

## Antibiotic Prophylaxis in Caesarean Section

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### Article Info

#### Article history:

Received Feb 16, 2012

Revised May 17, 2012

Accepted June 2, 2012

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#### Keyword:

Caesarean section

Antibiotic prophylaxis

Nepal

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### ABSTRACT

To study the use of prophylactic antibiotics in caesarean section (CS), a cross-sectional study was conducted at Western Regional Hospital of Nepal for 3 months period. Non-random purposive sampling was done and data about the women undergoing CS was collected using the data collection form. This study included a total of 188 women undergoing CS. The result showed that 42.6% of the women were of 20-24 years of age followed by 31.9% of 25-29 years. The indications for CS included cephalopelvic disproportion (62.2%), oligohydramnios (20.2%), breech presentation (18.1%) and fetal distress (10.1%). Failed induction, multiple pregnancy, failure to progress, dystocia and preeclampsia/eclampsia were relatively rare indications. Elective and emergency CS was common between the age group 20-24 and 25-29 years whereas emergency CS was more common than elective in the age group below 20 and above 39 years. In 99.5% cases metronidazole, 50.5% cases ciprofloxacin and 50.5% cases gentamycin was used for prophylaxis. Of the total women 50% of the women got 3 antibiotics for prophylaxis followed by 47.9% of them who got 2 antibiotics for prophylaxis. The average length of hospital stay was found to be 6.7 days. The results obtained from the study revealed that CS was prevalent in Western region of Nepal and prophylactic antibiotics were commonly used in women undergoing CS.

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### 1. INTRODUCTION

A CS, also known as C-section or Caesar, is a surgical procedure in which incisions are made through a mother's abdomen (laparotomy) and uterus (hysterotomy) to deliver one or more babies [1]. Incisions are made either horizontally or vertically in the uterus. Horizontal cut in the lower section of uterus is called a low transverse incision. In rare circumstances, vertical or "classical" uterine incision is done. This might be the case if baby is very premature and the lower part of uterus is not yet thinned out enough to cut. And if a classical incision is made, it's much less likely to attempt a vaginal delivery with next pregnancy [2].

A C-section may be planned or unplanned. a) Planned/elective cesarean: An elective Caesarean (sometimes called a 'cold section' in medical jargon) is carried out before labour begins [3]. Caesarean sections are planned when a known medical problem would make labor dangerous for the mother or baby. b) Unplanned/Emergency cesarean: An emergency Caesarean is one that is carried out as a result of some complication arising during labour [3].

Infectious complications that occur after cesarean delivery are an important and substantial cause of maternal morbidity and are associated with a significant increase in hospital stay [4]. These complications

include fever, wound infection, endometritis, bacteremia, urinary tract infection and other serious infections (including pelvic abscess, septic shock, necrotizing fasciitis and septic pelvic vein thrombophlebitis) [5-7].

General principles for the prevention of any surgical infection include sound surgical technique, skin antisepsis and antimicrobial prophylaxis. The reduction of endometritis by two thirds to three quarters and decrease in wound infections justify a policy of recommending prophylactic antibiotics to women undergoing elective or non-elective cesarean section [8]. Without prophylaxis, the incidence of endometritis is reported to range from 20 to 85%; rates of wound infection and serious infectious complications as high as 25% have been reported [9]. Therefore, different antibiotics are used for prophylaxis following CS.

A prophylaxis is a measure taken to maintain health and prevent the spread of disease. Antibiotic prophylaxis refers to the use of antibiotics before, during or after a diagnostic, therapeutic, or surgical procedure to prevent infectious complications. Different articles published by Cochrane show the effectiveness of these antibiotics in preventing infections [10,11]. This study aims in determining the antibiotic prophylaxis pattern used for women who have undergone CS in the Western Regional Hospital of Nepal.

## 2. RESEARCH METHOD

**Study type:** A cross-sectional study was conducted from July 20, 2009 to Sep 20, 2009 including 188 women undergoing CS. Non-random purposive sampling technique was used.

**Study site:** The study was carried out at Western Regional Hospital, Pokhara, Nepal. This is the main center for conducting CS in Western Region of Nepal.

**Inclusion criteria:** All women undergoing CS in the study period with absence of prior infection.

**Exclusion criteria:** Those who had infection prior to hospitalization and had been taking antibiotic at the time of hospital admission, and HIV infected women.

**Tools used:** Data collection was done by using data collection form. Questions were prepared using WHO Questionnaire for Maternal Health and data were filled using the complete information of the women from the hospital. The information about women undergoing CS was retrieved from the information sheet available in the hospital. Since the information sheets were filled by trained health professionals in the hospital, the chances of bias are minimal.

**Field administration:** We visited the hospital and collected the required data through the use of data collection form. The data collection was done from July 20 to September 20, 2009 prospectively.

**Ethical consideration:** Ethical clearance was obtained prior to the initiation of the study from School of Health and Allied Sciences, Pokhara University.

**Statistical analysis:** Data was interpreted using SPSS version 12.0.

## 3. RESULTS AND ANALYSIS

Figure 1 represents the age group of women undergoing CS. The mean age of the women was found to be 24.9 years. Majority of the women were of age group 20-24 and 25-29 years who constituted 42.6 and 31.9 % respectively. With an increase in the age the number of women undergoing CS was found to decrease. Among the total population, 10.1% of the women were of age < 20 years. Pregnancy at young maternal age followed by CS is an important predictor of adverse perinatal outcome for mother and babies [12]. 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 [13]. So, the risk of CS in teenage pregnancy is not well established.

Different indications for CS are established. Figure 2 presents the major indications for CS seen in the women. A total of nine different indications were determined. Among them the most common indication for CS was cephalopelvic disproportion that constituted 62.2% of the total population. The other common indications included oligohydramnios (20.2%), breech presentation (18.1%) and fetal distress (10.1%). Failed induction, multiple pregnancy, failure to progress, dystocia and preeclampsia/eclampsia were relatively rare.

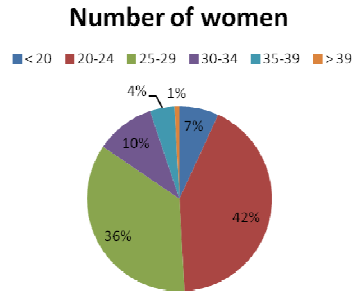


Figure 1. Age group of the women

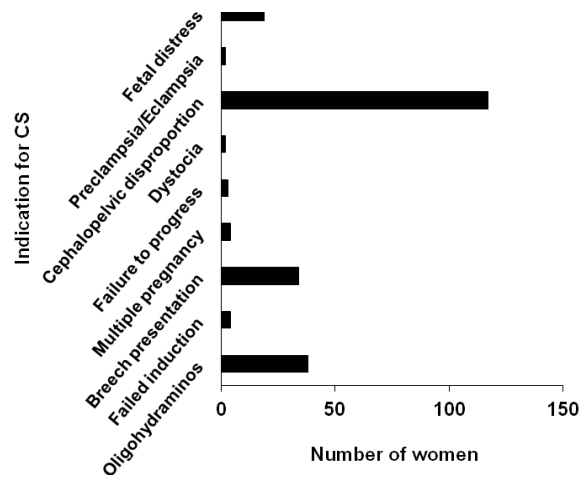


Figure 2. CS indications

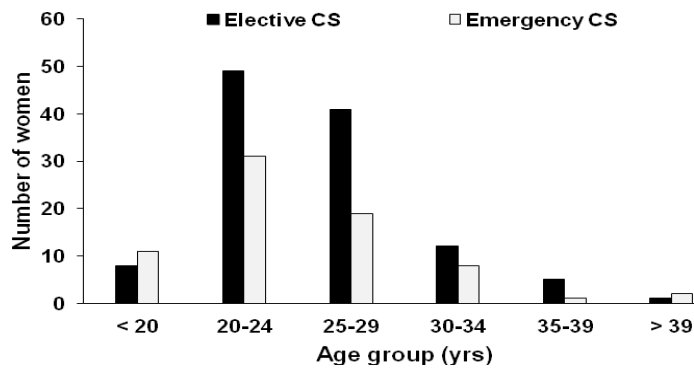


Figure 3. Age group of the women and type of delivery

CS is further classified as elective and emergency type. Figure 3 represents the number of women undergoing each type of CS for different age groups. Elective CS was common between the age group 20-24 and 25-29. In case of the age groups < 20 and > 39 yrs, emergency CS was more prevalent than elective. 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 [14]. This might be a reason that there were more emergency caesarean cases than elective ones in women of < 20 years. With

increase in the age of the women emergency CS rate increases as there are physiological changes like decrease in the uterine contractility along with other complications. So, older maternal age is the risk factor that can lead to emergency CS [15]. Therefore, the cases of emergency CS are higher than elective ones in women >40 years of age.

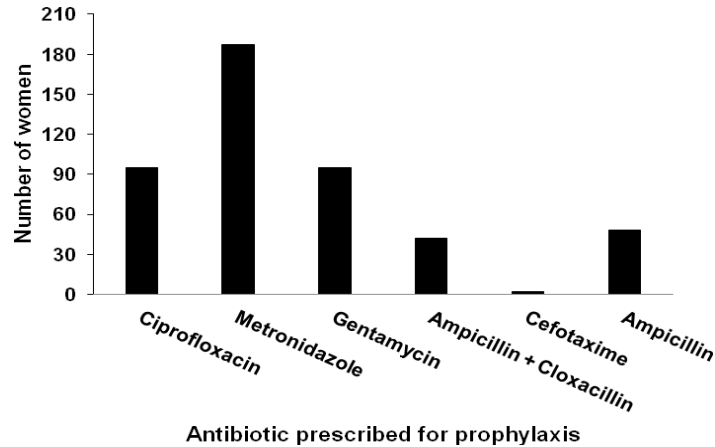


Figure 4: Antibiotics prescribed for prophylaxis

Figure 4 shows the antibiotics that were used for prophylaxis in the women who underwent CS. The most commonly used antibiotic for prophylaxis was metronidazole which was prescribed in 99.5% of women. Gentamycin and ciprofloxacin was used in 50.5% of the study population. Ampicillin and ampicillin+cloxacillin was used in 25.5% and 22.3% respectively. Cefotaxime was least commonly used. All the 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 [16]. Although from our present study we found that only one 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 prescribed antibiotics varied among ampicillin, cefazolin, cefuroxime or cefoxitin in the observational study on post-caesarean infection after antibiotic prophylaxis [11]. 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 [11]. 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 [17]. But from our study we found that metronidazole, ciprofloxacin and gentamycin were more commonly used which are all broad spectrum antibiotics. 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 [18]. 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, ciprofloxacin and gentamycin which were in contrast to a study done by Th-akib *et al.* where ampicillin was the commonly used one in Nepal [16]. 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.

Figure 5 describes the number of antibiotics prescribed in combination to prevent the infection following CS. The number of antibiotics prescribed ranged from 1 to 4. 50% of the women got 3 antibiotics for prophylaxis followed by 47.9% who got 2 antibiotics for prophylaxis. 0.5% of the women got 4 antibiotics whereas only 1.6% 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 [16]. 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).

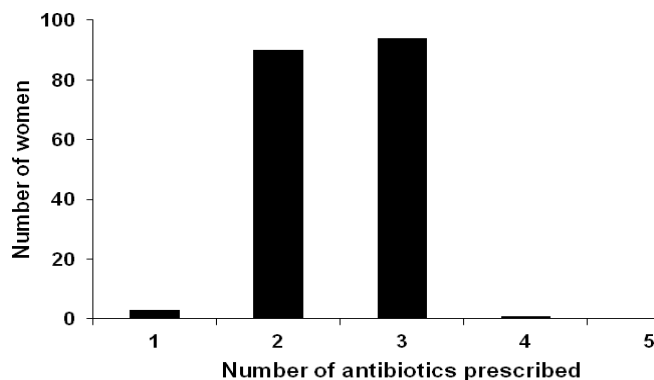


Figure 5. Number of antibiotics prescribed for prophylaxis

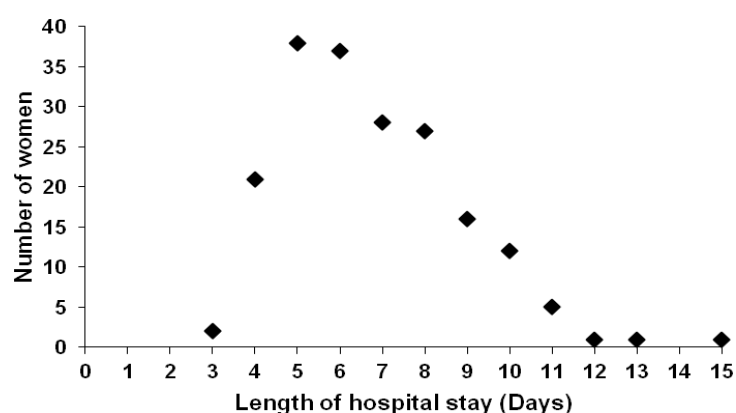


Figure 6. Length of hospital stay following CS

Figure 6 presents the length of hospital stay following CS in the study group which ranged from 3 to 15 days. The average length of hospital stay was 6.7 days. Majority of women i.e. 20.2% stayed in the hospital for 5 days followed by 19.7% women who stayed for 6 days. The average length of hospital stay following CS was relatively longer than that reported from the United States of America for both primary and repeated CS (5.2 and 4.7 days respectively) [19]. While 75% of the women stayed for 7 days, the same proportion stayed for only 5 days or less in the United States. 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.

#### 4. CONCLUSION

CS was found to be highly prevalent among women in the Western region of Nepal. 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.

#### ACKNOWLEDGEMENTS

We express our heartfelt gratitude to Mr. Niranjana Shrestha, Lecturer, School of Health and Allied Sciences, Pokhara University who brought his valuable contribution to this study. We would also like to thank the staff of Western Regional Hospital who assisted us in the study.

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