

The
CENTRAL AFRICAN
JOURNAL
OF
MEDICINE



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SUPPLEMENT TO VOLUME 17, NUMBER 1, JANUARY, 1971

FACTORS AFFECTING THE OUTCOME OF
TREATMENT OF PULMONARY TUBERCULOSIS
IN SUB-OPTIMAL CONDITIONS:

An 18-month Follow-up of 224 Patients

By

D. H. SHENNAN and M. LOUISE WESTWATER.

Changes in African Disease Patterns with Western Acculturation

BY

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Perhaps every physician in Rhodesia today has an impression in the back of his mind that as the cultural patterns of the Africans change, so also do their diseases. The situation under which this study was undertaken seemed particularly favourable to the testing of this hypothesis.

PLAN AND METHOD

Commencing January, 1966, every patient entering the Chikore hospital was classified as T (traditional), ST (semi-traditional), or W (westernised), according to the degree to which his cultural mores seemed to depart from the customary towards the modern. This evaluation was a total impression based upon such considerations as education, occupation, income, social position and fluency with English.

Although at first viewed with certain apprehension, such subcultural classification proved in practice relatively easy. Whereas some mothers arrive by foot carrying their children in goatskins on their backs, other arrive in this year's car. Some patients have had no formal education; others have overseas degrees. Some come from families attempting to live at subsistence levels on incomes of \$5 monthly or less; others on \$150 or more. The subcultural designation was facilitated by the fact that many of the patients, particularly the westernised, were known to the staff personally and by the fact that the final categorisation was always done by the same person, the author, usually at the time of the first visit. Although initially the aim was to select off a sample of westernised Africans for comparison with a traditional group, the necessity for an intermediate semi-traditional group soon became apparent for those who seemed to fit well into neither extreme.

Regrettably, the scope of this study had to be limited. Excluded, for instance, are differential analyses of childhood disease patterns, obstetric and gynaecologic problems, orthopaedic cases, major surgical illnesses and malignancies.

RESULTS

A total of 5,376 cases were studied over a period of approximately 2½ years. Of these, 4,317 (80.3 per cent.) were classified as essentially

traditional in cultural habit, 881 (16.4 per cent.) as semi-traditional and 178 (3.3 per cent.) as westernised.

The results of this study are grouped below into four main disease categories: (1) a parasitic group; (2) a nutritional group; (3) an infectious group; and (4) certain miscellanies.

A. Parasitic Diseases

The incidence rates of five parasitic diseases for the three subcultural groups are charted in Table I.

The general pattern, though not exceptionless, appears one of a significant decrease in parasitic disease with westernisation. Whereas the combined incidence rate of schistosomiasis for all ages was 9.9 per cent. in the traditional group, this was but 1.7 per cent. for the westernised. Ascariasis similarly decreased from 3.2 per cent. to 1.1 per cent., and enterobiasis from 3.0 per cent. to 1.1 per cent. Scabies dropped from 6.6 per cent. to 3.4 per cent. The only exception to this trend was hookworm, which showed an increase from 8 per cent. to 10.7 per cent.

The decrease in parasitic morbidity was even more pronounced in the contrast between the semi-traditional and the westernised. The unexpectedly high incidence rates for the semi-traditional group will be discussed subsequently.

B. Nutritional Diseases

The nutritional diseases followed in this study show clear and consistent trends. Clinical malnutrition, avitaminosis B complex and kwashiorkor showed decreases from 4.9 per cent., 3.9 per cent. and 4.4 per cent. respectively to 0 per cent. in each instance. Anaemia decreased from 19.5 per cent. to 12.9 per cent. On the other hand, obesity showed an opposite trend, rising from one in every 270 of the traditional patients to one in every 22 of the westernised. Semi-traditional rates proved consistently intermediate.

An obvious increase in nutritional balance and adequacy underlies this entire pattern. Whereas the traditional African is more likely to suffer from undernutrition or specific deficiency, the westernised African is more likely to suffer from nutritional excess.

C. Infectious Diseases

Incidence rates for bacterial, viral, fungal diseases and malaria are charted in Table III. These are listed mainly by anatomic region.

With westernisation a rising incidence appears to take place in such diseases as rhinitis, conjunctivitis, upper respiratory infections, influenza, tonsillitis, pharyngitis, laryngitis, bronchitis, ringworm, other dermatitis and malaria. In marked

contrast, decreased incidence rates appear for bronchopneumonia, pneumonia and tuberculosis. Very little change in incidence rate appears to take place in infectious gastrointestinal disease, but venereal disease appears to increase slightly.

The above diseases showing higher incidence rates with westernisation are generally the less severe. Since it is difficult to believe that the *actual* incidence of such ailments as conjunctivitis, influenza and ringworm are less in the traditional group, other explanations need be sought. The simplest would appear to be that, for various reasons, the more westernised African comes more readily for treatment. Thus milder infections are more likely to be treated and serious infections earlier. Conversely, the traditional African tolerates larger amounts of illness. Thus the bronchitis of the child in a westernised family, promptly treated, never becomes a bronchopneumonia, whereas the "normal cough" of the child in a traditional hut on a cold, rainy night does. Such an interpretation is supported by the fact that the serious respiratory diseases followed in this study—bronchopneumonia, pneumonia and T.B.—reveal combined incidence rates four times as high in the traditional group compared with the westernised.

Malaria appears to present within the microcosm of one disease the entire morbidity spectrum presented by respiratory tract diseases. As observed in Table III, malaria emerges primarily one of the milder diseases for the African, for which the more westernised is more likely to come to the hospital for treatment. It seems significant that in this subcultural group not a single case of malarial complication or fatality occurred, in contrast to an estimated malarial complication rate of 21 per cent. among the confirmed positive cases of the traditional group, some of which were extremely severe.

Although the incidence of hand-to-mouth parasitic diseases, such as pinworm and ascariasis, showed a decrease with westernisation, suggesting improved personal hygiene, the relative constancy of the infectious gastrointestinal group suggests that effective house fly control does not occur until almost 100 per cent. latrine control is established in a given area.

D. Other Diseases

Hypertensive cardiovascular disease showed an increase from 1.5 per cent. in the traditional group, much of which reflects renal compensation in the elderly, to 4.5 per cent. in the westernised. For the latter an increasing importance of such other aetiological factors as obesity and emotional tension are presumed. That emotional factors

begin to become increasingly important with westernisation was also suggested by the fact that a survey of secondary level students revealed an incidence rate of hypertension of 12.1 per cent. (Donaldson, 1970). The increase in rate of psychoses from 0.2 per cent. to 1.1 per cent. also suggests an increasing role of emotional tension. Many clinicians implicate emotional factors among the aetiological agents in obesity (Cecil, 1951; Harrison, 1966; Meakins, 1956).

The increase in incidence of caries requiring extraction from 3.5 per cent. in the traditional group to 16.9 per cent. in the westernised would appear to reflect in part the richer diet of the latter. The apparent increases in menstrual problems and minor traumatic injuries probably reflects the increased propensity of the westernised group to avail themselves of scientific medical help.

DISCUSSION

The incidence rates quoted in this study probably err mainly conservatively. More intensive investigations elicitive of subclinical cases could undoubtedly increase appreciably the incidence rates of such diseases as malnutrition, avitaminosis B and scabies. The incidence of clinical malaria was appreciably greater than that for the positive blood slide cases quoted above. The incidence rates of caries requiring extraction are probably high in this study, on the other hand, due to the reputation of an orderly at the hospital for painless dentistry.

One limitation of this study was the subjective factor in the subcultural classification of patients. Several considerations suggest, however, that a reasonable objectivity was attained. The relatively small size of the westernised group, 3.3 per cent., supports that a fairly select group was singled out, while the numbers of the three groups—4,317, 881 and 178—support statistical reliability. The common emergence of parallel trends, with semi-traditional results intermediate, also supports the study's validity.

Quite unexpectedly, however, in at least ten disease categories maximal incidences emerged in the intermediate group. This occurred for schistosomiasis haematobium, hookworm, enterobiasis, ascariasis, venereal disease and the psychoses. Although such an increased incidence for one or two might be dismissed as a spurious statistic, this for so appreciable a group does not permit so facile an explanation. One possible explanation is that perhaps the persons in the semi-traditional group are at once, like the more westernised, more cognisant of disease and more prepared to seek treatment, but also, like the more traditional,

not sufficiently the beneficiaries of better nutrition and sanitation. Nutritional adequacy, as Sigerist (1943) emphasises, is probably the most important background factor in the genesis of all disease.

An alternative explanation, particularly for the psychoses, could be that those attempting to adjust to two not always compatible cultural worlds become susceptible to greater amounts of disease.

The results of this study, viewed as an entirety, suggest a trend towards increased longevity with western acculturation. The pattern which emerges is one of decreased incidence of parasitic disease, improved nutrition and less severe infectious disease. On the other hand, partially offsetting these gains, arise increased incidences in diseases related to overnutrition and to nervous tension.

In comparison with the African living in Central Africa to-day, writes Gelfand (1968, p. 90), "the European can be said to be living in a different world. Parasitic disease is not important in his life. . . . These days European babies practically never die of malaria. Malnutrition in the European is exceptional, and I doubt whether classical kwashiorkor ever occurs. . . . Anaemia (is) . . . comparatively uncommon." The present study, confirming such a two-world hypothesis, indicates that a cultural change from one towards the other becomes attended by correspondingly altered patterns of disease susceptibility.

Far more questions than answers, however, are raised by this study. Why such frequently highest incidences in the semi-traditional group? What are the factors in the rise of hypertension with western acculturation? Does cultural disruption contribute to nervous or venereal disease?

What factors in "westernisation" are most evocative of disease?

SUMMARY AND CONCLUSIONS

A two and three-quarter year study is reported investigating incidence rates of disease in 5,376 rural African patients of varying subcultural backgrounds ranging from the traditional (80 per cent.) to the westernised (3 per cent.). With western acculturation, these statistics suggest, a pattern of change in incidence of disease takes place. Parasitic diseases, such as bilharziasis, hand-to-mouth nematode diseases and scabies, markedly decrease. Nutritional deficiency diseases such as the avitaminoses, kwashiorkor and anaemia also decrease, but diseases associated with nutritional excess, such as obesity and caries, begin to increase. Infectious diseases tend to be less severe and to be treated earlier. Diseases associated with emotional tension, on the other hand, such as essential hypertension and psychosis, appear to increase.

In brief, as the African departs from his traditional ways for those brought in by western civilisation, he also leaves his more traditional diseases in exchange for more western. The evidence suggests, however, a significant overall gain in decreased morbidity and more favoured longevity.

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Table I
PARASITIC DISEASES

Disease	Traditional		Semi-traditional		Westernised	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
<i>S. haematobium</i>	333	7.7	74	8.4	3	1.7
<i>S. mansoni</i>	96	2.2	17	1.9	0	0
Hookworm	344	8.0	125	14.2	19	10.7
Ascariasis	138	3.2	32	3.6	2	1.1
Enterobiasis	130	3.0	36	4.1	2	1.1
Scabies (clinical)	287	6.6	73	8.3	6	3.4



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