WAGES, DIET AND NUTRITIONAL STATE

A NUTRITIONAL STUDY OF TWO GROUPS OF BETTER-PAID FACTORY WORKERS IN DURBAN

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A recent study of low-paid, mainly migrant, African labourers in and near Durban revealed a high prevalence of various signs of malnutrition. This was associated with a poor standard of diet and an unsatisfactory level of nutritional knowledge. On the basis of these findings, 3 allied measures were recommended: canteen feeding, increased wages, and the health education of workers.[1]

The present report deals with a subsequent study, in June 1960, of 2 groups of slightly better-paid Durban workers: a group of African men in a manufacturing industry, and a group of Indian men at a foundry and engineering works.

SUBJECTS AND METHODS

Each group comprised 40 workers, aged 20 - 39 years, employed for at least 6 months. Workers with possible privileges, such as cooks, and also men under treatment for tuberculosis, were excluded. At the first factory, the men selected were matched in age with low-paid workers who had previously been randomly selected for study at the same factory. Apart from this qualification, the selection of workers was random.

The African workers were predominantly Zulu (82%). Their mean age was 31·6 years. Most (65%) were living away from their wives or parental families. Almost all (98%) had spent most of their childhood in a rural area, but most (78%) had spent 10 years or more in town. Most were in fairly stable employment; they had been in their present job, on average (median figure), for 5·5 years. Their mean cash wage, according to their own statements, was £4 7s. 0d. per week. All were engaged in manual work, usually not strenuous.

The Indian workers were mainly Tamil- (52%) or Hindustani-speaking (30%). Their mean age was 29·7 years. Almost all (98%) were living with their wives or parental families. The majority (85%) had spent most of their childhood in a town, and 90% had spent 10 or more years in town. They too were in stable employment, their median period in their present job being 5·0 years. Their mean cash wage was £3 14s. 0d. per week. All were engaged in manual work, very strenuous in some cases. The men examined were not housed by their employers.

The methods used have been detailed elsewhere.[1,2] The chi-square test, with Yates' correction, was used to assess the statistical significance of the findings. The 5% level of probability was used.

FINDINGS

Better-paid African Workers

There was considerable evidence of malnutrition among these men (Table I), the lesions being consistent with the consumption of a high-maize diet deficient in animal tissues, milk, yellow and green vegetables, and fruit.

Their nutritional state appeared, however, to be better than that of low-paid African labourers in the same age-group, examined a few weeks previously.[1] These low-paid labourers comprised 4 groups of 40 men each, employed at 4 Durban factories, and not provided with rations. Their mean weekly wage was £2 19s. 11d., or £1 7s. 1d. less than that of the better-paid men. A number of signs of malnutrition were less prevalent among the better-paid workers (Table I). In several instances, statistical significance was reached. Only 1 sign, namely follicular enlargement, a sign of doubtful significance, was significantly commoner among the better-paid men.

The men's answers to a series of questions indicated that their diet was unsatisfactory. The number of days per week on which the following foods were usually taken (median figures) was: meat, 4·5; green or yellow vegetables, 4·5; milk (in porridge), 2; milk (as beverage), 1; *amasi* (sour milk), 1; fruit, 1; fish, 0; and eggs, 0. Their stable cereal was maize. Their diet was, however, considerably better than that of the low-paid workers, with particular regard to their consumption of meat, milk, fruit, and green/yellow vegetables (Table II).

When these men were compared with a group of 40 low-paid men employed at the same factory, similar dietary and nutritional differences were found. Patronage of the works canteen was similar for both groups.

Asked what food they usually took in the morning, before work, 20% said they took nothing, 8% tea only, 70% cereal foods with or without tea, and only 2% a more substantial breakfast. These findings were similar to those among the low-paid workers.

A series of questions revealed that the men's standard of knowledge concerning the relationship of food to health was in some respects unsatisfactory. For example, 80% regarded *phuthu* (thick maize porridge) as being healthier than bread; 28% did not consider *amasi* (sour milk) to be healthier than *mahewu* (fermented maize gruel); and 30% did not consider potato to be healthier than mealie-rice. These findings did not differ significantly from those among the low-paid workers, for whom the corresponding figures were 66%, 38% and 44% respectively.

Indian Workers

There was considerable evidence of malnutrition among the Indian workers (Table I). This finding conforms with that of Lapping, who found evidence of malnutrition in 89% of a sample of Indian factory workers.[3]

Compared with the low-paid African workers, whose mean weekly wage was 14s. 1d. less, some signs of malnutrition were significantly less prevalent among the Indian men; there were fewer men with lingual papillary changes, skin xerosis, mosaic of the legs, and low total serum-protein concentrations. Fewer of the Indian men were overweight in

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TABLE I. PREVALENCE % OF SIGNS OF MALNUTRITION AMONG BETTER-PAID WORKERS IN DURBAN, WITH COMPARATIVE FIGURES FOR LOW-PAID DURBAN WORKERS

	Better-paid workers		*Low-paid African workers*[1]	*Explanatory notes*
	African no. : 40	*Indian no. : 40*	*no. : 160*	
Tongue signs:				
Papillary changes	72·5*	70·0*	89·4	Papillary atrophy and/or hypertrophy/hyperaemia, of any degree. Usually at the tip and sides. 'Geographism' excluded. As atrophy and hypertrophy/hyperaemia may under certain conditions be manifestations of the same pathology, their combined prevalence is given, as well as the separate prevalence of each (below).
Papillary atrophy	15·0*†	42·5*	62·5	Of any degree. Usually at the tip and sides. 'Geographism' excluded.
Papillary hypertrophy and/or hyperaemia	57·5	62·5	65·6	Of any degree.
Fissuring	55·0	72·5	68·8	Of any degree.
Magenta	0	0	8·8	Over 0% is regarded as abnormal.[3]
Indentations	100·0	100·0	95·6	Tooth impressions visible at sides or tip.
Lip signs:				
Lip dryness	65·0	50·0	63·8	Any degree of dryness, of lips as a whole or at angles.
Angular stomatitis	2·5	0	8·1	Sodden or cracked angles. Over 5% is regarded as abnormal.[3]
Gum signs:				
Gingivitis	47·5	62·5	65·0	Any degree of softness and swelling or redness, with or without pus.
Pyorrhoea	37·5	45·0	56·2	Pus obvious, or appearing when gums are pressed lightly.
Bleeding	0	2·5	4·4	Bleeding, spontaneous or on light pressure.
*Skin signs:***				
Xerosis	35·0*	35·0*	89·2	Score[1] based on degree and extent of dryness, dullness, increased reticulation and flaking on face, trunk, shoulders and arms, and thighs.[2] Men with scores of under 9 (i.e. mild or localized signs) are excluded.
Xerosis, marked (thighs)	5·0	0*	16·7	Marked signs on thighs (score of 8 or over for this skin area). Separate figures provided for thighs, which are relatively protected from occupational trauma.
Phrynoderma	32·5	50·0	44·2	Score based on degree and extent of follicular keratosis[4] on trunk, shoulders and arms and thighs, excluding elbow, knee and trochanteric regions, and sternal and interscapular areas. Score based on degree and extent of lesion.[2] Men with scores of under 2 (i.e. mild localized signs) are excluded.
Phrynoderma, moderate or marked (thighs)	15·0	15·0	27·5	Men with scores of 2 or more for this skin area. Excluding knee and trochanteric regions.
Follicular enlargement	55·0*†	22·5	33·3	'Permanent gooseflesh'[4] of any degree in areas listed above, under 'phrynoderma'.
Dyssebacea/folliculosis	50·0	27·5	45·0	Follicles enlarged or plugged with sebum, on face, sternal or interscapular areas. Score based on degree and extent of lesion.[2] Men with scores of under 4 are excluded.
Mosaic, legs	37·5*	27·5*	78·3	'Crackled skin'.[4] Mild lesions are excluded.
Oedema:	0	0	1·2	Definite pitting on pressure over both ankles. Over 0% is regarded as abnormal.[3]
Leanness:	45·0	30·0	30·0	Arm skinfold thickness of under 5·0 mm. Measured half-way down the back of the right arm, over the triceps, with a Harpenden caliper.[5]
Underweight:	17·5†	72·5*	20·6	Weight at least 10% below the standard weight of a US male of the same age and height.[3]
Overweight:	15·0†	0*	16·2	Weight at least 10% above the standard weight of a US male of the same age and height.[3]
Low total serum protein (below 7·5 g. per 100 ml.):	10·3* (39)	17·9* (39)	52·0 (150)	Although there is no clarity on the precise significance of total serum-protein values, there is evidence of a relationship between malnutrition and low values among Durban Africans.[6] The figures in parentheses indicate the number of subjects.

* Significantly different from the figure for low-paid workers.
† Significantly different from the figure for Indian workers.
** The figures for low-paid workers apply to only 120 men. One group of 40 men, many of whom were covered with dust which was difficult to remove completely, were excluded.

TABLE II. FREQUENCY WITH WHICH VARIOUS FOODS ARE TAKEN. TWO GROUPS OF BETTER-PAID WORKERS IN DURBAN, COMPARED WITH LOW-PAID DURBAN WORKERS

Food and usual frequency per week	*Percentage of workers*		
	Better-paid workers		*Low-paid African workers***
	African no. : 40	*Indian no. : 40*	*no. : 160*
Meat, 3 or more days	77·5*†	20·0*	48·1
Milk (as beverage), 4 or more days	30·0*	10·0	10·6
Milk (with porridge), 1 or more days	60·0*†	5·0	16·2
Meat or milk (as beverage or with porridge), 7 days	60·0*†	5·0*	22·5
Fish, 1 or more days	25·0†	65·0*	18·1
Sour milk, 2 or more days	45·0*†	0*	22·5
Eggs, 1 or more days	12·5†	52·5*	6·9
Fruit, 1 or more days	57·5*†	100·0*	15·6
Green/yellow vegetables, 3 or more days	70·0*†	97·5*	28·1

* Significantly different from the figure for low-paid workers.
† Significantly different from the figure for Indian workers.
** Figures derived from study by Abramson and Gampel.[1]

relation to a US standard, and more were underweight; this last finding may, at least in part, reflect a racial difference.

The usual diet of the Indian workers was unsatisfactory in many respects. The number of days per week on which the following foods were taken (median figures) was: green or yellow vegetables, 6; meat, 2; fruit, 2; fish, 1; eggs, 1; milk (as beverage), 0; milk (in porridge), 0; and sour milk, 0. Their staple cereal was maize. Their diet was in some respects better than that of the low-paid African workers (Table II). They took green/yellow vegetables, fruit, fish and eggs more frequently. Meat and sour milk, however, were taken less often. There was no significant difference in respect of milk taken as a beverage or with porridge.

Few of the men had a satisfactory breakfast before starting work. There were 58% who had no food, or tea only, and 32% who had cereal foods, with or without a beverage.

The nutritional state of the Indian workers was, in most respects, fairly similar to that of the better-paid African men, whose mean weekly wage was 13s. more. There were only 2 significant differences in the mucocutaneous signs: the Indian workers had a higher prevalence of lingual papillary atrophy, and a lower prevalence of follicular enlargement. In addition, more of the Indian workers were underweight, and fewer overweight (Table I).

Their diet differed considerably from that of the better-paid African men (Table II). They took meat and milk less often, but green/yellow vegetables, fruit, fish, and eggs more often.

The Indian workers' knowledge of the value of food, like that of the African workers, was not satisfactory. For example, 58% regarded mealie-meal as being healthier than bread, and 62% did not consider potato to be healthier than mealie-rice.

DISCUSSION

It is apparent that there was considerable malnutrition among these slightly better-paid workers, associated with a poor standard of diet and nutritional knowledge. However, both their nutritional state and their diet were, in general, superior to those of the low-paid workers studied previously. The contrast was clearer in respect of the better-paid African workers, where the wage disparity was greater, and the issue was not clouded by cultural differences in food customs or possible racial differences in body-build.

Before concluding that the wage difference was the main factor accounting for the nutritional superiority of the better-paid African workers, alternative explanations had to be considered. The 2 African groups did not differ notably in their mean age, ethnic composition, or marital state. In each group there were few men (2%) with gainfully occupied wives. Family size was similar; the better-paid men had, on average, 2·3 living children per married man; and the low-paid men, 2·4. In each group, 98% had spent most of their childhood in a rural area. In both groups, the majority had been in town for a considerable time; 100% of the better-paid men had been in town for 5 or more years, and 78% for 10 or more years; the corresponding figures for the low-paid men were 91% and 63%. Both the better-paid and the low-paid were in fairly stable employment. They had spent on average (median figures), 5·5 and 5·7 years respectively in their current jobs, and 43% and 44%, respectively, had been in the same employment for 6 or more years.

Three differences were however apparent between the 2 groups. First, the better-paid men were better educated; 75% had been to school, compared with 42% of the low-paid men; 55% had had over 4 years of schooling, compared with 22% of the low-paid men. As the 2 groups did not, however, differ significantly in their responses to questions about the relationship of diet to health, the difference in formal education did not appear to be crucial in this context. Secondly, among the better-paid men there were significantly fewer who were living away from their wives or parental families (65% compared with 95%). In view of this finding, such men were compared with men who were living with their families. Among the better-paid men there were only minor differences between these 2 smaller sub-groups — either in their diet or in their nutritional state. Thirdly, although the better-paid men were engaged in manual work, this work was, by and large, somewhat less strenuous than that of the low-paid men. Had their usual dietaries been similar, this difference might have been considered an important determinant of their nutritional difference. In the presence of marked dietary differences, however, it was considered unlikely that differences in exertion could be considered a major factor.

The findings thus suggested that the higher wage received by these men was in fact the main factor accounting for their better diet and nutritional state. It is apparently not true that 'if African workers are paid higher wages, they will not spend more on food'. On the contrary, it is likely that, as might have been expected, wage increases will appreciably improve the nutritional state of workers.

Health Education

The findings confirm, however, that the raising of wages should be accompanied by health education. Despite the higher educational standard of the better-paid workers, who had, on average, passed Std. III or IV (median educational levels of African and Indian workers respectively), their knowledge concerning the health value of various foods was no better than that of the low-paid workers, 58% of whom had not been to school at all.

Experience has shown that it is difficult to make effective educational contact with workers during their leisure hours. Workers are most easily contacted at their place of work. It has previously been suggested that employers or employers' organizations should consider the employment of health educators for this purpose, both to modify

workers' nutritional knowledge and habits, and to perform other functions aimed at improving the health of workers and their families.[7]

In view of the obvious importance of such a measure, it is necessary to review the availability of trained health educators in this country. It must be stressed that health education can only be effectively performed by a person trained in this work. Posters, pamphlets, films and 'health newsletters' are educational tools, not substitutes for an educator. The effectiveness of such aids depends on the skill of the educator using them. Their use should form part of a planned and integrated programme, and should, where possible, be supplemented by informal discussions of their subject-matter. It has been shown that even literate people may completely misinterpret the message of a poster.[8]

In 1944 the National Health Services Commission recommended that, in view of the rôle of ignorance as a cause of ill-health in South Africa, 'the National Health Service of the future should become the vehicle of health teaching by the entire technical personnel of the service, including a few who should be specially trained for this work'.[9] Subsequently, a governmental institute (presently the Institute of Family and Community Health of the Natal Provincial Administration*) was set up in Durban, at which, *inter alia*, 'health assistants' (now styled 'health educators') of all ethnic groups were trained on a large scale. Initially they were given 6 months' training, which in 1949 was expanded to a 3-year course. As a result of policy changes, this formal training was stopped in 1954. Although there are at present a number of trained health educators, some of whom might be willing to take up employment in industry, there is now no formal training of this kind in South Africa, apart from the in-service training of staff members of a handful of local health agencies.

Elsewhere, health educators have achieved professional status. In South Africa, where it has been stated that ignorance is a close rival to, if it does not actually exceed, poverty as a cause of disease,[10] there is paradoxically little appreciation of the need for such personnel,[11] whether in industry, in hospitals, or in neighbourhood health services.

Canteen Feeding

It is probable that employers could, by providing suitable food for workers at their place of work, reduce the prevalence of malnutrition. The fact that so few men have a satisfactory meal before starting work, reinforces the likely value of the provision of mid-morning or midday meals.

However, canteen feeding presents problems. A recent report on feeding schemes for non-Europeans in Durban industries states:

'1. Canteens are not generally successful. Where they are reasonably successful the success has been achieved only over a long period. No canteen has ever achieved 100% attendance.

'2. Experience of various firms also indicated that there is an invariable tendency on the part of the Native to require payment in lieu of the value of the meals. Bantu firmly believe that they can buy better than their employers and would take 6d. for a meal costing their employers 1s. 3d. in the belief that money enables them to buy to the best advantage.

'3. Industrialists have found that where Natives are dissatisfied with matters other than food, such as pay, work conditions, etc., there is a tendency immediately to boycott the canteen in the belief that this injures the firm and would help to further their claim to have their disputes settled.

'4. Where prices of the ingredients in preparing meals are from time to time fluctuating and the management substitute an equally nourishing ingredient, the Natives who patronize the canteen regard this as an infringement of their rights and agitate for the original diet irrespective of the cost'.[12]

A memorandum dealing with a survey of Natal canteen schemes states that 'Native employees in general did not take kindly to being fed by their employers . . . . The Natives appear genuinely to believe that some ulterior motive prompts the employer to feed him, and even where they are fed at no cost to themselves, representations are not infrequently made by the Natives to the employers to withdraw the feeding scheme and instead pay to the Natives the amount expended by the employer for such scheme . . . There are factories that provide a well-balanced ration of palatable food at a very sub-economic cost to the Native, where the amenity provided is boycotted by the Natives, but readily patronized by the other races. Even . . . in the dairy industry, where it is normal to issue a free ration of milk and allow additional milk to be purchased at well below retail price, by no means all the Natives take advantage of these facilities'.[13]

These undoubted difficulties do not lessen the need for such schemes. Rather, they underline the need for concurrent health education concerning the importance to health of food in general, and of certain foods in particular. In the words of the memorandum cited above, employers are advised 'that in their own interests, greater efforts should be made by way of education, and by making the meals more attractive, to persuade the employees to take greater advantage of the amenities of feeding'.[13]

The Worker's Family

This study has provided further support for the value of 3 allied measures: increased wages, canteen feeding, and the health education of workers. Such measures are likely to have an impact, not only on the health of workers, but on that of their families.

The likely effect of increased wages on the health of workers' families needs no emphasis. In the better-paid and low-paid African groups and the Indian group, 82%, 66% and 68% respectively of the men were married, the mean number of living children per married man being 2·3, 2·4 and 2·3. In each group, only 2% of the men had gainfully employed wives. Almost half (42%) of the Indian workers had dependants other than their wives and children; the African workers were not questioned about their other dependants.

A number of recent publications have pointed out the disparity between the average income of African and

* This Institute closed down on 31 January 1961, after this article was written.

Indian families, and their minimal needs for healthy living.[11-17] In 1958 it was estimated that the 'poverty line' for a non-White family of man, wife and 3 children in Durban, i.e. the amount needed to provide the minimum essentials for living, was £4 8s. 10d. per week, without allowing for rent or transport.[18] Including expenditure on these 2 items, the average income of both groups of 'better-paid' workers fell short of this figure.

Important too, is the possible effect of health education on the food habits of workers' families. Commonly the man controls the purse-strings of the home, and often he determines not only what should be spent on food, but also how it should be spent. Particularly if men learn, not only what they themselves should eat, but also what women and children should eat, it is likely that they will effect changes in the family diet. Canteen feeding, together with health education, may appreciably alter food practices in the home. Workers who learn to eat and relish new dishes may introduce them into their own homes. In a study of two US plants, it was shown 'that a well-run in-plant nutrition education program can be effective in changing eating habits, when integrated with the plant food services. Sixty per cent of the workers eating in the cafeteria of one plant indicated changes in their dietary practices since onset of the nutrition program. Twenty-five per cent of this group disclosed an extension of the effects of the nutrition program into the home'.[19]

SUMMARY

A study was undertaken, in June 1960, of the nutritional state and diet of groups of better-paid African and Indian manual workers in Durban.

Their nutritional state was found to be superior to that of low-paid African labourers examined previously.

The diet of the better-paid African men was superior to that of the low-paid labourers.

The men's standard of nutritional knowledge was poor.

The findings are considered to support the value of 3 allied measures: increased wages, canteen feeding, and health education.

We are indebted to the managements and men for their interest and cooperation, to Sister T. Triegaardt, health educators A. T. Mbombo, J. Francis, B. Gajadhur, E. F. Govender, A. C. Jacob, J. Mngadi, M. Ngidi, W. S. Nkuhlu, R. Philips and I. I. Pitso, medical recorder S. J. Maharaj, and nurse-aids E. Handley and A. Perumal for their assistance, and to Dr. S. M. Joubert of the Department of Pathology, University of Natal, for the serum-protein estimations.

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