The Relationship Between Socioeconomic Status and the Prevalence of Elective Cesarean Section in Nulliparous Women in Niknafs Teaching Centre in Rafsanjan, Iran

Majid Davari [1]; Mohammadreza Maracy [2]; Zohreh Ghorashi [3,*]; Mitra Mokhtari [4]

[1]Department of Pharmacoeconomics and Pharmaceutical Administration, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, IR Iran
[2]Department of Epidemiology and Statistics, Isfahan University of Medical Sciences, Isfahan, IR Iran
[3]Department of Midwifery, Rafsanjan University of Medical Sciences, Rafsanjan, IR Iran
[4]Teaching and Therapeutics Centre, Niknafs Teaching Center, Rafsanjan, IR Iran

Corresponding author: Zohreh Ghorashi, Department of Midwifery, Rafsanjan University of Medical Sciences, Rafsanjan, IR Iran. Tel: +98-3915225900, E-mail: zghorashi@yahoo.com

Background: In the recent decades, the high rate of cesarean section is increased worldwide along with critical concerns about its primary benefits. Many researchers showed the positive relationship between socioeconomic status (SES) and the prevalence of cesarean delivery. However, it seems that the prevalence of elective cesarean section is even rising in low socioeconomic classes.

Objectives: The aim of this study was to evaluate the relationship between the socioeconomic status and the prevalence of elective cesarean section in nulliparous women in Niknafs Teaching Centre, in Rafsanjan, Iran.

Patients and Methods: This cross-sectional study was comprised of 459 nulliparous women and was carried out in Niknafs Teaching Center, in Rafsanjan from August 2011 to April 2012. A valid questionnaire was completed during a brief interview with the subjects. It included the demographic, economic, and educational statuses of the subjects as well as information about the delivery types. The collected data was analyzed using chi-square and Fisher exact tests in SPSS version 16.

Results: Five socioeconomic groups were defined as very poor, poor, fair, good, and very good. Overall, 74% of the participants were placed in fair and lower groups. Significant relationships were observed between SES and primary elective cesarean delivery (P < 0.001) as well as the final rate of cesarean delivery (P = 0.02). However, there was no statistically significant relationship between the reason for cesarean delivery and SES of the mothers.

Conclusions: The improvement of the SES has a linear relationship with demand for cesarean delivery. But elective cesarean section is notably high in Iran even in lower socioeconomic classes. This could verify that socioeconomic factors are not the only reason for the high prevalence of cesarean delivery in Iran and that other factors are in fact responsible for this level of performance.

Keywords: Cesarean Section; Social Class; Prevalence; Iran

1. Background

The principal aim of a cesarean delivery is to reduce the complication and mortality rate during childbirth in both mother and child (1). This objective has been fully accomplished in the past few decades. But, the increase of this surgery in the past two decades has challenged such primary objectives. In 1985 the World Health Organization (WHO) suggested that there was no excuse for any area in the world to have a cesarean rate of over 15% (2). Although the world's average cesarean rate is 15% (3), its prevalence differs around the world. In Australia, this rate increased from 20% to 29% in one decade (4); and in the Netherlands it rose from 8.5% in 1997 to 15.1% in 2007 (5). This increase in some developing countries is even more dramatic. For example, this rate in countries such as Brazil, Chile and China has risen to 40-42% (3, 6). How-ever, in less developed countries such as central Africa and poor Asian countries such as Nepal, cesarean rate has stayed at 1% (7).

Various studies have shown that cesarean rate in Iran is varied from 26% to 68.5% in different provinces and has even been recorded up to 87% in some private institutes (8-12). It is reported that cesarean rate in Tehran was 84% between 2004 and 2006 (13). Another study showed that cesarean rate in Isfahan increased from 48% in 2005 to 60% in 2008 (14). The high cesarean rate has obvious side effects on mothers such as respiratory infections, emboli and bleeding and also breathing difficulties in fetuses and an increasing hospitalization of the newborn in the Neonatal Intensive Care Unit (NICU) (15, 16). It is stated that death rate in elective cesarean is 2 to 3 times greater

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than natural birth (17). Likewise the life years lost because of death or disabilities due to cesarean deliveries has been estimated at 20.6 years per 1000 deliveries, whereas this loss for natural deliveries has been 8.8 years (18). This increase in side effects has put the benefits of cesarean delivery into serious questions.

In addition to health concerns, this excessive and irrational use of cesarean deliveries has imposed increasing financial burden on the health systems (19). This is why in countries with cesarean rate between 20 to 30% intensive efforts are made to reduce this rate to less than 15%. The important point for Iran is that this rate is currently about 5 times greater than the acceptable rate of cesarean delivery which is suggested by WHO (20, 21). One of the new problems on the way to reducing cesarean deliveries is the spreading of elective cesarean deliveries that have no medical reasons and are preformed due to the patients' will. In Iran, a woman is 3 times more likely to undergo a cesarean than 20 years ago (22). Mohammadian has shown that in Tehran, 22% of all elective cesareans were done under the mothers' will (11).

While the main reason for elective cesarean delivery in developed countries is being worried about harming the pelvic organs (23), in Iran, it is the fear of labor pain (8, 11). A recent study in Iran showed that the incidence of cesarean delivery has been related to factors such as the type of hospital, educational level, job, neighborhood, family type and socioeconomic class of the patients (10). But it is believed that even families with less economic advantage prefer this method of child birth in recent years.

2. Objectives

The aim of this study was to determine the relationship between elective cesarean and SES in nulliparous woman attending Niknafs Teaching Medical Center, in Rafsanjan, Iran.

3. Patients and Methods

This cross-sectional study was comprised of 459 nulliparous women and was undertaken in Niknafs Teaching Medical Center, in Rafsanjan, in 8-months, starting from August 2011 to April 2012. The inclusion criteria for nulliparous women were to have a 37-weeks gestational age, a living fetus and willingness to take part in the study. The exclusion criteria were the absence of inclusion criteria. A total population sampling method (24, 25) was used for all pregnant women who met the inclusion criteria and referred to the teaching center during the study period. A valid and reliable self-administered questionnaire was used to collect the data. The questionnaire had two parts. The first part included demographic questions, history of delivery and insurance types. The questions in the second part were concerned the socioeconomic status (SES) (26-29) and included the level of income, job, living area (urban or rural), housing, family size and the level of education. By taking into account the indicators and their

importance (30, 31), the socioeconomic classes were classified into very poor, poor, medium, good and very good. A short interview was conducted with the pregnant women or their relatives to complete the questionnaires. The interviews were performed after the subjects registered in the Delivery Section of the Medical Centre. The collected data were analyzed by the SPSS software. Chi-square, Kruskal-Wallis, and ANOVA tests were used to evaluate the significance of the parameters. In all statistical tests significant level was considered as $P < 0.05$.

4. Results

A total of 459 women participated in the study. The average age of pregnant mothers and the spouses were 24.3 ± 4 and 28.1 ± 4.4, respectively. Regarding education, 77.7% of mothers had high school diploma and only 1.1% were illiterate. Also, 89.3% of the mothers were housewives. High school diploma was also the highest educational degree among the fathers with the rate of 48.7%. Only 2.2% of the fathers were illiterate. The occupation of 48.7% of the couples was manual labor.

With respect to the place of residence, 58.1% of the subjects lived in the urban and 41.9% in the rural areas. In terms of housing, 65.5% lived in private and 32.3% in rental houses. The most common income of the subjects was 2-4 million Iranian Rials per month. With regards to insurance, 95.5% of the subjects were insured by different insurance companies. Social security health insurance organization was the most popular and covered 42.8% of the participants. The average length of work experience of the physicians working as an obstetrician in the center was 10.8 ± 10.3 years; but 40% of the subjects were under the care of physicians and had 2 years or less work experience. By weighting socioeconomic factors, the subjects were classified into 5 classes of very poor, poor, medium, good and very good. The results showed that 7.5% of the women were placed in very poor class. Likewise, 26.3%, 40.1%, 3.8% and 8.17% of the mothers were situated into poor, medium, good and very good classes respectively.

The results show that 24.1% of the subjects were hospitalized for induction delivery, 27% for cesarean and 48% for natural delivery. Among the mothers hospitalized for cesarean delivery, 52.9% had medical reasons and in 47.1% cesarean childbirth was at mothers' own will. However, the final results of delivery showed that 43.9% of all mothers had cesarean delivery, 52.2%, natural delivery and 3.9% had deliveries using forceps or vacuum devices. Our findings showed that the rate of hospitalization for cesarean delivery was increasing with improving SES which inversely related to the rate of natural delivery (Table 1). By using the chi square test, a statistically significant relationship was shown between the SES and the selected delivery type upon admission to the medical centre ($X^2_2 = 28.4$ (Kruskal-Waliss), $P < 0.001$). There was also statistically significant relationship between the SES and the final delivery type ($X^2_2 = 14.02$ (Kruskal-Waliss), $P = 0.001$) (Table 1).

Table 1. Relationship Between SES and the Studied Variables in the Subjects [a, b]

SES	Selected Delivery Type			Final Delivery Type			Cesarean Reason	
	NVD	CS	Induction of Labor	CS	With Device	NVD	Medical	Elective
Very poor	21 (61.8)	2 (5.9)	11 (32.4)	11 (32.4)	1 (2.9)	22 (64.7)	2 (3.1)	1 (1.8)
Poor	68 (56.7)	20 (16.7)	32 (26.7)	45 (37.8)	5 (4.2)	69 (58)	8 (12.5)	11 (19.3)
Medium	88 (48.1)	55 (30.1)	40 (21.9)	78 (42.9)	5 (2.7)	99 (54.4)	27 (42.2)	27 (47.4)
Good	33 (40.7)	27 (33.3)	21 (25.9)	44 (55)	3 (3.8)	33 (41.3)	14 (21.9)	12 (21.1)
Very good	13 (34.2)	19 (50.0)	6 (15.8)	22 (57.9)	4 (10.5)	12 (31.9)	13 (20.3)	6 (10.4)
Total	223 (48.9)	123 (27.0)	110 (24.1)	200 (44.2)	18 (4)	235 (51.9)	66 (100)	57 (100)

[a] Abbreviations: CS; cesarean section, NVD; normal vaginal delivery, SES; socioeconomic status.

[b] Data are presented as No. (%).

The results show no statistically significant relationship between the mothers' age and the elective delivery type ($F_{(2, 455)} = 1.66$, P value = 0.190), as well as the final delivery type ($F_{(2, 452)} = 1.58$, P value = 0.207). However, statistically significant and positive relationships were found between the physicians' work experience and the selected delivery type upon admission to the medical centre ($X^2_2 = 57.9$ (Kruskal-Waliss), P < 0.001) and also the final delivery type ($X^2_2 = 20.3$ (Kruskal-Waliss), P < 0.001). There were no statistically significant differences (P = 0.53) between SES and the cause of cesarean delivery (Table 1).

5. Discussion

The aim of this study was to determine the relationship between elective cesarean childbirth and SES in nulliparous women. The results of the study showed that about 74% of all subjects were classified as medium and below and only 8.3% were categorized as very good SES (Table 1), a finding supported and verified by the level of education and the profession of spouses.

The study also illustrated that the SES of the subjects was proportionate to the primary demand for cesarean delivery and the actual performance of cesarean increased in a positive linear mode. The positive relationship between the prevalence of cesarean childbirth and the socioeconomic factors has already been reported in several studies (10, 20, 32, 33); although this relationship has been very strong in non-emergency and weak in emergency cesarean deliveries (34).

Despite the obvious difference in total cesarean rate between various socioeconomic classes, our findings showed that there was no statistically significant difference in various SES in non-emergency cesareans. But attention is drawn to two important points. The first is that elective cesareans have risen from 1.8% to 47.4% in the very poor to medium classes, which is an alarming rate. On the other hand, the prevalence of elective cesarean has undergone a dramatic change from 47.4% to 10.4% in the medium to very good classes. But, this decrease may be due to the fact that people with higher SES had chosen private rather than public hospitals, a finding supported by the lengths of the physicians' experience. These data show that there is a significantly positive relationship between the physicians' experiences and the frequency of elective method of childbirth and also between the physicians' experiences and the frequency of delivery method, which in turn is affected by SES. In other words, mothers with higher SES preferred experienced physicians with higher surgery fees. This was consistent with the findings of Naseriasl study in Ardabil, Iran (35). In addition, while the proportion of referrals in SES of very poor to medium increased from 7.5% to 40.1%, the rate of medium to very good SES decreased from 40.1% to 8.3%.

The second highly important point was that 45% of non-emergency cesareans had medical reasons behind them (Table 1), which is much higher than the international standards (2) and could be a sign of serious local health problems amongst women. A possible alternative which could explain such discrepancy is potential misdiagnosis. However, further research is needed to explore and verify these assumptions.

Another considerable finding of this research is that not only does the demand for cesarean increase with improving SES, but also the elective cesarean in the very poor to medium classes has risen considerably (Table 1). This increase is just less than the rate recommended by WHO (2) in the very poor class, and slightly higher in the poor class and twice as much in the medium class. These considerable findings show that the demand for cesarean, without any medical reasons, has risen even in low socioeconomic classes. A recent study in China also reported that there was a noticeable rise of cesarean throughout all socioeconomic classes in 2008 (36). This study concluded that the increasing trend of cesarean cannot be explained by socioeconomic factors.

In recent years in Iran, cesarean delivery, especially elective cesareans, are increasing even in mothers with low SES. This trend could somehow be associated with the increase in health insurance coverage, decrease in fertility in general and the increase in health service. Nevertheless, it is important to emphasize that the high rate

and irrational use of cesarean delivery has imposed considerable financial burden on the health system (19) as well as increasing health risks for mothers. This could be considered as one of the factors which could cause collective inefficiencies (37) in the health care delivery system. Improving SES has positive linear relationship with demand for cesarean. However, elective cesarean is remarkably high in Iran even in low socioeconomic classes. This could verify that socioeconomic factors are not the only reason for the prevalence of cesarean in Iran and that other conditions are in fact responsible for this level of performance. The high rate cesarean could impose great financial pressure on the health system and be considered as one of the causes of inefficiency in the health care delivery system.

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Authors' Contribution

Majid davari and Zohreh ghorashi developed the original idea and the protocol, abstracted and analyzed data and wrote the manuscript; Mohammadreza maracy contributed to protocol development, data analysis and writing the manuscript; Mitra mokhtari supervised acquisition of the data.

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