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The Incidence and Risk Factors of Third- and Fourth-Degree Perineal Tears in Ministry of Health in Bahrain over 5 Years

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Abstract

Background: Perineal trauma and vaginal laceration are considered a common complication associated with vaginal delivery. Well established risk factors, recognized by the Royal College of Obstetricians and Gynecologists, are ethnicity, birth weight over 4 kg persistent occipital posterior position, null parity, induction of labor, shoulder dystocia, instrumental delivery. There are other risk factors that were suggested in the literature, but data are conflicting, such as prolonged second stage of labor, episiotomy and obesity. **Objective:** To evaluate third- and fourth-degree perineal rears rates and the impact of related risk factors on perineal tears in Ministry of health in Bahrain over 5 years (which includes Salmanyia Medical complex (SMC) and Jidhafs maternity hospital (JMH)). **Methods:** This retrospective descriptive cross-sectional study analyzed all vaginal deliveries from January 2015 to December 2019 in Obstetrics and Gynecology department in Salmanyia Medical Complex (the main hospital in Kingdom of Bahrain which received all kinds of cases including low and high risks) and Jidhafs Maternity Hospital (tertiary hospital which received only low risk cases), Kingdom of Bahrain. During the period of interest 33,694 records were identified. Data were extracted from observational recording from SMC and JMH labour registry books. **Results:** There was no statistically significant difference between groups according to age ($p = 0.199$). On the other hand, there was statistically significant higher cases of >40 weeks at gestational age, obesity > 35 kg/mr, vacuum delivery, pushing stage > 90 min, birth weight > 4 kg, head circumference > 34 cm, fetal length at birth > 50 cm, episiotomy and lower cases of nulliparity in study group compared to control group 16 (66.7%) vs. 13,805 (41.0%), 3 (12.5%) vs. 1448 (4.3%), 3 (12.5%) vs. 1414 (4.2%), 4 (16.7%) vs. 1751 (5.2%), 3 (12.5%) vs. 1751 (5.2%), 12 (50.0%) vs. 15,926 (47.3%), 15 (62.5%) vs. 20,135 (59.8%) and 17 (70.8%) vs. 29,024 (86.2%); ($p = 0.027$, 0.009, <0.001, 0.014, 0.022, 0.021,

0.023, 0.001 and 0.011) respectively. **Conclusion:** Gestational age > 40 weeks, obesity > 35 kg/mr, pushing stage > 90 min, birth weight > 4 kg, head circumference > 34 cm, fetal length at birth > 50 cm and using of vacuum increase incidence of 3rd and 4th degree perineal tears with vaginal delivery however maternal age and nulliparity have no significant role. Finally, episiotomy did not represent as protective factor for perineal damage.

Keywords

Perineal Tears, Vaginal Laceration, Vaginal Delivery

1. Introduction

After vaginal delivery, the vagina, perineum, and anorectum are examined to identify and repair significant injuries. Occult injury to the anal sphincter complex may occur at the time of an otherwise uncomplicated delivery and, if neglected, can contribute to anal incontinence. Even when recognized and repaired, persistent sphincter dysfunction is the most common cause of postpartum anal incontinence [1].

In 1999, Sultan proposed refining the traditional classification system for obstetric perineal lacerations. The revised system provided a subclassification for third-degree lacerations: **The American College of Obstetricians and Gynecologists-ACOG Practice Bulletin No. 165, 2016** [2].

- **First-degree lacerations:** involve injury to the skin and subcutaneous tissue of the perineum and vaginal epithelium only.
- **Second-degree lacerations:** extend into the fascia and musculature of the perineal body, which includes the deep and superficial transverse perineal muscles and fibers of the pubococcygeus and bulbocavernosus muscles.
- **Third-degree lacerations:** extend through the fascia and musculature of the perineal body and involve some or all the fibers of the external anal sphincter (EAS) and/or the internal anal sphincter (IAS). Third-degree lacerations are subclassified as follows:
  - 3a – < 50 percent of EAS thickness is torn
  - 3b – >50 percent of EAS thickness is torn
  - 3c – Both EAS and IAS are torn
- **Fourth-degree lacerations:** involve the perineal structures, EAS, IAS, and the rectal mucosa.

The above classification system represents a significant improvement over older systems, as it takes the IAS into account. The new classification has been adopted by the Royal College of Obstetricians and Gynecologists as well as the American College of Obstetricians and Gynecologists. It has also been acknowledged by the Agency of Healthcare Research and Quality [3].

Possible complications from third- and fourth-degree laceration and repair include breakdown, infection, and symptoms of pelvic floor dysfunction. Repairs

of third- and fourth-degree lacerations appear to be at increased risk of infection and breakdown compared with repairs of first- and second-degree lacerations. A prospective cohort study of over 250 women with third- and fourth-degree lacerations reported a nearly 25 percent incidence of wound breakdown and 20 percent incidence of wound infection. For comparison, the incidence of breakdown of all types of perineal wounds has been reported between 0.1 and nearly 5 percent. It is not known if the infection and breakdown risks vary among the end-to-end and overlap techniques, although the choice of sphincter repair seems unlikely to impact infection risk [4].

Third- and fourth-degree lacerations are associated with symptoms of pelvic floor dysfunction such as incontinence and prolapse. These symptoms may vary with the repair technique, but more data are needed for definitive conclusion. [5]

2. Methods

Because of the importance of postpartum care after perineal tears repair and hence there are no studies done in the ministry of health in the kingdom of Bahrain to assess this issue. This study aimed to evaluate third and fourth-degree perineal tears rates and the impact of related risk factors on perineal tears in Salmanyia medical complex and Jidhafs maternity hospital.

2.1. Study Design

Retrospective descriptive cross sectional.

2.2. Study Area

Obstetrics and Gynecology department in Salmanyia Medical Complex and Jidhafs Maternity Hospital in Kingdom of Bahrain.

2.3. Study Period

Between January 2015 to December 2019.

2.4. Study Subjects

There were a total of 46,136 deliveries from January 2015 till December 2019. 12,442 deliveries (27.0%) were cesarean deliveries and excluded from the study.

2.4.1. Inclusion Criteria

1) Vaginal delivery
2) Singleton pregnancy
3) Cephalic presentation
4) Gestational age > 24 weeks

2.4.2. Exclusion Criteria

1) Any delivery not meeting the inclusion criteria
2) Any delivery with missing data

2.5. Sample Size

33,694 women.

2.6. Study Procedure

The study population included a total of 46,136 delivery, 24 of them had severe perineal tears (Third- or fourth-degree tear). Interventions such as analgesia and use of oxytocin were performed according to specific clinical protocols for delivery care. Portogram were routinely used to monitor labor, woman's position, fetal head degree of flexion, plotting first and second stage times. Instrumental delivery was reserved for usual indications, such as arrested progression or fetal distress. All operative deliveries were carried out through instrumental delivery, without fundal pressure, by experienced and trained obstetricians. Great attention was paid after the delivery to assess the presence and the severity of obstetrical tears. Lacerations were classified into 1, 2, 3 or 4 according to RCOG. Patients who developed a severe perineal tear (third and fourth degree) were included in group A (Study group), otherwise in group B (control group). Descriptive statistics about population characteristics, antenatal care, onset of labor, use of oxytocin, duration of second stage of labor, use of episiotomy and fetal parameters were calculated.

2.7. Data Collection Method

Observational recording form from registry books in the labor ward from Salmanyia medical complex and Jidhafs maternity hospital. obtained consent from the patient through contacting them through phone.

2.8. Data Management and Analysis Plan

Data analysis was conducted by using Microsoft Excel office 2013 and statistical software package SPSS-20.

2.9. Implication

This study identified risk factors of third and fourth perineal tears in the ministry of health (Salmanyia medical complex and Jidhafs maternity hospital), in which the identification of the risk factors will reduce the incidence of perineal tears and improve the quality of female life.

3. Statistical Analysis

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

- Chi-square (x2) test of significance was used to compare proportions between qualitative parameters.
- Odds ratios (OR) with 95% confidence intervals were computed to assess the

overall association between each possible risk factor and the occurrence of severe perineal tear. The adjusted ORs were estimated using a multivariate logistic regression model.

- The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:
- Probability (p-value) – p-value < 0.05 was considered significant.
- p-value < 0.001 was considered as highly significant.
- p-value > 0.05 was considered insignificant.

4. Results

This table shows the perineal tear at 2015 (n = 4), at 2016 (n = 2), at 2017 (n = 5), at 2018 (n = 5) and at 2019 (n = 1) at delivery in SMC (Table 1).

Table 1. Distribution of delivery women's according to their normal delivery, cesarean section and 3rd & 4th perineal tear at SMC.

SMC	Total NVD	3rd & 4th Perinea! Tear
2015	4442	4
2016	4481	2
2017	4447	5
2018	4199	5
2019	3216	1

This table shows the perineal tear at 2015 (n = 1), at 2016 (n = 3), at 2017 (n = 2), at 2018 (n = 0) and at 2019 (n = 1) at delivery in JMH (Table 2).

Table 2. Distribution of delivery women's according to their normal delivery, cesarean section and 3rd & 4th perineal tear at JMH.

JMH	Total NVD	3rd & 4th Perineal tear per
2015	2510	1
2016	2679	3
2017	2375	2
2018	2553	0
2019	9929	1

This table shows no statistically significant difference between groups according to age (years), with p-value > 0.05 NS (Table 3).

Table 3. Comparison between study group and control group according to age (years).

Age (years)	Groups		Odds	Cl. 95%		p-value
	Study Group	Control Group		Lowe	Upper	
>30 years	14 (58.3%)	21,010 (62.4%)	0.784	0.466	1.322	0.199
<30 years	10 (41.7%)	12,660 (37.6%)				

This table shows statistically significant higher cases of >40 weeks at GA in study group compared to control group, with p-value < 0.05 S (Table 4).

Table 4. Comparison between study group and control group according to gestational age (weeks).

Gestational age (weeks)	Groups		Odds	C. I. 95%		p-value
	Study Group	Control Group		Lower	Upper	
>40 weeks	16 (66.7%)	13,805 (41.0%)	1.666	1.007	2.757	0.027*
<40 weeks	8 (33.3%)	19,865 (59.0%)				

This table shows statistically significant lower cases of nulliparity in study group compared to control group, with p-value < 0.05 S (Table 5).

Table 5. Comparison between study group and control group according to nulliparity.

Nulliparity	Groups		Odds	C. I. 95%		p-value
	Study Group	Control Group		Lower	Upper	
Nulliparity	17 (70.8%)	29,024 (86.2%)	2.483	1.444	4.266	0.011*
Multipara	7 (29.2%)	4646 (13.8%)				

This table shows statistically significant higher cases of obesity ≥35 in study group compared to control group, with p-value < 0.05 S (Table 6).

Table 6. Comparison between study group and control group according to obesity BMI.

Obesity by BMI	Groups		Odds	C. I. 95%		p-value
	Study Group	Control Group		Lower	Upper	
Moderate/se	3 (12.5%)	1448 (4.3%)	2.712	1.283	5.729	0.009*
formal weight	21 (87.5%)	32,222 (95.7%)				

This table shows statistically significant higher cases of vacuum delivery in study group compared to control group, with p-value < 0.001 HS (Table 7).

Table 7. Comparison between study group and control group according to vacuum delivery.

Vacuum delivery	Groups		Odds	C. I.95%		p-value
	Study Group	Control Group		Lower	Upper	
Yes	3 (12.5%)	1414 (4.2%)	3.400	1.667	6.936	<0.001**
No	21 (87.5%)	32,256 (95.8%)				

**** In our practice we are using either outlet forceps or vacuum as instrumental delivery, however during this period of collected data, no forceps was used for instrumental delivery ****

This table shows statistically significant higher cases of pushing stage ≥ 90 min in study group compared to control group, with p-value < 0.05 S (Table 8).

Table 8. Comparison between study group and control group according to pushing stage.

Pushing stage	Groups		Odds	C. I 95%		p-value
	Study Group	Control Group		Lower	Upper	
Stage > 90 nun	4 (16.7%)	1751 (5.2%)	3.465	1.518	7.911	0.014*
Stage < 90 min	20 (83.3%)	31,919 (94.8%)				

This table shows statistically significant difference between groups according to episiotomy with p-value < 0.001 HS (Table 9).

Table 9. Comparison between study group and control group according to episiotomy.

Episiotomy	Groups		Odds ratio	C. I. 95%		p-value
	Study Group (n = 24)	Control Group (n = 33,670)		Lower	Upper	
Yes	19 (79.2%)	5979 (17.8%)	2.193	1.105	5.291	<0.001**
No	5 (20.8%)	27,691 (82.2%)				

This table shows statistically significant higher cases of weight > 4 kg in study group compared to control group, with p-value < 0.05 S (Table 10).

Table 10. Comparison between study group and control group according to birth weight.

Birth weight	Groups		Odds	C. I 95%		p-value
	Study Group	Control Group		Lower	Upper	
Weight > 4 kg	3 (12.5%)	1751 (5.2%)	2.520	1.190	5.338	0.022*
Weight < 4 kg	21 (87.5%)	31,919 (94.8%)				

This table shows statistically significant higher cases of HC > 34 cm in study group compared to control group, with p-value < 0.05 S (Table 11).

Table 11. Comparison between study group and control group according to head circumference at birth.

Head circumference at birth	Groups		Odds	C. I. 95%		p-value
	Study Group	Control Group		Lower	Upper	
Head circumference	12 (50.0%)	15,926 (47.3%)	2.306	1.305	4.075	0.021*
Head circumference	12 (50.0%)	17,744 (52.7%)				

This table shows statistically significant higher cases of length > 50 cm in study group compared to control group, with p-value < 0.05 S (Table 12).

Table 12. Comparison between study group and control group according to length at birth.

Length at birth	Groups		Odds	C. I. 95%		p-value
	Study Group	Control Group		Lower	Upper	
Length > 50 cm	15 (62.5%)	20,135 (59.8%)	2.054	1.053	4.009	0.023*
Length < 50 cm	9 (37.5%)	13,535 (40.2%)				

This tables shows that Nulliparity, Moderate/severe obesity, Vacuum delivery, Birth weight > 4 kg and Pushing stage ≥ 90 min, have a significant effect on the perineal tear, while gestational age insignificant (Table 13).

Table 13. Binary logistic regression of factors affecting Perineal tear versus non-perineal tear.

Risk factors	B	OR	Lower	Upper	p-value
Gestational age > 40 weeks	0.695	1.482	0.858	2.560	0.514
Nulliparity	1.051	2.349	1.298	4.252	0.029*
Moderate' severe obesity	0.980	2.616	1.210	5.657	0.007*
Vacuum delivery	1.148	3.079	1.417	6.687	0.019*
Birth weight > 4 kg	0.787	1.032	0.871	2.098	0.003*
Pushing stage > 90 min	1.463	4.123	1.806	9.414	0.017*
Episiotomy	0.744	1.586	0.918	2.739	0.550

5. Discussion

In Statistical analysis of our results showed that there was no statistically significant difference between groups according to maternal age and episiotomy (p = 0.199, 0.001) respectively.

Al-Ghamdi *et al.* [6] Research examined third-and fourth-degree tears and the effect on perineal tears of associated risk factors in a single Saudi center. This retrospective cohort study examined all vaginal deliveries at Security Forces Hospital, Riyadh, Saudi Arabia, from January 2011 to December 2015. 28,325 records were discovered during the period of interest. 7322 (25.8 percent) of the caesarean section were performed. 20,300 of the current 21,003 documents were included. A serious perineal tear was registered in 56 patients (0.28 percent) and was included in Group A (Study Group). The remaining 20,244 cases were in Group B (Control Group). They agreed with us and stated that maternal age ≥ 30 years and episiotomy have no significant role in occurrence of perineal tears 33 (58.9) vs. 12,632 (62.4) and 12 (21.4) vs. 3603 (17.8); (p = 0.17, 0.274 and

0.696) respectively.

Smith *et al.* [7] Study explains the extent of perineal damage in women with singleton vaginal birth and measures its impact on the occurrence of perineal tears from maternal and obstetric characteristics. Between May and September 2006, they performed an observational study on patients with a scheduled singleton vaginal delivery in one obstetric unit, three freestanding midwifery-led units and homes in Southeast England. They analyzed data for 2754 women with complete data for perineal outcomes. They were in line with us and stated that maternal age was not associated with obstetric anal sphincter injury (OASIS), however; The multivariate analysis showed that episiotomy was linked with a decline in the changed risks of unexpected perineal damage it was associated with other risk factors such as longer duration of second-stage childbirth, greater birth weight and instrumental delivery.

Christianson *et al.* [8] Research defined risk factors during vaginal delivery for anal sphincter injury. It was a case-control retrospective research. They reviewed 2078 vaginal delivery reports over a two-year duration from 1 May 1999 to 30 April 2001. Cases (n = 91) were identified during the study period as participants who had more than a second degree of perineal injury history. Control participants (n = 176), classified using a blinded method, included participants born vaginally with a perineal injury of less or equivalent to second grade. They accepted with us and stated that cases and control subjects did not differ significantly in maternal age 24.2 ± 6.9 vs. 25.4 ± 5.3; (p = p > 0.05).

Mohamed [9] study determined the incidence of perineal trauma among low-risk parturient women, found out the harmful and non-harmful practices behind the occurrence of perineal trauma, and conducting a workshop for nurses working in labor unit about measures used to prevent perineal trauma. A cross-sectional design was used. The sample included 500 parturient women admitted to labor room without obstetrical or medical complications. She disagreed with us and stated that differences observed are statistically significant regarding to the age (p = 0.00) and the majority (81.5%) of women who had perineal tear were in the age group of 30 - 33 years.

Gebuza *et al.* [10] the study reported episiotomy and perineal tear causes the study involved 4493 participants following vaginal delivery at the Ludwik Rydygier Local Polyclinical Hospital in Torun in a third-referral clinical ward. They disagreed with us and said that women's age increases nullipara's risk of perineal tears (OR 1.02).

Gommesen *et al.* [11] the study investigated perineal tear, wound infection and dehiscence risk factors among primiparous. The prospective cohort research of 603 primiparous women screened in 3 categories was performed in four Danish hospitals (Odense, Esbjerg, Aarhus, and Kolding), 203 with none-labial/1st degree, 200 with 2nd degree and 200 with tears in 3rd/4th degree from July 2015 to January 2018. They disagreed with us and said that the age of 25 years is significantly associated with a reduced risk for perineal tears in the third and fourth grades (OR 0.38, 95% CI 0.22 - 0.66).

Statistical analysis of our results showed that there were statistically significant higher cases of >40 weeks at gestational age in study group compared to control group (16 (66.7%) vs. 13,805 (41.0%)) (p = 0.027).

Al-Ghamdi *et al.* [6] study agreed with us and stated that gestational age > 40 weeks is a risk factor for severe perineal tears 38 (67.8) vs. 8300 (41); (p = 0.023).

Statistical analysis of our results showed that there were statistically significant lower cases of nulliparity in study group compared to control group (17 (70.8%) vs. 29,024 (86.2%)) (p = 0.011).

Al-Ghamdi *et al.* [6] study disagreed with us and stated that nulliparity is a risk factor for severe perineal tears 40 (71.4) vs. 17,450 (86.2); (p = 0.004).

Smith *et al.* [7] were against us and stated that the overall proportion of women with an intact perineum at delivery was just over three-fold higher in multiparous women, 31.2% (453/1452) compared with nulliparas, 9.6% (125/1302). OASIS occurred in 6.6% (86/1302) of nulliparas, and 2.7% (33/1452) of multiparas.

Christianson *et al.* [8] study didn't accept us and found that greater parity was associated strongly with reduced risk in both adjusted and unadjusted analyses.

Dahlen *et al.* [12] study determined trends and risk factors for severe perineal trauma. This was a population-based data study of 510,006 women giving birth to a singleton baby during the period 2000-2008 in New South Wales, Australia. They weren't in line with us and stated that compared with women who had an intact perineum or minor perineal trauma (first-degree tear and graze), women who were primiparous (AOR 1.8 CI (1.65 to 1.95) had a significantly higher risk of severe perineal trauma.

Mohamed [9] study disagreed with us and found that differences observed are statistically significant (p = 0.00) regarding to parity and women who had para 4+ were more likely to have perineal tears than those with para (2 - 3), (70.4% & 57.5% vs. 29.6% & 42.5% respectively).

Eskandar and Shet [13] The research has analyzed 3038 deliveries over a two-year span (2005 and 2006) to recognize perineal tear risk factors in 3rd and 4th grades. They used the medical files and the list of the organization and reviewed the health information. After ignoring the optional and emergency caesarean sections, 2278 women were delivered vaginally, 36 of whom had perineal tears of third- and fourth grade, as described in the RCOG Green top Recommendations No 29 (2007). For this research, a total of 2242 participants who produced perineal tears without vaginally 3rd and 4th degrees were used as controls disagreed with us and found that primipara was a risk factor for anal injury compared with higher parity. The OR was 5.8 (CI 95%, 2.7 - 12).

Statistical analysis of our results showed that there were statistically significant higher cases of obesity ≥ 35 kg/m^2 in study group compared to control group (3 (12.5%) vs. 1448 (4.3%)) (p = 0.009).

Al-Ghamdi *et al.* [6] study agreed with us and stated that moderate/severe obesity BMI ≥ 35 kg/m^2 is a risk factor for severe perineal tears 78 (12.5) vs. 871 (4.3); (p = 0.005).

Gommesen *et al.* [11] study agreed with us and stated that women with BMI > 35 kg/m^2 faced a more than threefold risk factor for severe perineal tears (OR 3.46, 95% CI 1.10 - 10.9).

Statistical analysis of our results showed that there were statistically significant higher cases of Instrumental delivery (vacuum) in study group compared to control group (3 (12.5%) vs. 1414 (4.2%)) ($p \leq 0.001$).

Al-Ghamdi *et al.* [6] study agreed with us and stated that instrumental delivery is a risk factor for severe perineal tears 8 (14.2) vs. 851 (4.2); ($p \leq 0.001$).

Smith *et al.* [7] were in line with us and stated that use of instrumental delivery was associated with significantly increased odds of OASIS 4.43 (2.02, 9.71).

Christianson *et al.* [8] study accepted with us and stated that more than 80% of the control subjects, but fewer than one half of the cases, were delivered spontaneously without instruments; one half of the cases, but fewer than 10% of the control subjects, were delivered with the use of forceps or vacuum. In both unadjusted and adjusted models, instrumental delivery was associated with a substantially increased risk of perineal tears; (Odds ratio: 10.8 and 11.9) respectively.

Dahlen *et al.* [12] were in line with us and stated that compared with women who had an intact perineum or minor perineal trauma (first-degree tear and graze), women who had an instrumental birth (AOR 1.8 CI (1.65 to 1.95) had a significantly higher risk of severe perineal trauma.

Eskandar and Shet [13] study disagreed with us and found that instrumental deliveries reduced the rate of the anal injury with an OR of 0.77 (CI 95%, 0.23 - 2.5).

Gebuza *et al.* [10] study agreed with us and stated that operational delivery was found to increase the risk of perineal tears threefold in nulliparas (OR 3.00) and multiparas (OR 2.86).

Gommesen *et al.* [11] study agreed with us and stated that instrumental delivery increased the risk of both 2nd degree (OR 5.69, 95% CI 2.26 - 14.4) and 3rd or 4th degree tears (OR 13.7, 95% CI 5.48 - 34.1).

Statistical analysis of our results showed that there were statistically significantly higher cases of pushing stage ≥ 90 min in the study group compared to control group (4 (16.7%) vs. 1751 (5.2%)) ($p = 0.014$).

Al-Ghamdi *et al.* [6] study agreed with us and stated that pushing stage ≥ 90 min is a risk factor for severe perineal tears 10 (17.8) vs. 526 (5.2) N = 10,103; ($p = 0.002$).

Smith *et al.* [7] were in line with us and stated that longer duration of second stage of labour was associated with significantly increased odds of OASIS 1.49 (1.13, 1.98).

Christianson *et al.* [8] the analysis failed to accept us and suggested that tears were considerably more likely with an expanded duration of the first and second phases of birth in unadjusted studies. In multivariate models, childbirth time was reduced to near unity and not significant anymore.

Eskandar and Shet [13] the research disagreed with us and found that the second stage duration was inversely related to the rate of extreme perineal tear incidence. This may be because the second stage is sluggish and more managed with less uterine expulsive strength.

Gommesen *et al.* [11] the research accepted with us that a higher level of tear was seen, with a longer second stage of labour and a longer active delivery, but after modification to other obstetrical influences these results did not have statistical significance. Duration of active birth < 220 min also reduced the risk of 2nd grade tears (OR 0.56, 95% CI 0.33 - 0.97) and increased the risk (OR 1.75, 95% CI 1.02 - 2.99) with a 2nd stage < 16 min.

Statistical analysis of our results showed that there were statistically significant higher cases of birth weight > 4 kg, head circumference > 34 cm and fetal length at birth > 50 cm in study group compared to control group 3 (12.5%) vs. 1751 (5.2%), 12 (50.0%) vs. 15,926 (47.3%) and 15 (62.5%) vs. 20,135 (59.8%); ($p = 0.022$, 0.021 and 0.023).

Al-Ghamdi *et al.* [6] study agreed with us and stated that birth weight > 4 kg, head circumference > 34 cm and fetal length at birth > 50 cm are risk factors for severe perineal tears 7 (12.5) vs. 1053 (5.2), 29 (51.7) vs. 9575 (47.3) and 36 (64.2) vs. 12,106 (59.8); ($p = 0.009$, 0.014 and 0.02).

Smith *et al.* [7] were in line with us and stated that l heavier birth weight was associated with significantly increased odds of OASIS 1.001 (1.001, 1.001).

Christianson *et al.* [8] study accepted us and stated that in unadjusted analyses, tears were significantly more likely with increased fetal weight. In multivariate models, fetal birth weight remained a significant predictor of tears. Assuming a linear association between birth weight and log odds of tears in adjusted analyses, a 100-g increase in birth weight was associated with a 9% increased risk of tear.

Eskandar and Shet [13] study agreed with us and stated that birth weight of a >4 kg baby was found to be associated with anal injury with an OR of 1.19 (CI 95%, 0.45 - 3.1).

Gebuza *et al.* [10] Study agreed with us and stated that an increase in the risk of perineal tearing in nullipara (OR 1.56) and multipara (OR 1.23) was observed at birthweight above 3500 grams. The risk of episiotomy in multiparas was increased by birth weight over 4000 grams (OR 1.35).

Gommesen *et al.* [11] The research accepted with us that a higher degree of tear was found with a higher head circumference but this correlation was not statistically significant after correction for other obstetric factors; birth weight < 3000 g to decrease the risk of 2nd degree tears (OR 0.42, 95% CI 0.22 - 0.80) while birth weight > 3500 - 4000 g increased the risk of 3rd or 4th degree tears.

6. Conclusion

Perineal tears may occur after a vaginal delivery; however, the proper assessment to differentiate the degree of perineal tears is the most important thing for prop-

er management. The presence of well-trained midwives and obstetricians in the labour room will help to decrease the incidence of third- and fourth-degree perineal tears. Our results showed that gestational age > 40 weeks, obesity ≥35 kg/m^2, pushing stage ≥ 90 min, birth weight > 4 kg, head circumference > 34 cm, fetal length at birth > 50 cm and using of vacuum for instrumental delivery increase incidence of 3rd and 4th degree perineal tears with vaginal delivery however maternal age and nulliparity have no significant role. Finally, episiotomy did not represent a protective factor for perineal damage. Pre-conceptional counseling for any women with high BMI ≥ 35 kg/m^2, to reduce her weight and strengthening her pelvic floor muscle by exercises is to reduce the unwanted complications during her next pregnancies. Great care of evaluating the patient's risk factors for the third- and fourth-degree perineal tears is to prevent the subsequent complications of perineal tears. We need in our centers to have an anorectal ultrasound for postnatally following up with any patient with 3rd and forth degree tear and especially in symptomatic patients.

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Ethical Approval

The study was approved by the Institutional Ethics Committee.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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