



## **The Relationship between the Kind of Delivery and 5 Indexes of Mother and Baby's Health Before and After Implementing Health Reform Plan in Selected Hospitals of East Azerbaijan (Iran)**

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### **ARTICLE INFO**

#### **Article History:**

Received: 27 Jan 2019

Revised: 6 Apr 2019

Accepted: 19 June 2019

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### **ABSTRACT**

**Background:** To improve the individuals' health, reforms should be made in the health systems. As a result, assessing the impacts of reforms is a way to evaluate the effectiveness of the health system. The aim of this study was to study the relationship between the kind of delivery and the five indexes of mother and baby's health before and after implementing the health reform plan in selected hospitals of East Azerbaijan, Iran.

**Methods:** This descriptive-analytical study was conducted in 2018. The study was conducted among eight educational, medical, and private hospitals. Before and after the program, 800 files were selected using simple random sampling method. The researcher made a check list with confirmed validity to extract the data. The data were analyzed using descriptive statistics and T-tests by SPSS-22.

**Results:** The average age of mothers in the two intervals was 27 years. Most participants did not deliver before and their education was diploma or lower. The rate of natural delivery from 34.5% (before the plan) reached 44.2% (after the plan)( $p < 0.05$ ). The rate of mothers and babies' mortality reduced from 0.3 and 0.8 to 0 and 0.5, respectively. Mothers and babies' mortality and stillbirth had no significant difference based on the kind of delivery ( $p > 0.05$ ).

**Conclusion:** Findings indicated significant increase of natural delivery after the reform plan in health system. Moreover, the rate of mothers and babies' mortality decreased. These results can guide the policymakers for deciding about the course of plan and its review.

**Key words:** Health reform plan, Health indexes of mother and baby

### **Citation**

This paper should be cited as: Jabari H, Seyedamini B, Navvabi E, Asadi S. **The Relationship between the Kind of Delivery and 5 Indexes of Mother and Baby's Health Before and After Implementing Health Reform Plan in Selected Hospitals of East Azerbaijan.** Evidence Based Health Policy, Management & Economics. 2019; 3(2): 105-11.

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## Introduction

The main duty of the health system is improving health and responding to the needs of people in society(1). Therefore, health and medical systems encounter a wide variety of requests for various and high quality services. Due to the increased awareness about health, as a public right, health systems inevitably have to respond to this situation affectively (2,3). Provision of responses to needs of the society has currently challenged the health systems, which is due to the increasing request for high-quality services, changing lifestyle and diseases' trends, growing medical costs, population aging, developing rate of chronic diseases and inabilities, and advancing medical technologies (4-9). The old structures of the medical and health system and their priorities are not responsive to new needs in health field. Therefore, structural and fundamental changes are needed in all medical and health systems more than before. These major changes are called reform, which is the process of making basic changes to overcome weaknesses (10). It includes providing the necessary background to improve and use the system's strengths. Usually the aims of the reforms in health and medical system are increasing the financial access and covering the health services, focusing on mismatches, eliminating injustice in health sector, improving fundamental infrastructures and informational system, organizing the systems that provide affective and high quality health services, educating patients and empowering them, supporting the personnel in health and medical sector to provide better services, and conducting practical studies(11-13). Iran Health System is no exception to such changes and experienced different reforms to adjust to new situations. The latest reforms conducted in the recent decade were the health reform plan, which was implemented in the second half of 2014. This plan has eight axis, one of which is promoting the rate of natural birth to improve the mothers and babies' health indexes by reducing c section and increasing natural birth. The specific goals of this axis included reducing c section, increasing contentment of pregnant women by maintaining

their privacy and optimizing the physical atmosphere, and reducing direct payments (14). C section is a problem in health and medical system, which entails different consequences for patients, causes great costs, results in different complications, and finally reduces the quality of life for patients (15). According to the statistics by health, treatment, and medical education organization, the frequency of c section was estimated as 40% in Iran, which causes negative effects on health indexes of mothers and babies (16). This rate was reported as 58.6% in 2012 in Ardabil (17), 44.50% in Yazd in 2013(18), 26% in Arak in 2010(19), 28.4% in Maragheh in 2010 (20)and 71.9% in Isfahan in 2013(21). Increased rate of the c section is not limited to a specific geographical area; its rate is higher than the standard recommended by WHO ( 15 % of all deliveries) all over the world(22-24). The rate of c section in the U.S is highly increasing so that in 1965 the total rate was 4.5% and reached 26.1% in 2002(25). The rate of c section in England, China, Canada, Australia, Taiwan, and Italy were 24.6%, 25%, 26%, 31%, 32%, and 35% of all deliveries(26-30), respectively. From different indexes of health reform plan, reducing c section and promoting natural delivery is provided to improve the mother and baby's health index. C section has various adverse effects that are expected to be reduced by promoting the natural delivery. Therefore, according to the aforementioned remarks, the aim of this study was investigating the relationship between the kind of delivery and the five indexes () of mother and baby before and after implementing the health reform plan in selected hospitals of East Azerbaijan, Iran.

## Material and Methods

This is a before and after, experimental, descriptive-analytical study with ethical code of 5/3/996380. The study population included all files of the mothers and their babies in selected public (Alzahra and Taleghani) and private hospitals (Zakaria and Shams) in Tabriz and hospitals of Marand, Mianeh, Osku, and Sarab before and after



implementation of the health reform in the second half of 2013 and 2015. The statistical population was divided into two groups. So, an equal number of clinical files of women before and after the health reform plan were randomly selected, so that 50 files were randomly selected in each interval (before and after the reform) from different hospitals. Accordingly, the number of was 400 participants were investigated with confidence factor of 95% and error level of 5% in a six-month interval each year from eight hospitals. Finally, the ultimate sample included 800 clinical files. The inclusion criteria of the statistical sample were delivery in hospitals under study within the study interval. In the case that the participants' information was not completed neither by clinical files nor by phone calls, were they excluded from the study. To collect the indexes' information, the checklists were initially completed by the researcher. Later, gynecologists and midwives were asked to read them for validity confirmation. They were also asked to make any necessary changes. Next, the researchers made the required coordination with the related hospitals to extract the prioritized indexes and demographic variables from files. The collected information was recorded. In this study, T-Test and Chi-square test were used and the data were analyzed using spss-22.

## Results

First, equal numbers of files (400 new mothers) were selected from before and after the health reform plan. The demographic results showed that the number of newborn boys was 192 (48%) and the number of newborn girls was 208 (52%) in the interval before the reform plan. The numbers of new born boys and girls in the interval after the health reform plan were 202(50.5) and 198(49.5%), respectively.

The results related to the age of the new mothers indicated that their highest and the lowest ages before the health reform plan were 43 and 15 years, respectively. In the interval after the reform plan, the highest and the lowest ages of the mothers were 45 and 14 years, respectively. The average age of the recently delivered mothers

before and after the reform plan were 27.50 and 27.79, respectively. Moreover, the standard deviations of the mothers' age in the interval before and after the health reform plan were 5.632 and 5.919, respectively. The number of previous deliveries at the interval before implementing the health reform plan was so that of 400 mothers, 227 mothers (56.8%) did not have any previous delivery, 164 (41%) had 1-2 deliveries, and 9 mothers (2.3%) had more than two deliveries. However, at the interval after implementing the health reform plan 242 mothers (60.5%) did not have any previous deliveries, 142 (35.5%) had 1-2 deliveries, and 16 mothers (4%) had more than two deliveries. Of 400 mothers at the interval before the health reform plan, 187 mothers (46.8%) did not have the high school diploma, 144 mothers (36%) had high school diploma, and 69 mothers (17.3%) had academic education. However, at the interval after the health reform plan, 154 mothers (38.5%) did not have high school diploma, 163 mothers (40.80%) had high school diploma, and 83 mothers (20.8%) had academic education. Regarding the kind of delivery, at the interval before the health reform plan, 138 mothers (34.5%) delivered naturally and 65.5% had c section, while these numbers at the interval after the reform plan were 177 (44.3%) natural deliveries and 223 (55.8%) deliveries with c section.

Regarding the impact of the kind of delivery on indexes of mothers and babies' mortality and stillbirth, the results showed that of 800 deliveries before and after the health reform plan, 315 were natural and 485 were with c section. Among these, one case of mother's death was reported for natural delivery; whereas, no case mother's death was reported for c section. The results of the statistical tests, T test, and chi-square showed that this difference was not significant ( $p>0/05$ ). Regarding the babies' death based on the kind of delivery, no babies' death was reported for natural delivery, while five cases of babies' death were reported in c section. According to the results of chi square, no significant difference was observed in the rate of babies' mortality between the two kinds of



deliveries ( $p>0.05$ ). Regarding the effectiveness of the kind of delivery on the index of stillbirth, the results showed 6 and 5 cases of still birth in natural delivery and c section, respectively. The results of chi square test indicated that this difference was not significant (Table 2).

Comparing hospitalization duration in the two kinds of delivery, independent T-test and chi

square indicated that the average length of hospitalization for natural delivery was 1.39 days with the standard deviation of 0.693. However, the average time of hospitalization for c section was 1.66 days with standard deviation of 1.01. Based on the results of t-test a significant difference was observed between the two kinds of deliveries with regard to the hospitalization period ( $p<0.05$ )

**Table 1.** Comparing Apgar 1, 2, and anthropometric indexes for natural and cesarean delivery

Index	Test statistic	Average difference	Independent t Freedom degree	Significance level
Apgar 1	- 4.296	- 0.300	798	0.001
Apgar 2	- 1.938	0.180	798	0.049
weight	1.149	951.616	798	0.251
Height	0.847	0.292	798	0.397
Head circumference	-1.883	- 0.4673	798	0.060

**Table 2.** Comparing mortality indexes of mothers, babies, and stillbirth in natural delivery and c section

Index	The kind of delivery		K score	
	natural	C section	Freedom degree	Significance level
Mothers' mortality	yes	1	0	0.214
	No	314	485	
Babies' mortality	yes	0	5	0.071
	No	315	480	
Stillbirth	yes	6	5	0.300
	No	1	0	

## Discussion

Results showed that health indexes of mothers and babies before implementing the health reform plan was different from after the reform plan. Considering the kind of delivery at the interval before the health reform plan, 34.5% of mothers had natural delivery and 65.5% had c section. However, after implementing the health reform plan, 44.3% had natural delivery and 55.8% had c section. Considering the kind of delivery, Kalhor et al and Yarmohamadian et al (31) reported the same results. About the index of mothers' mortality, the results of this study indicated positive effect of reform plan on reducing this index, which is consistent with the findings of Barati et al (32) and Kranti et al (33). Results showed that implementing the health reform plan decreased the c section rate and increased natural delivery. These

results are consistent with the study by Ahmadi et al (31) and Afshari et al (31). In addition, the results of this study showed that although the rate of c section after the plan reduced compared to before implementing the plan and the natural delivery rate increased, these changes were not significant. These findings are consistent with a study by Yarmohamadian et al (31). Regarding the relationship between the kind of delivery and indexes of mother and baby's health, the results showed that the kind of delivery had a significant difference with apgar 1 and 2 indexes and the period of hospitalization. However, regarding the relationship between the kind of delivery and anthropometrics, mothers and babies' rates of mortality and stillbirth was not significant. The findings showed that reforms of health systems were most effective on health indexes of mothers



and babies on indexes of the c section and natural delivery, rate of stillbirth, mothers and babies' mortality, and complications of pregnancy and delivery. Results of the studies showed that most studies on health reforms and its effect on health indexes of mother and baby has been descriptive all over the world. Regarding the importance of the subject and to compare the effect of health reforms in different countries of the third world, systematic, case, and pilot studies are recommended. Studies showed that making reforms on the kind of delivery affects the total health indexes of mother and baby. By increasing the rate of natural delivery and reducing c section, the mortality rate of mothers and babies reduces, although motherhood complications may increase a little(31,37).

### Conclusion

Health reforms assessment is of great importance to deliver better and more effective reform plans and changes in the health system. Medical and health organizations, especially hospitals should necessitate the changes recommended by the health organization in line with the local conditions to provide better and more effective services with high quality.

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The importance of the reforms in health sector and their effects on health indexes of mothers and babies, as an effective component and variable, has been emphasized by policymakers and managers of the health area. However, little evidence exists in this regard and related studies mentioned only few indexes in this regard. Constant improvement of the health indexes, especially mother and baby's health need effective actions, changes, and reforms. This study provided evidences over assessing Iran health Reform Plan. The aim was to provide the managers and policymakers of the health system with effective measures to implement and improve mothers and babies' health indexes. Finally, although the health reform plan has just started, it is possible to take effective and positive steps for mothers and babies' health indexes by reducing c section rate, increasing natural delivery, and also creating delivery blocks.

### Authors' contributions

Jabari H, Navvabi E, and Asadi S designed research; Jabari H and Asadi S conducted research; , Navvabi E analyzed data; Asadi S and Jabari H wrote the paper. Seyedamini B had primary responsibility for final content. All authors read and approved the final manuscript.

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