

## THE EVOLUTION OF PREMATURE BIRTH RATE DEPENDING ON SOCIO-ECONOMIC FACTORS IN BRASOV COUNTY

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### ABSTRACT

**Introduction.** Prematurity continues to represent a problem due to the social, financial and most important, human lives impact. In 2010, 8,2% of the total births number in Romania were premature deliveries, thus placing Romania among the high incidence countries.

**The aim of the study** was to assess the connection between socio-economic factors and preterm deliveries in a county hospital from Romania, between 1977-2013.

**Methods.** Correlations have been made between data on deliveries registered in The Obstetrics and Gynecology Clinical Hospital of Brasov, Romania, regarding births between 1977 and 2013, and the economical indexes: inflation rate, medium wage and the consumer price index. Economic data were obtained accessing the database of the National Institute of Statistics.

**Results.** Our study identified 3 periods of time in which the implemented laws, along with the socio-economic characteristics, had clearly impact on the number of premature deliveries. The first (1977-1992) and the last (2005-2013) period studies revealed a drop in the number of premature deliveries, correlated to a rise in the average wage. Due to the marked economic instability corresponding to 1992-2004, along with

### RÉSUMÉ

**L'évolution du taux de naissances prématurées par rapport aux facteurs socio-économiques dans la région de Brasov**

**Introduction.** La prématurité continue de représenter un problème en raison de la situation financière, sociale et le plus important, des vies humaines. En 2010, 8,2% du nombre total de naissances était représenté par des accouchements prématurés, situant ainsi la Roumanie parmi les pays à une incidence élevée.

**Objectifs.** L'objectif de cette étude est d'évaluer le lien entre les facteurs socio-économiques et les naissances prématurées en Roumanie, dans un hôpital départemental, entre 1977-2013. Les corrélations ont été faites entre les données des accouchements enregistrés à l'Hôpital clinique d'Obstétrique et de Gynécologie de Brasov, Roumanie concernant les naissances entre 1977 et 2013 et les indices économiques : taux d'inflation, le salaire moyen et l'indice des prix de consommation. Les données économiques ont été obtenues en accédant à la base de données de l'Institut National de Statistique.

**Résultats.** Notre étude a identifié 3 périodes de temps ou les lois instituées, ainsi que les caractéristiques socio-économiques ont eu un impact sur le nombre

reinforcing the law that incriminates abortion, the premature deliveries number increased, along with the increase of the medium wage. Moreover, paradoxically, in the same period we witnessed the lowest number of premature deliveries in this study: 502 in 1995.

**Conclusion.** The well-being of the population, translated into high medium wage and controlled economic indexes, reflects on the number of premature deliveries in a specific manner, that requires future studies.

**Keywords:** premature birth rate, economic index, legislation.

## INTRODUCTION

Prematurity represents one of the important health problems that we face nowadays, worldwide. Every year, the number of babies delivered prematurely increases. Prematurity still represents the most important cause of mortality in children under 5 years old<sup>1</sup>.

There are several factors with impact on the prognosis of a pregnancy, medical and non-medical ones. As science has clearly shown the etiopathogenic mechanism that leads to a premature delivery, little is yet known about factors such as the historical and economic climate impacting birth rate. There are many data in the scientific literature that highlight the lower education level and the low income of the mother delivering prematurely, but few regarding the correlation of economic indexes with premature birth rate<sup>2,3</sup>.

We decided to study the economic climate and search the correlation with the number of premature deliveries, as Romania has been one of the countries in which the communist regime has modified multiple times the abortion policy.

The unique legislative climate, where abortions were allowed only in strict conditions, overlapped with economic situation, dominated by instability between 1977-2013 all over Romania.

We studied the specific economic indexes, because the economic situation further on creates a vicious circle with the low education level. We tried to find correlations between economic indexes, specific historic facts and birth rate in „Dr. I. A. Sbarcea“

d'accouchements prématurés. La première (1977-1992) et la dernière période (2005-2013) de l'étude ont montré une diminution du nombre d'accouchements prématurés corrélé à une augmentation du salaire moyen. En raison de la forte instabilité économique correspondant à la période 1992-2004 ainsi qu'au renforcement de la loi incriminant l'avortement, le nombre des accouchements prématurés a augmenté en parallèle avec l'augmentation de la rémunération moyenne. En outre, paradoxalement, dans la même période de temps, nous étions témoins du moindre nombre de naissances prématurées dans cette étude: 502 en 1995.

**Conclusion.** La connexion directe entre le bien-être de la population traduit dans le salaire moyen accru et contrôlé par les indices économiques se reflète sur le nombre d'accouchements prématurés de manière spécifique qui impose des études supplémentaires.

**Mots-clés:** taux de natalité, indice économique, la législation.

Hospital of Obstetrics and Gynecology, Brasov, Romania.

**The aim of the study** was to evaluate how the historical and economic specifications had impact on the evolution of the birth rate and of the premature births in „Dr. I.A. Sbarcea“ Hospital of Obstetrics and Gynecology, Brasov, between 1977-2013.

The main objectives of this study were to create a database of the registers from the hospital, with statistical analysis of the information, to correlate with economic indexes provided by the National Institute of Statistics and to estimate the impact of legislation changes over time.

## MATERIAL AND METHODS

Statistical data were obtained from the statistical department of „Dr. I.A. Sbarcea“ Hospital of Obstetrics and Gynecology, Brasov and from the National Institute of Statistics. Data collected refer to the number of births registered per year in the time period between 1977-2013. The statistical information was taken from the National Institute of Statistics.

Several variables were analyzed: the average gross salary, price index and inflation rate, each of them registered per each year of the studied period, number of births registered per each year of the studied period.

The data collection and also the study were approved by the ethical committee of the hospital, thus ensuring the privacy and the confidentiality of the personal data.

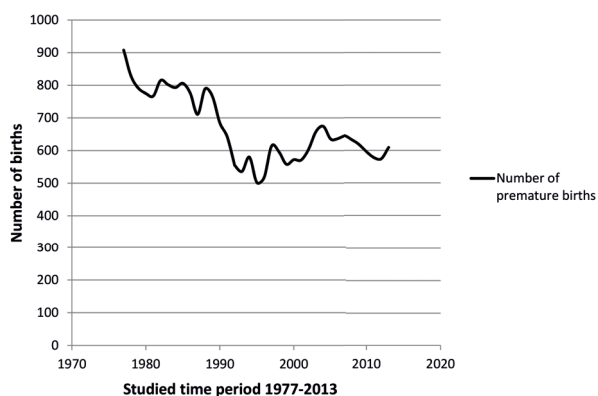


Figure 1. Evolution of the total number of births between 1977-2013

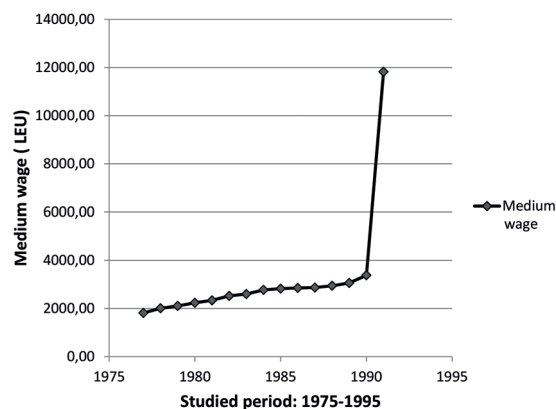


Figure 3. Medium wage (lei/month) between 1977-1992

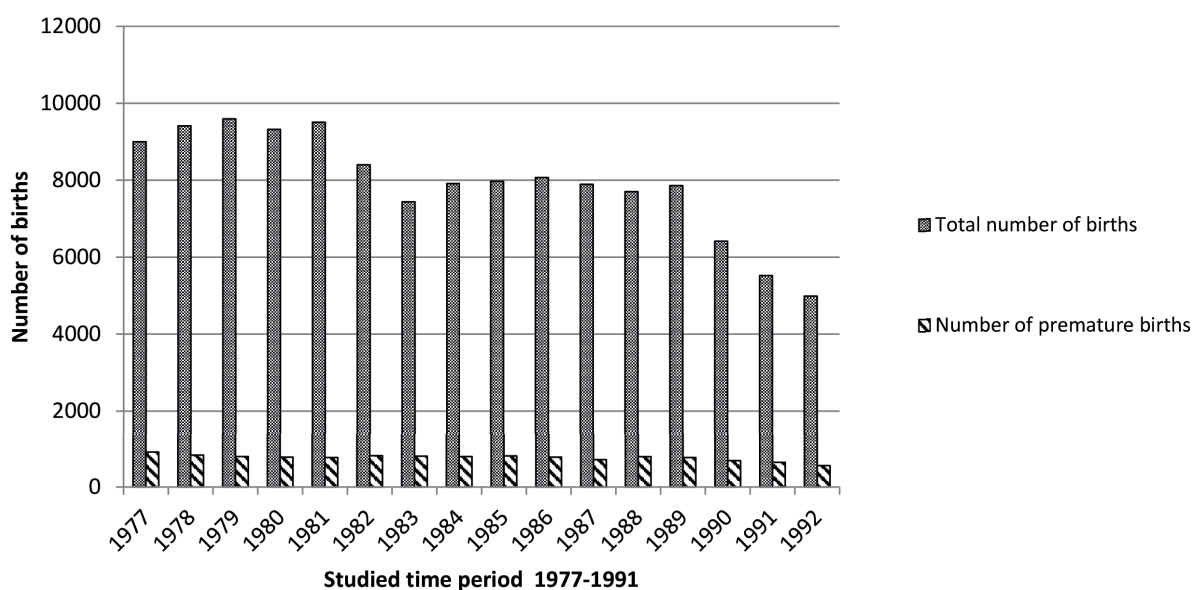


Figure 2. Evolution of premature births and total number of births between 1977-1991

## RESULTS

During the period studied (38 years, between 1977-2013), a total number of 25,272 premature deliveries was registered.

The distribution of the total number of births is shown in figure 1. We can observe that the lowest number of premature deliveries was registered in 1995.

When studying the same time period, we can notice that the highest number of premature deliveries was registered in 1977.

We divided the period of study in 3 time periods: 1977-1992, 1992-2004 and 2005-2013 and we overlapped economical data.

During the first time period, 1977-1992, we noticed an indirect correlation between the number of premature deliveries and the average gross wage

During the second time period, 1992-2004, the greatest economic instability was revealed through important changes of the economic indices. During this time period, although we witnessed an increase of the average gross wage, we also registered an increase in the number of premature delivered babies ( $r=.79$ ,  $p\text{-value}=0,00131$ ). As a direct result of the economical crisis of this period, we also registered the highest price index of the entire period studied, respectively 356.10 in 1993 (Figure 4).

Interesting, despite the difficult economic situation, as depicted above in 1995, the lowest rate of the prematurely delivered babies was reached in 1995: 502. Moreover, in 1996, we noticed the lowest rate of births between 1977-2013: 3921.

During the last period studied, 2005-2013, the same pattern described in the first period appears:

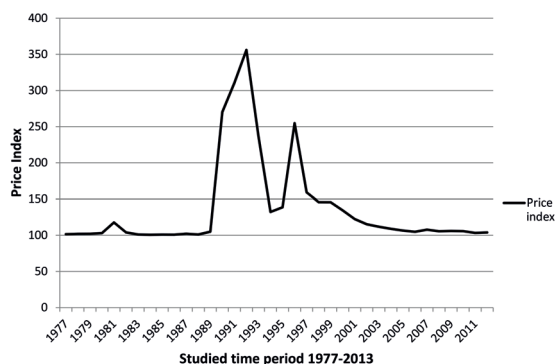


Figure 4. Evolution of price index between 1977-2013

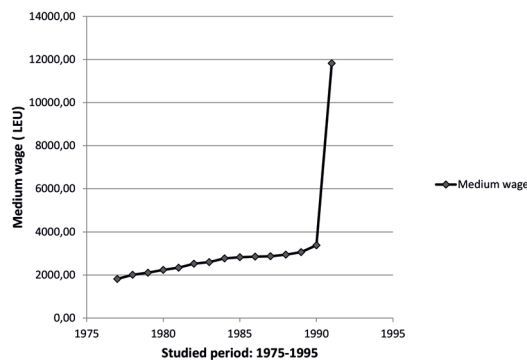


Figure 5. Medium wage (lei/month) between 2005-2013

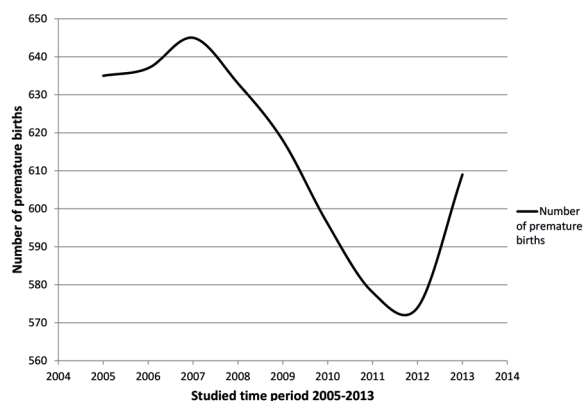


Figure 6. Evolution of the number of premature births between 2005-2013

a drop of the number of prematurely delivered babies and an increase of the average wage ( $r=0.75$  and  $p\text{-value}=0.01208$ ). The same time period presented the lowest inflation rate, of only 5.90, and an average monthly wage of 1913.22 lei (Figure 5).

Again, despite a growth of the average wage, between 2005 and 2013 the prematurely delivered babies reached the highest rate of the total number of births: 13.57 compared to only 9.76 between 1977-1992 and 13.39 between 1992 and 2004 (Figure 6).

The low number of births registered in 1995 represents the consequence of the law adopted in 1989, that liberalized abortion and abrogated all articles of the Criminal Code on abortion. Moreover, the same period overlaps with economic and political instability after the revolution of 1989 in Romania.

## DISCUSSION

Between 1996 and 2004, the number of births dropped, as a consequence of the law 140/1996. This law brought new regulations about abortion, and stipulated that the medical act must be performed by qualified personnel, in dedicated institutions, and at a gestational age of less than 14 weeks of amenorrhea.

When we compared the situation to law no 1/26<sup>th</sup> December 1989 and to the decree no 770/1966 on pregnancy termination, we noticed that, compared to the number of births registered between 1977-1989, the number of premature births between 1989-1992 decreased by 21.03%<sup>4,5</sup>.

Prematurity had over time different terminologies. In 1935, the American Academy of Pediatrics defined the premature baby as having a weight of less than 2,500 grams; in 1961, the definition was replaced by the World Health Organization, from weight of gestational age<sup>6,7</sup>. Nowadays, Romania uses the term premature delivery for any birth occurring after 24 weeks and 1 day of gestation, resulting in a living newborn<sup>8</sup>.

The fact that prematurity is linked to the socio-economic factors is shown by different aspects, the most important being the diet of the pregnant woman. Thus, a diversified diet supplemented with iron decreases the risk of premature delivery<sup>9,10,11,12</sup>. This simple correlation diet-prematurity shows how economy and social life have impact on pregnancies, mothers and newborns as well.

Unstable economic climate and financial crisis easily unbalance countries which register a high mortality outside crisis<sup>13</sup>. This assumption was verified by the results of our study, if we assume prematurity rather than mortality.

A limitation of this study is the impossibility of statistical determination of the discrepancies regarding terminology of the premature newborn in the time period studied.

## CONCLUSION

The evolution of the premature birth rate registered in „Dr. I.A. Sbarcea“ Hospital of Obstetrics and Gynecology, Brasov, was: 908 in 1977, reached the lowest value (502) in 1992 and slowly increased to a number of 609 in 2013. Two out of the three time

periods evaluated in our study followed the trend mentioned in the scientific literature, with a decrease of the number of premature deliveries correlated to a raise in the medium wage.

Between 1977-1992 and 2005-2013, the premature deliveries number decreased, along with the increase of the medium annual wage. At a closer look, we can observe that once again the legislation alterations may be the key in understanding this discrepancy. Between 1992-2004, we noticed a paradoxical situation, in which the number of premature deliveries increased, together with an increase of the medium wage. This situation may be the result of the unstable economic climate, as the same time period registered the highest inflation rate. The same period also registered the lowest number of premature deliveries: 502 in 1992.

The only explanation for this situation is given by the legislation alterations and by the social stress derived after the revolution of December 1989, as impact on maternal psychological state represents a recognized factor for preterm birth<sup>14</sup>. One way to favourable influence natality and minimize prematurity is to achieve economic growth and to decrease psychological stress factors induced by the social climate<sup>15</sup>.

Further studies about the correlation of the premature deliveries and economic indexes are necessary, on a longer time period, as socio-economic factors represent key factors in prematurity prognosis.

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