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A STUDY ON LOWER SEGMENT CESAREAN SECTION IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Caesarean section is a major operation, with great potential benefit, but also with substantial risks for both mother and baby.[1] Maternal mortality and morbidity are higher than for vaginal delivery, although rates are becoming lower with advances in technology.[2] Factors that have been associated with an increased risk of infection and infectious morbidity among women who have a cesarean delivery include emergency cesarean section, labor and its duration, ruptured membranes and the duration of rupture, the socioeconomic status of the woman, number of prenatal visits, vaginal examinations during labor, urinary tract infection, anemia, blood loss, obesity, diabetes, development of subcutaneous hematoma, the skill of the operator and the operative technique. Prophylactic antimicrobials are proved to be effective in lowering postoperative infections both in women at high risk (in labour after membrane rupture), and low risk (non-labouring with intact membrane). They are often administered after umbilical cord clamping. **Objectives:** 1. To assess the cause, indication, socioeconomic group involved and types of Lower segment Cesarean section. 2. To evaluate the pattern of Antimicrobial prophylaxis in Lower segment Cesarean section. 3. To assess the frequency of post operative morbidity. 4. To assess the ADR's associated with Antimicrobial drugs used. **Methods:** It was a prospective observational study was conducted in the department of Obstetrics, Rajarajeshwari Medical College and Hospital, Bangalore. A study was conducted over a period of one year on 250 patients based on 20% of prevalence rate of lower segment cesarean section. The patients who underwent lower segment cesarean section (elective and emergency) was observed from the period of 1st dose of antimicrobial prophylaxis till the patient is discharged. Relevant information on each patient was collected according to the proforma designed for the study. Antibiotics used, their dose dosage schedule were recorded. Investigations like pus, blood and urine culture and sensitivity was done for patients with postoperative complications. **Results:** Out of 250 patients in the study, 59.2% (148) were Primigravida and 40.8 % (102) were Multigravida. 63.6% (159) patients underwent Emergency cesarean section, which was preferred over Elective cesarean section (36.4%). Meconium stained liquor is the most common indication for the cesarean section in 24.4% of the patients followed by Pre mature rupture of membrane in 16.85 of the patients. Two antimicrobials combination was most preferred in our study with 61.6% and three drug combination in 38.4 %. 56 Patients in our study developed post operative morbidity. Fever was most common which was seen in 32 patients, wound infection in 16 patients and UTI in 8 patients. Ecoli was the most common organism isolated from wound & UTI in our study followed by Klebseilla. **Conclusion:** Cesarean delivery is associated with a significantly higher post-operative infection (SSI, WI, UTI) rate than following vaginal birth and other surgical procedures. Overall, this study proved that, use of prophylactic antibiotics in women undergoing cesarean section substantially reduced the incidence of episodes of fever, endometritis, wound infection, urinary tract infection and serious infection after cesarean section. Majority of the women received more than 1 antibiotic which is not in accordance with the antibiotic guidelines.

KEYWORDS: Lower segment Cesarean section, Surgical site infections, Antimicrobial prophylaxis.

INTRODUCTION

Caesarean section involves the delivery of the baby through an abdominal cut. Initially, “caesarean section” was referred to as “caesarean operation”.

Caesarean section has been performed for many centuries and is considered to be one of the oldest operations in the history of medicine. References to cesarean section date back to ancient Hindu, Egyptian, Roman and Grecian folklore. For example, in Greek mythology, Apollo removed Asclepius, originator of religious medicine, from his dying mother's abdomen. Even the socio-economic structure of Jewish society accommodated such surgery.

Caesarean section is a major operation, with great potential benefit, but also with substantial risks for both mother and baby.[1] Maternal mortality and morbidity are higher than for vaginal delivery, although rates are becoming lower with advances in technology.[2] Infectious morbidity remains a leading cause of postoperative complications following caesarean delivery.[3]

A Cesarean section is indicated when delivery is required and cannot be performed vaginally because it will take too long or because it will endanger the mother or the foetus. Cephalopelvic disproportion, previous cesarean, fetal distress, cord prolapsed etc are some common indications of cesarean delivery.[4]

Lower segment Cesarean section is the most common surgical procedure done in the department of Obstetrics. The rates averaging greater than 20% in the developing countries. Women undergoing Cesarean delivery have a 5 to 20 fold greater risk of infection compared with Vaginal delivery.[5]

Infectious complications includes fever, wound infection, endometritis, bacteremia, UTI and other serious infections (including pelvic abscess, septic shock, necrotizing fascitis, and septic pelvic vein thrombophlebitis).[5] These complications not only results in increased hospital stay but also increase in the cost of care.

Factors that have been associated with an increased risk of infection and infectious morbidity among women who have a cesarean delivery include emergency cesarean section, labor and its duration, ruptured membranes and the duration of rupture, the socioeconomic status of the woman, number of prenatal visits, vaginal examinations during labor, urinary tract infection, anemia, blood loss, obesity, diabetes, development of subcutaneous hematoma, the skill of the operator and the operative technique.[5]

Surgical site infections (SSI) are the most common nosocomial infections, accounting for 38-40% of all such infections.[6] Wound infections—surgical site infections—in the form of cellulitis, abscess, or dehiscence can occur following laparotomy. Pelvic infections, such as an abscess or infected hematoma, are a risk with any surgical procedure that enters the abdominal cavity. Endometritis can result from Caesarean section or surgical abortion. Urinary tract infections can occur as a result of any procedure that involves catheterization of the bladder.

A number of patient-related and procedure-related factors have been shown in univariate or multivariate analyses to influence the risk of SSIs (Table 1).

Patient-related and procedure-related factors that may influence the risk of surgical site infections (adapted from Mangram *et al.*[7]).	
Patient-related Procedure-related	Procedure-Related

Age Nutritional status Diabetes Smoking Obesity Coexistent infection at a remote body site Colonisation with micro-organisms (particularly *Staphylococcus aureus*) Altered immune response Length of preoperative hospital stay	Duration of surgical scrub Skin antisepsis Preoperative shaving Preoperative skin preparation Duration of operation Antimicrobial prophylaxis Operating room ventilation Inadequate sterilisation of surgical instruments Foreign material in the surgical site Surgical drains Surgical technique poor haemostasis failure to obliterate dead space tissue trauma

The major microorganisms responsible for infection are aerobic gram-negative bacilli, principally E.coli; anaerobic gram-negative bacilli, principally Bacteroides species and gardnerella vaginalis; aerobic gram-positive cocci, primarily Group B and Group D streptococci; and anaerobic gram-positive cocci, specifically peptococcus species and peptostreptococcus species.[8]

An increasing number of SSIs are attributable to antibiotic-resistant pathogens such as meticillin-resistant *S. aureus* (MRSA) or *Candida albicans*. This development may reflect the increasing number of severely ill or immunocompromised surgical patients, and the widespread use of broad-spectrum antibiotics. Pathogens may also originate from preoperative infections at sites remote from the operative site, particularly in patients undergoing insertion of a prosthesis or other implant.[7]

SSI pathogens may originate from exogenous sources such as members of the surgical team, the operating theatre environment, and instruments and materials brought within the sterile field during the procedure. Such pathogens are predominantly aerobes, particularly Gram-positive organisms such as staphylococci and streptococci.[7]

The development of clinical infection is dependent on a complex balance between host defence mechanisms and bacterial virulence factors. Cesarean delivery alters this balance so as to predispose the patient to infection. During labor and abdominal delivery, the endometrium and peritoneal cavity invariably are contaminated with large numbers of highly pathogenic aerobic and anaerobic bacteria. The serosanguineous fluid that collects in the abdomen after surgery and the injured uterine tissue at the site of the incision provide excellent culture media for microbial growth. The bacterial inoculum is particularly large when cesarean section is performed after multiple vaginal examinations and extended duration of labor and ruptured membranes.[8]

Antibiotics administered prior to the contamination of previously sterile tissues or fluids are deemed “prophylactic antibiotics”. Prevention of surgical site infection is the major goal of antibiotic prophylaxis.[1]

Prophylactic antimicrobials are proved to be effective in lowering postoperative infections both in women at high risk (in labour after membrane rupture), and low risk (non-labouring with intact membrane). They are often administered after umbilical cord clamping. This administration of drug shortly after cord clamping is considered to be as effective as administrating the drug preoperatively.[9]

The current debate focuses on the choice of antimicrobials and the timing of administration. With respect to timing, the debate lies between pre-incision or after clamping of the umbilical cord and the choice of antimicrobial lies between narrow-range and broad-spectrum. Both of these debates have been influenced by concerns that broad spectrum antimicrobials given before incision might mask neonatal infection or result in a neonatal infection in which no organism could be cultured. There are also concerns that the wrong choice of antimicrobial may result in the neonate being exposed to resistant strains of bacteria, which might lead to a worse neonatal outcome or the need for expensive neonatal septic screens and infection work-ups.

Antimicrobial resistance development results mainly from the inappropriate use of antimicrobials. Incomplete courses of antimicrobial therapies and the unnecessary use of broader spectrum regimens play a role. Adherence to both treatment and prophylaxis guidelines likely assists in reducing infection and antimicrobial resistance in cesarean section.

OBJECTIVES

1. To assess the cause, indication, socioeconomic group involved and types of Lower segment Cesarean section.
2. To evaluate the pattern of Antimicrobial prophylaxis in Lower segment Cesarean section.
3. To assess the frequency of post operative morbidity.
4. To assess the ADR’s associated with Antimicrobial drugs used.

MATERIALS AND METHODS

A prospective study was conducted over a period of one year on patients undergoing lower segment cesarean section. 250 cases were included in the study.

Location of study

The study was conducted on patients admitted in the obstetrics and gynecology department of Rajarajeswari Medical College & hospital, Bangalore

Data collection

A proforma containing detailed information on each patient was prepared according to the protocol designed for the study. Informed consent was taken from all the patients included in the study. Ethical clearance was obtained from institutional ethics committee.

Inclusion criteria

1. Patients undergoing emergency cesarean section
2. Patients undergoing elective cesarean section

Exclusion criteria

1. Patients who received any antibiotics in the preceding two weeks of surgery.
2. Patients with co-morbid conditions like diabetes mellitus, autoimmune disease, tuberculosis, HIV infection or prophylaxis for rheumatic fever.
3. Patients on cancer chemotherapy, radiotherapy, long term steroids or immunosupressants.

Relevant data was taken from the patients undergoing lower segment cesarean section while they were admitted in the hospital and also from the hospital records. The data included name and age of the patient, socioeconomic status (Modified Kuppuswamy's classification),[86] date of admission and discharge, type of surgery performed. It also included details of the use of antibiotic prophylaxis such as choice of antibiotic, dose and dosage schedule, route of administration and also any change in the antibiotic following culture and sensitivity report.

Patients were followed up during the postoperative period till the day of discharge. Postoperative complications and investigations relevant to the postoperative complications were also recorded. In patients who developed wound infection, which was characterized by erythema, induration, serous and purulent discharge from the site of incision pus culture and sensitivity was done by the department of microbiology.

The patients presenting with burning micturition and fever were considered to be suffering from UTI and urine culture and sensitivity was done. Patients presenting with oral temperature of more than 38^0C on two occasions at an interval of six hours, 24 hours after surgery were considered to be suffering from fever. Blood sample was collected from these patients and culture sensitivity was done.

The antibiotics were administered by the intravenous route of administration preoperatively and approximately first four days postoperatively. Later it was changed to oral route of administration whenever oral formulation of the drug was available.

The Culture and Sensitivity was done by the following procedures

Pus culture[10]

Pus samples were inoculated on sheep blood agar, Mac Conkey's agar and thioglycollate broth. Blood agar and Mac Conkey's agar were incubated at 37^0C aerobically for 24 to 48 hours. Then colonies were identified using standard biochemical reactions.

Urine culture[10]

Urine samples were cultured on sheep blood agar and Mac Conkey's agar using a standard loop. It was then incubated at 37^0C for 2 hours. Colonies with significant growth were identified using biochemical test.

Blood culture[10]

5 ml of blood was collected from the patient aseptically into a blood culture bottle containing 50ml of brain heart infusion broth and incubated at 37^0C for 24 hours. Subcultures were done on sheep blood agar and Mac Conkey's after 24hrs, 72 hrs and 7 days. Plates were incubated at 37^0C for 24-48 hours aerobically during each subculture. Colonies were then identified using standard biochemical reaction and confirmed by serological methods if necessary.

The data obtained were subsequently analyzed using descriptive statistics. The results were expressed as mean ± standard deviation. Wherever necessary the result will be depicted in the form of percentages or graphs.

RESULTS

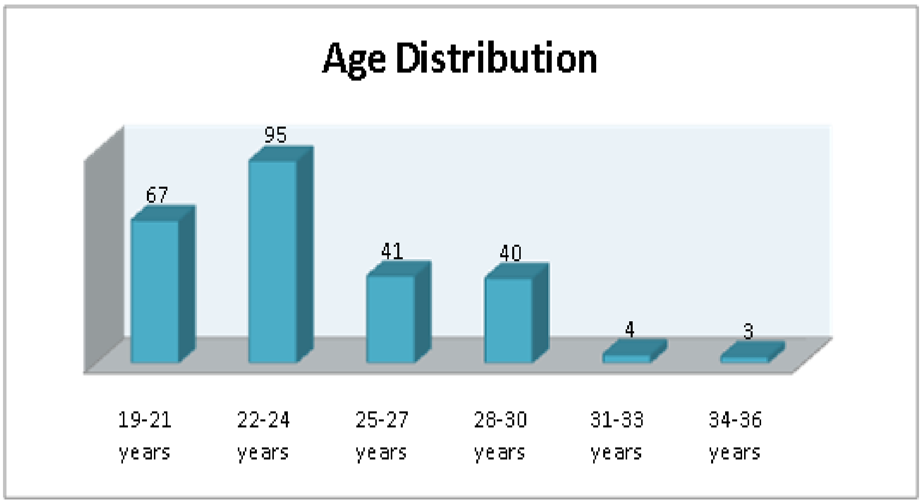
A total of 250 patients were included in our study with age group ranging from 19 years to 36 years.

Demographic data

Table 1: Distribution of age in patients undergoing caesarean section.

Age in years	No of patients	Percentage
19-21	67	26.8%
22-24	95	38%
25-27	41	16.4%
28-30	40	16%
31-33	4	1.6%
34-36	3	1.2%

In our study highest number patients undergoing cesarean section was found in the age group of 22 – 24 years of age (38 %) followed by 19-21 years (26.8%) [Table 1].

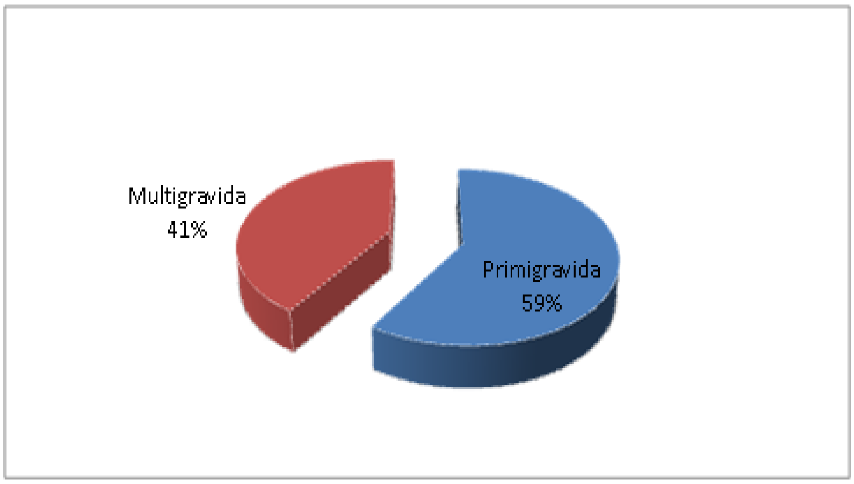


Graph 1: Distribution of age in patients undergoing caesarean section.

Table 2: Diagnosis.

	No of patients	Percentage
Primigravida	148	59.2
Multigravida	102	40.8

Out of 250 patients in the study, 59.2% (148) were Primigravida and 40.8 % (102) were Multigravida [table 2].

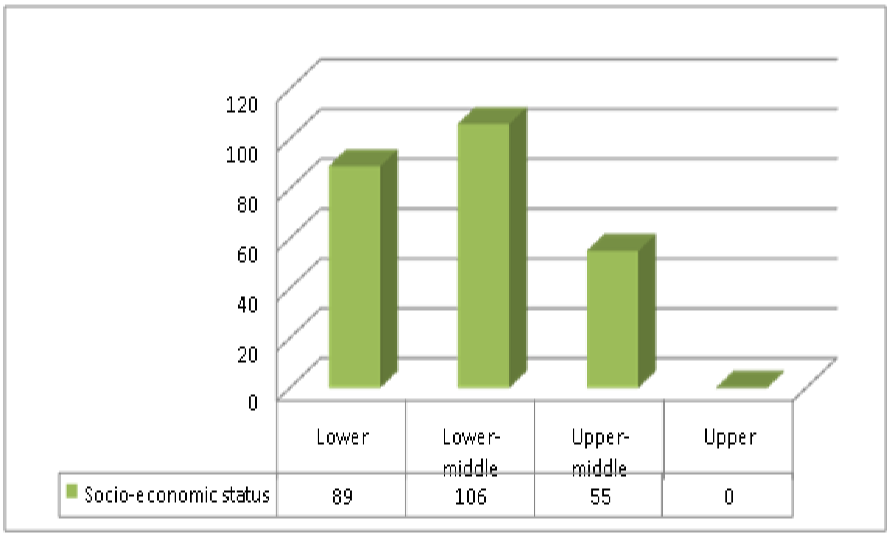


Graph 2: Diagnosis.

Table 3: Distribution of patients based on socio-economic status (Kuppuswamy classification).

Socio-economic status	No of patients	Percentage
Lower	89	35.6
Lower –middle	106	42.4
Upper- middle	55	22
Upper	0	0

Out of 250 patients, 42.4% (106) were from Lower-middle class, 35.6% (89) were from Lower class. None of the patients were from Upper class [table 3] as per Kuppuswamy's classification.

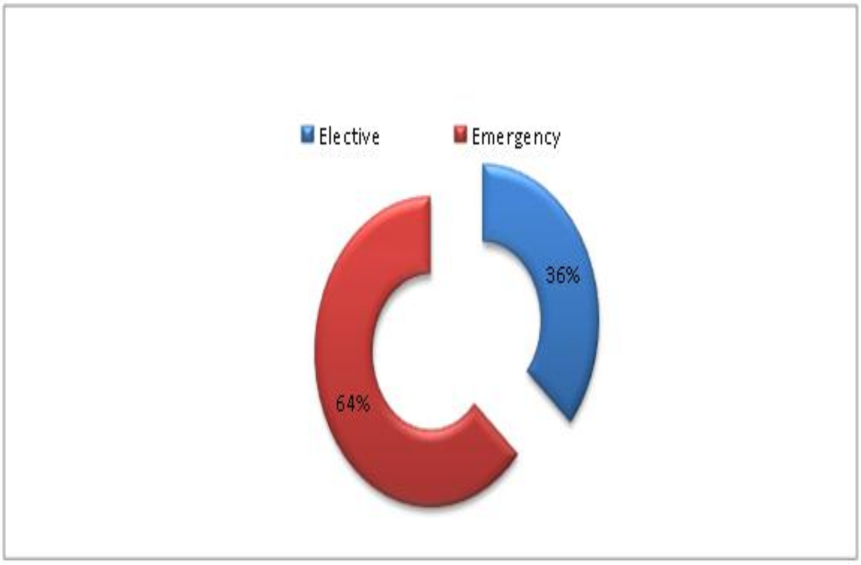


Graph 3: Distribution of patients based on socio-economic status (Modified kuppuswamy's classification).

Table 4: Type of cesarean section in patients.

Type of surgery	No of patients	Percentage
Elective	91	36.4
Emergency	159	63.6

63.6% (159) patients underwent Emergency cesarean section, which was preferred over Elective cesarean section (36.4%).

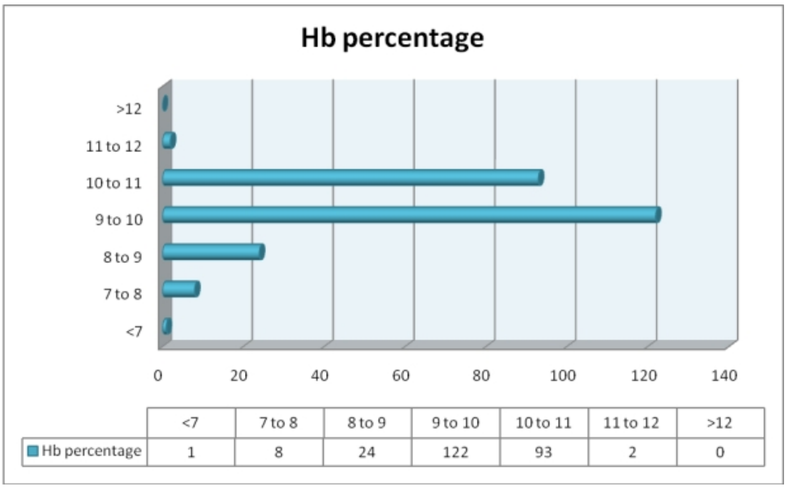


Graph 4: Type of cesarean section in patients.

Table 5: Haemoglobin % in patients undergoing cesarean section.

Haemoglobin in gm%	No of patients	Percentage
<7	1	0.4
7-8	8	3.2
8-9	24	9.6
9-10	122	48.8
10-11	93	37.2
11-12	2	0.8
>12	0	0

In our study most of the patients had Hb% of 8-10 with a mean of 9.23gm%.



Graph 5: Haemoglobin % in patients undergoing cesarean section.

Table 6: Indications for cesarean section.

Indications for surgery	No of patients	Percentage
CPD	27	10.8%
Meconium stained liquor	61	24.4%
Pre mature rupture of membrane	42	16.8%
Malpresentation	09	3.6%
Previous Cesarean section	24	9.6%
Pre-eclampsia	19	7.6%
Oligohydromios	04	1.6%
Failure to progress	31	12.4%
Placenta previa	02	0.8%
Decreased fetal movements	14	5.6%
Twin gestation	05	2%
Failed induction	12	4.8%

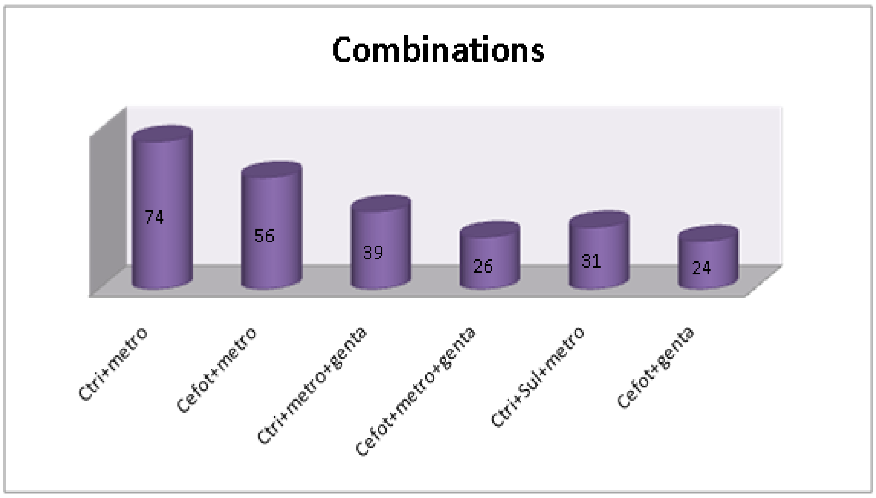
Meconium stained liquor is the most common indication for the cesarean section in 24.4% of the patients followed by Pre mature rupture of membrane in 16.85 of the patients.

Table 7: The antimicrobial agents used in the prophylaxis of cesarean Section and Their dosage.

Drugs used	Dose
Ceftriaxone	1g twice daily
Cefotaxime	1g twice daily
Metronidazole	400mg thrice daily
Gentamicin	80mg twice daily
Sulbactam	500g twice daily

Table 8: Combination of drugs used in cesarean section.

Combinations	No of patients	Percentage
Ceftriaxone+metronidazole	74	29.6%
Cefotaxime+metronidazole	56	22.4%
Ceftriaxone+metronidazole+gentamycin	39	15.6%
Cefotaxime+metronidazole+gentamycin	26	10.4%
Ceftriaxone+Sulbactam+metronidazole	31	12.4%
Cefotaxime+gentamycin	24	9.6%

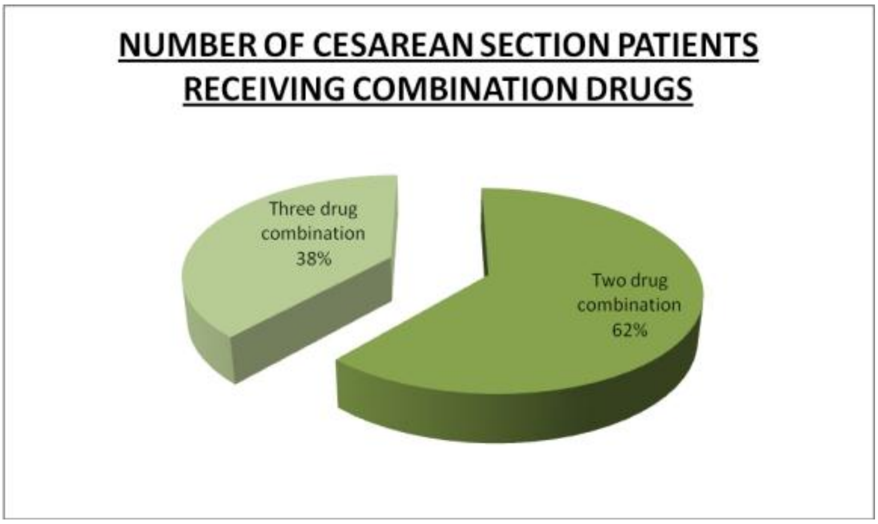


Graph 6: Combination of drugs used in cesarean section.

Table 9: Number of cesarean section patients receiving combination drugs.

	No of patients	Percentage
Two drug combination	154	61.6%
Three drug combination	96	38.4%

Two antimicrobials combination was most preferred in our study with 61.6% and three drug combination in 38.4 %. None of the patients received single antimicrobial agent.

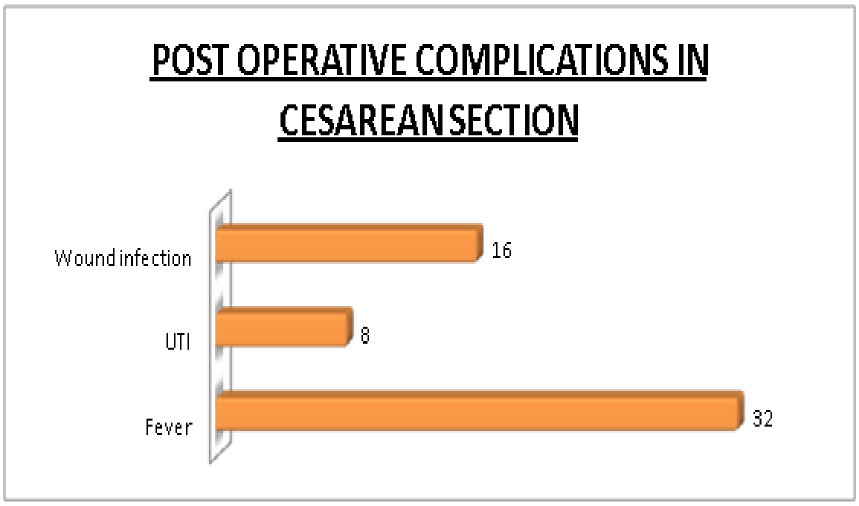


Graph 7: Number of cesarean section patients receiving combination drugs.

Table 10: Post operative complications in cesarean section.

Post operative complications	No of patients	Percentage
Fever	32	12.8%
UTI	8	3.2%
Wound infection	16	6.4%
Endometriosis	0	0
Pelvic inflammatory disease	0	0

56 Patients in our study developed post operative morbidity. Fever was most common which was seen in 32 patients, wound infection in 16 patients and UTI in 8 patients.



Graph 8: Post operative complications in cesarean section.

Table 11: Organisms isolated in wound & uti.

	Organism isolated	No of patients
Wound	E coli	3
	Klebsiella	2
	E coli, klebsiella	3
	E coli, pseudomonas	2
	Klebsiella , pseudomonas	1
	Pseudomonas	1
	E coli, enterobacter	1
	Klebsiella, enterobacter	1
	Pseudomonas , enterobacter	1
	Enterobacter	1
Uti	E coli	6
	Klebsiella	2

Ecoli was the most common organism isolated from wound & UTI in our study followed by Klebseilla.

Table 12 shows adverse drug reactions of the Antimicrobial agents prescribed in our study.

Table 12: Number of cesarean patients with adverse drug reactions.

Adverse drug reactions	No of patients	Percentage
Rash	4	1.6%
Itching	6	2.4%
Nausea and Vomiting	13	5.2%

DISCUSSION

Surgical-site infections account for 20% of all hospital-acquired infections; these hospital-acquired infections continue to represent an important cause of morbidity and mortality.[11] Antimicrobial prophylaxis, long used to prevent infection in several surgical procedures, is being incorporated widely as a performance measure.[12] Cesarean delivery is a major risk factor for postpartum infection.[13] In women undergoing elective and nonelective cesarean delivery, antimicrobial prophylaxis is an important strategy to reduce surgical-site infections.[8]

The objective of antibiotic prophylaxis is to administer an antimicrobial agent that both provides coverage against commonly encountered organisms and achieves adequate tissue and serum drug levels throughout the duration of the operation.[14]

Burke demonstrated the importance of establishing tissue levels of antibiotics before bacterial contamination.[8] Data from human studies reinforce the influence of antibiotic timing on infection rates. Lowest rates of wound infections were observed when antibiotics were administered within 2 hours before skin incision, with infection rates increasing when antibiotics were delayed until after skin incision.[15]

The National Surgical Infection Prevention Project encourages the administration of antimicrobial agents within 60 minutes before incision.[16] Although the historical practice of antimicrobial prophylaxis in obstetrics after umbilicalcord clamping contradicts this basic tenet of surgical prophylaxis, our study is consistent with antimicrobial prophylaxis principles supporting preoperative administration of antimicrobials for cesarean deliveries.

The mean age of the women who underwent cesarean section was to be 24.9 years. Majority of the women were of age group 22-24 and 19-21 years who constituted 38% and 26.8% respectively. This is similar to the study conducted by Jahan Ara Khanem et al where the age group was between 21 to 35 years.[16] The mean age of patients who underwent caesarean section was 25.2±4.7 years in the study conduted by Heethal et al.[17] With an increase in the age the number of women undergoing CS was found to decrease. Among the total population, 21.2% of the women were of age < 20 years. Pregnancy at young maternal age followed by CS is an important predicator of adverse perinatal outcome for mother and babies.[11] Another study explains that although pregnant women less than 18 years old were more likely to deliver preterm than older women but have less maternal and perinatal morbidity and were more likely to have normal vaginal deliveries.[12] So, the risk of CS in teenage pregnancy is not well established.

In our study most of the patients came from low-socioeconomic status that is 35.6%, lower-middle (42.4%). Our study showed that most of the patients who developed post-operative complications were of low socioeconomic status, it may be due to poor nutritional status of the patients. The mean Hb% of these patients was 9.3g% in the study conduted by Heethal et al17 which is similar to our study (9.23g%). Anaemia is one of the risk factors for postoperative complications.

CS is further classified as elective and emergency type. In our study emergency CS (63.6%) was more prevalent than elective CS(36.4%). Emergency CS was common between the age group.[19-23] Our study correlates with the study conducted by Heethal et al17 where most of the cases were of emergency. A study done in Nepal shows that the risk of CS was decreased due to higher incidence of low birth weight in teenage pregnancies as this would be associated with a higher chance of successful vaginal delivery. In addition, local gynecologists are reluctant to perform surgical procedures on teenagers.[13] This might be a reason that there were more emergency caesarean cases than elective ones in women of < 23 years. In our study elective CS was more common in multigravida than primigravida.

A total of twelve different indications were determined in our study. Among them the most common indication for CS was Meconium stained liquor that constituted 24.4% of the total population. The other common indications included premature rupture of membranes (16.8%), Failure to progress (12.4%). CPD (10.8%) and Previous Cesarean section (9.6%). Pre eclampsia, Decreased fetal movements Placenta previa Failed induction, Twin gestation were relatively rare.

In the present study the most commonly used antibiotic for prophylaxis was Metronidazole which was prescribed in 100% of women. Ceftriaxone was used in 57.6% of the study population. Cefotaxime and Gentamycin was used in 42.8% and 35.6% respectively.

Salbactum was least commonly used. All antibiotics used were broad spectrum and bactericidal. An article published by Th-akib*et al*. regarding utilization of antibiotics in CS found that most of the women underwent emergency CS and this was the reason why rate of the antibiotic prophylaxis was very high.[14] Our present study we found that almost two third of the women underwent an emergency CS but also the rate of antibiotic prophylaxis was very high. This may be due to the prescribing habit of the physician. On the other hand, high rate of antibiotic prophylaxis can lead to cases of resistance. The summary of a Swedish-Norwegian Consensus Conference for antibiotic prophylaxis in surgery recommended that second-generation cephalosporins as an intravenous single dose, be used for all emergency and some elective CSs.[18] A systemic review also recently concluded that a single dose of ampicillin or first-generation cephalosporins has been established to be efficacious as the other extended broad-spectrum antibiotics.[19] But from our study we found that metronidazole, ceftriaxone and gentamycin were more commonly used. In addition, the degree of colonization and drug resistance of organisms causing antibiotic failure need to be considered in each area. Fortunately, healthy pregnant women undergoing CS are unlikely to be colonized with drug-resistant organisms from the community prior to surgery.[20] Thus, high spectrum antibiotics should not be required and the cost can be reduced, especially in developing countries. The most commonly used antibiotics were metronidazole, ceftriaxone, and gentamycin which were in contrast to a study done by Th-akib*et al.* where ampicillin was the commonly used one in Nepal.[14] In addition to the drugs mentioned above, a fixed combination like ampicillin+cloxacillin was still used. Although there was no data on the most likely infecting pathogen in high risk CSs, it seems that the choice of the antibiotic was based on empiric and availability considerations.

The number of antibiotics prescribed in this study ranged from 2 to 3. 61.6% of the women got 2 antibiotics for prophylaxis and 38.4% got 3 antibiotics for prophylaxis. Whereas none of the women undergoing caesarean delivery got single antibiotic for prophylaxis. The research of Th-akib*et al.* found that for prophylactic purpose most of the women were given single antibiotic.[14] But our present study found that 2 or 3 antibiotics in combination were given commonly which was more than what was recommended in antibiotic guidelines (i.e. use of single antibiotic for prophylaxis).

In our study all the patients received Antimicrobial agents preoperatively, none of them received intra operatively or while cord clamping. A randomized controlled trial conducted evaluated the administration of cefazolin (2 g, intravenously) at the time of skin incision (at-incision group) compared with administration after umbilical cord clamping in women in labor undergoing cesarean delivery (cordclamping group). The investigators observed a significant decrease in endometritis (7.8% versus 14.8% in the at-incision group and the cord-clamping group, respectively), but not wound infection (3.9% versus 5.4% in at-incision group and cord-clamping group, respectively).[21]

The length of hospital stay following CS in this study ranged from 5 to 9 days. The average length of hospital stay was 6.7 days. Majority of women i.e. 31.2% stayed in the hospital for 6 days followed by 25.6% women who stayed for 6 days. The average length of hospital stay following CS was relatively longer than that reported for both primary and repeated CS (5.2 and 4.7 days respectively).[22] The use of the length of stay is recommended as a measure of quality of care rendered. Hospital stay of 7 days or more following CS identifies patients' in whom the quality of care was less than standards. Therefore, the hospitals need to make better policies in order to provide better health facilities.

In our study, the total number of post operative complications in the patients was about 22.4% (56 patients). Post-operative febrile morbidities were found in 32(12.8%) patients,[16] (6.4%) patients had wound infection and 8(3.2%) patients developed UTI. Endometrosis and pelvic inflammatory disease was not found in our study. In the study conducted Hasan Karahasan et al 21 the most common inflammatory complication was wound infectionin 21 cases (84%) endometritis in 2 cases (0.66%) and peritonitis in 2 cases (0.66%). Fever may occur after any surgical procedure and cesarean section may not necessarily be a marker of infection. The infections after cesarean section were polymicrobial, i.e. the combination of anaerobic and aerobic bacteria.[15]

The common pathogens responsible for post operative complications in this study were E coli, Klebseilla and pseudomonas. This is in contrast to the study conducted by Heethal et al 17 where Ecoli, Klebseilla, MSSA (methicillin sensitive Staphylococcus aureus), MRSE, (methicillin resistant Staphylococcus epidermidis) and Streptococcus faecali. The antibiotics were changed according to the culture sensitivity report and the patients responded to the treatment.

In our study, adverse drug reactions was seen in 9.2% of the patients. Nausea and vomiting was common in patients taking Ceftriaxone. Rash and itching was seen in patients taking amtimicrobial agents containing Gentamicin.

CONCLUSION

- Cesarean delivery is associated with a significantly higher post-operative infection (SSI, WI, UTI) rate than following vaginal birth and other surgical procedures.
- Overall, this study proved that, use of prophylactic antibiotics in women undergoing cesarean section substantially reduced the incidence of episodes of fever, endometritis, wound infection, urinary tract infection and serious infection after cesarean section.
- Majority of the women received more than 1 antibiotic which is not in accordance with the antibiotic guidelines.
- Cases where even narrow spectrum antibiotics can work efficiently, our study revealed that all the antibiotics used were broad spectrum and bactericidal. Hence, a proper guideline is required for optimum antibiotic prophylaxis in CS.
- The antibiotic chosen should be safe and cost-effective to the patient because in our study most of the patients were from low socio economic status.
- Previous reports have concluded that a short course of prophylaxis is as effective as a longer course. So the antimicrobial agents administered should be of short duration to avoid the resistance of antmicrobial agents.
- In surgical practice, there is considerable variation in the timing of prophylactic administration of antimicrobials. Classen *et al*[7] have shown that timing of antibiotic administration was critical in preventing post operative wound infections. We observed that prophylactic antimicrobials were often not administered at optimal time preoperatively to ensure their presence in effective concentration throughout the operative period. Thus therapeutic concentration of the drug may not have been achieved during the operative period. This could have led postoperative complications.
- In our study all the patients received antimicrobials intravenously for the first four postoperative days. This is to achieve high and quick plasmaconcentration of the drug during the period at which the risk of bacterial contamination is maximum.
- Most post surgical infections are due to patient's own organism. The choice of antibiotics should be guided by the knowledge of organisms causing infections within the institution and their susceptibility pattern. In our hospital, the choice of antimicrobial for prophylaxis was appropriate for the expected pathogens and their antimicrobial susceptibility.

However, cefazolin could have been used as it has long t1/2, good tissue penetration and it is cheaper than cefotaxime or ceftriaxone.

- Better data on the safety of the intervention for the mother and infant are needed. Studies should be undertaken to determine what role antimicrobial prophylactic regimens have in the development of antimicrobial resistance.
- So from the data of our study we can say that use prophylactic antibiotic in cesarean section reduces the post operative complication effectively.

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