IMPACT OF HIV/AIDS ON MORTALITY AMONG THE INPATIENTS AT MOTEBANG HOSPITAL, LESOTHO

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Study design. A retrospective descriptive study of the mortality trend among inpatients at Motebang district hospital in Lesotho.

Aim. To assess the impact of HIV/AIDS on the mortality of Motebang Hospital inpatients from 1989 to 2003.

Rationale. If the hypothesis that AIDS had modified the mortality in a unique way could be confirmed, mortality trends could be used to supplement other methods of estimating the impact of HIV/AIDS such as antenatal and sexually transmitted infections sentinel surveillance.

Methodology. Inpatients' data were collected from January 1989 to December 2003. The 15-year period was split into three 5-year periods (1989 - 1993, 1994 - 1998, and 1999 - 2003) and the diagnoses were grouped into Global Burden of Disease groups I, II, and III. The data were analysed to establish time, gender and age trends.

Results. The mortality rate and number of deaths increased over the 15-year period. Group I (communicable diseases, maternal, perinatal, and nutritional conditions) contributed 69% of all deaths. The rise in mortality was most pronounced in the 15 - 49-year age range, progressively forming a 'bulge' on the death incidence by age curve, with the female peak occurring at the 25 - 29-year age category, 5 years earlier than males. The study found that AIDS-related deaths accounted for 51 - 65% of total deaths and 70 - 80% of group I deaths. Although the number of the inpatients in group II was low, there was evidence of increasing burden from non-communicable diseases. However, the burden from group III (injuries) remained stable.

Conclusion. AIDS modified the mortality trend of the Motebang Hospital inpatients by raising the deaths of younger adults, thereby deviating from the expected natural trend. This implied that mortality data of the hospital provenance can provide information necessary for, *inter alia*, evaluation of the impact of current and future interventions, for instance, the impact of the proposed provision of antiretroviral drugs.

There were 37.8 million people living with HIV/AIDS worldwide at the end of 2003, and 2.9 million had died in the past year. HIV/AIDS is spreading unchecked across Africa and parts of Asia. The African continent has 29.4 million people living with HIV/AIDS, and approximately 4.8 million new infections were recorded in 2003. In Lesotho, national adult prevalence has reached 31%.[1] Lesotho, a developing country in sub-Saharan Africa with a population of 2.057 million, reported its first AIDS case in 1986; however, it had 360 000 people living with HIV/AIDS in 2001.[2] In 2000, 59% of the reported full-blown AIDS cases were clustered in the 20 - 39-year range and the majority of HIV-positive cases were young females (aged less than 19 years).[3] Estimation of the HIV/AIDS prevalence in Lesotho is based on data from sentinel surveillance of antenatal and sexually transmitted infection clinic attendees,[2] and reported AIDS cases.[3] The estimate could be higher than the actual prevalence according to the Kenya Demographic and Health Survey.[4]

Mortality surveillance using the routine vital statistics and censuses reports can supplement the sentinel surveillance data and methods are available for correcting under-registration and misclassification of deaths,[5] such as the

Growth Balance Equation by Brass (1975), the Death Distribution Method by Preston and Coale,[6] and the Age Group Specific Growth Rates Method by Bennett and Hourichi (1984).[7] Cause-of-death attribution depends on the accuracy of information available at the time of death, postmortem report, diagnostic technology, skills of the clinician assigning the diagnosis, and coding in conformity to a set of specific rules and rubrics such as those specified in the International Classification of Diseases (ICD). The quality of cause-of-death attribution is still of concern.[8]

AIDS-related mortality surveillance proceeds from the premise that there is an increase in the male mortality in the 29 - 59-year range and female mortality in the 20 - 49-year range, with an emergence of a young adult peak, which occurs 5 years earlier among females.[3,9-11]

METHODOLOGY

The present study was carried out at Motebang Hospital. This hospital, with a capacity of 208 beds and situated in north-western Lesotho, serves Leribe district and is the second largest hospital in Lesotho. From the hospital records, data capture sheets were used to collect data from 1 January 1989 to 31 December 2003. The fields were gender, age, date of admission and discharge, diagnosis and outcome (discharge or death). Medical officers were consulted if abbreviations, representing the diagnoses, could not be deciphered. The data were entered and analysed using the Epi Info 2002 statistical package, and each record was assigned a serial number. The diagnoses were categorised into Global Burden of Disease (GBD) group I (pre-transitional diagnoses consisting of communicable diseases, maternal, perinatal and nutritional conditions), group II (non-communicable diseases), and group III (injuries).

Age was categorised into age ranges that exhibited similar characteristics and were comparable internationally. These ranges were 0 - 4, 5 - 14, 15 - 49 and ≥ 50 years. For the findings to be considered significant, it was predetermined that a trend had to be set and/or each cell had to have at least 150 units. To investigate the time trend, data for each year were used on the death incidence by age curve and a trend was evident. However, for other calculations such as mortality rate, a trend could not be set and most of the cells had less than 150 units. Therefore, the data were grouped into three 5-year periods (1989 - 1993, 1994 - 1998 and 1999 - 2003), which satisfied the predetermined requirements.

The estimate of the 1999 - 2003 mortality attributable to AIDS was computed against the backdrop of the following assumptions:

- The deaths for the period 1989 - 1993 were taken as baseline as they were assumed to have been largely non-AIDS related.
- Although in absence of HIV/AIDS health improvement gains were expected, it was assumed that difficult economic conditions impacted negatively on social spending, negating these gains.
- HIV/AIDS-related deaths were assumed to be the sum of deaths directly caused by HIV/AIDS, and those that were indirectly related to it. For instance, HIV/AIDS may have shifted substantial focus and resources from other conditions. In addition, children orphaned by AIDS, unlike other children, are more likely to die irrespective of their HIV status.[12]

The study protocol was approved by the Lesotho Ministry of Health and Social Welfare and the University of the Western Cape research ethics committee.

RESULTS

DEMOGRAPHY

A total of 24 328 inpatients were recorded from 1989 to 2003. Females and males accounted for 52% and 48% respectively (Fig. 1). Age was available for 85% of inpatients, recorded as 'adult' for 13.5% ,and missing for 1.5%. The 0 - 4-year category accounted for the largest proportion (26.5%). The age range decreased to a low level in the 10 - 14-year category before rising to a peak in the 20 - 24-year category and gradually declining thereafter (Fig. 2).

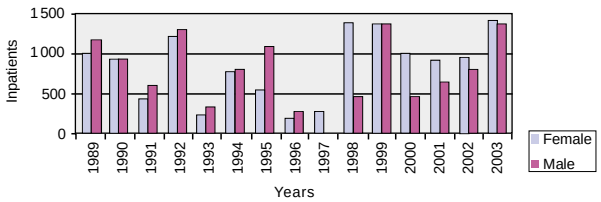

Fig. 1. Motebang Hospital inpatients by gender and year, 1989 - 2003.

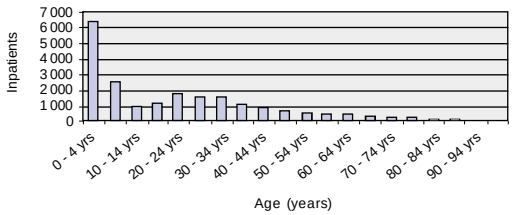

Fig. 2. Motebang Hospital inpatients by age, 1989 - 2003.

MORTALITY

Among all the inpatients, 8.7% died and of these 54.9% were females. The 0 - 4-year category contributed the

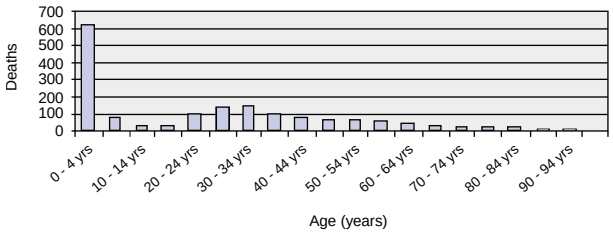

Fig. 3. Motebang Hospital deaths by age, 1989 - 2003.

largest proportion of deaths (29.2%). Mortality then dropped to 1.5% in the age category 15 - 19 years. It then rose to a peak of 7.1% in the age category 30 - 34 before declining gradually (Fig. 3). The 'adult' category contributed 18.7% of the total mortality.

Between 1989 - 1993 and 1999 - 2003, the mortality rate increased by more than twofold (Fig. 4). This increase in mortality progressively caused a bulge between 15 and 49 years. In the first and second periods (1989 - 1993 and 1994 - 1998) the bulge was not as evident as it was in the third period (1999-2003) (Fig. 5). Mortality rate per 1 000 population in the over 50 years category was the highest, followed by the 0 - 4 years, and 15 - 49 years categories. The lowest mortality rate was in the 5 - 14 years category (Fig. 6).

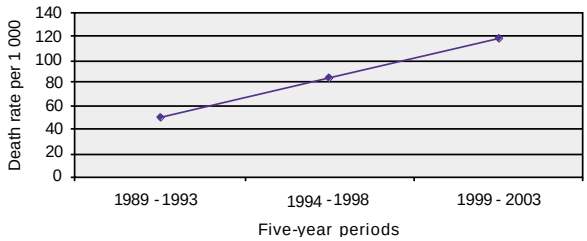

Fig. 4. Motebang Hospital death rate over the three 5-year periods.

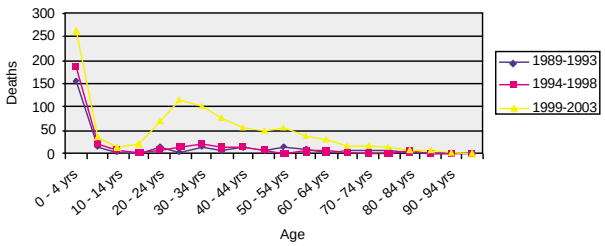

Fig. 5. Motebang Hospital deaths by age and the three 5-year periods.

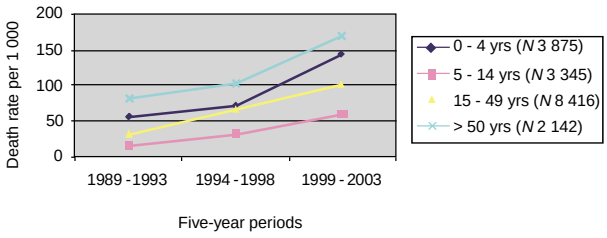

Fig. 6. Motebang Hospital death rates by age and the three 5-year periods.

MORTALITY AND GENDER

There were more deaths among females than males. For inpatients in the 15 - 49-year range, the peak for females was between 25 and 29 years and that for males between 30 and 34 years. The peak for females occurred 5 years earlier than for males (Fig. 7). In the 'adult' category, more males were admitted and there was a correspondingly higher death incidence throughout the study period. Although the mortality rate was higher in the 'adult' category, its male curve mimicked the unique trend of that of males in the 30 - 49-year range. In this range, the male mortality rate curve rose steeply from 1989 - 1993 to 1994 - 1998 and then dramatically declined. The female curves had some similarities in that they were parallel up to 1994 - 1998, and then the mortality rate decelerated (Fig. 8).

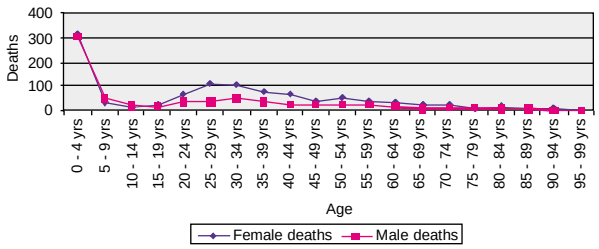

Fig. 7. Motebang Hospital deaths by age and gender, 1989 - 2003.

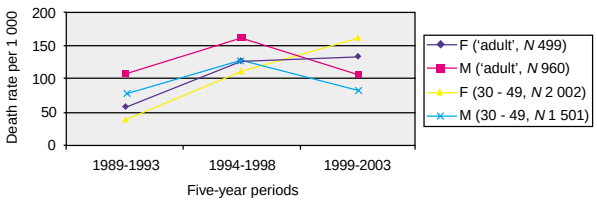

Fig. 8. Motebang Hospital death rates for 30 - 49 years and 'adult' by gender and period, 1989 - 2003.

MORTALITY AND GBD CLASSIFICATION

Groups I, II, and III had 54%, 13% and 30% of inpatients respectively, and the inpatients increased from 1989 - 1993 to 1999 - 2003, except in group III, which showed a slight reduction (Fig. 9). The death rate for group III was the lowest and its increase from 1989 - 1993 to 1999 - 2003 was the least compared with groups I and II. In contrast to

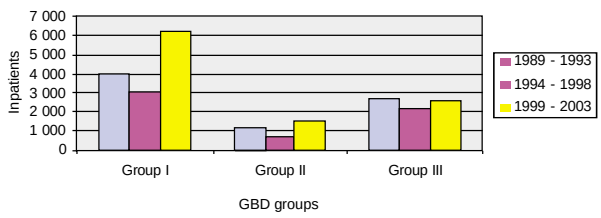

Fig. 9. Motebang Hospital inpatients per GBD group for the three 5-year periods.

the trend in group III, the death rate trends in groups I and II were similar (Fig. 10). When the data for each group in the 15 - 49-year range were excluded from the death incidence graphs, group I exclusion resulted in a deviation from the trend of the total deaths but exclusion of groups II and III did not (Fig. 11).

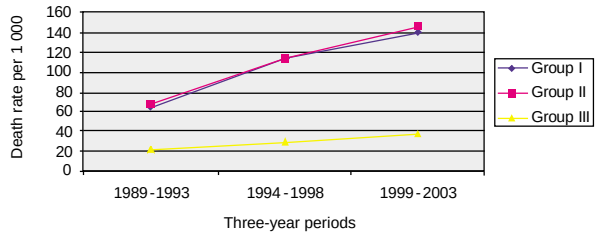

Fig. 10. Death rates in Motebang Hospital groups I, II and III inpatients by 3-year periods.

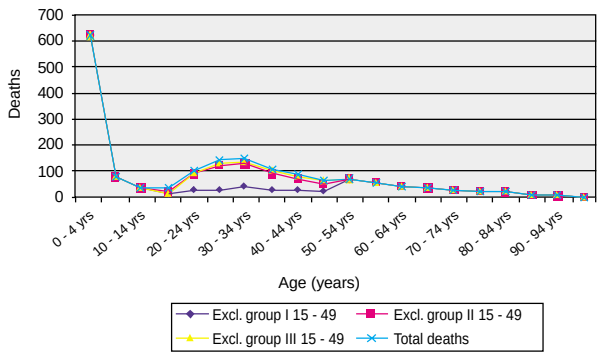

Fig. 11. Motebang Hospital total deaths and deaths excluding the 15 - 49-year group, for each group by age, 1989 - 2003.

DISCUSSION

As was expected, the death incidence was high in the 0 - 4-year category, it then declined through the 5 - 9-year category to a low level in the 10 - 19-year category. However, instead of rising gradually, the mortality rose rapidly forming a bulge on the death incidence curve between 20 and 49 years. Females peaked between 25 and 29 years and males between 30 and 34 years, a 5-year difference. This unusual bulge was completely absent in the period 1989 -1993, incipient in 1994 - 1998 and clearly evident in 1999 - 2003. In addition, it was limited to group I conditions. The trend exhibited similarities to that of known AIDS-related deaths in Lesotho, Zimbabwe and the ASSA 2000 prediction model, and South African mortality.[3,9-11] Given that the first case of HIV in Lesotho was in 1986,[3] and that HIV-infected people take an average of 10 years (in the absence of antiretroviral therapy) to develop full-blown AIDS,[13] this peak coincided with the period when AIDS-related mortality had gained momentum. The timing, age range and a trend that mimics that of confirmed AIDS-related mortality in Lesotho[3] held AIDS culpable, and this conclusion had been drawn in South Africa and Zimbabwe, where similar trends have been documented.[9-10]

In this study, the AIDS-related trend was not evident in the first period (1989 - 1993). It started emerging in the second period (1994 - 1998), and was well established in the last (1999 - 2003). The mortality in the first period was therefore assumed to have been largely non-AIDS-related and used as a benchmark. For the period 1999 - 2003, using this benchmark, 51% of all the deaths, and 70% of the deaths in group I, were AIDS-related. These figures rose to 65% and 80% respectively when the deaths were adjusted to account for inpatients discharged to community care. The degree of validity of the adjusted figures can be considered high in view of the facts that data were of hospital provenance, and that communicable diseases, the main subset of group I, contributed 60% of total disease burden in Africa.[12]

Unlike other age groups, group I mortality rates in the 'adult' and 30 - 49-year categories doubled between 1989 - 1993 and 1994 - 1998, after which they dropped to the initial level, although the number of inpatients remained high. This had been observed in a Kenyan national referral hospital[14] and a rural South African hospital.[15] The drop after the second period was more dramatic among males than females. One could speculate that this unexpected trend was related to health care beneficiaries and/or health care providers. It is probable that from 1989 - 1993 to 1994 - 1998 the population had not fully appreciated the impact of HIV/AIDS on their health, and therefore still had confidence in the efficacy of the health services. Consequently, they continued to seek health services and therefore more AIDS patients died in the hospital as the incidence of AIDS rose. However, from 1994 - 1998 to 1999 - 2003, information about AIDS was spreading and diagnoses were being made. Patients and relatives were realising that AIDS was a terminal illness, and they only sought admission for acute conditions and thereafter requested discharge.

Another reason could have been prohibitive cost of a protracted stay in hospital for the majority of patients and their relatives. In addition, social reasons such as stigma associated with AIDS, and intractable and embarrassing conditions such as chronic diarrhoea, could have lowered the threshold for eschewing hospital care. On the other hand, health care provider-related factors could have provided an alternative explanation. The health care providers may have encouraged patients to be cared for at home for two reasons. Firstly, this would have decongested the wards and allowed more patients suffering from other conditions to be admitted. If this were the case, it would have signified a health delivery system that was being overwhelmed by chronic end-stage disease. The risk of collapse of the hospital services had been predicted in the

early stages of the HIV epidemic.[16] This school of thought, however, still lacks empirical corroboration. For instance, a baseline assessment for health sector reform in Lesotho reported a bed occupancy rate of 58%.[17] Besides availability of beds, limitation of other resources could have encumbered hospital services, but a study carried out in a Nairobi hospital in Kenya nullified the hypothesis that hospital services were likely to collapse under the burden of HIV/AIDS.[14] Secondly, the health care providers could have encouraged utilisation of community- and home-based care health services. Whatever the reason, it was clear that many patients were probably dying at home, thus shifting the burden to the nascent community and home-based care.

The death rate of males (in the 'adult' and 30 - 49-year age categories) fell dramatically from 1994 - 1998 to 1999 - 2003, while the decrease for females was not as dramatic. Common factors must have been driving the mortality rate for both males and females; however, it is probable that the maternal conditions were confounding the trend of the female curves. A study found that the maternal death rate variable was proportional to the HIV prevalence variable.[18] Moreover, the 1999 confidential enquiry into maternal deaths of the South African Department of Health stated that AIDS was clearly demonstrated to have a heavy impact on maternal death, reporting that of the 35.5% of maternal deaths with HIV sero-status, 68% were HIV- positive.[19] It is probable that the difference between male and female mortality rates from 1994 to 1998 can be attributed to the impact of AIDS on maternal mortality.

Although group II had only 13% of inpatients, it contributed 17% of the total deaths. The number of inpatients and death rates in group II increased over the 15-year period covered. The death rate increased at the same rate as that of group I, suggesting progress into a double burden scenario of pre-transitional and non-communicable conditions. This is consistent with the WHO observation that, in Africa, the burden of non-communicable diseases continued to increase in tandem with communicable diseases.[12] However, the rate of progress into the double-burden scenario may differ from one country to the other. For instance, in 2003 group II was responsible for 15% of deaths, which was lower than the 37% reported in South Africa in 2000.[20] This is probably because Lesotho had a shorter life expectancy at birth (35.7 years, 2002) than South Africa (50.7 years, 2002),[12] and therefore fewer people reached old age to succumb to chronic non-communicable diseases. Secondly, Lesotho could have been lagging behind South Africa in epidemiological transition.

Group III had 30% of inpatients but contributed the lowest portion of deaths (10%). The number of inpatients declined slightly between 1989 - 1993 and 1999 - 2003, while the death rate rose marginally. Males accounted for 61% of injuries, indicating that they shoulder a heavier burden of injuries, as has been reported in South Africa (males 74%)[20] and estimated by the World Health Organisation (WHO) (males 70%).[12] The higher burden of injuries among males in Lesotho could probably be ascribed to their higher risk for, *inter alia*, road traffic accidents and interpersonal violence. Despite this stability, the WHO fears an exponential rise in road traffic-related injuries in developing countries and warns against complacency.[12]

CONCLUSION

The HIV/AIDS pandemic has had a huge impact on the inpatient mortality in Lesotho, and it has modified the trend in a similar way as reported in Zimbabwe and South Africa and as predicted by the ASSA 2000 prediction model. The ASSA 2000 model was used to make similar predictions in Lesotho. It appears that the AIDS burden is shifting from the hospitals to the homes and communities, which in turn may require additional resources to cope with the increasing demand. AIDS may be accelerating maternal mortality, but this requires further investigation. In addition, the pandemic in Lesotho is progressing into a double-burden scenario of pre-transitional and non-communicable conditions. The injuries-related burden has remained stable, although this cannot justify complacency.

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