The impact of health reform on maternal and child health indicators in developing countries: A systematic review

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ABSTRACT

Maternal and child health indicators were the focused issues of both programs leading to a substantial improvement in reduction of mortality, providing services, and promoting their health. Health policy makers of the country executed health transformation plan in 2014 to respond to main challenges especially regarding the high cost of treatment, lack of enough coverage, improper facilities, and redundant therapies and procedures. Primary reports showed the success of the results of this plan.

Aim: The study aims to investigate the impact of reform program on maternal and child health indicators in developing countries.

Method: This study was conducted as a systematic review by searching on SID, Magiran, Pubmed, Science Direct, and Scopus during 2000-2017. The searched keywords in Farsi databases: health reforms, the impact of changes in health, consequences of health reforms, maternal and child health indicators, and their Latin equivalences on English databases. Then data were entered in summary tables and at the next step were investigated and concluded.

Result: According to inclusion and exclusion criteria, the result of the searching was 2837 articles refined step by step, and finally 19 items were selected and analyzed. The results of national studies showed that after executing health reform program, the rate of cesarean section decreased about 2.5-4% in the country in the first three-month period of execution of the program and total status of realization of indicators was in a desirable level. Natural childbirth promotion program (free natural childbirth franchise indicator) was 90.8%. Global experiences also show that mortality rate of newborns decreased from 11.1% to 9.1% after reform and promotion of health system in Mozambique. Also, health reforms in Pakistan for developing the health of mothers and newborns showed that beneficiaries should support evidence-based interventions for the sake of the health of mothers and newborns. Finally, health reform in Indonesia, Nepal, Philippines, and India showed that the rate of mortality of mothers, newborns, and stillbirth had been reduced.

Conclusion: The reforms have had a positive impact on maternal and child health indicators. The realization status of indicators has reached an acceptable level through execution of reform. The main reasons for improvement within indicators are the extension of the health system, increase in labor force, and more support by government for the health system.

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INTRODUCTION

The primary objectives of the health system are to provide, maintain, and improve health level and meet the people's need alongside with establishing a fair system of financial contribution.[1] The managers of the system in these rapidly changing environments face various challenges resulted from technology development, knowledge explosion, growing demand of customers and politicians for improving quality, justice, and changing nature of diseases. They continually seek new solutions in response to increasing tensions such lack financial resources and reaching high efficiency.[2,3] All around the world, the change in lifestyle and burden of diseases, boosting growth in medical expenses, aging population, high level of chronic diseases, inabilities, and developments of therapeutic technologies have revealed a shortage of traditional structures of the health system in response to recently appeared needs.[4,5] They also have made it inevitable to execute reforms.[6] Usually, reforms are designed and implemented aiming at increasing financial access and expanding coverage of services, reduction of injustice, infrastructure development, strengthening of the information system, and providing effective and high-quality health services.[7,8]

Iranian health system has also got some important issues in its history during recent decades including setting up health networks based on primary health care for accessing global goal of health for everyone up to 2000 in the 1980s.[7] It also executes family physician and rural insurance programs (2014) for the sake of general coverage of health and millennium development goals.[8-10] Both mentioned revolutions had got significant achievements in improving health indicators. Maternal and

child health indicators were the focused issues of both programs leading to a substantial improvement in reduction of mortality, providing services, and promoting their health.[11,12]

However, health policy makers of the country executed health transformation plan in 2014 to respond to main challenges especially regarding the high cost of treatment, lack of enough coverage, improper facilities, and redundant therapies and procedures. Primary reports showed the success of the results of this plan.[15-18] The mentioned program includes eight axes. One of the most important is natural childbirth promotion program and reduction of cesarean with the general goal of promoting maternal and child health indicators.[19] Cesarean as one of the health problems with many consequences for patients. It results in significant costs, various complications, and finally, decrease in quality of life of the patients.[20] But in Iran, a cesarean is much more than WHO advice (15 percent of all deliveries).[21-24] Those reports show the percentages about 26 to 60 and even 87 in some private centers which are higher than countries like America (22%), Brazil (25%), Chile (27%), and nineteen Latin American countries (17 to 40%).[25]

The most important point is the rate is rapidly increasing. It is an underlying factor for an adverse effect on maternal and child health indicators.[26] Therefore, according to the importance of the subject of maternal and child health indicators, this study has been designed and executed aiming at investigating the effects of health reform on maternal and child health indicators in developing countries.

METHOD

This study has been conducted as a systematic review by searching in SID, Magiran, Pubmed, Science Direct, and Scopus during 2000-2017. Searched keywords were Reform, Health Reform, Healthcare Reform, Healthcare Reform Plan Iran, Effect of Health Reform, The Consequences of Health Reform, and Maternal and Child Health Indicators. Additionally, Cesarean and Natural Childbirth, Complications of Childbirth and Pregnancy, Maternal Mortality, Infant Mortality, as well as Anthropometric Indicators in Farsi and their Latin equivalents can be used as a searched keyboards. Inclusion criteria involve health reforms, maternal and child health indicators, developing countries, as well as full articles and abstracts of articles in Farsi and English. On the other hands, exclusion criteria filter financial, structural, and educational reforms, health and non-health indicators of child, reports of health reforms, and lack of access to full article, abstracts, and books. Then the findings were extracted as summary tables, and investigation and conclusion were made at the next step as well. Qualitative content analysis method was used to analyze and combine the results of this study.

RESULT

According to the inclusion and exclusion criteria, the result of this search was 2837 articles which were refined step by step leading to 11 full-text articles and two booklets of abstracts of conferences. There are eight abstracts which were related to the subject and involved in the study. Eleven full text included countries of Iran, Africa, Pakistan, India, Indonesia, and Nepal, as well as eight abstracts, were for Iran as summary tables. The conducted studies were about the impact of health reform on the rate of indicators of cesarean, natural childbirth, the rate of stillbirth, and maternal and child mortality.

DISCUSSION

Considering the importance of the subject and its expansion, as well as a comparison of the impact of health reforms on the third-world countries, they are suggested to conduct systematic, case, and pilot studies. Studies showed that executing reforms of delivery affects total indicators of maternal and child health in a way by increasing the rate of
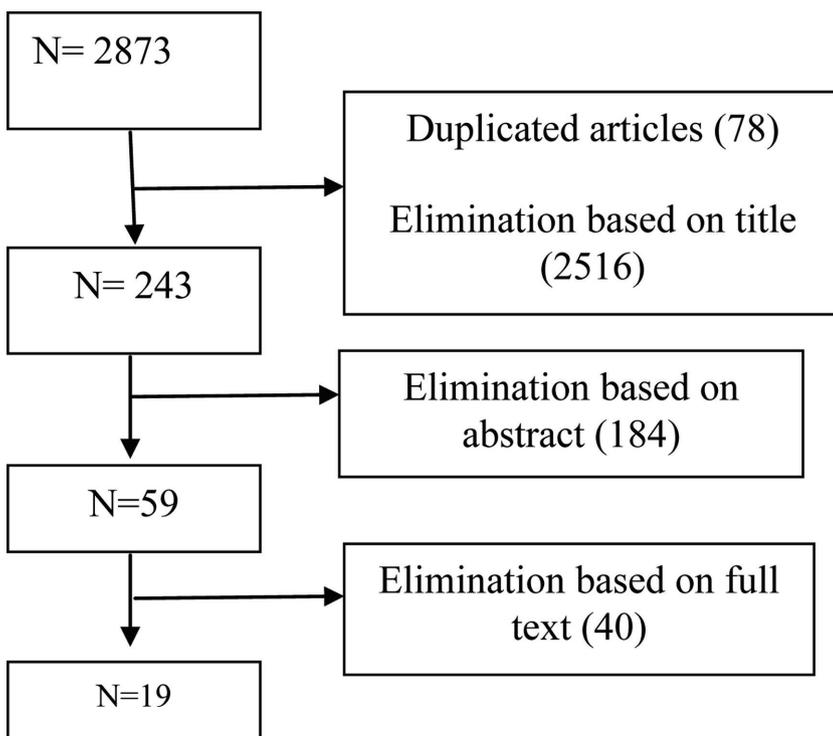

Diagram 1   Stages of extracting the studies

Table 1 Summary of the findings of the selected studies

Title of study	Authors	Year	Country	Method	Results
Health reform plan with emphasis on promoting normal childbirth program in state universities of universities of medical sciences in Iran	Goudarzi et al.	2014	Iran	The study was conducted as descriptive-cross sectional for four months. The statistical population included 129 hospitals of 57 universities, sampling was random, and material was a standard checklist of ministry including 12 questions and five-axes. The analysis was made by SPSS software.	Seventy-three percent of hospitals were public, and 27% were specialized. The lowest mean and the most undesirable standard deviation was for an increase in the number of natural childbirth and the highest mean and the most popular standard deviation was for specialized hospitals comparing with pre-reform plan execution. Dimensions of promoting natural birth program had got approximately beneficial status.
Challenges and achievements of executing health plan at Kowsar hospital of Qazvin	Kalhor et al.	2014	Iran	The study was conducted as descriptive. The analysis was made by SPSS software.	By executing the support for natural childbirth, the rate of cesarean to natural delivery has promoted about 5% in the country.
Women health and health reform plan	Ahmadi et al.	2014	Iran	A qualitative study was conducted as focused group discussion (FGD) method. Participants were of different medical and human sciences' groups.	The decrease in cesarean rate and increase in natural childbirth were free.
How much has health reform plan changed cesarean? Comparative study of the cesarean rate at hospitals of Isfahan universities of medical sciences	Afshari et al.	2014	Iran	The descriptive-analytical study was conducted as longitudinal and retrospective. The statistical population was all hospitals of Isfahan University of Medical Sciences.	Applying health reform plan has averagely caused 8.5% reduction in cesarean rate.
The success rate of promoting natural childbirth program in health reform plan	Maleki et al.	2014	Iran	It was a review study using data in mother and baby information registry system.	The cesarean rate in all country was 56.1% in 2013, and in the first three-month period of health reform plan, it was 53.6%. The cesarean rate in state hospitals was 47% before health reform and 43% after health reform.
Comparison of rates of natural childbirth and cesarean between the first 6-month of executing health reform plan and the same period of the former year in general hospitals of Isfahan	Yarmohammadian et al.	2014	Iran	The study is descriptive-analytical. Statistical population includes all public hospitals of Isfahan as census, and data collection was conducted through referring to Vice-Chancellor in Treatment Affairs. The analysis was made by SPSS software.	Although there was an increase in natural childbirth rate in the 6-month period of health reform plan than before, this increase was not significant.

Table 1 *Continues*

Title of study	Authors	Year	Country	Method	Results
Has health reform plan been successful in reaching promotion of maternal and child health indicators by decreasing the rate of cesarean?	Nourian et al.	2014	Iran	The study was descriptive-cross sectional. Understudy population was Imam Khomeini Hospital of Shirvan. The material was the standard form of birth control by quality improvement unit.	The rate of cesarean has been reduced, but maternal complications have increased after health reform than before.
Comparing cesarean before and after executing health reform plan	Karimi	2014	Iran	Available data from statistics of 9 months before and after applying health reform plan by Chi-square test	Doing cesarean operation has had a decreasing trend.
Evaluation of health reform plan by therapy surveillance experts	Khayyeri et al.	2014	Iran	The study was descriptive-analytical. The statistical population consisted of 256 hospitals from 57 universities. Sampling was random material. It was a standard checklist of the ministry including 72 questions related to supervision on six executive programs of health reform emphasizing critical indicators of each axis. Ten questions were about promoting natural childbirth. The analysis was made by SPSS-20 software.	Status of indicators realization was reasonably desirable. Promoting natural childbirth program (free natural childbirth franchise indicator) was 90.8%.
Impacts of development and reinforcement of health system on mortality of children in Mozambique: a systematic review	Fernandez et al.	2014	Africa	This study has been conducted as a systematic review on Google, PubMed, and Scholar databases during 1966-2014 among Southern African countries emphasizing Mozambique. Keywords: health systems, development, and reinforcement of health systems, labor forces, human resources, mortality of children, mortality of children under-5-year, Millennium Development Goals	Due to development of health system in Mozambique, mortality of children has fallen from 11.1% to 9.1%. Mortality of children has severely reduced by increasing the ratio of nurse per mother and entirely by increasing labor force. The decrease in mortality of children was significant during 2000-2014which was due to development of health system especially human resources unit and higher support of government to the health system.
Health reform in Pakistan to improve the health of mothers and children	Mazhar et al.	2012	Pakistan	This article deals with reforms of health systems aiming at the improved use of maternal and child services in rural areas of Pakistan.	The procedure of reforms should stand against long-term challenges, limitations, and failures of the health system of the country. Moreover, the government should deal with development and execution of effective policies and also beneficiaries should support evidence-based interventions for the health of mothers and children.

Table 1 *Continues*

Title of study	Authors	Year	Country	Method	Results
Maternal health status in India: a case study	Kranti et al.	2009	India	This study has been conducted as a case study and is about the analysis of mortality rate of mothers all around India and also health reforms of India for promoting maternal health. Data collection was based on a review of related literature and the second data analysis via National Information Management System and interview with beneficiaries.	The rate of stillbirth is 7.5 in 2005 in India. The mortality rate of children in 2006 was 56 in India, and maternal mortality rate in 2003 in India was 301 according to Death Registration System. Evidence showed that maternal death was 2000 deaths per 100000 live births in 1946. Health Promotion Committee has estimated that maternal mortality in 1959 decreased to 1000. The main reason is a reduction of malaria outbreak in pregnant women. Recent results showed that maternal mortality had been decreased all around India, as a study in 1992 in India showed that maternal mortality has fallen to 437 death in 100000 live birth.
Impact of health reform plan on prevalence and costs of normal childbirth and cesarean	Zandian et al.	2017	Iran	The study has been conducted as cross sectional and retrospective, and its statistical population includes all women referring to Ardabil Bou-Ali Educational Hospital for delivery (2013-2015). A random sample was selected as 200 cases before health reform and 200 cases after health reform plan. The self-made checklist has been used to collect data and data have been analyzed by STATA software.	The results showed that in the pre-health-reform stage the rate of normal childbirth was 39.5% (799 cases in 200) while this rate increased to 57% after health reform (114 cases out of 200). Results of the deductive analysis showed that there was a significant difference in natural childbirth prevalence (t= -7.987, P<0.001) and cesarean prevalence (t= 6.988, P<0.001) before and after health reform plan.
Achievement rate of goals of promoting natural childbirth program of health reform plan: a case study at a big public hospital in Tehran	Zarei et al.	2017	Iran	This cross sectional research was conducted using information of activities of physicians and Obstetricians. Required data were collected from hospital information system and the statistics of deliveries in two methods of natural and cesarean were extracted separately for 2013 and 2014. Excel 2013 software was used for descriptive analysis of data.	Of 5 studied physicians employed in the hospital, four managed to decrease the percentage of cesarean to total delivery rate from 3 to 7 percent compared with base year. But the objective of 10 percent reduction in cesarean rate was not met in the performance of any physician. Of the total documents, a 2-percent decrease was observed in cesarean rate.
Impact of health reform plan on natural childbirth and cesarean rate in hospitals of Shiraz University of Medical Sciences 2015	Rooyin Tan and Aghaei	2016	Iran	The study was descriptive-analytical and related information was collected from Maternal Health Office and Statistics Unit of Shiraz University of Medical Sciences. Accumulated data for a time interval of 2013-2014. Descriptive statistics and Associate t-test and Wilcoxon test were used for data analysis.	Rates of natural and cesarean deliveries were respectively 35.3 and 64.7 in 2013 and changed to 4.1 and 58.6 respectively in 2014 which shows a 6-percent increase in normal childbirth.

Table 1 *Continues*

Title of study	Authors	Year	Country	Method	Results
Case investment for promoting maternal and child health: results of four countries	Jamens Soto et al.	2013	Indonesia, Nepal, Philippines, and India	Case investment has been provided in the mentioned countries for regional planning based on evidence and budgeting to present high quality maternal and child services. The framework of case investment includes foundations of strategic problem solving and decision support models. In this study identification and analysis of strategies of interventions of promoting maternal and child, cares were investigated through cohort study design.	Results of Indonesia have been provided in the format of 4 regions. In Sika region the reduction rate of mortality among mothers, newborns, and under-5-year children in a 5-year period were 24, 14, and 7 percent respectively. In Merakeh region reduction in mortality of mothers was 35%, newborns 33%, and under-5-year children 13%. In Puntik region reduction rate in mortality among mothers, newborns, and under-5-year children in a 5-year period were 15, 12, and 5 percent respectively. In Tasikmalaya region reduction in mortality of mothers was 14%, newborns 15%, and under-5-year children 7%. Results related to Nepal have been provided in 3 clusters. In the cluster of Tray reduction rate in mortality of mothers, newborns, and under-5-year children in a 5-year time interval were 23, 39, and 18 percent respectively. In the cluster of Hills reduction in mortality of mothers was 34%, newborns 57%, and under-5-year children 33%. In the cluster of Mountains reduction in mortality of mothers was 26%, newborns 40% and under-5-year children 24%. Results of Philippines has been provided in three regions. In Psay city the reduction rate of mortality among mothers, newborns, and under-5-year children in a 5-year period were 13, 5, and 5 percent respectively. In Northern Samar mortality of mothers decreased 39%, for newborns decreased 25% and for under-5-year children decreased 17%. In Eastern Samar the reduction rate of mortality among mothers, newborns, and under-5-year children in a 5-year period were 45, 26, and 20 percent respectively. Results related to India have been presented in two regions. In Kendrapara the reduction rate of mortality among mothers, newborns, and under-5-year children in a 5-year period were 34, 35, and 23 percent respectively. In Riagada mortality of mothers decreased 28%, for newborns decreased 35% and for under-5-year children decreased 25%.

Table 1 *Continues*

Title of study	Authors	Year	Country	Method	Results
Impact of rural family physician plan on the mortality rate of newborns in Iran: a time-series study	Naderi Magham et al.	2017	Iran	In this study, three separate regression models were designed to investigate the impact of the plan on mortality of newborns. Second-hand information resources were used in this study.	The results of this study showed that mortality rate of newborns had been decreased 34% as a result of urban family physician plan.
Utilizing inter-institutional resources to execute maternal and child health programs as a social intervention with multiple strategies in Harayana, north of India: a retrospective evaluation	Gupeta et al.	2017	India	The research was retrospective where information of pre-intervention (2002-2004), intervention (2007-2008), and post-intervention (2012-2013) was investigated.	The results of the investigation showed that the maternal mortality in pre-, during, and post-intervention have been 1/86, 1/53, and 1/21. Also, mortality of newborns were 61 in pre-, 55 in during, and 41 in post-intervention stages.
Investigating the impact of the health reform plan on the cesarean rate and mean cost paid by mothers: a case study of Kurdistan Province 2013-2015	Pirouzi et al.	Iran	2017	This descriptive study has been conducted as longitudinal and retrospective. The cesarean rate in all hospitals of Kurdistan Province was extracted in 2013 and 2015. SPSS 20 was used for data analysis.	The cesarean rate in Kurdistan Province has been decreased 14.02% one year after executing reform plan comparing with base year (2013) (p<0.001).

normal childbirth. Furthermore, they also consequently decrease the cesarean mortality rate of newborns and mothers. Additionally, it is possible for the rate of maternal complications to increase.[28] The study of Goudarzi, et al. in Iran showed that the lowest mean and the most unfavorable standard deviation is related to rise in the number of normal childbirth. In contrast, the highest mean and the most favorable standard deviation is similar to specialized hospitals.[16] Executing Iran health reform plan caused improvement in the status of maternal and child health indicators due to the decrease in cesarean rate (based on the study of Afshari et al.).[16] Fernandez et al. showed that mortality rate of newborns has decreased in Mozambique which could be due to the expansion of health system, increase in the ratio of nurse to mother, and an increase in labor force and higher support of government for health system.[28] On the other hand, Health Promotion Committee of India has estimated that maternal mortality in India reduced to 1000 in 1959 as the main reason was a decrease of malaria outbreak in pregnant women.[29] In a study conducted by Zendanian et al., they found out that the rate of normal delivery has increased after health reform plan. There are significant differences in prevalence of normal

childbirth (t= -7.987, P<0.001) and cesarean prevalence (t= 6.988, P<0.001) before and after health reform plan.[30] In a study conducted by Rooyin Tan and Aghaei, they observed that the rates of natural delivery and cesarean were 35.3 and 64.7 in 2013 and were 41.4 and 58.6 in 2014 respectively. They show a 6-percent increase in natural childbirth.[32] In the study of Jamens Soto et al., they understood that maternal and child mortality has decreased in various amounts in different regions of understudied countries. They shows the effectiveness of health reform in promoting maternal and child mortality indicator in the mentioned countries.[33] In addition, the results of the study of Naderi Magham et al., showed that mortality rate of newborns following the execution of urban family physician plan had decreased 34%.[34,35] The results of that study are similar to those of Gupeta et al. in India[36]

CONCLUSION

Finally, according to conducted studies, it is possible to conclude that the most important indicators of maternal and child health which were affected by the health system reformation are natural childbirth, the ratio of cesarean to natural childbirth,

delivery complications, mortality of mothers and newborn, and rate of stillbirth. It is possible to say that generally, health reform has had a positive effect on these indicators.

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