PFCJ PEDIATRIC AND FAMILY CARE JOURNAL
Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

Original Article

The relationship between age, parity, and birth weight with the degree of perineal rupture

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Abstract:
Perineal rupture can occur during vaginal birth and can affect maternal physical and psychological health. Age, parity, and infant birth weight are common risk factors that may influence rupture severity. This study analyzed the relationship between maternal age, parity, and infant birth weight with the degree of perineal rupture at Sagea Community Health Center. This observational analytic study used a case-control approach with secondary delivery room register data from October 2023 to September 2024. The sample included 654 mothers diagnosed with perineal rupture. The independent variables were age, parity, and infant birth weight. The dependent variable was the degree of perineal rupture. Data were analyzed using univariate analysis, Spearman rank correlation, and multiple logistic regression with the backward method. Bivariate analysis showed that younger maternal age, lower parity, and higher infant birth weight were significantly associated with higher degrees of perineal rupture. Birth weight became the dominant factor in the multivariate model, with OR = 142.273 and R square = 14.9%. Age, parity, and birth weight were associated with the degree of perineal rupture. Infant birth weight was the most dominant factor. Risk screening, childbirth preparation education, controlled pushing support, and postpartum wound care counseling are needed to reduce severe rupture risk.

Keywords:
age, parity, birth weight, perineal rupture, vaginal delivery

Article Info:
Submitted:
09-03-2026
Accepted:
24-06-2026
Published:
30-06-2026

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DOI: https://doi.org/10.53713/pfcj.vxix.xxx

INTRODUCTION

Perineal rupture remains one of the most frequent morbidities related to vaginal delivery. It refers to a tear in the perineal tissue that occurs when the fetal presenting part passes through the birth canal, either spontaneously or after an obstetric intervention. The injury can involve the vaginal mucosa, perineal skin, perineal muscles, anal sphincter complex, and rectal mucosa. The International Classification divides injuries into first, second, third, and fourth degrees. First-degree rupture affects the vaginal mucosa and perineal skin. Second-degree rupture extends into the perineal muscles without involving the anal sphincter. Third-degree rupture involves the anal sphincter, while fourth-degree rupture extends into the rectal mucosa. This classification matters because the clinical consequences increase with the degree of rupture. Minor tears may cause

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

transient pain and delayed mobility, but severe tears can lead to postpartum hemorrhage, infection, wound dehiscence, dyspareunia, urinary symptoms, fecal incontinence, and long-term psychological distress (Pergialiotis et al., 2014; Meriwether et al., 2016; Waldenstrom & Ekeus, 2017).

The prevention of severe perineal trauma is a core component of respectful and safe intrapartum care. Evidence shows that perineal trauma does not result from a single cause. It reflects interaction among maternal factors, fetal factors, and clinical management during the second stage of labor. Maternal factors include age, parity, perineal elasticity, previous childbirth experience, physical condition, and ability to follow guided pushing instructions. Fetal factors include birth weight, fetal head circumference, presentation, and shoulder dystocia. Clinical factors include episiotomy practice, instrumental delivery, speed of fetal head expulsion, birth position, and the skill of the birth attendant in protecting the perineum (Aasheim et al., 2017; Jiang et al., 2017; Jansson et al., 2020; Longo et al., 2023). These factors explain why a mother with otherwise normal labor may still experience a moderate or severe tear if fetal size, pushing pattern, and perineal support do not align well during delivery.

Age has received considerable attention as a predictor of perineal rupture. Women younger than 20 years may have lower reproductive organ maturity, limited childbirth experience, and a higher probability of primiparity. These conditions may reduce readiness for effective pushing and may increase the chance of perineal stretching beyond tissue tolerance. Older maternal age has also been identified in several studies as a risk factor for obstetric anal sphincter injury, partly because perineal tissue elasticity and pelvic floor resilience can decrease with age (Waldenstrom & Ekeus, 2017; Attali et al., 2026). In Indonesian midwifery studies, the relationship between age and perineal rupture varies across settings. Some studies show a higher risk in mothers aged under 20 years, while others identify an increased risk in mothers aged 35 or older. This variation suggests that age should not be interpreted alone. Age needs to be considered alongside parity, birth weight, labor management, and local childbirth practices (Hastuti et al., 2016; Hukubun et al., 2021).

Parity also influences the risk and degree of perineal rupture. Primiparous mothers often experience greater perineal resistance because the birth canal has not previously stretched during vaginal delivery. Multiparous and grand multiparous mothers may have a more elastic perineum, but they are not fully protected from rupture, as large fetal size, rapid delivery, or poor perineal support can still lead to tears. Studies on parity consistently show that nulliparity or primiparity increases the risk of second-degree and severe perineal trauma. This finding has practical meaning for midwives. Primiparous mothers require more intensive coaching, careful monitoring of fetal descent, and controlled delivery of the fetal head (Mikolajczyk et al., 2008; Damanik & Siddik, 2018; Jansson et al., 2020). Pregnancy class and counseling can help mothers understand proper pushing technique, birth position options, and perineal care after delivery (Kurniyawan et al., 2023; Kurniyawan et al., 2024).

Birth weight represents the fetal factor most directly linked with perineal stretching. Higher birth weight increases pressure on the perineal body during crowning. Macrosomia can enlarge the fetal head and shoulders, increase the risk of shoulder dystocia, and increase the need for assisted maneuvers. Cohort studies and reviews show that fetal weight above 4000 grams increases the risk of second-degree tears and obstetric anal sphincter injury (Fuchs et al., 2013; Turkmen et al., 2018; Jansson et al., 2020). In contrast, low birth weight does not eliminate the risk of rupture because

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

rapid fetal expulsion and premature birth may still disturb controlled delivery. However, the mechanical burden of large birth weight makes it a key variable in evaluating the degree of rupture.

Postpartum perineal wound care also needs attention because rupture does not end at the time of suturing. Delayed healing can increase pain, infection risk, and difficulty in breastfeeding and infant care. Studies have discussed knowledge and practice of perineal wound care, perineal wound healing factors, and postpartum interventions for wound recovery (Darulis et al., 2021; Novelia et al., 2021; Suharja et al., 2022). A study also examined perineal wound healing using snakehead fish extract, reinforcing the need to consider postpartum nutritional and wound care support after perineal trauma (Indrayani & Riviana, 2023). These studies support the broader argument that preventing severe rupture and improving postpartum care both contribute to maternal well-being.

The preliminary delivery register at Sagea Community Health Center showed a high number of perineal rupture cases. From January to March 2024, the delivery room recorded 259 cases of perineal rupture among 370 deliveries. The ruptures consisted of first-degree, second-degree, third-degree, and fourth-degree tears. This pattern indicates that perineal rupture is a persistent clinical issue in the service area. Local childbirth practices, including preferred pushing positions and variations in maternal understanding of labor instructions, may affect the occurrence and severity of rupture. Based on this problem, this study analyzed the relationships among maternal age, parity, and infant birth weight and the degree of perineal rupture among mothers giving birth at Sagea Community Health Center. The findings can support risk screening, childbirth preparation education, and safer intrapartum care planning at the primary health care level.

METHOD

This study used an observational-analytic design with a case-control approach, based on secondary data from the delivery room register of Sagea Community Health Center. The design was selected because the study aimed to examine the relationship between several exposure variables and the degree of perineal rupture that had already occurred during vaginal delivery. This approach allowed the researcher to compare the distribution of maternal age, parity, and infant birth weight across different degrees of perineal rupture without manipulating the labor process. The study setting was the delivery room of Sagea Community Health Center, and the observation period covered deliveries recorded from October 2023 to September 2024.

The study population included all mothers with vaginal delivery who received a diagnosis of perineal rupture during the study period. The sample consisted of 654 patients who met the research criteria. The study used total sampling because all eligible cases were included. The inclusion criteria were mothers who gave birth vaginally at Sagea Community Health Center, had complete documentation of maternal age, parity, infant birth weight, and degree of perineal rupture, and had a documented diagnosis of first-degree to fourth-degree perineal rupture. Exclusion criteria included incomplete delivery records, missing birth weight data, unclear rupture classification, or referral cases with incomplete intrapartum documentation. Using total sampling reduced selection bias and allowed the analysis to reflect the actual case distribution within the health center during the observation period.

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

The independent variables were maternal age, parity, and infant birth weight. Maternal age was categorized into three groups: less than 20 years, 20 to 35 years, and more than 35 years. Parity was categorized as primipara, multipara, and grand multipara. Infant birth weight was categorized as low birth weight, normal birth weight, and macrosomia. Low birth weight refers to a birth weight of less than 2500 grams. Normal birth weight is between 2500 and 4000 grams. Macrosomia refers to a birth weight greater than 4000 grams. The dependent variable was the degree of perineal rupture, classified into first, second, third, and fourth degrees based on the anatomical tissue involved. The classification followed standard obstetric definitions used in delivery documentation.

Data collection used a structured checklist developed from the operational definitions of the study variables. The checklist captured maternal age, parity, infant birth weight, degree of perineal rupture, and supporting notes from the delivery room register. The researcher checked each record for completeness before entering it into the analysis dataset. Data cleaning included verification of category coding, comparison of row totals with the total number of eligible cases, and correction of obvious table alignment errors during manuscript preparation. The study did not involve direct intervention or patient contact because it used existing clinical records. Patient names and personal identifiers were not written in the analysis table or article draft.

Data analysis consisted of univariate, bivariate, and multivariate analyses. Univariate analysis described the frequency and percentage of each variable. Bivariate analysis used Spearman's rank correlation because the independent variables and the degree of perineal rupture were ordinal variables. The test assessed whether higher or lower categories of age, parity, and birth weight correlated with the degree of rupture. A p-value less than 0.05 indicated a statistically significant relationship. Multivariate analysis used multiple logistic regression with the backward method to identify the most dominant independent factor associated with the degree of perineal rupture. Odds ratio, confidence interval, p-value, and R-squared were used to interpret the strength and contribution of the dominant factor. The analysis focused on clinical significance as well as statistical significance, given that perineal rupture is influenced by multiple maternal, fetal, and labor management factors.

RESULTS

The results present the distribution of perineal rupture by age, parity, and birth weight among 654 mothers who experienced perineal rupture at Sagea Community Health Center. The analysis also identifies the most dominant factor associated with a higher degree of perineal rupture. Delivery care at Sagea Community Health Center was adjusted to maternal and fetal conditions. The delivery records showed 1,577 spontaneous deliveries during the observation period. Of these cases, 654 records met the criteria for analysis of perineal rupture. The most common rupture was second-degree, followed by first-degree, third-degree, and fourth-degree. The health center implemented preventive measures, including guided pushing, perineal support during crowning, and selective episiotomy based on indication.

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

Table 1. Association Between Maternal Characteristics, Infant Birth Weight, and Degree of Perineal Rupture (N = 654)

Variable	Category	Grade 1 n (%)	Grade 2 n (%)	Grade 3 n (%)	Grade 4 n (%)	Spearman's rs	p-value
Maternal age (years)	<20	36 (39.6)	50 (54.9)	4 (4.4)	1 (1.1)	-0.106	0.007*
	20–35	218 (44.2)	254 (51.5)	16 (3.2)	5 (1.0)		
	>35	43 (61.4)	26 (37.1)	1 (1.4)	0 (0.0)		
Parity	Primipara	66 (32.4)	130 (63.7)	7 (3.4)	1 (0.5)	-0.184	<0.001*
	Multipara	202 (49.8)	185 (45.6)	14 (3.4)	5 (1.2)		
	Grand multipara	29 (65.9)	15 (34.1)	0 (0.0)	0 (0.0)		
Infant birth weight	<2500 g	40 (57.1)	28 (40.0)	1 (1.4)	1 (1.4)	-0.121	0.002*
	2500–4000 g	257 (44.5)	301 (52.1)	17 (2.9)	3 (0.5)		
	>4000 g	0 (0.0)	1 (16.7)	3 (50.0)	2 (33.3)		
	Total	297 (45.4)	330 (50.5)	21 (3.2)	6 (0.9)		

Note. rs = Spearman's rank correlation coefficient. $p < 0.05$ indicates statistical significance.

Table 1 summarizes the relationships between maternal age, parity, infant birth weight, and the degree of perineal rupture. Maternal age was significantly associated with rupture severity ($rs = -0.106$, $p = 0.007$), with younger mothers, particularly those aged <20 years, experiencing a higher proportion of severe perineal rupture. Parity was also significantly associated with rupture severity ($rs = -0.184$, $p < 0.001$), indicating that primiparous women were more likely to experience second- to fourth-degree perineal rupture than multiparous or grand multiparous women. Similarly, infant birth weight showed a significant relationship with the degree of perineal rupture ($rs = -0.121$, $p = 0.002$). Mothers delivering macrosomic infants (>4000 g) had the highest proportions of third- and fourth-degree perineal rupture compared with those delivering infants of normal or low birth weight. These findings suggest that maternal age, parity, and infant birth weight are significant factors associated with the severity of perineal rupture during childbirth.

Table 5. Multivariate Analysis of Factors Associated with Degree of Perineal Rupture

Variable	p-value	OR (95% CI)	R Square
Infant birth weight	0.000	142.273 (15.493-1269.612)	14.9%

Multiple logistic regression showed that infant birth weight was the dominant factor associated with the degree of perineal rupture. The positive coefficient indicated that higher birth weight increased the probability of a more severe perineal rupture.

DISCUSSION

This study found a significant relationship between maternal age and the degree of perineal rupture. The correlation was negative, indicating that younger maternal age was associated with a higher degree of rupture. Mothers aged less than 20 years had a higher proportion of second- to fourth-degree tears than mothers aged 20 to 35 years and those older than 35 years. This finding

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

supports the assumption that very young mothers may have lower pelvic floor and perineal readiness during the first childbirth experience. Younger mothers also tend to be primiparous, and primiparity itself increases the risk of rupture because the perineum has not previously stretched during birth. In this context, age likely works together with parity rather than acting as a fully independent biological factor.

The age finding aligns with studies that identify age as one of the maternal characteristics associated with perineal trauma, although the direction of risk differs across populations. Waldenstrom and Ekeus (2017) found that obstetric anal sphincter injury increased with maternal age across parity groups. More recent evidence from Attali et al. (2026) suggested that younger maternal age was independently associated with spontaneous perineal injury among nulliparous women. This difference confirms that age does not operate in a simple linear pattern. At a younger age, reproductive tissue maturity, limited childbirth experience, fear, and poor pushing coordination may increase risk. At an older age, reduced tissue elasticity and comorbidities may increase risk. The present study showed that the younger group carried the greater burden, which may reflect local demographic patterns and the strong overlap between young age and first childbirth at Sagea Community Health Center.

Parity also showed a significant relationship with the degree of perineal rupture. Primiparous mothers had more second-degree rupture than multiparous and grand multiparous mothers. This finding matches the biological explanation that the first vaginal delivery places new mechanical pressure on perineal tissue. In multiparous women, prior deliveries may increase tissue compliance and improve the mother's ability to recognize the contraction rhythm, respond to instructions, and control pushing. However, multiparity does not fully prevent rupture. Large birth weight, rapid expulsion, instrumental assistance, malposition, and inappropriate birth position can still cause tears in multiparous mothers. This explains why the study still found second-, third-, and fourth-degree ruptures among multiparous mothers.

The parity result is consistent with previous research. Mikolajczyk et al. (2008) showed that primiparity increases the risk of birth canal laceration. Jansson et al. (2020) also reported that primiparous women had a high incidence of second-degree perineal tears and obstetric anal sphincter injury. Indonesian evidence from Damanik and Siddik (2018), Hastuti et al. (2016), and Hukubun et al. (2021) also supports the relationship between parity and perineal rupture. For clinical practice, this finding means that birth attendants should not treat primiparous mothers as routine cases only because they have no obstetric complication history. Primiparous mothers need more structured coaching on breathing, pushing, positioning, and responding to the attendant's commands during crowning.

Birth weight had the strongest relationship with the degree of perineal rupture and became the dominant variable in the multivariate analysis. Mothers who delivered macrosomic infants had a much larger proportion of third-degree and fourth-degree rupture. The regression model showed that higher birth weight substantially increased the odds of a higher degree of rupture. This result has a clear biomechanical explanation. A heavier infant usually has a larger head circumference, shoulder width, and body mass. During crowning, the perineal body must stretch to accommodate the fetal head and shoulders. When fetal size exceeds the tissue's stretching capacity, the tear can extend from the skin and mucosa into the perineal muscles and anal sphincter complex.

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

The dominant effect of birth weight agrees with international studies on macrosomia and maternal birth trauma. Fuchs et al. (2013) reported that fetal macrosomia increased the risk of severe perineal tears and postpartum hemorrhage. Turkmen et al. (2018) also found that macrosomia increased the risk of episiotomy, laceration, and shoulder dystocia. Jansson et al. (2020) identified fetal weight above 4000 grams as an independent risk factor for second-degree perineal tear and obstetric anal sphincter injury among primiparous women. These studies support the finding that fetal size deserves special attention during antenatal care and labor planning. Birth attendants should use estimated fetal weight, maternal nutritional history, diabetes risk, fundal height, and clinical assessment to identify mothers who may need closer intrapartum supervision.

Although birth weight was dominant, the R-squared value showed that age, parity, and birth weight explained only part of the variation in perineal rupture degree. This is important. Perineal rupture also depends on clinical management. Controlled delivery of the fetal head, selective episiotomy, warm compresses, perineal support, maternal position, and communication during pushing influence whether the perineum tears and how severe the tear becomes. Aasheim et al. (2017) and Jiang et al. (2017) emphasized that perineal techniques and selective episiotomy practice can affect perineal trauma outcomes. Longo et al. (2023) also showed that clinical and obstetric complications such as shoulder dystocia increase the risk of obstetric anal sphincter injury. These findings show that risk screening must be combined with skilled intrapartum management.

The local context at Sagea Community Health Center strengthens this interpretation. The record review showed that many cases occurred in routine delivery services. Some mothers preferred certain birthing positions based on local custom, and some young mothers had limited understanding of labor instructions. Birth attendants may accept patient preferences when they do not directly endanger the mother. However, when the fetal head crowns, the attendant still needs to maintain a controlled and protective process. Poor timing of pushing, sudden fetal expulsion, and inability to stop pushing can increase tissue damage. This condition makes therapeutic communication important. Kurniyawan et al. (2024) support the role of communication in reducing psychological distress, while Kurniyawan et al. (2023) highlight the value of family support in improving health awareness. In childbirth care, this means midwives need to involve mothers and families in counseling before labor, so they understand how to cooperate during the second stage.

The study also has relevance for postpartum care. Perineal rupture can cause pain, limited mobility, difficulty sitting, fear of defecation, and delayed return to sexual function. If wound care is poor, infection and delayed healing may occur. Darulis et al. (2021), Novelia et al. (2021), and Suharja et al. (2022) show that perineal wound care practices and healing factors require ongoing postpartum education. Indrayani and Riviana (2023) also reinforce the need to improve post-rupture wound recovery support. This evidence supports integrated care. Midwives should not only suture the rupture but also teach hygiene, nutrition, danger signs, pain management, and follow-up care.

The main implication of this study is the need for risk-based childbirth preparation. Mothers younger than 20 years, primiparous mothers, and mothers suspected of carrying large infants should receive focused counseling during antenatal care. The counseling should cover pelvic floor preparation, participation in the pregnancy class, balanced nutrition, diabetes screening, fetal growth monitoring, and labor cooperation. During labor, attendants should apply careful perineal support and avoid routine episiotomy without indication. After labor, mothers with second-degree to fourth-degree rupture should receive standardized wound care and follow-up. Future studies should include

Volume 02 Number 01 (June 2026)
p-ISSN: 0000-0000
e-ISSN: 0000-0000

variables this study did not assess, such as head circumference, duration of the second stage, type of episiotomy, delivery position, attendant technique, maternal body mass index, diabetes status, and use of instrumental delivery. These variables may improve the model's explanatory power and provide a clearer prevention strategy for severe perineal rupture.

CONCLUSION

This study found that maternal age, parity, and infant birth weight were significantly associated with the degree of perineal rupture among mothers delivering at Sagea Community Health Center. Younger maternal age and lower parity were associated with higher rupture severity. Infant birth weight was the most dominant factor. Mothers who delivered heavier infants, especially macrosomic infants, had a higher risk of more severe perineal rupture. These findings support the need for risk screening during antenatal care, accurate fetal growth monitoring, structured childbirth preparation, careful guidance during pushing, selective episiotomy, and consistent postpartum wound care education. Sagea Community Health Center can use these findings to strengthen midwife-led counseling and develop a perineal rupture prevention protocol for mothers at higher risk.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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