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## Cost of mental and behavioural disorders in Kenya

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### Abstract

**Background:** The health and economic impact of mental and behavioural disorders (MBD) is wide-ranging, long-lasting and large. Unfortunately, unlike in developed countries where studies on the economic burden of MBD exist, there is a dearth of such studies in the African Region of the World Health Organization. Yet, a great need for such information exists for use in sensitizing policy-makers in governments and civil society about the magnitude and complexity of the economic burden of MBD. The purpose of this study was to answer the following question: From the societal perspective (specifically the families and the Ministry of Health), what is the total cost of MBD patients admitted to various public hospitals in Kenya?

**Methods:** Drawing information from various secondary sources, this study used standard cost-of-illness methods to estimate: (a) the direct costs, i.e. those borne by the health care system and the family in directly addressing the problem of MBD; and (b) the indirect costs, i.e. loss of productivity caused by MBD, which is borne by the individual, the family or the employer. The study was based on Kenyan public hospitals, either dedicated to care of MBD patients or with a MBD ward.

**Results:** The study revealed that: (i) in the financial year 1998/99, the Kenyan economy lost approximately US\$13,350,840 due to institutionalized MBD patients; (ii) the total economic cost of MBD per admission was US\$2,351; (iii) the unit cost of operating and organizing psychiatric services per admission was US\$1,848; (iv) the out-of-pocket expenses borne by patients and their families per admission was US\$51; and (v) the productivity loss per admission was US\$453.

**Conclusions:** There is an urgent need for research in all African countries to determine: national-level epidemiological burden of MBD, measured in terms of the prevalence, incidence, mortality, and, probably, the disability-adjusted life-years lost; and the economic burden of MBD, broken down by different productive and social sectors and occupations of patients and relatives.

### Background

"...mental health affects all spheres of human endeavour and that there is no health without mental health. ... Ministers (of Health at the 54<sup>th</sup> World Health Assembly) agreed that raising the level of awareness is the first priority. Policy-makers in government and civil society need to be sensitized about the

*huge and complex nature of the economic burden of MBD and the need for more resources to treat MBD.*"

Senator the Hon. Phillip C. Goddard, Minister of Health, Barbados [1].

The historical marginalization of mental health from mainstream health and welfare services in many countries has contributed to endemic stigmatization and discrimination of MBD people [2]. As a result, mental health has received low priority in health policy development, health services, psychiatric human resource development and resource allocation. Yet, worldwide, mental and neurological conditions account for a substantive proportion of the global burden of disease. For example, in 1999, neuropsychiatric disorders resulted in 911,000 deaths and a loss of 158.7 million disability-adjusted life-years (DALYs) among the 191 WHO Member States [3]. Approximately, 9% of those deaths and 10% of the lost DALYs occurred in the WHO's African Region. Of the latter DALY losses, 35.5% were attributed to unipolar major depression, 10.2% to bipolar affective disorder, 3.5% to psychoses, 11.6% to epilepsy, 13.2% to alcohol dependence, 2.3% to Alzheimer's disease and other dementia, 0.5% to Parkinson's disease, 0.7% to multiple sclerosis, 2.8% to drug dependence, 1.5% to post-traumatic stress disorder, 7.3% to obsessive-compulsive disorders, 3.4% to panic disorder and 7.6% to other neuropsychiatric disorders.

Groups at a higher risk of developing mental and behavioural disorders (MBD) include people with serious or chronic physical illnesses, children and adolescents with disrupted upbringing, people living in poverty or difficult conditions, the unemployed, female victims of violence and abuse, and the neglected elderly persons [2]. To these we would add victims of natural (e.g. floods) and man-made (e.g. civil wars) disasters, and those whose human rights are recurrently violated.

The economic impact of MBD is wide-ranging, long-lasting and large [2]. It includes: the cost of organizing and operating mental health-related services; the impact on the families' and care-givers' resources; the expenses related to crimes caused by the MBD; the productivity losses due to debility, morbidity and premature death; and the psychological pain borne by the patients and their family members. A number of researchers, mainly from developed countries, have estimated the aggregate economic costs of MBD. Osterhaus *et al.* [4] estimated that mental disorders costed the USA about US\$42.3 billion in 1990. Rice *et al.* [5] estimated that mental disorders accounted for approximately 2.5% of the gross national product per year in USA. Meerding *et al.* [6] estimated that 23.2% of total annual health service expenditure in Netherlands goes to the treatment of mental disorders. Patel and Knapp [7] estimated that inpatient treatment of mental disorders accounts for 22% of the annual national health service expenditure in UK. Unfortunately, unlike in North America and Europe, there is a dearth of studies that have attempted to estimate the economic burden of MBD in the African Region [8].

This article focusses on the economic burden of MBD. It attempts to answer the question: From the societal perspective (specifically the families and the Ministry of Health), what is the total cost of MBD patients admitted to various public hospitals in Kenya? The specific objectives were to estimate: (a) the direct costs, i.e. those borne by the health-care services and the families in directly addressing the problem; and (b) the indirect costs, i.e. mainly the losses in productivity caused by the disease, borne by the individual, the family or the employer.

## Methods

### Study site

Like elsewhere in the African Region where the prevalence and extent of poverty is high, MBD is a major public health problem in Kenya. It is estimated that over 30% of the people attending health facilities in the country suffer from some form of MBD, with many of them going largely unrecognized and receiving inappropriate treatment [9]. A majority of MBD patients are treated at the Mathare Psychiatric Hospital and in general hospitals with psychiatric wards, e.g. in Kakamega, Nakuru, Murang'a, Nyeri, Machakos, Mombasa, Kisumu, Eldoret and Gilgil. The Mathare Hospital is the largest psychiatric facility in the country with 1,043 beds, of which 61% are general care beds and 39% maximum security beds. In 1999, a total of 5,678 inpatients (49% of whom were female) were treated at the aforementioned hospitals. About 24% of them were hospitalized at the Mathare Psychiatric Hospital; 42%, 52% and 6% of the patients fell within the age brackets of 10–25 years, 25–49 years and 50 years and above respectively. Nearly 4.5% of the patients died during treatment [10]. The estimates of the economic burden reported in this study are based on the 5,678 inpatient cases of MBD.

### Conceptual framework

#### Definition of costs estimated

The economic burden of MBD comprises direct costs, indirect costs and intangible costs. Direct costs has two strands. Firstly, the costs to the government of organizing and operating psychiatric hospital services: personnel remunerations (including salaries and fringe benefits); travel; transport operations; materials (e.g. consumable materials, uniforms, hospital linen, stationery, medical records); drugs; non-pharmaceutical supplies (e.g. dressings and other disposable inputs); administration (including expenses of boards, committees and conferences); utilities (i.e. electricity, water, telephone, postage and conservancy); kitchen (including food and gas expenses); diagnostics (clinical laboratory and imagery); maintenance (of vehicles, equipment and buildings); rents and rates; and capital costs (i.e. purchase of vehicles, beds, equipment and buildings) [11]. The capital items were annuitized assuming a useful life span of 30 years for buildings, 10 years for equipment and vehicles [12]. A

10% discount rate was used to annuitize capital costs. It is the rate that has been used in other costing studies undertaken in Kenya [12,13]. Thus, the annual equivalent costs for buildings, equipment and vehicles were obtained by dividing their replacement values by the appropriate annuity factors. Secondly, the out-of-pocket expenses borne by the patients and their families, including: return-journey bus fare for patients, accompanying persons and visitors; lunch and dinner expenses when visiting patients; accommodation expenses during visits; user fees for treatment; X-ray fees; laboratory tests fees; official mortuary fees and informal mortuary attendants' payments (for patients who die during treatment); and funeral expenses, e.g. transportation of bodies and the accompanying people [14].

The indirect costs consist of opportunity cost of time lost due to morbidity and premature mortality. The morbidity-related component includes the productivity losses of time invested by patients in pre-admission consultations, travel to and from hospitals, waiting for admission, and during institutionalized treatment; by relatives accompanying patients during pre-admission consultations, travel to and from hospitals accompanying patient(s), waiting for patients to be admitted, and visiting patients after admission. The confirmatory diagnostic tests are performed after admission. Thus, the diagnostic, treatment, side-effects monitoring and treatment times are all captured within the duration of stay [14].

The premature mortality-related cost component is equal to the lost work-years due to premature death (i.e. national retirement age minus age at death) times average remuneration per year. A casual labour wage rate of US\$1.00 per day (which is also equivalent to the international poverty line) was used for valuing all the lost labour time.

Intangible costs refer to welfare losses due to the physical and psychological pain. Due to the stigma attached to MBD, the related psychic and social costs to the affected families can be profound. For example, in most Kenyan communities, most people are very reluctant to marry into families with a history of MBD. As a result, many young men and women from families with a history of MBD often find it difficult to get marriage partners. Time constraints prohibited the collection of willingness-to-pay data that would have facilitated the estimation of intangible costs.

*Analytical model*

The total economic cost (TEC) incurred by MBD patients and relatives can be expressed as follows:

$$TEC = DC + IC + ITC \dots\dots\dots (1)$$

where: DC is direct cost, IC is indirect cost (which is productivity loss) and ITC is intangible cost (including physical and psychological pain).

The total direct cost (DC) was estimated using equations 2 to 10:

$$DC = COO + OoPE \dots\dots\dots (2)$$

where: COO are the total costs borne by government in operating and organizing mental hospital services; and OoPE are the out-of-pocket expenses borne by patients, family members and relatives.

$$COO = P + FB + TOE + TE + U + BCC + DR + FO + NP + MA + ME + RR + KC \dots\dots\dots (3)$$

where: P is personnel remunerations; FB is fringe benefits; TOE is transport operating expense; TE is travel expense; U is cost of utilities; BCC is the expense of hospital boards, committees and conferences; DR is the cost of drugs; FO is the cost of food and cooking gas; NP is the cost of non-pharmaceutical supplies; MA is the cost of materials; ME is the cost of vehicles, equipment and building maintenance; RR is the rent and rates; and KC is the annual equivalent cost of capital items. The raw data for COO components was obtained from the Government of Kenya [11] recurrent and development expenditure estimates.

$$OoPE = L + D + A + F + UF + OF \dots\dots\dots (4)$$

where: L is lunch cost during visits, D is visitors' dinner cost, A is visitors' accommodation cost, F is travel cost (bus fare), UF is the average user fees, and OF is other fees;

$$L = NA \times NL \times NVs \times CL \dots\dots\dots (5)$$

where: NA is the number of admissions, NL is the number of lunches per trip, NVs is the number of visits, and CL is the average cost per lunch;

$$D = NA \times ND \times NVs \times CD \dots\dots\dots (6)$$

where: ND is the number of dinners per trip, NVs is the number of visits, and CD is the average cost per dinner;

$$A = NA \times NV \times NVs \times NN \times CN \dots\dots\dots(7)$$

where: NV is the number of visitors, NN is the number of nights spent in a town where a hospital is situated, and CN is the average cost per night;

$$F = NA \times NV \times NVs \times CF \dots\dots\dots(8)$$

where: CF is the average return fare per person per visit;

$$UF = NA \times ALS \times UFPD \dots\dots\dots(9)$$

where: ALS is the average length of hospitalization in days and UFPD is the average user fees per day; and

$$OF = NA \times OF_{ALS} \dots\dots\dots(10)$$

where:  $OF_{ALS}$  is the other fees per average length of stay.

The total indirect costs (IC) were obtained using the following algorithm:

$$IC = L_H + L_V \dots\dots\dots (11)$$

where:  $L_H$  are the productivity losses due to work days lost by patients and  $L_V$  is the productivity loss due to the work-time lost by relatives accompanying and visiting patients;

$$L_H = NA \times ALOS \times WR \dots\dots\dots (13)$$

where: WR is the wage rate per hour or day; and

$$L_V = NA \times NV \times NVs \times TV \times WR \dots\dots\dots (14)$$

where: TV is the time spent by a visitor per visit. This includes the time spent travelling, waiting and socializing with a patient at a hospital.

The total intangible costs (ITC) were not estimated in this study. The estimations for out-of-pocket expenses and productivity losses incurred by patients and their families were based on two sets of assumptions: first, those related to patients from within the district where the hospital is situated; and second, those related to patients admitted from other districts. Both sets of assumptions are contained in the Appendix. Those assumptions are based on past Kenyan health facility-based studies [9,14].

**Limitations of the study**

*(a) Omission of intangible costs*

Due to research resource constraints, data used in this study were obtained mainly from secondary sources. Thus, it was not possible to collect willingness-to-pay data that would have facilitated the estimation of intangible costs, i.e. the costs of physical and psychological pain and loss of leisure time. However, they can potentially be estimated using the following algorithm:

$$ITC = NA \times WTP \dots\dots\dots(15)$$

where: NA is as defined previously and WTP is the average amount of money (or its equivalent in goods or services) that each patient's family would be willing to pay for an intervention that would obviate any form of MBD, and hence the associated stigma and pain. Readers who are

interested in knowing how to elicit WTP values in an African context can refer to Kirigia, Sambo and Kainyu [15].

*(b) Use of casual-labour wage rate to value lost labour time*

A casual-labour wage rate of US\$1.00 per day was used in valuing all the lost labour time. This may have led to an underestimation of the economic burden since the patients admitted in various hospitals were likely to have belonged to a wide range of occupations, e.g. peasant farmers, civil servants, private sector employees, self-employed (business people), housewives, students, unemployed, etc. However, the extremes may have been modified by the fact that we did not adjust the estimated figures by the rate of unemployment. We were reluctant to make the adjustment since even those who were voluntarily unemployed attached a lot of value to their leisure time. In fact, economists have suggested that it would take double the normal wage rate to induce such people to trade off their leisure for paid work.

*(c) Omission of economic burden imposed by non-institutionalized MBD patients*

Although the current study focussed mainly on an estimation of the economic burden emanating from the institutionalized MBD patients, the same methodology could be extended to non-institutionalized patients.

The cost of labour time lost per occupational category per year will be equal to the days of work lost in a typical month due to MBD, plus the days worked in a typical month with MBD symptoms, times the per cent productivity on the days worked with MBD symptoms (assuming normal productivity is 100%), times the daily earnings for an individual within an occupational category (4,16). Algebraically, this can be expressed as follows:

$$LTC = [MD + (DWS \times PRO)] \times WR \times MO \dots\dots\dots (16)$$

where: LTC is the cost of the labour time lost by outpatient MBD patients; MD is the number of the days of work missed in a typical month due to MBD; DWS is the number of the days worked in a typical month with MBD symptoms; PRO is the productivity loss, i.e. 100% minus the per cent productivity on the days worked with MBD symptoms; WR is the average daily earnings for an individual within an occupational category; and MO is 12 months per year.

*(d) Omission of economic costs incurred by MBD patients seeking care among traditional medicine practitioners*

MBD occurrence in the African Region is commonly associated with local cultural values and various beliefs (including religion, magic, ancestral spirits). In this context, majority (although the exact number is unknown) of MBD patients, particularly in rural areas, seek care from

**Table 1: Annual cost of operating and organizing psychiatric services in Kenya (1 US\$ = Ksh. 65 in 1998/99)**

Cost items	Cost (US\$)	Percentage
Personnel salaries	4,837,527	46.11
Fringe benefits	1,569,495	14.96
Transport operating expenses	39,867	0.38
Travel expenses	26,228	0.25
Utilities	281,166	2.68
Hospital boards, committees & conferences	17,835	0.17
Drugs	568,627	5.42
Food & cooking gas	750,126	7.15
Non-pharmaceutical supplies	118,551	1.13
Materials	257,036	2.45
Maintenance	91,274	0.87
Rents and rates	77,635	0.74
Annual capital cost	1,855,907	17.69
<b>TOTAL COST</b>	<b>10,491,275</b>	<b>100</b>

traditional medicine practitioners, e.g. traditional 'priests' (diviners and rainmakers), herbalists, magicians, sorcerers. Usually, such patients, majority of whom are poor, pay the cost of treatment in-kind, e.g. chicken, goats, cereals. This study did not estimate the economic cost incurred by MBD patients that sought care among traditional medical practitioners.

### Results

Table 1 provides an itemized schedule of various costs of operating and organizing (COO) hospital psychiatric services during the Kenya Government's financial year 1998/99. The COO amounted to US\$10,491,275, out of which 82.3% constituted recurrent costs and 17.7% capital costs. Personnel-related expenses, drugs, kitchen (food and gas), and utilities accounted for 61%, 5%, 7% and 3% respectively.

Table 2 presents a summary of the direct and indirect costs. The cost of operating and organizing inpatient psychiatric services in public hospitals amounted to US\$10.5 million per year.

The total out-of-pocket expenses (OoPE) borne by patients and their relatives was US\$289,846.

The indirect costs (IC) added up to US\$2,569,719. Ninety-two per cent of the total productivity losses were attributed to premature mortality and 8% to the time lost through hospitalization of MBD patients.

The grand total economic loss (i.e. COO plus IC) attributable to the 5,678 admissions due to MBD at various public hospitals in Kenya was US\$13,350,840.

### Discussion

The key findings of this study were:

- The unit cost of operating and organizing psychiatric services (COO) per admission was US\$1848 (i.e. US\$10,491,275 divided by 5,678 inpatients).
- The out-of-pocket expenses (OoPE) borne by patients and their relatives per admission were US\$51 (i.e. US\$289,846 divided by 5,678 inpatients).
- The productivity loss per admission was US\$453 (i.e. US\$2,569,719 divided by 5,678 inpatients).
- The direct and indirect costs constituted 81% and 19% of the total economic burden of MBD.
- The total economic cost of MBD per admission was US\$2,351 (i.e. US\$13,350,840 divided by 5,678 inpatients).

The grand total economic cost attributable to the 5,678 MBD admissions at various Kenyan hospitals constituted approximately 10% of the Ministry of Health's total recurrent expenditure in 1998/99. This is an enormous loss in a country where 50% of the population live on less than US\$1 per day and 56% of the population have no access to safe drinking water and 15% have no access to adequate sanitation facilities (17).

The readers will recall that 23.2% of total annual health service expenditure in Netherlands [6]; and 22% of the annual national health service expenditure in UK [7] goes to the treatment of mental disorders. Thus, in comparative terms, the Kenyan estimate of 10% of the Ministry of Health budget is lower than that of the Netherlands and

**Table 2: Direct and indirect costs of MBD (1 US\$ = Ksh. 65 in 1998/99)**

<b>Cost components</b>	<b>Cost (US\$)</b>	<b>Percentage</b>
<b><u>Direct costs:</u></b>		
(1). Total cost of operating and organizing psychiatric services	10,491,275	78.6
(2) Out-of-pocket expenses borne by patients and family members	289,846	2.2
<b><u>Indirect costs:</u></b>		
(1) Value of productivity lost by patients and family members due to MBD morbidity	203,840	1.5
(2) Value of productivity lost through premature mortality of MBD patients	2,365,879	17.7
<b>TOTAL COST</b>	<b>13,350,840</b>	<b>100.00</b>

the UK. This difference could be attributed to two factors. Firstly, there is evidence that many of MBD patients in Kenya go largely unrecognized and/or wrongly diagnosed and receiving inappropriate treatment in the non-psychiatric health facilities [9]. Secondly, the current study omitted the economic burden imposed by non-institutionalized MBD patients who are treated in health centres, public hospitals outpatient departments, profit and not-for-profit private hospitals and traditional medical practitioners clinics.

### Conclusion

This study, in spite of its limited scope, has demonstrated that MBD imposes a substantive economic cost on the country. And, although the current study focussed mainly on an estimation of the economic burden emanating from the institutionalized MBD patients, it has demonstrated how the same methodology could be extended to non-institutionalized patients.

Given the high degree of ignorance about the magnitude of the epidemiological and economic burdens of MBD in sub-Saharan Africa, there is an urgent need for research to determine:

- national-level epidemiological burden of MBD, measured in terms of its prevalence, incidence, mortality and, probably, disability-adjusted life-years lost;
- national-level economic burden of MBD, broken down by different productive and social sectors and occupations of patients and relatives; and
- costs and consequences of alternative treatments, prevention of MBD and promotion of mental health to facilitate use of more cost-effective strategies and informed choice of interventions.
- proportion of MBD patients seeking care from traditional medicine practitioners and the reasons for such a choice of source of care.

### Competing interests

None declared.

### Authors' contributions

JMK entered the data, participated in the methodology development, analysis and drafting of sections of the document. LGS participated in the development of the methodology, drafting of sections of the manuscript and coordination of the entire study.

### Appendix: assumptions

The assumptions presented below are based on studies undertaken in Kenya [9,14].

*Assumptions related to patients from within the district where the hospital is situated:*

- 60% of inpatient admissions are from the district where a hospital is situated;
- each patient is accompanied by two adults when being taken for admission;
- each patient will, on average, spend 29.9 days in the hospital;
- each patient and the two accompanying adults will spend a total of 8 hours each, i.e. including seeking doctor's/magistrate's recommendation for admission, travel time and waiting for admission. During the visit a total of US\$9 will be spent on lunch (i.e. US\$3 per person);
- each patient will have a one-day visit by two relatives / friends during the length of his/her stay. During the visit a total of US\$9 will be spent on lunch (i.e. US\$3 per person);
- return journey public transport fare is US\$0.77 per person; and

G. wage rate per hour is US\$0.125 per hour.

*Assumptions related to patients admitted from other districts:*

- A. 40% of inpatient admissions are from other districts;
- B. each patient is accompanied by two adults when being taken for admission;
- C. each patient will, on average, spend 29.9 days in the hospital;
- D. each patient and the two accompanying adults will spend a total of 16 hours each, i.e. including seeking doctor's/magistrate's recommendation for admission, travel time and waiting for admission;
- E. the two accompanying relatives will spend a night in the town where the hospital is located. Thus, each will incur a hotel accommodation and breakfast cost of US\$8, lunch cost of US\$3, and dinner cost of US\$3;
- F. each patient will have a one-day visit by two relatives / friends during the length of his/her stay;
- G. return journey public transport fare is US\$7.7 per person; and
- H. wage rate per hour is US\$0.125 per hour.

*Assumption related to the MBD patients*

We are assuming that all the 5678 cases reported in this study fall within the mental and behavioural disorders defined in ICD10 [18].

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