

Is a poor pregnancy outcome related to young maternal age? A study of teenagers in Estonia during the period of major socio-economic changes (from 1992 to 2002)

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Abstract

Objective: To assess the risk of low birth weight, preterm birth, stillbirth, neonatal and postneonatal death among primiparous teenagers having singleton births, compared to a similar group of women aged 20–24 years in Estonia during the period of major socio-economic changes.

Study design: Registry study using the data from the Estonian Medical Birth Registry (EMBR) for years 1992–2002; EMBR data were linked with infant deaths in the Estonian Mortality Database. Study population included 51,890 women aged 13–24 years, arranged into three groups: ≤17, 18–19, and 20–24. Crude odds ratios (OR), adjusted ORs and their 95% confidence intervals (CI) for the different outcomes were estimated using multiple logistic regression analysis.

Results: Compared with women aged 20–24 years, the risk of low birth weight and preterm birth was higher among teenagers. The risk of low birth weight and preterm birth within the study group as a whole did not change during the study period. Increased risks in neonatal and postneonatal death among younger teenagers of an age of 17 years and less seem to be a result of prematurity.

Conclusions: Despite major socio-economic changes resulting in improvements in obstetric care and growth in incomes, teenagers remained a higher risk group.

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Keywords: Adolescent pregnancy; Preterm birth; Low birth weight; Neonatal death; Postneonatal death

1. Introduction

Teenage childbearing has repeatedly been associated with increased risks for adverse pregnancy outcomes, like preterm birth [1–5], low birth weight [2,3,5], and death in the neonatal or postneonatal periods [4–6].

Teenage pregnancy is associated with social, economic and behavioral risk factors, which are also independent risk factors for adverse outcomes of pregnancy [2]. Childbearing at an early age is strongly associated with infant homicide [7].

The public health importance of these elevated risks is influenced by the prevalence of teenage pregnancies [4].

In Estonia, from 1992 to 2002, fertility rate per 1000 teenage girls in the 15–19-year-old age group decreased more than twice from 50.5 to 21.9 [8]. The percentage of teenage mothers among all parturients has decreased steadily, being 14.6 in 1992 and 8.8 in 2002 [9]. Younger teenagers, through 17 years, constituted about 22–25% of teenage parturients [9].

Major socio-economic changes, including health-care reforms, took place in Estonia after the country regained its independence in 1991. Rapid changes from a planned to a market economy began in 1992. During the next 10 years Estonia completed an important stage in its development, the creation of democratic political institutions and a market economy [10]. The progress is reflected, for example, in Estonia's change in rank according to the Global Human Development Index, Estonia had risen from 77th position in

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1998 (according to 1995 data) to 42nd place in 2002 [10,11]. At the same time there is concern whether this high macro-economic indicator has been achieved at the cost of social development [10,11]. These years witnessed a marked social polarization of the society in comparison with the socially unifying conditions during the preceding five decades. The number of young people without basic education increased, according to statistics, by more than 1000 every year, the effects related to stratification, labour market and educational opportunities have been especially negative for non-ethnic Estonians [12].

The reforms carried out during the 1990's in organizing obstetric care favourably affected all pregnant women in Estonia. Overall perinatal mortality rate per 1000 births (birth weight at least 500 g) decreased remarkably in 1992–2002 in all age groups, being 20.1 in 1992 and 8.1 in 2002 [9].

Risks of adverse pregnancy outcomes have been analysed by many researchers to determine the exact crucial age of a teenager or which age can be regarded as low gynecological age, below which, age itself can be associated with adverse pregnancy outcomes. It has been suggested that age 15 and below is the critical age, below which the risk of infant death, very low birth weight (<1500 g) and very preterm birth (less than 32 weeks) is elevated compared to older adolescent mothers and 20–23-year-olds [13]. Another study indicates that the risk of low birth weight and preterm birth is increased in 13–17-year-old non-smoking teenagers, compared to 20–24-year-olds, but that there is no increased risk among 18–19-year-old non-smoking teenagers [14]. A systematic literature review [2] revealed that maternal age less than 16 years was associated with a modest (1.2–2.7-fold) increase in preterm birth, low birth weight, and neonatal death. Scholl et al. have found [15] that although chronologic age may not be a good predictor of pregnancy outcome, adolescents remain a high-risk group due to factors that are more common among this age group, such as biologic immaturity, inadequate prenatal care, poverty, minority status, and low prepregnancy weight, and because factors associated with an early adolescent pregnancy, such as low gynecologic age, may continue to influence the outcome of subsequent pregnancies.

The objective of the present study was to find out whether there are any differences in perinatal outcomes between 13 and 19-year-old primiparous teenagers and 20–24-year-old primiparous women having singleton pregnancies in Estonia in the years 1992–2002, i.e. a period of rapid socio-economic changes accompanied by growing social polarization of the society.

2. Materials and methods

Data about births came from the Estonian Medical Birth Registry (EMBR), which was established in 1991. Data were gathered from all hospitals rendering obstetric services. The primary document for gathering data is the birth card, and it

is obligatory by a legal regulation to fill in the card for every birth (live or stillbirth) in Estonia [9].

Since 1992, the WHO ICD-9 criteria of live and stillbirth have been used in Estonia. A “live born child” is defined as a newborn with at least one characteristic of life; a stillborn is a newborn with a birth weight of at least 500 g and without any signs of life [16].

The study population included primiparous women aged 13–24 years, who had singleton births during 1992–2002. Maternal age was defined as age in completed years at delivery and the study population was arranged into three groups: <17, 18–19, and 20–24 years as the reference group. Primiparas were selected in order to have more similar/homogenous groups and to exclude factors that may contribute to preterm delivery in multiparous women, e.g. short interpregnancy interval [17,18], previous preterm birth [18], or for which multiparous women have less risk, e.g. preeclampsia and eclampsia.

The outcomes studied were preterm birth (birth at less than 37 completed weeks of gestation), low birth weight (less than 2500 g), stillbirth, neonatal (0–27 days after birth) and postneonatal (28–364 days after birth) death.

Data of stillbirths were obtained from the EMBR. Using the child's unique personal identification number, the data in the EMBR 1992–2001 were linked to the Estonian Mortality Database 1992–2002 to ascertain all neonatal and postneonatal deaths. It was not possible to link our data with the Estonian Population Registry to get information about emigration in order to identify how many deaths could have been missed through linkage. Presumably the number of mothers emigrating with newborns who subsequently died abroad during their first year of life is marginal.

Gestational age was based on the estimate on the EMBR birth card, which takes into consideration the last menstrual period and the results of the ultrasound examination during the routine anatomy scan before the 21st week of pregnancy. In analysis we used full weeks to describe the gestational age.

Data on ethnicity, marital status, place of residence (urban or rural), smoking during pregnancy, and number of antenatal visits were obtained from the EMBR. The EMBR includes self-reported ethnicity similarly to that used in the Estonian Population Census, and for this study, ethnicity was defined as Estonian and non-Estonian. If the mother came from one of the five largest cities in Estonia—Tallinn, Tartu, Kohtla-Järve, Narva and Pärnu, her place of residence was regarded as urban; all other residence was considered as rural. To evaluate the adequacy of antenatal care, we created an antenatal care index. Antenatal care was considered inadequate if the number of antenatal visits was less than the mandatory number after taking into account the length of gestation, by the 25th week of gestation there should have been at least two visits, by week 26–29, at least three visits, by week 30–33, at least four visits and by week 34 or more, at least five visits.

We evaluated trends over time with respect to the age groups regarding the following variables: ethnicity, marital

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