Original Research Paper

Volume - 15 | Issue - 10 | October - 2025 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Obstetrics & Gynaecology

COMPARISON OF SURGICAL SITE INFECTION RATES FOLLOWING HAIR CLIPPING AND SHAVING IN CAESAREAN SECTION

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ABSTRACT **Background:** Surgical site infection (SSI) is defined by the Disease Control and Prevention (CDC) criteria as an infection which occurs within 30 days after a surgical procedure. World Health Organization recommends hair removal only if it interferes with the surgical procedure and if hair removal is required, clipping instead of shaving should be preferred but in routine practices, razor is mostly used. So, we undertook this study to assess the rate of infection after clipping and shaving of hair. **Method:** A total of 60 patients were enrolled and divided into two groups, razor group and clipping group. Both groups had 30 patients each. The patients were observed for 30 days post-operatively to check for any SSI, if present. **Result:** Our study concluded that the incidence of SSI was 26.67% in the shaver group and 3.33% in the clipper group. **Conclusion:** The study reiterates the increasing rate of surgical site infections which is one of the major concerns in health system. The post-surgical infections not just decrease patient compliance but also possess burden to healthcare system. The strategical implementation of this small step to use clipper instead of razor in hospital can effectively decrease the infection rate which will ultimately reflect as the decreased financial burden of surgical site infection in healthcare.

KEYWORDS : Surgical site infections, shaving, clipping

INTRODUCTION:

Surgical site infection (SSI) is defined by the Disease Control and Prevention (CDC) criteria as an infection which occurs within 30 days after a surgical procedure [1]. SSI is one of the most common post-operative complications and causes significant post-operative morbidity and mortality. SSIs are associated with increased cost, increased rate of patient dis-satisfaction, increased morbidity and mortality, increased length of hospital stay and poses a burden to health care system [2]. In LMICs, the pooled incidence of SSI is 11.8/100 surgical procedures (range 1.2—23.6). While the global estimates of SSI have varied from 0.5% to 15%, studies in India have consistently shown higher rates ranging from 23% to 38% [3]. Preoperative hair removal by any means is associated with increased SSI rates [4]. According to World Health Organization guidelines [5], hair should not be removed unless it interferes with the surgical procedure. Patients can also be engaged in reducing their risk of wound infection through education on appropriate hair removal [6]. Advice of 'leave the clipping to us' can be incorporated into preoperative skin preparation [7]. Though pre-operative hair removal is done to decrease the post-operative wound infection, but use of razor paradoxically increases the rate of infective in post-operative state. This may be because razors predispose to skin abrasions and cuts which may get contaminated by skin commensals and other pathogens. Although if hair removal is required, WHO recommends clipping instead of shaving but in routine practices, use of razor is commonly seen. Razors are still commonly used probably due to cost considerations. This may partly explain the fact that developing countries like India have high surgical site infection than developed countries where preoperative razor shaving is less preferred. This study was undertaken with the intent to assess the rate of infection after clipping and shaving of hair.

Aim:

1. To compare the rates of surgical site infection in clipping v/s shaving of hair in caesarean section.

Objectives:

The Primary Objective Of The Present Study Was

1. To evaluate the rate of surgical site infection in shaving v/s clipping of hair after caesarean section.

The Secondary Objective Of The Present Study Was

1. To access the factors affecting surgical site infection after caesarean section.

MATERIALS & METHODS:

This was a hospital based prospective observational study conducted in Obstetrics and Gynaecology department of AIIMS Bathinda. This study was Indian Council of Medical Research (ICMR) approved project and was carried out over a period of two months from 15/12/23 to 15/02/24. Study population comprised 60 women who underwent elective caesarean section at AIIMS Bathinda.

Inclusion Criteria:

1. Women who underwent caesarean section during the study time.

Exclusion Criteria:

1. Patients with complicated pregnancy or delivery (suffering from diabetes, immunosuppressive disorder like HIV, chorioamnionitis etc.) [3,8].
2. Patients who had excessive blood loss during labour, delivery or surgery.
3. Patients who underwent prolonged surgery (more than 2 hours).

Methodology:

A total of 60 patients were enrolled. Patients were divided into two groups. Information about the study was provided verbally to each patient meeting the inclusion criteria. After explaining the study, informed consent was taken. The patients were divided into two distinct groups, patients who underwent site preparation using a razor were categorized as razor group and who underwent site preparation using clipper were categorized as clipper group. To maintain uniformity same skilled staff was employed for all the cases for the preparation of caesarean site across all patients. After the surgical procedure, the patient was transferred to the postoperative ward, where they received standardized and consistent quality care. Throughout their hospital stay, patients were constantly evaluated to monitor their recovery and any signs of SSI. Following discharge, the patients underwent regular follow.up assessment along with a follow.up questionnaire in the OPD to ensure there were no signs of SSI.

The Questionnaire Covered The Following Objectives-

It consisted of socio demographic details like age, education, residence, obstetrics history and date of delivery.

Along With It, The Following Symptoms Were Noted, If Present-

1. Redness at incision site.
2. Swelling at incision site.
3. Pus discharge from incision site.
4. Pain at incision site that did not go away or get worse.
5. Fever.
6. Gaping at wound site.

Wound culture was collected from pus and then sent to the laboratory to identify any microbes in it and antibiotics were given accordingly.

Statistical Analysis:

The patients were monitored for 30 days manually if hospitalized or

telephonically if they were at home. The data collected from the participants was entered in structured Performa. After data collection and coding, the analysis was done. Descriptive statistics were used to depict the distribution of the socio-demographic variables. The rates of infection were assessed by calculating the number of patients showing SSI in both groups. Bivariate analysis was done to assess the association between the sociodemographic variables and infection occurring. Further, multivariate binomial analysis was done to explore the chances of getting infected in shaving or clipping by generating adjusted odds ratio with 95% confidence intervals. P-values less than 0.5% were considered statistically significant.

RESULTS:

The study consisted of 60 people out of which 30 patients underwent caesarean section after preoperative hair removal by razor and 30 patients underwent caesarean section after preoperative hair removal by clipper. We compared the surgical site infection in both the groups. Surgical site infection is an infection which occurs within 30 days of surgery, so we monitored the patients for 30 days. After their discharge, they were monitored telephonically and on their further visits in hospital.

In the razor group, maximum women were of age group 26-30 years while in the clipper group, most women were in age group 21-25 years and 31-35 years (Table 1).

Table 1: Age Distribution Of The Patients

Age range (years)	Razor group (n = 30)	Clipper group (n = 30)	p-value (chi-square test)
16–20	0	1	0.231
21–25	3	9	
26–30	12	8	
31–35	8	9	
36–40	6	3	
41–45	1	0	
Mean age (years)	31.33	28.63	
Total	30	30	

The mean age of patients was 31.3 years in the razor group and 28.7 years in the clipper group. There was no statistically significant difference in age distribution between the two groups ($\chi^2 = 6.86$, df = 5, p = 0.231), indicating that both groups were comparable with respect to age.

For surgical site infections following post-operative symptoms were noted in patients over a period of 30 days after surgery:

1. Redness at surgical site-

In this study, 2 patients out of 30 complained of redness at surgical site in the razor group. Redness started appearing in 10 days of surgery in one patient and after 15 days of surgery in another patient. However, no such case was found in the clipper group.

2. Swelling at surgical site-

Out of 30 patients in the razor group, one patient complained of swelling at surgical site, this swelling occurred after 10 days of surgery. No such complain was found in the clipper group.

3. Pus discharge from wound-

In the razor group, 4 patients complained of pus discharge from wound. One patient complained of pus discharge after 5 days of surgery, another at 8th day and others at 20th and 25th day of surgery. In the clipper group, only one patient had pus coming out of surgical site over 2nd day of surgery.

4. Pain that did not go away or get worse over time-

2 patients experienced extreme pain that was just getting worse on 9th and 20th day of their respective surgery in the razor group while no such case was found in the clipper group.

5. Fever-

In this study, no such complain was found either in razor or clipper group.

6. Gaping at wound site-

One patient had gaping in their wound in both the groups. In the razor group, patient had gaping in the wound on 5th day of surgery while in the clipper group, patient had gaping in the sutures on only 2nd day of surgery.

Table 2: Post-operative Complaints Of Patients In Both Groups

Complaint	Razor group		Clipper group		p-value
	n	%	n	%	
Redness at surgical site	2	6.67%	0	Nil	0.492
Swelling at surgical site	1	3.33%	0	Nil	1.000
Pus discharge from wound	4	13.33%	1	3.33%	0.353
Pain that gets worse	2	6.67%	0	Nil	0.492
Fever	0	Nil	0	Nil	1.000
Gaping of wound site	1	3.33%	1	3.33%	1.000

Redness, swelling, pus discharge, and worsening pain were more frequently observed in the **razor group** (Table 2). Only pus discharge (13.3% vs 3.3%) and wound gaping (3.3% in both groups) were noted in the **clipper group. None of the differences reached statistical significance** (all Fisher's Exact Test; p > 0.05).

Overall, the rate of surgical site infection was found to be more in the razor group. A total of 8 people had SSI who underwent preoperative hair removal by razor while only 1 person had SSI from those who underwent preoperative hair removal by clipper (Table 3). The Relative risk (RR) was 8.0 with 95% CI (1.07-60.09) and Odds Ratio (OR) was 10.55 with 95% CI (1.23-90.67). The difference between two groups was statistically significant (p<0.05).

Table 3: Rate Of Surgical Site Infection

Group	SSI (+)	SSI (–)	Total	p-value (Chi-square test)
Razor	8	22	30	0.030
Clipper	1	29	30	
Total	9	51	60	

Hence, patients who underwent preoperative hair removal by razor had more postoperative infections than whose who underwent preoperative hair removal by clipper.

DISCUSSION:

Our study aimed to find out if there existed any difference in hair removal by razors or clippers. Our study concluded that the incidence of SSI was 26.67% in the shaver group and 3.33% in the clipper group, with a statistically significant difference.

13.33% people complained about pus discharge from surgical site in razor group while only 3.33% people complained in clipper group. 6.67% people complained about redness over surgical site and 3.33% people experienced swelling over surgical site in the razor group while no one complained about it in the clipper group. 6.67% people had pain that was getting worse in the razor group while no such complain was found in the clipper group. 3.33% people had gaping in wound in both the groups. Overall, the razor group had more infections.

The results also coincided with the result of study performed by Omolabake et al [9] which showed that out of total 158 operative sites in 146 patients, razor shaving and hair clipping were applied to equal number of operative sites (79 each) and postoperative wound infection occurred in 7 (8.9%) patients in the razor-shaved group and 2 (2.5%) patients in the hair-clipped group (p=0.167). These findings were also consistent in study by Mukesh and their colleagues [10].

As the study was done on patients undergoing caesarean section so it's better to know that caesarean section (CS) is a surgical procedure performed to facilitate delivery of the baby through an incision made on the mother's abdomen. Ideally, it is recommended in situations where normal vaginal delivery (VD) can pose risks to either the mother, baby, or both. Over the years, global caesarean section (CS) rates have significantly increased from 7% in 1990 to 21% today suppressing the ideal acceptable CS rate which is around 10-15% according to WHO with the projected global rate of 29% by 2030 [11]. However, currently, not all CS are done for medical reasons with rapidly increasing the trend of caesarean on maternal request. CS reduces both maternal and neonatal morbidity and mortality significantly when it is done under proper indications while at the same time, it can be of harm to the mother and the child when performed contrary. So, this increasing trend of caesarean section makes it necessary that we must implement the methods that can reduce the complication associated with it and a very common problem associated with it is surgical site infection.

According to the Centres for Disease Control and Prevention (CDC), SSI is an infection that occurs after surgery in the part of the body

where the surgery took place. The financial burden of SSI is considerable; it ranks as the costliest of hospital.acquired infections. SSIs may increase the duration of hospital stay, emergency department visits, and chances of readmissions. Based on these data, it is not an overstatement to say that how well SSI is controlled is the conclusive factor in good postoperative results.

SSI depends on both patients related modifiable and non.modifiable factors as well as treatment.related factors. Changing from the usual practice to the use of hair removal is an extrinsic factor contributing to SSIs that can be easily modified. Skin preparation before surgery is an important step to prevent SSIs. Most commonly, products containing iodophors or chlorhexidine gluconate are used as skin preparation agents. Hair removal is necessary, whatever may be the surgical technique involved, and skin preparation products used. Hairs are often areas of poor sanitation and pose a problem during and after surgery. Reasons for this practice of hair removal include the facilitation of surgery, facilitation of adhesive draping and dressings, reduction of surgical site infections (SSI), reduction of pain and discomfort associated with wound dressing changes and for psychological reasons.

According to the studies done before, preoperative hair removal increases the risk of surgical site infection so should be avoided unless necessary and if done necessarily then use of clipper is effective in minimizing the risk of surgical site infection. This is because razors predispose to skin abrasions and cuts which may become contaminated by skin flora and other microbes leading paradoxically to increased wound infection. Despite it, the use of razors is seen very commonly in the hospital setting. It is probably because razor shaving is cheap, widely available, easily accessible and the process is fast while clippers are expensive and not readily available.

This study showed that when we used clippers in our hospital setting, we reduced the surgical site infections from 26.67% to 3.33%. In this case, their socio demographic details were found to be almost similar, and patients were randomly assigned in both the groups without taking account of their socio demographic and obstetrics history and same staff performed the surgery in both the groups so there is very less chances of bias and the drop in surgical site infections in very significant.

CONCLUSION:

The study reiterates the increasing rate of surgical site infections which is one of the major concerns in health system. The post-surgical infections not just decrease patient compliance but also possess burden to healthcare system. Our study showed the increasing rate of surgical site infection in people who underwent preoperative hair removal by razor instead of clipping. The use of clippers instead of razor significantly reduced the infection rate which will aid in decreasing total cost of treatment. The strategical implementation of this small step in hospital can effectively decrease the infection rate which will ultimately reflect as the decreased financial burden of surgical site infection in healthcare. It will be beneficial to the society as well as government.

Implication And Society Welfare:

Programs for wound surveillance can decrease the rate of infection which in turn may decrease the cost of surveillance and treatment.

Limitations Of The Study:

A major limitation of our study is the small sample size, which may reduce the statistical power and limits the generalizability of results. Therefore, further research with larger cohorts is recommended to validate these observations.

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