

CORRELATION BETWEEN CESAREAN SECTION AND PERINATAL MORTALITY RATE

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CORRELATION BETWEEN
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Objectives: cesarean section rates show a wide variation among countries, ranging from 0,4-40%, and continuous rise. Our aim was to test hypothesis that higher Cesarean rate than 15% does not correlates with lower perinatal mortality rate.

Methods: We analysed 18-year period with high-quality cesarean delivery and perinatal mortality rates information data. Data were analysed by Chi-square test with Yate's correction for large values.

Results: Cesarean section rates has increasing trend. In first six-years of observed period (1998-2003) mean cesarean section rate was 17,24%, in second (2004-2009) 19,33% and in third (2010-2015) 23,97%. In observed period mean perinatal mortality rate was 9,90‰, with fluctuation of 20,70‰ to 3,82‰. In first six-years of observed period (1998-2003) mean perinatal mortality rate was 13,81‰, in second (2004-2009) 8,28‰ and in third (2010-2015) 7,46‰. These data clearly showed that increase of cesarean section rate more than 19,33% is not correlate with decreasing od perinatal mortality.

Conclusion: Despite many suggestions that improvement in perinatal mortality does not necessarily rely upon an ever-increasing cesarean section rate and recommendation by World Health Organisation that cesarean section rate should not exceed 10-15 percent to optimise neonatal outcomes, this recommendation may be too low, and suggests rate of 19%.

Key words: cesarean section reate, perinatal mortality rate, correlation.

INTRODUCTION

Cesarean Section is the common major surgical procedure in obstetric practice (1). Cesarean section rates shows a wide variation among countries in the world, ranging from 0,4-40%, and a continuous rise in the trend has been observed in past few decades (2). It is being because of development of effective antimicrobial agents, allied to advancement in surgical and anesthetic techniques, and rendered cesarean section a safe option to the obstetrician, preventing many maternal and fetal injuries. Until 1960's the increase in ceraean section rates had a direct impact on decreasing perinatal mortality in most developed countries (3). But, the decrease of perinatal mortality cannot be explained only by increased cesarean section rate. Many factors have the impact on perinatal mortality rate as advancements in prenatal care and education of pregnant women, use of corticosteroids in inducing of fetal pulmonary maturation, useness of ultrasonography, use of many effective tocolitic agents, improved obstetric care, and improved neonatal care.

However, the indiscriminate increase in cesarean sections, often performed

without scientific basis, has become a multifactorial issue of difficult control (3). With the increasing importance of this procedure in our practice, it has become imperative to constantly evaluate not only the maternal but also the foetal outcome following cesarean operation.

The World Health Organisation (WHO) recommends that cesarean delivery rates should not exceed 10-15 per 100 live births to optimize maternal and neonatal outcomes (4). Some studies suggest that there are differences in cesarean section rates between low-income, medium-income and high-income countries. In low-income countries, a negative and statistically significant linear correlation was observed between cesarean section rates and perinatal and maternal mortality (2). Many autors published that improvement in perinatal mortality does not necessarily rely upon an even-increasing cesarean section rate (5, 6, 7, 8, 9, 10, 11), particularly in countries with low level of antenatal care (12). Contrary, some autors published that higher cesarean section rate is associated with improved neonatal outcomes and lower maternal or neonatal mortality in countries with up to

15-19% per 100 live births (4), particularly in low-income countries (2).

The aim of this study is determining the perinatal mortality rate among women delivered through cesarean section, find relationship between cesarean section rate and perinatal mortality rate, and test hypothesis that higher Cesarean rate inversely correlates to perinatal mortality rate.

METHODS

A retrospective study was carried out to determine the occurrence of cesarean section deliveries, as well as early neonatal and perinatal mortality rates from January 1998 to December 2015. Obstetric care was carried at University Hospital Tuzla, Bosnia and Herzegovina. We analysed 18-year period from 1998 to 2015 because this is period with high-quality cesarean delivery and perinatal mortality rates information data.

Early neonatal mortality was obtained by dividing the total number of deaths of newborns aged less than 7 days by the total number of live births during a given period. Perinatal mortality was calculated by dividing

the total number of deaths of fetuses with more than 28 weeks of gestation (when the date of last menstrual period was unknown, a fetal weight greater than 1,000 g was calculated) plus number of deaths of newborns aged less than 7 days, by the total number of stillbirths and live births during a given period.

Data were analysed by Chi-square test with Yate's correction for large values.

RESULTS

Between January 1998 and December 2015, a total of 77,258 deliveries were performed at University hospital Tuzla. Out of 77,258 deliveries, 15,380 (19,90%) were performed by cesarean section. Figure 1. shows relative ratio between total number of deliveries and deliveries performed by cesarean section.

Total number of deliveries fluctuated between 3574 in 2015 to 5483 in 1998 with evident decreasing tendency. A cesarean section rates fluctuated between 15,53% in 1998 to 25,68% in 2014 with evident increasing tendency.

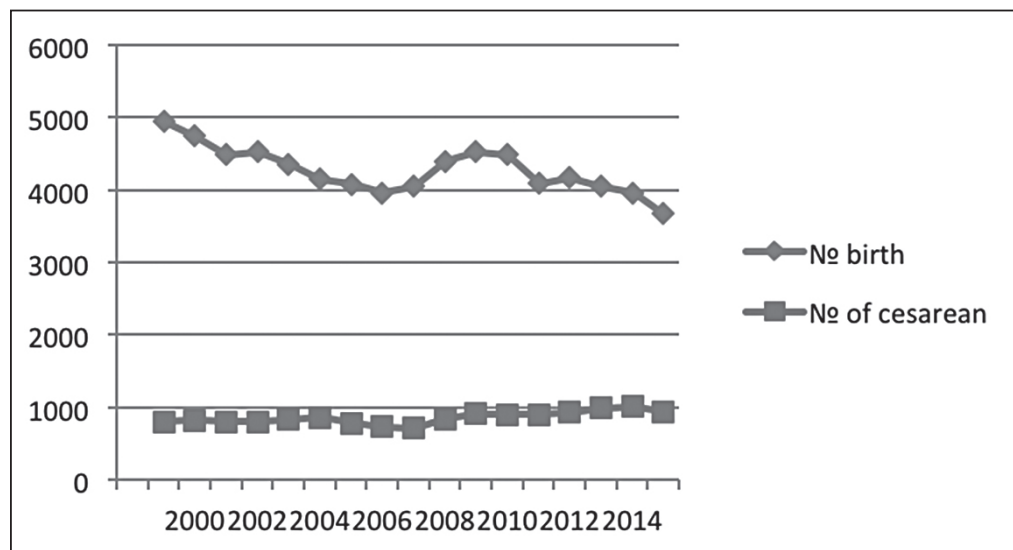


Figure 1. Relative ratio between total number of deliveries and deliveries performed by cesarean section

Figure 2. shows trend in cesarean section rates which had evident increasing trend. In first six years of observed period (1998-2003) mean cesarean section rate was 17,24%. In second period (2004-2009) it was 19,35% and in third period (2010-2015) was 23,97%.

In observed period mean perinatal mortality (PNM) rate was 9,90‰, with fluctuation of 20,70‰ in 1998 to 3,82‰ in 2004. In first six years of observed period (1998-2003) mean perinatal mortality rate was 13,81‰, in second six-year period (2004-2009) was 8,28‰ and in third period (2010-2015) was 7,46‰. (Figure 3.).

Between first and second six-year observed period, we did not find statistical difference in cesarean section rates (17,24% vs 19,33%: $P < 0,01$), as well as between first and third period (17,24% vs. 23,97%: $P < 0,01$) and second and third observed period (19,33% vs. 23,97%: $P < 0,001$).

Between first and second six-year period, we did find statistical difference in perinatal mortality rates (13,81‰ vs. 8,28‰: $P < 0,001$) but we did not find statistical difference in perinatal mortality rates between second and third observed period (8,28‰ vs. 7,46‰: $P = 0,33$; $P > 0,05$).

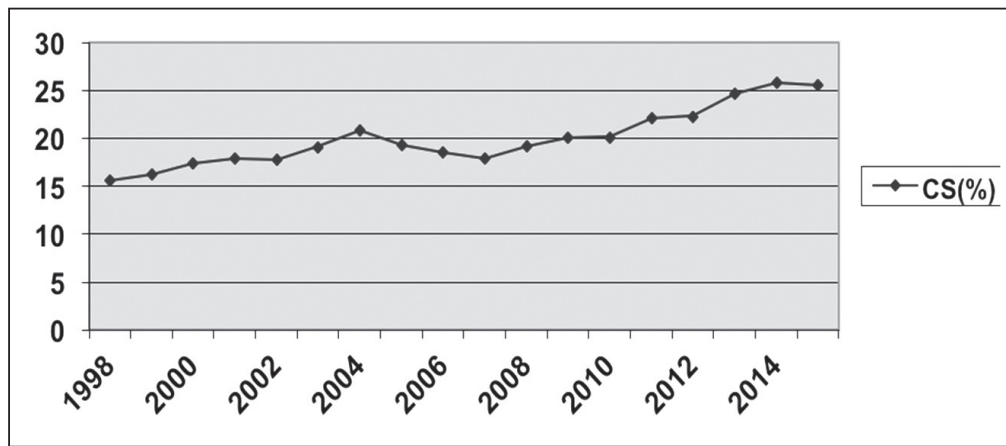


Figure 2. Cesarean section rates (%) in period 1998-2015

These data clearly showed that increase of cesarean section rate up to 19,33% were associated with lower perinatal mortality rate, but cesarean section rate more than 19,33% is not correlate with decreasing of perinatal mortality rate.

Figure 3. combines cesarean sections and perinatal mortality rates and clearly shows increasing tendency of cesarean delivery rates at the same time with decreasing tendency of perinatal mortality rates.

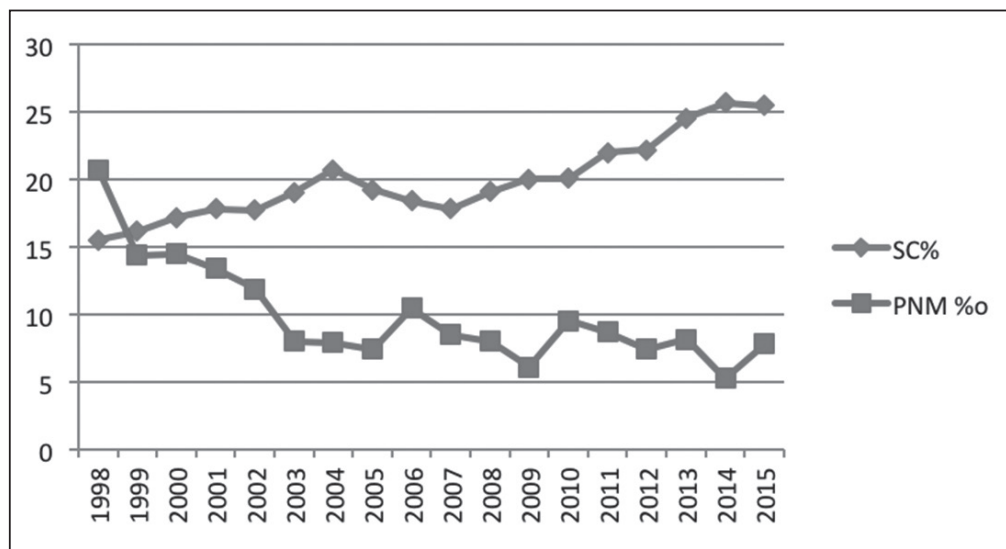


Figure 3. Cesarean section (%) and perinatal mortality rates (%)

DISCUSSION

Our study findings confirmed same trends seen worldwide. Until the 1960's increasing cesarean section rate was found to have a direct impact on decrease of perinatal mortality (13). According to Nielsen et al. (14) cesarean section and perinatal mortality rates do not necessarily have an inverse correlation, a decrease in perinatal mortality cannot be explained solely by increased cesarean section rates, since many factors such as prenatal, obstetric, and neonatal care, socioeconomic conditions and better health organisation also play an important role. Meehan et al. (15) observed that an increase of cesarean section rates was only associated with a decreasing of perinatal mortality when cesarean section were indicated based

on restricted obstetric criteria. Many studies present data which confirm theory that increasing cesarean section rate is not inversely correlated with perinatal mortality rate (5, 6, 7).

Meehan et al. (15) showed that increase of cesarean section rates was only associated with reduction of perinatal mortality when cesarean section were indicated based on restricted obstetric criteria not due to iteration. The authors recommend a rigorous screening policy before performing a cesarean section so that perinatal mortality could be effectively reduced.

According to O' Driscoll and Foley (16), the increase in cesarean section rates has not contributed to reduced perinatal mortality after their study at the National Maternity Hospital in Dublin, and they reported

cesarean section rates ranging from 4,2%-4,8% and simultaneously decreasing perinatal mortality rate in range of 42,1‰ to 16,8‰ wich strongly evidencing that cesarean section rates has not a direct impact on perinatal mortality.

Lumbiganon (9) showed in his study that women who give birth by cesarean section may be at an increased risk for negative consequences on maternal health, but with improved neonatal outcomes in cases of abnormal fetal presentation, and suggest that cesarean section be performed only when medically necessary.

Based on WHO systematic review, increasing section cesarean rates up to 10-15% at the population level are associated with decreases in maternal, neonatal and infant mortality (17).

The results of present studies showed permanently increasing tendency of cesarean section rate from 15,53% to 25,68%, as in many countries (17,18) and decreasing trend of perinatal mortality rates.

In our study, in analising period from year 1998-2015 we found permanent increasing cesarean section rate ranging from 15,3% to 25,67% with mean value of 19,90%. At the same time perinatal mortality rate

showed permanent decreasing tendency in range from 20,70‰ to 3,82‰.

Cesarean section rate up to 19,33% was followed by decreasing perinatal mortality rate in our observed period wich is similar to results of Molina et al. (4) and Volpe (10). But, cesarean section rate more than 19,33% in our study, was not followed by decrease of perinatal mortality rate. That is higher cesarean section rate than WHO recommended (10-15%) to optimise maternal and neonatal outcomes.

In conclusion, many factors must have contributed to the reduced perinatal mortality, such as better prenatal and neonatal care. One of the main points of present sudy was to show that the reduction of perinatal mortality was not affected by permanent rising rates of cesarean sections. Despite many suggestions that improvement in perinatal mortality does not necessarily rely upon an ever-increasing cesarean section rate and recommendation by World Health Organisation that cesarean section rate should not exceed 10-15 per one hundred live births to optimise neonatal outcomes, this recommendation may be too low, and suggests rate of 19 percent of cesarean setion rate in improving better perinatal outcomes.

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