

Original article

Causes of child mortality in Gondar hospital, Ethiopia

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Abstract: During a five year period (1987-1992), a total of 656 childhood hospital deaths, between the age of days and 15 years were registered in the Paediatrics Department, Gondar College of Medical Sciences. Protein-energy malnutrition (24.5%), bronchopneumonia (12.2%), pyogenic meningitis (8.4%), septicemia (7%) and disseminated tuberculosis (6.1%) were the five primary leading causes of death. Four hundred eighty five (73.9%) of the deaths occurred in children under five years of age. Two hundred seventy (41.2%) children were admitted in a moribund state and died within 24 hours of admission. [Ethiop. J. Health Dev. 1996; 10(3): 145-148]

Introduction

Ethiopia still has very high infant and child mortality rates of 123 and 208 per 1,000 live births, respectively (1). The World Health Organization (WHO), through primary health care activities (2), has a target to reduce the under-five mortality rates by the year 2000 to 70 per 1,000 live births (1). On the other hand, the absence of the most elementary data on mortality has become a common feature in many developing countries making monitoring and evaluation of health interventions difficult. But, with due regard to their limitations, hospital-based mortality statistics, are useful indicators and can be utilized as basis for planning, implementing and monitoring of health services. Although these data do not reflect the true community or regional childhood diseases patterns, they can still be of use in identifying major local problems and serve as measuring tools in redirecting the health facilities (resources) to these problems. The aim of the present study is to provide information on the pattern of mortality among hospitalized children whose deaths were medically attended and certified. The major causes of death, their seasonal patterns and relationships with age, sex and hospital stay are discussed. Comparisons of the data with other previous studies in Ethiopia and outside are attempted. It is hoped that the information generated will help to improve child survival in the region.

Methods

All children who died between 11th September 1987 and 10th September 1992 at Gondar College of Medical Sciences (GCMS), Paediatrics Department, are included in this study. Gondar College of Medical Sciences is a teaching and referral hospital with 350 beds catering for nearly three million population in Northwest Ethiopia, The paediatrics department has an ambulatory service and a 65 bed in patient ward with 100% occupancy. Information on year, month of admission, age, sex, address, duration of stay and causes of death were obtained from patient's clinical records and in-patient registry books. Complete blood count (CBC), cerebrospinal fluid (CSF) cell count and culture, blood culture, urinalysis, stool microscopic examinations, Mantoux test and chest x-rays were used when necessary to support the diagnosis. Wellcome classification was used for assessment of nutritional status (3). Severe forms of protein-energy malnutrition, (PEM), kwashiorkor, marasmus, marasmic kwashiorkor were also taken as leading causes of death. Children weighing more than 80% of the expected 50th centile (Harvard) were classified as well nourished. Underweight was not considered a primary cause of death. The final diagnoses were further validated by a consensus of doctors' opinion during death report discussions. Whenever laboratory findings were missing, diagnoses

were ascertained based primarily on clinical ground. Of the multiple diagnoses listed and documented by the physician who attended the death the first three categories of diagnoses (primary , secondary, tertiary) in the order of their contributions towards the child's hospitalization and death were

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re-registered for this analysis. There were 6370 admissions and 656 deaths in the five-year period. One hundred seventy one patients and majority of them in the moribund state were discharged against medical advice and were excluded from the study. Epi info version 5.0 software was used for analysis.

Results

During a five year period a total of 656 childhood deaths, aged between 3 days and 15 years (mean age 40 months) were registered. Table I shows monthly distribution of admissions and deaths. The highest number of patients were admitted in the month of October (after the rainy season) and the lowest were admitted in July (during the heavy rainfall). Deaths were very high in November (12.5%) following the high number of admissions in October. The death frequencies were low in June (when the rainy season commences). Distribution of deaths according to the age and sex is shown in Table 2. Of the total deaths 36.1% and 73.9% occurred below one year and five years of age, respectively, with male preponderance (1:0.74). The five leading causes of death were severe protein-energy malnutrition (kwashiorkor, marasmus, marasmic kwashiorkor (24.5%), septicemia (13%). broncho-pneumonia (12.1 %), bacterial meningitis (8.4%) and disseminated tuberculosis (6.1%) (Table 3). Neonatal deaths contributed to 14.3% (94/656) of the total deaths (Table 4). Septicemia, meningitis, prematurity , tetanus and pneumonia accounted for 92.5% of these neonatal deaths. October and November were the peak months for which deaths due to proteinenergy malnutrition and broncho-pneumonia were recorded (Figure 1).

Table 1: Monthly distribution of admissions and deaths at GCMS, Paediatrics Department, Gondar. Ethiopia, 1987-1992.

	admissions	deaths	Percentage
sept.	569	54	9.4
oct.	708	78	11
nov.	650	81	12.5
Dec.	524	52	9.9
Jan.	471	57	12.1
feb.	518	51	9.8
Mar.	511	46	9
Apr	484	40	8.2
May.	583	66	11.3
jun	449	36	8
jul.	384	44	11.5
Aug.	519	51	9.8
	6370	656	

Table 2: Age and sex distribution of 656 deaths at GCMS. Paediatrics Department, Gondar, Ethiopia, 1987-1992.

Age (Months)	Male n(%)	Female n(%)	Total	%	Cum. %
0-11	146 (61.6)	91 (38.4)	237	36.1	36.1
12-23	46 (48.2)	49 (51.8)	95	14.5	50.6
24-35	35 (51.4)	33 (48.6)	68	10.4	61.0
36-47	26 (57.7)	19 (42.3)	45	6.9	67.9
48-59	22 (55)	18 (45)	40	6	73
> 60	102	69	171	26.1	100
Total	377 (57.5)	279 (42.5)	656	100	

Table 3: Distribution of deaths from five primary leading causes GCMS, Paediatrics Department, Gondar, Ethiopia, 1987-1992.

Age (Months)	**PEM	Speticema	B. Pneum.	Meningitis	Diss. TB
0-11	32	59	39	30	2
12-23	46	11	11	3	1
24-35	39	5	5	3	3
36-47	14	-	14	4	1
48-59	15	3	6	1	4
>=60	15	7	5	14	29
Total	161	85	80	55	40
%	24.5	13	12.1	8.4	6.1

* Includes neonatal septicemia 42/85 (49.4).

** PEM = Protien energy malnutrition.

Table 4: Causes of death in newborns at GCMS, Paediatrics Department, Gondar, Ethiopia, 1987-92.

Causes of death	No. of cases	%
Sepricemia	42	44.7
Preterm, LBW	16	17.0
neonatal tetanus	12	12.8
cong. pneumonia	10	10.6
meningitis	7	7.4
Others	7	7.4
Total	95	99.9

LBW = Low birth weight

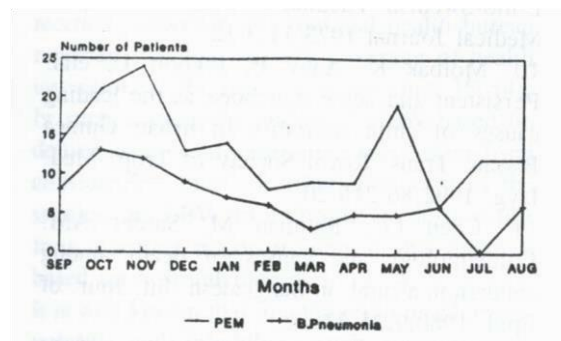


Figure 1 .Seasonal distribution of death. due to PEM and B. Pneumonia at GCMS. PEDS. DEPT Gondar. Ethiopia. 1987-1992.

Discussion

In developing countries, despite the presence of high mortality amongst infants and children (1), the actual data are not readily available for health planning, interventions and monitoring. A few techniques, including verbal autopsy methods, used in community-based studies are found to be helpful in obtaining information of

death (4). When both time and fund are lacking for large scale studies, mortality data from health institutions can still serve the purpose with obvious limitations. Some hospital mortality studies have also shown good agreement with community studies in reflecting the cause of death in children (5). During the study period (1987-1992), there were 656 deaths out of which 485 (73.9%) were in children under five years of age. The

overall mortality rate of 10.3%, was comparable to hospital based studies of Senegal's 9.8% (6) Zimbabwe, 9.1% (7) and Nigeria's 9.9% (8). It was lower than the Ethio-Swedish Children's Hospital (Ethiopia), 20.8%, which was reported twenty years ago (9).

Disease patterns contributing to death are not different from the patterns described from other developing countries. Pneumonia, diarrhoeal disease, protein-energy malnutrition and measles are found as the major causes of death in children under five (4, 10, 11) in either hospital or community-based studies. In hospital-based studies in Zimbabwe (7) and Nigeria (8), pneumonia and PEM are the two leading causes of death, similar to the findings from the Gondar hospital.

In the present study, PEM was directly responsible for 24.5% of deaths compared to 23% in Nigeria (8) and 28.9% in Zimbabwe (7). The risk of death from malnutrition was high between 12 and 36 months of age (52.8%), which is well within the traditional weaning period. The seasonal pattern of admissions and deaths (after the rainy season) due to PEM seems to be related to the low intake of staple food during the rainy season and this appears to hold true particularly for kwashiorkor. Pneumonia, which is the 3rd most commonest cause of death particularly in the first two years, has peak presentation September, October and November. The similar seasonality pattern both in PEM and broncho-pneumonia are pretty helpful for timely planning and intervention.

Deaths during neonatal period contributed to 14.3% of the total deaths which is lower than the report from Zimbabwe's 24.1% (7) and Ethio-Swedish Children Hospital's 30.8% (9). The low death rate is not attributable to the presence of optimal neonatal service but very few neonates were brought to medical services in Gondar Hospital. Septicemia, prematurity and tetanus are the three leading causes of death in newborns in this study. Lack of adequate immunizations, particularly during antenatal period, poor umbilical cord care and harmful traditional practices (e.g:uvulectomy) (12) could also be considered as the major contributing factors for neonatal tetanus of which none of the patients survived during clinical observations.

Although there are many limitations in hospital-based data, some conclusions and recommendations can still be drawn. As the major causes of child death of the Gondar Hospital (Ethiopia) are preventable, under-five clinics with all preventive, promotive and rehabilitative activities need to be strengthened, Provision of health education (against harmful traditional practices) and provision of immunization during antenatal period (against tetanus) require special priorities. Delivery of neonatal care service should not be delayed. Hospital-based morbidity and mortality data should continue to be recorded as these data can provide insight on disease trends, on optimizing the overall cost-effectiveness of child health programs and can also help in designing new approaches all strategies.

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