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INCIDENCE AND FACTORS ASSOCIATED WITH POST-SPINAL HEADACHE AMONG PATIENTS RECEIVING SPINAL ANAESTHESIA AT BHARATPUR HOSPITAL CHITWAN NEPAL

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ABSTRACT

Post Spinal Headache (PSH) is one of the most common complications of spinal anaesthsia. It usually occurs within several days after the lumbar puncture for the different surgical procedure. Spinal anaesthesia (SA) is an anesthetic technique of choice for older adults due to its overall favorable profile. This was a descriptive cross-sectional study carried out at Bharatpur hospital of chitwan district of Nepal which is 300 bedded government hospital where approximately 220 patients were operated under spinal anaesthesia per month. Ethical consideration was taken both from Thesis committee of CMC College of Nursing and CMC/IRC and bharatpur hospital before starting data collection. Data were collected through the self administered semi-structured questionnaire. The collected data was coded and entered in SPSS version 16 for statistical analysis. Collected data were analyzed using the descriptive statistics such as frequency, percentage, mean, SD and inferential statistics such as chi-square test, and Odds ratios was used to find out the association between different variables related to spinal anaesthesia and post spinal headache. The incidence of post spinal headache was 14.9%. the post spinal headache was statistically significant with BMI of the respondents, direction of the bevel, number of puncture attempts and position during anaesthesia. There was no significant associatiob between age, post procedure spinal anaesthesia management and post spinal headache. But the incidence of headache is higher among the respondents who had raise head before 24 hours than who had raised head after 24 hours.

1. BACKGROUND

Post Spinal Headache (PSH) is one of the most common complications of spinal anaesthsia. It usually occurs within several days after the lumbar puncture for the different surgical procedure.[1] According to international headache society, post-lumbar puncture headache (PLPH) developed within 5 days of dural puncture and resolves within one week spontaneously.[2] Spinal anaesthesia (SA) is an anesthetic technique of choice for older adults due to its overall favorable profile. Benefits of SA include its relative safety, excellent lower body muscle relaxation and absence of effect on consciousness of the patient; furthermore its use doesn't require an empty stomach.[3] It is achieved by injecting local anesthetics into the subarachnoid space. Indications of SA are operation below the umbilicus.

There are two basic theoretical mechanisms to explain postdural puncture headache (PDPH); one is reflex vasodilation of the meningeal vessels due to lowered cerebrospinal fluid pressure, another is traction on the pain sensitive intracranial structure in the upright position.[4] PDPH developed in postoperative/postpartum period which is always troublesome for anaestheics as well as patients.

2. METHODOLOGY

This was a descriptive cross-sectional study carried out at Bharatpur hospital of chitwan district of Nepal which is 300 bedded government hospital where approximately 220 patients were operated under spinal anaesthesia per month. Sample size was calculated as 282 by using $n_0 = Z^2pq/d^2$ formula. All patients (males and females of all age group) who were received SA and admitted in ward for at least within 72 hours after SA and patients who could converse and willing to participate were included in this study whereas the patient who were discharged within 72 hours after SA and the patients who developed headache without postural variation, non-operative patients, seriously ill patients and patients who needs to keep in ICU or ventilator and could not converse and developed headache after 72 hours after SA although

patient is admitted were excluded from this study. Ethical consideration was taken both from Thesis committee of CMC College of Nursing and CMC/IRC and bharatpur hospital before starting data collection. Anonymity was maintained and each patient was briefed about the purpose of the study and both written and verbal consent were taken before the participation of the patients in the interview for this study voluntarily. Data were collected through the self administered semi-structured questionnaire. The patients were interviewed on day third post-operative day and was questioned as regard to headache developed or not. The collected data was coded and entered in SPSS version 16 for statistical analysis. Collected data were analyzed using the descriptive statistics such as frequency, percentage, mean, SD and inferential statistics such as chi-square test, fisher exact test and Odds ratios was used to find out the association between different variables related to spinal anaesthesia and post spinal headache.

3. RESULTS

To study the incidence and factors associated with PSH, total 282 patients were taken whose operation was done under spinal anaesthesia at bharatpur hospital. The data were tabulated below.

Table 1: Socio-demographic Characteristic of respondents

S.N.	Characteristics	Frequency	Percentage
1.	**Age group in years**		
	Less than 20	39	13.8
	20 – 29	138	48.9
	30 – 39 *	62	22.0
	40 – 49	27	9.60
	More than 50	16	5.70
	Mean age = 29.02 years, S.D. = 9.28 years, Range = 13 – 62		
2.	**Sex of the respondents**		
	Male	26	9.2
	Female	256	90.8
3.	**BMI of the respondents**		
	Less than 18.5	12	4.3
	18.5 – 24.9	142	50.4
	25 – 29.9	108	38.3
	More than 30	20	7.1
	Mean BMI = 24.61, S.D. = 3.58, Range = 17 – 37		

Table 1 showed that nearly half of the respondents (48.9%) were in the age group of 20-29 years and only 5.7% of the respondents were in the age group more than 50 years. The age of the respondents ranges from 13 to 62 years. Almost all of the respondents (90.8%) were female. Regarding the BMI, half of the respondents (50.4%) had normal BMI (18.5 – 24.9) and only 4.3% had less than normal.

Table 2: Incidence and duration of post spinal headache (PSH)

S.N.	Variables	Frequency Percentage	95% CI
1.	Incidence of Post spinal headache (PSH)		
	Yes	42 (14.9%)	10.53% - 19.0%
	No	240 (85.1%)	
2.	**Onset and Duration of PSH (hours) n=42**	**Frequency**	**Percentage**
	Within 24 hours	2	4.8
	Within 25 – 48 hours	26	61.9
	Within 49 - 72 hours	14	33.3
	Mean duration in hours = 45.26 hours, S.D. = 12.96 hours, Range = 22 – 70 hours		
3.	**Characteristics of PSH**	**Frequency**	**Percentage**
	Position that patients experienced headache first time		
	Raising the head with pillow	1	2.4
	Raising the head of bed	17	40.5
	Sitting in upright position	24	57.1
4.	**Part in which PSH occurs**		
	Frontal	24	57.1
	Temporal	1	2.4
	Occipital	13	31
	Generalized	2	4.8

	Parietal	2	4.8
5.	**Onset of headache after head raised**		
	Within 15 minutes	41	97.6
	After 15 minutes	1	2.4
	Mean = 7.57 minutes, S.D. = 6.20 minutes, Ranges = 1 to 30 minutes		
6.	**Headache worsening by raising the head**		
	Yes	38	90.5
	No	4	9.5
7.	**Headache relieved by flat position**		
	Yes	42	100
8.	**Time of headache relieved by flat position**		
	Within 15 minutes	41	97.6
	After 15 minutes	1	2.4
	Mean = 8.43 minutes, S.D. = 5.63		
9.	**Pain radiating to the neck and shoulder**		
	Yes	19	45.2
	No	23	54.8

Table 2 showed that Post Spinal headache was developed in 14.9% of the respondents. Of which more than half (61.9%) of the respondents were experienced headache in between 25 – 48 hours after spinal anaesthesia. Only 4.8% of the respondents were experienced headache within 24 hours after spinal anaesthesia. More than half (57.1%) of respondents were experienced PSH sitting in upright position whereas less than half (40.5%) experienced headache in semi sitting position. More than half of the respondents (57.1%) complain headache in frontal region whereas only 2.4% of respondents complain headache in temporal region. Almost all of the respondents (97.6%) experienced PSH within 15 minutes of head raised. Headache was worsen by raising the head in almost all of the patients (90.5%) where all of them relieved their headache in flat position within 15 minutes in 97.6% respondents.

Table3: Association between demographic and PSH

S.N.	Variables	Experienced of PSH		p-value
		Yes	No	
1.	**Age Group in years**			
	Up to 30	27 (14.1%)	164 (85.9%)	0.846
	31 – 45	11 (15.9%)	58 (84.1%)	
	More than 45	4 (18.2%)	18 (81.8%)	
2.	**Sex of patients**			
	Male	2 (7.7%)	24 (92.3%)	0.221
	Female	40 (15.6%)	216 (84.4%)	
3.	**BMI of Patients**			
	≤ 24.99	29 (18.8%)	125 (81.2%)	0.042
	> 24.99	13 (10.2%)	115 (89.8%)	

Table 3 showed that there were no significant association between age group and PSH (p=0.846) as well as sex and PSH (p=0.221) whereas there was a significant association between PSH and BMI of the respondents (p=0.042).

Table 4: Logistic regression analysis of different variables

S.N.	Variables	Experienced of PSH		Unadjusted Odds ratio (OR) (95% CI)
		Yes	No	
1.	**BMI of the respondents**			
	≤ 24.99	29	125	2.052 (1.018 - 4.139)
	> 24.99	13	115	1
2.	**Position During Spinal anaesthesia**			
	Lateral decubitus	28	201	1
	Sitting position	14	39	2.577 (1.245 – 5.334)
3.	**Bevel Direction**			
	Parallel to dural fibers	31	207	1
	Transverse to dural fiber	11	39	2.226 (1.021 – 4.855)

4.	**Number of LP attempts**			
	Single	13	181	1
	Multiple	29	59	6.844 (3.341 – 14.019)

Table 4 showed that the respondents having BMI less than 25 were two times more likely to developed PSH than the respondents having BMI more than 25 (OR = 2.052; CI=1.018-4.139; p=0.0001). Similarly, there was double risk of developing PSH in the respondents undergoing SA in sitting position (OR=2.577, CI= 1.245 – 5.334, p=0.011). But there was 6 times high risk of developing PSH in the respondents undergoing multiple attempts of lumbar puncture (OR 6.844, CI = 3.341 – 14.019.

Table 5: Association between different variables and PSH

S.N.	Variables	Experienced of PSH		p-value
		Yes	No	
1.	**Position during spinal anaesthesia**			
	Lateral decubitus	28 (12.2%)	201 (87.8%)	0.009
	Sitting position	14 (26.4%)	39 (73.6%)	
2.	**Approach of SAB**			
	Median	41 (14.8%)	236 (85.2%)	0.556
	Paramedian	1 (20.0%)	4 (80.0%)	
3.	**Leakage of CSF**			
	Yes	20 (19.4%)	83 (80.6%)	0.106
	No	22 (12.3%)	157 (87.7%)	
4.	**Duration of appearance of CSF in the hub of the needle**			
	≤ one second	10 (24.4%)	31 (75.6%)	0.065
	> one second	32 (13.3%)	209 (86.7%)	
5.	**Duration of flat position after SA (n=282)**			
	Up to 24 hours	40 (15.4%)	220 (84.6%)	0.548
	More than 24 hours	2 (9.1%)	20 (90.9%)	
6.	**Head raised with pillow (n=261)**			
	within 24 hours	14 (16.3%)	72 (83.7%)	0.726
	25 – 48 hours	22 (13.3%)	143 (86.7%)	
	After 48 hours	2 (20.0%)	8 (80.0%)	
7.	**Head raised by semi sitting position (n=239)**			
	Within 24 hours	28 (14.7%)	163 (85.3%)	0.446
	More than 24 hours	5 (10.4%)	43 (89.6%)	
8.	**Head raised in upright position (n=282)**			
	Within 24 hours	34 (16.2%)	176 (83.8%)	0.296
	More than 24 hours	8 (11.1%)	64 (88.9%)	
9.	**Direction of the bevel of spinal needle**			
	Parallel to the dural fibres	31 (13.0%)	207 (87.0%)	0.040
	Transverse to the dural fibres	11 (25.0%)	33 (75.0%)	
10.	**Number of LP attempts**			
	Single	13 (6.7%)	181 (93.3%)	0.000
	Multiple	29 (33.0%)	59 (67.0%)	

Table 5 showed that there were significant difference between position during spinal anaesthesia and PSH (p=0.009) and number of LP as well as direction of bevel of spinal needle and PSH. But there were no significant difference between leakages of CSF during LP, approach of SAB, duration of flat position of patient after SA, duration of CSF in hub of the needle.

4. DISCUSSION

The spinal headache is caused by the leakage of Cerebrospinal Fluid (CSF) through dural puncture site. The incidence of post spinal headache (PSH) was varied in different study. The result of present study showed that 42(14.9%) of the respondents were suffered from PSH in the post operative period where 26 gauge Quincke needle was used for dural puncture. Our study is consistent with the result of a study done by Hafer in 1997 in which PSH was 17.6%.[5] Finding of our study is slightly different to Singh et al which were conducted in Dhulikhel Hospital where the PSH was 25%.[6]

The clinical characteristics of PSH in the present study were similar to other study conducted by different authors.

Diagnosis of PSH depend upon its association with body position of the patient during the time of hospital stay. The pain was aggravated by sitting or standing and

relieved by lying down in flat position. The most important factor for contributing to the higher incidence of PSH were age, sex, BMI of the respondents, position during spinal anaesthesia, direction of the bevel and the number of lumbar puncture attempts. Regarding the onset of PSH, present study found that more than half of the respondents (61.9%) out of 42 suffered from headache within first 25 – 48 hours. Similar study conducted by Majd et al in 2010 revealed that headache starts within 24 to 48 hours after the lumbar puncture and usually last for one to two days but it may begins as early as one hour after the lumbar puncture or it may occurs beyond one week or sometimes after several weeks in few cases.

Another study conducted by Singh et al found that the onset of headache was within 24 hours in 80% of patients.[6] In the present study the association between age group of the patients and PSH was not statistically significant (p=0.846). The incidence of PSH was 14.1% in age group within 30 years which is not consistent with the results of the study done by Singh in 2010 where the incidence of post dural puncture headache was 70% in 18 – 30 years old age group of the patients.[6] Present study showed that the incidence of PSH was 7.7% in male and 15.6% in female. The incidence of PSH and sex of the respondents was not statistically significant (p=0.221) however result of the study conducted by Amorim in 2012 found that there is significant association between sex and PSH (female=11.1%, male = 3.6%, p=0.03).

There was statistically significant association between PSH and BMI of the respondents. The occurrence of PSH in the patients of having BMI less than 24.99 had two times higher chances (OR=2.052, p=0.0001). This finding was consistent with findings of Almeida et al. They found that there were greater risk of PSH in the patients having lower BMI (OR=3.3, p=0.001).[7]

The result of present study suggests that there is no statistically significant association between demographic data such as age and sex. The incidence of PSH is more common among parturient because of reduction of both the intra-abdominal and epidural pressure after delivery thereby promoting more leakage of CSF than usual. The factors contributing for an increased incidence of Post dural puncture headache (PDPH) in obstetrics patients also includes stress of labor, changing hormonal level and dehydration.

In the present study, 26 gauge Quincke needle was used to all the patients for spinal anaesthesia. For the successful block, 68.8% of the patients required one attempt, whereas 13.5% and 13.1% of patients required two and three attempts respectively. There was significant association between PSH and number of LP attempts in single and multiple attempts (p=0.000). However similar study conducted by Lee in Korea found that there was no significant association between PSH and number of LP attempts.[8]

This study reveals that there was a significant association between PSH and position of the patients during spinal anaesthesia in lateral decubitus and sitting position (p=0.009) which is consistent with the finding of the study conducted by Siamak et al. in 2010 (p=0.001).[9] There was double risk of developing PSH in the respondents undergoing SA in sitting position (OR=2.577, CI= 1.245 – 5.334, p=0.011). This might be due to the higher pressure of CSF in sitting position than in lateral position which can make a larger hole in the dura that make a prolong leakage of CSF. The parallel or longitudinal direction results significantly lower incidence of PSH as compared with the transverse or perpendicular direction. This finding is similar to the finding of the study conducted by Flatten et al. in which the incidence of PDPH was 22.6% and 3.8% in transverse and parallel group. This is also supported by the finding of the study by Richman et al. in 2006.[10] The insertion of a bevel needle parallel to the dural fibers would result in fewer dural fibers being cut and less leakage of CSF, thus consequently lower the incidence of PSH.

There was no significant association between median and para-median approaches during insertion of spinal needle with PSH (p=0.746). However, similar study conducted by Haider et al. in 2005 on 50 patients found that there was statistically significant association (p<0.05).[13]

There was no significant association between leakage of CSF from the hub of the spinal needle during spinal anaesthesia and PSH (p=0.204). Loss of CSF from the punctured site produces low CSF pressure which in turns leads to intra cranial venous dilation resulting in an increase in brain volume in the upright position. There occurs a difference in CSF volume and also pressure difference between the intra-cranium and intra-vertebral part of the sub-arachnoid space. Venous dilation and compensatory increase in brain volume will result in brain sag which in turn will exert a traction and stimulate pain sensitive and anchoring structures like dural vessels, basal dura and tentorium cerebelli causing the PSH. Similarly, in the present study, the incidence of PDPH was not statistically significant association with the post procedure management, which is similar to the study done by Hafer et al. in 1997.[11] This result was consistent with the result of the study conducted by Sudlow et al which revealed the role of fluid supplementation in the prevention of PSH is uncertain and also concluded that there is no good evidence that routine bed rest after dural puncture is beneficial. Present study revealed the 54.8% of the respondents experienced headache in the frontal region which is similar to the finding of the study conducted by Shah et al. in 2002 which found there was 88.9% headache in frontal region.

5. CONCLUSION

The incidence of post spinal headache was 14.9%. the post spinal headache was statistically significant with BMI of the respondents, direction of the bevel, number

of puncture attempts and position during anaesthesia. There was no significant associatiob between age, post procedure spinal anaesthesia management and post spinal headache. But the incidence of headache is higher among the respondents who had raise head before 24 hours than who had raised head after 24 hours.

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