

STUDY OF SIX SIGMA METHODOLOGY TO REDUCE CESAREAN SECTION RATE IN INDIAN HOSPITAL

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ABSTRACT

Cesarean section (CS or C-section) is a surgical conveyance of a child that includes making incisions in the mother's stomach divider and uterus. By and large considered protected, C-sections do have a larger number of dangers than vaginal births. Furthermore, mothers can return home sooner and recover quicker after a vaginal conveyance. Certainly, the C-section rate is high in a considerable lot of the created countries too, for instance almost 32% of all institutional conveyances in the US are done through a C-section, while this figure is 33% for Australia, 28% for Canada and 35% for China, according to information compiled by the World Health Organization. This implies the C-section rate in India is twice the ideal rate. It is just in the public authority sector hospitals in provincial India where under 15% ladies conceive an offspring through medical procedure. The C-section rate in government hospitals in the urban sector is almost twofold at 26%. Yet, with regards to private sector hospitals, a larger part of births (54% in provincial territories and 56% in urban regions) are conducted through a C-section, which is very nearly multiple times more than the ideal rate. Certainly, the C-section rates are considerably higher in charitable hospitals, however just about 1% births happen in such hospitals.

Keyword: WHO, delivery, cesarean section

INTRODUCTION

Six Sigma methodology deals with the identification of major root causes and guarantees the targeted results by providing a solution, both in terms of improvements desired and time span fixed. Six Sigma is a disciplined, data-driven approach and methodology for eliminating defects in any process from manufacturing to transactional, from products to services. Lean Six Sigma in healthcare has been even more controversial among the practitioners in the last few years, with some of them visualizing it a large amount of opportunities, but with others doubtful in achievability of success in such environments [1].

As a consequence, people involved in the project enhanced their knowledge and skills. As a reason, not only does an organization itself gain benefits from implementing Six Sigma in terms of cost savings, productivity enhancement and process improvement, but individuals involved also increase their statistical knowledge and problem-solving skills by conducting a Six Sigma project.

A fundamental piece of Six Sigma is DMAIC. The DMAIC model alludes to five interconnected stages that efficiently assist associations with tackling problems and improve their cycles. Dale et al. (2007) momentarily defines the DMAIC stages as follows:

- Define – this stage inside the DMAIC interaction includes characterizing the group's job; project extension and limit; client prerequisites and assumptions; and the objectives of those projects (Gijo et al., 2011).
- Measure – this stage incorporates choosing the measurement elements to be improved (Omachonu and Ross, 2004) and giving a design to assess current execution just as evaluating, looking at and checking resulting improvements and their capacity (Stamatis, 2004).
- Analyse – this stage habitats in deciding the underlying driver of problems (abandons) (Omachonu and Ross, 2004), understanding why deformities have occurred just as contrasting and focusing on promising circumstances for advance improvement (Adams et al., 2003).
- Improve – this progression centers around the utilization of experimentation and measurable procedures to create potential improvements to decrease the measure of value problems and additionally deserts (Omachonu and Ross, 2004).
- Control – at long last, this last stage inside the DMAIC interaction guarantees that the improvements are supported (Omachonu and Ross, 2004) and that progressing execution is checked. Cycle improvements are likewise archived and organized (Stamatis, 2004).

DMAIC looks like the Deming's consistent learning and interaction improvement model PDCA (plan, do, check, act) (Deming, 1993). Inside the Six Sigma's methodology, the DMAIC model shows, bit by bit, how problems ought to be tended to, gathering quality devices, while setting up a normalized routine to tackle problems (Bezerra et al., 2010). Hence, DMAIC guarantees the right and powerful interaction execution by giving an organized strategy to tackling business problems (Hammer and Goding, 2001). This thorough and restrained design, as per Harry et al. (2010), is the thing that numerous authors perceive as the fundamental trademark which makes this methodology exceptionally successful.

Although cesarean delivery can be a life-saving surgery, this procedure should be performed only when medically indicated, as complications that have adverse consequences for the mortality and morbidity of both the mother and the newborn are well documented in the literature. Some of the negative health outcomes in infants born via cesarean delivery include childhood obesity, respiratory disorders, type 1 diabetes, acute lymphoblastic leukemia, impaired cognitive development, higher rates of autism, and an increased risk of neurodevelopmental disorders. Cesarean delivery has been reported to be associated with an approximately 4-fold increase in the risk of maternal death. In addition, unnecessary cesarean deliveries may be associated with higher health care costs in many low-income settings.

India has also experienced increases in cesarean delivery rates similar to those observed in the rest of the world. Based on our calculations, cesarean delivery rates have more than doubled in India as a whole, from 8% in 2005 through 2006 to 17% in 2015 through 2016. The World Health Organization (WHO) recommends that the percentage of cesarean deliveries should not exceed 10% to 15% in any nation. The present study assessed the variation in cesarean delivery rates in public and private sector health facilities in India to evaluate whether private facilities were associated with increases in cesarean delivery rates and to estimate the burden of avoidable cesarean deliveries in the private sector.

Objectives of the study:

- 1- To investigation cesarean section rate and increase rate of vaginal conveyance in India.

RESEARCH METHOD

The examination, this article reliant on Secondary sources like books, journal, articles, discourses, reviews, research reports, etc Subsequently, factors, the National Family Health Survey (NFHS), of India clinic. The motivation behind this examination was to comprehend the cesarean section rate was explored the definite understanding specifically for the medical clinic industry in India relating to information investigation on quality activities predominant in hospitals, existence of value divisions and critical thinking groups in hospitals with respect to Lean Six Sigma hospitals (LSSH). The paper follows the DMAIC methodology to systematically investigate the root cause of defects and provide a solution to reduce/eliminate them. Vishwasudha Hospital, Savda (MH) giving consideration to around 15000 puerperae yearly. This investigation

was directed in 2018 and followed the DMAIC guide step- by-step, beginning from the Critical-To- Quality (CTQ) measure, breaking down the current interaction execution just as finding potential impacting factors on the CTQ, and afterward actualizing evidence-based improvements. Mean ± standard deviation esteems ($\chi \pm S$) are introduced for nonstop and ordinal information, and downright information are introduced as the supreme check and rate.

DATA ANALYSIS

Define

The reason for this stage is to decide the venture degree and article ties, set up the undertaking group, and affirm the jobs and responsibilities of task colleagues. The extent of the undertaking was parturient ladies who conceived an offspring Vishwasudha Hospital, Savda (MH). Vishwasudha Hospital is one of the most established enlisted multi strength clinics arranged in the heart of Maharashtra. The cycle beginning and finishing focuses were maternity confirmation and cesarean section, separately. The objective assertion in October 2018 was to diminish the cesarean section rate to 42%, and the CTQ of the venture was the cesarean section rate. An imperfection was defined as a parturient lady who went through a cesarean section.

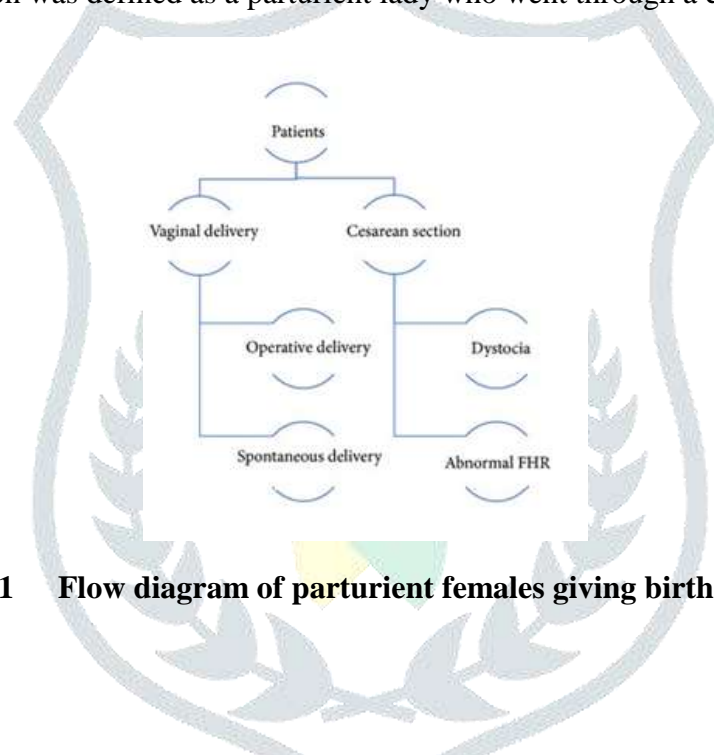


FIGURE 1 Flow diagram of parturient females giving birth in hospital

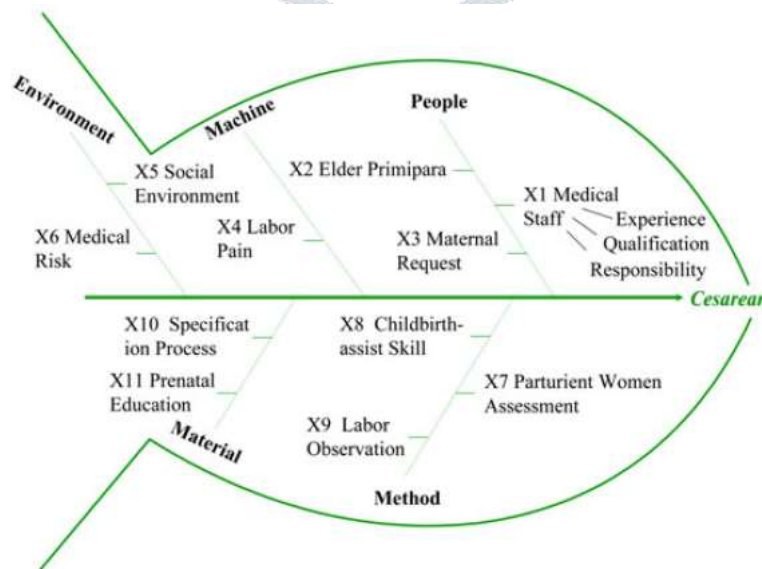


FIGURE 2 Analysis of cesarean section complication diagram (Chai et al.,2016).

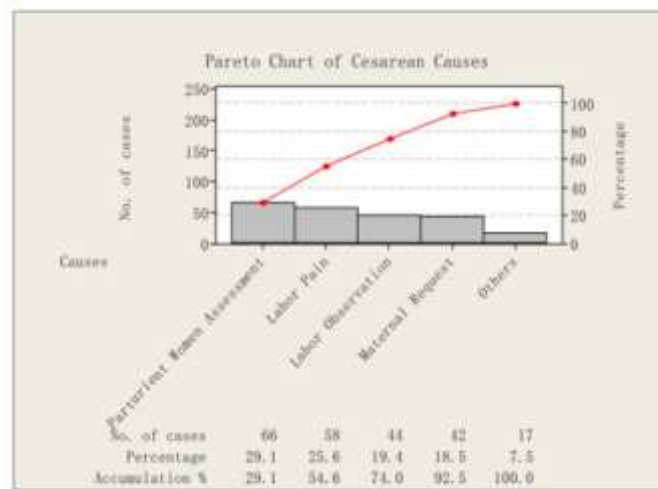


FIGURE 3 Pareto chart of the highest reasons of cesarean section (Chai et al.,2016).

was on the job, mentioning that lesser inhabitants answered to unrivaled doctors in a convenient way when a circumstance was outside their capacity, undertaking further assessment, and dodging cesarean section due to the specialist's shortcoming.

Measure

The vital strides in this stage are introduced in the flowchart appeared in Figure 1. At first, the information assortment structure was planned, with Y addressing the quantity of cesarean sections performed. At that point a meeting to generate new ideas was dispatched, pooling the experience and endeavors of colleagues, which exploited a Cause and Effect Analysis Diagram to distinguish reasons for cesarean section from 5 viewpoints: individuals, machine, climate, technique, and material. This shaped the premise of the second information assortment structure, after patients with legitimate clinical purposes behind cesarean section, like fetal pain and oligohydramnios, were avoided. Auxiliary information assortment included X1 maternal solicitation, X2 clinical staff (insight, capability, duty), X3 senior primipara, X4 work torment, X5 social climate, X6 clinical danger, X7 parturient ladies appraisal, X8 childbirth-assist expertise, X9 work perception, X10 determination interaction, and X11 pre-birth training (Figure 2). The technique for information assortment was an irregular assortment of 1332 consecutive cases from documented records in January 2018.

Analysis

ANOVA programming investigation uncovered that the inadequate rate at standard was 52.31% (512/1332), and the cycle power Six Sigma score (i.e., Z esteem) was 2.106. After 256 patients with legitimate clinical explanations behind cesarean section were avoided, the Pareto Chart (Figure 3) showed that maternal solicitation (X1), work torment (X4), parturient ladies appraisal (X7), and work perception (X9) were the principle purposes behind cesarean section.

Improve

For the principle purposes behind cesarean section portrayed over, the following improvements were executed.

Improve parturient female's appraisal system

The wasteful appraisal distinguished an expanded cesarean section rate, particularly in pregnant ladies with a medium-sized pelvis, or potentially cephalic where the fetal size was assessed to be enormous. What's more, junior inhabitants would in general choose cesarean section all the more promptly as a result of an absence of involvement and lacking childbirth-assist abilities. Improvement measures included guaranteeing a senior obstetrician

Improve pregnancy nutrition direction

As macrosomia builds the cesarean section rate, a decrease in the frequency of macrosomia could diminish this rate. Improvement measures included doing diabetes separating the subsequent trimester, setting up pregnancy nutrition guiding at the out quiet facility, instructing pregnant ladies with respect to the significance of good nutrition, and empowering satisfactory exercise and weight control by means of a pregnancy school to diminish the rate of macrosomia.

Go to labor pain and work toward a painless labor

Countless pregnant ladies chose to go through cesarean section as a result of a dread of labor torment. Improvement measures remembered organization of an anesthetist for the delivery room (in collaboration with sedative division) and arrangement of mobile labor extradural absence of pain.

Upgrade midwifery group building, cautiously notice labor

Improper delivery intercessions and inadequate preliminary of labor increment the pace of cesarean sections. Improvement measures included designating a central birthing specialist to assume responsibility for the delivery

TABLE 1 Comparison of the pace of cesarean section when intercession

	No. of cases	Cesarean rate (cases)	Valid reason rate (cases)	Six Sigma score
October	1332	52.31 % (512)	20.97% (256)	2.106
July	1256	32.89% (408)	19.67% (310)	2.309
P value	NA	<.005	.718	NA
NA, not available.				

Room, detailing birthing specialist capabilities, characterizing ability prerequisites, presenting an appraisal system, and lessening clinical mediations.

Advocate childbirth-assist abilities to improve the capacity of midwifery

Dominating talented vaginal delivery and neonatal revival techniques decreases the cesarean section rate. Improvement measures incorporated the arrangement of obstetrical specialized preparing month to month, remembering preparing for forceps delivery, neonatal revival, shoulder dystocia, the treatment standards of baby blues discharge, and amniotic liquid embolism. The preparation structure covered both hypothetical exercises and useful experience. In such manner, all specialists were needed to take part in sedation division pivot, to rehearse just as comprehend intubation innovation, in this way improving their capacity to safeguard instances of neonatal asphyxia.

Control

Ten months after the principal information assortment, a second assessment of the quantity of cesarean sections performed from October 1 to October 31, 2018 was directed to permit examination of the rate when the model was executed.

C-sections in private sector hospitals

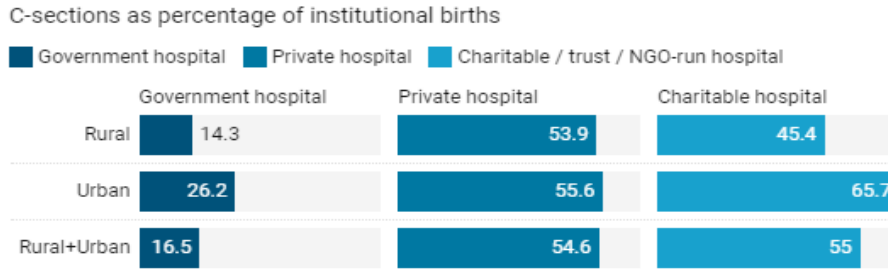


Table 1 : C-sections are more normal in private sector hospitals

About 29% of institutional births in India happen in a private sector medical clinic, yet these hospitals conduct almost 63% of all C-sections in the country. Government hospitals conduct almost 70% of all conveyances yet just 35% of every C-section.

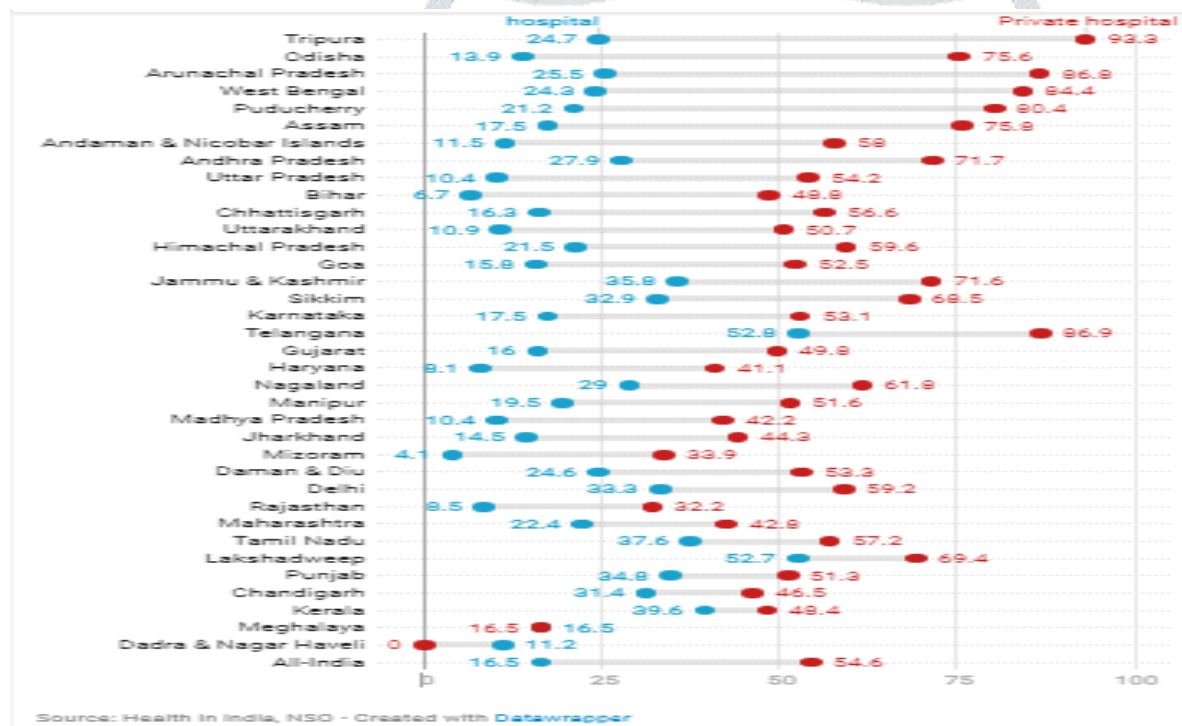


Table 2: High C-section rate in private sector hospitals through states

The higher rate of C-sections likewise implies that Indians are spending more on child birth than they would something else. The normal use per child birth in case a mother goes through C-section is almost multiple times more than that in case of an ordinary conveyance – around ~23,000 compared to ~4,700. The normal consumption regardless is six to multiple times more in private hospitals compared to government ones . A typical conveyance in an administration emergency clinic costs around ~2,100 on normal compared to almost ~15,000 in a private emergency clinic. Essentially, in case of C-section conveyance, the normal consumption in government hospitals is around ~5,500 compared to almost ~33,000 in private ones.

RESULTS

After execution of the LSS methodology, 408 instances of cesarean section were recorded (310 cases with a substantial clinical explanation), among an aggregate of 1256 labors in October 2018. ANOVA programming examination uncovered that the deficient rate diminished from 52.31 % to 32.89% and the Six Sigma score expanded from 2.106 to 2.309 after usage of the improvement measures (P < .005; Table 1).

CONCLUSION

Taking everything into account, LSS is a viable method to diminish the pace of cesarean sections. Nonetheless, the control of cesarean section rate needs nonstop improvement, and the following stage will be to tirelessly improve the key imperfect components using LSS methodology, with the goal that the pace of cesarean sections proceeds to diminish and arrives at an objective of 30% or less. Most critical complement appended to fetal government help with the current little family standard has changed the transport rehearses for C-Section. Apparently India is in the beginning phases of an example of increasing cesarean conveyances. Given the context of India, with its extending working class, quickly growing private sector, low legislative administrative capacity, and administrative policy that encourages public-private organizations, conditions appear to be great for the increase in cesarean conveyance rates to occur in exceptionally populated states.

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