BIRTH-WEIGHT AND SOCIO-ECONOMIC FACTORS

A Pilot Study

A.P. CAMILLERI
T. MICALLEF

Department of Obstetrics and Gynaecology
Royal University of Malta

Summary

Records have been examined of 407 births at St Luke's Hospital in 1974. The sample was restricted to primagravidae with no complication of pregnancy whose height was 5ft 1in and over.

The effect of socio-economic factors upon birth-weight was studied, taking into account maternal age, duration of gestation and baby's sex. No such influence was detected to a convincing degree.

Introduction

In an earlier study from this Unit (Cremona and Camilleri, 1968) we emphasized the variability of birth-weight and showed how much this parameter is a multifactorial product. The important influence of some of these factors has been already established in the large literature on birth-weight, but the effect of certain other factors is still debated. Among the latter is the mother's socio-economic status, and an attempt is made in this paper to study this role in Maltese births.

The Sample

The sample analyzed for the purposes of this paper is taken from an extensive study which we are carrying out in an effort to determine the influence of maternal height on the obstetric performance of Maltese women.

Our initial sample comprised all the mothers who were 5ft 1in and over in height and whose babies were born at St. Luke's Hospital in 1974. We eliminated the effect of parity by restricting the sample to primagravidae with single births. There was a total of 528 such births. We then

excluded all mothers who had hypertension or toxaemia (78), threatened abortion (11), antepartum haemorrhage (6), or glucose intolerance (14). We were left with a sample of 419 mothers (Table 1), 12 of whom did not have the baby's birth-weight recorded.

Table I
Births at St. Luke's Hospital in 1974

	Total	Percentage
Total Births	3486	—
Detailed Records available	1999	100
Mothers 5 ft. 1 in and over	1071	54
First births	523	26
Complicated Pregnancies	109	—
Weight not recorded	12	—
Sample used	407	20

Since the mothers were all of the same race and ethnic group and no change in geographical locality was entailed, the major variable factors that remained in our sample were the maternal age, the duration of gestation, the baby's sex and the mother's socio-economic status.

The socio-econic status was determined according to the "Pink Form" assessment of the relevant family conditions carried out by the Department of Social Welfare. Patients who were entitled to totally free treatment were classified as Group C; those who were not entitled to any form of relief or free treatment were classified as Group A; and Group B comprised those patients who were entitled to free hospital treatment but had no relief outside hospital. We understand that Group A are largely families possessing over £1500

(or owner-residents of a house costing more than £3,000) or whose weekly income exceeds a certain specified rate (e.g. £17.20 for a childless couple, £19.90 for a family of four, and £26.50 for a family of nine or more). All families without such assets fall into Group C, unless they own a fixed deposit up to the value of £1500 or else they possess over £300 at home or in a current account in either of these two conditions such families fall into Group B.

In Table II we have divided the sample (407 births) according to the mother's socio-economic grouping, at the same time giving the means (with standard deviations) of the maternal ages of each group.

Table II

Maternal Socio-Economic Groups and Ages

Socio-Economic Groups	Total	Age in Years Mean	Standard Deviation
A	169	25.16	3.98
B	99	23.53	3.80
C	139	23.51	3.45

Results

The 407 first-born babies in our sample of healthy mothers, whose height was 5f 1in and over, are distributed in Table III in relation to maternal socio-economic status, duration of gestation and baby's sex. The even distribution of the sample is immediately apparent.

In Table IV we have calculated the mean birth-weight in grams for the babies of the three socio-economic groups at the four durations of gestation; this table is best considered in conjunction with Table III. Where the number of births is five or less, the corresponding mean birth-weight is bracketed. This table reveals no clear pattern for an effect of socio-economic factors upon birth-weight.

Table V gives the overall picture for any possible influence of the mother's socio-economic status upon the birth-weight of her baby. The existence of any such influence should become manifest from a study of the data in this table. It is evident, at least, that there is no consistent increase in birth-weight, for either sex or for both together, as the mother's socio-economic status improves.

The variations in birth-weight have been analyzed for statistical significance, employing Students' t-test (Table VI). There is no highly significant difference among the birth-weights in the three socio-economic groups, nor is there any level of statistical significance between the birth-weights of babies born to mothers of Group A and those born to mothers of Group C. Girls, too, reveal no significant difference in their birth-weight relative to the socio-economic group of their mothers. Boys, on the other hand, show a significant tendency to have a higher birth-weight if

Table III

Distribution of Sample

Duration of Gestation

SE Groups	Sex	Under 36 weeks	36-38 weeks	38-41 weeks	Over 41 weeks	Totals
A	Boys	2	11	63	10	86
	Girls	nil	8	63	12	83
	Total	2	19	126	22	169
B	Boys	1	10	34	8	53
	Girls	1	5	31	9	46
	Total	2	15	65	17	99
C	Boys	nil	9	41	12	62
	Girls	1	4	57	15	77
	Total	1	13	98	27	139
	Totals	5	47	289	66	407

Table IV

Mean Birth-Weight (G) for Sex and Gestation

SE Groups	Sex	Duration of Gestation			
		Under 36 Weeks	36-38 weeks	38-41 weeks	Over 41 weeks
A	Boys	(1814.40)	3046.32 (SD 343)	3324.71 (SD 531)	3240.41 (SD 448)
	Girls	Nil	3132.63 (SD 614)	3222.32 (SD 409)	3139.73 (SD 235)
B	Boys	(2636.55)	3325.47 (SD 405)	3187.13 (SD 840)	3685.46 (SD 372)
	Girls	(3430.35)	(3084.48)	3315.19 (SD 333)	3379.95 (SD 401)
C	Boys	Nil	3087.00 (SD 173)	3233.98 (SD 301)	3546.11 (SD 526)
	Girls	(2409.75)	(2700.34)	3318.44 (SD 437)	3298.05 (SD 470)

Table V

Birth-Weight (G) for Socio Economic Groups

Socio-Economic Group	Boys		Girls		Both Sexes	
	Mean	SD	Mean	SD	Mean	SD
A	3279 (86 babies)	463	3214 (33 babies)	400	3247 (169 babies)	433
B	3395 (53 babies)	411	3305 (46 babies)	333	3353 (99 babies)	378
C	3273 (62 babies)	367	3271 (77 babies)	466	3272 (139 babies)	423

Table VI

Statistical Significance of Birth-Weight Differences

	SE Groups	t-test Probability	Statistical Significance
Boys	A and B	$p > 0.02$	definite, in favour of Group B
	B and C	$p > 0.1$	very low, in favour of Group B
	A and C	no difference	none
Girls	A and B	small difference	none
	B and C	small difference	none
	A and C	small difference	none
Both Sexes	A and B	$p > 0.05$	low, in favour of Group B
	B and C	small difference	none
	A and C	no difference	none

60

their mothers belong to Group B as opposed to Group A or (to a less extent) Group C, and this tendency is reflected in the overall figures for both sexes together although more mildly. This tendency might have occasioned surprise and conjecture if it had occurred at an appreciable level and if it had been repeated in the case of girls as well.

Discussion

In 1974 there were 5762 total births in the Maltese Islands, and of these 3486 (60 per cent) were born at St. Luke's Hospital. Of the total births at this hospital, 407 comprise the sample we have used for our pilot study (Table I). This sample is believed to be reasonably representative of the respective situation in Malta.

The mean overall birth-weight in our sample was 3218g, with a mean of 3308g for boys and 3256g for girls. These findings refer to first-born babies of healthy mothers, and correspond very closely with our data in an earlier study(Camilleri and Cremona, 1970) where the mean for first-born boys was 3346 g and that for girls 3256g.

The present sample is taken for a much larger survey (already in an advanced stage) to determine the effect of the mother's height upon her obstetric performance. Consequently we have deliberately excluded all mothers whose height was less that 5ft 1in. We also considered it necessary to restrict the sample to primigravidae, because of the fact we have already established that there is a convincing progression of birth-weight with increasing parity (Camilleri and Cremona, 1970). Moreover, because of their known effect on placental efficiency and foetal growth, such conditions as hypertension, toxaemia, threatened abortion, antepartum haemorrhage and glucose intolerance necessitated the exclusion of 109 cases from our sample. We believe we were thereby left with a homogeneous sample in respect to the known factors that influence the variability of birth-weight (Cremona and Camilleri, 1968) except the ones analyzed further in this study.

We could rule out any hypothetical

effect exerted by maternal age not only because the association between birth-weight and rising maternal age remains uncertain (Mc Keown and Gibson, 1951; Cremona and Camilleri, 1968), but more precisely because the age distribution of mothers in our three socio-economic groups was very similar (Table II).

The principal parameter in the present study is the maternal socio-economic group. We believe that the factors that determine to which of the three groups a family is allocated provide a reliable overall basis for evaluating any potential effect that a mother's socio-economic environment may have on the birth-weight of her offspring.

This parameter is almost certainly a composite one, and its potential effects should tend to disappear if its constituent disparities were evened out between the different socio-economic groups. For example, we have emphasized (Camilleri, 1970) that a poor maternal diet carries the risk of low birth-weight and raised perinatal mortality, but we suggest that nutritional disparity can be more readily reduced in the compact community like ours especially since the more telling effect is probably related to the mother's own childhood and adolescence (Aykroyd and Hossain, 1967).

Some authors in other countries (notably Butler and Bonham, 1963) have shown a negative social class gradient in birthweight from the upper to the lowest socioeconomic group. This is not the case in Malta. There is no evidence of any major statistical significance in the differences in birth-weight of babies born to mothers of different socio-economic circumstances, whether over all or else related to baby's sex or to duration of gestation. The only slight difference elicited in this pilot study is that the male babies of mothers in socio-economic Group B are somewhat heavier than those of the other two groups; if this difference is sustained in a larger study, it may prove useful to scrutinize the possible reasons in the Maltese population

BSc (Hons), Msc (Lond), for much help with the statistical analysis.

References

AYKROYD, W.R., and HOSSAIN, M.A. (1967): Brit. med. J., *1*, 42.

BUTLER, N.R., and BONHAM, D.G. (1963): Perinatal Mortality. E. & S. Livingstone, Edinburgh.

CAMILLERI, A.P. (1970): Practitioner, *204*, 406.

CAMILLERI, A.P., and CREMONA, V. (1970): J. Obstet. Gynaec. Brit. Commonwealth, 77, 145.

CREMONA, V, and CAMILLERI, A.P. (1968): St. Luke's Hosp. Gaz., *4*, 125.

Mc KEOWN, T., and GIBSON, J.R. (1951): Brit. J. Soc., Med., *5*, 98.