affects pregnant women's quality of life. Integrating educational programs and policies that emphasize the importance of maintaining an ideal body weight during pregnancy may help prevent UI and improve the overall quality of life for pregnant women.

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Highlights:

1. There is a correlation between maternal weight gain and urinary incontinence, an increase in weight during pregnancy may raise the risk of urinary incontinence.
2. Urinary incontinence correlates with poorer quality of life in pregnant women and has the potential to affect their well-being negatively.

INTRODUCTION

Urinary incontinence (UI) is a disorder defined as the unintentional leakage of urine due to loss of bladder control, affecting approximately 423 million adults worldwide. Among women, the prevalence ranges from 24% to 45%, with 7%–37% reported among women aged 20–39 years and up to 39% in those over 60 years. Risk factors for UI include pregnancy, childbirth, obesity, diabetes, and high body mass index (BMI).[1] In Europe, the prevalence of UI reaches 37%, while in Asia, Africa, and the Middle East it ranges between 13% and 52%.[2,3] In Indonesia, the prevalence of UI was reported at 13.5% in 2014 and 5.8% in 2020, with increasing rates among women over 65 years of age.[4,5]

UI during pregnancy, particularly in the third trimester, is influenced by physiological alterations, including elevated intra-abdominal pressure, elevated progesterone levels, and pelvic floor muscle strain.[6] The most prevalent form of urinary incontinence is stress type, followed by urgency and mixed types.[7] UI negatively affects pregnant women's quality of life (QoL), especially with regard to physical activity, social relationships, and emotional well-being.[8] Despite its impact, less than 22% of pregnant women seek professional help, often due to embarrassment or the belief that symptoms will resolve post-delivery.[9] Evidence from previous studies indicates that UI during pregnancy elevates the likelihood of both postpartum and long-term incontinence.[10]

Several risk factors for UI during pregnancy have been investigated, such as age, parity, and history of previous incontinence.[9–11] Despite its importance, the role of gestational weight gain has been insufficiently explored, even though excessive weight gain is known to increase the pressure within the abdominal cavity and may lead to pelvic floor dysfunction. Compared to other risk factors, weight gain can be objectively measured and quantified. Some multivariate analyses suggest a strong correlation between increased BMI and UI.[12] Yet, in Indonesia, There remains a scarcity of research focusing on the relationship between maternal weight gain and UI.

In addition, although international studies have found that UI during pregnancy can significantly reduce QoL, local data in Indonesia, especially involving pregnant women, are scarce. Most Indonesian studies focus on general UI populations, rather than specifically pregnant women. This research seeks to address that gap by examining the relationship between maternal weight gain with urinary incontinence, along with its influence on pregnant women's quality of life in Tegal Regency, Central Java.

MATERIALS AND METHODS

A quantitative, analytic, cross-sectional approach was applied to investigate the association between maternal weight gain, UI, and QoL among women in their third trimester of pregnancy. Ethical clearance for this study was issued by the Research Ethics Committee of Universitas Padjadjaran, Bandung, on April 17, 2025 (No. 328/UN6.KEP/EC/2025). In addition, research permission was granted by the Tegal District Health Office on May 9, 2025 (No. 028/1769/2025). A total of 50 respondents, the third-trimester pregnant women in Lebaksiu, Tegal Regency, Central Java, were selected using cluster random sampling, where clusters were defined based on nearby villages served by the public health center (PHC). Random selection was then conducted within selected clusters. Inclusion criteria were: (1) gestational age ≥28 weeks, (2) aged ≥20 years, (3) multiparous, (4) history of normal vaginal delivery, (5) no prior history of UI, and (6) willingness to participate with signed informed consent. Exclusion criteria included incomplete data on maternal height and first-trimester weight in the MCH handbook and no first ANC visit (K1) in the first trimester.

Maternal weight gain was calculated by subtracting the weight at the first trimester (recorded in the MCH handbook) from the current weight measured during the study using a digital scale. UI was evaluated through the Indonesian version of the International Consultation on Incontinence Questionnaire–Short Form (ICIQ-UI SF), which includes questions on frequency, amount of leakage, and its impact on daily life. Scores vary between 0 and 21, where higher scores denote more severe levels of UI. QoL assessment was carried out using the Indonesian version of the WHOQOL-BREF, which has been validated for use in Indonesia. The scoring system was converted into a 0–100 scale, with thresholds set at <65 for poor QoL and ≥65 for good QoL. Both the ICIQ-UI SF and WHOQOL-BREF have been shown to be reliable and valid instruments in Indonesia. The ICIQ-UI SF demonstrated a Cronbach's alpha=0.75 and an ICC=0.84, while the WHOQOL-BREF showed Cronbach's alpha=0.91, strong construct validity.

Data were analyzed using IBM SPSS Statistics version 26 (modified in 2022, USA). Univariate analysis described the characteristics of each variable. Normality of the numerical variables was evaluated using the Shapiro–Wilk test. Bivariate analysis was conducted to examine the correlation between maternal weight gain and UI score, and between UI score and QoL score. Pearson's correlation analysis was conducted for normally distributed variables, while Spearman's rank

correlation was applied to data that were not normally distributed. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

The normality test in this study was performed using the Shapiro-Wilk test due to limited number of subjects. The results showed that the p-value for maternal weight gain (kg) was 0.005 and the p-value for the urinary incontinence (UI) score was 0.000, indicating that both variables were not normally distributed. In contrast, the p-value for QoL score was 0.220, showing a normal distribution. Based on these findings, non-parametric methods were applied for assessing correlations. The characteristics of participants in the third trimester of pregnancy are presented in Table 1.

Table 1. Characteristics of participants

Variables	Mean (SD)	Median (Min-Max)	n (%)
Age (year)		29 (20-43)	
Weight gain (kg)		10 (2-30)	
Scor UI		11 (0-17)	
Scor QoL*	65.27 (9.486)		
Physical health		63 (44-81)	
Psychological		69 (50-94)	
Social relationship		69 (50-94)	
Environment		63 (50-94)	
Education			
- Elementary - Junior high			21 (42%)
- Senior high - Undergraduate			29 (58%)
Job			
- Housewife			43 (86%)
- Working			7 (14%)
Clasification of UI			
- No			15 (30%)
- Yes			35 (70%)
- Mild			2 (4%)
- Moderate			16 (32%)
- Severe			17 (34%)
Quality of Life			
- Less			23 (46%)
- Good			27 (54%)

Table 2. Maternal characteristics based on the occurrence of UI and QoL

Variable	UI				p-value	QoL				p- value
	Yes		No			Low		Good		
	n	%	n	%		n	%	n	%	
Age					1.000 [b]					0.689[b]
- 20-35	30	69.8	13	30.2		19	44.2	24	55.8	
- >35	5	71.4	2	28.6		4	57.1	3	42.9	
Education					0.150[a]					0.555[a]
- Elementary - Junior high	17	81	4	19		13	61.9	8	38.1	
- Senior high - Undergraduate	18	62.1	11	37.9		10	34.5	19	65.5	
Job					0.415[b]					1.000[b]
- Housewife	31	72.1	12	27.9		20	46.5	23	53.5	
- Working	4	57.1	3	42.9		3	42.9	4	57.1	

Note: a) Chi-square, b) Fisher Exact

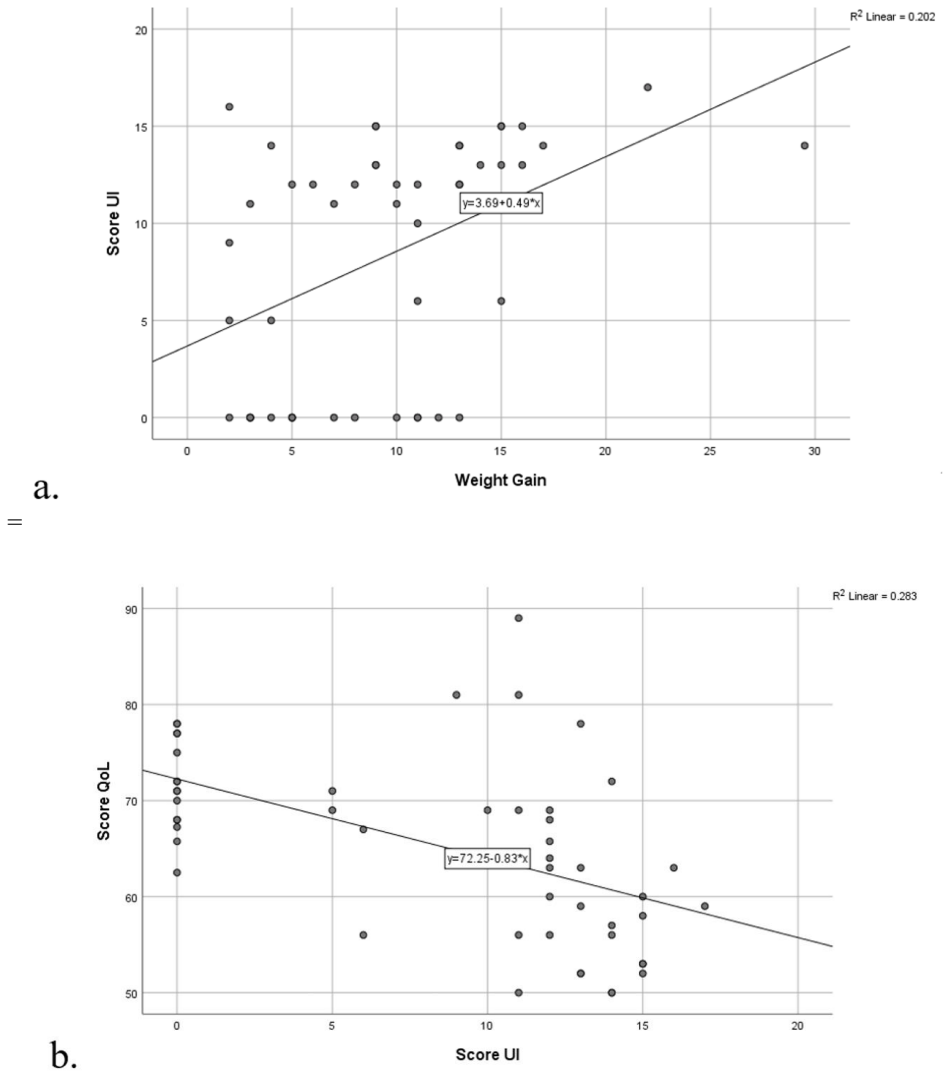

Figure 1A & B. The relationship maternal weight gain with UI, and its impact on QoL

Figure 1A demonstrates the relationship between maternal weight gain, the incidence of urinary incontinence, and its subsequent impact on quality of life. Spearman's rank correlation test was applied, as the data were not normally distributed, yielding a p-value of 0.001 and a correlation coefficient (r) of 0.462. Since the p-value was below the 0.05 threshold, the correlation was statistically significant. The correlation coefficient indicates a moderate positive association, suggesting that higher maternal weight gain is linked to an increased likelihood of experiencing urinary incontinence.

Figure 1B shows the correlation between UI scores and QoL scores. Spearman's rank correlation test produced a p-value of 0.000 and a correlation coefficient (r) of –0.614. With a p-value below 0.05, the correlation was statistically significant. The negative coefficient indicates a moderately strong inverse relationship, suggesting that higher UI severity is associated with lower QoL among pregnant women. This finding highlights that urinary incontinence has a substantial negative impact on quality of life.

The comparison of maternal characteristics based on the occurrence of UI and QoL is presented in Table 2. Urinary incontinence is a common health issue that can affect women across all age groups, although it is more commonly reported among older women.[13] In this study, third-trimester pregnant women experienced an average weight gain of 9.79 kg (SD = 5.642). A significant proportion (70%) reported experiencing UI, with 4%

classified as mild, 32% as moderate, and 34% as severe. Among UI types, stress urinary incontinence (SUI) was the most common (66%), followed by mixed urinary incontinence (MUI) at 4%. Pregnancy and associated weight gain are known to be contributing factors to the onset of UI, particularly the stress subtype.[8] As pregnancy progresses, maternal weight increases, exerting more pressure on the lower urinary tract and pelvic floor muscles. UI is more likely to appear in the later stages of pregnancy, especially in the third trimester showing the highest prevalence.[14] Although the exact etiology remains unclear, UI during pregnancy is considered multifactorial, involving mechanical stress and hormonal changes.[15]

Physiologically, weight gain during pregnancy increases intra-abdominal pressure, which in turn affects bladder function and urethral mobility.[16] The added weight may lead to chronic tension and stretching of pelvic floor tissues and nerves.[12] Hormonal fluctuations, such as increased progesterone and decreased relaxin, may reduce pelvic floor muscle tone and connective tissue support, collectively heightening the risk of UI.[8]

This study reported an average QoL score of 65.27 (SD = 9.486), with 46% of pregnant women reporting poor QoL. The physical health domain had the lowest median score 43 (44-81), indicating that UI primarily affects physical functioning and social relationships. Analysis using Spearman's rank correlation indicated a significant negative correlation between UI severity and QoL ($p = 0.000$, $r = –0.614$), supporting the second hypothesis that UI negatively impacts maternal quality of life. Women with severe UI reported substantially lower QoL, particularly in areas involving daily activities, social interaction, and emotional well-being. The correlation between maternal weight gain and UI was also statistically significant ($p = 0.001$, $r = 0.462$), indicating a moderate positive relationship. This finding supports the first hypothesis and aligns with previous studies. Barbosa et al. (2018) reported that excessive gestational weight gain increases the risk of UI, while Zhou et al. (2023) and Liang et al. (2020) found that high BMI and substantial weight gain are linked to pelvic floor dysfunction and stress incontinence.[12,17,18] Similarly, women with pre-pregnancy overweight or obesity were found to have a 1.5 times greater risk of developing UI.[12,19] Nevertheless, some studies have presented contrasting findings. Sologuren-García et al. (2024) found no significant association between overweight status and mixed UI, despite higher prevalence.[16] Oliveira et al. (2013) also reported high UI prevalence among underweight women, possibly due to protein deficiency and weakened muscle tissue. These findings highlight the multifactorial nature of UI, where hormonal, anatomical, and behavioral factors all play roles.[20]

UI significantly reduced QoL in this study, reinforcing findings by Keskin & Sahin (2024), AlQuaiz et al. (2023), and Tesemma (2024), who noted considerable decreases in physical and psychosocial domains among women with UI.[8,19,21] However, Kocaoz (2010) and Citak (2021) observed only minimal impact on QoL, especially when the severity of UI was mild. These discrepancies suggest that the perceived burden of UI may vary by individual, cultural context, or severity.[22,23] Further analysis revealed no statistically significant associations between maternal characteristics, such as age, education, and occupation, and the incidence of UI or reduced QoL. This is consistent with previous findings by Keskin (2023), AlQuaiz (2023), and Tesemma (2024), who also found no significant relationship between sociodemographic variables and UI.[8,19,21]

Overall, the findings indicate that excessive weight gain during pregnancy increases the risk of UI, which in turn negatively impacts quality of life. Therefore, healthcare providers, especially midwives, should monitor maternal weight gain and educate pregnant women about maintaining healthy weight and practicing pelvic floor exercises. Lifestyle modifications, including limiting caffeine and alcohol intake and engaging in moderate physical activity, are also recommended to reduce UI risk.[16]

This study has several limitations. First, it did not account for hormonal variables such as estrogen and progesterone levels, which are known to influence pelvic floor strength and lower urinary tract function and may contribute to UI during pregnancy. Second, the cross-sectional design of this study precludes causal inferences, allowing only correlational conclusions. Regardless of these limitations, The present research provides a deeper understanding of the relationship between maternal weight gain, UI, and QoL during pregnancy. The findings underscore the need for further research, ideally with a longitudinal design and broader consideration of hormonal, anatomical, and behavioral risk factors, to develop comprehensive strategies for the prevention and management of UI in pregnant women.

CONCLUSION

This study demonstrated a significant association between maternal weight gain in the third trimester and the occurrence of UI, with greater weight gain linked to a higher risk of UI. Moreover, UI was found to exert a significant negative effect on the QoL of pregnant

women, with increased severity of UI corresponding to lower perceived QoL scores.

DISCLOSURES

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Conflict of interest

All authors state that no conflicts of interest exist concerning the content of this study.

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Author contribution

Each author contributed to the research process, from study design and data collection to analysis, manuscript preparation, and approval for submission.

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