Some Thoughts on Malnutrition, Dietary Intervention and Amelioration of High Death Rates in Young South African Blacks

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SUMMARY

In South Africa, mortality rates from nutritional deficiency and infectious diseases among the very young are lower in Whites than in the other ethnic groups, particularly Blacks. Among Black preschool children, 25-35% are under the 3rd percentile of weight for age according to Harvard reference standards, and, orthodoxy, exhibit protein energy malnutrition. The proportion is even higher among Black scholars until late puberty. Many, particularly overseas, believe that direct or indirect dietary intervention by health authorities could ameliorate these situations to a tremendous extent. In fact only dietary intervention in the very young is likely to significantly improve morbidity and mortality rates. Elsewhere, intervention during school years has usually failed to yield unequivocally beneficial results, and the same applies as regards supplements in pregnancy and lactation and their effects on morbidity and mortality in infants. All these uncertainties underline the need, emphasized by World Health Organization bodies, to carry out definitive controlled elucidatory studies.

As regards non-dietary measures relating to medical services, water supply, socio-economic level and health education (particular nutritional) — while all these are mandatory, elsewhere their beneficial effects have often been slow in forthcoming or have been of uncertain clinical value. There is no universal 'blueprint' for reducing morbidity and mortality rates from malnutrition in developing populations. Preventable adverse health situations in the young in other parts of the world are by no means limited to Third World populations.


In South Africa, concern regarding the health of the less privileged populations, especially Blacks, dates back many decades. Workers such as Brock, Latsky, Fox, Rijno Smit, Best, Le Riche and especially Kark1 made very valuable pioneering contributions. Interest lapsed to a large extent, but at present this important subject is receiving much greater attention because of: (i) the results of intensive anthropometric and other studies being made on infants, older preschool children and schoolchildren; (ii) the results of dietary and other surveys; and (iii) the results of investigations of mortality rates, especially those in the young.2

In recent decades, enormous improvements in health situations in the less privileged have been noted; for example, Hansen3 has referred to the almost total disappearance of kwashiorkor in Coloured infants at the Red Cross Hospital, Cape Town. In the course of long-term field studies in the rural Transvaal we have noted a considerable decrease in the incidence of pellagra in school populations. Among urban Blacks, infant mortality rates have fallen dramatically. In Soweto, Johannesburg, in 1978 the figure was 40,2 per 1 000 live births.4 Interestingly, this is much the same figure as that (38,2) in New York's huge Black population little more than a decade ago.5 Yet commentators, especially those overseas, insist that further falls in infant mortality rates, and especially in mortality rate in 1-4-year-olds, could readily be achieved by a greater degree of intervention, direct and indirect, by health and other authorities. This view, which is regarded as over-simplified, will now be examined, particularly as to the bearing on it of other interventions — all in the interests of giving perspective to the local health problem at issue.

THE IMPLICATIONS OF MALNUTRITIONAL DISEASE

Although the problem which evokes primary concern is malnutrition in less privileged populations, the term has profound relevance to all populations, developing and developed.

Viewed holistically, malnutrition refers to diseases caused by (i) insufficient intakes of energy and/or particular nutrients, aggravated by infections, unhygienic circumstances, and other adverse environmental factors; and (ii) excessive intakes of energy and/or of particular nutrients.

As regards the first category, specific dietary and other forms of intervention may be necessary to combat the diseases of deficiency, e.g. marasmus, kwashiorkor, rickets, pellagra, scurvy, beri-beri, goitre, and dental caries in low-fluoride areas. In all these cases, intervention programmes have had varying degrees of success. Examples are the enrichment of cereals with three B-complex vitamins in part to combat pellagra, the addition of iodide to table salt to prevent goitre and the fluoridation of water to reduce the incidence of dental caries.

Intervention may also be essential in some segments
of populations in times of physiological stress, e.g. during growth, pregnancy, lactation, and old age.

Nutritional diseases caused or promoted by excessive intakes of nutrients include obesity, high blood pressure, diabetes, and coronary heart disease. Intriguingly, while these diseases, so common in prosperous populations, are primarily due to or linked with luxus intakes of nutrients, in such populations there is a sequence of conditions or diseases in which a deficiency of a food component may be the factor primarily responsible for disease. Perhaps the best examples are bowel diseases such as constipation, haemorrhoids, appendicitis, polyps, diverticular disease, and colon cancer; all these are more common in consumers of low-fibre compared with high-fibre diets, whatever their ethnic group or segment of a given community.

THE CRITERIA FOR NUTRITIONAL DEFICIENCY DISEASE

According to Yudkin, to establish the presence of a deficiency disease there should be evidence of: (i) a low intake of the particular nutrient; (ii) proof of metabolic involvement of the nutrient; and (iii) proof of benefit following an increased intake of the nutrient. The criteria also apply, in converse, to a disease of nutritional excess. The list could profitably be extended in two respects, namely (iv) proof that any change resulting from dietary intervention is not simply a placebo effect; and (v) proof that any improvement in nutritional status is unquestionably clinically meaningful.

THE CRITERIA OF SUCCESSFUL INTERVENTION

The criteria of successful intervention should include evidence of: (i) reduction in the incidence and severity of the deficiency disease; (ii) reduced morbidity as evidenced, for example, by reduced absenteeism from school or work; (iii) enhanced well-being as exhibited by behaviour at home, at school, at work, and at play; and (iv) raised relevant biological values, but only when these are unequivocally linked with clinical improvement.

Bearing the above in mind, malnutritional disease situations in particular age groups will now be considered.

Infants and Preschool Children

At what ages and under what malnutritional conditions is dietary intervention of critical importance, i.e. unequivocally beneficial?

There is least controversy over whether or not to intervene dietarily as regards the age group 0-2 years (and possibly slightly older). During these years a high proportion (e.g. 25%) may lie under the 3rd percentile of Harvard weight for age reference standards, although the huge majority have normal weight for height. It is at this age period that the maximum intensities of morbidity and mortality from malnutrition and undernutrition diseases prevail. Since these are usually associated with high frequencies of infectious diseases, there is the problem of specific responsibility; how much of the ill-health is due to malnutrition per se, and how much to adverse non-dietary factors (inadequate health services, overcrowding, unhygienic practices and living conditions, etc.)? There is no doubt, as clearly demonstrated by observations made in Guatemala, Peru and elsewhere, that dietary supplementation in less privileged, very young children definitely reduces ill-health and mortality. Yet definitive information is lacking on the precise burdens of ill-health in the various periods (0-1, 1-2 and later years) which are significantly remediable by dietary intervention. Briefly, then, in the early preschool years a shortfall in growth rate may connote a measure of clinical risk, yet with advancing age its magnitude has not yet been defined.

Schoolchildren

Although the provision of school meals began almost 200 years ago in Munich, Germany, it will come as a surprise to many to learn that the precise benefits from school-feeding programmes remain very uncertain.

As examples, in the UK Bender et al. compared poorly and adequately fed children in schools. While differences were apparent, they were associated neither with academic attainment nor frequency of absence from school. ‘From our measurements we can only say that there are several children in need of dietary care, but whether they are at educational, nutritional or medical risk would need further examination.’ In the USA recently, ‘an evaluation of a ghetto school breakfast program’ in terms of school attendance and performance using physical, anthropometric and psychological tests yielded inconclusive results. The pupils were predominantly Black and in poor socio-economic circumstances. From the results of these and other studies carried out on schoolchildren in Western countries it is clear that, broadly, the benefit of school meals to health status remains unproven.

In a study of a less privileged population in South America, Baertl et al. were so disappointed in their results that they concluded: ‘this tends to cast doubt on the value of school lunch programs, the most common form of supplementation throughout the world’. In a Black population in Kenya, pupils at a school where meals were provided did not differ in mean haemoglobin level from pupils at a control school.

It is incredible that the results of school-feeding as practised in less privileged populations in Africa, India, and similar parts of the world have been so inadequately investigated.

In South Africa a high proportion (half or more) of Black schoolchildren lie under the 3rd percentile of weight for age until late puberty, according to Harvard reference standards. This fraction, orthodoxy, is deemed at risk and deserving of intervention. Yet, on a weight-for-height basis, the huge majority of all pupils have normal dimensions. It is maintained, however, that this risk is statistical only, and remains undefined in relation to the presence of meaningful clinical stigmas. Many
individual workers, and also authoritative bodies (including the World Health Organization), reject the unqualified application or interpretation of Harvard reference standards to all child populations extant, although granting their value as yardsticks.

To reiterate, despite the millions (or rather billions) of money units that have been spent on the provision of school meals (in the UK, for example, meals cost R500 million per annum), there are still uncertainties about the precise benefits accruing both in developed and developing populations.

Lactation

All dietary bodies recommend increases in the intake of certain nutrients during pregnancy and lactation for the benefit of the mother, and more particularly the child, before and after birth. Yet it has to be admitted, and this is admitted by authoritative workers and health bodies, that our knowledge regarding the precise benefits of supplementation is far less adequate than we would wish.

In privileged populations, indeed in Western populations as a whole, it is doubtful whether the course of pregnancy or of lactation is significantly affected by the diets habitually consumed by mothers.

Even in less privileged or developing populations, however, speaking generally, the need for supplements is not clear-cut. Certainly some groups have profited from supplements, yet several reports have remarked on how well mothers manage in pregnancy and lactation on diets in which levels of intake of many constituents are far lower than those given in the Recommended Dietary Allowances. In India, Gopalan stated: 'While the malnutrition of mothers subsisting on inadequate diets is understandable, what is intriguing is the fact that a large number of these mothers are able to go through pregnancy apparently normally and deliver normal infants of average birth weight.' A recent report from Nigeria supports this view. Furthermore, under conditions of severe privation (as in prisoner-of-war camps, concentration camps, etc.), reports have indicated that both pregnancy and lactation proceeded much better than would have been expected.

An example will now be given of a study, the results of which were entirely contrary to orthodox thinking; it concerns calcium supplements. For decades, such supplements have been considered mandatory in pregnancy and lactation. We therefore investigated cortical thickness, cortical volume and other dimensions of the second metacarpal and the humerus in four groups of South African women or mothers. They were: (i) White women who had had 0-2 pregnancies; (ii) White women who had had an average of 7 pregnancies; (iii) Black women who had had 0-2 pregnancies; and (iv) Black women who had had an average of 8 pregnancies. As will be understood, the Black mothers were habituated to low calcium intakes; moreover, compared with White mothers, they contributed much more calcium to the infant during their usually long periods of lactation. It transpired that in these diverse groups the mean values for the variables measured (cortical thickness, etc.) were almost identical, i.e. neither the level of calcium intake nor the calcium expenditure seemed important."

Briefly, then, the nutritional and metabolic burdens of pregnancy and lactation in less privileged populations may be of less consequence to health than is usually imagined. This certainly does not imply that concern is unnecessary or that dietary intervention has a negligible place in pregnancy and lactation in such populations; it simply means that critical information is lacking. In a very recent review, Hyttten stated: 'The fetus may be very much less vulnerable to the vagaries of maternal diet than has been thought because of protective physiological mechanisms associated with pregnancy.' In an associated review, Whitehead stated: 'In conclusion, although there is strong circumstantial evidence to suggest that the capacity of the mother to produce sufficient amounts of breast milk of high nutritional quality is influenced by her dietary status, more practically orientated work needs to be done before we can make unreserved recommendations at the planning level.'

It is concluded that it is unlikely that giving nutritional supplements to pregnant and lactating women in less privileged populations such as South African Blacks will significantly reduce morbidity and mortality rates in very young children.

FURTHER RESEARCH

A joint FAO/WHO expert committee has emphasized that 'Value systems need to be established to assess the comparative benefits by various intervention programmes.' In another WHO report, on 'Supplementary feeding programme: need for a fresh look', it was stated that 'there is a feeling that feeding programmes have been unsuccessful or unrealistic, but sometimes the need for them is evident and urgent'. None, of course, would dispute this.

Non-Nutritional Factors

While the principal concern in this contribution is the bearing of dietary intervention in its capacity to reduce morbidity and mortality rates in the very young, reference must be made to non-dietary measures, the roles of which are also subject to controversy.

1. The provision of more health services, particularly for the very young. An increase in the number of ante- and postnatal clinics and under-fives clinics may well improve the health situation in the very young, as demonstrated by Morley in Central Africa. However, some have criticized undue emphasis on the value of these clinics, and experience elsewhere cautions against excessive optimism. For example, McNamara et al. in New York City 'tried to determine if the Children and Youth Projects (CYP) have had perceptible effects on trends in infant mortality. The CYPs are federally funded programmes to provide comprehensive health facilities particularly in areas with many poor families. The infant mortality rates in areas with a CYP have been compared with the rate in the remainder of New
York City. Although the infant mortality differential did diminish, this was almost entirely due to the improvement in neonatal mortality. Whether the CYPs are responsible remains doubtful because there was little change in the difference in post-neonatal mortality — and it is this that is most sensitive to social improvement.

2. **The provision of pure water.** In developing populations, rural and urban, gastro-enteritis in infants and very young children may be the cause of 25 - 35% or more of the total mortality among them. In Western populations, gastro-enteritis in infants occurs almost exclusively in bottle-fed babies; for example, in 1974 in Manchester only 1 of a series of 339 infants hospitalized with the infection had been breast-fed.\(^{29}\) In gross contrast, in certain developing populations even when breast-feeding with minimal supplementary feeding is practised, gastro-enteritis may result in a high death rate; this has been noted in Gambia\(^{29}\) and rural India.\(^{30}\)

Such illnesses and deaths are clearly due not to faulty nutrition but rather to unsatisfactory unhygienic practices. How can the incidence of gastro-enteritis be reduced? Here again there are misconceptions, because experience shows that the provision of pure water (deemed by many to be all that is necessary) is by no means as immediately effective as would be expected. We have carried out numerous surveys in Black villages with water supplies ranging from very poor water almost unfit for cattle consumption to excellent borehole water; we have found next to no differences in (i) the incidence of gastro-enteritis in the very young, or (ii) the frequency of absenteeism in school-goers.\(^{31}\) These observations are in agreement with many made elsewhere. An investigation in Nigeria concluded that the quantity of water is far more important than its quality.\(^{32}\) A recently published book stressed that the whole bearing of water supply on health experience in developing populations requires re-examination.\(^{33}\)

Briefly, then, even with the provision of satisfactory food and water, morbidity and mortality rates from gastro-enteritis and similar infections may not improve significantly until the hygienic practices of the population involved are greatly improved.

3. **Elevation of socio-economic level.** It is usually regarded as axiomatic that with greater spending power the nutritional status and vital statistics of populations cannot fail to become more favourable. While this is usually the case,\(^{33}\) such improvement is far from being invariably. A study in Chile revealed that the infant mortality rate in a not-so-poor group was three times higher than that in a very poor group. The former bottle-fed and the latter breast-fed their babies. In the Philippines in central Luzon an investigation of preschool children in six rural villages revealed 'no association between mortality or growth and the family economic status',\(^{34}\) hence it must not be assumed that a rise in wages or an improvement in social conditions among South African Blacks will necessarily lower morbidity and mortality rates considerably among the very young.

4. **Raising standards of health education.** All workers in African and similarly placed countries recognize the need for greater health awareness, and in particular greater understanding of the role of nutrition, hygiene, etc. in health maintenance. Early workers laid strong emphasis on this belief as regards kwashiorkor, its causation, cure and prevention, and especially knowledge of how to make the best use of locally available foods.\(^{40}\) Although in recent studies in Mexico, Jamaica, and elsewhere workers have expressed disappointment over the lack of the effectiveness of health education,\(^{41}\) surely it is crazy to fault developing populations for remissness in not applying knowledge, bearing in mind the gross remissness exhibited in many segments of privileged Western populations, for instance by fast driving, excessive smoking, an excessive rate of venereal disease, over-eating, etc.

**DISCUSSION**

Throughout the ages men have sought to delineate ideal frameworks for procedures of government and modes of living, as in Plato's *Republic* and Sir Thomas More's *Utopia*. Men have placed great score on codes of conduct, as in the Hippocratic Oath. As regards health matters, many felt how wonderful it would be if ideal or near-ideal situations existed which could serve as models for relevant authorities and populations to strive for — in other words it would be extremely valuable if it could be said with overwhelming assurance (based on actual situations) that the implementation of this or that health measure or practice, *ipso facto*, would result in this or that fall in morbidity and mortality from particular diseases. Certainly much could be learnt in many respects from the experiences of religious groups such as the Seventh-Day Adventists and Mormons.

South African authorities and workers are repeatedly faced with severe censure for their seeming indifference to or dilatoriness in endeavouring to improve the vital statistics of the less privileged population groups. Accordingly, as indicated, it would be immensely informative if it were possible, on the basis of near-ideal conditions, to know just how local health improvement efforts could be geared to make them more effective. In the UK, what may be learned regarding changes in the mortality rates in Caribbean and West African immigrants? How long did it take, on exposure to the National Health and other services, for the mortality rates in the very young to conform to the relevant figures of the British? To the writer's knowledge, no such data have been published. The closest analogy as far as Blacks are concerned is probably the situation of Whites and Blacks in the USA. Yet in South Africa the proportional representation is 10 White persons to 40 Black persons, whereas in the USA the ratio is 10 White persons to 1 Black person, so that in the latter country the task of improving vital statistics in the less privileged section of the community has been, and is, of far less magnitude than the corresponding task confronting South African health and other authorities.

What is the magnitude of the health disparity between Blacks in Soweto, Johannesburg, and Blacks in, say, New York?

In Soweto, with its population of about 1,25 million,
the infant mortality rate in 1978 was 40.2 per 1,000 live births. In 1976 in Central Harlem (where 94% are Blacks) it was 42.8% — admittedly the population of Central Harlem is relatively small and these data are the highest in New York. Yet it was only 12 years ago, in 1967, that the infant mortality rate for the whole of the Black population in New York was 38.5%. In a rural part, County Bolivar, Mississippi, the rate in 1976 was 47.1. As for social problems, in Johannesburg and Durban in 1976 50 and 66% respectively of Black babies were illegitimate; in Central Harlem in the same year 73% were born out of wedlock. In Johannesburg and Soweto the proportions of White and Black adults aged over 45 years were 36% and 13% respectively; in New York the figures were 39% and 21%. In Soweto, the current expectation of life at birth is not accurately known. That for South African Blacks as a whole for 1965-1970 was about 55 years, i.e. 13 years less than that of Whites (68 years). The disparity with Blacks in Soweto would currently be less, taking into account the improved vital statistics of the very young. In 1976 in New York, the expectation of life at birth was about 63 years in Blacks, i.e. 7 years less than that of Whites (70 years).

The purpose of providing these comparative data is not to excuse or to seek to explain away the adverse data on Blacks in South Africa, but to demonstrate that in the USA, in spite of her splendidly advanced medical and social services and numerous other provisions, adverse health situations in segments of the Black population are not very different from the adverse health situations currently found in urban South African Blacks. The broad implication is that there is no readily available 'blueprint' whose adoption could guarantee instant or even quick success when applied under South African conditions. Indeed, it is noteworthy that in a review of a book published in the Netherlands recently on Nutrition and Anthropology in Action, it was stated that: 'There is no formula for reducing malnutrition rates, or for enabling a "primitive" or poor community to come to terms with a more Westernized and commercial way of life. Perhaps the main message of the book is that each community has its own pattern or problems, which must be analysed in context.'

Needless to say, in South Africa we must press on and continue to combat preventable ill-health situations in every possible way, especially in the less privileged populations. Regarding dietary intervention, there must be controlled trials such as are maintained by Cochrane to be indispensable to every aspect of disease therapy. Yet it would display ignorance and naivety to regard the task ahead as straightforward, and it would be little short of mischievous to entertain, indeed to assert, that absence of will or indifference is the almost total reason for the adverse vital statistics under discussion.

REFERENCES