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ORIGINAL ARTICLE

Effect of maternal age on the rate, type, and indications of caesarean section deliveries: A study from a maternity hospital of Peshawar, Pakistan.

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ABSTRACT… Objective: To evaluate the effect of maternal age on the rate, type (elective or emergency) and indications of caesarean section. **Study Design:** Cross-sectional study. **Setting:** Government Maternity Hospital, Peshawar. **Period:** January 2020 to January 2021. **Methods:** The normal labor register, which contains data of each, and every delivery conducted in the mentioned hospital, was used to find out total number of caesarean sections during the period of study. All those patients were included in the study who underwent caesarean section during the study period. Total number of caesarean sections was 603 after excluding the patients with ruptured uterus, multiple pregnancies, ectopic pregnancy and cephalopelvic disproportion. Maternal age was noted and compared with the rate of caesarean section. Maternal age was further categorized as <20; 21-25; 26-30; 31-35; 36-40 and >40 years. **Results:** Among 603 patients, the majority of patients who underwent caesarean section were in 26-30 years age group followed by 21-25 years. When the indications for caesarean section were compared based on the already defined categories of age, a significant difference ($p<0.001$) was found. Previous caesarean sections were found to be the topmost cause in all age groups while the second common cause was malpresentation. Elective caesarean section rate was found to be significantly higher than emergency ones with p-value<0.001. **Conclusion:** Our results revealed a greater number of caesarean sections in the younger age group; therefore, it can be concluded that maternal age has no direct effects on the rate, type, and indications of caesarean section.

Key words: Caesarean Section, Cephalopelvic Disproportion, Maternal Age, Miscarriage.

INTRODUCTION

The universal rise in interventions related with obstetrics since the 1970s is a matter of great concern because such interventions possibly will not only decrease the maternal and fetal morbidity and mortality but will also enforce hazards of unwanted measures or additional interventions. Cesarean section (CS), one of the most frequent surgical interventions performed on women, is tremendously increasing in number worldwide. The Organization for Economic Co-operation and Development (OECD) and World Health Organization (WHO) also have shared great concerns about the increasing rate of CS.[1,2]

Common factors which may increase the risks of CS include chromosomal or congenital abnormalities, miscarriage, diabetes, hypertension, preterm labor and placenta previa. These factors are more likely to develop in women aged ≥35 years. Moreover, in this age group, decrease chances of future pregnancies and possibility of still births are among the most important concerns which make mother and obstetrician in favor of CS.[3-5] Beside these factors it is also assumed that maternal age can be counted as an independent cause for rising rate of CS and poor obstetric outcomes.[6-8]

Increased maternal age per se indicates a decline of normal functions including the uterine muscles, genital tract, and the endocrine system.[6] Several evidences favor a constant age-related deterioration in the bodily abilities to achieve adequate contractions of uterus required for normal labor, thus increasing a possible threat

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of labor dystocia.[7,8] Therefore, the increased rate of CS may also be a result of associated comorbidities linked to increased maternal age.[9,10] Likewise, primigravida are believed to be more prone to have CS than multigravida. For both mother and child, CS may result in short- and long-term consequences which may impose more risks in forthcoming pregnancies. Data also reveal that the frequency of cesarean deliveries are more among women aged ≥35 years in comparison with women younger than 35 years.[11]

In Pakistan, most of the females were previously getting married in younger age especially in the rural areas. However, now because of much awareness and education this trend is declining but at the same time the number of CS has increased greatly in the last few years. Previously some studies were performed to find out the association of maternal age and frequency of CS, but no one evaluated its effect on the type (elective or emergency) of CS performed and its indications. Therefore, the present study was designed to fill the identified gaps in the literature by finding the effect of maternal age on the type, frequency and causes of caesarean deliveries in Pakistani population. Moreover, this study will also help to suggest remedial measures for the modifiable causes of CS which are associated with increase maternal age.

METHODS

A record based retrospective study was performed from January 2020 to January 2021, at Government Maternity Hospital, Peshawar after approval from ethical committee (RMI/RMI-REC/Approval/162) (24-10-2022). The hospital caters both booked and unbooked patients of rural and urban areas of district Peshawar. Annual delivery rate in the said hospital is almost 4500-5000. The normal labor register, which contains data of each and every delivery conducted in the mentioned hospital, was used to find out total number of CS during the period of study. All patients who underwent CS during the study period were included in the study. Total number of CS during the study period was 603 after excluding the patients with ruptured uterus, multiple pregnancies, ectopic pregnancy and cephalopelvic disproportion. Age was noted and compared with the rate of CS. Maternal age was further categorized as <20; 21-25; 26-30; 31-35; 36-40 and >40 years. Name of the patients was kept confidential.[12,14]

Data Analysis and Interpretations

SPSS version 20 was used for statistical analysis. Calculations were made separately for different categories of age and expressed in percentage. ANOVA was used to compare different indications for CS. Comparison of indications based on elective and emergency CS was done by using Chi-square test. P-value <0.05 was considered statistically significant.

RESULTS

Age of Patients

Among 603 patients, maximum patients who underwent CS were in 26-30 years age group followed by 21-25 years. Initially, in the younger age group the rate of CS was low and then it started rising till 30 years of age and then again started declining (Table-I).

Age (years)	No. of Patients	% Age of Patients
<20	13	2.15
21-25	146	24.21
26-30	293	48.59
31-35	107	17.74
36-40	38	6.30
>40	6	1.0

Table-I. Age of patients versus rate of C-section (n=603)

When indications of CS were compared based on the already defined categories of age, a significant difference (p<0.001) was found. Previous CS were found to be the topmost cause in all age groups while the second most common cause was malpresentation. Similarly, the majority of CS were performed in the 26-30 years age group (Figure-1).

The number of miscarriages was also noted and compared age-wise. Miscarriages were not counted cumulatively, miscarriages which took place in that particular age were counted only. The highest number of miscarriages was found in 26-30 years, followed by 31-35 years. No

miscarriage was found in the participants having age <20 and >40 years (Figure-2). A significant difference was found with p-value <0.001 among different groups based on age.

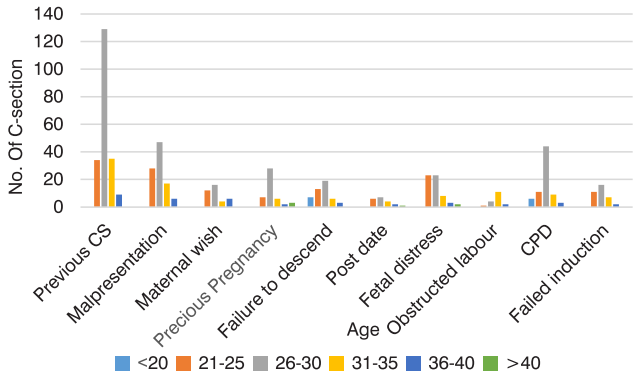

Figure-1. Age wise indications for C-section

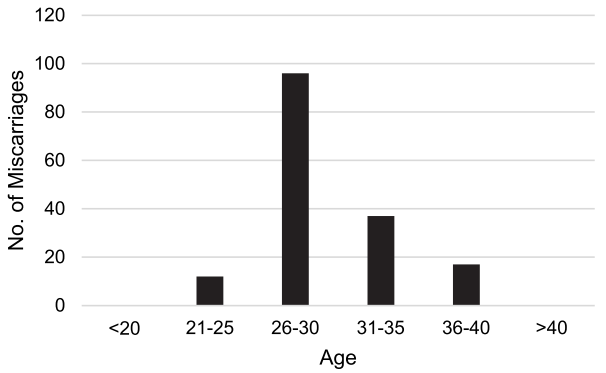

Figure-2. Number of miscarriages based on age

CS were further compared based on elective and emergency CS. Elective CS rate was found to be high for both the indications with p-value <0.001 each (Figure-3).

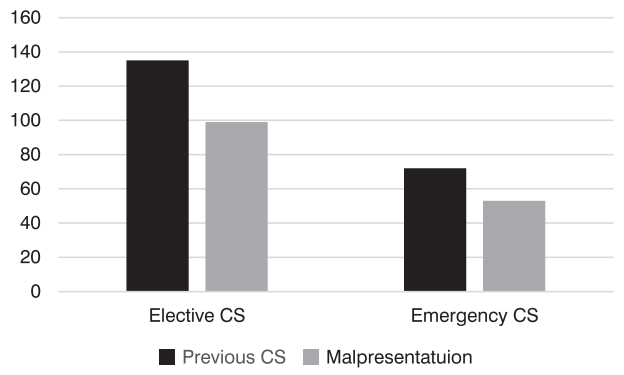

Figure-3. Comparison of emergency and elective C-section based on indications (previous CS & malpresentation)

DISCUSSION

This study was carried out at Government Maternity hospital, Peshawar from January 2020 to January 2021, a total of 603 CS were performed during the period of study. Most of the CS were performed for the age group 26-30 years followed by 21-25 years. A significant difference (p<0.001) was found when different indications of CS were compared. Similarly, difference between the rate of CS based on elective and emergency was also found to be significant (p<0.001).

In United States, a study was performed by Boyle et al, they evaluated the data of 38,484 patients who undergone CS. This study was performed on a large scale involving multiple centers; 19 hospitals and 12 clinical centers. They found that the rate of CS was more in the 25-29 years age group followed by 20-24 years both in primigravida and multigravida. The total percentage of CS in 25-29- and 20-24-years patient was 24.8% and 22.9% respectively.[15] Similarly, Sethi et al performed a study in India. They included multigravida with pregnancy of more than 28 weeks, who had earlier vaginal delivery of more than 20 weeks gestation. They also reported that maximum number of women undergoing CS were from the age group of 25-29 years (41%).[16] Another retrospective hospital-based study was carried out by Unnikrishnan et al in a tertiary care hospital specializing in Obstetrics and Gynaecology. They also found the majority of CS in the 21-30 years age group.[17] The findings of these mentioned studies are comparable to ours. Reasons for a greater number of CS in the age of 26-30 years may be that it is the most reproductive and fertile age of a female, majority of the women want to complete their families in this period. Moreover, in Pakistan some of the females either get marry or deliver for the first time during this age, it can be another reason for more frequent CS. Similarly, medical augmentation to avoid and manage labor dystocia is commonly used especially in elderly woman as compared to younger ones, proposing a reduced uterine ability to make satisfactory progress during labor.

Kim et al performed a study to find the effect of maternal age on rate of emergency CS at

term in nulliparous females who have cephalic presentation of fetus and were trying normal vaginal delivery without any indication for CS at the start of labor. Out of 3513 women, 541 (15.3%) were delivered by emergency CS, rate was significantly higher in woman aged >35 years. Non reassuring fetal heart rate was responsible for performing emergency CS in 150 (28%) cases while arrest disorders in 391 (72%) cases.[18] In our study elective CS were found to be significantly higher than emergency CS and the main indication responsible for both type of CS was previous CS followed by malpresentation. It may be because of the majority of booked and multigravida patients in our study.

Another surprising finding in our study was that a smaller number of miscarriages were found in females of 30 years age as compared to younger participants and no miscarriage was found in 40 years age group. Many studies have shown an association of miscarriage with maternal age. A study was performed by Magnus et al in Norway, 421201 patients were included in the study. They evaluated the association of miscarriage with maternal age. Risk of miscarriage was found lower (10%) in 25-29 years while it started increasing after 30 years and was highest (53%) in women ≥45 years.[19] Likewise, Anderson et al conducted a study in Denmark to find the effect of maternal age on miscarriage's rate. Overall, 13.5% pregnancies ended in fetal loss; among which 8.9% miscarriages took place in women aged 20-24 years and 74.7% in ≥45 years. Increase in maternal age was a key risk factor responsible for miscarriages regardless of previous history of miscarriages, parity, or calendar period. Increasing maternal age also increases the chances of stillbirths and ectopic pregnancy.[20] The findings of these studies are in contrast to our study.

In our study no increase in the rate of CS was found with an increase in maternal age. It may be due to inclusion of majority of booked patients in the study. Secondly, women aged ≥35 years were supposed to visit hospital more frequently for regular antenatal checkups. They were thoroughly examined, investigated, and timely managed for development of complications if found. Moreover, as most of the patients ≥35 years age were multigravida with previous normal vaginal deliveries, therefore, risks of CS were comparatively less in them.

CONCLUSION

Results of this study revealed that increase in maternal age has no direct effects on the rate, type and indications of caesarean section.

LIMITATION OF THE STUDY

More multicenter studies are needed for the generalization of results.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
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2	Ayeman Aftab	Literature search, Conception & design, important intellectual content and final approval.	
3	Muhammad Haider Aftab	Literature search, Conception & design, acquisition of data, and final approval.	
4	Rizwan Faisal	Conception & design, acquisition of data, important intellectual content and final approval.