



## The Impact of the Health Care Reform Plan on the Rate of Caesarean Section in the Educational Hospital: A Case Study

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### ABSTRACT

**Background:** In recent years, the tendency of women to have C-section has increased, without enough knowledge about it and its side-effects. Vaginal birth promotion program is one of programs included in the health care reform plan which is an important step in promoting the awareness of vaginal birth. The aim of this study is to investigate the impact of the health care reform plan on C-section rates in one of educational hospitals in Tehran University of Medical Science.

**Methods:** The present study was descriptive-analytic which was conducted in longitudinal and retrospective manner. Data were collected from 8510 deliveries through the patients' medical records in the span of three consecutive years, one year before implementing the health care reform plan and two years after its implementation. Calculations were done via Excel and SPSS<sub>20</sub> soft wares.

**Results:** From the total of 2309 deliveries in 2013, (before implementing the plan), 69 percent of them had C-section and 31 percent had vaginal delivery. In the first year of the plan, from a total of 2989 deliveries, 70.8 percent had C-section and 29.2 percent had vaginal delivery and in the second year, from a total of 3212 deliveries, 71.3 percent had C-section and 28.6percent had vaginal delivery. The rate of avoidable C-sections in 2013, was 21.6 %, in 2014, 14.8 % and in 2014, 15 % .The execution of health care reform plan led to a 6.7 % decline rate in avoidable C-sections such as elective caesarians.(p = 0.001). Among the reasons for non-avoidable caesarians are, repeated caesarian, failure in delivery, and preeclampsia, respectively.

**Conclusion:** Although this hospital did not succeed in reducing the rate of C-section, considering the causes for C-section, it could reduce avoidable caesarians like elective deliveries. Given that this hospital has a large number of critically ill patients referred from other centers for C-section, it has a high rate of C-section. Two important factors contributing to the execution of this program are, making the delivery room's space pleasant according to the birth center standards, and increasing human resources and professional and friendly obstetricians. Therefore, in order to promote vaginal birth a comprehensive planning is needed.

**Key words:** Vaginal Birth Promotion Program, Health Care Reform Plan, Investigation

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## Introduction

Performing delivery is one of the most delicate and important services of medical and healthcare systems in all societies which in addition to its natural process, covers caesarian section as well (1). Caesarian means the birth of fetus through incision in abdominal wall and uterus of the mother. In emergency situations, this surgery can save both the mother and the child. Of the indications of cesarean delivery are, incompatibility of head with hip, previous cesarean section, placenta previa, placental abruption, umbilical cord prolapse, severe preeclampsia, fetal distress, failure of delivery, multiple births and, in general, conditions in which mother's life or the fetus is compromised in the absence of surgical intervention. Furthermore, these rates for each birth are estimated to be between 5.8% and 8.8% (2).

Today, C-section does not take place only in cases where it is necessary to save lives of the mother and the baby, and this has led to an increase in the number of C-sections both worldwide and in Iran (3). Increasing the delivery rate of C-section can not only affect maternal and neonatal complications, but also impose additional health care costs (4-5). Nowadays, the likelihood of a woman undergoing C-section is three times more than 20 years ago and in some societies this practice has turned into luxury (3).

Due to complications of surgery, financial costs, hospitalization of the mother, vaginal birth is preferred. According to World Health Organization (WHO) recommendations, the proportion of C-section should not exceed 15% of all deliveries (6). But regardless, the number of C-sections varies from place to place, and is considerably rising. The growing number of C-section is a concern for public health at the international level (7). Studies have shown that cesarean delivery increases medical risks such as infection, hemorrhage, blood transfusion between the mother and child, damage to other organs, anesthesia and psychological complications of the mother and maternal death from C-section by a factor of three compared with natural vaginal delivery (2-3).

According to the WHO 2014 report, the average C-section rate around the world between 2006 and 2012 was 17%. In this report, cesarean section rates in low-income, lower middle-income, higher middle-income, and high income countries were 6, 9, 32, and 28 percent, respectively. The rate of cesarean delivery in neighboring countries of Turkey, Afghanistan, Bahrain, Iraq, and Pakistan was 4, 37, 22, 30, 7%, and for the countries of France, Japan, Russia, Germany, was respectively, 21, 19, 22, 32% (8).

C-section is one of the indicators of assessing the function of maternal health programs in countries, so that unnecessary increase in cesarean section would be indicative of poor performance of the country system. The WHO has suggested 5 to 15 percent C-sections with medical indications (9). However, the cesarean section in Iran had a rising trend over the past three decades. In 1976, the rate of delivery-section in Iran was 19.5%, which reached 24% in the mid-70s (2). In 2010, according to multiple-indicator demographic and health survey, this rate reached 45.5% and in 2013 (10); Iran with the rate of 54% had the second most C-sections in the world (11). A lot of studies have been done on the causes of pregnant women's tendency towards C-section. The most important reasons of which include encouragement from the physician, recommendation of others, fear, beauty of the mother and following fashion, lack of knowledge about the complications of this surgery, negative attitude to vaginal birth and attributing incorrect complications to it (12-15).

Policymakers have suggested strategies to improve the aforementioned situation in recent years; strategies such as care standardization, education, and change in payment systems, although implementation of such strategies could not significantly reduce the country's cesarean rate (16). In 2014, the Ministry of Health, treatment and Medical training set an agenda for implementation of the Health Care Reform Plan in various packages with multiple goals including reducing out-of-pocket payment, financial



protection of patients with special needs, and improving the quality of services (17).

One of the service packages of this project, entitled "Vaginal Birth Promotion Program", was proposed with the main goal of removing barriers to promote vaginal birth, and subsequently reducing the rate of cesarean section, which was expected to be by a factor of 25-30% in the first step. Then the reduction would continue by 2.5% per quarter (1st, 2nd, 3rd and 4th quarter, 2.5%, 5%, 7.5% and 10% respectively), and by 10% per Gynecologist and the hospital each year. Among other goals of this program is increasing the satisfaction of pregnant mothers through protecting privacy by optimizing the physical space of the delivery rooms, as well as a reduction in out-of-the-pocket payment (to deliver free of charge in public hospitals) Proper policy in partnership with proper implementation and proper supervision achieve significant progress towards health goals (11).

Since monitoring and evaluating programs and policies are part of management tasks, managers must examine the results of a program to analyze the reasons for its success or failure. Therefore, this study was conducted with an aim to determine the extent of realization of the goals of the vaginal delivery promotion program defined in health care reform plan in a large public hospital in Tehran in 2016.

### Materials & Methods

This descriptive-analytic study was carried out in a longitudinal and retrospective manner in one of the major public and educational hospitals in Tehran in 2016. Data on 8510 vaginal and cesarean deliveries divided by months of the year and physician through census, for three consecutive years, one year before implementation of the health reform plan and two years after its implementation, were collected from medical records of patients and the information available in HIS and the mother and baby information system. Among the women in the study, those suffering from any kind of special illness were identified in the study so that indicated and elective C-section delivery cases were singled out. These diseases include heart disease, respiratory diseases, rheumatoid diseases, and the

existence of any cesarean section indications, such as incompatibility of head with hip, fetus's oblique or transverse lie, placenta previa, placental abruption, umbilical cord prolapse, severe preeclampsia, fetal distress, labor failure, multiple births, very low or high weight children, breech and, in general, conditions that in the absence of surgical intervention would put mother or fetus in danger and require C-section. For this purpose, the checklist of the statistics unit of the Treatment Deputy in Tehran University of Medical Sciences was used. Calculations were described and analyzed using Excel and SPSS softwares version 20 using frequency indices, percentage, mean and chi-squared test.

Further, in the current study all ethical issues were observed based on the Helsinki Declaration.

### Results

The findings indicate that the total number of deliveries in this hospital in 2013 (the year before the implementation of the reform plan), the base year, were 2309 deliveries, and in 2014 and 2015, the first and second years after the implementation of the reform plan they were 2989 and 3212, respectively. In general, this birth rate shows a 22.7 percent increase of the total deliveries in 2013 compared to the base year and a 28.1 percent increase of the total deliveries in 2014 compared to the base year.

The number of vaginal births in the years 92, 93 and 94 was 872, 716 and 920, respectively, that as a result the percentage rate in the first and second year after the implementation of the plan was 29.2% and 28.6% respectively, and it was 31% in the base year. The total number of C-sections in the hospital in 92, 93 and 94 year was 1593, 2117 and 2292, respectively. As a result, the percentage rate of C-section in the first and second years after the implementation of the project was 70.8% and 71.3% respectively, and in the base year it was 69%. The rate of avoidable cesarean delivery in 92, was 21.6%, in 93, 14.8% and in 94, 15%, respectively. Implementation of the health care reform plan has led to a 7.7% decrease in avoidable C-sections including elective C-section, which was statistically significant ( $p = 0.001$ ). The most important causes of non-avoidable C-sections



were repeated C-section, labor failure, and preeclampsia.

Furthermore, in terms of achieving the goal of cost-free vaginal birth in governmental hospitals, it was observed in the vaginal births bills that the delivery was free of charge and patients paid only for expenses that were not included in the plan, such as care provider costs. Since C-section is under Global Payment System and in line with the

guidelines of patient's cost-reduction program as defined in Global System, the difference for medication and equipment used will be funded through subsidy plan. Therefore, the patient's discount includes 10% of basic insurance plus 100% of the medication and equipment used for delivery, and services that are not covered in the Global Plan that used to be paid by the patients themselves.

**Table 1.** Frequency of C-sections from 92-94 separated by cause

Year	C-section		Vaginal delivery		Total
	number	percentage	number	percentage	
2013	1593	69	716	31	2309
2014	2117	70.8	872	29.9	2989
2015	2292	71.3	920	28.6	3212

**Table 2.** Percentage distribution of cesarean indications before and after the health care reform plan 2013-2015

C-section indication	2013	2014	2015
The total percentage of C-section	68.82	70.74	71.29
Repeated C-section	45.48	49.93	58.85
failed labor induction	6.47	5.59	4.17
Abnormal fetal heart rate (FHR)	6.32	10.20	10.46
Elective	3.40	0.83	0
Golden baby	1.97	0.55	0.01
Breech position	4.79	3.91	3.65
Mother's heart disease	0.63	1.02	0.79
placental abruption	1.02	1.57	1.68
twin	4.02	4.02	3.85
Thick meconium	2.74	0.84	0.52
Preeclampsia	5.13	2.74	2.45
Other	18.19	13.92	15.03

**Discussion**

According to the findings of this study, the total number of deliveries during the first and the second year of vaginal birth promotion program, compared to the base year, increased, but the percentage of vaginal deliveries at the hospital in these two years after the implementation of the program was lower than that of the last year. The lack of reduction in the number of C-sections performed in the hospital under study in line with predicted goals has several causes which analyzing and providing appropriate solutions for them can be of great help to reduce the rate of C-section.

Currently in our country, fear of vaginal delivery and lack of awareness of vaginal birth, fear of fetal complications, fear of physical complications in

vagina and perineum, unnecessary interventions in the onset of labor pain, estimation of fetal weight by ultrasound particularly high weights and the probability of a hard delivery, fear of legal issues for high-risk childbirths such as multiple pregnancies and breech, lack of skill to use childbirth tools such as vacuum, lack of educated obstetricians as defined by the standards, inaccessibility to physiological and pain free delivery in the wider community and finally, lack of proper scientific supervision on C-section indications suggests an increase in cesarean deliveries compared to vaginal birth (12-15).

Of course, in many treatment centers, relaxation techniques and vaginal birth counseling, presence of a care provider during labor, anesthesia and painless delivery, aromatherapy, and several other



ways to reduce pain and encourage natural delivery are used. However, it seems that the implementation of the health care reform plan has speeded up the rate of cesarean delivery (18). Because this hospital has a large number of critically ill patients referred from other centers for C-section, it has a high rate of cesarean delivery. Although the hospital failed to decrease the rate of C-section, with respect to the causes of cesarean section, it helped to decrease 6.7% of avoidable C-sections, including elective cesarean deliveries. The measures taken to encourage vaginal birth include planning to open a new delivery block, the launch of a 24-hour physiologic and pain free delivery, and the presence of a 24-hour anesthetic specialist in the delivery block. There were two important factors for implementing this program, making the delivery room space pleasant in line with the birth center standards, and increasing the number of human resources and professional and friendly obstetricians. Therefore, a comprehensive planning must be done to promote the vaginal birth. The findings of the study conducted by Yarmohammadian et al. in public hospitals in Isfahan showed an increase in the vaginal birth rate in the first six months of the program (19), which do not compatible with our findings, as the plan in that hospital had better outcomes.

None of the gynecologists had succeeded in achieving the goal of vaginal birth promotion package, i.e. reducing the rate of C-section by 10% by the end of the year 93. Furthermore, in the first year of implementation of the health care reform plan, the hospital under the study managed to reduce the rate of C-section by 2% compared to the base year. According to the Ministry of Health report, the rate of C-section was 54% at the beginning of the health care reform plan. One year after the implementation it declined by 5.5% (11).

According to the documentation available on the websites of the medical universities, following the implementation of the health care reform plan, the rate of cesarean delivery in Jam, Bushehr has decreased by 9%. In Kermanshah, the rate of

C-section has decreased from 54% in 92 to 49.68% in 1993. The treatment deputy of Khuzestan also reported a decrease of 9% in C-sections. Also, after the implementation of the plan, there has been a reduction of more than 5% in C-section in all public and private hospitals. According to the head of Yasuj Hospital, C-section rates have decreased by more than 7% and vaginal birth rates have increased. The treatment deputy of Arak Medical University, too, has reported a 12 % reduction in cesarean delivery. The head of treatment affairs in Mashhad University of Medical Sciences, reported a decrease of 7% in cesarean section in the areas affiliated with this university. According to the head of Semnan University of Medical Sciences, the health care reform project has reduced 10% cesarean section in the hospitals affiliated with this university (18).

The study of Afshari et al. in Isfahan hospitals showed that during the first eight months of the implementation of the plan, the rate of C-section decreased by 12.5% (20). According to Iran's National Institutes of Health Research, one year into the health care reform plan led to a decrease of 10.2% in the rate of C-section in the country (21), compared to the baseline at the beginning of the plan. However, in the present study, the reduction in the number of C-sections performed was only 2 percent, which was lower than the country's decline rate in general. It seems some factors such as educational hospital and the referral of complicated deliveries to the hospital led to the failure of the hospital to achieve the goal of the program in promoting vaginal birth and decreasing the rate of C-section. The factors affecting the rise of C-section in Iran concerns both health providers and mothers. Increased age of the first pregnancy, fear of vaginal bith pain, previous C-section, and increasing inclination of pregnant women to delivery through cesarean are factors that encourage mothers to have C-section (2, 22-23). On the other hand, legal issues related to the consequences of vaginal labor, and documented lawsuits, the lack of doctors' interests in vaginal bith due to lack of time and skill, and the



difference in payments are factors that lead service providers to C-section (16).

The vaginal birth promotion program has succeeded in lowering the out-of-the-pocket-payments, and no one was charged for the vaginal birth in the hospital under study. This shows financing of the project by the Ministry of Health and treatment. The study done by Goodarzi et al. in 129 hospitals, showed that the coverage of vaginal birth bills was the most desirable aspect of the vaginal birth promotion program (24).

It seems that the implementation of the health care reform plan has been successful in lowering cesarean total index and indications, and with proper and consistent implementation, it would meet the scientific goals of the country and improve the health of women and infants, thus bringing the C-section rate closer to the global standards. The fact that this study was conducted only at the level of a large public educational hospital was one of the limitations of this study. Therefore, for better analysis, studies need to be done at a larger scale and with more hospitals. It seems that more time is needed to succeed in programs like vaginal delivery promotion in hospitals in charge. Therefore, it is recommended to repeat such studies with a longer period of time. Considering that the demand of pregnant mothers for cesarean delivery is one of the main factors in increasing the rate of C-section, education can be effective in enhance their willingness to have vaginal birth (25-27). Some studies have claimed that expanding the knowledge of both pregnant women and their husbands of C-section complications and pain free delivery are effective. Other suggestions for reducing cesarean delivery are holding childbirth and counseling classes, eliminating mother's fear and anxiety of vaginal delivery, educating the doctors, having a pain-free labor, performing vaginal delivery after C-section, and limiting C-section to hard labors with definitive diagnostic criteria. In several studies and in

various medical settings cesarean delivery has been recommended to save the lives of the mother (28) and the fetus and the WHO has approved of 10-15% rate of C-section (29). Therefore, policies concerning the decline of cesarean rate should be made cautiously and after considering all the aspects related to it (30).

### **Conclusion**

Although the hospital failed to reduce the rate of C-section, but considering its cause, the hospital could reduce the number of avoidable C-sections, like elective delivery. Measures taken to encourage vaginal birth include planning to open a new delivery block, the launch of a 24-hour physiologic pain-free delivery, and the 24-hour presence of an anesthetist specialist in the delivery block. Due to the fact that this hospital has a large number of critically ill patients referred from other centers for cesarean delivery, it has a high rate of C-section. There are two important factors in executing this program, making the delivery room space pleasant in line with the birth center standards and increasing the number of human resources and friendly professional obstetricians. Therefore, a comprehensive planning must be made to promote vaginal birth.

### **Conflicts of interest**

The authors of the study state that there is no conflict of interest.

### **Acknowledgment**

All experts who participated in this research are highly appreciated.

### **Authors' contributions**

Afshari M, Pourmohammadi M designed research; Asadollahi SH and Kamali M conducted research; Gavami Z, Corani Bahador R and Radin Manesh M analyzed data; and Afshari M and Afshari M and Pourmohammadi M, Ghavami Z wrote the paper. Afshari M had primary responsibility for final content. All authors read and approved the final manuscript.



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