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INFLUENCE OF SOME SOCIAL AND MATERNAL FACTORS ON BIRTH WEIGHT IN HUNGARY

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In this study, we have examined the impact of some social and maternal factors on birth weight in the two regions Hungary, in the capital and in one county. Although many of the variables were analyzed in both regions, significant relationships were found between LBW and smoking habits, birth order and mother's age. The incidence of low birth weight was higher in Budapest than in Vas. Smoking habits were found as a common factor of higher significance in both regions. Birth order and mother's age were found as other factors of higher significance in the Budapest sample as compared to Vas.

INTRODUCTION

Birth weight is a major determinant of an infant's potential for survival and future development /6/. Perinatal and infant mortality, as well as increased risk of morbidity are highly correlated with birth weight /4/. For this reason, frequency of LBW is accepted as a general indicator of health status of population groups.

It is estimated that about 21 millions infants with LBW are born each year in the world. The vast majority of these infants are encountered in the poorest part of the developing world /9/.

Previous studies have shown that the most important factor leading to the higher infant mortality rate in Hungary (19 ‰)

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as compared to other European countries is the relatively high rate of LBW. The frequency of LBW in Hungary was reported as 9.8 % in 1986 /5,8/.

This study is a data analysis of some factors such as maternal age, parity, birth interval, education, occupation, marital status, smoking which are known to influence outcome of pregnancy and LBW in Hungary as they relate to two regions which show differences in their perinatal mortality and LBW rates.

MATERIALS AND METHODS

Budapest and Vas, which represent two regions with different LBW and perinatal mortality rates were selected for the study.

Reported perinatal mortality rates for the two regions were 10.9 % and 7.8 %; frequency of LBW in the two regions being 23.3 % and 16.1 %. The number of pregnant women living in these two regions were 1043 and 947 in respective order at the time when the demographic data were collected. The total number of pregnancies in the two regions (1990) corresponds to 0.24 % of the national figure /4/.

The data used in this study were taken from the longitudinal survey program, "Health and demographic study of pregnant women and infants", carried out in eight regions of Hungary (Demographic Research Institute, Department of Population Statistics of the Central Statistical Office, National Institute of Child Health and Department of the Maternal, Child and Youth Welfare of the Ministry of Health.) The first stage of this survey started in November 1979 and ended in August 1983, data on 8800 pregnant women and on outcome of all pregnancies were collected (corresponding to a representative sample of 1.2 % of the national figure) /4/. For this purpose detailed questionnaires were filled in by the health visitors during pregnancy starting at around the 9th week of pregnancy and repeated at the 20th, 27th and 34th weeks and after delivery. Gestational age was taken as the number of completed weeks from the first day of the last normal menstruation to the date of delivery. All newborn babies were examined and weighed immediately after delivery. For the purposes of this study, the results of this survey as they relate to the two regions, Budapest and Vas were evaluated by an IBM PC/XT computer with SPSS/PC statistical package. Chi-square test was used in statistical analysis. Multiple regression was also applied for the simultaneous analysis of these factors (Table I).

TABLE I

Factors related to birth weight (by multiple regression analysis)

Total Group	R^2	F	Budapest	R^2	F	Vas County	R^2	F
1) Smoking habits	0.016	34.1^{xx}	1) Birth order	0.020	21.2^{xx}	1) Smoking habits	0.016	15.8^{xx}
2) Birth order	0.023	24.3^{xx}	2) Smoking habits	0.032	17.4^{xx}	2) Educational level	0.019	9.4^{xx}
3) Mother's age	0.029	19.7^{xx}	3) Mother's age	0.039	14.2^{xx}	3) Marital status	0.021	6.9^{xx}
4) Employment status	0.030	15.4^{xx}	4) Educational level	0.041	11.2^{xx}	4) Mother's age	0.022	5.4^{xx}
5) Educational level	0.032	13.2^{xx}	5) Employment status	0.043	9.5^{xx}	5) Birth interval	0.023	4.4^{xx}
6) Marital status	0.033	11.3^{xx}	6) Birth interval	0.044	8.0^{xx}	6) Employment status	0.023	3.7^{x}
7) Birth interval	0.333	9.7^{xx}	7) Marital status	0.044	6.9^{xx}	7) Birth order	0.023	3.2^{x}

^{x} $p < 0.01$

^{xx} $p < 0.001$

RESULTS

Gestational age

There was a difference between the two regions in the rate of prematurity among low-birth-weight infants. In Budapest, 52.3 % of all babies with LBW were preterms with gestational ages less than 37 completed weeks while this proportion was much higher (75 %) in Vas.

The overall prematurity rate was also higher in Vas being 11.9 % as compared with 7.0 % in Budapest. Fifty five (55.1 %) percent of these preterm babies were born with normal birth weight (2500 g or higher).

The incidence of small-for-dates was more than twice higher in Budapest as in Vas (4.3 % and 1.8 %).

For all infants, the increase in birth weight by gestational period was statistically significant ($p < 0.001$) in both regions.

Age of mothers

In the Budapest group, birth weight distribution was found to be influenced by maternal age ($p < 0.001$). A higher incidence of low-birth-weight infants was noted among the offsprings of young mothers and also for infants born to mothers over 40 years of age (Figure 1). The incidence for LBW increased from the low 8.8 % for 20-29 year old mothers to 19.0 % in babies born to mothers under the age of 20 years and to 40.0 % in babies born to 40-49 year old women.

The incidence of low-birth-weight babies varied from a low 6.4 % for those born to mothers aged 20-29 years, to 9.2 % for infants born to 30-39 year old mothers and to 10.5 % for infants born to women under the age of 20 years in Vas. No significant correlation was found between birth weight distribution and mother's age.

Number of previous pregnancies and birth interval

The incidence of LBW was low in first pregnancies (6.7 %) in Budapest and in third (3.0 %) and second pregnancies (5.6 %) in Vas. It has risen sharply for three and more pregnancies in both regions, being higher in Vas (21.0 %) than in Budapest (13.3 %).

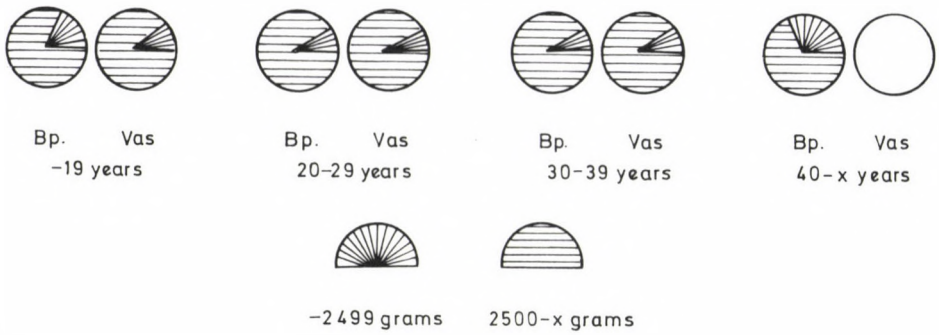

Fig. 1. Low birth weight rate of live births by age-group of mothers in Budapest and Vas county

Birth weight distribution by interval between the actual and previous pregnancy is shown in Figure 2. A higher incidence of low birth weight for very short and very long intervals was found in Budapest. The optimum interval was between 2 and 3 years.

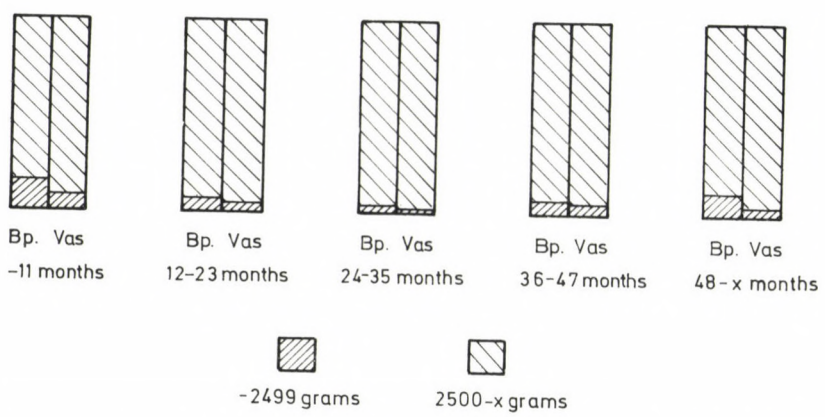

Fig. 2. Low birth rate of live births by interval between previous pregnancies in Budapest and Vas county

Although birth weight distribution by number of previous pregnancies was statistically significant in both regions ($p < 0.001$), the correlation by birth interval was evident only in the Budapest group ($p < 0.001$).

Marital status

The frequency of unmarried women was higher in Budapest than in Vas (10.5 % and 7.9 %). A higher rate of low birth weight was observed for out-of wedlock infants. At all ages, unmarried mothers were more likely to deliver a low birth weight infant than married mothers (14.7 percent compared with 8.1 percent in Budapest and 15.5 percent compared with 6.4 percent in Vas). However, the difference in low birth weight rate between married and unmarried mothers is the highest in the group of women under the age of 20 years. The ratio of this age-group is much higher among unmarried than married mothers. (8.9 % and 4.3 % in Budapest; 39.4 % and 7.0 % in Vas).

Educational level

A relationship between the educational level of the mother and LBW rate was found in both regions (Figure 3). This relationship was statistically significant ($p < 0.01$) in Budapest.

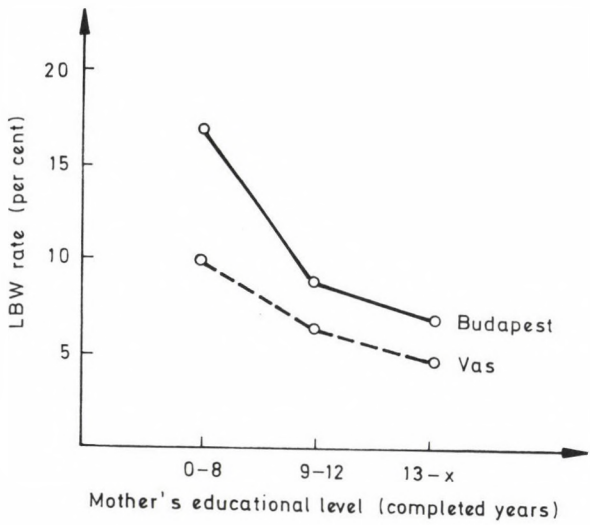

Fig. 3. Low birth weight rate of live births by mother's educational level in Budapest and Vas county

Smoking habits

In Budapest, the prevalence of smoking before pregnancy was the highest among females under 20 years (48 % in both regions) decreasing gradually with age. A similar trend was also noted in Vas. Thirty-four percent of the smokers in Vas and 25.3 % in Budapest stopped smoking during pregnancy.

Smoking before and during pregnancy was directly related to birth weight distribution. In both regions the incidence of low birth weight was higher among smoking mothers and increased with the number of cigarettes smoked daily (before pregnancy, from 9.1 % to 14.3 % in Budapest and from 8.2 % to 42.9 % in Vas; during pregnancy, from 8.3 % to 16.7 % in Budapest and from 16.0 % to 16.7 % in Vas). Decline in birth weight related to smoking was statistically significant in both regions ($p < 0.01$ in Budapest, $p < 0.001$ in Vas).

Employment status

Distribution by type of employment showed differences in the two regions.

The LBW incidence in case of women of manual occupation was higher than in case of non-manual workers in both regions (12.8 % compared with 7.7 % in Budapest and 9.4 % compared with 5.5 % in Vas). Difference in birth weight distribution between the workers' groups was statistically significant ($p < 0.01$ in Budapest, $p < 0.04$ in Vas).

DISCUSSION

This study was carried out in an effort to contribute to the available information on the aetiology of LBW by investigating the influence of some social factors and maternal variables on birth weight in two different regions in Hungary. It is known that differences exist in incidence of LBW related to mother's residence place in Hungary, the incidence being higher in rural areas than in urban areas. One example to this is Budapest, the capital, which shows a high rate of LBW and which is one of the

two regions selected for this study. The proportion of small for date babies in the LBW group was twice as high in Budapest as in Vas (47.7 % as compared to 25 %).

Gestational age determined as the number of completed weeks from the first day of the last normal menstruation to the date of delivery was accepted as reliable in this large sample.

Our analysis in this study included some social and maternal factors known to have an impact on birth weight. In each category analysed the effects of single and multiple factors have been studied. In this analysis of many factors known to be correlated with birth weight we concentrated on some social factors which showed differences in distribution in the two regions included in the study. One important difference between the two regions is that one of them is the capital and the other a county.

According to the data derived from the total group including both the Budapest and Vas county samples, the incidence of low birth weight varies by mother's age, number of previous pregnancies, birth interval, marital status, educational level, smoking habits and employment status. Multiple regression analysis was carried out to compare the effect of these inter-related factors (Table I). Smoking habit was found as the most significant variable related to birth weight. Smoking during pregnancy is widespread in Hungary. Its relationship to LBW, especially in the group of babies weighing 1500-2000 g at birth had been reported in previous studies /8/.

Mother's age, marital status and birth order were also among the major factors influencing birth weight. The incidence of LBW was higher among very young and older mothers, and, at all ages, among unmarried mothers.

The lower birth weight in third or further deliveries is well-known. Two-child families prevail in Hungary and a higher birth order is characteristic of mothers of a low educational level. Higher educational level of the mother was associated with a reduced incidence of low birth weight. Employment status was also a determinant of birth weight in both regions. Low birth weight rate was higher among manual workers as compared to the non-manual workers or to house-wives.

The effect of the various factors influencing the weight of the infant at birth was differently distributed in the two regions. Birth order, smoking habits and mother's age were found as the leading factors in the Budapest sample, while smoking habits, educational level and marital status were the factors of highest significance in Vas. Independently of these factors, LBW rate was higher in Budapest than in Vas.

This analysis was useful in bringing out the risk factors for LBW and in showing that the order of importance of these factors is not uniform in all societies.

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