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Paracetamol as Analgesia Following Spontaneous Vaginal Delivery: Reappraisal of Practice

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ABSTRACT

Background: Perineal pain is a frequent but less studied unpleasant postpartum outcome. The aim of the study is to determine the prevalence of perineal pain following postpartum vaginal delivery, the requirement of paracetamol as analgesia, and its associated factors. **Methods:** The study was performed from December 14, 2020, until February 14, 2021, in a single tertiary centre in northwest Malaysia. The pain score was assessed immediately postpartum and every six hours for the next 48 hours, and the requirement for paracetamol as analgesia was documented. Maternal sociodemographic data and baseline clinical details associated with the requirement for paracetamol were analysed. **Results:** A total of 285 study participants were included. The majority (93.0%) were Malays, with a mean age of 31.0 6.08 years. Majority of the women delivered their second child (36.1%) with a first-degree tear (46.7%). The majority neither required any analgesia within the first few hours of delivery in the labour room (71.3%) nor in the next 48 hours of ward observation (54.4%). The mean pain score following spontaneous vaginal delivery in the labour room was 4.0 ±1.07, while the mean pain score in the ward was 2.8 ± 1.05 (p<0.001). Logistic regression analysis determined that maternal weight (cOR: 1.02, 95% CI: 1.01, 1.04) and episiotomy (cOR: 3.28, 95% CI: 1.52, 7.08) were significantly predictive of paracetamol requirement as analgesia. **Conclusion:** Most of our population did not require oral analgesia in the postpartum period. However, the identification of susceptible individuals may guide clinicians to have a targeted approach for early management to ensure a positive birthing experience for all mothers.

Keywords: Analgesia; Obstetrical; Postpartum Period; Prevalence; Episiotomy; Acetaminophen; Logistic Models

INTRODUCTION

Postpartum pain is an important issue to address. Proper management helps mothers manage themselves following delivery, encourage early ambulation and breastfeeding, and care for the newborn. The prevalence of perineal pain following vaginal delivery was 88% in the first day of postpartum (Persico *et al.*, 2013). Even 75% of women with an intact perineum still experienced pain, while almost all women with perineal trauma (including perineal lacerations or episiotomy) complained of it (Persico *et al.*, 2013). Similar results were echoed in a study among 147 vaginal postpartum women, where 51.7% of postpartum women reported pain in the immediate postpartum period, the majority with perineal trauma (Mathias *et al.*, 2015).

Post-delivery pain can be caused by uterine contraction and involution, nipple pain, back pain, painful hemorrhoids, headaches, and perineal pain (Colleen Stainton *et al.*, 2005). Perineal pain is common but often poorly studied. It may be due to bruising, spontaneous tears, surgical incisions such as episiotomies, or in association with operative vaginal deliveries (with ventouse or forceps-assisted births). Pain assessment is strictly individualised and may be influenced by personal experience and expectation.

Post delivery pain is often managed with oral analgesia. Despite low-quality evidence indicating that paracetamol is not superior to a placebo in relieving uterine cramping or involution following birth (Abdel Shaheed *et al.*, 2021), other reviews and randomised clinical trials have suggested otherwise (Aworinde, 2021; Chou *et al*., 2013). In

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Malaysia, there is currently no standardised protocol for the prescription of oral analgesia to manage mild postdelivery pain from vaginal births. Celecoxib 200 milligrams, mefenamic acid 500 milligrams, diclofenac 50 milligrams, or paracetamol 1000 milligrammes are commonly used to treat postpartum pain (Lim *et al.*, 2008).

The consistently reported risk factors for acute perineal postpartum pain are unique because they are easily recognisable and potentially modifiable. It was hypothesized that the prevalence of patients who require paracetamol following immediate delivery in labour room is higher compared to patients in obstetric wards. The current study sought to determine the prevalence of postdelivery pain among mothers who gave birth spontaneously, the concordance and discordance of the numerical pain rating with the need for paracetamol as analgesia, and the factors that contribute to analgesic requirement after normal delivery.

METHODOLOGY

A clinical audit was performed from December 14th, 2020, to February 14th, 2021, at a single tertiary centre from northwest Malaysia. Eligible post-spontaneous vaginal delivery women were approached and explained regarding the study before an informed consent was taken. Patients delivered with instrumental assistance, sustained 3rd or 4th degree tear, had other types of analgesia (oral or epidural) in labour and required examination under anaesthesia for extended perineal tear or cervical tear were excluded. Socio-demographic and baseline clinical data such as age, ethnicity, education level, employment status, gravidity, parity, gestational age, maternal weight before delivery, weight of the baby and the presence of perineal tear were recorded.

A pain score assessment was performed in the labour room 30 minutes after birth and every six hours for the next 48 hours in the postpartum wards. Numerical verbal pain score was used to assess perineal pain intensity, with an 11-point numerical scale being used with the following pain classification: 0-absence of pain; 1-3 mild; 4-6 moderate, 7-9 string, 10-unbearable pain. The requirement of 1000 gm paracetamol as analgesia was as per protocol in our centre and was documented along this timeline. There were no additional procedures or treatments given to the patients in this study.

Paracetamol was administered as per patient's request regardless of the numeric score in the rating scale (NRS) value. If paracetamol was not given, the patient will be monitored every 4-hourly (without the administration of other type of pain-relieving medication). In cases where higher NRS were detected with the requirement of other type of analgesia, the patient will be excluded.

A core outcome set (COS) was used when designing the study. The study complied with the World Medical Association Declaration of Helsinki regarding the ethical conduct of research involving human subjects. Statistical analysis was performed with SPSS 26 (IBM, Armonk, NY). The mean standard deviation was reported for continuous variables such as age and maternal weight. The comparison between the numerical pain score in the labour room and ward was performed using a paired *t*-test, while the discordance of the pain score and the requirement for analgesia in the labour room and ward was determined with the Pearson chi-square test of independence. The logistic regression analysis was used to determine the predictive factors for paracetamol requirement as analgesia. A *p*-value of less than 0.05 was considered to indicate statistical significance.

Ethical Consideration

Research involving human subjects complied with all relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration (as revised in 2013). Ethical approval for this study was waived by the Medical Research and Ethics Committee (MREC) of the Ministry of Health Malaysia due to the nature of the study being a clinical audit. The study has been registered in the National Medical Research Register of the Ministry of Health Malaysia (NMRR ID-22-00100-SUH) on 26 January 2022.

RESULTS

A total of 285 study participants were included for analysis. Majority were Malays (93.0%) with the mean age of 31.0 ± 6.08 years old, housewife (54.0%) and completed education until secondary school (50.5%). Most delivered their second child (36.1%) with first degree tear (46.7%), with mean gestational age of 38.8 ± 1.24 weeks. Detailed sociodemographic variables and relevant clinical parameters are shown in Table 1.

Table 1: Baseline Sociodemographic Variables and Clinical Parameters of Study Participants (N=285)

Variable(s)	*n* (%)	Mean (SD)
Maternal weight before delivery (in kg)		71.9 ± 15.80
Ethnicity		
Malay	265 (93.0)	
Chinese	1 (0.4)	
Indian	4 (1.4)	
Siamese	7 (2.5)	
Others	8 (2.8)	
Education level		
Primary school	10 (3.5)	
Secondary school/certificate	144 (50.5)	
Matriculation/diploma	67 (23.5)	
Degree/postgraduate	63 (22.1)	
Employment		
Working (Full-time/part-time)	129 (45.3)	
Housewife	154 (54.0)	
Weight of baby (in kg)		3.1 ± 0.35
Parity		
1	81 (28.4)	
2	103 (36.1)	
3	43 (15.1)	
4	42 (14.7)	
≥5	16 (5.7)	
Perineal tear		
Intact perineum	38 (13.3)	
Episiotomy	105 (36.8)	
1st degree	133 (46.7)	
Others	9 (3.2)	

Majority did not require analgesia within the first few hours of delivery in the labour room (71.3%) nor in the next 48 hours of observation in the ward (54.4%). The mean pain score following spontaneous vaginal delivery in the labour room was 4.0 ± 1.07 while the mean pain score in the ward was 2.8 ± 1.05 (p<0.001). It was noted that there was a statistically significant difference between the verbal pain score given by the patient and the requirement for paracetamol as analgesia, both in the labour room and in the ward (Table 2). In other words, the verbal pain score given by the patients did not match with their requirement for analgesia.

Table 2: Discordance of Pain Score Given by Patient and The Requirement for Analgesia

Variable(s)	PCM not given *n* (%)	PCM given *n* (%)	χ^2	*df*	*p*-value
Labour room					
Low pain score (0-3)	189 (87.5)	27 (12.5)	113.58	1	<0.001*
High pain score (≥4)	14 (20.6)	54 (79.4)			
Ward					
Low pain score (0-3)	148 (59.0)	103 (41.0)	17.78	1	<0.001*
High pain score (≥4)	7 (20.6)	27 (79.4)			

**Statistically significant*

Sub-analysis was performed on patients who required paracetamol as analgesia following spontaneous vaginal delivery (n=174, 61.1%). The median duration of time of paracetamol requirement in the labour room was 52 minutes (IQR=34.50) post-delivery, while the mean duration of time of paracetamol being required in the ward was 2.8 ± 1.05 hours following vaginal birth.

Among those requiring analgesia, 138 either required paracetamol in the labour room or in the ward (79.3%), while 36 required analgesia both in the labour room and while in the ward (20.7%). Among those who did require paracetamol in the labour room (n=81), the mean pain score was 3.8 ± 1.15 and their mean pain score in the ward was 1.8 ±1.39 (p<0.001). Those who did not require paracetamol in the labour room had a mean pain score of 2.4 ±0.94 and their mean pain score in the ward was 2.0 1.39.

Logistic regression determined that maternal weight in kilograms (cOR: 1.024, 95% CI: 1.01, 1.04) and episiotomy (cOR: 3.28, 95% CI: 1.52, 7.08) were significantly predictive of paracetamol requirement as analgesia at any point following delivery (Table 3).

Table 3: Logistic Regression to Determine Associated Factors to Paracetamol Requirement as Analgesia at Any Point Following Spontaneous Vaginal Delivery

Variable(s)	PCM not required *n* (%)	PCM required *n* (%)	Crude OR (95% CI)	*p*-value
Maternal age (in years)†	29.3 ± 4.82	29.3 ± 5.69	1.01 (0.96, 1.05)	0.770
Education level				0.535
Primary school	6 (60.0)	4 (40.0)	0.36 (0.09, 1.40)	
Secondary / certificate	56 (39.2)	87 (60.8)	0.83 (0.45, 1.55)	
Matric / diploma	26 (38.8)	41 (61.2)	0.85 (0.41, 1.73)	
Degree / postgraduate	22 (34.9)	41 (65.1)	1.00 (Ref.)	
Parity				0.311
1	27 (33.3)	54 (66.7)	1.0 (Ref.)	
2	41 (39.8)	62 (60.2)	0.76 (0.41, 1.39)	
3	14 (33.3)	28 (66.7)	1.00 (0.45, 2.21)	
4	22 (52.4)	20 (47.6)	0.46 (0.21, 0.97)	
≥5	6 (37.5)	10 (62.5)	0.83 (0.27, 2.54)	
Gestational age (in weeks)†	38.7 ± 1.29	38.8 ± 1.29	1.05 (0.87, 1.26)	0.624
Weight of baby (in kg)†	3.02 ± 0.41	3.07 ± 0.38	1.44 (0.77, 2.68)	0.252
Maternal weight (in kg)†	65.7 ± 14.15	71.4 ± 17.18	1.024 (1.01, 1.04)	0.005*
Presence of perineal tear				0.022*
Episiotomy	31 (29.5)	74 (70.5)	3.28 (1.52, 7.08)	
1st degree	54 (40.9)	78 (59.1)	1.99 (0.96, 4.13)	
Intact perineum	22 (57.9)	16 (42.1)	1.00 (Ref.)	
Others	3 (33.3)	6 (66.7)	2.75 (0.60, 12.68)	

Expressed in mean standard deviation
**Statistically significant*

DISCUSSION

The present study found that most of our mothers did not require analgesia following spontaneous vaginal delivery. Our findings resonate with similar studies performed to determine the prevalence of perineal pain following vaginal delivery, which quoted only 9.8% of women complaining of perineal pain within the first hour of delivery (Francisco *et al*., 2011).

In the immediate postpartum period, the prevalence of moderate intensity perineal pain in the presence of an episiotomy was 51.8%, while it was 93.4% in the presence of perineal lacerations (Mathias *et al.*, 2015). A previous study found that the onset of postpartum pain ranges from 1.9 to 97.7 hours, with a mean of 27.7 hours and a median of 23.1 hours (Francisco *et al.*, 2011), similar to our study population. Postpartum vaginal and perineal pain is the result of tissue damage and inflammation during vaginal delivery (Komatsu, Ando, & Flood, 2020). In a study by Persico *et al*., (2013), 50.6% and 77.3% of women with analgesia treatment had perineal lacerations and episiotomy performed, respectively (Persico *et al*., 2013).

Oral paracetamol is recognised as a good choice of analgesia due to its useful analgesic properties and established safety profile (Francisco *et al.*, 2011). Paracetamol has both analgesic and antipyretic properties through the inhibition of cyclooxygenases activity (COX-1, COX-2, and COX-3) leading to inhibition of prostaglandin production and its involvement in the endocannabinoid system and serotonergic pathways (Przybyła, Szychowski, & Gmiński, 2021). According to findings from a randomised trial, more women experienced pain relief at four hours in the paracetamol group as compared to placebo, either with 500 gm or 1000 gm of paracetamol (Abdel Shaheed *et al.*, 2021; Chou *et al.*, 2013), in agreement to our observation of significant reduction in pain score following paracetamol administration.

The perception of pain is subjective and individualised. Contributing factors to pain susceptibility include racial or ethnic differences and the presence of another analgesic adjunct. Studies have supported the notion of ethnic differences in experimental pain sensitivity (Kim *et al.*, 2019; Wyatt, 2013) as observed in one study where Asians were noted to have 24% lower demands for analgesia in the first 24 hours post-surgery as compared to the European populations (Konstantatos *et al.*, 2012).

Our study also assessed the factors related to the requirement of analgesia postpartum among women with spontaneous vaginal deliveries. It was identified that maternal weight prior to delivery and the presence of an episiotomy were significantly predictive of analgesia requirement postpartum, whereby maternal weight was significantly associated with a higher requirement of paracetamol in the postpartum period at one hour and the first 24 hours. Obese people are more sensitive to pain (Basem *et al.*, 2021; McKendall & Haier, 1983; TashaniTashani *et al.*, 2017), which has been linked to endogenous opiate control ingestive behaviours (McKendall & Haier, 1983) and genetic polymorphism that alters individual sensitivity to pain (Elmallah *et al.*, 2018). Furthermore, it has been reported that obese individuals had greater systemic inflammation from the release of inflammatory mediators, resulting in a lower pain threshold (Weisberg *et al.*, 2003).

The present study findings on perineal pain in the immediate postpartum period following vaginal delivery may encourage health professionals to be more involved and better understand the consequences of pain to the quality of life of the parturient, hence improve their assistance during and after delivery. Proper management of postpartum pain is also important to encourage early breastfeeding (Dwi Putri, 2019; Hasan & Hasan, 2020) and foster patients' satisfaction (Amasha, Abdel-Haleem, & Gamal, 2020). Proper identification of pain intensity among susceptible mothers will also allow early interventions to ensure optimised healthcare services and making childbirth a positive experience for all mothers. More recent study has also looked into the effect of essential oil inhalation in relieving postpartum pain (Abdraboo, Amasha, & Ali, 2020; Hartono *et al.*, 2021).

In this study, the source and site of pain was not evaluated as these were not our focus. However, they are indeed crucial to be considered in a detailed assessment of pain postdelivery. Future studies may also look at multimodal pain management in the postpartum period. A combination of multiple interventions with non-pharmacological pain relief therapies may also interfere with breastfeeding less (Francisco *et al.*, 2011).

CONCLUSION

Regardless of the degree of perineal injuries, all women have a significant degree of perineal pain following vaginal delivery. Maternal weight prior to delivery and the presence of an episiotomy were found to be predictive of postpartum analgesia requirements. Hence, timely and appropriate pain assessment and management throughout and following the labour process will contribute to improved healthcare service delivery and satisfaction among our patients.

Conflict of Interest

The authors declare that they have no conflict of interests.

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