Pak. J. Biotechnol. Vol. 16 (2) 127-131 (2019) pISSN: 1812-1837 eISSN 2312-7791 www.pjbt.org
http://doi.org/10.34016/pjbt.2019.16.1.19

ECONOMIC BURDEN OF CAESARIAN SECTION DELIVERIES AT CIVIL HOSPITAL HYDERABAD from PATIENTS PERSPECTIVE

A cost estimating cross-sectional study

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Article received 23.2.2019, Revised 15.6.2019, Accepted 20.6.2019

ABSTRACT

Background: Caesarean Section (CS) is a surgical process to minimize the risk of complications associated with vaginal birth and saves the life of both Mother and Child. Although it has economic aspects that directly effect on low income families. This study was designed to estimate the total average costs and to evaluate the opportunity cost of mothers and her guardian after cesarean section at public tertiary care Hospital.

Methodology: It was a Hospital based cost estimating cross-sectional study. Total 270 mothers were randomly selected and interviewed. Data was collected through a semi-structured questionnaire consisted of demographic and expenditure on various factors of care for the cesarean section delivery.

Results: The average unit costs for cesarean section delivery were 7647 rupees (69$). The mean opportunity cost of cesarean section delivery of days of work loss were 1334.02 rupees (12.13$) respectively. Duration of stay (>5 days) at cesarean section wards (p =0.000) and comorbidity (p = 0.001) was showed the significant association with total cost 2064769 (18603.57$).

Conclusion: This study concluded that expenditure on cesarean section delivery and the opportunity cost of time of work loss were high, and it was equal to/ more than the monthly household income of one-fourth of families. Postpartum mothers and their families were economically affected due to high costs.

Keywords: cesarean section, unit cost, patient's perspective, opportunity cost

INTRODUCTION:

Caesarean Section (CS) is a surgical process to prevent poor obstetric results and can save approximately 2.9 million neonatal and 0.18 Million maternal deaths worldwide by every year (Campbell and Graham, 2006, Lumbiganon 2010)).

However, it seems that Caesarean Section saves the lives of both Mother and Child from some critical situations such as uterine rupture and placenta praevia (Liu et al., (2007)). The optimal rate of caesarean section is unknown however very low and very high rates of Caesarean section can be dangerous. According to WHO, the range estimate of CS rate must be 5–15% (WHO Unicef, 2009), but over past few decades the rate of caesarean section deliveries increases rapidly worldwide (Betrán et al., 2016), and It becomes challenge for universal and individual nation's healthcare system. (Beogo et al., 2017) Globally 18·6% of females were giving delivery by cesarean section by WHO (Miller et al., 2016). This increasing rate in CS is always a reason for risk for both Mother and Child. Caesarean Section carries nearly three times more the risk of Mother's disease and death in comparison to normal vaginal birth (Beogo et al., 2017). The maximum rate of Caesarean Section is (32%) which was described in Latin America and the Caribbean region, while the African region reported the minimum rate as 7% (Betrán et al., 2016). Caesarean section is a very costly surgical process even though various discounted services are provided by different public facilities but still costs too much as compare to normal deliveries. An evaluation of the economic factors of other delivery modes revealed a range of expenses of £1238–£3551 for cesarean section (CS) likened with £629–£1298 for normal vaginal delivery. Surgical sections delivery cost in the UK is nearly £760 that is more than a vaginal delivery, and that increase gives an evaluation that 1% reduction in each optimal delivery rate would save five million pounds nationwide (Penna et al., 2003). The increasing Caesarean Section rates also observed as an economic burden. The global estimated cost of excess cesarean section by World health organization (WHO) is to be $2.3 billion dollars (Gibbons et al., 2010)

Only Provider's perspective is not sufficient to view hospital-based delivery. An amount of unseen spending for expectant females to visit city hospitals throughout delivery can mirror the actual situation of the economic load for expectant females. (Acharya et al., 2016)

In Pakistan the limited data is present regarding estimation of economic burden of caesarean section and opportunity cost of caesarean section. Researches regarding estimation of economic burden in surrounding of developing countries like Pakistan can be beneficial for health policy makers to govern the essential projects to progress facility presence that eventually decrease the rate of unnecessary C-section which ultimately will improve Mother and Child Health (MCH). So, the rational of this study

is to decrease the rate of unnecessary C-section and improve Mother and Child Health (MCH).

MATERIALS AND METHODS

Study design: The study was Hospital based cost estimating cross-sectional study that was conducted to estimate the economic burden of the caesarian section from patient's perspective by calculating the average per person cost. Duration of the study was from 1st September 2017 to 30th Nov. 2017.

Study area: This study was carried out at the Liaquat University Hospital, usually known as Civil Hospital Hyderabad is a 1450 bedded tertiary care hospital in Hyderabad. Since 1881 this hospital providing basic health facilities, it has various departments like Vascular Surgery, Cardiothoracic Surgery, Cardiology, Pediatrics, Obs and Gynae, Nephrology, Accident and Emergency etc.

Sample size and sampling techniques: Simple random sampling technique was used to select 270 postpartum mothers with their husbands that were interviewed to estimate total average cost and opportunity cost at CIVIL hospital Hyderabad between 19th October and 19th November 2017. All the participants were interviewed at the time of discharge.

Data collection and analysis: The questionnaire was adopted from a Pakistani study (Khan et al., 2010). The questionnaire consisted of 3 sections: demographic characteristics, direct and indirect medical cost, opportunity cost. 38 questions that were asked to participants.

Participants were informed about the purpose of research and they were also informed that the data would only be used for research purpose and it would be strictly kept confidential.

Mothers were asked about the delivery-related expenses and delivery related information loss of their daily wages between the period of stay in the hospital to calculate the opportunity cost of work loss generated by way of the condition, if the respondent's level of income reflected efficiency (primarily based at the human capital technique methods) (Sabes-Figuera et al., 2010). Attendant of mothers was asked to give receipts of payments and medical records.

The financial burden on postpartum mothers and their families was calculated based on the market rate (or 'shadow price') (Sabes-Figuera et al., 2010). The cost data were entered into Microsoft Excel to get average, percentages, maximum, minimum and total costs. The cost data and demographic data were entered into SPSS version 20. Data were analyzed using mean, median, percentages, frequencies, multiple linear regression and simple linear regression were used to estimate the confounder and also analyze the association between total cost and comorbidity, age and duration of stay in the hospital. For statistical significance, the P-value was taken (less than or equal to 0.05).

Multiple variables were used to estimate economic burden and opportunity cost of patient who deliver their babies through caesarean section.

Ethical considerations: The study was approved by ethical review board committee of health services academy and the civil hospital where the study was conducted. Informed verbal consent was taken from participants. Evidence will be reserved strictly confidential. Data will be used exclusively for the determination of the study. There will be no financial reward to study contributors. There will be no straight advantage to the individual study contributor but in the extended run, there will be profit to the public and country.

RESULTS

Demographic characteristics: A total of 270 participants were recruited randomly for the study between the age group that ranged (15 years to 40 years), the mean age of mother's ware 26 years. The mean number of children alive was 1.33 and mean number of durations of stay in the caesarian section was 4.03 (min 3- max 11). The mean monthly income of the household was 18176 rupees (164$).

Table -1: Socio-demographic characteristics of women with caesarian section delivery (n = 270).

Characters	**Mean ± SD**	**Rang**
Age	26	15-40
Duration of stay	4.03	3-11
Monthly income	18176	3000-60,000
Age of mothers	**Frequency (n)**	**Percentage (%)**
Age	26	15-40
Duration of stay	4.03	3-11
Monthly income	18176	3000-60,000
Edu Level	**Frequency (n)**	**Percentage (%)**
Illiterate	130	48.1
Primary	85	31.5
Secondary	46	17.0
Higher secondary	9	3.4
HH Income PKR)	**Frequency (n)**	**Percentage (%)**
3000-10,000	72	26.7
10,001-20,000	122	45.2
>20,000	66	24.5
Unemployed	10	3.7

The Economic burden of Caesarian section deliveries including opportunity cost was "2064769" rupee (18768.75$), and the total cost of the caesarian section excluding opportunity cost was "1704-583" (15494.66$) respectively. Major cost factors from patient perspective were Transport 20%, Diagnostics 18% and Opportunity cost 18% these three components contribute a higher proportion to the total cost that affects more to the economic burden

of the caesarian section to patients and their families as shown in (table 2).
The average unit cost of the caesarian section including opportunity cost was "7647" rupees (68.82$). The unit cost excluding the opportunity cost was "6313" rupee (56.82$).

Table 2: Economic/financial burden of Hospital-based caesarian section

Cost factors	Mean (Pkr/dollar)	Total Cost (Pkr/ dollar)	Percentage
Transport cost	1548 (14&)	418080 (3767$)	20%
Cost on Dugs	1221 (11$)	329685 (2970$)	16%
Food cost	870 (8$)	234778 (2115$)	11%
Cost on Diagnostics	1359 (12.24$)	367010 (3307$)	18%
Cost on Blood Transfusion	705 (6$)	190450 (1716$)	9%
Opportunity cost	1334 (12$)	360186 (3245$)	18%
Cost on Tips	382 (3.44$)	103180 (930$)	5%
Others	227 (2$)	61400 (553$)	3%
Total cost including (OC)	7647 (69$)	2064769 (18603.57$)	100%
Total cost excluding (OC)	6313 (57$)	1704583 (15358.29$)	

Opportunity cost: The opportunity cost was one of the most contributing cost factors and also affect more to the economic burden of caesarian section deliveries on mothers and their families. The opportunity cost of 58% husbands who lost their wages due to staying in caesarian section wards was Rs 360186.00 (3274.09$) and the average unit opportunity cost per patient (family) was Rs1334.0222 (12.13$) respectively. Two mothers were employed out of the total study population that was 270, none of them lost their wages. 260 husbands were employed, out of the 158 lost their wages and 102 were not lose their wages. Only 10 was unemployed. 158 were give-up from wages instead of staying at the hospital (table.4).

Table 3: The Opportunity cost of time stayed in Caesarian section ward

Characters	Employed	Unemployed	Loss of wages	Total monthly income	Mean of total monthly income
Mother	02	268	00	55,000 (500$)	27,500 (249.98$)
Husband	260	10	158	4,852,500 (44109.23$)	18663 (169.65$)

The opportunity cost of time stay in Hospital	Total cost	Mean	Range
Caesarian section	Rs360186 (3274.09$)	Rs1334.0222 (12.13$)	Rs500-Rs12000 (4.55-109.08)

The relationship between total Economic/Financial burden and other characteristics: The study shows the strong association between the duration of stay in caesarian section ward (p=.000) and total costs and also a positive association is found between comorbidity (p=.002) and total costs

DISCUSSION

The average unit cost of hospital-based cesarean section deliveries was 7647 rupees (69$) and less than one third (27%) participants were earned less or equal to average unit cost in a month. These results show that the facility based caesarean section delivery was expensive exposure for mothers from lower and middle socioeconomic status even there were no hospital charges and it is also observed that economic burden of caesarean section need to be decreased by focusing on some socio-demographic aspects like (mother's education, employment status of mothers and their husbands and household economic status) and also some delivery related elements like (distance from hospital, duration of stay, and travel time). Near to half (45%) of households were earned 10,000-20,000 rupees (90 US$-181 US$) per month, and the mean monthly income was 18176 rupees (164 US$). Most of them were belongs to low socioeconomic status. They earned on daily basis, their daily earning range was 100-2500 rupees (0.91 US$- 22.63 US$), we calculated their daily income to monthly income. With concern to household income, many families cannot afford the cesarean section delivery's costs, some of them borrow from relatives and friends. A similar study conducted at Nigeria showed that the average unit cost on care was 39,400 Naira (246.3 US$), less than half (46.7%) participants earn less than the average unit cost 39,400 Naira (246.3 US$) in a month and their mean monthly income was about 13000 Naira (Adamu et al., 2013).
A study was conducted at public hospitals in Nigeria in which cost for childcare was first and cost on food was second major cost contributor to the total cost of facility-based cesarean section delivery respectively (Adamu et al., 2013). Similarly, another study was conducted in Bangladesh in which the cost of medicine was first, transport was second and food for patients was a third major expenditure of hospital-based cesarean section delivery (Acha-

rya et al., 2016). And this study showed the cost of transport was first, diagnostics and opportunity cost was a second major expenditure of the facility based cesarean section delivery. The total cost of drugs was on the fourth number because some drugs were provided for free to patients that's why the burden of drugs was less than others cost factors. Hospital dues and consultant fees were also free of costs.

The opportunity cost is one of the most important cost factors that measure how much you give up in terms of real cost by carrying out an activity. The more exact words used for opportunity cost is familiar caregiver's time cost or alternative cost. In our study the mean opportunity cost was 1334.0222 rupees (12.13$) that showed the greater loss of wages due to the work loss of husbands after delivery, only two mothers were employed in our study and they were not contributing to the opportunity cost because they had permanent jobs. A quite similar study was conducted at Nepal found a higher mean opportunity cost for cesarean section delivery that was 8,354.04 NRs (81.9 USD) respectively. Employment ratio of mothers was less than one third (20.4%) and was contributing to the opportunity cost (Beogo et al., 2017). Opportunity costs of work loss are an economic burden on poor persons who depend on daily wages.

The opportunity cost was determined after classifing the work status of the caregivers and the patient as salaried work, unemployed or housework. Housework was given a monetary value of 45 US$ (3000 rupees per month) the minimum permissible salary in Pakistan. Unemployment was not given any monetary value. Intangible costs which reflect the patient's level of pain and suffering and the limitations it imposes on the quality of life are difficult to measure and were not measured in this study.

Furthermore, in our study, multiple regression was analyzed that showed a strong association between the duration of stay in caesarian section ward and total costs and a positive association is found between comorbidity and total costs. These results show that number of children alive, the age of mothers and monthly income have not significant association with total costs. A study showed the same results that indicate a strong connection between total cost and duration of stay in the ward and also between household monthly income and total cost that was conducted at Pakistan (Betrán et al., 2016). This association shows the total cost depends not only on cost factors but some other study variable too. When we increase the duration of stay in cesarean section ward, the total cost also increases. Facilities might decrease the economic burden by decreasing the duration of stay at the hospital ward. A linear regression model was used to confounder, results were not significant that showed that there was no confounder in this study neither age nor comorbidity.

Management of government facility have to ensure that caretaker do no pay tips for daily services to waged staff and also maintain cleanness and hygiene in caesarean section ward because operated mothers are more vulnerable to infectious diseases and Government also should have introduced public private partnership (PPP) to reduce economic burden of maternity care from mothers and their.

Conclusion: This study concluded that expenditure on cesarean section delivery and the opportunity cost of time of work loss were high, and it was equal to/ more than the monthly household income of one-fourth of all families. Postpartum mothers and their families were economically affected due to high costs. More than half of the costs of C.S delivery were attributed to transport, diagnostics and opportunity cost. Some study variables such as comorbidity and the duration of stay were directly affected to total expenditure. In this study age was a confounder.

Mothers with a high monthly income were able to spend their money for non-medical expenses and poor were not. Health insurance concepts should be introduced to make maternal healthcare more affordable to the poor and average households and also recommended that the hospital management should introduce some policies to make transport free for poor who came from rural areas.

5.3 Limitations: This study had some limitations. First, the study was conducted in only one public tertiary hospital in Hyderabad, it is thus not possible to generalize our results to all the public hospitals. Second, the comparison was not conducted between the costs of the mode of deliveries, patients, and Providers perspective and public and private hospitals. Third, due to the time constraint, it was not feasible to take qualitative methods to get more data and a better understanding of the issues, as in other similar studies. Fourth, the quality of life was not measured in this study because it was difficult to measure.

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