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Original Research Article

Effect of Coffee Consumption on the Incidence and Severity of Post Dural Puncture Headache among Post Cesarean Section Women

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Abstract: ***Background:*** Post-Dural Puncture Headache (PDPH) is the most prevalent complication after lumbar puncture (LP), with reported frequency varying from 6% to 36% of patients. ***Aim:*** investigate the effect of coffee consumption on the incidence and severity of post-dural puncture headache among post cesarean section women. ***Research design:*** Randomized controlled clinical trial**.** ***Setting:*** Postpartum department at Damanhour National Medical institute/ Elbehira governorate. Egypt. ***Sample:*** 120 women undergoing elective caesarean section under spinal anesthesia were randomly allocated to study and control group using randomization block. ***Tools***: three tools were used for data collection. Structured interview schedule to collect basic data, headache assessment tool *(visual analogue pain scale*, short-form McGill pain questionnaire, assessment of headache aggravating and alleviating factors) and physical activities limitation questionnaire. ***Results*****:** The incidence and severity of PDPH is higher among control more than coffee group. While, the maximum incidence of continuous PDPH occurs in the third post-operative day among control group (40%) compared to only 13.3% among intervention. Both VAS and McGill Pain score are statistically higher among control compared to intervention group over several time points. PDPH is aggravated by light, noise, standing, moving and siting in control groups than intervention groups. Laying down, closing eyes, drinking fluids are major soothing factors for both groups. The highest percentages of coffee group had no effect on activity of daily living compared to control group. The differences between the two groups are statistically significant intergroup, intragroup and for group time interactions. ***Conclusion:*** Coffee decreased both incidence and severity of PDPH and increased tolerance of post Cs activities. ***Recommendations:*** Oral coffee may be added to post Cs nursing care protocols to decrease PDPH incidence, severity and enhancing early physical activities.

Keywords: Post-Dural puncture headache, caesarian section, spinal anesthesia, coffee.

INTRODUCTION

Cesarean section (CS) is very important procedure that save mother and neonate if there is contra indications for vaginal delivery. The world health organization stated that CS rate more than 10% did not contribute to the reduction of maternal mortality. Egypt demographic and health survey 2014 had reported a sharp surge in CS rate that reach 52% of births [1].Generally, spinal anesthesia is preferred than general anesthesia in case of CS. The main aim of using spinal anesthesia is to avoid complications of general anesthesia for both mother and fetus. General anesthesia is commonly used in case of emergency situation depending on the mother and fetus wellbeing. Consequently in almost all elective CS spinal anesthesia is chosen to minimize the side effects and improve post-operative recovery [2].

CS under spinal anesthesia is commonly associated with abdominal operation risks. These including wound infection, adhesions, bleeding, hernia and tubal adhesions. Other temporal discomforts including incisional pain, after pain, post spinal hypotension and Post-Dural Puncture Headache (PDPH) [3]. Post-Dural Puncture Headache (PDPH) is the most prevalent complication after lumbar puncture (LP), with reported frequency fluctuating between 6% and 36%. Historically, PDPH was firstly described by August Bier (1861-1949). He reported the recurrent incidence of this phenomenon among his patients. Surprisingly, he suffered from PDPH himself when he conducted an operation under spinal anesthesia [4].

Post-Dural Puncture Headache (PDPH) is bifrontal and occipital pain that becomes worse when moving head, upright position, noise, light and strain. Nausea, vertigo, tinnitus, diplopia and vomiting are known as warning signs that followed by PDPH. Furthermore, the soothing factors for PDPH is lying down without pillow and dark, quite environment. Time of its first occurrence ranged from several hours to days after dural puncture but mostly in 90% of cases it takes place during the first 5 days post-operative and specifically in the first three days. Usually, PDPH is self-limited at about 5-7 days among 80 to 85% of cases. It rarely lasts longer than two weeks [5].

The cause PDPH is still to be vague and unsure. The most accepted hypothesis of its occurrence is the low cerebrospinal fluid (CSF) pressure after spinal puncture. Leakage of CSF through a dural and arachnoid tear generated by the puncture may temporally exceeds its output resulting in low CSF pressure. The constant CSF leakage over days cause some strain on the central nervous system (pain-sensitive structure stretching) resulting in PDPH. Another hypothesis is that, PDPH occurs due to the cerebral vasodilation following lumber puncture resulting in cerebral hypotension [6]. Although, PDPH have unknown and vague causes but some factors are reported to be linked with its incidence and severity. These factors can be classified as modifiable and non-modifiable one. Modifiable factors include needle size and shape of its tip, number of trials, dural fiber bevel placement, lumber puncture method, type of anesthetic solution and anesthetist skills or experience. The non-modifiable factors include age, sex, PDPH history, and pregnancy [7].

In general, PDPH is more prevalent in women than men are in the same age group. According to Lybecker *et al.*, Women have double risk to suffer from PDPH than male. They reported that some physiological and psychological factors inside the female's bodies made them at higher risk. Women appear to be processing nociceptive data differently from males, demonstrating more sensitivity to painful stimuli that promotes the process of core sensitization. In addition, pain perception in females is higher than males [8].

Some studies reported that older women have more risk to develop PDPH. The condition become worse with parturient due to many factors. Those factors includes but not limited to secondary dehydration due to postpartum diuresis, blood loss, hormonal imbalance, increased serum estrogen, intra-abdominal imbalance, and peri-dural pressure. Furthermore, the elevated estrogen level results in systemic vasodilation in the blood vessels including cerebral blood vessels. Consequently parturient is the highest risk group for PDPH, with an incidence up to 38% [8, 9]. Although PDPH pathophysiology is uncertain, various treatments for this disorder are considered to be efficient. Medical treatment includes different types of analgesia including opioids and antiemetic, epidural saline, epidural dextran, blood patch and caffeine injection [9, 10].Nursing intervention for PDPH including vigorous hydration by oral and intravenous fluids, bed rest without pillow to increase blood supply to the head, and caffeine drinking [9, 10].

In 1949, caffeine was first recorded as a PDPH therapy. Caffeine is central nervous system stimulant and is believed to treat PDPH by causing cerebral vasoconstriction. Doses from 300 to 500 mg is considered safe and therapeutic. Caffeine can be administrated intravenous, intramuscular and oral. Where, oral intake of caffeine is more safe, easy and acceptable by large population. Caffeine is used for treatment of multiple headache situations and proved to be helpful. It can also be used to manage neonatal respiratory depression and in electroconvulsive therapy [11, 12] Caffeine may generate immediate adjuvant analgesic characteristics in many pain circumstances [13]. Itis known to cause cardiovascular vasoconstriction. This effect may be helpful to relieve postprandial hypotension and other hypotention conditions as PDPH [14]. Blocking of methylxanthine sensitive adenosine receptors is the mechanism of action presently adopted by caffeine. Coffee is the most popular drink of caffeine. Other sources include cola and dark chocolate. Coffee is the most popular drink used around the world. It is used to improve mood, manage fatigue, promote wakefulness, and enhance attention. Other medical benefits had been discovered for coffee as protect against Parkinson's and Alzheimer disease due to its stimulant effect [15]. In addition, coffee has cardiovascular protective effect. It decrease the risk for stroke and act as antifibrotic agent [16]. It also have the ability to improve liver functions and protect against liver diseases [17].

Any way coffee is considered to be safe and have health benefits if used in moderate quantities and not excised daily recommended dose (about 5 cups of coffee). Heavy coffee use is associated with numerous unpleasant symptoms such as restlessness, anxiety, insomnia, nervousness and elevated blood pressure. Practice guidance on secure coffee consumptionis necessary [18]. Post cesarean women has numerous complains that has been exaggerated by PDPH. It can decrease pain tolerance, increase anxiety, tension and increase the severity of postpartum blues. PDPH also can limit her ability to care for herself and her newborn. If the nurse can find natural, simple, available method to relive such PDPH, it will help to alleviate the women suffering. This study is essential to clarify the role played by nurse in post-operative care, headache prevention and therapy after dural puncture by encouraging post-operative use of coffee. Ultimately, mothers will suffer less from PDPH, resulting in early ambulation and early role accommodation and improve post-partum outcomes.

MATERIALS AND METHOD

MATERIALS

Aim: Investigate the effect of coffee consumption on the incidence and severity of post dural puncture headache among post cesarean section women.

Research Hypothesis

H1: Post Cs women who consume 300-500mg of coffee daily exhibit lower incidence and severity of PDPH and more tolerance of daily living activities than control group.

H0: Post Cs women who consume 300-500mg of coffee daily exhibit the same incidence and severity of PDPH and daily living activities tolerance as control group.

Research design: Randomized controlled clinical trial.

Setting: This study was done at postpartum department at Damanhour National Medical institute allied to ministry of health/ Elbehira governorate/ Egypt.

Sample

A purposive sample of 120 women undergoing Caesarean section were considered as potential subjects. Inclusion criteria were normal pregnancy, elective cesarean section with spinal anesthesia, aged 20-45 years, free medical history, and accepted to participate in the study. The women who had any intra or post-operative complications or who usually consume more than three cups of coffee per day were excluded from the study.

The sample size was estimated based on the Epi-Info 7 program using the following parameters: Target population 720 in the last year; Expected frequency p = 50%; Acceptable error = 10%; Confidence coefficient = 95%; Sample size = 120

Study participant were randomly assigned to either study or control group using randomization block technique. Randomization block was manually done according to the following steps:

- The researchers prepared a list contain the numbers from one to 120
- Another separate paper for each number from 1 to 120 was prepared.
- Each separate paper was rolled up until the number is unseen at that time all papers were mixed and put in a ball.
- The 120 pieces of papers were randomly and blindly divided into 6 blocks each one comprises 20 random numbers.
- From each block, 10 random numbers were picked up blindly to be assigned to the study group and the residual 10 to the control group.
- Then recordkeeping of the cases order was done on the formerly prepared list (Before each number the investigator write the word case or control) to be considered during data collection. A total of 60 women were cases and 60 were control.

Tools: Five tools were used for data collection.

Tool one: structured interview schedule:

It was developed to collect basic data. It contains three parts. *The First* contain socio-demographic data such as name, phone number, age, level of education, occupation, current residence, monthly income and marital status. *The second* contains obstetric history such as: gravidity, parity, gestational age at delivery, and number of antenatal visits. *The third part* concerned with analgesia type, dose and frequency.

Tool two: headache assessment tool.

***Part I: Visual analogue pain scale (VAS) to assess pain intensity* [19]:**

It is a 10 points numerical scale, matching to the degree of headache. Where 0 indicates no pain, 1 up to 3 indicates mild pain, 4 up to 6 indicates moderate pain, 7 up to 9 indicates severe pain. Finally 10 indicate the worst unbearable pain. The parturient was asked to select from that 10 points numerical continuum the number that corresponds to her perceived PDPH intensity. Each day in the period of data collection the women is asked to assess severity and duration of headache either continues or intermittent.

Part II: The short-form McGill Pain Questionnaire [20]:

It was settled by **Melzack**1987 [19] to evaluate both the quality and intensity of subjective pain. The scale is adopted and translated to Arabic language. The translated form contains *Pain Rating Index (PRI) (Sensory and affective descriptors).* It composed of 10 items that describe both sensory (6 items) and affective sensations (4 items) associated with headache. Each item is rated as (none =0), (mild=1), (moderate =2) and (sever =3). The total score for the 10 items ranged from 0 to 30.

Part III: assessment of PDPH aggravating and alleviating factors.

This part was developed by the researchers to assess headache aggravating factors as noise, light, speech, standing,……..etc. and alleviating factors as rest, closing eyes, eating,…etc.

Tool three Physical activities limitation Questionnaire

It was developed by the researchers to assess the limitation of physical activities due to PDPH after cesarean section. It consists of 6 items (sitting in bed, standing up, walking, performing personal hygiene, and using a toilet) which ranked as: 0= easy done, 1= done with difficulties, 2= done with help**,** and 3=cannot done**.** The total scores ranged from 0 to 18.

METHODS

1. An official permission was obtained from nursing college Damanhour University. Then it was directed to the accountable authority in Damanhour National Medical institute to obtain their permission to carry out the research after clarification of its aim and scientific background.

2. Tool one and three were developed by the researchers after reviewing the related literatures. Tool two were adopted and translated into Arabic language. All tools were revised by a board of five professors in the field of obstetrics and gynecology and one in the biostatistics to guarantee content validity. Cronbach's alpha for tool 2, and tool 3 were r = 0.73, and 0.81 respectively.

3. After the completion of the tools, a pilot study was done on 20 women who undergoing CS to ensure clarity and applicability of the tools.

4. **Ethical consideration:** Each woman in the study and control groups was interviewed alone in complete privacy in order to explain the study purpose, take her consent to participate, ensure her right to refuse participation or withdraw from the study at any time without any consequences. The woman was assigned to study or control group based on the predetermined randomization blocks.
   - The researchers interviewed each woman individually on the day before the operation for about 30 minutes; the researchers introduced themselves, and explained the study purpose, then oral consent was obtained for participation in the study. During this interview tool 1(part 1 and 2) was collected from the woman.
   - The researcher contracted the woman to participate on the study during the postpartum period.

8 Hours after the Operation

- For the study group the researchers provide each woman with a packet contain 500 mg of instant coffee. In the hospital the researcher offered the woman 200 ml cup of instant coffee 8 hours after surgery. Then she was instructed to consume three cups per day. It is preferred to be at the day in order not to interfere with sleeping time. Each 200 ml cup of instant coffee =160mg caffeine. [21] A total of 480 mg of caffeine was consumed per day. The type of coffee was fixed and no additive except sugar were allowed. The therapeutic dose from 300 up to 500 mg per day. During hospitalization, coffee consumption was ensured by the in duty nurse. The researcher used tool two and three to asses PDPH incidence and severity. Therefore, the study group received coffee with the routine hospital care. After discharge both coffee consumption follow up and headache assessment was done by the researcher using phone interview. Follow up for coffee consumption and headache assessment was done for one week post-operative
  .
- The control group received routine hospital care only. The routine hospital care include bed rest without pillow and scheduled analgesic (Morphine). The same follow up was done for control group by the researchers.
- Data was collected over a period of eight months from the beginning of January until end of August 2019.

5. After data collection was completed, it was feed to SPSS version 24 to analyze it. Data was coded and categorized, number, percentage, mean and stander deviation were used to describe the basic data. Chi-Square, Fisher Exact Test and T-test were used to test the differences between coffee and control groups.

RESULTS

Table-1: Percent distribution of the study participants according to their demographic characteristics and reason for CS

Demographic characteristics	Intervention group N= 60	%	Control group N= 60	%	Significant test	P value
Age						
≤ 20 year	13	21.7	10	16.7	X^2=0.484	P=0.487
21 - 35 year	47	78.3	50	83.3		
Mean±SD	23.65±4.149		25.08±3.997		t=0.576	P=0.566
Working status						
Employee	31	51.7	26	43.3	X^2=0.835	P=0.361
Housewife	29	48.3	34	56.7		
Education						
Illiterate/ read & write	13	21.7	10	16.7		
Primary & preparatory	22	36.7	19	31.7	FET=1.429	
Secondary	21	35.0	27	45.0		P=0.729
University/Post	4	6.7	4	6.7		
University						
Marital status						
Married	55	91.7	58	96.7		
Divorced	4	6.7	1	1.7	FET=1.972	P=0.521
Widow	1	1.7	1	1.7		
Residence						
Rural	33	55.0	40	66.7	X^2=1.71	P=0.262
Urban	27	45.0	20	33.3		
Monthly income						
Enough and save	4	6.7	3	5.0		P=0.521
Enough	15	25.0	19	31.7	FET=1.972	
Not enough	41	68.3	38	63.3		
Reason for CS						
Pregnancy complications	15	25.0	9	15.0		P=0.332
Previous CS	33	55.0	40	66.7	X^2=2.215	
Woman choice	12	20.0	11	18.3		

X^2: Chi-square test; FET: Fisher exact test; t: independent sample t test; *significant at 0.05

According to Table-1, no statistically significant differences are found between the two groups' socio-demographic characteristics. Furthermore, more than three-quarters (78.3&83.3%) of intervention and control groups respectively were 21-35 years old**.** In addition, 36.7%&35% of the intervention group are primary &preparatory and secondary education, respectively, compared to 31.7%&45% of the control group. Approximately one- half of the intervention (55%) and control (66.6%) groups are rural area residents.It is found that 68.3% of the intervention and 63.3% control groups monthly income is not enough. Finally 55% of intervention group have previous Cs compared to 66.7% of the control group,

Table-2: Mean and stander division of the study participants according to their obstetrical history and post-operative vital signs

Obstetrical history and post-operative vital signs	Intervention group (N=60) Mean ± SD	Control group (N=60) Mean ± SD	t test	P value
Gravidity:	1.83±0.717	2.02±0.692	-1.329	0.186
Parity	1.72±0.739	1.90±858	-1.255	0.212
Gestational age	38.00±0.823	37.88±0.804	0.785	0.434
Numbers of previous CS	1.32±1.112	1.60±1.224	-1.327	0.187
Number of antenatal visits during current pregnancy	13.12±1.367	12.34±1.652	0.066	0.947
Systolic BP 6h post CS	116.42±7.853	120±5.223	-0.569	0.170
Diastolic BP 6h post CS	76.25±5.721	77.08±7.082	-0.810	0.420
Pulse 6h post CS	71.25±5.561	73.42± 6.939	-2.063	0.041*
Respiration 6h post CS	17.50±1.127	18.23± .948	-0.175	0.861
Cumulative dose of analgesia (morphine) use during the first 48h in mg	1500.235±19.993	2500.67±20.773	2.224	0.032*

t: independent sample t test; * significant at 0.05

Table-2 elucidated that there is no statistically significant differences between intervention and control group in relation to their obstetrical history and post-operative vital signs except for pulse. The mean was 71.25±5.561 and 73.42± 6.939 among intervention and control groups respectively for Pulse 6h post CS. For cumulative morphine, use during the first 48 h the mean is 1500.235±19.993&2500.67±20 mg for intervention and control group, respectively. Morphine use is statistically higher among control group than intervention.

Table-3: Percent distribution of the study participants according to incidence and duration of PDPH

incidence and duration of PDPH		Intervention		Control		Significant test	P value
		N	%	N	%		
Operation day	No headache	60	100.0	59	98.3		
	Intermittent headache	0	0.0	1	1.7	FET=1.359	0.315
	Continuous headache	0	0.0	0	0.0		
1st post-operative day	No headache	49	81.7	38	63.3		
	Intermittent headache	8	13.3	12	20.0	FET=5.965	0.05*
	Continuous headache	3	5.0	10	16.7		
2nd post-operative day	No headache	31	51.7	25	41.7		
	Intermittent headache	21	35.0	13	21.7	FET=9.049	0.010*
	Continuous headache	8	13.3	22	36.7		
3rd postoperative day	No headache	31	51.7	19	31.7		
	Intermittent headache	21	35.0	17	28.3	FET=11.301	0.004*
	Continuous headache	8	13.3	24	40.0		
4th postoperative day	No headache	35	58.3	17	28.3		
	Intermittent headache	19	31.7	23	38.3	FET=14.150	0.001*
	Continuous headache	6	10.0	20	33.3		
5th postoperative day	No headache	39	65.0	26	43.3		
	Intermittent headache	17	28.3	19	31.7	FET=14.150	0.001*
	Continuous headache	4	6.7	15	25.0		
6th postoperative day	No headache	46	76.7	32	53.3		
	Intermittent headache	12	20.0	21	35.0	FET=7.745	0.021*
	Continuous headache	2	3.3	7	11.7		
7th postoperative day	No headache	53	88.3	49	81.7		
	Intermittent headache	6	10.0	9	15.0	FET=2.697	0.260*
	Continuous headache	1	1.7	2	3.3		

FET: Fisher exact test; t: independent sample t test; * significant at 0.05

Table-3 shows that almost all (100% and 98.3%) of intervention and control group, respectively, had no PDPH at operation day without statistically significant differences between the two groups. At the first post-operative day, 81.7% of the intervention group had no headache compared to 63.6% of the control group with statistically significant difference between the two groups. Continuous PDPH is present among 13.3% of the intervention group compared to 36.7% of the control group during the 2nd post-operative day. Meanwhile, in the 3rd day the percentage of continues PDPH was the same (13.3%) in the intervention group but it raised to 40% of the control group. In the 4th day continues PDPH substantially decreased among intervention group to only 10% compared to 33.3% of the control. Later on, during the 4th day, continuous PDPH is decreased between both groups but it is still higher in the control

group (25%) compared to intervention (6.7%). In the 6th day 76.7% of the intervention group have, no PDPH compared to 53.3% of the control. Finally, in the 7th post day 10 % of the intervention group compared to 15% of the intervention group have intermittent headache. The differences between the two groups is statistically significant.

Table-4: Mean differences between intervention and control group in relation to their VAS, McGill Pain score and physical activity limitation due to PDPH

Group	Operation day (*Mean±SD*)	1st day post CS (*Mean±SD*)	2nd day post CS (*Mean±SD*)	3rd day post CS (*Mean±SD*)	4th day post CS (*Mean±SD*)	5th day post CS (*Mean±SD*)	6th day post CS (*Mean±SD*)	7th day post CS (*Mean±SD*)	*F* for time	*F* for group	*F for* time x group interaction
VAS											
Intervention (n=60)	7.27±3.262	6.20±2.950	5.18±2.678	4.17±2.464	3.12±2.309	2.43±2.028	1.70±1.566	0.75±1.230	F= 506.556	F=14.536	F=692.059
Control (n=60)	6.57±2.658	6.43±2.270	5.47±2.127	4.70±2.157	4.05±1.836	3.42±1.700	2.50±1.524	1.28±1.530	P=0.001*	P=0.001*	P=0.000*
P-value	0.200	0.678	0.522	0.210	0.05*	0.05*	0.05*	0.37*			
Total McGill Pain score											
Intervention (n=60)	23.80±5.719	20.88±5.073	18.03±4.878	15.70±4.515	13.17±4.203	10.72±3.983	8.20±3.555	5.20±2.736	F=412.739	F=14.918	F=631.633
Control (n=60)	23.17±6.068	21.98±5.426	20.53±5.274	18.78±4.941	16.90±4.729	14.58±4.637	12.35±4.776	9.40±5.143	P=0.000*	P=0.000*	P=0.000*
P-value (t test)	0.557	0.254	0.008*	0.001*	0.000*	0.000*	0.000*	0.000*			
Sensory descriptors											
Intervention (n=60)	16.6333±3.92716	14.9167±3.75654	13.3833±3.52757	12.1167±3.32475	10.5833±3.35115	8.8167±3.31147	6.8500±3.10726	4.5833±2.50621	F=19.02	F=408.393	F=1612.549
Control(n=60)	15.4667±4.29216	14.8667±4.00198	14.0333±3.95297	13.1833±3.65222	12.2000±3.53577	10.9500±3.46618	9.6000±3.61353	7.7833±3.95779	P=0.001*	P=0.000*	P=0.000*
P-value	0.123	0.944	0.344	0.097*	0.011*	0.001*	0.000*	0.000*			
***Affective* descriptors**											
Intervention (n=60)	7.1667±2.01828	5.9000±1.46946	4.6500±1.63464	3.5833±1.51032	2.5833±1.16868	1.9000±1.00338	1.3500±.79883	.6167±.61318	F=21.224	F=722.462	F=0.951
Control(n=60)	7.1333±2.12704	6.7167±1.96660	6.1500±1.99002	5.4500±1.96085	4.6167±1.94929	3.8000±1.82078	3.0667±1.83992	2.1333±1.87279	P=0.000*	P=0.001*	P=0.000*
P-value	0.930	0.011*	0.002*	0.000*	0.000*	0.001*	0.003*	0.000*			
Physical activity limitation due to PDPH											
Intervention (n=60)	18.00±4.190	15.10±3.423	12.72±3.289	10.42±3.004	7.95±2.547	5.90±2.454	3.85±2.476	1.62±2.026	F=1304.670	F=4.326	F=1625.095
Control(n=60)	17.35±3.839	14.97±3.360	13.03±2.893	11.02±2.771	8.70±3.005	7.02±2.777	5.02±2.914	1.70±3.005	P=0.000*	P=0.014*	P=0.000*
P-value	0.377	0.830	0.577	0.258	0..143	0.021*	0.020*	0.859			

F: Repeated Anova measure t: independent sample t test *significant at 0.05

Table-4 shows that VAS is statistically higher among control compared to intervention group over four time points starting from the 4th to 7th post-operative days. In addition, Total McGill Pain score is significantly lower among intervention than control group over sixth times points starting from the 2nd to 7th post-operative days. Sensory descriptors of McGill Pain scale is higher among control group compared to intervention group over 5 points of times starting from the 3rd to 7th day. Meanwhile, the affective descriptors of McGill Pain scale is higher among control than intervention group over 7 points of times starting from the 1st to 7th post-operative days. Physical activities limitations due to PDPH is lower in the intervention compared to control groups over two points of times beginning from 5th to 6th post-operative days. The differences between the two groups in VAS, McGill Pain score and physical activities limitations due to PDPH are statistically significant intergroup, intragroup and for group time interactions.

Table-5: Percent distribution of the study participants according to their PDPH aggravating and reliving factors

PDPH aggravating and reliving factors	Intervention				Control				Significance Test	P
	Yes		No		Yes		No			
	N	%	N	%	N	%	N	%		
Aggravating factors										
– Light	35	58.3	25	41.7	51	85.0	9	15.0	X^2=10.506	0.001*
– Noise	32	53.3	28	46.7	43	71.7	17	28.3	X^2=4.302	.038*
– Standing	47	78.3	13	21.7	57	95.0	3	5.0	FET=7.212	0.007*
– Moving	49	81.7	11	18.3	56	93.3	4	6.7	FET=2.911	0.049*
– Siting	31	51.7	29	48.3	42	70.0	18	30.0	X^2=4.23	0.040*
– Hunger	9	15.0	51	85.0	11	18.3	49	81.7	X^2=0.240	0.628

– Thirsty	15	25.0	45	75.0	10	16.7	50	83.3	X^2= 0.768	0.375
– Speaking	19	31.7	41	68.3	15	25.0	45	75.0	X^2= 0.657	0.418
Reliving factors										
– Lying down	58	96.7	2	3.3	57	95.0	3	5.0	FET=0.210	0.648
– Closing eyes	47	78.3	13	21.7	45	75.0	15	25.0	X^2= 0.186	0.666
– Diverting attention	14	23.3	46	76.7	9	15.0	51	85.0	X^2=1.875	0.171
– Drinking fluids	50	83.3	10	16.7	48	80.0	12	20.0	X^2=0.223	0.637
– Eating	35	58.3	25	41.7	32	53.3	28	46.7	X^2=0.304	0.581

X^2: Chi-square test; FET: Fisher exact test; t: independent sample t test; *significant at 0.05

Table-5 showed that PDPH is more aggravated by light, noise, standing, moving and siting in control groups than intervention groups with statistically significant differences between them. Furthermore, laying down, closing eyes, drinking fluids are major soothing factors for PDPH in both groups without statistically significant differences between them.

DISCUSSION

Generally, PDPH is a serious complication that commonly occurs after spinal anesthesia. Conservative management of PDPH involves extensive hydration, bed rest without pillow, psychological assurance and vasoconstrictors such as caffeine. Coffee is the most popular source of oral caffeine [22]. Drinking coffee to manage PDPH is acceptable nursing intervention that have no side effect. If it is proved to be effective, it will provide safe, effective, easy, cheap and acceptable PDPH treatment option. Therefore, this study aims to investigate the effect of coffee consumption on the incidence and severity of PDPH among post cesarean section women.

The current study results shows that the incidence and severity of PDPH is higher among control than intervention group. While, the maximum incidence of continuous PDPH occurs in the third post-operative day among control group (40%) compared to only 13.3% among intervention. In addition, both continuous and intermittent PDPH recovered faster in the coffee compared to control group. Finally, in the 7th post day only 10 % of the intervention group compared to 15% of the intervention group have intermittent headache. Both VASand McGill Pain score is statistically higher among control compared to intervention group over several time points. The differences between the two groups in VAS and McGill Pain score are statistically significant intergroup, intragroup and for group time interactions.

The result of the current study is consistent with at least six other studies. *First*, Ali [23] who studied effect of nursing intervention tension headache incidence among surgical patients undergoing spinal anesthesia in Egypt. They confirmed that there was a true reduction in the duration of tension headache in the intervention group compared to control. In addition, PDPH intensity is significantly lower among intervention group compared to control group. *Second,* Masoudifar *et al*., [24] who conducted a research to combined caffeine with acetaminophen and dexamethasone medication in the treatment of PDPH. They reported that 53.3% of their study group reported the incidence of PDPH compared to only 37.7% of the control group. The differences between the two groups was not statistically significant. They further added that headache frequency was registered 35 times in the control group compared to 27 among intervention group. They concluded that their intervention decreased both incidence and duration of PDPH without statistical significant difference between the two groups. Third, Babatunde O, & Adebola G [25] who conducted evidence based review of primary health care practices in the management of PDPH. They elaborated that caffeine gives temporally non-sustainable relive from PDPH, therefore, repeated dose over the day is urgent. Fourth, Ragab and Facharzt [26] who investigated the effect of 500 mg IV caffeine injection of the incidence and severity of PDPH among patient undergoing elective knee surgery. They reported lower incidence and severity of PDPH among caffeine injection group compared to control. They concluded that caffeine might be recommended therapy for PDPH. Fifth, Eshghizadeh *et al*., [27]. They performed randomized controlled clinical trial on 140 women undergoing caesarian section in Razi hospital at Torbat Heidarieh. Their study group consumed four cups of instant coffee divided on two dose daily. Each time the woman take two cups with an hour space. They reported that PDPH occurred among only 15.7% of the coffee group compared to only 37.1 of the control. Furthermore, the intensity of headache was more sever in the control compared to coffee group. The differences in PDPH incidence and severity were statistically significant between coffee and control group. Sixth, Zeger *et al*., [28] who compared the effect of caffeine injection tocosyntropin in management of PDPH among adult patents who came to emergency department. They found that caffeine was effective as cosyntropin in PDPH management.

The present study results is also in line with current literatures. Turnbull *et al.*, [29] reported in his review that caffeine have cerebral vasoconstrictive effect that can help in reducing PDPH. They further added that caffeine is proved to be effect in both IV and oral form. Although, oral caffeine is absorbed and produce its peak effect after only 30 min and its half-life is around 3±7.5 hours. They further recommended that PDPH can be managed by 2-3 cups of coffee daily.in addition, Shibli K *et al*., [30] had reported the same beneficial effect of caffeine for PDPH management. However, they raised the dose required to reach 500 mg/8 hours (1500 mg/24). This may raise safety concern because high dose of caffeine is associated with serious side effect. It is proved that 500mg/day is safe and effective dose for PDPH.

The present study results are incongruent with Lin *et al*., [31] who wrote an article about the myths of using caffeine, bed rest and intravenous fluids for the treatment of PDPH. They did not perform a study to investigate the effect of caffeine on PDPH but they criticize some old studies. Furthermore, they did not did not elaborate the physiological base of their critique. Furthermore, Esmaoghla *et al*., [32] who compared two doses of caffeine combined with paracetamol for the management of PDPH among patients undergoing lower extremities surgery. They concluded that there is no statistically significant differences between the two groups and control in term of PDPH incidence and severity. In addition, no signs of caffeine excess appeared among their participants. The differences between the current study results and that of Esmaoghla *et al*., [32] might be due to the difference in intervention. Where, they combined paracetamol with different doses of caffeine while the present study used caffeine only. Furthermore, their participants conducted lower extremities surgery where, the present study conducted on post CS woman.

The study findings revealed that PDPH is more aggravated by light, noise, standing, moving and siting in control than intervention groups with statistically significant differences between them. Furthermore, laying down, closing eyes, drinking fluids are major soothing factors for PDPH in both groups without statistically significant differences between them.

These findings are consistent with Turnbull *et al*., [29] & Bezov *et al*., [33] The former discussed the pathogenesis and aggravating factors associated with PDPH. They reported that PDPH is aggravated by standing, siting in upright position and head movement. They further added that laying down decreased the severity of PDPH. They further added that PDPH is decreased with supine position, increasing fluid intake and complete bed rest. This finding is confirmed by physiological decrease in cerebral pressures that occurs in upright position. *The latter,* Bezov *et al.,* [33] reported that patients complains of severe headache, characteristically located in the frontal and or the occipital region. The pain is worsened with the upright position and improves with lying down.They further added that PDPH is aggravated with any increase in intracranial pressure associated with coughing, peering down or sneezing. Other studies reported the same results [34, 35].

The highest percentages of patients in study (Coffee) group had no effect on activity of daily living compared to patients in control group. This result may be due to the fact that coffee increases energy, alertness, ability to concentrate, decreases fatigue and pain. Awareness of caffeine properties that enhance alertness, energy may encourage its use in the management of PDPH. In line with the current study is that of Karen *et al*., [36] who studied the effect of caffeine on activity of sedentary women. They reported that caffeine use significantly enhanced energy expenditure and average power. They further added that caffeine significantly decreased perceived exertion rate among their participates at time of maximum activity. This effect occurred after ingestion of 6mg of caffeine for each kg of body weight. The result of the current study seems to be logic. As, if the severity and frequency of PDPH is decreased, the woman physical activities will be improved. Therefore, if coffee significantly decreased PDPH incidence and severity physical activities will be improved. Coffee increases energy, alertness, ability to concentrate and decreases fatigue. Awareness of caffeine properties that enhance alertness, energy may encourage its use in the management of PDPH after Cs.

CONCLUSION

Based on the current study results H1 is accepted. The incidence and severity of PDPH is higher among control than coffee group. While, the maximum incidence of continuous PDPH occurs in the third post-operative day among control group (40%) compared to only 13.3% among intervention. Both VAS and McGill Pain score are statistically higher among control compared to intervention group over several time points. PDPH is aggravated by light, noise, standing, moving and siting in control groups than intervention groups. Laying down, closing eyes, drinking fluids are major soothing factors.The highest percentages of coffee group had no effect on activity of daily living compared to control group.The differences between the two groups are statistically significant intergroup, intragroup and for group time interactions.

RECOMMENDATIONS

Oral coffee may be added to post Cs nursing care protocols to decrease PDPH incidence, severity and enhancing early physical activities.

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