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TITLE: Incidence and severity of intraoperative, postoperative shoulder tip pain and associated factors in mothers who undergo cesarean section under spinal anesthesia in Tikur anbesa specialized hospital in year 2023-2024 GC.

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A research thesis paper submitted to the department of anesthesiology, critical care and pain medicine, school of medicine in partial fulfilment of the requirements for the award of a specialty certificate in anesthesiology, critical care and pain medicine in Addis Ababa university, college of health science.

TITLE

Incidence and severity of intraoperative, postoperative shoulder tip pain and associated factors in mothers who undergo cesarean section under spinal anesthesia in Tikur anbesa specialized hospital in year 2023 – 2024GC.

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May 2024 GC

DECLARATION OF THE PRINCIPAL INVESTIGATOR

I, Dr. Fitsum Tamene declare that this research is my original paperwork in Incidence and severity of intraoperative, postoperative shoulder tip pain and associated factors in mothers who undergo cesarean section under spinal anesthesia in Tikur anbesa specialized hospital in year 2023 – 2024GC. as partial fulfillment required for specialty certificate in anesthesiology, critical care and pain medicine.

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Finally, I would like to thank my fellow friends for many helpful discussions, and good idea along the way.

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LIST OF ABBREVIATION

AAU…… Addis Ababa university
AOR……. Adjusted odds ratio
ACCPM…… Anesthesiology, critical care and pain medicine
ASA…… American Society of Anesthesiology
BMI……. Body mass index
C/S……. Caesarean section
CSE…….. Combined spinal epidural
COR……. Crudes odd ratio
GA…… General anesthesia
ISP…… Intraoperative shoulder pain
LUTS…… Lower uterine transverse section
NRT…….. Numerical rating scale
OBGYN…….. Obstetrics and gynecology
OR…… Odds ratio
RCT……. Randomized control trial
SA……. Spinal anesthesia
SPSS…….....Statistical package for the social science
STP……... Shoulder Tip Pain
TASH……... Tikur Anbessa specialized hospital
VAS…….. Visual analogue score

ABSTRACT

Background: Shoulder tip pain is a common complaint among women during and after cesarean section delivery. In certain cases, it can be severe, debilitating and lasts for several days. It can cause severe movement restrictions in the upper limb region. STP also seems to be associated with increased hospitalization time and costs; it negatively affects the patient's physical and mental health. Pain makes breastfeeding and caring for newborns even more difficult. There is nothing studied about STP incidence, severity and associated factors in Africa and Ethiopia found published or documented, the aim of this study is to generate data, to create awareness to address adequate pain management and to wipe the way for further studies.

Objectives: To determine the incidence and severity of intraoperative, postoperative shoulder tip pain and associated factors during and after cesarean delivery.

Method and materials: institutional based, Prospective, Cross-sectional study was conducted. The single population proportion formula was used to calculate the sample size. A total of 165 study participants were involved. Sequential non-random sampling was used to select study participants. The data was collected by the standard questioner during the intra op period and within 24hr post op period. The collected data were entered, cleaned, and analyzed by SPSS version 27.0 statistical software. Descriptive results were presented by tables and figures. Bi-variate analysis was employed to select independent variables and multivariate regression used to measure the association between independent and dependent variate. On bi-variate analysis, those variables with a value less than 0.25 were entered on multi-variate analysis. Finally, variables with a p-value < 0.05 were declared as independent predictor of the outcome variables. The model fitness test was checked by Hosmer and Lemeshow's goodness-of-fit test.

Result: Out 165 participants 44.2% experienced shoulder Tip pain either intraoperative or post operative, 14.5% experienced intraoperative and 38.8% experienced post operative Shoulder tip pain. Right side STP found dominant and moderate to sever type of pain scale found. Bleeding is found to be as sole associated factor with a p value of < 0.01 with adjusted odd ratio and 95%CI of 4.427(2.162-9.064).

Conclusion: STP is a less noticed and understood problem with high incidence rate, requires attention and interventions. Further RCT and Multidisciplinary studies recommended.

CHAPTER ONE
INTRODUCTION

Backgrounds

Cesarean section is the most common type of surgical interventions done among women all over the world (1). As it is an invasive procedure, it requires major anesthesia modality to proceed the surgery. Mode of anesthesia for the operation of cesarean section depends on many factors such as surgical indications, urgency of the surgical intervention and the patient's underlying condition and will. The procedure can be done either by general anesthesia or regional anesthesia techniques, regional anesthesia is most commonly preferred one, specifically Spinal anesthesia has recently become the preferred anesthesia for cesarean section (2), due to the advantages of regional anesthesia include an awake mother at delivery, minimal side effect of the newborn and minimize or avoidance of the risks (aspiration, difficult intubation etc...) of general anesthesia(3).

C\S can result in a number of complications such as hemorrhage, postoperative pain, atelectasis, nausea, vomiting, and wound infection.(1,2). Even though it is common in laparoscopic surgeries, Shoulder tip pain (STP) is also a common complication that occurs after C\S, but is often overlooked and not properly treated.(4)

STP is a sharp type of pain noticed intraoperatively during C\S is usually experienced in the shoulder area, was described by the patients to originate from deep inside the shoulder. They also at times complain to originate this from the right side of chest. The pain is found to go down to the upper arm and in the neck on right side sometimes. The pain at times leads muscle spasm. disappears within 2-3 days after the operation.(5)

The mechanism behind this pain has been proposed to be a referred pain caused by the phrenic nerve. Arising from C3-C5 nerve roots, the phrenic nerve innervates both iliopsoas and diaphragm muscles. It also carries sensory fibers from parietal peritoneum layers located on the inferior surface. Hence, the phrenic nerve can be stimulated by any tension on the diaphragm or

parietal peritoneum. This leads to the stimulation of the C5 nerve, referring pain signals in the musculocutaneous, radial, median, and axillary nerve dermatomes.(6)

The reason for this pain is postulated to be sub diaphragmatic clot, sub diaphragmatic air trapping or because of peritoneal irritation resulting from them, STP following laparoscopic surgery have been incriminated to the effect of CO2 pneumoperitoneum, peritoneal stretching and diaphragmatic irritation. but still the precise mechanism of STP remains unclear.(4)

Postpartum period is a period when the mother feels most sensitive emotionally, psychologically and physically. This pain experienced by the woman in the postpartum period can negatively affect both her own care and her baby's care.(7,8)

There are few studies investigated this problem in patients undergoing cesarean delivery. in one study it was reported that the incidence of STP after cesarean section is significant.(4), no research done in African and Ethiopia about it at all.

Statement of the problem

One of the most common surgical procedures for women is cesarean section. According to World Health Organization, C\S use continues to rise globally, now accounting for more than 1 in 5 (21%) of all childbirths., rate found in Africa (7.3 %). In Ethiopia, the small size studies indicate there was also arise in performing C\S in the country(9,10)

Shoulder tip pain is a common complaint among women after cesarean section. In certain cases, it can be severe and debilitating and last for several days. It can cause severe movement restrictions in the upper limb region. STP also seems to be associated with increased hospitalization time and costs; it negatively affects the patient's physical and mental health (5). Pain makes breastfeeding and caring for newborns even more difficult. Due to the distress faced

by mothers, many mothers seek help from orthopedic services aiming to alleviate the pain.(11,12)

Even though there is nothing studied about STP incidence, severity and associated factors in Africa and Ethiopia found published or documented, it is a common scenario to see patients complaining this shoulder tip pain following cesarian delivery, intraoperatively and postoperatively affecting patients' life quality.

This research aims to study the incidence, severity and associated factors of this shoulder tip pain following cesarean section in mothers, who undergo the surgery under spinal anesthesia in TASH, Addis Ababa, Ethiopia.

Significance of the Study

In Tikur anbesa specialized hospital the number of mothers who get birth through cesarian section is around 300 annually, most of the patients undergo the surgery through spinal anesthesia, patients will experience shoulder pain intraoperatively after baby delivery and require some form of IV analgesics and the pain persists post operatively.

The incidence of this pain, its severity and the associated factors are not studied in scientifically sound way in TASH hospital, even in our country. So, the result of this study will wipe the way:

1, To create awareness about the problem among physicians, nurses and anesthesia providers.

2, To treat those mothers appropriately and improve their quality of life.

3, For further study on the ways to prevent or reduce its incidence and severity.

4, For further studies to compare effectiveness of drugs on pain management.

CHAPTER TWO
LITRATURE REVIEW

STP is a sharp type of pain noticed intraoperatively during C\S is usually experienced in the shoulder area, was described by the patients to originate from deep inside the shoulder. They also at times complain to originate this from the right side of chest. The pain is found to go down to the upper arm and in the neck on right side sometimes. The pain at times leads muscle spasm. disappears within 2-3 days after the operation.(5)

Shoulder tip pain is a common complaint among women after cesarean section. In certain cases, it can be severe and debilitating and last for several days. It can cause severe movement restrictions in the upper limb region. STP also seems to be associated with increased hospitalization time and costs; it negatively affects the patient's physical and mental health(5). Pain makes breastfeeding and caring for newborns even more difficult. Due to the distress faced by mothers, many mothers seek help from orthopedic services aiming to alleviate the pain.(11,12)

2.1 Incidence

Shoulder tip pain (STP) usually seen after laparoscopic surgery and has been reported in more than 60% cases(13,14). However, recent studies suggest that this type of pain is also seen after cesarean section.(4,12)

Study which is a prospective randomized double-blind clinical trial study was conducted in the evket Yılmaz Training and Research Hospital, Bursa, Turkey showed an overall incidence of STP in study population was 35.7%,(15). In another study carried out in 2010 in Mashhad, 131 (39.45%) of 332 women who had undergone C-section complained of STP,(4). also, study done in Gulhane Training and Research Hospital, Ankara, Turkey showed significant incidence of STP which was was 49.5% in the study population.(16). Those studies show the high incidence of the problem which means it is a common but neglected consequence after CS. No study found at the level of nation and continental wide.

2.2 Severity

In same studies measured the severity of the pain based on the VAS score the study at Yılmaz Training and Research Hospital, Bursa, Turkey showed a score of mild pain in a round 48% (50/107), moderate pain 46% (48/107) and sever pain around 8% (9/107), among 107

patients who developed Shoulder tip pain after cesarean section(15). Also, the study at Mashhad university iran, showed most of patients had moderate pain (*p*0.001)(4). The research at Gulhane Training and Research Hospital, Ankara, Turkey showed high incidence of severe pain about 36 to 42 % and moderate pain 44 to 50% among patients who developed STP post cesarean.(16) According to those studies STP results in moderate to severe pain.

2.3 Location

Location of the pain and its dominant side of the shoulder were studied in the same researches showing right side dominance of the pain in about 66% among the one who developed STP in the study at Yılmaz Training and Research Hospital, Bursa, Turkey.(15)about 62% (37/59) of mothers experienced on the right side in the study at Mashhad university, Iran(4). The research at Gulhane Training and Research Hospital, Ankara, Turkey showed 77% to 89% of right-side dominant Shoulder tip pain, then followed by bilateral then left side.(16)

2.4 Associated factors

Even though risk factors not well studied, there are some studied factors like mode of anesthesia, position, amount of bleeding, presence of previous surgeries(adhesions)

2.4.1 mode of Anesthesia

There is no agreed correlation between anesthetic techniques and the incidence of shoulder pain in the literature. But study done by zirak at Mashhad University, iran suggested for the first time that the anesthesia method might have an effect on the occurrence of STP, and in this study, the incidence of STP was found to be higher in patients with general anesthesia compared to the spinal anesthesia group (40% and 19%, respectively) [4]. Similarly, the study at Yılmaz Training and Research Hospital, Bursa, Turkey reported that STP after a C/S was more common in the general anesthesia group than in the spinal anesthesia group (43.9% and 26.6%, respectively).(15) But a study at Gulhane Training and Research Hospital, Ankara, Turkey found that STP after spinal anesthesia was more common than after general anesthesia. (16)

2.4.2 position

Study done by Kikuchi at Japan Demonstrated that 2–5 degrees of head-up position during and after a CS reduces the incidence of shoulder Tip pain in patients who underwent combined spinal and epidural anesthesia, (50/126 vs 62/164, $P < 0.05$).(17) but study by carried out by

Lahijani at iran, it was indicated that reverse Trendelenburg position played no role in reducing STP after C-section.(18)

2.4.3 Bleeding, Adhesions and obesity

Study done by Kikuchi at Japan suggested that the presence of subdiaphragmatic blood and/or amniotic fluid could be a plausible cause of STP after C-section(17), However, in study by zirak at iran, they were unable to obtain any clear correlation between these but found cauterization, along with other factors such as high BMI, may lead to an increased risk of STP after C-section.(19),

CHAPTER THREE
OBJECTIVES

General Objective

: To determine the incidence and severity of intraoperative, postoperative shoulder tip pain and associated factors after cesarean delivery.

Specific objectives

: To determine the intraoperative incidence of STP during cesarean delivery.

: To determine postoperative incidence of STP after cesarean delivery.

: To measures the severity of STP during and after cesarean delivery.

: To Identify factors affecting the incidence and severity of STP in those mothers.

CHAPTER FOUR
METHODOLOGY AND DESIGN

4.1 Study Design

- institutional based, Prospective, Cross-sectional study.

4.2. Study Area

- Study was conducted in one of the largest territory referral hospitals in Addis Ababa, Ethiopia, called Tikur Anbesa Specialized Hospital, which is owned by Addis Ababa university.

4.3. Population

4.3.1. Source population

- All parturient who have undergone elective cesarean section

4.4.2. Study Population

- All selected parturient who underwent elective C\S under spinal anesthesia.

4.4. Study period

- From August 1 2023 to March 30, 2024, GC.

4.5. Inclusion and Exclusion Criteria

4.5.1 Inclusion criteria

- Inclusion criteria were parturient >18 years old and with an indication for elective C-section under Spinal anesthesia.

4.5.2 Exclusion criteria

- A history of any shoulder problems, shoulder trauma, fracture and dislocation.

- Chronic shoulder and neck pain.

- Intraoperative surgical complications including possible hysterectomy, and rupture of the bladder, abdominal, and pelvic organs.

- Patients who had a severe systemic or chronic disease, under opioid treatment.

- Emergency cases

- Having any problems preventing communication, including psychiatric illness.

- Failed SA and patchy or incomplete block, necessitating more analgesia \ sedation.

- A history of major abdominal surgery other than C\S.

- Those who did not consent to participate.

4.6. Sample size determination

The Sample size is calculated by using single population proportion formula:

$$n = \frac{(z_{\alpha/2})^2 \cdot pq}{d^2}$$

n = Sample size

P = Incidence rate, from a previous study done atevket Yılmaz Training and Research Hospital, Bursa, Turkey, showed 26.6% incidence of shoulder tip pain among parturient who received spinal anesthesia for caesarean section, during the period of September 2013 to December 2013.

Z = Corresponding to a 95% level of significance = 1.96

d = Margin of error = 5% (0.05)

n = ((1.96)2 x 0.26 (1- 0.26))/ (0.05)2= 295

- The population to be studied in a year is less than 10,000 so the next formula, which uses the required sample size obtained from the above formula, was applied.

- In TASH there were 374 obstetric elective cases in the calendar year of 2022.

$$n_f = \frac{n_0}{1 + \frac{n_0}{N}}$$

Where n_f=final sample size, n_0=sample size from the above formula and N=total population.

= Final sample size = 295 / (1+295/374) = 165

4.7. Sampling Procedure

- Sequential non-random sampling of women undergoing elective caesarean section under spinal anesthesia who full fill the inclusion criteria.

4.8. Data collection procedure

- The data was collected by the lead researcher and ACCPM residents assigned in the obstetric elective operation theatre through a structured questionnaire, during intra op and post op with in 24hrs.

- The data was checked for completeness every day after collecting questionnaire papers.

- **The structured questionnaire** includes:

1, Socio-demographic variables.

2, (using numeric scale) rated from 0 to 10, postoperative STP was subjectively measured. This tool is widely used and its validity and reliably is approved.

- Pain score was assessed intraoperatively and within 24 hrs post operatively.

4.9. Data Analysis Procedure

- After the data collected and completeness were confirmed, it was entered into the SPSS version 27.

- Data cleaning was performed to check for outliers, missed values and any inconsistencies before the data are analyzed using the software.

4.10. Data quality assurance

A pilot survey (pre-test on 5% of individuals before the actual data collection time) was carried out before the formal use of the questionnaire to ensure that the statement of each question is clear and understandable, data were cleaned on daily basis. The questionnaires were checked for its completeness to assure the quality of data.

4.11. Study variables

4.11.1. Dependent variables

= Shoulder tip pain

4.11.2. Independent variables

= Maternal age (years)

= Maternal height (cm)

= Maternal weight (kg)

= Body mass index (BMI=kg/m2)

= Gravidity

= Gestational age

= Infant weight (grams)

= intra op position

= Amount of bleeding

4.12. Operational definition

- Shoulder tip pain: is a sharp type of pain noticed intraoperatively during C\S is usually experienced in the shoulder area, described to originate from deep inside the shoulder or sometimes either side of the chest. Which radiates to the upper arm and in the neck sometimes.

- Pain score: STP was assessed with Numeric score out of 10. 0-no pain to 10-most severe pain). Mild pain was defined as score <4, moderate pain as score 4-6, and severe pain as score >7, The patient was considered to have STP if the numeric score for STP >0.

4.13. Ethical issue

- In the first instance**,** all participants were treated with respect and courtesy, a strategy of informed consent was adopted, with the aim and methods of the research being made clear to all participants. confidentiality and anonymity of the individual respondent were assured, . and the right to withdraw from the study at any time throughout their interview.

- Ethical clearance and support letter was obtained from AAU college of health science, school of medicine, Anesthesiology, critical care and pain medicine department, and Chief Clinical and Academic Director Offices.

4.14. Result dissemination plan

- The study results were presented to the Department of Anesthesiology, Critical Care and Pain Medicine, School of Medicine and College of Health Sciences at Addis Ababa University.

- Extreme efforts will be a taken to publish this paper.

CHAPTER FIVE
RESULTS

A total of 165 adult pregnant women scheduled for elective cesarean section under spinal anesthesia took participation in the study with 100% response rate, non-randomized sequential type of sampling used. Those with exclusion criteria and unwilling mothers excluded from the beginning. on this study incidence of both intraoperative and post operative shoulder tip pain assessed, associated risk factor studied.

5.1 Socio-demographic characteristic

Age descriptive statistics majority 95(57.6%) of the participants fell under the age group of 21-30 years, BMI majority of the participants 90(54.5%) fell in the category of 18.5-24.9kg/m2.

Table 4 socio demographic characteristics of participants

Variables	Categories	Frequencies	Percentage %
Age	18-20 years	6	3.6
	21-30 years	95	57.6
	31-40 years	63	38.2
	>40 years	1	0.6
BMI	18.5-24.9kg/m2	90	54.5
	25-29.9kg/m2	59	35.8
	30-34.9kg/m2	16	9.7
	>35kg/m2	0	0

5.2, Preoperative characteristic

Gravidity among 165 study participants majority 66(40%) were gravida 3, Number of previous cesarean delivery among 165 participants majority 62(37.6%) had 1 previous cesarean section, Gestational week of the participants among 165 participants majorities 140 (84.9%) were in term pregnancy.

Table 5 preoperative characteristics of participants

Variables	Categories	Frequencies	Percentage
Gravidity	Gravida 1	34	20.6
	Gravida 2	49	29.7
	Gravida 3	66	40
	Gravida 4	14	8.5
	Gravida 5	2	1.2
Previous cesarean deliveries	0	36	21.8
	1	62	37.6
	2	56	33.9
	3	11	6.7
Gestational week	<37wks	6	3.6
	37-38+6wks	79	47.9
	39-41+6wks	61	37
	>42wks	19	11.5

5.3, Intraoperative Characteristic

all the participants 151(91.5%) of them positioned intraoperatively in head up reverse Trendlberg position, majority of the participant 93(56.4%) achieve a T10 sensory level of spinal block, Intra op bleeding 88(53.4%) bleeds less than 500ml, the remaining 77(46.6%) bleeds 500 and above. Majorities 127(77%) of the participants effect a newborn having a normal birth weight 2500 – 4000gm, majorities of the surgeries 128(77.6%) took 45 – 60min.

Table 6 intraoperative characteristics of the participants

Variables	Categories	Frequencies	Percentage%
Intraop position	Neutral flat	14	8.5
	Head up Reverse trendlberg	151	91.5
Sensory block level	T10	93	56.4
	T8	29	17.6
	T6	28	17
	T4	15	9.1
Intra op bleeding	< 500ml	88	53.4
	500ml and above	77	46.6
Neonatal weight	<2499gm	10	6.1
	2500 – 4000gm	127	77
	>4000gm	28	17
Duration of surgery	<45min	19	11.5
	45-60min	128	77.6
	>60min	18	10.9

5.4 Incidence of shoulder tip pain

Among the total participants on the study 73(44.2%) of the patients develop either intraoperative shoulder tip pain, postoperative shoulder tip pain or both.

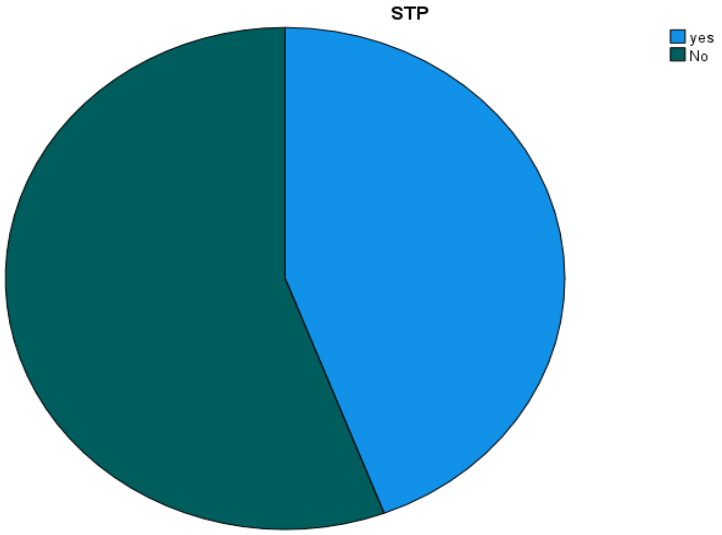

Figure 6 Incidence of STP

5.4.1 Incidence of *Intraoperative shoulder tip pain*

Among the total participants on the study 24(14.5%) of the patients develop intraoperative shoulder tip pain.

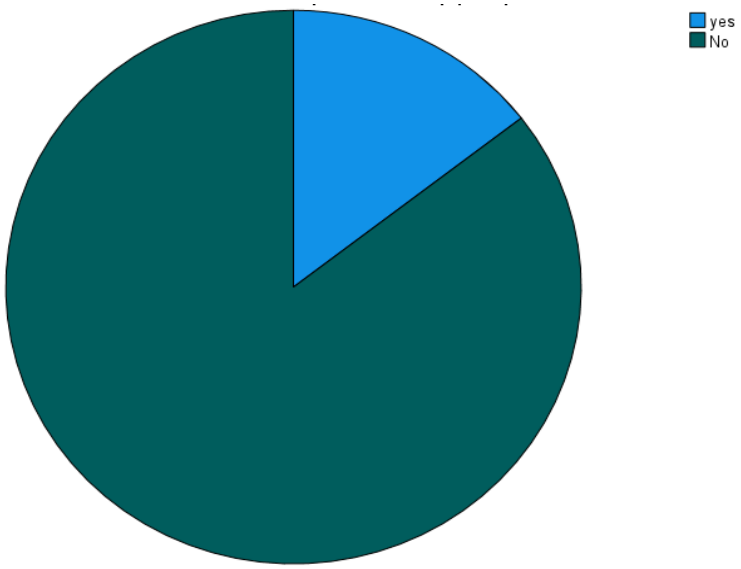

Figure 7 Incidence of Intraoperative STP

5.4.2 Incidence of Postoperative shoulder tip pain

Among the total participants on the study 64(38.8%) of the patients develop intraoperative shoulder tip pain.

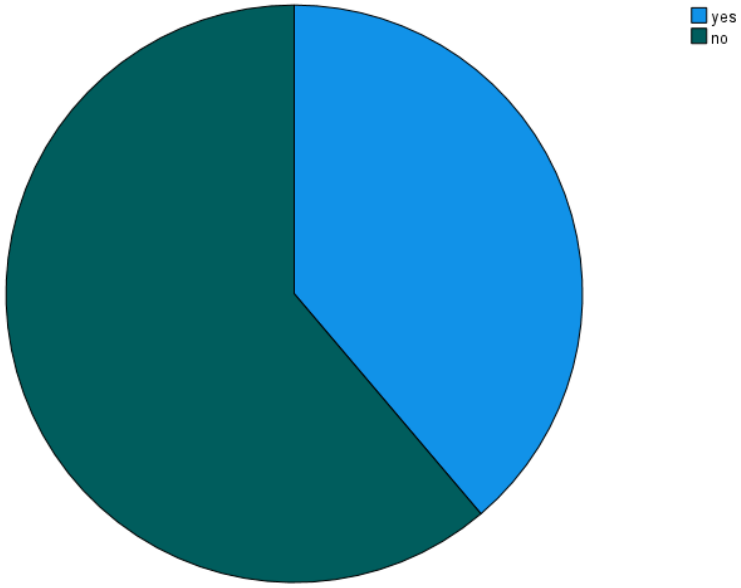

Figure 8 Incidence of post operative STP

15 parturient experienced both intraoperative and postoperative shoulder TIP pain. 15 out of 24 parturient who experienced intra operative STP also experienced the pain postop.

5.5, Location of STP

On both intra op and post op shoulder tip pain right side was dominant, followed by left side STP, patients who experienced on both sides are just 5 parturient.

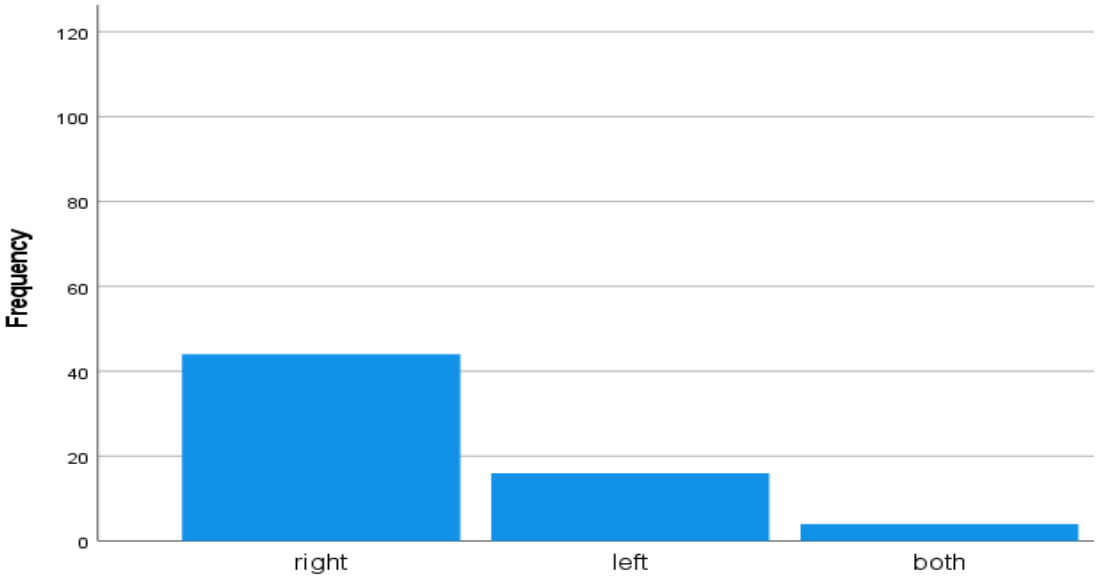

Figure 9 postoperative STP location

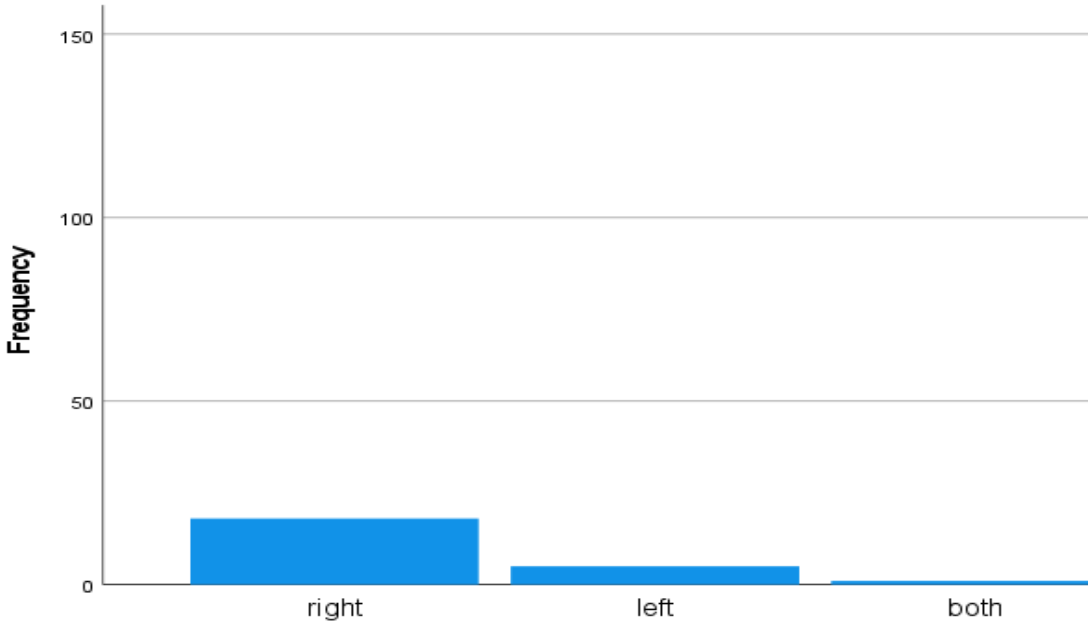

Figure 10 Intraoperative STP location

5.6, Severity of STP

In intra op STP, sever pain dominates in numeric type of pain assessment while moderate pain dominates post op STP. Among the parturient who developed intraoperative shoulder Tip pain 12/24 parturient experienced sever shoulder TIP pain, followed by moderate 10/24 parturient, 2/24 experienced mild pain intraoperatively after the delivery of the baby. Among those who experienced Post operatively shoulder tip pain 36/64 patients had moderate pain, 15/64 experienced mild pain and 13/64 experienced severe pain postoperatively within 24 hrs.

	f	%	Categories		Frequency	Percentage %
STP	**73**	44.2	Intra operative		24	14.5
			Post operative		64	38.8
Location			Intra OP STP	Right	18	10.9
				Left	5	3
				Both	1	0.6
			Post OP STP	Right	44	26.7
				Left	16	9.7
				Both	4	2.4
Severity			Intra OP STP	Mild	2	1.2
				Moderate	10	6.1
				Sever	12	7.3
			Post OP STP	Mild	15	9.1
				Moderate	36	21.8
				Sever	13	7.9

Table 4 Incidence, location and severity of STP

5.7, Factors affecting incidence of Intra operative STP

All independent variables were entered in the bi-variate binary logistic regression model in order to see the association with the independent variables. On the bi-variate logistic regression model, those variables with a p-value less than 0.25 were selected as a candidate variable to be analyzed by the multivariate logistic regression, those variables were (BMI, number of previous C/S, duration of surgery, bleeding) entered in the multivariate regression model. Finally, variables with a p-value less than 0.05 were declared as significantly associated with the dependent variable and presented with 95% CI and AOR.among the above multivariate candidate amount of bleeding found to have significant p value or relationship.

5.8 Factors affecting incidence of STP

Variables	Categories	COR (95%CI)	P value	AOR (95%CI)	P value
Age		1.095(0.505-2.371)	0.819	-	-
BMI	18.5-24.9kg/m2	1	0.155	1	-
	25-29.9kg/m2	2.955(0.873-10.00)	0.082	2.858(0.609-13.41)	0.183
	30-34.9kg/m2	3.377(0.903-12.06)	0.071	4.178(0.775-22.53)	0.096
Previous C\S	0	1	0.055	1	-
	1	1.089(0.327-3.620)	0.890	3.085(0.373-25.50)	0.296
	2	1.344(0.378-4.779)	0.648	3.455(0.557-21.41)	0.183
	3	0.194(0.042-0.882)	0.034	3.982(0.592-26.80)	0.155
Gestational week	<37wks	1	0.490	-	-
	37-38+6wks	1.380(0.146-13.05)	0.779	-	-
	39-41+6wks	1.833(0.183-18.40)	0.607	-	-
	>42wks	0.343(0.033-3.562)	0.370	-	-
Gravidity	Gravida 1	1	0.295	-	-
	Gravida 2	1.236(0.345-4.430)	0.745	-	-
	Gravida 3	1.250(0.325-4.163)	0.716	-	-
	Gravida 4	0.310(0.073-1.320)	0.113	-	-
	Gravida 5	2.700(0.890-8.830)	0.999	-	-
Intra op bleeding	< 500ml	1		1	-
	500ml and above	5.660(2.885-11.10)	<0.01	4.427(2.162-9.064)	0.01*
Intra op position	Neutral flat	1		-	-
	Head up	0.428(0.530-3.433)	0.424	-	-
Sensory level	T10	1		-	-
	T8	0.868(0.176-4.272)	0.862	-	-
	T6	0.738(0.125-4.350)	0.738	-	-
	T4	1.282(0.190-8.663)	0.799	-	-
Neonatal weight	<2499gm	1		-	-
	2500 – 4000gm	0.771(0.091-6.496)	0.811	-	-
	>4000gm	0.333(0.036-3.119)	0.336	-	-
Duration of surgery	<45min	1		1	
	45-60min	0.282(0.789-2.765)	0.030	1.789(0.888-1.557)	0.316
	>60min	0.950(0.912-0.990)	0.014	1.012 (0.959-1.067)	0.679

1=indicate for reference range ***significant p-value(P<0.05)**

Table 5 bivariate and multivariate binary regression analysis to identify associated factors for incidence of intraoperative shoulder tip pain

Intraoperative bleeding amount found to have significant association with a p value of < 0.01 with adjusted odd ratio and 95%CI of 4.427(2.162-9.064) which means patients who bleed more than 500ml intraoperatively has 4.427 times more likely to develop shoulder tip pain.

CHAPTER 6
DISCUSSION

The Study revealed an overall incidence of 44.2% shoulder tip pain. The incidence of intraoperative STP compared to postoperative is relatively lower 14.5% intra op incidence while the post op incidence reaches 38.8%. The incidence in this study is higher than the one done at evket Yılmaz Training and Research Hospital, Bursa, Turkey showed an overall incidence of STP in study population was 35.7%(15) and study carried out in Mashhad, Iran 39.45% of STP incidence,(4).but lesser than the study done in Gulhane Training and Research Hospital, Ankara, Turkey with 49.5% incidence of STP(16)but the previous studies does not study the intraoperative incidence of STP.

This study shows overall dominance of moderate type of pain in numeric pain scale with 54.5% of the STPs, but when we see the intraoperative STP it is dominated by sever type of pain with 56.2%. Post operative STP has also a moderate type of pain score dominance. Previous studies at Yılmaz Training and Research Hospital, Bursa, Turkey showed a score of mild pain in a round 48%, moderate pain 46% and sever pain around 8% this shows near equal dominance of moderate and mild STP(15). Also, the study at Mashhad university iran, showed most of patients had moderate pain(4). The research at Gulhane Training and Research Hospital, Ankara, Turkey showed high incidence of severe pain about 36 to 42 % and moderate pain 44 to 50% among patients who developed STP post cesarean.(16).

This study reveals Location of the pain as right, left or both majority of the participant parturient 70.4% showed to be on the right shoulder tip followed by left side 23.8% and 5.8 on both side of the shoulder, The above-mentioned researches showing right side dominance of the pain in about 66% among the one who developed STP in the study at Yılmaz Training and Research Hospital, Bursa, Turkey.(15). about 62% of mothers experienced on the right side in the study at Mashhad university, Iran(4). The research at Gulhane Training and Research Hospital, Ankara, Turkey showed 77% to 89% of right-side dominant Shoulder tip pain, this research shows similar dominance of pain location with the previous studies.

In this study among the studied possible associated factors like BMI, presence of previous cesarean sections, bleeding amount, neonatal weight, duration of surgery. We founded that a higher amount of bleeding (above 500ml) is found to have significant association with a p value

of < 0.01, with adjusted odd ratio and 95%CI of 4.427(2.162-9.064) , showing 4.427 times higher incidence than the one with less bleeding. Many of the previous studies did not reach to a common or to a certain arguable associated risk factor, they tried to study perioperative factors. Most of the researches did not get significant association in common. Study done by Kikuchi at Japan suggested that the presence of subdiaphragmatic blood as a plausible cause of STP after C-section(17), However, in study by zirak at iran, they were unable to obtain any clear correlation between them.

Some studies show some association between intra op positioning and incidence of STP Study done by Kikuchi at Japan Demonstrated that 2–5 degrees of head-up position during and after a CS reduces the incidence of shoulder Tip pain in patients who underwent combined spinal and epidural anesthesia.(17) but study by carried out by Lahijani at iran, it was indicated that reverse Trendelenburg position played no role in reducing STP after C-section.(18) our study did not found an association between intra op positioning and incidence of STP.

CHAPTER 7

STRENGTH AND LIMITATION OF THE STUDY

7.1 Strength

- This study tried to dig out Data on a very common but Neglected area of practice.
- It will be very helpful to create awareness and on the way of improving management.
- The first in its Kind nationally and continentally.
- It will be an eye opener for further studies.
- Encompass the possible maximum available sample size.

7.2 Limitation

- Single Centered study
- This Study failed to assess the effect of mode of Anesthesia on STP incidence.
- Failed to incorporate other surgical technical factors on the study.

CHAPTER 8
CONCLUSION AND RECOMMENDATION

8.1 Conclusion

- Cesarean section delivery is one of the commonest surgical procedures in our hospital and also world widely. Pain is also generally among the most undertreated medical condition world widely. Shoulder TIP pain is under studied, unrecognized and neglected post operative burden on parturient both intraoperatively and post operatively. This study indicates the burden at a single study center aiming to create awareness and improve post operative quality of life on parturient for the future. And also opens the way for further multidisciplinary studies to find out strong associated factors, this study reveals the higher incidence of this pain more on post operative period but lesser incidence with severe form during the intraoperative period. Also found to have an association with a higher amount of bleeding (those above 500ml).

8.2 Recommendation

- Since the only associated factor found significant in this study is bleeding, so it is good to find a way to minimize amount of intra op bleeding.

- Further multidisciplinary study with obstetric side including surgical technical factors

- Better to do RCT to study the effect of mode of anesthesia and also to standardize the intraoperative care for all participants.

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CONSENT

ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF ANESTHESIOLOGY, CRITICAL CARE AND PAIN MEDICINE

INCIDENCE AND SEVERITY OF INTRAOPERATIVE, POSTOPERATIVE SHOULDER TIP PAIN AND ASSOCIATED FACTORS IN MOTHERS WHO UNDERGO CESAREAN SECTION UNDER SPINAL ANESTHESIA IN TIKUR ANBESA SPECIALIZED HOSPITAL IN YEAR 2023/2024.

General Information

My name is Fitsum Tamene; I'm here on behalf of Addis Ababa University. These questionnaires aim to determine the incidence, severity and associated factors of shoulder tip pain after cesarean section who undergo under spinal anesthesia at Tikur Anbessa specialized hospital.

This study will help to fill the information gap incidence and severity of intraoperative, postoperative shoulder tip pain and associated factors in mothers who undergo cesarean section under spinal anesthesia which can contribute to the improvement of perioperative anesthesia management and increase patient satisfaction with anesthesia service. You are randomly selected to participate in this study and provide an appropriate response to questions. Your participation is voluntary. Only anonymous data will be analyzed, and the secret of the participant will be strictly kept confidential. Participating or not participating in this study will not bring any harm or benefit to you. We strongly value your honest response to the questions. If you feel or face any problem regarding your participation, you can contact the principal investigators by 0913863971, email address = Fitsumtamene37@gmail.com

Do you agree to participate? 1. If agree go to the next page 2. If not agree got to the next participant

Name of the data collector: _____ Date: _____ Sig. _____

Name of the supervisor: _____ Date: _____ Sig

QUESTIONNAIRE

Part I: Identification (Socio-demographic)		
S. NO	Response	Remark
1 Card no		
2 Age (year)	A, below 20 years B, 20 to 30 years C, 30 to 40 years D, above 40 years	
3 Height (cm)		
4 Weight (kg)		
5 BMI **(kg/m2)**		
Preoperative assessment		
8 **Gravidity**		
9 Parity		
10 **Gestational ages (weeks)**		
11 Previous C**esarean deliveries**	A, 1 C, 3 B, 2 D, 4 E, above 4	
Part II: Intraoperative assessment		
1, Intra OP Position	A, supine (neutral) B, head up C, other……	
2, Intra OP bleeding (ml)		

3, **Neonate weight (grams)**			
4, Duration of surgery**(min)**			
5, Sensory level of spinal block			

Pain Assessment

6, Does the patient have intra operative shoulder tip pain?	A, Yes B, No	**If yes proceed to question 7**	
7, is the pain on the left or right shoulder	A, Left B, Right C, Both		
8, How is the pain score?		Use numerical scale	
Post operative pain assessment			
9, Does the patient have post operative shoulder tip pain?	A, yes B, No	**If yes proceed to question 10**	
10, Is the pain on the left or right shoulder	A, Left B, Right C, Both		
11, How is the pain score?		Use numerical scale	

The Numeric Rating Scale (NRS)