CHILD HEALTH AND FAMILY SIZE *

A SURVEY RELATING TO THE CAPE COLOURED POPULATION OF CAPE TOWN IN THE YEARS 1961—1962

ISOBEL ROBERTSON, B.A., M.B., CH.B., D.P.H., *Maternal and Child Welfare Officer,* and
MARGRETHA KEMP, M.B., CH.B., *Clinical Medical Officer*
Child Welfare Branch, City Health Department, Cape Town

The City of Cape Town has a population of 490,300, of whom about 72,000 are children under 5 years of age. Of these children, 17,800 are European, constituting 9% of the total European population, and 48,600 are Coloured, forming 17·0% of the total Coloured population.† Of all European deaths, 4·5% occur in this group under 5 years, while, of all Coloured deaths, 38% occur under 5 years—29% under 1 year and 9% between 1 and 5 years.[1]

Most of these deaths among the Coloured children are preventable, as is much of the vast amount of sickness from which they suffer. In aiming at prevention of this mass of sickness and death in the very young, the roles played by various factors which may have a bearing on the aetiology deserve study.

Such factors are bad housing, overcrowding (with particular relation to infectious diseases, including tuberculosis), poverty, and ignorance about nutrition. The high birth rate is a contributory cause in both overcrowding and poverty. The birth rate among the Coloured section of the population was 42·9 per 1,000 in 1961,[1] which is very high for any group, and brings the rate for the whole city up to 33 per 1,000,[1] compared with England and Wales, where it is 16·5 per 1,000, or the County of London, where it is 17·2 per 1,000.[2] The death rate for Europeans has not altered significantly in the last 25 years, while that for non-Europeans has been halved in this time.

Largely as a result of the high birth rate and the fall in the death rate, the number of Coloured persons in Cape Town at the time of the 1960 census was double that at the time of the 1936 census, while in the same period the number of Europeans in the city increased by just over 25%. With this explosive increase in numbers, there has been an actual increase in the numbers of sick children and deaths in childhood, although the death rates are falling.

The effects of the high birth rate on the community and factors influencing the birth rate and death rate among children deserve study.

SURVEY RELATING TO SIZE OF FAMILIES

A survey was undertaken in the early months of 1962 to discover to what extent the high birth rate and the size of the family affect the health of the individual pre-school child, and what other factors come into play.

Families were compared with a control group according to the state of nutrition of the pre-school members, taking one group where the children were underweight and a second group where children had died from causes related to malnutrition.

Standard of Weight Used

For the purpose of this survey weights are divided into groups, A, B, C and D (Fig. 1), with reference to the following lines:

Group A—above the Boston 50th percentile line.[3]

Group B—between the Boston 50th percentile and the Boston 3rd percentile.[3]

Group C—between the Boston 3rd percentile and a line representing two-thirds of the Boston 50th percentile, suggested by Prof. F. J. Ford as the 'malnutrition line'.[4]

Group D—below the 'malnutrition line'.

In practice group-C children are undernourished, and group-D children are described by doctors examining them as 'grossly malnourished'. A very high proportion of

* Paper presented at the 5th Congress of the South African Paediatric Association (M.A.S.A.), Durban, July 1962.

† The remainder of the child population is made up of 4,400 African and 1,400 Asian children.

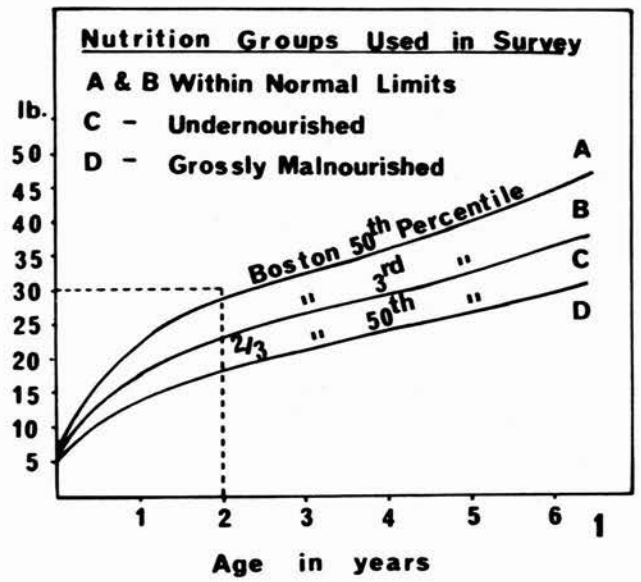


Fig. 1. Nutrition groups used in the survey, using Boston percentile lines[3] and ⅔ of Boston 50th percentile.[4] Dotted area indicates the section of this diagram used in Fig. 2.

Coloured infants and toddlers attend the child welfare centres, over 90% attending at least once; therefore the nutrition of Coloured infants and pre-school children as a whole can be fairly accurately assessed from a sample of clinic attenders. A sample of 1,000 attenders in all centres throughout the city on one day (Fig. 2) showed that 26% of attenders were in group C and 6% were in group D. These figures are probably on the low side, because many of the worst cases of malnutrition occur in infants and children who are rarely, if ever, brought to the clinics.

MALNUTRITION AND ITS RELATIONSHIP TO MORTALITY FROM CERTAIN DISEASES

It is common practice to use infantile mortality as a gauge of child health, but since our particular interest here is to consider preventable disease related to malnutrition, and since many of these diseases occur in children over 1 year of age, only those deaths under 5 years that were certified as being due to kwashiorkor, malnutrition, gastro-enteritis and bronchopneumonia, are considered. The relationship between malnutrition and deaths from gastro-enteritis, bronchopneumonia and kwashiorkor is illustrated in Fig. 2. The weights charted are those of children who happened to have attended child welfare clinics about a month before death from the cause shown, but were not then suffering from the particular disease. It will be noted that 37%, 40% and 66% of children who subsequently died from bronchopneumonia, gastro-enteritis, and kwashiorkor or malnutrition, respectively, fell in group D, and a further 26—44% in group C. This illustration has had to be drawn from records extending over 5 years, since many children who died had not attended child welfare centres near the time of death, if at all.

A further illustration of this point concerns the deaths of 9 sets of twins, the facts about which were discovered

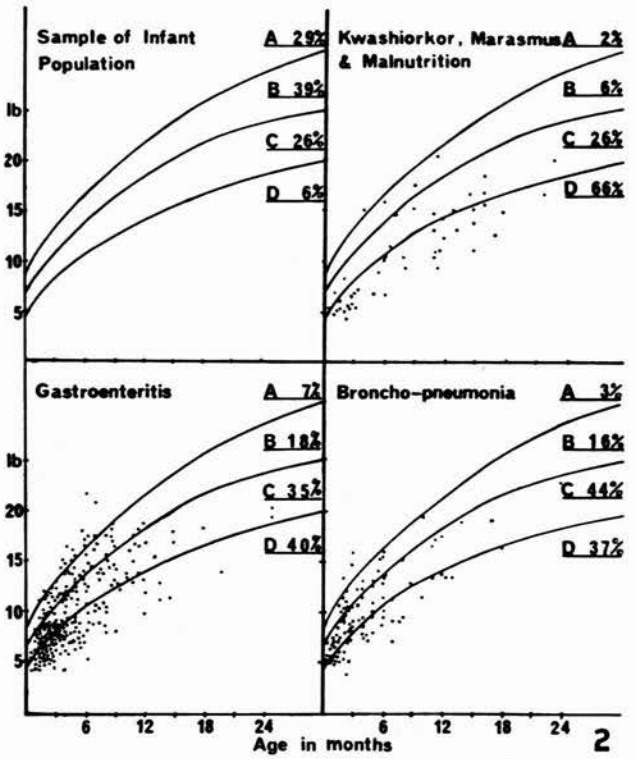


Fig. 2. Percentage of children falling in weight groups A, B, C and D. (For key to letters see text.)

Top left. Sample of 1,000 infants and young children attending child welfare clinics.

Top right and lower left and right. Weights of children who died of causes shown, as recorded one month before death.

while going through the above records. All 18 children died between 2 and 7 months of age. In 6 cases both twins died in the same week, and the longest interval between the deaths of twins in this group was 5 weeks. The causes of death were certified as follows:

In 4 cases both twins died of gastro-enteritis; in 2 of these both twins died in the same week.

In 4 cases one twin died of gastro-enteritis and the other of bronchopneumonia; in 3 of these both twins died in the same week.

In 1 case one twin died of bronchopneumonia, and the other of kwashiorkor on the same day.

TEST SERIES COMPARED WITH CONTROL SERIES

The survey was limited to Coloured families, and the following groups of children were investigated:

Test Series I. Families of Children in Weight Groups C and D

Particulars were obtained relating to 200 undernourished Coloured children between 3 months and 5 years of age, 100 in group C and 100 in group D.

Test Series II. Families of Children who Died from Causes Related to Malnutrition

Particulars were obtained relating to 250 infants and children under 5 years who died from kwashiorkor, mal-

nutrition, gastro-enteritis or bronchopneumonia in 1961, the number from each cause being in the proportion in which these deaths occurred in 1961, i.e. 175 from gastro-enteritis, 66 from bronchopneumonia and 9 from kwashiorkor, making up the series of 250.

Control Series

Particulars were obtained relating to 428 infants whose parents had not gone beyond primary school education.

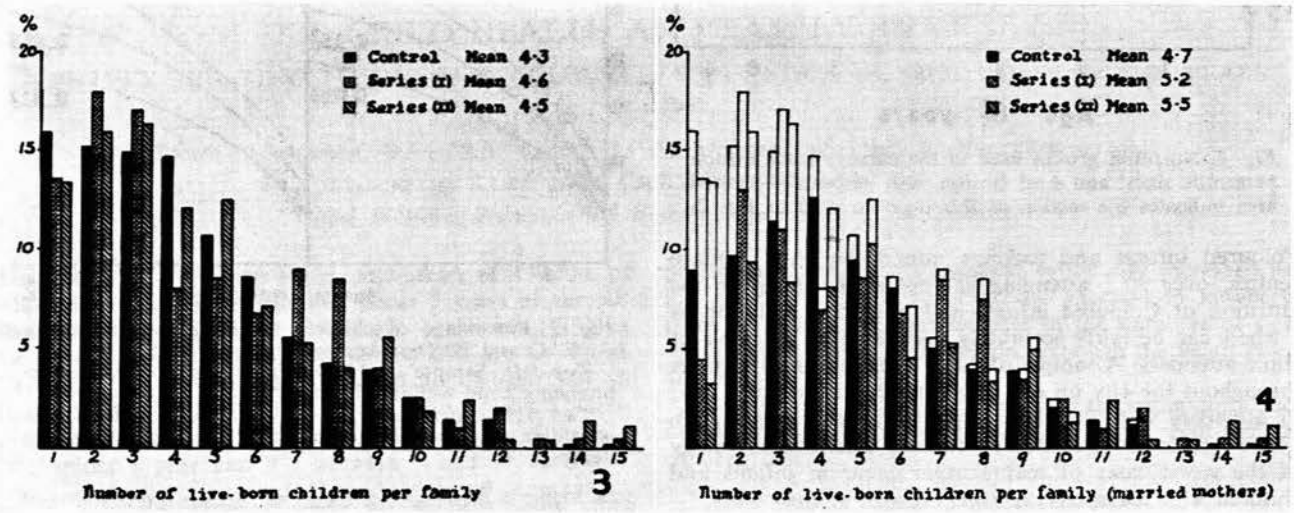
In order to get an unselected control to show the size of families, all new births notified in one week in February 1962 were investigated. This was done by asking the health visitors, who normally visit all new births, to fill in special enquiry forms in these cases.

It was necessary to balance this control to match the other two series as far as possible. It was found that 20% of the births were illegitimate and there appeared no way of comparing the income of these mothers with that of married mothers; it was therefore decided to use as the control series all those children whose parents had not gone beyond primary school level.

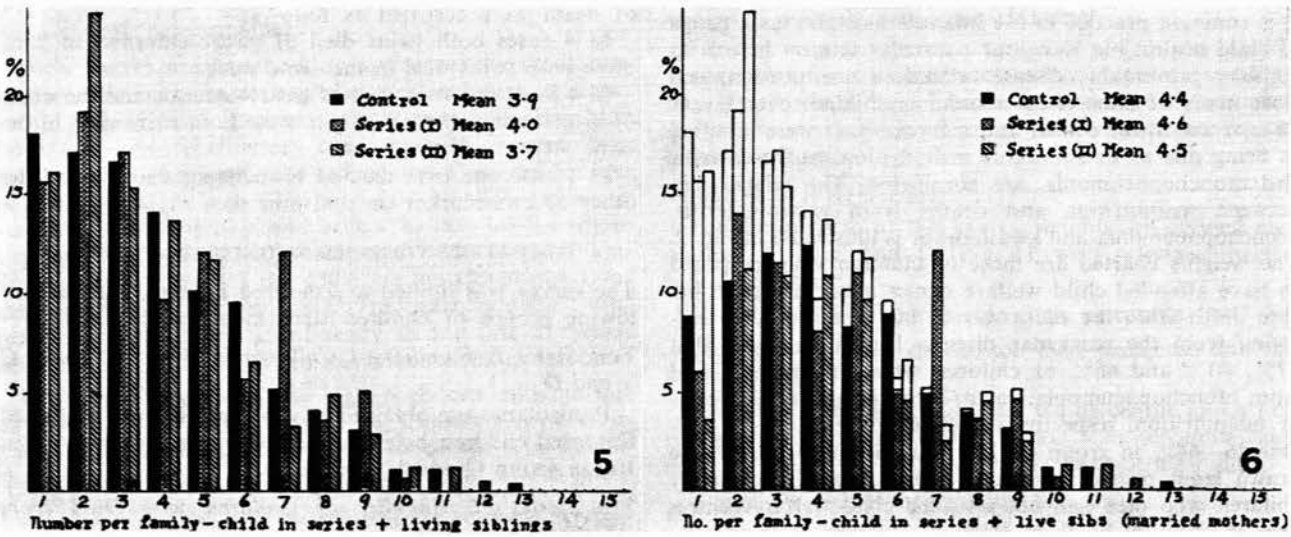
Comparison between Test and Control Series

Figs. 3 and 4 show the distribution of families according to the number of live-born children per family. They provide a comparison, in respect of the numbers of live-born children per family, between families in which malnutrition and deaths from causes related to malnutrition occurred, and families in the control series, which represent a normal distribution.

If large numbers in the family increase the risk to the individual child of (*a*) malnutrition and (*b*) death from a cause related to malnutrition, then the test series should



Figs. 3 and 4. Graph showing the percentage of families (ordinate), with varying numbers of live-born children in the families (abscissa).
Fig. 3. All families. *Fig. 4.* Families of married mothers only.



Figs. 5 and 6. Graph showing the percentage of families (ordinate), with varying numbers of children (abscissa)—being the children in the series plus their living siblings at the time of the enquiry.
Fig. 5. All families. *Fig. 6.* Families of married mothers only.

show a bias, with a higher percentage of families with 6, 7 or 8 children per family and a lower percentage with 1, 2 or 3 children per family than the control series.

It will be noted that fewer single children are malnourished or die than appear in the control series. This is more marked when children of married mothers only are considered. Beyond this there is no marked bias towards malnutrition being more prevalent in children born into large families.

The point that is always stressed where a large family is concerned, is the number of mouths to feed. Figs. 5 and 6 were therefore drawn up to show the children in the 3 series with the surviving siblings in each family at the time of the enquiry. Again where there is only one child in the family, there are fewer children in the malnourished or deaths series than in the control series, particularly where the mother is married, but beyond this there is no evidence to show that the number of children present in the household affects the nutrition of the young child.

Sibling Deaths

The difference between the mean number per family of live-born children (Figs. 3 and 4) and the mean number per family of children in the series plus living siblings (Figs. 5 and 6), represents the mean number of siblings who died in each series before the enquiry. These differences are seen in Table I, and it is clear that where malnutrition is seen in one member of the family, or more particularly where one member has died from a cause associated with malnutrition, the occurrence of previous sibling deaths is higher than in the control series.

TABLE I. MEAN NUMBER OF SIBLINGS WHO HAD DIED BEFORE THIS INVESTIGATION, PER FAMILY OF CHILDREN IN SERIES

	Control series	*Series I (Malnutrition)*	*Series II (Deaths)*
All families	0·4	0·6	0·8
Married mothers only	0·3	0·6	1·0

Families at Risk

The conclusions reached from a comparison of the test groups and the control group, are that the individual child under 2 years of age does not suffer to any great extent because of its place in the family, except that first-born and single children, particularly those of married parents, are better off than the rest.

This finding, and experience in child welfare work, both show that where one member of the family suffers from malnutrition all the children are probably malnourished or have suffered from malnutrition during their pre-school years; this applies whether there are 3 children or 10. The risk to life is highest in infancy and early childhood, when malnutrition has its most marked effect (Fig. 7). This has also been pointed out by Moodie in writing about the siblings of children suffering from kwashiorkor.[5]

In the series of deaths investigated it was noted that a high percentage of the siblings of these children had died. If the survival rate of siblings to children in the two test series is compared with the survival rate of siblings to children in the control group, it is found for all sizes of family that the survival rate of those in the control group is greater than that of the siblings of the children in the test series. This leads to the conclusion that it is the family that is at risk, and not the individual child just because it happens to be, say, the 6th or 8th child.

Fig. 7. The siblings of a child aged 18 months who died of gastro-enteritis and malnutrition. This is a family at risk.
In order of age the 1st, 4th and 5th children are in group B, the 2nd, 3rd and 6th children are in group C, the 7th and 8th (twins) and the 9th children are in group D. The 3 youngest all have rickets and are unable to walk at 4 years of age (twins) and 3 years of age (9th child).

FACTORS INFLUENCING THE DEGREE OF RISK TO FAMILIES

Poverty

This is undoubtedly the most important factor. Two illustrations are given from the data collected in child welfare centres and in the outpatient department of a childrens hospital.[6]

1. Details of the family incomes were obtained for 100 children in each of the weight groups A, B, C and D. The percentage of families in each group with incomes under R10 per week were as follows—group A 20%, group B 39%, group C 61% and group D 79%.

2. A total of 63 families with 6 or more live-born children, among whom there had been no deaths, were compared with 64 families with 6 or more live-born children, 3 or more of whom had died. Of the first group of 63

families, 39% had incomes under R10 per week, while in the second group of 64 families 79% had incomes under R10 per week.

These illustrations demonstrate the role played by poverty in the causation of malnutrition and death in young children, but in each case there is a percentage of families with a low income who are not malnourished, and a percentage with a better income who are malnourished.

This observation leads on to the important factors discussed in the following paragraphs.

The Individual Capacity of the Mother

The importance of this factor has been demonstrated previously by other writers,[7] and was seen to be of great importance when going through the records of the children in the series studied.

Repeatedly, in the records of children in group D or in the records of those who had died, remarks are found which were made by various doctors and health visitors who saw the children, such as 'difficult uncooperative mother', 'careless mother', 'mother low I.Q.' and 'mother cannot cope with these small children'. In contrast the records of some of the children in groups A or B had a remark recorded by the health visitor such as 'very poor but clean home, good mother' or 'capable mother'.

The mothers with the capacity to care properly for their children will do so in spite of adverse circumstances, and will take advantage of all facilities offered. In Cape Town, fortunately, these are considerable. Health visitors advise the mothers at home, child welfare clinics are scattered throughout the city, at which medical and feeding advice is available, and dried milk is provided for infant feeding. For the past year subsidized skimmed dried milk has been distributed to toddlers for kwashiorkor prevention.

The Ability and Cooperation of the Father

The father's helpfulness or otherwise, his capacity for regular work or the reverse, the amount he drinks or gambles, all have marked bearing on the family welfare. Many unmarried mothers and some married mothers receive little or no support from the father of their children. This often compels them to go out to work, leaving the young children with an old relative, a neighbour, or one of the older children. In many of the worst cases of malnutrition the father is reported to have deserted, or to be sick, unemployed or in gaol.

Birth Control

Our experience is that the mothers of the families 'at risk' are usually the last who will attend the mothers' clinics or carry out the advice given if they are persuaded to attend. The women with the better capacity as mothers are the ones who will attend and benefit by the advice given.

Family spacing leads to an improvement in maternal health; the hazards of parturition in the multigravida are well known, and so are the debilitating effects of pregnancies following close on each other. Parents who are striving to do the best for their children also realize that they can manage better and provide more for the children's material needs and for their education if they are able to space their families. Many of the Coloured people are doing their utmost to promote their children's welfare and education.

The provision of birth control clinics, therefore, is very necessary, but it does not materially affect the position of those children who suffer most from the effects of malnutrition.

Environment

Bad housing and overcrowding are known factors, increasing the risk of infection to the children, and contributing to the social disorganization of the families. No estimate in relation to housing conditions was made in this survey, since a great deal of re-housing was in progress. It was noted, however, that out of 300 married families in the control group, 77 were living in one room, and 39 were each sharing a room with another family.

STANDARD OF EDUCATION AND SIZE OF FAMILY

All the mothers of new births notified in February 1962 were questioned as to the standard they and their husbands had reached at school, or what higher education they had had. In Fig. 8 the sizes of the families where both parents had not gone above primary school level are compared with those where both parents had had secondary or higher education. It will be seen that there is a marked difference between these two groups. The group where one parent had high-school education and the other only primary education gave an intermediate reading between the two groups shown.

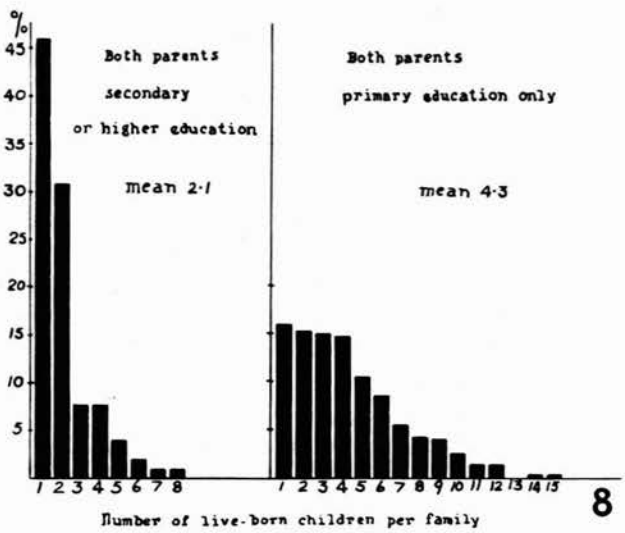


Fig. 8. Graph showing the percentage of families (ordinate), with varying numbers of live-born children in the families (abscissa).
Left—both parents had had secondary or higher education.
Right—both parents had had primary education only.

With better education go a better standard of living and a lower illegitimacy rate, and therefore a healthier, better-cared-for child population. The drop in the size of the families is one of the results of improvement in living standards.

CONCLUSION AND SUMMARY

A survey is presented of certain aspects of child health among the Coloured population of Cape Town, using the weights of the children and the mortality rates from diseases related to malnutrition as indices. The effects of the high birth rate, poverty, environment and the capacity of the parents are considered. The size of the family appears to have little effect *per se* on the health of the younger members, families being 'at risk' because of poverty, accompanied by poor parental capacity. The effect of education (and all that goes with it in the way of improved standards of living) in limiting the size of families is clearly demonstrated.

These findings emphasize the fact that improvement in the health of the child population depends on improvement in the standard of living, although temporary measures, such as subsidized milk, may achieve a measure of success in preventing the worst grades of malnutrition. This confirms previous observations[8] that isolated attempts to limit the population cannot have any marked effect on child health unless accompanied by improvement in education and standards of living, because it is whole families who are 'at risk', and not individual members.

We wish to thank Dr. E. D. Cooper, Medical Officer of Health of Cape Town, for permission to publish this paper, and the health visitors for their assistance in collecting information.

REFERENCES

1. Medical Officer of Health (1961): *Annual Report for the City of Cape Town.*
2. Registrar General (1959): *Registrar General's Report for England and Wales.* London: Her Majesty's Stationery Office.
3. Nelson, W. E. (1950): *Textbook of Pediatrics,* 5th ed. Philadelphia and London: Saunders.
4. Ford, F. J.: Personal communication.
5. Moodie, A. (1961): J. Pediat., **58**, 392.
6. *Idem:* Personal communication.
7. Spence, J., Walton, W. S., Miller, F. J. and Court, S. M. D. (1954): *A Thousand Families in Newcastle-on-Tyne,* p. 168. London: Oxford University Press.
8. Bigwood, E. J. (1960): *Symposium on Humanity and Subsistance,* p. 80. Switzerland: Nestlés Publication.