

## NEWBORN'S DEVELOPMENT BY SOCIODEMOGRAPHIC FACTORS IN A REPRESENTATIVE SURVEY

É. Gárdos, and K. Joubert

Central Statistical Office, Budapest, Hungary; Demographic Research Institute of CSO Budapest, Hungary

*Abstract: Birth weight and duration of pregnancy of about 8000 live births have been worked up in the connection with some social and demographic factors. It is well known that birth weight and duration of pregnancy are influenced by health, social and demographic conditions of mothers. In this paper, however, the newborn's development is focussed, which measures the corresponding of birth weight to gestational age. The main conclusion is that biological insufficiencies result shorter duration of pregnancies rather than dismaturities, while disadvantageous social background has a considerable effect on the birth weight as well as the development of babies. In this respect education of mothers has the most significant influence on the newborns' parameters.*

*Key words: Newborns; Sociodemographic factors; Low birth weight; Small for gestational age; Appropriate for gestational age; Large for gestational age*

### Introduction

In Hungary the average number of children per family has been so low for decades that it does not ensure the replacement of the population. This can be attributed to the fact that the number of live births decreased from year to year – especially since the last third of the 1970s – and both the perinatal and infant mortality rate are very high on an international scale. Though in the recent past both of them improved almost uniformly, this decrease does still not the desired extent. The unfavourable high infant mortality can be ascribed, first of all, to the high proportion of children of low birth weight and of small for gestational age.

As the earlier results of this research have proved, development by birth weight has an influence on the children's weight and height development until their age of 6 years at least.

The aim of the present paper is to point at some criteria which have a significant effect on the children's development regarding their gestational age and birth weight together.

### Material and Methods

The data of this paper relating to about 8000 live births come from the "Health and demographic survey of pregnant women and infants" started in 1979 (Joubert, Gárdos 1991). Regarding the Hungarian standard for birth weight (Joubert 1983), newborn constitute three groups according to their gestational age and birth weight: SGA (birth weight is lower than the 10th percentile values relating to the actual gestational age), AGA (birth weight is between the 10th and 90th percentile values) and LGA (birth weight is above the 90th percentile value) (Battaglia, Lubchenco 1967). Duration of pregnancy, birth weight have been investigated in the connection with the mothers' age, previous obstetrical events, educational level, economic activity, as well as with that if

the pregnancy was wanted and planned, if mothers needed intensive prenatal care, and with mothers' smoking habit before and during pregnancy. The significant differences in the values, of average birth weight has been established using T-test, and inequalities among several distributions according to the development of babies have been evaluated by  $\chi^2$ -test.

### Results

In the age group of 20–24 year old women 91 per cent of children were born in term, that is gestational age was at least 37 weeks. Considering birth weight this age interval is enlarged with the next five years, and what is more the 25–29 year old mothers' offspring are the biggest, their average birth weight exceeds 3200 grams. Birth weight of the 82 per cent of babies born to 20–24 year old mothers were AGA. Among both younger and older women's infants the ratio of AGA children is lower, however in the younger age groups the proportion of SGA is higher, while at older ages mothers have LGA babies more frequently (Fig. 1).

Depending on the *age of women* not only the newborn's distribution varies according to their development but the *average birth weight* in the three categories alters as well. Birth weight of AGA and LGA babies is the highest among the infants born to 25–29 year old women, while it is the lowest among those of mothers under 20. The difference

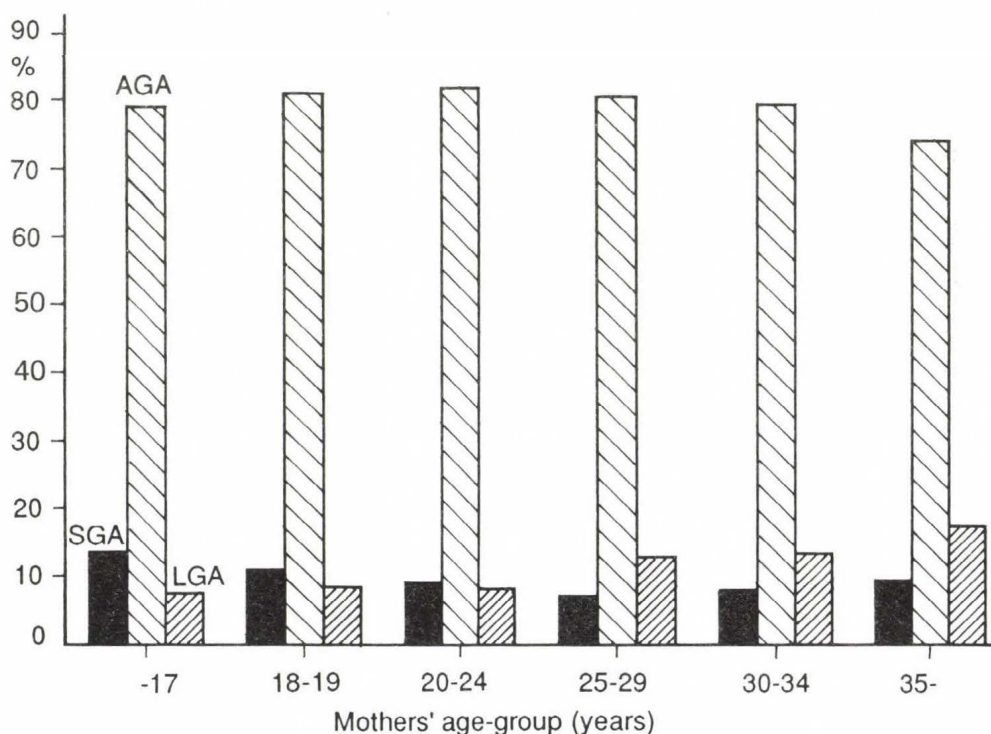


Fig. 1: Distribution of newborns by development and mothers' age-group

is highly significant between the average birth weight of children born to 18–19 and 25–29 year old mothers. Rising mothers' age the average birth weight standardized on the distribution of the previous obstetrical events gradually increases. In spite of the highest proportion of AGA children among mothers who had had one or two pregnancies, but not all of them ended in live births, the ratio of low-birth-weight babies is the lowest among the mothers who had had also one or two pregnancies before the investigated pregnancy, but all of them ended in live births (*Fig. 2 and 3*).

Social, cultural surroundings can be approached by the *mother's educational level* at the best (e.g. Eiben 1989). Women of the lowest educational attainment are in a significantly lower position in the both respect of gestational age and birth weight. The ratio of the SGA infants is 2–3 times higher than in the any other group by school years completed (*Fig. 4*). The proportion of low-birth-weight babies is 19 per cent vs. the 8 per cent of the whole sample. Even in the category of women completed 8 years the ratio of low birth weight infants does not reach the half of that of the former one. Among the children of mothers of at least 8 grades the percentage of LGA ones is equally about 11, there is only difference relating to the distribution between AGA and LGA groups. Elevating the number of years completed the average birth weight increases in all the three categories of the development (*Fig. 5*).

Rising the school years completed by women the ratio of *not wanted children* considerably increases. This percentage is 36 among the mothers of the lowest educational attainment, while it is 3 among those who had at least 13 years completed. The 11 per cent of not wanted children did not reach the 2500 gram birth weight, and the proportion of SGA babies was the same. Although the ratio of LGA infants is the highest, the average birth weight of LGA children is the lowest here (*Fig. 6*).

While among *active and inactive women* the ratio of those having 7 years completed at most is about 2 per cent, this proportion of dependents is near to 1/3, and a further 40 per cent have 8 grades. In this latter group only 2 per cent of women had no previous live birth. The proportion of SGA babies is the lowest (7 per cent) and that of LGA infants is the highest (24 per cent) among inactive mothers vs. the dependent women where the ratio of SGA offspring is two times higher. The average birth weight of dependents' babies is much lower in all of the three development categories, even in the LGA group: the differences is 300 grams (*Fig. 7*).

There is an opportunity to compare the significance of the *health and social background*, respectively, if gestational age and birth weight is investigated by the reason for *intensive prenatal care*. More than half of the women included into the sample needed intensive prenatal care immediately before the end of pregnancy. 90 per cent of them had "only" some health reasons, 5 per cent had "only" some social reasons, and 5 per cent left had both of them. Women only socially endangered are the most likely to have an SGA offspring (19 per cent) 2.5 times more frequently than among those who did not need intensive prenatal care, and more than 2 times than among women whose social background was satisfactory, but they or their foetus had certain health risks (*Fig. 8*). The ratio of low birth weight babies here is near three times higher comparing to those who were not endangered, what is more, in relation to the mothers who had only health risks, the low-birth-weight ratio is only 50 per cent more than in the latter group. Women endangered by social and health reasons as well have doubled



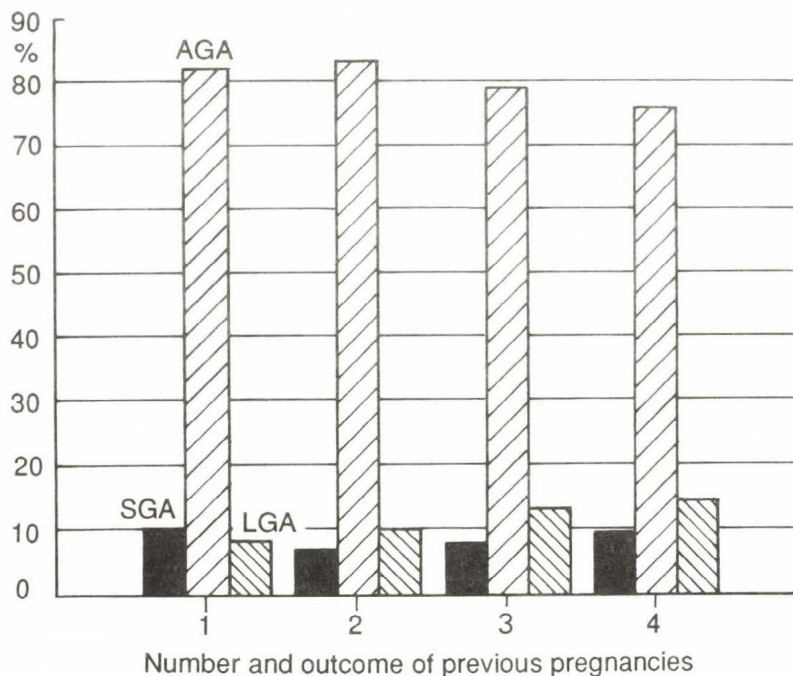


Fig. 2: Distribution of newborns by development and the number and outcome of previous pregnancies (1 = 1st pregnancy; 2 = 2nd or 3rd pregnancy, not only live births; 3 = 2nd or 3rd pregnancy, only live births; 4 = min. 4th pregnancy)

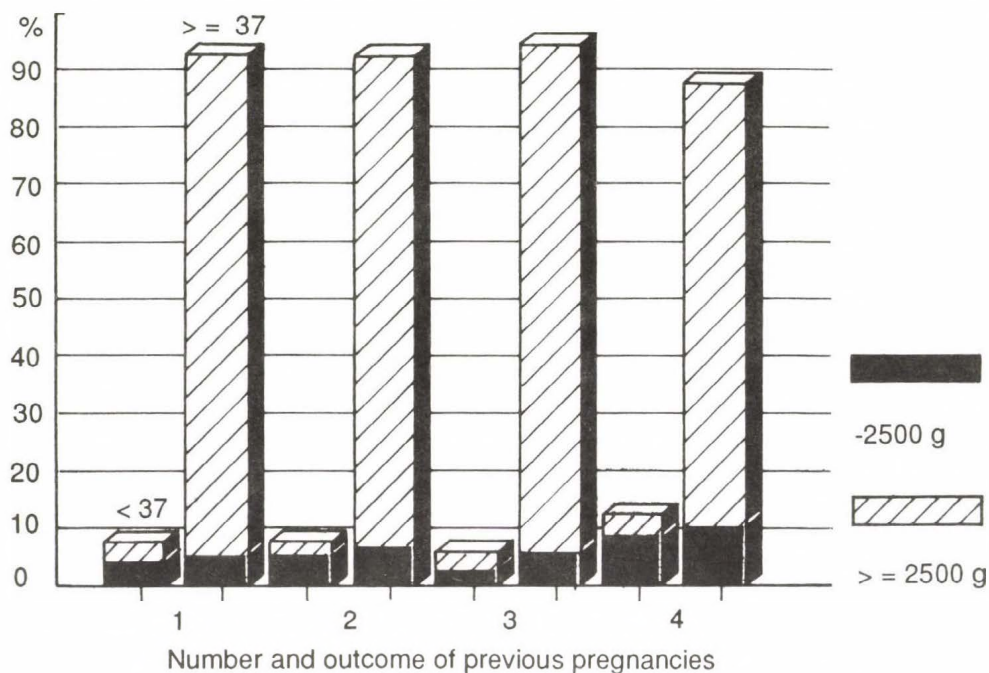


Fig. 3: Distribution of newborns by gestational age, birth weight and the number and outcome of previous pregnancies (for symbols see Fig. 2)

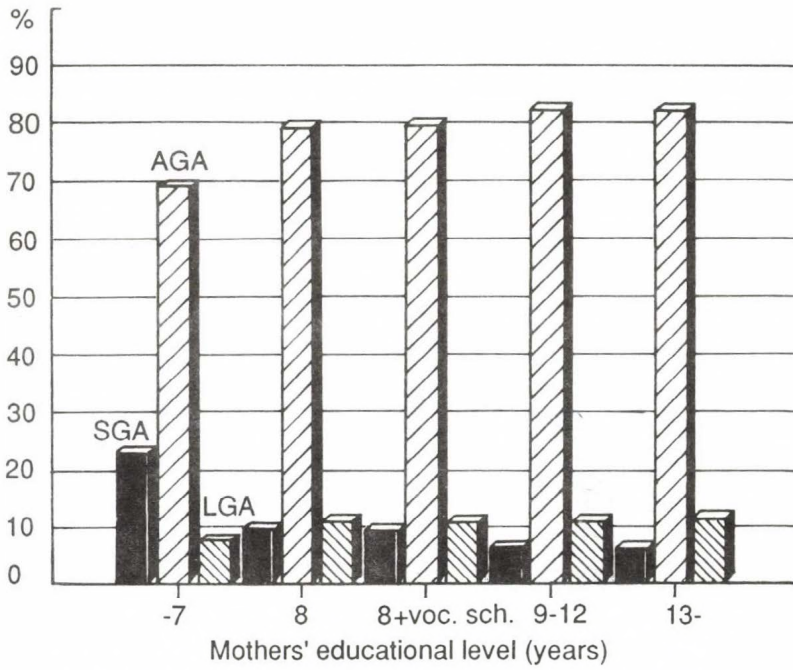


Fig. 4: Distribution of newborns by development and mothers' educational level

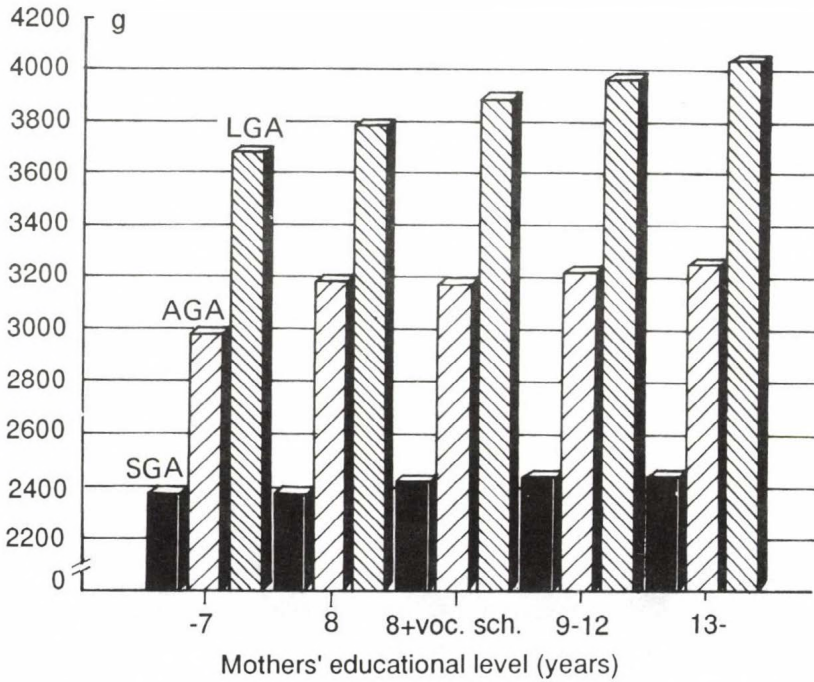


Fig. 5: Average birth weight by mothers' educational level and newborns' development by birth weight

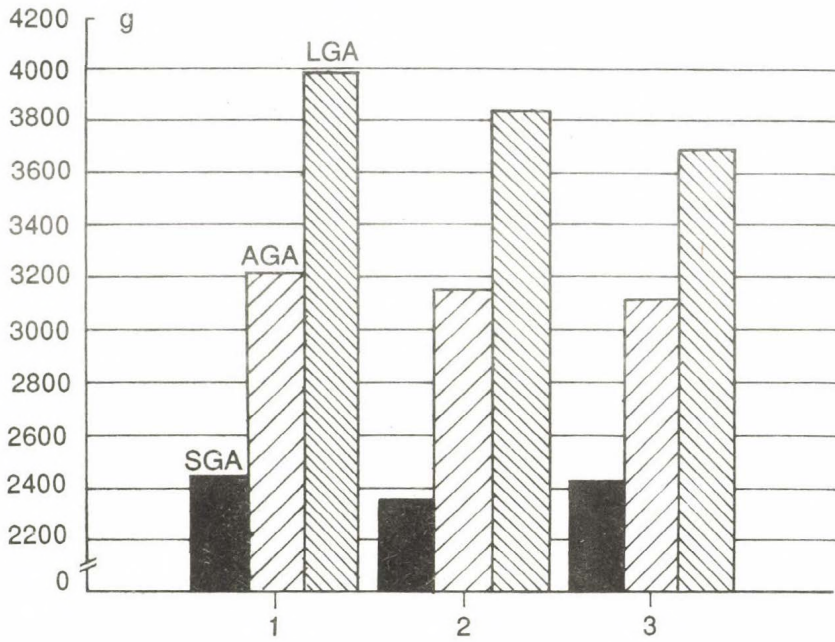


Fig. 6: Average birth weight by that if pregnancy was wanted and planned and newborns' development (1 = wanted, planned; 2 = wanted, not planned; 3 = not wanted)

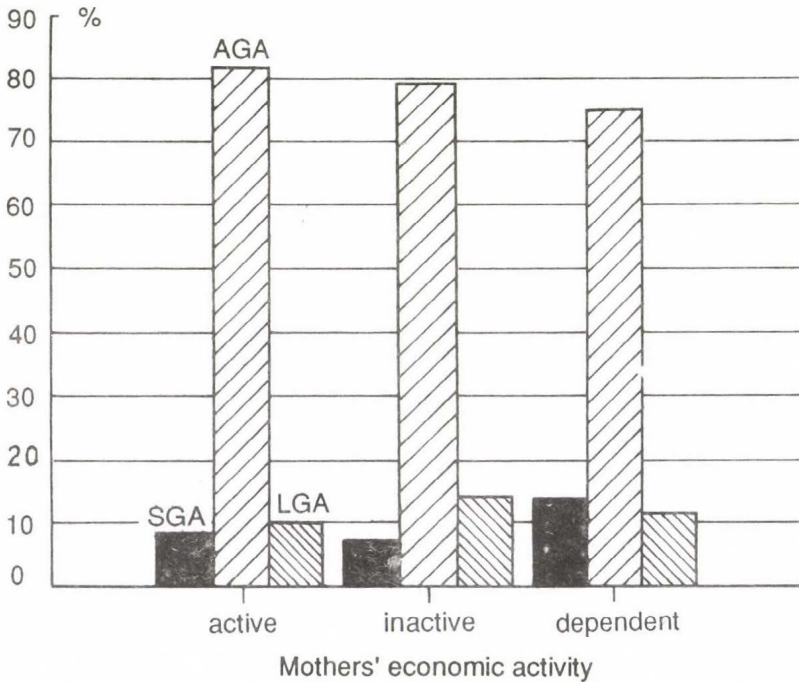


Fig. 7: Distribution of newborns by development and mothers' economic activity

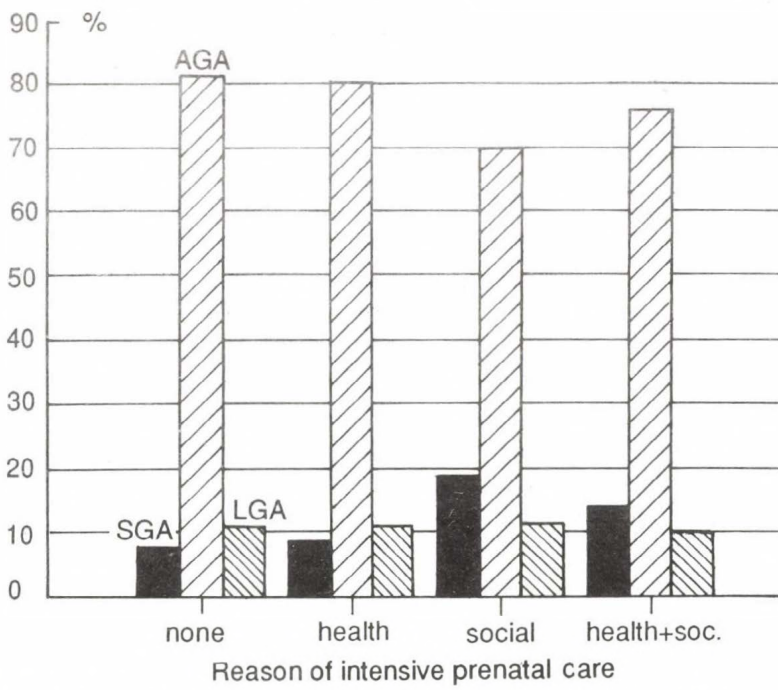


Fig. 8: Distribution of newborns by development and the reason for intensive prenatal care

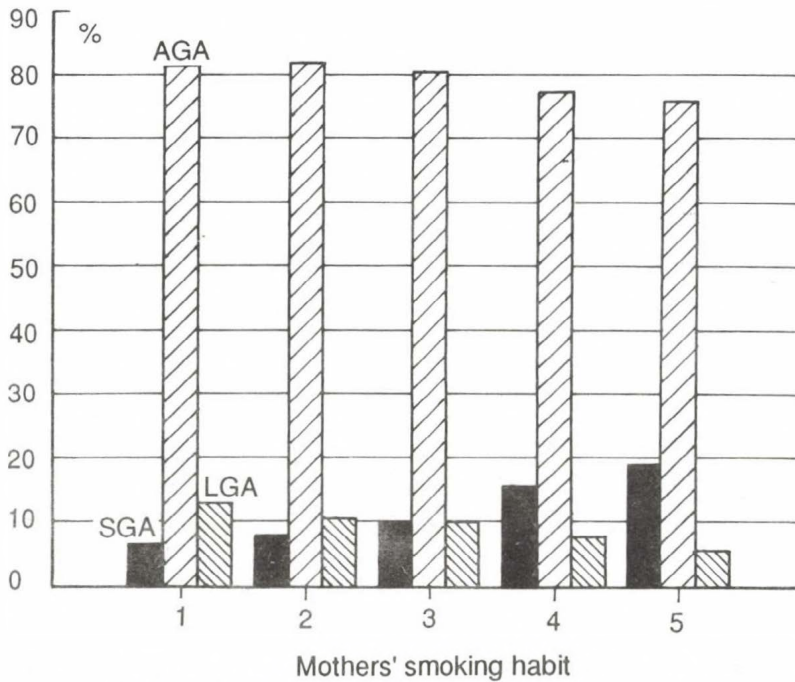


Fig. 9: Distribution of newborns by development and mothers' smoking habit (1 = no smokers; 2 = smokers till pregnancy; 3 = smokers till the first prenatal care; 4 = smokers till the 20th week of pregnancy; 5 = smokers till the end of pregnancy)



risk and this fact deteriorates the parameters of infants in a certain relation. The proportion of pre-term and low-birth-weight babies, respectively, is the highest here, though, the ratio of AGA offspring is 10 per cent higher than among women of only social risk.

It is well known fact that *smoking during pregnancy* endangers the development of foetus. The proportion of SGA infants is the lowest, hardly more than 6 per cent, among women who had not smoked either before pregnancy. Rising the intensity of smoking it is gradually increasing to 19 per cent and the proportion of AGA and LGA offspring is decreasing in a parallel way (Fig. 9). Increasing the duration of smoking average birth weight is diminishing in all the three categories. However in this research it could be stated that smokers who had not smoked more than 20 cigarettes a day before pregnancy and they kicked up smoking about the time of conception have as high chance as the non smokers to give an in-term-birth. However, if she gives up smoking after about the 10th week of pregnancy it leaves its mark on the development of her child. Cigarettes smoked by mother during pregnancy significantly decrease the birth weight of infants as well, still the mothers giving up smoking before the 27th week of pregnancy can prevent her child from further injury (Fig. 10).

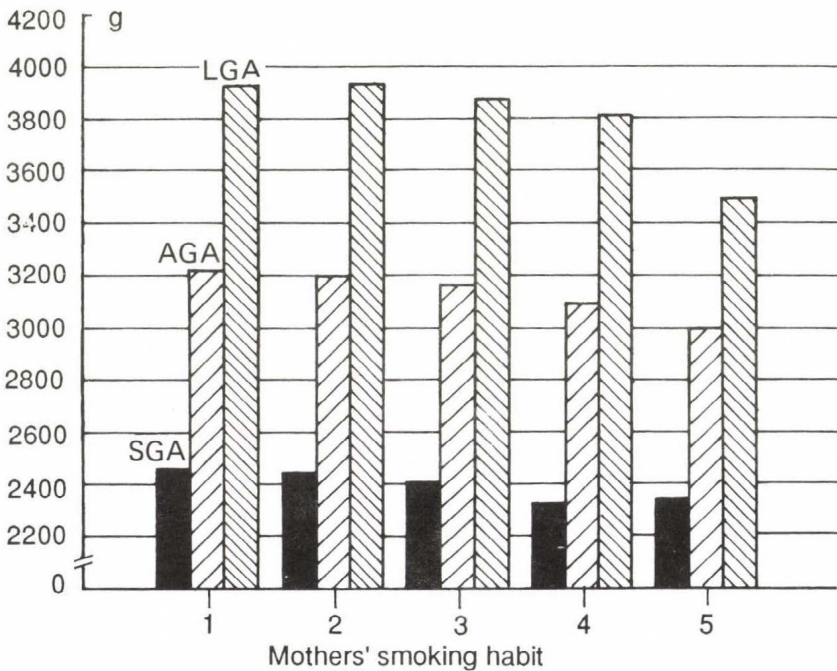


Fig. 10: Average birth weight by mothers' smoking habit and newborns' development (for symbols see Fig. 9).



## Discussion

Generally it can be stated that in an average group of females the unfavourable social background has the most considerable damage on the outcome of pregnancy (Gárdos 1982, Gárdos, Joubert 1990), especially in the relation of birth weight and the development of newborns. Duration of pregnancy is mostly influenced by biological factors. In consequence of the different determination of birth weight and duration of pregnancy, the low educational, cultural level, adverse attitude to the child, etc. go with insufficient development of children rather than with preterm gestational age.

It is supported by the fact that, although, in the connection with the mother's age referring to the duration of pregnancy it is generally known that 20–24 year old mothers have the most favourable conditions for giving a birth (Demographic Yearbooks of the CSO) has been proved in this research too, the 25–29 year old mothers' children are still the biggest and in this age group the proportion of LGA habies is higher.

It can be generally stated, that the number of previous pregnancies and live births among them is more important than the age of mothers. Women having 1–2 previous pregnancies, but at least one of them ended in either stillbirth or spontaneous or induced abortion might have primary or secondary obstetrical defect, however, this results a low–birth–weight baby because of premature delivery rather than because of dismaturity. It is supported by the fact that not only the proportion of SGA group is the lowest here, but among the preterm babies the percentage of those under 2500 grams is the smallest as well. This calls the attention to the phenomenon mentioned earlier that the harmful factors connected with biological origin shorten duration of pregnancy rather than influence development by birth weight. Those who had at least three pregnancies earlier constitute a separate group, and their disadvantageous status is generally caused rather by their adverse social, cultural background.

Mothers' educational attainment generally has a close correlation with their social background, life style, health and hygiene knowledge, housing, etc. In extreme situations the lack of education is an obstacle of the social integration. All of them can prevent women to use the required contraception method, to recognize a pregnancy at an early phase, to use prenatal care in time and further, they are likely to have a very risky prenatal behaviour (Casper, Hogan 1990). The low educational level causes three types of attacks against pregnancy and foetus: 1. the ratio of in–term–babies is reduced; 2. the proportion of low–birth–weight infants is higher and 3. the relationship between these two parameters refers to that much more intrauterine retarded children are born here. The significance of the educational level is highlighted by the fact that only 12 per cent of babies born from a pregnancy during which the mother had bleeding or contractions weighed under 2500 grams at birth, and this ratio is considerable lower than the value experienced at infants whose mother had had neither bleeding nor contractions but had only 7 school years at most.

The fact if the pregnancy was wanted and planned – on the basis of its relationship with other investigated variables – reflects the cultural, social background of the family and surroundings rather than the mother's age or previous obstetrical events. Similarly, the mother's economic activity, marital status, cultural level, even the type of her living pace relate to a sort of way of life, and this is reflected by the parameters of pregnancy.

In Hungary, generally, those women do not have a job out of their home whose educational level is lower and living conditions are unfavorable. It can be mostly explained by that the minors are highly represented here (17 per cent) and the ratio of the 18–19 year old mothers is similar, however among economically active women the ratio of those under 20 is hardly above 10 per cent and among inactive it does not reach 5 per cent. The cultural, social background going with the young age and low educational attainment is enough for dependents to have the shortest pregnancies, and two times higher LBW ratio than among the inactive mothers who were mostly on children's care leave at the time of the data collection.

Investigating the reasons for intensive prenatal care our hypothesis referring to the importance of social background is supported, although, these are established by the obstetricians and the district nurses. Considering both of gestational age and birth weight social problems have more significance in this respect. Women endangered by both of health and social reason have the most LBW babies partly because of the highest proportion of prematurity, partly because of dismaturity.

It can be proved that smoking – in addition to its direct effect – transmits other negative characters of mothers referring to their cultural level, life style, etc. This is especially true for women who smoke a lot and do not kick up smoking at an early phase of pregnancy. The lower the mother's educational attainment, the higher the probability of her smoking during pregnancy and the more the number of daily cigarettes is. It is sure that the women who does not continue smoking from the time of about conception prepares for the arrival of her child, and this may be the explanation for the phenomena that in these cases the effect of early smoking is eliminated.

\*

Paper presented at the Fifth International Symposium of Human Biology, Keszthely, Hungary, June 1991; Received 31 July, 1991.

## References

- Battaglia FC, Lubchenco LO (1967) A practical classification of newborn infants by weight and gestational age. — *The Journal of Pediatrics*, 71: 159–162.
- Casper LM, Hogan DP (1990) Family networks in prenatal and postnatal health. — *Social Biology*, 37: 84–101.
- Demographic Yearbooks of the Central Statistical Office*, Budapest.
- Eiben OG (1989) Educational level of parents as a factor influencing growth and maturation. — in Tanner JM (Ed.) *Auxology '88. Perspectives in the Science of Growth and Development*. p. 227–234. — Smith-Gordon — Nishimura, London, Niigata-Shi.
- Gárdos É (1982) *A terhesség alakulását befolyásoló néhány tényező elemzése*. — Central Statistical Office, Budapest.
- Gárdos É, Joubert K (1990) *Terhesek és csecsemők egészségügyi és demográfiai vizsgálata. A terhes nők összefoglaló adatai*. — Central Statistical Office, Budapest.
- Joubert K (1983) *Birth weight and birth length standards on basis of the data on infants born alive in 1973–1978*. — Demographic Research Institute of the Central Statistical Office, Budapest.
- Joubert K, Gárdos É (1991) *Terhesek és csecsemők egészségügyi és demográfiai vizsgálata. A kutatási program általános ismertetése* (with an English summary). — Central Statistical Office, Budapest

*Mailing address:* É. Gárdos  
Központi Statisztikai Hivatal  
Népesedési és egészségügyi statisztikai főosztály  
H-1525 Budapest, Keleti Károly u. 5–7.  
Hungary