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The impact of parity on postpartum recovery and perinatal outcomes among obese women

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Abstract

Maternal obesity is associated with adverse maternal and neonatal outcomes and may affect postpartum recovery; however, the role of parity remains unclear. This study evaluated the relationship between maternal and neonatal outcomes and postpartum recovery quality by parity in obese women. This descriptive and correlational study included 128 women (64 primiparous, 64 multiparous) with body mass index ≥30 kg/m². Data were collected using standardized forms and the Obstetric Quality of Recovery Scale. No significant difference was found between groups in total recovery scores ($p>0.05$), although multiparous women had higher scores in current recovery perception ($p<0.05$). Mode of delivery, neonatal intensive care unit admission, and oxygen requirement were associated with recovery outcomes. Regular antenatal care was identified as a significant predictor, although the regression model explained only a limited proportion of the variance. Parity was not an independent determinant of overall recovery; maternal and neonatal factors appear to play a more important role. *(Afr J Reprod Health 2026; 30 [21]: 100-112).*

Keywords: Parity; maternal obesity; postpartum recovery; neonatal outcomes; midwifery

Résumé

L'obésité maternelle est associée à des issues maternelles et néonatales défavorables et peut affecter la récupération post-partum ; toutefois, le rôle de la parité reste incertain. Cette étude a évalué la relation entre les issues maternelles et néonatales et la qualité de la récupération post-partum en fonction de la parité chez les femmes obèses. Cette étude descriptive et corrélationnelle a inclus 128 femmes (64 primipares, 64 multipares) présentant un indice de masse corporelle ≥ 30 kg/m². Les données ont été recueillies à l'aide de formulaires standardisés et de l'échelle de qualité de la récupération obstétricale. Aucune différence significative n'a été observée entre les groupes concernant les scores totaux de récupération ($p > 0,05$), bien que les femmes multipares aient obtenu des scores plus élevés concernant leur perception de la récupération actuelle ($p < 0,05$). Le mode d'accouchement, l'admission en unité de soins intensifs néonatals et les besoins en oxygène étaient associés aux issues de récupération. Un suivi prénatal régulier a été identifié comme un facteur prédictif significatif, bien que le modèle de régression n'explique qu'une faible proportion de la variance. La parité n'était pas un déterminant indépendant de la récupération globale; les facteurs maternels et néonataux semblent jouer un rôle plus important. *(Afr J Reprod Health 2026; 30 [21]: 100-112).*

Mots-clés: Parité; obésité maternell; récupération post-partum; résultats néonataux; sage-femme

Introduction

Maternal obesity (MO), commonly defined as a body mass index (BMI) of ≥30 kg/m² before or during pregnancy, has become a major public health concern among women of reproductive age. The increasing prevalence of obesity worldwide has contributed to a parallel increase in obesity-related pregnancy complications, making maternal obesity an important challenge for contemporary obstetric care. Previous studies have consistently demonstrated that maternal obesity is associated with adverse maternal and neonatal outcomes, including gestational diabetes mellitus, hypertensive disorders, preeclampsia, prolonged labor, cesarean delivery, postpartum hemorrhage, fetal macrosomia, and neonatal morbidity.[1,2] These complications may negatively affect not only pregnancy and childbirth but also maternal health and well-being during the postpartum period.[3]

The postpartum period represents a unique and complex phase of recovery during which women experience substantial physiological, psychological, and social changes while adapting to motherhood. Unlike recovery after other medical or surgical events, postpartum recovery involves not

only healing from childbirth-related tissue damage, inflammatory responses, blood loss, and fluid shifts but also adapting to the physical and emotional demands of caring for a newborn.[3] Mothers are expected to cope with pain, fatigue, sleep deprivation, breastfeeding challenges, hormonal changes, and alterations in family and social roles while simultaneously recovering from labor and delivery. Consequently, postpartum recovery has emerged as a multidimensional concept encompassing physical, psychological, social, and functional well-being rather than merely the absence of morbidity.[3-5] Contemporary maternal healthcare approaches increasingly emphasize that postpartum outcomes should be evaluated not only according to mortality and morbidity indicators but also by considering women's subjective perceptions of recovery and overall quality of life.[4,5]

Maternal obesity may adversely affect postpartum recovery through several biological and clinical mechanisms. Obesity is associated with chronic low-grade inflammation, impaired tissue repair, delayed wound healing, reduced mobility, increased postoperative pain, and a higher risk of thromboembolic and infectious complications.[2,3] Furthermore, obese women are more likely to experience prolonged labor, operative vaginal delivery, cesarean section, postpartum hemorrhage, and breastfeeding difficulties, all of which may delay recovery and impair maternal functioning during the postpartum period.[1,2] Although some studies have reported that increasing BMI is associated with poorer postpartum recovery and a higher incidence of complications, inconsistent findings have also been reported.[3,6,7] Differences in study populations, BMI classifications, obstetric characteristics, postpartum assessment methods, and clinical management strategies may partly explain these discrepancies.

Postpartum recovery is influenced not only by obesity but also by a variety of maternal, obstetric, and neonatal factors. Maternal age, educational status, antenatal care, pregnancy complications, mode of delivery, neonatal outcomes, and social support have all been identified as potential determinants of postpartum health. In this context, parity represents an important obstetric characteristic that may influence maternal adaptation and recovery after childbirth. Parity reflects a woman's previous childbirth experiences and physiological adaptations to pregnancy and labor. Primiparous women may face greater uncertainty, anxiety, and difficulties adapting to maternal roles because of their first childbirth experience, whereas multiparous women may benefit from previous maternal experience but may also have accumulated obstetric risks associated with repeated pregnancies. Previous evidence suggests that obesity-related maternal and neonatal complications may occur more frequently among multiparous women than among primiparous women.[8] However, previous childbirth experiences may facilitate psychological adaptation and improve maternal confidence during the postpartum period. Therefore, the overall impact of parity on postpartum recovery among obese women remains unclear and is likely influenced by multiple biological and psychosocial factors.

Although maternal obesity and postpartum recovery have each been widely investigated, limited evidence exists regarding the combined effects of obesity and parity on postpartum recovery quality. Most previous studies have focused primarily on pregnancy or delivery outcomes, whereas relatively few have simultaneously evaluated maternal outcomes, neonatal outcomes, and postpartum recovery according to parity status among obese women. Moreover, the interaction between parity-related obstetric characteristics and postpartum recovery in the context of maternal obesity remains insufficiently understood. This gap in the literature limits the development of individualized postpartum care strategies and evidence-based interventions for obese mothers.

Understanding the relationship between parity, maternal and neonatal outcomes, and postpartum recovery quality among obese women has important implications for clinical practice. Identification of obstetric factors associated with poorer recovery may facilitate early recognition of high-risk women and contribute to the development of individualized antenatal, intrapartum, and postpartum care plans. Such evidence may support healthcare professionals, particularly midwives, in providing comprehensive, woman-centered care and improving maternal and neonatal health outcomes. Therefore, this study aimed to evaluate

maternal and neonatal outcomes and the quality of postpartum recovery according to parity status among obese women.

Research questions

1. Do maternal and neonatal outcomes differ in obese women according to parity status?
2. Does the quality of postpartum recovery differ in obese women according to parity status?
3. What factors affect the quality of postpartum recovery in obese women?

Methods

Research aim and design

This descriptive, correlational study was designed to evaluate the relationship between maternal outcomes, neonatal outcomes, and postpartum recovery quality in obese women by parity status. The research was conducted between April 1, 2024, and July 31, 2024, in the Department of Obstetrics and Gynecology of a university hospital in Turkey.

Study population and sample

The population included pregnant women at 38–42 weeks' gestation who presented to the university hospital for delivery. The sample was determined using the G*Power 3.1.9.7 program.[9] Considering Cohen's (1988) medium effect size recommendation, the sample size was calculated using an independent two-group difference t-test. The effect size was determined to be d=0.5, statistical power was set at 80%, the significance level was set at 5% (α=0.05).[10,11] The sample size calculation yielded a total of 128 pregnant women (64 primiparous and 64 multiparous). Our study included 128 pregnant women. According to the post-hoc power analysis performed at the end of the study, a power of 0.80 (1-β=0.80) was achieved with a sample of 128 individuals (64 in each group).

Sampling criteria

Inclusion Criteria: Pregnant women aged 19-40, with a healthy singleton pregnancy, with a gestational age greater than 38+0 weeks and less than 42+0 weeks, carrying a live fetus, in active labor, without physical disabilities or comprehension, perception, or communication problems, and able to speak Turkish to answer questions correctly were included in the study.
Exclusion Criteria: Those diagnosed with high-risk pregnancies; those with current mental health problems or a history of mental illness requiring treatment; those with mobility, hearing, or psychological disabilities; and those who had not yet entered active labor were excluded from the study.

Removal criteria

Participants who wished to withdraw during the study period, those who could not adapt, and those who experienced communication problems were excluded from the study. However, no pregnant women were excluded from the sample.

Data collection tools

Data were collected using the Personal Data Form, the Maternal-Neonatal Information Form, and the Postpartum Recovery Quality Scale. Personal Information Form: This form contains 8 questions on the sociodemographic characteristics of pregnant women (e.g., age, education level, employment status, duration of marriage, family structure). The questionnaire was developed by the researchers following a comprehensive review of the literature.[12,13]

Obstetric Maternal and Neonatal Information Form: This form, which collects information about the mother and newborn during labor and the first 24 hours postpartum, contains 27 questions regarding maternal outcomes(type of delivery, postpartum oxygen saturation, EFM result, etc.)and seven questions regarding newborn characteristics (1st- and 5th-minute Apgar scores, weight, etc.). The form was developed by the researchers based on a review of the relevant literature.[13-16]

Quality of Postpartum Recovery Scale (QPRS): Validation and reliability were established by Önal *et al*., and it is a two-factor scale consisting of 11 items. Each item is scored from 0 to 10 points (0 = strongly disagree, 10 = strongly agree).[5] The first factor seeks to answer the question "How did you feel in the last 24 hours?" and includes items 1-

5, all of which are reverse-scored and have scores between 0-50. The second factor addresses the question 'How do you feel now?', includes items 6–11, and is scored from 0 to 60. Therefore, higher scores indicate better postpartum recovery. The scale has no cutoff point. The total score possible on the scale ranges from 0 to 110. The Cronbach's alpha of the validated, reliable scale is 0.7. In our study, Cronbach's alpha for the total scale score was 0.8.

Research implementation

All pregnant women at 38–42 weeks of gestation who presented to the university hospital for childbirth were interviewed in the delivery room, where their height and weight were measured and their BMI was calculated. Pregnant women with a BMI above 30 were classified as maternally obese. The purpose and method of the research were explained to the pregnant women, and those who agreed to participate were asked to sign the 'Informed Consent Form'. A personal information form was completed during the first interview. Pregnant women were classified into primiparous and multiparous groups based on their parity. A second interview was conducted 24 hours postpartum with women admitted to the gynecology and obstetrics ward, and the Quality of Postpartum Recovery Scale was administered because its first sub-dimension asks how they felt in the preceding 24 hours. Maternal and neonatal outcomes were collected by the researchers.

The data collection process required approximately 10–15 minutes per participant. During the data collection phase of the research:

- In determining which pregnant women would be included in the sample, body weight, height, and oxygen saturation were measured using delivery-room equipment. Body weight, height, oxygen saturation, maternal heart rate, maternal blood glucose, and neonatal blood glucose were measured by the researcher.
- Maternal hemoglobin values, neonatal blood gas measurements, neonatal heights, and body weight values were obtained from hospital records, as they were recorded according to hospital procedures.

Evaluation of research data

Statistical evaluation of the data was performed using licensed SPSS 22.0 software. Descriptive statistical measures (mean, standard deviation, minimum and maximum values, and percentages) were used. When parametric test assumptions were met, the independent-samples t-test was used to compare the means of two independent groups, and one-way ANOVA (Tukey post hoc test) was used to compare the means of more than two independent groups. When parametric assumptions were not met, the Kruskal-Wallis H-test was used to compare more than two independent groups; Pearson correlation analysis was used to examine the relationships among QPRS total and subscale scores and selected continuous variables; Two-Way ANOVA was used to determine differences in variables and total scale scores between groups; and multiple linear regression was used to determine the variables thought to have an effect on the scale, with a significance level of 0.05.

The level of relationship between variables is interpreted as weak if the correlation coefficient is between 0-0.29; moderate if it is between 0.30-0.64; strong if it is between 0.65-0.84; and very strong if it is between 0.85-1.00.[17]

When evaluating the normality of the data, the Kolmogorov-Smirnov test statistic and p-value, together with the skewness and kurtosis coefficients, were examined to determine the distribution from which the variables' data were drawn. In line with the suggestion of Tabachnick and Fidell, if the p-value is greater than 0.05 or the skewness and kurtosis coefficients are within the ±2 limits, the distribution of the data is considered to be within normal limits.[18]

Ethical aspects of the research

Ethical approval for the research was obtained from the Clinical Research Ethics Committee of a state university (dated 02.05.2024, number 83116987-303; No: 24-KAEK-161), and institutional approval was obtained from the university hospital where the data were collected (number E-21979232-020-408236). Permission was obtained by email on 13.01.2024 from the researchers who conducted the

validity and reliability assessment of the scale to be used in the study. Verbal and written informed consent were obtained from all participants in the study, and the research was conducted in accordance with the provisions of the Declaration of Helsinki.

Results

Table 1 compares the total and subscale scores on the Quality of Postpartum Recovery Scale (QPRS) between primiparous and multiparous women. The mean total QPRS score for primiparous women was 56.72±19.07, while for multiparous women it was 55.84±19.77, and no statistically significant difference was found between the groups ($p>0.05$). When the subscales were examined, multiparous women had a higher mean score on the "How do you feel right now?" subscale, and this difference was statistically significant ($p<0.05$).

Table 2 shows the distribution of sociodemographic characteristics of obese pregnant women according to their parity status and their comparison with the total QPRS score.

When primiparous and multiparous pregnant women were compared, a statistically significant difference was found between the groups in terms of age and education level ($p<0.05$).

When the relationship between the total QPRS score and sociodemographic variables was examined, a significant difference in QPRS score was found between education-level groups among multiparous pregnant women ($p<0.05$). However, among primiparous pregnant women, no significant association was found between sociodemographic variables and the total QPRS score ($p>0.05$).

In the analysis in which parity and other variables were evaluated together, a statistically significant association was found between the total QPRS score and age, education level, employment status, place of residence, family type, current BMI, and pre-pregnancy BMI ($p<0.05$).

Table 2 presents the distribution of obstetric characteristics among obese pregnant women according to their parity status and compares their values with the total score of the QPRS.

When the relationship between the total QPRS score and obstetric variables was examined, a significant difference in the QPRS score according to regular prenatal care status was observed among multiparous pregnant women ($p<0.05$). However, in primiparous pregnant women, no significant association was found between obstetric variables and the total QPRS score ($p>0.05$).

In the analysis in which parity and other variables were evaluated together, both the institution where prenatal care was received and the status of receiving prenatal education during pregnancy were significantly associated with the total QPRS score ($p<0.05$).

Table 1: Distribution and comparison of total and sub-dimensions of the *quality of postpartum recovery scale* according to parity

	Parity		**t/p**	**Cronbach**
	Primiparity (n=64)	**Multiparity (n=64)**		**Alpha**
	X̄±SD (min-max)	**X̄±SD (min-max)**		
QPRS total	56.7±19.0 (15-110)	55.8±19.7 (0-110)	t=0.2 / p=0.7	0.8
How did you feel in the last 24 hours?	16.6±11.9 (0-44)	14.4±10.2 (0-43)	t=1.1 / p=0.2	0.7
How do you feel now?	39.1±11.4 (15-60)	43.5±10.0 (17-60)	***t=-2.2 / p=0.0****	0.8

t: Independent Sample t test, QPRS: Quality of Postpartum Recovery Scale, X̄: mean value, SD: Standard Deviation, min: smallest value, max: largest value, *p<0.05

Table 2: Distribution of sociodemographic and obstetric characteristics of obese pregnant women according to parity status and comparison with the total score of the quality of postpartum recovery scale

Variables	**Primiparity (n=64)**		**Multiparity (n=64)**		**Parity Primiparity (n=64) QPRS total X̄±SD**	**Multiparity (n=64) QPRS total X̄±SD**
	n	**%**	**n**	**%**		
Age					57.9±20.3	56.9±20.4
20-28 years	53	82.8[a]	26	40.6[b]	50.7±9.7	55.1±19.5
29 years and over	11	17.2[a]	38	59.4[b]		
	χ2=24.1 / p<0.0				t=1.7 / p=0.0	t=0,3 / p=0.7
					[a]p=0.0*	
Educational level					(n=1)	36.2±14.2[a]
Primary school	1	1.6[a]	5	7.8[a]	56.7±16.4	58.9±22.6
Middle school	9	14.1[a]	21	32.8[b]	57.6±19.4	52.5±14.9
High school	34	53.0[a]	27	42.2[a]	55.9±20.4	67.0±19.6[a]
University and above	20	31.3[a]	11	17.2[a]		
	χ2=10.8 / p=0.0				F=0.2 / p=0.8	***F=3.6 / p=0.0***
					[a]p=0.0*	
Employment status	44	68.8	52	81.2	57.9±19.8	54.0±19.3
Unemployed	20	31.2	12	18.8	54.0±17.3	63.8±20.3
Employed						
	χ2=2.6 / p=0.1				t=0.7 / p=0.4	t=-1.5 / p=0.1
					p=0.0*	
Settlement	36	56.2	39	60.9	53.75±18.55	60.36±18.87
Province	22	34.4	14	21.9	60.59±20.25	49.29±18.29
District	6	9.4	11	17.2	60.33±17.55	48.18±21.58
Village						
	χ2=3.3 / p=0.1				F=0.9 / p=0.3	F=2.7 / p=0.0
					[a]p=0.0*	
Family type	50	78.1	44	68.8	56.7±19.4	56.5±20.3
Nuclear family	14	21.9	20	31.3	56.7±18.1	54.3±18.7
Extended family						
	χ2=1.4 / p=0.2				t=-0.0 / p=0.9	t=0.4 / p=0.6
					[a]p=0.0*	
Current BMI*					54.64±20.03	53.9±22.4
Between 30-34.9 kg/m2	39	60.9	37	57.8	59.96±17.38	58.4±15.3
Between 35-39.9 kg/m2	25	39.1	27	42.2		
	χ2=0.1 / p=0.7				t=-1.0 / p=0.2	t=-0.8 / p=0.3
					[a]p=0.0*	
Pre-pregnancy BMI						
Between 18.5-24.9 kg/m2	13	20.4	6	9.4	57.1±18.6	62.1±25.2
Between 25-29.9 kg/m2	22	34.3	31	48.4	55.6±18.4	51.0±22.3
Between 30-34.9 kg/m2	24	37.5	25	39.1	58.6±20.2	59.2±14.0
Between 35-39.9 kg/m2	5	7.8	2	3.1	55.8±21.3	67.0±9.8
	χ2=5.8 / p=0.2				F=0.4/ p=0.7	KW=4.2 / p=0.2
					[a]p=0.0*	
Receiving regular prenatal care	61	95.3	60	93.8	56.3±19.3	57.5±18.4
Yes	3	4.7	4	6.2	63.6±12.0	30.2±23.8
No	χ2=0.1 / p=0.6				Z=0.874 / p=0.3	***Z=-2.0 / p=0.0***
					[a]p=0.0*	
Prenatal care institution	15	24.6	13	21.7	63.2±20.6	52.8±16.4
State hospital	43	70.5	46	76.7	53.8±18.9	58.7±19.1

University hospital	3	4.9	1	1.6	58.6±16.1	(n=1)
Private hospital	χ2=1.2 / p=0.5				KW=1.7 / p=0.1	t=-1.0 / p=0.3
					[a]p=0.0*	
Receiving prenatal education during pregnancy					59.5±22.0	59.2±14.3
					55.2±17.4	54.9±20.9
Yes	22	34.4	13	20.3		
No	42	65.6	51	79.7		
	χ2=3.1 / p=0.0				t=0.8 / p=0.3	t=0.6 / p=0.4
					[a]p=0.0*	

[a]p: Two Way ANOVA, t: Independent Sample t test, X̄: mean value, SD: Standard Deviation, kg: kilogram, m2: square meter, BMI: Body Mass Index, Z: Mann Whitney U test, F: One Way ANOVA (Tukey test in posthoc analysis), KW: Kruskal Wallis H test, χ2: Chi-square test (Bonferroni corrected z-test in posthoc analysis),QPRS: Quality of Postpartum Recovery Scale, *p<0.05

Table 3: Comparison of delivery and neonatal characteristics by parity and their association with postpartum recovery scores in obese women

Variables	**Primiparity (n=64)**		**Multiparity (n=64)**		**Parity Primiparity (n=64) QPRS total X̄±SD**	**Multiparity (n=64) QPRS total X̄±SD**
	n	**%**	**n**	**%**		
Status of amniotic membranes:	22	34.4	23	35.9	58.5±16.6	55.9±16.3
Open	42	65.6	41	64.1	55.7±20.3	55.7±21.6
Closed	***χ2=0.0 / p=0.8***				t=0.5 / p=0.5	t=0.0 / p=0.9
					[a]p=0.0*	
Method of childbirth outcome	1[a]	1.6	7[b]	10.9	(n=1)	63.7±11.5
Normal spontaneous delivery	14[a]	21.8	24[a]	37.5	69.4±20.6	55.4±24.5
Vaginal delivery with episiotomy	49[a]	76.6	33[b]	51.6	52.8±17.2	54.4±17.1
Cesarean delivery						
	χ2=10.2 / p=0.0*				***Z=3.0 / p=0.0****	F=0.6 / p=0.5
					[a]p=0.0*	
Satisfaction with childbirth					53.8±18.1	57.9±19.6
Yes	49	76.6	41	64.1	70.6±26.7	51.7±25.1
No	6	9.5	10	15.6	63.3±14.3	52.3±15.7
Undecided	9	40.9	13	20.3		
	χ2=2.4 / p=0.2				F=2.8 / p=0.0	F=0.6 / p=0.5
					[a]p=0.0*	
Overall opinion regarding childbirth	23	35.9	27	42.2	55.3±22.2	56.2±19.9
	26	40.6	24	37.5	60.3±15.7	58.8±11.8
Very good	10	15.6	7	10.9	49.8±17.8	58.5±31.5
Good	5	7.9	6	9.4	57.8±22.6	38.8±24.4
Bad						
Very bad						
	χ2=1.0 / p=0.7				F=0.7 / p=0.5	F=1.7 / p=0.1
					[a]p=0.0*	
Induction of labor status	1[a]	1.6	7[b]	10.9	(n=1)	58.7±18.2
Yes	63[a]	98.4	57[b]	89.1	56.1±18.6	55.4±20.0
No						
	χ2=4.8 / p=0.0*				-	t=0.4 / p=0.6
					p=0.0	
Presence of meconium in amniotic fluid	13	20.3	10	15.6	59.31±18.50	42.8±21.3
	51	79.7	54	84.4	56.06±19.34	58.2±18.6
Yes						
No						

	χ2=0.4 / p=0.4				t=0.5 / p=0.5 ***[a]p=0.0****	***t=-2.3 / p=0.0****
Reasons for Cesarean Section (n=82)	0[a]	0.0	17[b]	51.5	(n=0)	54.8±14.3
	4[a]	8.2	4[a]	12.1	51.0±15.7	59.5±6.8
Previous C-section	5[a]	10.2	1[a]	3.0	68.6±21.7	(n=1)
Fetal distress	1[a]	2.0	4[a]	12.1	(n=1)	47.5±10.0
Failure to progress	6[a]	12.2	2[a]	6.1	48.1±19.5	72.5±53.0
Large fetus	14[a]	28.6	0[b]	0.0	52.0±16.6	(n=0)
Breech presentation	13[a]	26.5	5[a]	15.2	46.5±14.2	43.2±14.3
Cephol-pelvic disproportion	6[a]	12.2	0[b]	0.0	55.5±9.9	(n=0)
Patient request						
Other reasons						
	χ2=45.6 / p<0.0*				KW=2.0 / p=0.0	KW=1.5 / p=0.2
					[a]p=0.0	
Breastfeeding support status	56[a]	87.5	31[b]	48.4	55.7±19.2	52.4±15.2
Supported	3[a]	4.7	31[b]	48.4	61.6±22.1	60.2±23.2
Unsupported	5[a]	7.8	2[a]	3.2	65.0±15.7	40.5±6.3
Not breastfeeding						
	χ2=31.5 / p<0.0*				F=0.6 / p=0.5 [a]p=0.0	F=1.8 / p=0.1
Neonatal intensive care requirement	12	18.8	11	17.2	59.33±14.50	42.27±21.31
	52	81.2	53	82.8	56.12±20.05	58.66±18.39
Yes						
No						
	χ2=0.0 / p=0.8				t=0.5 / p=0.6 ***[a]p=0.0****	***t=-2.6 / p=0.0****
Newborn oxygen requirement	21	32.8	17	26.6	56.9±16.4	48.4±20.5
Yes	43	67.2	47	73.4	56.6±20.4	58.5±18.9
No						
	χ2=0.5 / p=0.4				t=0.0 / p=0.9 ***[a]p=0.0****	t=-1.8 / p=0.0

t: Independent Sample t test, Z: Mann Whitney U test, F: One Way ANOVA, [a]p: Two Way ANOVA, $\bar{X}$: mean value, SD: Standard Deviation, χ2: Chi-square test (Bonferroni corrected z-test in posthoc analysis),QPRS: Quality of Postpartum Recovery Scale, *p<0.05

Table 3 presents the distribution of delivery and neonatal characteristics by parity status among obese women and their comparison with total QPRS scores.

A statistically significant difference was found between primiparous and multiparous women in terms of mode of delivery, induction of labor, reasons for cesarean section, and breastfeeding support status (p<0.05).

In the analysis including parity and other variables, significant associations were observed between total QPRS scores and the condition of the amniotic membranes at admission, mode of delivery, satisfaction with labor, overall birth experience, presence of meconium in amniotic fluid, neonatal intensive care unit (NICU) admission, and neonatal oxygen requirement (p<0.05).

When examined separately, mode of delivery was significantly associated with QPRS scores in primiparous women, whereas the presence of meconium in amniotic fluid and NICU admission were significantly associated with QPRS scores in multiparous women (p<0.05).

Table 4 presents the relationships between QPRS total and subscale scores and selected variables according to parity.

Among primiparous women, a strong positive correlation was observed between total QPRS scores and subscale scores (p<0.0). Total QPRS scores were moderately and negatively correlated with duration of labor (r=-0.4, p<0.05)

Table 4: Distribution of relationships between the total and sub-dimensions of the quality of postpartum recovery scale in primiparous women and some variables

PRIMIPAROUS WOMEN		**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
QPRS total (1)	r	1	***0.7***	***0.7***	***-0.4***	-0.1	0.0	0.0	-0.0	0.1
	[a]p		***<0.0****	***<0.0****	***0.0****	0.4	0.7	0.5	0.9	0.2
How did you feel in the last 24 hours? (2)	r		1	0.2	0.2	-0.0	0.0	0.0	0.0	0.0
	[a]p			0.0	0.0	0.6	0.8	0.6	0.7	0.5
How do you feel now? (3)	r			1	***0.3***	-0.0	-0.0	-0.0	-0.0	0.1
	[a]p				***0.0****	0.5	0.9	0.8	0.9	0.2
Labor duration (4)	r				1	-0.0	0.2	-0.1	0.0	-0.0
	[a]p					0.7	0.0	0.3	0.6	0.9
Time to start breastfeeding (5)	r					1	0.1	0.0	-0.0	***-0.3***
	[a]p						0.1	0.9	0.8	***0.0****
Postpartum maternal blood sugar at 1 hour (6)	r						1	0.1	-0.0	-0.0
	[a]p							0.2	0.7	0.5
Current BMI (7)	r							1	***-0.3***	0.0
	[a]p								***0.0****	0.8
Postpartum maternal oxygen saturation at 24 hours (8)	r								1	-0.1
	[a]p									0.1
Postpartum maternal hemoglobin value at 6 hours (9)	r									1
	[a]p									
MULTİPAROUS WOMEN										
QPRS total (1)	r	1	***0.6***	***0.5***	0.0	-0.1	0.0	0.0	-0.0	0.0
	[a]p		***<0.0****	***<0.0****	0.6	0.2	0.8	0.9	0.4	0.8
How did you feel in the last 24 hours? (2)	r		1	0.2	***-0.2***	-0.0	-0.0	0.0	-0.1	0.0
	[a]p			0.0	***0.0****	0.6	0.6	0.4	0.3	0.5
How do you feel now? (3)	r			1	0.1	***-0.2***	0.0	-0.0	-0.1	0.0
	[a]p				0.2	***0.0****	0.5	0.8	0.2	0.9
Labor duration (4)	r				1	-0.1	0.1	0.1	-0.0	***0.2***
	[a]p					0.1	0.3	0.3	0.9	***0.0****
Time to start breastfeeding (5)	r					1	0.0	0.1	0.0	0.0
	[a]p						0.7	0.3	0.8	0.9
Postpartum maternal blood sugar at 1 hour (6)	r						1	0.0	0.0	0.0
	[a]p							0.4	0.6	0.7
Current BMI (7)	r							1	0.0	-0.0
	[a]p								0.9	0.7
Postpartum maternal oxygen saturation at 24 hours (8)	r								1	0.0
	[a]p									0.5
Postpartum maternal hemoglobin value at 6 hours (9)	r									1
	[a]p									

[a]p: Pearson correlation analysis, r: Pearson correlation coefficient, *p<0.05

Table 5: Regression analysis of the total quality of postpartum recovery scale score in multiparous women

Independent Variables of the Quality of Postpartum Recovery Scale	**B**	**SE**	**p**	**95% CL**	
				Lower	**Upper**
Educational status	1.1	3.0	0.7	-5.0	7.3
Receiving regular prenatal care	-19.6	10.7	***0.0****	-41.1	1.8
Presence of meconium in amniotic fluid	6.6	7.3	0.3	-8.1	21.4
Need for neonatal intensive care	9.7	7.1	0.1	-4.5	23.9
R^2=0.188 Adjusted R^2=0.133, F(4,59)=3.420, p=0.014					

Multiple linear regression analysis was performed. SE: Standard Error, *p<0.05

and weakly and negatively correlated with time to initiation of breastfeeding (r=-0.3, p<0.05). No significant correlations were found between total QPRS scores and other variables (p>0.05).
Among multiparous women, total QPRS scores showed a moderate positive correlation with subscale scores (p<0.0). In addition, a weak negative correlation was observed between the "How did you feel in the last 24 hours?" subscale and duration of labor (r=-0.2, p<0.05). No other significant relationships were identified (p>0.05).

Table 5 presents the results of the multiple linear regression analysis of factors affecting the quality of postpartum recovery in multiparous women.

The established regression model was found to be statistically significant (F=3.4, p<0.05). The model explained 18.8% of the variance in postpartum recovery quality (R^2=0.188; adjusted R^2=0.133).
In the regression analysis, among the variables included in the model, only the status of receiving regular prenatal care was a significant predictor of the quality of postpartum recovery (p<0.05).

Discussion

Obesity, increasingly prevalent, is a significant public health problem among women of childbearing age and has multifaceted effects on pregnancy, childbirth, and the postpartum period. The literature has extensively demonstrated that maternal obesity is associated with both maternal and neonatal complications.[1,2,7] This study was conducted to evaluate the relationship between maternal and neonatal outcomes and postpartum recovery quality in obese women according to their parity status.

Our study found that primiparous women had higher mean postpartum recovery quality scores than multiparous women; however, this difference was not statistically significant, suggesting that parity alone may not be an independent determinant of postpartum recovery quality among obese women. Although evidence directly examining the relationship between parity and postpartum recovery is limited, previous studies have reported that obesity-related maternal and neonatal complications may occur more frequently among multiparous women.[8] However, increased obstetric risk does not necessarily translate into poorer postpartum recovery because recovery is influenced by multiple interacting biological, psychological, and social factors. Previous childbirth experience may enhance maternal confidence and coping abilities, whereas repeated pregnancies may increase cumulative obstetric risks. These opposing effects may partly explain the absence of significant differences in overall recovery quality between primiparous and multiparous women in the present study. Our findings suggest that postpartum recovery in obese women should be evaluated using a comprehensive approach that considers not only parity but also maternal, obstetric, and neonatal characteristics.

Our study demonstrated a significant association between BMI and the quality of postpartum recovery, suggesting that increasing maternal BMI may adversely affect recovery during the postpartum period. Maternal obesity has been associated with a higher incidence of obstetric interventions and complications, including prolonged labor, cesarean delivery, postpartum hemorrhage, and delayed maternal adaptation, all of which may negatively influence postpartum recovery.[1,2] Recent evidence has shown that severe maternal obesity may be associated with poorer recovery outcomes following childbirth, although the magnitude of this relationship varies across different populations and clinical settings.[6] Similarly, increasing pre-pregnancy BMI has been associated with adverse maternal and neonatal outcomes, including macrosomia, dystocia, gestational diabetes, and cesarean delivery.[7] The biological mechanisms underlying these associations may include chronic low-grade inflammation, impaired tissue repair, reduced mobility, and increased postoperative morbidity among obese women.[2] However, the literature reports inconsistent findings regarding the direct relationship between BMI and postpartum recovery quality, which may be explained by differences in BMI classifications, study populations, obstetric characteristics, and postpartum assessment methods.[3,6,7] These findings highlight the importance of individualized antenatal and

postpartum care strategies for obese women to minimize complications and support optimal recovery.

One important finding of our study is a significant relationship between the mode of delivery and the quality of postpartum recovery. Women who had vaginal deliveries had higher recovery scores than those who had cesarean deliveries. This can be explained by factors such as pain, risk of infection, delayed mobilization, and longer hospital stay because cesarean delivery is a surgical procedure. Similarly, the literature reports that vaginal delivery is associated with better postpartum recovery.[19,20] These findings highlight the importance of promoting vaginal birth whenever clinically appropriate and providing additional postoperative support for obese women undergoing cesarean delivery.

Our study found a significant relationship between receiving antenatal education and the quality of postpartum recovery. Pregnant women who receive education acquire greater knowledge about the birthing process and the postpartum period, which can reduce their anxiety levels and contribute to better adaptation to childbirth. While there are varying results in the literature on this subject, some studies show that antenatal education has positive effects on postpartum recovery.[21,22] This suggests that antenatal education should be given greater importance in clinical practice.

When neonatal variables were examined, NICU admission and neonatal oxygen requirement were significantly associated with postpartum recovery quality. Maternal concern regarding neonatal health problems may adversely affect emotional well-being and the perception of recovery during the postpartum period. Admission of the newborn to the NICU may delay mother–infant bonding, skin-to-skin contact, and breastfeeding initiation, thereby negatively influencing maternal adaptation and recovery. Previous studies have demonstrated that neonatal complications and NICU hospitalization are associated with increased maternal stress, anxiety, and postpartum depressive symptoms, which may impair postpartum well-being. These findings suggest that postpartum care for obese women should include not only maternal assessment but also psychosocial support for mothers whose newborns require specialized neonatal care.

Our study found a significant correlation between the presence of meconium in amniotic fluid and the quality of postpartum recovery. The presence of meconium is generally considered an indicator of fetal distress and can lead to increased intervention rates during labor. This situation can negatively affect the mother's birth experience and subsequent recovery process. The literature reports that meconium aspiration is associated with both maternal and neonatal adverse outcomes. The presence of meconium may increase maternal anxiety and the likelihood of obstetric interventions during labor, which may negatively influence the childbirth experience and postpartum adaptation. These findings suggest that both maternal and neonatal conditions should be considered together when evaluating postpartum recovery among obese women

In the present study, regular antenatal care was identified as a significant predictor of postpartum recovery quality. This finding is consistent with previous studies suggesting that adequate prenatal care and education contribute to improved maternal well-being, maternal confidence, and postpartum health outcomes.[3,21,22] Antenatal care is important not only for monitoring pregnancy but also for supporting postpartum recovery. Early detection and management of complications among regularly monitored pregnant women may contribute to healthier delivery and postpartum outcomes. However, these findings should be interpreted cautiously because of the cross-sectional design of the study.

Study strengths and clinical implications

The present study has several strengths. To our knowledge, it is among the few studies evaluating maternal and neonatal outcomes together with postpartum recovery quality according to parity status among obese women. The use of a validated postpartum recovery instrument and the assessment of both maternal and neonatal variables provided a comprehensive evaluation of postpartum recovery. In addition, the inclusion of primiparous and multiparous women allowed a better understanding of the potential influence of parity on recovery

outcomes. The findings of this study have important clinical implications for obstetric and midwifery practice. The results suggest that postpartum recovery among obese women is influenced not only by parity but also by maternal and neonatal characteristics such as mode of delivery, neonatal complications, antenatal education, and regular antenatal care. Identifying women at increased risk of delayed recovery may facilitate individualized antenatal counseling, targeted postpartum follow-up, and multidisciplinary care strategies aimed at improving maternal and neonatal health outcomes.

Conclusion

This study demonstrated that parity alone was not a significant determinant of postpartum recovery quality among obese women. However, several maternal and neonatal factors, including body mass index, mode of delivery, neonatal intensive care unit admission, neonatal oxygen requirement, meconium-stained amniotic fluid, antenatal education, and regular antenatal care, were associated with postpartum recovery outcomes. These findings highlight the multifactorial nature of postpartum recovery and emphasize the importance of comprehensive maternal and neonatal assessment in obese women. Individualized antenatal counseling, appropriate intrapartum management, and targeted postpartum follow-up may contribute to improving recovery and maternal well-being. Further multicenter prospective studies with larger sample sizes are recommended to confirm these findings and support the development of evidence-based postpartum care strategies for obese women.

Limitations

This study has some limitations. Conducting the research at a single center may limit the generalizability of the findings. In addition, the selection of the sample group based on specific criteria may limit generalizability to other populations. The use of a self-report scale to evaluate the quality of postpartum recovery in the study may introduce bias because it is influenced by participants' individual perceptions. Because of the cross-sectional design of the study, the relationships between the variables cannot be interpreted as causal. In addition, the relatively small sample size may have limited the detection of small differences between primiparous and multiparous women.

Contributions of authors

DÇ: Conceptualization, Methodology, Formal analysis, Data interpretation, Supervision, Writing – review & editing, Visualization, Project administration.
ABE: Investigation, Data curation, Literature review, Data collection, Writing – original draft, Validation. All authors read and approved the final version of the manuscript.

Data availability statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to approval by the relevant ethics committee and institutional regulations.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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