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Factors Associated with Postdural Puncture Headache in Woman who undergo Caesarean Section under Spinal Anesthesia in Tertiary Hospital, Parsa

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ABSTRACT

Background: Postdural puncture headache (PDPH) is one of the second most common complications of spinal anesthesia. This study aimed to find out the factors associated with postdural puncture headache in woman who undergo caesarean section delivery under spinal anesthesia.

Methods: A descriptive cross-sectional research design was used. A total of ninety four pregnant mothers who underwent caesarean section delivery under spinal anesthesia were selected by purposive sampling method. A structured interview schedule and observational checklist were used for data collection from Dec 25, 2022 to Jan 7, 2023. Data were entered into the SPSS 20 version and were analysed by using descriptive and inferential statistics.

Results: This study shows mean age of the respondents was 25.26±2.87, only 6.4% had developed postdural puncture headache, among more than half (66.7%) of the respondents had raised their heads before 24 hours of anesthesia, about 50% of respondents had a worse headache while raising their head with a pillow and experienced headache within 15min after raising the head. Repeated attempts of spinal anesthesia (p-value is 0.0001) had a statistically significant association with postdural puncture headache.

Conclusions: These findings concluded that the incidence of PDPH is 6.4% in caesarean section delivery under spinal anesthesia and multiple attempts contribute to increased PDPH suggesting that repeated attempts of spinal should be minimized to decrease the incidence of post-dural puncture headache.

Keywords: *Caesarean section, postdural puncture headache*, *spinal Anesthesia*

INTRODUCTION

Worldwide there has been a tremendous increase in the cesarean section (CS) rate over the decades which has been a global public problem issue. The recommended rate of CS in any country is 10% and the acceptable is 15% but the prevalence of CS is more than the WHO recommendation in all developed and developing countries.[1] Reports show CS rate was 52% ranging across large cities from 13% to 91% in Latin America.[2] In Nepal prevalence of CS per 100 last birth was 9.8, 8.9, and 9.1in the previous one, three, and five years.[3]

Spinal anesthesia (SA) is the most commonly used anesthesia for cesarean delivery with 80-95% prevalence as it is easier to administer than general anesthesia with low-cost, safe, well-operating conditions. Postdural Puncture Headache (PDPH) is a problem for the patient next to dural puncture which affects the daily life of the patient with marked restriction of their physical activities it is also the iatrogenic cause of patient morbidity in modern anesthesia, as well as pain management, therapy after attempted epidural and spinal anesthesia.[4]

PDPH is the divesting complication of procedures that puncture the dura mater.[5] PDPH is one of the second most common complications following spinal anesthesia. PDPH is defined as a headache that develops within 5 days after dural puncture and disappears spontaneously within 1 week, or up to 48 hours after an epidural blood patch which might be accomplished by at least one of the following symptoms: neck stiffness, tinnitus, hyperacusis, photophobia, and nausea". PDPH is a common side effect of neuraxial anesthesia in obstetric

patients worldwide.[6] The cardinal feature of PDPH is its postural nature, with headache symptoms worsening in the upright position and relieved or, at least improved, with decumbency.[7]

The prevalence of PDPH is higher in pregnant women because they have high levels of estrogen which can influence the tone of the cerebral vessels, thus increasing the vascular distention response to CSF hypotension.[8]

There are many factors associated with PDPH in obstetric patients including the age, patient weight, size of spinal needle, position of giving anesthesia, no of attempt, anesthesia service provider, and type of spinal needle.[9] However, it can't be concluded or confirmed these factors in our population are the same in our setting. In the context of Nepal, there are many tertiary hospitals where cesarean section rates are increasing day by day and PDPH is high in pregnant mothers undergoing SA. Thus researcher felt the need to study its incidence and the associated factors.

METHODS

A descriptive cross-sectional research design was used to find the factors associated with postdural puncture headache in woman who undergo caesarean section under spinal anesthesia which was carried out in the Narayani Hospital, Parsa. A purposive sampling technique was used. The sample size was calculated using the Cochrane formula and a total sample of 94 pregnant women who underwent cesarean section were enrolled in the study.

Sample Size for infinite population (n) = Z^2pq/e^2

Where,

Z = 1.96 for 95% confidence interval:

p = 0.333 (33.3%) (Uwihoreye, 2021)

q = 1- p = 0.63 and

e = 0.1 margin of error expressed as decimal (i.e., 0.1), with allowable error of 10%

(Absolute precision).

= (1.96) 2× 0.33× 0.67 / (0.1)2

= 3.84×0.22/0.01

=0.844/0.01

=84.48

=~85

Adding 10 % non-response rate the final sample size was 85+ 9=94

A structured interview schedule and observational checklist were prepared based on the objectives of the research containing main three parts; Part 1: socio-demographic data; Part 2: Observational checklist related to exposure variables; Part 3: Questions related to diagnostic criteria of postdural puncture headache. The content validity of the instrument was established by consulting five experts. A permission letter was taken from Narayani hospital. Written informed consent was taken from each respondent. The findings were analysed using descriptive; Chi-square and Fisher's exact test were used to measure the association between incidence and selected variables.

RESULTS

Table 1: Socio demographic characteristics of respondents n=94

Characteristic	Number	Percent
Age		
Below 30 year	86	91.5
Above 30year	8	8.5
Mean ±SD 25.26±2.87		
Religion		
Hinduism	78	82.97
Islam	14	14.89
Buddhism	2	2.14
Ethnic group		
Madhesi	39	41.48
Dalit	17	18.09
Janajati	17	18.09
Muslim	15	15.96
Brahmin/Chhetri	6	6.38
Gravida		
Multi Para	57	60.6
Primi	37	39.4
Comorbidity		
No any	91	96.8
Hypothyroidism	3	2.6

Table 1 reveals that almost all (91.5%) respondents were from the age group below 30yrs, most of the respondents (82.97%) followed Hinduism and less than half (41.5%) of the respondents were Madhesi. More than half (60.1%) of the respondents were multigravida and almost all (96.8%) respondents had no comorbidity.

Table 2: Respondents' exposure variable related to postdural puncture headache n=94

Variables	Number	Percent
History of spinal anesthesia		
No	62	66.0
Yes	32	34.0
Preloading before operation with 0.9% or RL	82	87.2
Yes	12	12.8
No		
Position during SA		
Sitting	91	96.8
Lateral Decubitus	3	3.2
Types of the spinal needle		
Quincke	91	96.8
White chare pencil point	3	3.2
Size of the spinal needle		
25	92	97.9
26	2	2.1
Spinal success or not		
Success	90	95.7
Patchy	4	4.3
If successful, no of attempt		
1st attempt	69	73.4
2nd attempt	25	26.6
Service provider		
Anesthesiologist	52	55.3
B Sc anesthesia	38	40.4
Anesthesia Assistant	4	4.3
CSF leak		
Yes	61	64.9
No	33	35.1
If yes, the amount of CSF		
3 or fewer drop	31	93.9
More than 3 drop	2	3.2
The direction of the spinal needle	91	96.8
Midline	3	3.2
Paramedian		

Table 1 shows the Respondent's Exposure variables related to Postdural Puncture Headache. More than half (66%) of respondents had a history of exposure to spinal anesthesia, and 87.2% of the respondents had preloading before the operation with 0.9% or RL. All most all (96.8%) respondents' spinal anesthesia was given in a sitting position and (96.8%) Quincke spinal needle was used. All most (97.9%) of respondents were given spinal anesthesia with 25 gauze spinal needles. Regarding spinal success, (73.4%) of respondents, had spinal anesthesia success in 1st attempt. More than half (64.9%) of respondents had cerebral spinal fluid leaks, of which (93.9%) of the respondents had less than 3 drop CSF leaks, and (96.9%) of respondents' spinal needle direction was midline.

Table 3: Respondents' diagnostic criteria for post dural puncture headache

Variables	Number	Percent
Headache after surgery (n=94)		
yes	6	6.4
No	88	93.6
Timing of head raised (n=6)		
After 24 hour	4	66.7
Before 24 hour	2	33.3
The position that worsens the patient's headache	3	50.0
Raising head with a pillow	3	33.3
Sitting upright position	2	16.7
Raising the bed's head		
The onset of headache after raising the head	3	50.0
Within 15min	3	50.0
After 15min		
The area where headache occurs	3	50.0
Frontal	2	33.3
Temporal	1	16.7
Occiput		
Features associated with headache *	4	66.7
Nausea	3	50.0
Vomiting	2	33.3
Neck stiffness		
Headache relieved in a flat position	6	100.0
Duration of headache relieved		
With 15min	4	66.7
After 15min	2	33.3

**Multiple response*

Table 2 depicts that only 6.4% had postdural puncture headaches, among them more than half (66.7%) of the respondents had raised their heads before 24 hours of anesthesia. Half (50%) of the respondents had worse headaches while raising their heads with the pillow and had experienced headaches within 15 minutes after raising their heads. Half (50%) of the respondents had headaches in the frontal region and the onset time of headaches was within 15 minutes and were frontal area pain. More than half (66.7%) of respondents had nausea as an associated feature with headache. Cent percent of the respondents' headaches were relieved by a flat position, and 66.7% of the respondents experienced relief from headaches within 15 minutes in a flat position.

Table 4: Associations between postdural puncture headache and selected variables n=94

Variables	Incidence of PDPH		x^2	p-value
	No (%)	Yes (%)		
Age				
Below 30	80(85.11)	6(6.38)	0.591	0.440
Above 30	8(8.51)	0(0.00)		
Religion				
Hindu	73(77.66)	5(5.32)	0.001	0.981
Other	15(15.95)	1(1.06)		
Ethnic group				
Madhesh	37(39.36)	2(2.12)	1.000[b]	0.513
Other	51(54.25)	4(4.25)		
Para				
Live 0	36(38.29)	3(3.19)	0.690[b]	0.487
Live 1 or more than 1	52(55.31)	3(3.19)		
Comorbidity				
Hypothyroidism	3(3.19)	0(0.00)	0.210	0.641
No any	85(90.42)	6(6.38)		
Preloading before operation with 0.9% NS & RL				
Yes	77(81.91)	5(5.32)	0.880	0.761
No	11(11.70)	1(1.06)		
Position during SA				
Sitting	85(90.42)	6(6.38)	0.211	0.646
Lateral Decubitus	3(3.19)	0(0.00)		
Type of spinal needle				
Quincke	85(90.42)	6(6.38)	0.211	0.646
Whitacre Pencil Point	3(3.19)	0(0.00)		
Size of spinal				
25	86(91.48)	6(6.38)	0.131	0.701
26	2(2.12)			
No of attempt				
1st attempt	69(73.40)	0(0.00)	17.689	0.001*
2nd attempt	19(20.21)	6(6.38)		
Direction of spinal needle				
Midline	85(90.42)	6(6.38)	0.211	0.641
Para median	3(3.16)	0(0.00)		

**p-value significant at <0.05; b: expected cell value <5*

Table 3 shows there was a significant association between the number of attempts and PDPH (p-value 0.001).

DISCUSSION

The present study shows that the incidence of PDPH in this study is 6.4%. Similar studies conducted in Nepal reported 7.01% incidence of PDPH.[10] Multiple attempts during spinal anesthesia have been significantly associated with PDPH and this finding is similar to the study conducted in Jorden revealing that the repeated attempts increase the risk of PDPH .[9] A cohort study conducted shows the mean age was 25 years, the sitting position during spinal anesthesia was 98.4%, these findings are similar with this present study. [4] This study shows that 50% of the respondents with PDPH had frontal headaches which is similar to the findings of the research conducted in a similar setting. [10]

CONCLUSIONS

It is concluded that the incidence of PDPH is 6.4% in caesarean section delivery under spinal anesthesia and multiple attempts contribute to increase PDPH. Therefore it is recommended to minimize the number of attempts during spinal anesthesia.

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CONFLICT OF INTEREST

This study has no conflict of interest.

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