Review Article :

Risk Factors For Perineal Injury: A Systematic Review.

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Abstract

Several studies have investigated the importance of maternal, fetal factors and intrapartum characteristics in predicting severe perineal lacerations. The purpose of the present systematic review is to evaluate on research regarding risk factors for perineal injury. We reviewed PubMed, Science-Direct, Cochrane Library, and Medline for published studies in the field for observational studies. Two researchers independently assessed the included studies and documented outcomes. Data extraction was performed using a modified data form. Twenty-nine articles were selected for inclusion in the present systematic review. Several factors contribute to the development of severe perineal injury. The most common risk factor investigated was parity, episiotomy, birth weight, maternal age, prolonged 2nd stage of labor, head circumference, and instrumental deliveries. The present systematic review presents accumulated data that may help birth attendant estimate risks and provide appropriate intervention.

Keywords:
Perineal injury, Child-birth, Delivery.

Introduction

Episiotomy and OASI rates serve as key indicators of healthcare quality within health systems [1]. The misdiagnosis and underreporting of perineal tears pose significant hurdles in improving the management of birth-related perineal trauma (BPT) and its related outcomes in Europe [2]. Similar challenges are expected in Low- and Middle-Income Countries (LMICs), potentially causing more profound impacts on health and overall well-being. Among young women, chronic incontinence and dyspareunia due to these conditions often lead to diminished quality of life and self-esteem [3]. Socially, these conditions contribute to

stigma, isolation, and rejection within both marital and community contexts, resulting in emotional distress and feelings of shame [4]. Although the precise figures remain unknown, it is estimated that millions worldwide suffer from BPT annually, enduring its consequences silently [5].

The surge in cesarean section rates globally has been marked as a concerning trend, with recent data from The Lancet indicating a sharp increase to 21% over the past 15 years [6]. The World Health Organization (WHO) underscores that cesarean section rates exceeding 10–15% are unwarranted across different regions and populations [1]. In 2018, FIGO issued a position paper intending to garner support from professional bodies, women's organizations, and stakeholders for promoting normal labor [7]. The primary reason for these assertions is the heightened morbidity associated with cesarean sections. Despite lower rates of maternal and neonatal morbidity linked to normal labor, perineal trauma remains prevalent during childbirth, affecting between 53–79% of women [8]. These injuries are classified into four degrees, with third and fourth-degree lacerations being particularly severe, leading to increased immediate and long-term morbidity that significantly impacts women's quality of life (QoL) [9].

Despite these pressing concerns, considerable disparities persist on an international scale regarding the optimal preventive management of severe perineal tears, commonly known as OASIS (obstetric anal sphincter injury) [10]. The occurrence of OASIS fluctuates between 3% and 7% during normal deliveries. A recent cohort study encompassing 75,000 deliveries revealed that existing preventive strategies have plateaued, indicating a lack of further decline in sphincter injury incidence using current measures. The crucial task lies in identifying risk factors that elevate the likelihood of developing OASIS, aiming to estimate the actual effect size to improve diagnostic accuracy and develop targeted algorithms for at-risk women. In a prior meta-analysis involving 22 studies, Pergialiotis et al. highlighted several factors contributing to the increased risk of severe perineal lacerations, including higher birth weight, episiotomy usage, and labor augmentation [11]. Since then, numerous articles have emerged in this area, necessitating an updated assessment. This present systematic review aims to evaluate on prior research regarding risk factors for perineal injury.

Method

Protocol

Present review complies with the Preferred Reporting Items for Systematic re-

view and Meta analysis (PRISMA) guidelines 2020 version [12].

Search Strategy

We conducted searches across multiple databases like PubMed, ScienceDirect, Cochrane Library, and Medline. The search terms used for articles were "Perineal injury," "Parity" "Delivery" "Child-birth" and "Lacerations" tailored to match the vocabulary of each specific database. These keywords were merged using Boolean operators like "AND" and "OR." Our search was restricted to articles available in English. We further refined the filters to yield more precise and pertinent results.

Eligibility Criteria

This review encompassed all research examining risk factors for Perineal injury in women on child-birth. There was no restriction on the search timeframe to ensure a thorough compilation of relevant studies. However, studies published in conference proceedings, reviews, meta-analyses, commentaries, book chapters, reports, case studies, and letters to the editor were excluded from consideration.

Selection Process

Two authors independently and separately screened the titles or abstracts of the located studies. In cases of conflicting opinions between the two screening authors, the first author made the final decision. This rapid screening involved assessing the titles, objectives, and conclusions of the pertinent studies. Further investigation into specific studies was pursued by delving into the main text to gather additional information as needed.

Study Quality

Articles eligible for inclusion were independently assessed by reviewers for methodological quality. Although not a necessary step in systematic review methodology, reviewers thought this would assist in identifying the strengths and limitations of included studies. Due to the heterogenous nature of articles included in systematic reviews, the Quality Assessment Tool for Quantitative Studies (Effective Public Health Practice Project, 1998) was chosen due to its ability to appraise a wide variety of research methods.

Risk of bias

The Risk of Bias in Non-Randomized Studies - Exposure Studies (ROBINS-E) was used to evaluate the types of bias in each study 13. The ROBINS-E tool consists of seven domains that assess the internal and external validity of the study. The assessment of the results of the assessment of these domains consists of Low, Some concerns, High, and Very High. The RoB assessment result involved and were approved by all authors taking into account

the opinions of external reviewers.

Data Extraction and synthesis

To facilitate comprehension of the eligible studies' contents, crucial information has been summarized in a table. Two authors collaborated in this extraction process. In cases where there were differing opinions regarding the extracted data, they were reconciled through consensus. The extraction criteria included the first author and publication year, study design, sampel size, parity, grade of lacerations, factors related to the perineal injury.

Results

The initial database search retrieved 9,949 articles. After removing 5,430 duplicates and ineligible articles not relevant to the review's theme, 4,519 articles remained for screening. During the eligibility assessment, 54 studies were evaluated, and 25 articles were excluded for various reasons. Ultimately, only 29 studies met the criteria and will proceed to the next stage for extraction and analysis

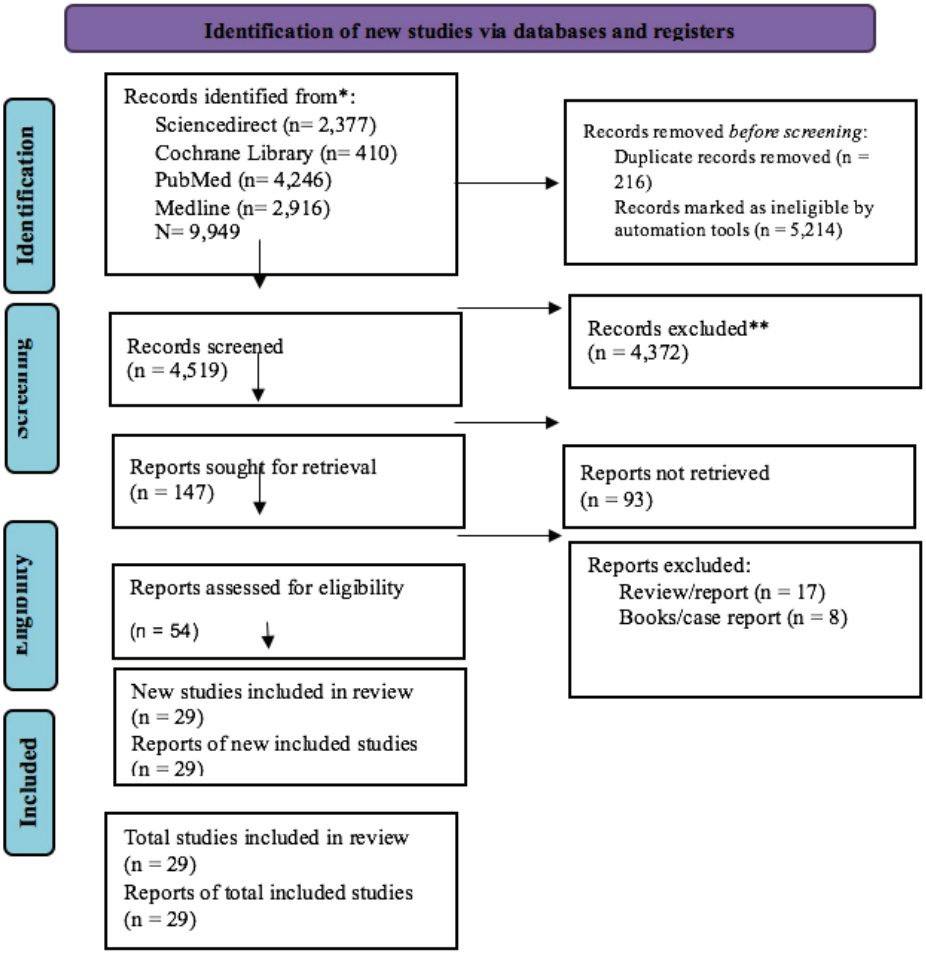


Figure 1. PRISMA flow diagram for literature search

Table 1. Characteristics of Eligible Studies

Author, Year, Country	Design	Sample size	Parity	Birth attendant	Degree of tears	Factors of perineal injury
(Albers et al., 1996) Mexico	Cohort	3,049	Nulliparous, Primiparous, Multiparous	Certified Nurse-Midwife, physician	1st - 4th	Lithotomy position, infant birthweight, epidural anesthesia, episiotomy
(Ampt Ab & Ford, 2015); Australia	Cohort	687,202	Primiparous	Midwife, doctor	3rd and 4th	Primiparity, instrumental birth, birthweight ≥4Kg, episiotomy
(Bączek et al., 2022) ; Poland	Single-center retrospective case-control	7,238	Primiparous, Multiparous	Midwife	1st - 4th	Age, BMI, number of pregnancies, home birth, gestational diabetes, home birth, vaginal birth after caesarean, the use of oxytocin, duration of second stage, circumference of the newborn head.
(Bugti et al., 2019) ; Pakistan	Cross-sectional	95	Primiparous, Multiparous	NR	1st and 2nd	Primigravida, Forceps delivery and increased gestational age
(Christianson et al., 2003) ; US	Retrospective, case-control	2,078	Primiparous, Multiparous	NR	3rd and 4th	Forceps, episiotomy, duration of labor, infant birthweight, epidural, oxytocin, nulliparous
(H. G. Dahlen et al., 2007) ; Australia	Prospective cohort	6,595	Primiparous, Multiparous	NR	3rd and 4th	Primiparity, instrumental delivery, Asian ethnicity and heavier babies
(H. Dahlen et al., 2013) ; Australia	Prospective cohort	510,006	Primiparous, Multiparous	NR	3rd and 4th	Birthweight, smoking, instrumental delivery, sex of the baby, ethnicity, place of birth
(da Silva et al., 2012) ; Brazil	Cross-sectional	1,079	Nulliparous, multiparous	NR	1st and 2nd	Parity, use of oxytocin during labour, position at time of giving birth and infant birth weight
(D'Souza et al., 2020) ; UK	Retrospective	756	Primiparous	NR	3rd and 4th	Age, Asian ethnicity, birthweight, length of 2nd stage
(Santos et al., 2021) ; Brazil	Retrospective Cohort	326	Nulliparous	NR	1st - 4th	maternal age, gestational age, oxytocin, use of pharmacological analgesia, maternal position during birth, forceps usage, infant birthweight, episiotomy, presence of perineal trauma
(Durnea et al., 2018) ; UK	Retrospective Cohort	45,557	NR	NR	1st - 4th	BMI
(Elvander et al., 2019) ; Sweden	Cohort	26,543	Nulliparous, multiparous	NR	ND	Age, BMI, maternal height, gestational length, epidural, oxytocin, length of pushing, birthing positions, episiotomy, birthweight, head circumferences, vacuum extraction
(Enyindah et al., 2007) ; Nigeria	Retrospective	4,720	Nulliparous, Primiparous, Multiparous	Midwife	1st - 3rd	Maternal parity, gestational age at delivery, type of vaginal delivery, birth weight
(Eskandar & Shet, 2009) ; UK	Retrospective	2,242	Primiparous, Multiparous	NR	3rd and 4th	Parity, use of epidural anaesthesia, use of medio-lateral episiotomy, instrumental delivery, IOL, birth weight and position of the head during delivery
(Fodstad et al., 2016) ; Norway	Prospective	882	Primiparous, Multiparous	NR	3rd and 4th	Age, Parity, mode of delivery
(Gauthaman et al., 2016) ; UK	Retrospective	403	NR	NR	3rd and 4th	Shoulder dystocia
(Kituku et al., 2019) ; Kenya	Cross-sectional	209	Nulliparous, Primiparous, Multiparous	Midwife	1st - 4th	Parity, History of Trauma in previous deliveries, induced, care attendant, position at delivery, infant birth weight, infant sex
(Gluck et al., 2020) ; Israel	Retrospective Cohort	22,387	Nulliparous, Primiparous, Multiparous	NR	3rd and 4th	Maternal age, instrumental deliveries, BMI, epidural, gestational age, induction, prolonged 2nd stage, birthweight
(Gommesen et al., 2019) ; Denmark	Prospective Cohort	603	Primiparous	NR	1st - 4th	Age, BMI, birthweight, head circumference, length of 2nd stage of labor, smoker, episiotomy
(Groutz et al., 2011) ; Israel	Cohort	31,784	Primiparous	NR	3rd and 4th	Primiparity, maternal age, Asian ethnicity, longer duration of 2nd stage of labour, vacuum-assisted delivery, birth weight

(Hauck et al., 2015) ; Australia	Retrospective	10,408	Primiparous, Multiparous	Midwife	3rd and 4th	Parity, Asian or Indian ethnicity, shoulder dystocia and assisted delivery, Second stage >1 h
(Hsieh et al., 2014) ; Taiwan	Cohort	1,879	Nulliparous, Primiparous, Multiparous	Obstetrician	3rd and 4th	Nulliparous, duration of 2nd stage, instrument deliveries, birthweight, BMI, head circumference
(Hudelist et al., 2005) ; Austria	Retrospective	5,044	Nulliparous, Primiparous, Multiparous	NR	3rd and 4th	Parity, prolonged first and second stages of labor, birthweight, episiotomy, forceps delivery
(Jansson et al., 2020) ; Sweden	Prospective Cohort	644	Primiparous	NR	3rd and 4th	Age, BMI, Induction, Episiotomy, position at birth, vacuum extraction, head circumference
(Komorowski et al., 2014) ; US	Prospective Cohort	448	Nulliparous	NR	2nd, 3rd and 4th	Head circumference, maternal age, ethnicity
(Kudish et al., 2008) ; US	Retrospective Cohort	46,239	Nulliparous, Primiparous, Multiparous	Interns and residents	3rd and 4th	Maternal age, parity, race, marital status, epidural anesthesia, birth weight, head circumference, episiotomy
(Smith et al., 2013) ; UK	Prospective	2,754	Nulliparous, Multiparous	Midwife, Physician	1st - 4th	Parity, shoulder dystocia, Age, episiotomy, duration of second stage labor, birthweight, instrumental delivery
(Vale de Castro Monteiro et al., 2016) ; Brazil	Retrospective Cohort	1,599	Primiparous, Multiparous	NR	1st - 4th	Using forceps, Labor anasthesia, the use of Oxytocin, birthweight, gestational age, parity
(von Theobald et al., 2020) ; France	Retrospective Cohort	25,645	Multiparous	NR	1st - 4th	Age at delivery, gestational age, birthweight, parity, BMI, epidural, shoulder dystocia, Episiotomy

Tabel 2. Summary of Quality Assessment

Author	Selection Bias	Study Design	Confounders	Blinding	Data Collection Methods	Withdrawals drop outs	Intervention integrity	Analysis	Global Rating
(Albers et al., 1996)	1	1 Cohort	1 Payment Source of delivery	N/A	1	N/A	No intervention/ exposure	1 Logistic regression	1
(Ampt Ab & Ford, 2015)	1	1 Cohort	N/A	N/A	1	N/A	No intervention/ exposure	1 Logistic regression	1
(Bączek et al., 2022)	1	1 retrospective case-control	1 Place of residence	N/A	1	N/A	No intervention/ exposure	1 the Kolmogorov–Smirnov test, the Lilliefors test, The Pearson's chi-squared test, Logistic regression	1
(Bugti et al., 2019)	1	1 Cross-sectional	N/A	N/A	1	N/A	No intervention/ exposure	1 Descriptive statistics	1
(Christianson et al., 2003)	1	1 Retrospective, case-control	N/A	N/A	1	N/A	No intervention/ exposure	1 Chi-squared tests, t-test, unconditional logistic regression	1
(H. G. Dahlen et al., 2007)	1	1 Prospective cohort	1 Public health insurance, marital status	N/A	1	N/A	No intervention/ exposure	1 Logistic regression	1
(H. Dahlen et al., 2013)	1	1 Prospective cohort	1 Country of birth of mother	N/A	1	N/A	No intervention/ exposure	1 logistic regression and multinomial regression	1
(da Silva et al., 2012)	1	1 Cross-sectional	1 Education	N/A	1	N/A	No intervention/ exposure	1 Chi-squared test	1

(D'Souza et al., 2020)	1	1 Retrospective	1 Education	N/A	1	N/A	No intervention/ exposure	1 The Mann-Whitney U test, the Kolmogorov-Smirnov test, Chi-square	1
(Santos et al., 2021)	1	1 Retrospective Cohort	1 Maternal education	N/A	1	Missing primary outcomes: n= 55 Twin pregnancies: n=2 Caesarean: n=85 Dead foetus: n=13 Multiparous: n=86	No intervention/ exposure	1 bivariate regression, multiple logistic regression	1
(Durnea et al., 2018)	1	1 Retrospective Cohort	1 Age, ethnicity, pregnancy length,	N/A	1	1 32% not meet inclusion criteria	No intervention/ exposure	1 Multivariate logistic regression	1
(Elvander et al., 2019)	1	1 Cohort	N/A	N/A	1	N/A	No intervention/ exposure	1 Chi-square	1
(Enyindah et al., 2007)	1	1 Retrospective	1 APGAR Score	N/A	1	N/A	No intervention/ exposure	1 Chi-square	1
(Eskandar & Shet, 2009)	1	1 Retrospective	1 Time of delivery	N/A	1	1 Caesarean (760)	No intervention/ exposure	1 Logistic regression	1
(Fodstad et al., 2016)	1	1 Prospective	1 Breastfeeding, marital status, educational level, household income	N/A	1	1 Delivery at different hospital (5)	No intervention/ exposure	1 Chi-squared test	1
(Gauthaman et al., 2016)	1	1 Retrospective	1 Age	N/A	1	1 files were stored off-site or were unobtainable (24)	No intervention/ exposure	1 multivariate regression	1
(Kituku et al., 2019)	1	1 Cross-sectional	N/A	N/A	1	N/A	No intervention/ exposure	1 Multiple logistic regression, Chi Square	2
(Gluck et al., 2020)	1	1 Retrospective Cohort	N/A	N/A	1	1 Not meet inclusion criteria (15,440)	No intervention/ exposure	1 Logistic regression	1
(Gommesen et al., 2019)	1	1 Prospective Cohort	1 Infection	N/A	1	1 Declined (81), could not be reached by phone (138)	No intervention/ exposure	1 Nominal logistic regression, two-tailed	1
(Groutz et al., 2011)	1	1 Cohort	N/A	N/A	1	N/A	No intervention/ exposure	1 t-test, multivariate logistic regression	1
(Hauck et al., 2015)	1	1 Retrospective	N/A	N/A	1	1 missing values for parity (13)	No intervention/ exposure	1 Chi-Square, multivariable regression	1
(Hsieh et al., 2014)	1	1 Cohort	1 Completed college,	N/A	1	N/A	No intervention/ exposure	1 Chi-Square, t-test, multivariate logistic regression	1

(Hudelist et al., 2005)	1	1 Retrospective	1 Use of Tobacco	N/A	1	N/A	No intervention/ exposure	1 Mann Whitney U test, Fisher exact test, Multivariate logistic regression	1
(Jansson et al., 2020)	1	1 Prospective Cohort	1 Age, Education, Heredity	N/A	1	1 Missing data (185)	No intervention/ exposure	1 t-test, the Wilcoxon ranksum test, Chi-Square	1
(Komorowski et al., 2014)	1	1 Prospective Cohort	1 Education	N/A	1	1 Not eligible (86)	No intervention/ exposure	1 Fisher exact test, Wilcoxon test, Multivariate logistic regression	1
(Kudish et al., 2008)	1	1 Retrospective Cohort	1 Marital status	N/A	1	N/A	No intervention/ exposure	1 Multivariate linear regression	1
(Smith et al., 2013)	1	1 Prospective	1 Place of delivery	N/A	1	1 Missing data (0.3 to 7.4%)	No intervention/ exposure	1 Logistic regression.	1
(Vale de Castro Monteiro et al., 2016)	1	1 Retrospective Cohort	1 Maternal age	N/A	1	1 lack of information on laceration (4)	No intervention/ exposure	1 The chi-square test, logistic regression	1
(von Theobald et al., 2020)	1	1 Retrospective Cohort	1 Mode of delivery, multiple pregnancy, breech delivery, shoulder dystocia	N/A	1	1 Not eligible (665)	No intervention/ exposure	1 chi-square test, Wilcoxon-Mann-Whitney	1

Characteristics of eligible studies

The 29 eligible studies in this review were conducted from various countries, including the United Kingdom (n=5), Australia (n=4), United States (n=3), Brazil (n=3), Sweden (n=2), Israel (n=2), and one study each in Mexico, Poland, Pakistan, Nigeria, Norway, Kenya, Taiwan, Austria, France, and Denmark. The eligible studies included samples ranging from 95 to 687,202 mothers who experienced perineal injury. The study design used was based on the inclusion criteria of this review, where to see the risk factors, the targeted study design was observational.

Based on parity, some studies included only nulliparous mothers [14,15], or included only primiparous and multiparous mothers [16–24]. Most of the studies involved all types of parity 25–30. Based on the degree of perineal injury, most studies focus on the severe degree of injury (3rd and 4rd).

Risk of Bias Assessment Results

The RoB assessment using the ROBINS-E tool is shown in figure 2 in the form of a traffic-light plot. Based on the summary, twenty studies were categorised into "Low" and the rest were in the "Some-concerns" category.

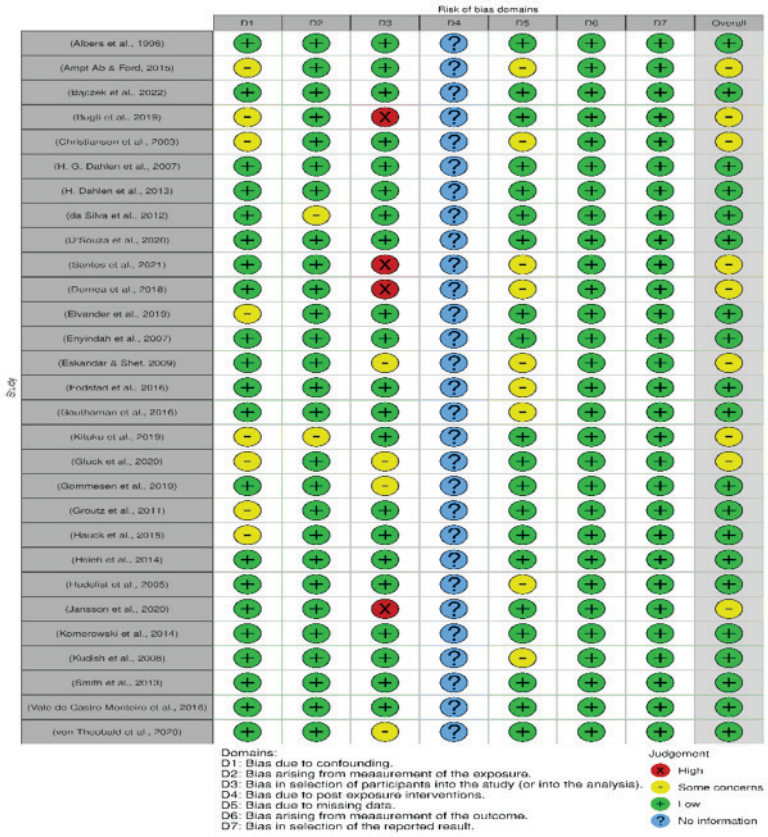


Figure 2. Traffic-Light plot for RoB assessment

Risk Factors for Perineal Injury

A number of risk factors were measured, including parity, birthweight, instrumental birth, episiotomy, head circumference, delivery position, shoulders dystocia, maternal age, gestational age, maternal BMI, race/ethnicity, smoking, mode of delivery, duration of labor, prolonged 2nd stage, induction, history of injuries in previous deliveries, and infant sex. The most common risk factor investigated was parity, episiotomy, birth weight, maternal age, prolonged 2nd stage of labor, BMI, head circumference, and instrumental deliveries. Regarding parity, primiparous was the most common type of parity analysed in studies exploring this variable, which was present in 15 studies [16,19–24,26,31–37]. Nulliparous also represents a parity type that was widely analysed in eligible studies (n=10) [14,15,17,18,27–30,38,39]. Episiotomy was documented in 13study [15,18,21,25,28,29,32,34–36,38–40]. The Australian study mentioned that episiotomy causes severe perineal trauma with a percentage of 35.4% [36], this was also mentioned in another study in Austria with a P-value of 0.004 [34]. Meanwhile, a study in Brazil found that 39 out of 43 deliveries with episiotomy had a very high laceration incidence rate (91%) [15], and aOR of 0.03

39. In contrast to studies in Sweden, perineal injury in mothers with Vaginal Birth after Cesarean is not affected by episiotomy [38], as well as other studies in the same country [35]. Eskandar and Shet in the United Kingdom found that medio lateral episiotomy protected against severe perineal tears with an OR value of 0.35 [21,29]. However, Gommesen and colleagues found that medio-lateral episiotomy increased the risk of infection threefold [32].

Birthweight were analyzed in 21 studies [15,17,18,20,24,25,27–34,36–40]. Albers and colleagues found that birthweight was not directly associated with perineal injury 25. Meanwhile, another study mentioned an association with the incidence of perineal injury aOR 2.45 [36], OR 1.36 [17], aOR 1.0 [20], p 0.041 [37], p 0.001 [31], p 0.01 [15], p 0.001 [38], p 0.19 [26], OR 1.19 [21], p 0.005 [30], p 0.325 [27], OR 1.77 32, p 0.117 33, p 0.001 (Hsieh et al., 2014), 0.001 [34], OR 2.1 [29], OR 1.0 [39], p 0.001 [24], dan p 0.001 [40].

Maternal age were analyzed in 13 studies [14,15,17,22,27,29,31–33,35,38–40]. In Poland, the older the mother, the lower the incidence of perineal injury by 1.06 times [17]. This is in line with what was found in the United Kingdom with a significance value of p 0.001 [31], as well as in other countries including Brazil, where the age of 20 - 34 is the age most often experiencing perineal injury with a significance value of p 0.03 [15], Sweden with P value 0.001 [38], aOR 0.38 [32], p 0.001 [33], OR 1.78 for 2nd degree perineal trauma [35], p 0.001 for age <25 [14], OR 1.2 [29], OR 1.55 for age 31 – 40 [39], p 0.019 [40].

Prolonged 2nd stage of labor was analyzed in nine studies [17,23,27,28,31–34,39]. 2nd stage duration was reported to contribute significantly to severe perineal injury in Poland with a P value of 0.000 [17], as well as a study in the United Kingdom with a p value of 0.001 [31], in Israel p 0.001 [33], in Australia p 0.001 23, while in Taiwan p 0.003 28, and in Austria P 0.022 [34]. In Denmark, an aOR of 1.57 for duration >45 minutes was found [32], and in the UK it was found to be aOR 1.49 [39].

Head circumference was analysed in seven studies [14,17,21,28,29,32,35]. Elvander and colleagues found a strong association between head circumference and perineal injury with a p value of 0.001 [38]. The same thing was also found in a study in Taiwan with a p value of 0.001 [28], in US with p 0.01 [14], and a study conducted by Kudish and colleagues found strong significance with a p value of 0.001 [29].

Instrumental deliveries mean that the labour process uses the help of instruments. Tools used include forceps, and vacuum. There were 22 studies that analysed the use of instruments in childbirth assistance [15,16,18,20–22,24,26–31,33–36,38,39,41,42]. In general, in-

strumental deliveries had a non-significant effect on perineal injury in a singular manner.

Discussion

Findings from 29 studies were extracted and analysed to explore risk factors for perineal injury. However, due to the wide differences and variability in the risk factors examined in the studies and the standards and tools used, it was not possible to accurately synthesise the research findings. In general, eligible studies used secondary data to analyse matters related to perineal injury. Only three studies used cross-sectional methods in their research [16,30,37]. Meanwhile, seven studies used a prospective design [14,19,20,22,32,35,39] and most others used a retrospective design.

Major risk factors for perineal injury

Based on the extraction results, it appears that parity is the main risk factor for perineal injury. Among the three types of parity, nulliparous and primiparous were the parity types that were analysed with frequency in the eligible studies. Therefore, it is important to focus interventions on this category of mothers to prevent perineal injuries that can be fatal.

The eligible studies mentioned that for invasive procedures such as episiotomy, it should be decided by the obstetrician and handled by them. Several studies have highlighted midline episiotomy as a potential risk factor linked to third- and fourth-degree tears [18,21,29,34–36] although conflicting findings exist in the literature.

Infant birthweight was not associated with perineal injury when the data were adjusted for parity. This means that birth weight is not a key factor in the incidence of perineal injury. [25], this was also found in studies in Australia, Israel, Denmark, Taiwan [19,27,28,32]. A study in Brazil stated that infants weighing >3500grams increased the prevalence of 2nd degree perineal injury [37]. Meanwhile, Christianson and team found that birthweight was a strong predictor of birth canal tears [18], The same was found in Israel, Austria, the United States, Brazil, and France [29,33,34,40]. Studies in the United Kingdom report that infants weighing >3500 are at 3.6 times the risk of Obstetric anal sphincter injuries (OASIS) [31]. Elvander and colleagues mentioned that birth weight as an independent risk factor for severe perineal trauma among nulliparous and those undergoing vaginal birth after cesarean delivery (VBAC) [38]. Enyindah and colleagues analysed the relationship between birthweight and episiotomy, but found that it was not significantly associated with episiotomy [26]. Studi di Kenya melaporkan adanya hubungan yang signifikan secara statistik antara berat badan lahir bayi dengan trauma perineum (p=0,005).

Kemungkinan mengalami trauma perineum meningkat dengan berat badan lahir bayi OR 2,878 [30].

Women sustaining Obstetric anal sphincter injuries (OASIS) were significantly older (>28) [31]. Maternal age is reported to be associated with grade 3 and 4 perineal injury, where age >35 is more prone to perineal injury [27,29,33,40]. This is in line with a study in Denmark which found that ages <25 are at high risk of experiencing grade 1 and 2 perineal injuries [32]. In contrast, a study in Sweden mentioned that age >25 is associated with grade 2 perineal injury 35. Meanwhile, Komorowski and colleagues in their study mentioned that older age is more at risk for perineal trauma, but the study did not determine the age and degree of perineal injury [14].

Those suffering obstetric anal sphincter injuries (OASIS) had significantly have a longer second stage of labor [31]. However, a study in Israel found that there was no association between the duration of 2nd stage of labour [27]. Studies in Denmark, Israel, Taiwan reported that the longer the duration of 2nd stage of labour, the greater the risk of high degree perineal injury [28,32–34]. Meanwhile, Smith and colleagues stated that a long 2nd duration of labour would result in a 1.49-fold increase in perineal injury [39].

Strength and Limitation

This review strictly followed the guidelines set by PRISMA version 2020, ensuring a meticulous approach in selecting and evaluating studies. The authors strived for impartial assessment, synthesis, analysis, and presentation of the incorporated research. To ensure fairness, standardized tools like the Quality Assessment Tool for Quantitative Studies from the Effective Public Health Practice Project were employed. By encompassing articles from 16 different countries, this review offered a broad international perspective. However, the findings are confined to the articles considered within its scope. Despite rigorous and methodical search procedures, some relevant articles might have evaded detection. Notably, our search was limited to English-language articles, potentially disregarding valuable research conducted in other languages. Nevertheless, this review is the inaugural endeavor of its kind that systematically employed methodologies for sourcing, retrieving, and analyzing data in this intricate field. This approach not only highlights gaps in the current literature but also emphasizes the need for future research in this area.

Conclusion

This comprehensive review aimed to investigate the risk elements associated with

perineal injury in nulliparous, primiparous, and multiparous women. It encompassed 29 articles concentrating on laboring mothers aged over 20 years. These studies identified episiotomy, birth weight, maternal age, extended 2nd stage of labor, BMI, head circumference, and instrumental deliveries as factors posing risks. There's a need for forthcoming patient-oriented, community-based, participatory approaches, as well as long-term studies to guide the development of novel interventions for preventing perineal injuries. Special attention is required for interventions tailored to nulliparous and primiparous women.

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