

# A Comparative Study between Staplers and Suture (Silk 2-0) for Skin Closure in Cesarean Sections at Gandaki Medical College Teaching Hospital

Jahan K<sup>1\*</sup>, Shrestha R<sup>2</sup>, Adhikari P<sup>3</sup>, Tripathi M<sup>4</sup>,  
Neupane CP<sup>5</sup>, Gurung RT<sup>2</sup>, Gurung TK<sup>2</sup>, Mally J<sup>2</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Lecturer, <sup>3</sup>Intern, <sup>4</sup>Professor & Head, <sup>5</sup>Associate Professor  
Department of Obstetrics and Gynecology, Gandaki Medical College & Teaching Hospital, Pokhara, Nepal

## ABSTRACT

**Background:** Skin closure in the abdominal surgeries is an important factor that affects the prognosis of wound in terms of hospital stay as well as overall outcome of the surgery.

**Objectives:** Cesarean section being the commonly performed operation, choice of suture material has the unexceptional role on it. This study has been performed with an objective to look for the merits and demerits of the skin closure by suture (Silk 2-0) and stapler.

**Methods:** Prospective comparative study conducted among the patients admitted in a Maternity Ward of Gandaki Medical College Teaching Hospital for elective and emergency cesarean section. The comparison has been made in terms of time taken during the skin closure, presence or absence of soakage and wound dehiscence, day of suture removal and pain during the suture removal.

**Results:** The average time taken for skin closure for suture group was found to be 5.46 min ( $\pm 0.97$ ) and the same for stapler group was found to be 1.22 min ( $\pm 0.15$ ) respectively. Similarly, the mean day of stitch removal in suture and staples were found to be 6.94 ( $\pm 1.75$ ) and 7.95 ( $\pm 1.89$ ) respectively. Surgical site infection (SSI) i.e. soakage was present in eight percent of those in suture group and 20% in stapler group. Wound dehiscence was present in two percent among the suture group and five percent among the stapler group. The severity of pain is more in stapler group than that of suture group during its removal.

**Conclusions:** Our study concluded suture being superior to staplers for skin closure during cesarean section. Though time taken for the closure is less in the stapler group, other factors like wound complications, duration of hospital stay, pain during its removal favored for the suture to be used.

## Keywords

*Cesarian section, Skin closure, Stapler, Suture.*

## Corresponding author

*\*Dr. Kamar Jahan  
Assistant Professor  
Department of Obstetrics and  
Gynecology  
Gandaki Medical College & Teaching  
Hospital, Pokhara, Nepal  
Email: ayaazkamar@gmail.com*

## INTRODUCTION

Skin closure is one of the important determining factors for success of a surgery. It's been over 50000 years physicians have been searching for ideal suture material<sup>1</sup>. The skin is protective and self repairing barrier between the body and external environment. Every surgeon would

wish to see wound healthy and scar cosmetically better. The method of closure should be simple, quick to use and cost effective. Many factors are involved in the choice of the skin closure material, including the type and place of the wound, available materials, physician expertise and preferences, patient age and health<sup>2</sup>.

Cesarean section is one of the most commonly performed abdominal surgeries worldwide with recent increase to unprecedented levels<sup>3</sup>. Mostly obstetricians use staples, interrupted suture or subcuticular suture immediately below the skin layer to close the skin during cesarean section<sup>4</sup>. The choice of the suture materials may affect the overall prognosis of wound in terms of time taken for skin closure, duration of hospital stay, wound infection, pain during the suture removal cosmetic outcome of the scar<sup>5</sup>. The existing literature still does not provide enough evidence to say whether one of the suture material either staplers or suture is better than one another for closure of abdominal wall in cesarean section<sup>6</sup>.

This comparative study has been done with objective to see the merits and demerits of skin closure by stapler and suture. The comparison has been made in terms of time taken during the skin closure, presence or absence of soakage and wound dehiscence, day of suture removal and pain during the suture removal.

## METHODS

**Study design:** Prospective comparative study conducted among the patients at Medical College Teaching Hospital of Western Region of Nepal.

**Study site:** Gandaki Medical College Teaching Hospital

**Study population:** The admitted patients in the Maternity Ward who went for elective or emergency cesarean section and agreed to participate were included in the study.

**Sample size:** In this study 200 pregnant women of aged 16 to 36 were enrolled.

**Study Period:** 15<sup>th</sup> April, 2016 to 14<sup>th</sup> May, 2017

**Sampling procedure:** Convenience sampling was applied as the patients admitted in Maternity Ward for cesarean section during the period of April 2016 to May 2017 were enrolled in the study.

**Instruments and techniques:** The patients were divided into two groups on the basis of material used for skin closure in cesarean section i.e. stapler and suture.

**Suture group:** Skin was approximated with vertical mattress suture using non absorbable silk 2-0 at a distance of one cm from each other.

**Stapler group:** The staplers were used to close the wound placed at a distance of 5 mm from one another.

Each patient was given same antibiotics for the same

duration. Wound of every patient was assessed at fourth, sixth, seventh and eighth post operative day. Wound dehiscence was noted.

Pain occurring during the removal was evaluated as mild, moderate or severe as described by the patient on 3 point severity scale.

**Data analysis:** Data was entered in SPSS 18 software and analyzed. Proportions, percentage were calculated for descriptive statistics and Chi square test was performed for the statistical analysis of the observations. P-value was set at 0.05 level of significance.

**Ethical consideration:** Informed consent for the enrollment in study was taken for all the patients before the surgery. Ethical clearance was taken and the ethical approval was obtained from the Institutional Ethical Committee of Gandaki Medical College.

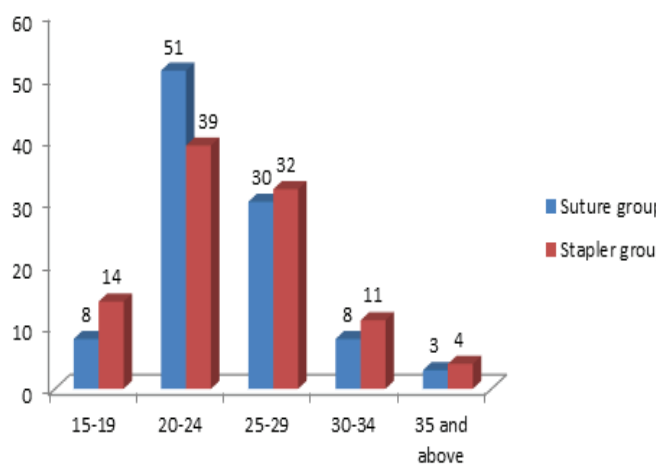
## RESULTS

Total 200 cases studied were divided into two groups each of 100 cases. Those cases whose skin was closed with suture are categorized as "Suture group" and those with stapler are categorized in "Stapler group" to compare the time taken during the skin closure, presence or absence of soakage and wound dehiscence, day of suture removal and pain during the suture removal. The results were analyzed from the observations made as follows:

### 3. 1. Age distribution

The mean age of the participants in the suture group and stapler group were 24.12 ( $\pm 4.073$ ) and 24.74 ( $\pm 4.769$ ) respectively. The age wise distribution of the two different groups is shown in fig 1.

**Fig 1:** Age wise distribution of suture and stapler groups



### 3.2. Time taken for skin closure

The average time taken for skin closure for suture group was found to be 5.46 min ( $\pm 0.97$ ) and the same for stapler group was found to be 1.22 min ( $\pm 0.15$ ) respectively ( $p < 0.001$ ).

### 3.3. Day of stitch removal

The mean day of stitch removal in suture and stapler were found to be 6.94 ( $\pm 1.75$ ) and 7.95 ( $\pm 1.89$ ) respectively ( $p < 0.001$ ).

### 3.4. Surgical site infection (Soakage)

Surgical site infection (SSI) i.e. soakage was present in eight percent of those in suture group and 20% in stapler group ( $p = 0.014$ ) as shown in table 1.

**Table 1:** Surgical Site Infection in suture and stapler group

Surgical Site Infection	Group A		Group B		P value
	N	%	N	%	
Present	8	2	20	20	0.014
Absent	92	98	80	80	

### 3.5. Wound dehiscence

Wound dehiscence was present in two percent among the suture group and five percent among the stapler group ( $p = 0.248$ ) as shown in table 2.

**Table 2:** Wound dehiscence in suture and stapler group

Wound dehiscence	Group A		Group B		P value
	N	%	N	%	
Present	2	2	5	5	0.248
Absent	98	98	95	95	

### 3.6. Pain during stitch removal

The severity of pain is more in stapler group than that of suture group during its removal as shown in table 3.

**Table 3:** Pain during stitch removal

Severity	Group A		Group B		P value
	N	%	N	%	
Mild	94	94	74	74	0.000
Moderate and Severe	6	6	26	26	

## DISCUSSION

Every surgeon wishes for the early healing of post operative wound with minimal complications. Indeed, it's

the responsibility of the surgeon to choose the method of skin closure that would be suitable for the patient in terms of early wound healing without post operative surgical site infection, cost effectiveness, minimal pain during the suture removal and duration of hospital stay. In our study, the two groups with similar demographic characteristics are evaluated with skin closure by suture on one and stapler on other.

In our study, time taken for the skin closure by staplers was significantly less than by suture which is in consistent with the other studies<sup>7-10</sup>. Use of staplers will thus shorten the duration of surgery and anesthesia on the patients considerably reducing the perioperative risk. It will also be of great value in the busy obstetric care settings where high number of patients needs to undergo cesarean section.

The mean day of stitch removal in suture group was found to be earlier than that of stapler which was statistically significant ( $p < 0.001$ ). This may be due to the fact that less evidence of surgical site infections was seen in the patient with suture group. This favors for the early discharge of patient from the hospital and indeed results in decrease in post operative complications. Similar study conducted by Basha *et al*<sup>9</sup> showed no significant difference between two groups in the length of hospital stay.

As far as surgical site infections i.e. soakage of the wound is concerned, it was seen more in the patient with stapler group than that of suture which was statistically significant ( $p = 0.014$ ). Similarly the wound dehiscence was also found to be more on the patient with stapler group than that of suture ( $p = 0.248$ ). The findings of our study were consistent with the studies by Mackeen *et al*<sup>5</sup> and Basha *et al*<sup>9</sup> where wound complication rates were higher in stapler group. A meta-analysis of randomized control trails by Clay *et al*<sup>11</sup> comparing staples and subcuticular suture had also shown high wound complications rate in staples group than that of suture. The exact reason behind the high infection rates among the staples group is not clear. We hypothesize that it may be due to increased bacterial migration to the incision site because of the gap between staples. Furthermore studies are needed to make this understanding clear.

Similarly, our study suggests the severity of pain is more in staples group than that of suture group during its removal. This finding is consistent with other studies conducted in orthopedic surgeries<sup>12,13</sup>, where the patient reported more pain during the stapler removal than that of suture. The reason for this may be more traumatic and

rigid fixation of the tissues by staplers.

Another important factor to be discussed here is the cost effectiveness of the suture and staplers for the abdominal closure. The market price of the staplers is relatively more than that of suture used for the abdominal wound closure here in our settings. Similar finding has been demonstrated in the study by Abdus-Salam *et al*<sup>7</sup>.

The limitation of our study is that we didn't evaluate other parameters for the comparison between the stapler and suture like patient satisfaction and scar cosmetic outlook after the healing. Other studies<sup>10,14</sup> that evaluated these parameters also didn't find any significant differences on it among the stapler and suture group.

The results of our study advocated for the use of suture rather than staplers during cesarean section for the skin closure. Though time taken for the closure is less in the stapler group, other factors like wound complications, duration of hospital stay, pain during its removal favored for the suture to be used. The cost effectiveness among the two is also an important factor determining for the selection of stapler and suture in our resource limited settings which furthermore emphasized for the use of suture rather than staplers.

## CONCLUSIONS

We compared the merits and demerits of the stapler and suture based on the different parameters. Staplers are less time consuming but have high rate of wound complications, results in lengthy duration of hospital stay and more painful during its removal. Furthermore staplers are expensive than suture. Our study provided the baseline comparison of outcomes between the staplers and suture for the skin closure in the cesarean section. Furthermore it's the choice of the operating surgeon and availability of the suture or staplers that ultimately decides the selection of suture materials for the skin closure in cesarean section.

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