An Investigation into the Prevalence and Geographical Distribution of Ainhum in the Tsolo District of the Transkei

MARIA TUNSTALL

SUMMARY

In a detailed local geographical study of ainhum in the Tsolo district of the Transkei some distinctive trends have emerged with regard to its high prevalence, unusual sex ratio, geographical 'clustering' of cases and familial occurrence.

S. Afr. Med. J., **48**, 2409 (1974).

Ainhum was the name given in 1867 by da Silva Lima to a rare affliction of the toes, the exact nature of which is still a mystery. It occurs almost exclusively in dark-skinned people and most commonly in adult males. It is characterised by a progressive annular strangulation, usually starting as a constricting groove at the base of the 5th toe, and culminating in spontaneous amputation—a process which takes from a few months to over 20 years. Ainhum is most commonly found in the tropics and among negroid people. The condition (having the Xhosa name *maxakata*) is well known in the Transkei.

This investigation sets out to examine the geographical distribution of ainhum cases in a detailed regional and settlement level study in order to provide basic epidemiological information and to suggest trends and relationships for further research. For this purpose the Tsolo district (to the north-west of Umtata) was chosen. Dr Daynes, Medical Superintendent of the area, had for some time been interested in ainhum, and had therefore recorded details of each case registered at St Lucy's Hospital over a number of years.

MATERIALS AND METHODS

Retrospective Study of Hospital Data

Records for all ainhum cases registered at the hospital over the previous 5 years were collected and examined.

Procedure: The records were checked for duplication; those with insufficient information were disregarded; patients were separated into home locations; the population at risk in each area was noted and prevalence rates for each location calculated; and these rates were plotted on a map of the Tsolo district.

The figures reevaled trends in the geographical distribution of the disease, with apparent concentration of cases in certain areas. However, since there were reservations about the representative nature of these prevalence rates, a check was necessary. The selected nature of the population sample, i.e. only those reporting at hospital, made necessary a pilot inquiry to find any other ainhum cases in the area.

Pilot Check

As a result of a number of spot-check examinations it became obvious that the incidence of ainhum in the Tsolo district was much higher than that recorded merely by the hospital admission figures. Differences in reported incidence between locations could be seen to be partly due to the variable of distance and accessibility to the hospital (a particularly relevant factor in view of the nature of the disease). Consequently it was decided to reduce the area under investigation and to concentrate the search by limiting it to those locations within easy access to the hospital: the land adjacent to the Inxu Valley was found most suitable (Fig. 1).

Method of Data Collection

Every clinic in the area was alerted to examine patients for ainhum. The Headman and schoolteachers of the locations were, as far as possible, drawn into the search. Every school was visited and the children examined.

RESULTS OF SECOND SURVEY

The number of cases increased from 66 to 127 in the second survey, and age distribution ranged from 7 to 88 years. The total population at risk was 6 664, giving a crude prevalence rate of 2,07/1 000 for the Tsolo district as a whole, and 4,7/1 000 for the Inxu Valley. The male : female ratio in the total population was 25 474 : 36 190 while the ratio for ainhum cases was 25 : 102. Fifty-three of the 127 cases had a positive family history, and 38 of these were direct blood relations. The geographical distribution revealed a concentration of 16 cases in Elujecweni, 15 cases in Jenca, and 'clusterings' of 9, 8, 7, 6, and 5 cases in other locations.

Department of External Staff, Medical Research Council, London
MARIA TUNSTALL, B.SC. HONS, F.R.G.S.

Date received: 22 July 1974.

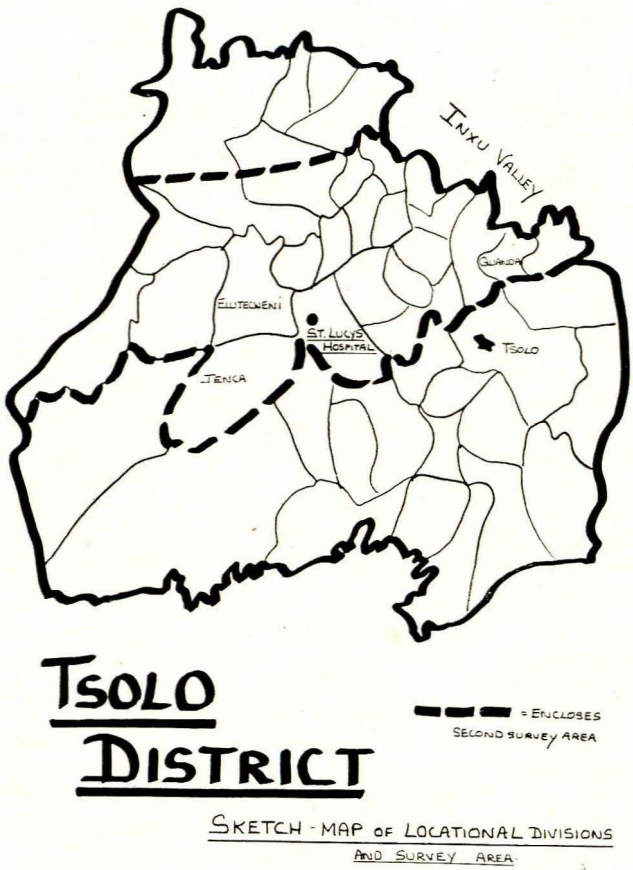

Fig. 1. Map.

Thus a new pattern of disease appeared to be emerging, with ainhum more widespread than the retrospective survey suggested. An interesting 'clustering effect', requiring further investigation, was also evident within certain locations.

EPIDEMIOLOGICAL TRENDS

Prevalence of Ainhum in the Area

Out of a population at risk of 61 664, the 127 cases of ainhum gives the Tsolo district a crude prevalence rate of 2,07/1 000.

Since the main survey concentrated its search for cases on the more limited area of the Inxu River valley, the rate here gives a more accurate picture of the over-all prevalence: 94 cases from an average population at risk of 20 000—a crude rate of 4,7/1 000. This differs appreciably from the results of the first survey (based on unchecked data) which gave a figure of 1,07/1 000. However, since the total number of cases of the disease is so small in relation to population at risk, it would be unwise to attach too much importance to the prevalence rates—particularly on the locational level—since the addition of one or two new cases to a location would disproportionately increase its prevalence rating.

The range of rates between locations is remarkable and shows the danger of generalising with regard to the over-all distribution of a disease, when such contrasts can exist within a small area.

Sex Ratio

Of the 127 people with ainhum in the Tsolo district, 25 were males and 102 females. Of the total population at risk, 41,3% were males and 58,6% females. Therefore, even taking into account the preponderance of females in the total population, there is a definitely higher percentage of women suffering from ainhum than men; a situation in contrast to all other reported series in the world.

Patients with ainhum, expressed as a percentage of the total population at risk, were 1,12% males and 2,82% females.

Geographical Distribution

Prevalence rates reveal a distinct 'clustering' effect on the locational level. On further investigation the aggregation of cases also appeared to exist on a smaller scale within locations, thus suggesting some environmental influence.

Age Incidence

Similar to other large series there was a very wide range of ages—from 7 to 88 years. Adjustment of age distribution according to approximate known age of onset of ainhum revealed that the majority of cases developed the condition between the ages of 40 - 50 years in women and 50 - 60 years in men.

Family History

In the Tsolo district of the Transkei this survey revealed a distinct familial trend in the disease—of 127 patients, 53 had a positive family history and 38 were direct blood relations (i.e. siblings, parents or grandparents).

Further investigation of a few of the kindred revealed examples of ainhum occurring in three consecutive generations. This study of ainhum within families was made difficult by the fact that the distribution of affected individuals within a kindred at any given moment does not necessarily coincide with the potential pattern of that condition (for ainhum is not confined to a specific age group).

It seems possible that there is some degree of inherent susceptibility with this disorder, and a correlation with the marked fibrogenetic tendency of dark-skinned people (especially Negroes) is likely. A genetic predisposition cannot be excluded, but no simple Mendelian laws are followed and the marked disparities in prevalence found in the Tsolo district are difficult to explain on grounds of

inheritance alone. At best the popular explanation of multifactorial inheritance in conjunction with an unknown environmental determinate may be offered.

Practical Difficulties Encountered

Since few people were certain of their exact age, it was considered best to regard figures given as approximations and to place each in a general age group.

The tracing of family histories proved difficult because family groups are wide and indeterminate; it was necessary to press for detailed information regarding direct blood relationships, for terms such as 'brother' could include brother-in-law or cousin.

The discovery of the same cases on more than one form emphasised the need to check for duplication.

With a number of different people reporting cases and filling in questionnaires, the danger of error was realised. Ideally, all cases should have been checked by one person to ensure continuity in the recognition of the disease.

Personal Observations

Ainhum is known among the people as a 'women's disease'. They relate it to the fact that it is a status symbol for men to wear shoes—which they do most of the time. Women, on the other hand, very rarely wear shoes, unless going to church. This reflects G. J. Cole's opinion that the sex incidence 'varies probably with the work women do with their feet'.

Injury to the toes (especially the 5th toe) was obviously a common hazard, and a great number of broken and rotated little toes were observed. An interesting case was also noted of a woman developing a ring constriction several years after cutting her toe with an axe. There were two reports that the adoption of the habit of wearing shoes stopped the progress of an ainhum ring constriction, thereby allowing healing to commence.

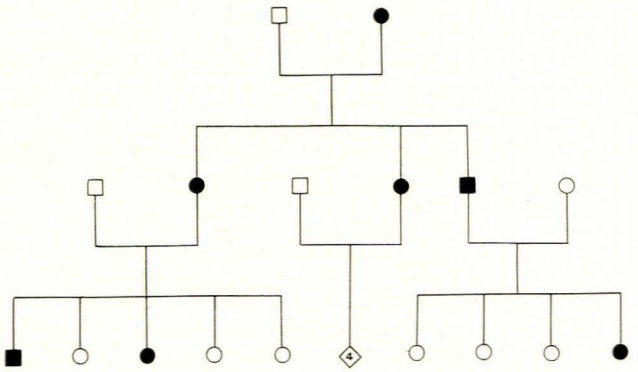

Fig. 2. Pedigree of the Nomaxayi family from Nomhala (black symbols indicate affected subjects) (□ normal male; ○ normal female; ■ affected male; and ● affected female).

DISTINCTIVE FEATURES OF THE AREA INVESTIGATED WITH REGARD TO THE INCIDENCE OF AINHUM

The many limitations of this investigation are obvious. However, some interesting features and associations have emerged:

1. The comparatively high prevalence of ainhum in the area.
2. The significant preponderance of female cases in contrast to all other reports.
3. The geographical variation in prevalence—the 'clustering' effect extending from the district scale to within the location.
4. Distinct familial aggregation.

This survey has prepared the ground for a more detailed environmental comparison of a high and low incidence area in the Tsolo district with a view to determining the basic reason for the contrasts observed.

I wish to thank the South African Government for the travelling scholarship which enabled me to do this survey, Dr Paul Keen of the South African Institute for Medical Research; Professor P. Beighton for examining the genetical aspects of the survey; and Dr Guy Daynes and all at St Lucy's Hospital.