Original Article

Persistent pain after caesarean and vaginal delivery: Experience at a public tertiary hospital, Benin city, Nigeria

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ABSTRACT

Background: Recent observation has revealed that persistent pain (PP) might follow both vaginal delivery (VD) and cesarean delivery. The present study sought to examine the development of PP following delivery in Nigerian women.

Methods: Questionnaires were administered to all consenting women at their 6-week post-delivery visit to hospital to ask about persistence of abdominal scar, pelvic, or perineal pain. They were subsequently called on phone to enquire about the duration of previously documented pain, or the persistence of pain at 6 months and 1 year post-delivery. Information on the frequency and intensity of pain, the impact on daily activities, as well as the quality of life was also sought. Chi-square test or Fisher's exact test was done for differences in proportion, prevalence ratio (PR) and cross tabulation was done for association using SPSS 20.0 and GraphPad Instat 3.

Results: Cesarean section (CS) was associated with higher prevalence of PP at 6 weeks postpartum than VD {(37/88, 42%) and (26/144, 18%), respectively; PR 2.1, 95% CI: 1.2--3.7, *P* = 0.01)}. The majority (93.7%) had mild to moderate pain. PP was associated with previous pain problem (PR 2.3, 95% CI: 1.2--4.5; *P* = 0.02). The women with PP recalled more severe peripartum pain (*P* = 0.01), and primiparity was highly predictive of PP (0.001).

Conclusion: PP is more common after 6 weeks of CS than VD, but pain beyond 6 months appears rare. PP is associated with poorly managed chronic pain and severe peripartum pain especially in primiparas. We advocate a deliberate attempt to screen for and treat pain on an individualized basis.

Key words: Abdominal pain postpartum; nature of pain postpartum; perineal pain postpartum; prevalence of persistent pain.

Introduction

Pain is considered persistent (chronic) when it has lasted up to 3 months, or alternatively when persisting beyond the expected healing time.[1,2] Previous studies have reported persistent pain (PP) after cesarean section (CS) and vaginal delivery (VD).[3-5] Episiotomy or perineal injury during VD and Pfannenstiel incision in CS have often been implicated as causes of pain following delivery, but the persistence of such pain beyond the expected time of healing can be attributed to many factors.[3-6]

Many investigators have suggested that the pregnancy-related hormone, oxytocin, acts as a key mediator on pain inhibition at the level of the spinal cord, effecting antihyperalgesia at the time of delivery. To support this observation, it has been noted that though Pfannenstiel incision for CS and surgical approach for hysterectomies are quite similar, some researchers have determined that the incidence of PP

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following CS is remarkably low compared with that occurring after hysterectomies.[6,7]

Recent investigations on the incidence of pain after CS have shown that up to 18% of women may suffer chronic pain.[4,8] Although PP beyond the time of delivery is often described as mild and may seem a rare event, with increasing delivery rates in our environment and closely linked high CS rates, the number of women affected could reach significant proportions in the coming years.

Chronic pain has a major impact on physical, emotional, and cognitive function, on social and family life, on the ability to work and secure an income, and is associated with negative short-term and long-term effects on the individual. Meaningful assessment of long-lasting pain is therefore a more demanding task than assessing acute pain. To the best of our knowledge, there are no studies in our environment documenting the contribution of delivery to PP problem, viz., need to consult for pain, use pain medicine, or suffer disability from pain. This study was designed to determine the prevalence of PP after CS and VD in our environment, and to document any association between mode of delivery and the evolution, frequency and intensity of pain.

Materials and Methods

A questionnaire-based cohort study was conducted from 1st July to 31st December, 2016 at the 6-week post-delivery clinic, following both VD and CS at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. All patients had been managed based on our standardized labor ward protocol.[9] Individual consent and research and Ethics Committee approval were obtained. All delivered mothers returning for postnatal clinic attendance were eligible. Withholding consent was the only exclusion criterion. The women who consented were enrolled and subsequently followed up till 1 year post-delivery.

In UBTH, VD is sometimes assisted with episiotomies especially amongst the nulliparous mothers. Prompt repair of the episiotomy, following local anesthetic infiltration of perineal skin, is carried out by the junior obstetric staff on duty, except in complicated cases requiring a senior registrar or consultant input. The choice of suture is usually Chromic Catgut No 0 and technique applied is continuous interlocking in the posterior vaginal wall, simple interrupted for the perineal muscle layer and subcuticular perineal skin closure. Broad spectrum antibiotics and analgesics are frequently prescribed following repair of episiotomy or perineal injury.

CS is done as elective or emergency procedure. For both types, spinal anesthesia is the first choice whereas general anesthesia with intubation is reserved for strict indications. Nearly all patients have their CS done through Pfannenstiel skin incision (with few midline incisions done either to maintain a former midline scar or for immediate surgical requirement), and a transverse lower segment uterine incision. The uterus is repaired in two layers with absorbable suture and the visceral peritoneum is repaired separately with absorbable suture. Delayed absorbable suture is used to close the rectus sheath, and rarely, Nylon No 1 or 2 is used. And subcuticular absorbable suture is used for the skin repair. Antibiotics and analgesics are prescribed during the 3--5 days the patient remains in hospital. Following discharge from hospital, postnatal visit is scheduled for 6 weeks post-delivery except an earlier visit is indicated.

By 2 months postpartum, a previous study estimated PP to be 14% among women who had CS,[4] and using this prevalence, assuming a power of 90% and significance at 5% level, a sample size of 164 postpartum women was required for this study. The sample size was increased to 232 to improve the power and external validity of the study.

The two investigators (NO and NP) participated in the completion of the self-administered questionnaires. Additional information was obtained from the case notes of these women. A numerical rating scale (NRS) was used for grading the pain. NRS has a 10 cm line, indicating "no pain" as 0 and the "worst imaginable pain" as 10. A verbal analogue scale (VAS) grading the intensity of pain as mild, moderate, and severe was also used. The women were asked about the presence of postoperative abdominal or pelvic pain. The survey also recorded details of vaginal delivery, occurrence of perineal pain, pain intensity, and impact on daily activities.

Follow-up was done by telephone interviews conducted by investigator NO. Participants were subsequently called up to enquire about persistence of pain. The phone calls were scheduled for 6 and 12 months post-delivery. Women who had pain at 6 weeks were contacted by telephone at 6 months, and those with pain at 6 months were contacted again at 12 months post-delivery.

NRS score of 7 and above was considered serious pain at any of the assessment points, whereas a VAS graded as severe was considered serious pain. The VAS grade was employed in assessing for peripartum pain recall. The women graded their pain as mild, moderate, or severe on the day of surgery and during the following 72 h after surgery. During the 6-week interview, both NRS and VAS were utilized, and during the

follow-up phone contacts, the assessment of pain was done with the NRS only.

Data management

The data was subjected to statistical analysis with a personal computer using SPSS version 20.0 (SPSS IBM Corp, Armonk, NY) and GraphPad InStat 3 (GraphPad Software Inc., San Diego, CA). Univariate analysis was conducted using Chi-square test or Fisher's exact test as appropriate. Cross-tabulation was conducted to determine associations documented as prevalence ratio (PR). Statistical significance was assumed at P value <0.05.

Results

Of the 1,390 women who delivered during the 6-month study period, 459 (33%) had CS, 931 (67%) had vaginal delivery VD, out of which 23 (1.65%) were assisted with forceps and 16 (1.15%) had vacuum delivery. The postnatal clinic was attended by 626 (45%) of the women and 232 (16.7%) of them joined the study. Out of the 232 women, CS was done for 88 (37.9%), whereas 144 (62.1%) had VD. Forceps was done for 2 (0.8%) women, and another 2 (0.8%) had vacuum delivery.

Table 1 shows the sociodemographic parameters of the women. Those who delivered vaginally did not differ significantly from those who had CS with respect to age ($P = 0.06$), parity ($P = 0.89$), gestational age at delivery ($P = 0.82$), social class ($P = 0.45$), or body mass index ($P = 0.86$). There were also no significant differences between them in terms of previous CS rate ($P = 0.08$), report of previous pain problem ($P = 0.34$), or neonatal birth weight ($P = 0.14$).

Table 2 displays the characteristics of VD and CS documented at recruitment. Initial labor before emergency CS was experienced by 79.5% of those in the CS group. Elective CS was done for 20.5% of the women. Abdominal wound breakdown in the CS group was recorded in 3.41%. Spontaneous labor occurred in 75.0% of the VD group, whereas 25.0% had induced labor. Although 20.8% of the VD group did not have perineal injury, combined episiotomy and perineal tear occurred in 49.3% of them. Perineal wound breakdown in the VD group was noted in 3.47%.

In the peripartum period, CS women were administered various combinations of analgesic agents including pethidine, fentanyl, nonsteroidal anti-inflammatory drugs (NSAIDs), tramadol, pentazocine, paracetamol, wound infiltration with 0.1% bupivacaine, and rectal diclofenac while VD women had pentazocine, tramadol, and transcutaneous electrical nerve stimulation (TENS) at different times. However, similar forms of analgesics, viz., paracetamol, tramadol, and NSAIDs were used by both groups of women either on prescription or bought over-the-counter in an attempt to treat PP in the postpartum period.

Table 3 shows that at recruitment by 6 weeks postpartum, 42% (37/88) of the CS group had PP whereas 18% (26/144) of the VD group continued to have perineal pain (PR 2.1, 95% CI: 1.2--3.7, $P = 0.01$); hence, delivery by CS was over two-fold more likely to result in PP than having a VD. However, abdominopelvic or perineal pain was more common following VD than CS within 3 weeks postpartum (82% vs

Table 1: Patients' sociodemographic and clinical characteristics

	Cesarean ($n=88$)	Vaginal ($n=144$)	P
Mean age (year)	32.60±5.18	31.46±3.97	0.06
Parity distribution			
Primipara	41	69	0.89
Multipara	47	75	
Mean GA at delivery (week)	38.09±2.61	38.76±2.00	0.82
Social class			
Low	34	65	0.45
Middle	29	37	
High	25	42	
Mean BMI (kg/m^2)	26.56±3.40	25.48±3.90	0.86
Mean birth weight (kg)	3.213±0.75	3.078±0.59	0.14
Previous CS	11	8	0.08
Previous pain problem	15	18	0.34

GA, Gestational age; BMI, Body mass index; CS, Cesarean section

Table 2: Characteristics of Caesarean section and vaginal delivery

	Caesarean ($n=88$): number (%)	Vaginal ($n=144$): number (%)
Spontaneous labor	59 (67.0)	108 (75.0)
Induced labor	11 (12.5)	36 (25.0)
Intact perineum	-	30 (20.8)
Tear requiring suturing	-	30 (20.8)
Episiotomy and tear	-	71 (49.3)
Forceps delivery	-	2 (1.4)
Vacuum delivery	-	2 (1.4)
Trial of vaginal birth	15 (17.0)	25 (17.4)
Elective CS	18 (20.5)	-
Emergency CS	70 (79.5)	-
Abdominal wound/ episiotomy infection	3 (3.4)	5 (3.5)

CS, Cesarean section

Table 3: Duration of pain after Caesarean section and vaginal delivery during follow up

Duration	Caesarean ($n=88$): number (%)	Vaginal ($n=144$): number (%)
<3 weeks	51 (58.0)	118 (81.9)
3-6 weeks	37 (42.0)	26 (18.1)
7 weeks to 6 months	5 (5.7)	5 (3.5)
Over 6 months; no more	0 (0.0)	0 (0.0)
Pain at 1 year	0 (0.0)	0 (0.0)

58, respectively). At recruitment, PP was significantly more common in women with previous pain problem (15/33 vs 48/199, PR 2.2, 95% CI: 1.2--4.2; $P = 0.02$), and the women with PP recalled severe pain around the time of CS (17/37 vs 8/51; $P = 0.01$) and VD (9/26 vs 15/118; $P = 0.01$) more than those who did not report PP.

By the end of 6 months, 28 of the original 37 participants with PP were reached by phone including 5.6% (5/88) with PP in the cesarean group. In the VD group, 20 of the 26 participants with PP at recruitment were accessible and 4.3% (5/144) of them had PP. All 10 women reported only occasional mild pain that did not interfere with their daily activities. At the end of 1 year, nine women with only one of them among the five with pain at 6 months in the cesarean group could be contacted. Six participants in the VD group were reachable at 12 months postpartum and this included only two of five women with persistent pain at 6 months. None of these women reported pain at this time [Table 3].

Table 4 shows the determinants of persistent pain following delivery. Maternal age and gestational age at delivery were not significant predictors of PP after delivery. Similarly, type of labor or the presence of puerperal complications did not predict PP post-delivery. In contrast, primiparity was highly predictive of PP ($P = 0.001$). Although the use of multimodal analgesia postpartum was associated with reduced burden of PP by almost 25%, this difference was not quite significant (50% vs 25.9; $P = 0.09$). However, the burden of PP 6 months post-delivery was significantly less than that at 6 weeks postpartum (14.5% vs 27.2; $P = 0.04$).

The majority of the women who had pain at 6 weeks reported mild-to-moderate pain in both the VD (34/37, 91.9%) and CS (25/26, 96.2%) groups. There were also no differences in the grading of pain scores at rest and during deep breathing in both groups. Although more women reported having had pain daily among the CS group (21/37, 56.8%) than the VD group (9/26, 34.6%), this difference was not statistically significant ($P = 0.11$). Similarly, the majority of women described the pain as aching in both the CS (28/37, 75.7%) and VD (16/26, 61.5%) groups [Table 5].

Further analysis of persistent pain at 6 months and 12 months postpartum was not done because very few participants reported pain at 6 months or could be contacted at 12 months. The participants with pain at 6 months described mild pain felt on few days since recruitment, and asserted that the pain did not affect their daily activities. All 15 women contacted at 1 year follow-up had remained pain-free for several weeks before the phone call. The three women who initially reported pain at 6 months had become pain-free, whereas others were lost to follow-up.

Table 4: Determinants of persistent pain following delivery

Variable	PP present ($n=88$)	PP absent ($n=169$)	P
Age (year)			
<30	36	100	0.88
≥30	27	69	
Parity			
Primipara	43	67	0.001
Multipara	20	102	
GA at delivery (week)			
<37	30	82	1.00
≥37	33	87	
Postpartum analgesia			
Single agent	6	6	0.09
Multimodal	57	163	
Type of labour			
Spontaneous	49	118	0.36
Induced	10	37	
Mode of delivery			
Vaginal	26	118	0.001
Caesarean	37	51	
Puerperal complication			
Present	38	96	0.66
Absent	25	73	
Duration since delivery			
<6 weeks	63	169	0.04
6 weeks-6 months	10	53	

PP, Persistent pain; GA, Gestational age

Table 5: Analysis of women with persistent pain at 6 weeks post-delivery

	Cesarean ($n=88$): number (%)	Vaginal ($n=144$): number (%)	P
Severity of pain			
Mild	16 (18.2)	17 (11.8)	0.22
Moderate	18 (20.5)	8 (5.6)	
Unbearable	3 (3.4)	1 (0.7)	
Pain at rest			
0-2	24 (27.3)	22 (15.3)	0.15
3-5	6 (6.8)	3 (2.1)	
≥6	7 (8.0)	1 (0.7)	
Pain during deep breath			
0-2	30 (34.1)	17 (11.8)	0.25
3-5	6 (6.8)	6 (4.2)	
≥6	1 (1.1)	3 (2.1)	
Occurrence of pain			
Daily	21 (24.0)	9 (6.3)	0.11
Constant	8 (9.1)	4 (2.8)	
Less often than weekly	4 (4.5)	7 (4.9)	
Disturbs sleep	0 (0.0)	3 (2.1)	
Constant and in special situations	3 (3.4)	3 (2.1)	
Hinders daily activities	1 (1.1)	0 (0.0)	
Description of pain			
Aching	28 (31.8)	16 (11.1)	0.29
Burning	2 (2.3)	4 (2.8)	
Stabbing	7 (8.0)	4 (2.8)	
Dull	0 (0.0)	1 (0.7)	
Vague	0 (0.0)	1 (0.7)	

Discussion

The prevalence of PP following delivery assessed at 6 weeks was found to be 18% and 42% in the VD and CS groups, respectively. Having previous pain problem and a recall of severe peripartum pain were associated with the experience of PP by the women, and primiparous women experienced more PP. PP was described by the majority of our participants as mild-to-moderate aching pain. Beyond 6 weeks postpartum, few participants suffered any further pain.

A review of literature carried out by Verhaak *et al*.[10] documented that 2--40% of adults suffered chronic benign pain. Kainu *et al*.[8] found an incidence of PP 1 year after CS to be 18% but 10% after VD. In their study, Dooley *et al*.[11] reported 28% PP at 2 months after VD. All these figures from different sources point to the fact that chronic pain disorder is a major burden for every population. With respect to labor and delivery, investigators have previously reported incidence of PP after CS to be higher than VD. Kainu *et al*.[8] reported 18% after CS, Nikolajsen *et al*.[3] found 5.9% after CS, and Loos *et al*.[6] reported 15.9% after Pfannenstiel incision for both CS and hysterectomy. On the other hand, following VD, PP incidence was found to be 12.8% by Thurmo *et al*.[5] and 28% by Dooley *et al*.[11] The latter study focused on women who had episiotomy, and this probably explains the high rate of PP after VD they found.

The prevalence of PP in the present study appears similar to previous reports but also suggests a lower rate of PP for VD and higher rate for CS than those documented by Dooley *et al*.[11] and Loos *et al*.,[6] respectively. There is probably a role for acute pain management following CS in this observed difference in PP after CS. The application of analgesics in the treatment of postoperative pain appears inadequate in our environment. Oftentimes, there is no clear protocol for pain management in labor, and many women either receive no analgesic or are given intermittent parenteral paracetamol or pentazocine, usually at the time of admission to active phase labor. There appears to be a growing reluctance on the part of the healthcare providers as well as the parturients to allow further use of these drugs for fear of harmful side effects in the neonate especially respiratory depression.[12] Again, epidural analgesia in labor is only just beginning to gain prominence in our practice.[13] Poorly managed labor pain thus impacts on the pain burden after delivery when the low level of analgesia is further promoted.

Following delivery, women usually experience pain either in the vagina/perineum from episiotomy or tears or from blunt vaginal or perineal musculature disruption, or pelvic pain from CS. We found that primiparous women were significantly more likely to experience PP than multiparous mothers. This finding has not been paid much attention by previous researchers, perhaps because the role played by parity appears to be overshadowed by the effect of mode of delivery. Furthermore, the place of other biosocial variables in determining the burden of chronic pain in an obstetric population is still being explored. It will seem plausible to suggest that the role played by primiparity in the observed burden of PP post-delivery can be partly explained by the higher frequency of episiotomy utilization so often documented in this group of mothers.

Severe acute pain post-delivery was found to be 10.9% by Eisanach *et al*.[14] They reported that PP was 2.5-fold more associated with the severity of acute postpartum pain. In the study by Cappell and Pulkall,[15] women with unresolved acute pain post-delivery and who continued to experience persistent genitopelvic pain beyond 3 months of delivery were more likely to have had CS. In the present study, we did not document the rate of acute pain in our participants. We set out to determine the report of pain 6 weeks after delivery, using their recall of serious pain at the time of delivery as a surrogate for assessing the burden of acute severe pain in our patients, which we also found to be associated with the prevalence of PP, similar to the findings of earlier researchers.[16,17]

Pain of childbirth is expected to resolve as the puerperium progresses. However, many women continue to experience different degrees of pain during this time, and sometimes well beyond 6--12 weeks. Liu *et al*.[4] documented that 14% of their study population had PP at 2 months, but the figure reduced to 4.2% at 12 months. Similarly, Eisanach *et al*.[18] showed that PP after delivery continued in 10% of the patients studied at 2 months, dropping to 2.8% at 6 months, and only 0.9% at 1 year, but those who continued to report pain by 1 year appeared to have developed a psychosocial component to their experience as assessed by their scores on the Edinburgh postpartum depression index for presence of depression.

In the present study, the rate of PP at 6 months was 5.6% after CS but 4.3% following VD. Our figures appear higher than the report of Eisanach *et al*.[18] but lower than the finding of 11.3% by Jin *et al*.[19] However, one clear distinction between our research and that of the latter authors is that we experienced a significant loss to follow-up. Over 20% of women with PP at 6 weeks in our study were not available for review at 6 months. Perhaps this could have reflected in the prevalence we found. Another possible reason for the difference could be that there exists a cultural or social component in the perception and experience of pain, as

well as the consideration of such pain as important to be reported. Sociocultural influence on pain threshold in the setting of pregnancy and delivery will make a good theme for further research.

Previous researchers have also suggested that postpartum pain can continue into the second year after delivery. Jin *et al*.[19] reported a rate of 6.8% at 1 year, Liu *et al*.[4] found 4.2% at 1 year, whereas Bijl *et al*.[20] found a much higher figure of 7.3% at 2 years. In the present study, we could not determine a reliable prevalence of PP at 12 months postpartum because only 6.5% of the women seen at 6 weeks could be reached for follow-up. However, the 15 women interviewed did not have any pain and could not remember having had any significant pain in the preceding 3 months. Again, we observed that pain after childbirth in our participants appeared to have improved steadily beyond 6 weeks and did not seem to impact negatively on their performance beyond 3 months. One possible explanation for this observation continues to be a likelihood of social, environmental, and microcultural modification of response to pregnancy changes. It is also likely that the process of recovery from childbirth pain differs from population to population.

Regional variations in the utilization of potent analgesics have been highlighted by some researchers, with North America and Europe being more liberal with opioids than Africa, Asia, or Latin America.[21] This difference in practice often leads to inadequate labor analgesia and undertreatment of post-delivery perineal pain and post-cesarean pain in our environment. The epileptic supply of potent opioids to regions outside of North America has also been shown to influence the overall prescription pattern of healthcare providers in Africa. The corollary is that experience in the use of opioids is fundamentally lacking so that misconceptions about their role in pain management further encourages poor level of application of potent opioids. Characteristically, the studies[3,14,22] that reported low prevalence of PP following CS were carried out in countries with strong belief in the practice of and commitment to pain management, established labor analgesia services, and constant supply of potent opioids.

The major strength of this study is the prospective design, although follow-up was difficult beyond the time of recruitment. The present study recruited women who attended their scheduled 6th week appointment to clinic; hence, those who defaulted could not have been part of the study. We acknowledge the limitation due to a hospital-based study, and recall bias regarding the experience of peripartum pain when assessment is done at the 6th week postpartum visit to the clinic. Perhaps the assessment of acute pain immediately after delivery with subsequent follow-up to determine the burden of PP and highlight the role of severe acute pain will form a vista for further research in this area. This is especially important in exploring sociocultural and environmental impact on pain perception, expression, and adaptation, and resolution.

In conclusion, PP following delivery is common in women returning 6 weeks postpartum, but the continuation of significant pain beyond 6 months postpartum is rare. Poorly managed severe acute peripartum pain appears to play a role in the burden of PP, and primiparous women are more prone to PP. We advocate the promotion of epidural analgesia for labor, especially in primiparas, and the use of multimodal analgesia regimen for adequate peripartum pain control. Furthermore, there should be a deliberate policy of screening for PP burden among postpartum women and mothers returning for care in other clinical settings, so as to identify those who may require long-term follow-up.

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Conflicts of interest

There are no conflicts of interest.

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