Available online at www.sciencedirect.com
ScienceDirect
Pathology – Research and Practice 205 (2009) 608–614
PATHOLOGY RESEARCH AND PRACTICE
www.elsevier.de/prp

ORIGINAL ARTICLE

Most common causes of natural and injury-related deaths in Addis Ababa, Ethiopia ☆

Tufa Gemechu[a], Mihrete Tinsae[a], Senait Ashenafi[a], Victor Manuel Rodriguez[b], Alfredo Lori[b], Michelle Collins[c], Rosemary Hurford[d], Rahel Haimanot[e], Melissa Sandoval[d], Enawgaw Mehari[e], T. Dianne Langford[f,*]

[a] *Addis Ababa University, Faculty of Medicine, Department of Pathology, Addis Ababa, Ethiopia*
[b] *Menelik II Hospital, Department of Forensic Pathology, Addis Ababa, Ethiopia*
[c] *Yale University School of Medicine, New Haven, CT, USA*
[d] *University of California San Diego, School of Medicine, Department of Pathology, La Jolla, CA, USA*
[e] *People to People, Inc., Morehead, Kentucky, USA and Addis Ababa, Ethiopia*
[f] *Department of Neuroscience, Temple University School of Medicine, Philadelphia, PA 19122, USA*

Received 17 December 2008; received in revised form 4 February 2009; accepted 13 February 2009

Abstract

In Ethiopia, like many developing countries, autopsy is rare unless conducted in the medico-legal arena, making vital statistics that include pathological diagnoses sparse. To determine the most common factors contributing to death among individuals who died from natural or injury-related events in Ethiopia 200 consecutive autopsies were conducted in 2006 at the Forensic Medico-legal Pathology Department, Menelik II Hospital, Addis Ababa, Ethiopia. The results describe significant pathological observations, putative cause of death, age distribution, and gender ratios. Eighty-one percent of the cases were male, and the mean age was 38.9 ($\pm$15.5 years). Fifty-two percent of the individuals died from natural causes, including infections, and 48% died from injury-related events. In the natural deaths group, as determined by gross examination at autopsy pulmonary complications were the most commonly reported cause of death, with suspected tuberculosis accounting for 12%. Tuberculosis (21, 8%) and liver disease (14, 5%) were the most common histopathological findings in the natural and injury-related causes groups, respectively. In the injury-related group, automobile accident was the most common cause of accidental death (80%), and homicide by beating was the most common cause of death in the intentional injury group (31%). These data provide valuable unbiased analyses of causes of death among individuals in Addis Ababa, Ethiopia.

Keywords: Autopsy; Cause death; Pathology

Introduction

Numerous studies describe the use of verbal autopsy to ascertain the cause of death in resource-limited settings where more precise means such as clinical autopsy and vital registration are scarce [1–3]. A verbal autopsy is an indirect method of finding out the cause of

☆ Funding: National Institutes of Neurological Disease and Stroke (R21NS055639 to T.D.L), Minorities Health and Health Disparities Research Programs, National Institutes of Health (T3700067 to M.C.), National Institutes of Mental Health (the Center for AIDS Research at UCSD (Developmental award to T.D.L. from the HNRC Center Award P30 MH62512 to Igor Grant)).
* Corresponding author.
E-mail address: tdl@temple.edu (T.D. Langford).

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doi:10.1016/j.prp.2009.02.007

a death, based on an interview with next of kin or other caregivers regarding symptoms, signs, and circumstances preceding death [4]. However, misclassification of cause of death presents a significant problem, and a high degree of variability for classification exists among sites [5]. Moreover, when cause of death statistics are collected strictly from hospital settings, the results tend to be biased since hospital populations are not representative [6]. Studies addressing the validity of verbal autopsy point out the need for models that consider populations with variable patterns of cause-specific mortality. In systems where community-based verbal autopsy interviews are utilized, vital registration is not maintained [1,2,5,7]. Thus, in these communities, there exists a need to improve the specificity and sensitivity of classification systems for cause of death.

In 1984, in one of the few and perhaps one of the best documented reports of autopsy findings in Addis Ababa, Gebre-Selassie analyzed 256 autopsies conducted at Addis Ababa Faculty of Medicine in Black Lion Hospital [8]. Results from these studies indicated that in 66.4% of the cases, clinical diagnoses were confirmed by autopsy, 31.2% revealed a different diagnosis, and 2.4% were inconclusive. These results clearly demonstrate the value of autopsy in developing regions to support clinical observations and advance epidemiological studies.

Methods

Data in this report are based on information collected from a study to determine the most common causes of natural and injury-related deaths from consecutive 200 adult autopsy cases received during a 2-month period by the Forensic Medico-legal Pathology Department at Menelik II Hospital in Addis Ababa, Ethiopia. Exclusion criteria were a postmortem time exceeding 24 h, individuals under the age of 18, and incomplete information from police reports or clinical sources. Subjects included individuals that died in the hospital or health clinic while receiving treatment and those that died outside of the hospital. A police report, clinical information, or both accompanied each case. Cases were categorized as either natural or injury-related deaths. Deaths from natural causes were classified as those resulting from documented pre-existing illnesses or an acute event (e.g., myocardial infarction) as determined by gross observations at autopsy. Injury-related deaths included accidental (automobile, falls), intentional (suicide, homicide), or those from an undetermined source of trauma, as previously described [9].

Histopathological analyses were conducted at Addis Ababa University Faculty of Medicine, Department of Pathology. For these studies, tissue blocks (approximately 2.5 cm^2) from the spleen, liver, lung (lower right lobe), peri-bronchial lymph nodes, adrenals, and brain (frontal cortex/white matter, basal ganglia/lenticular nucleus, hippocampus and spinal cord) were obtained from each case. Blocks were fixed in 10% formalin and processed for histological analyses. Paraffin blocks were serially sectioned and stained with hematoxylin and eosin for pathological examination. Histological diagnosis of Tuberculosis was verified by acid-fast staining as described by Bibbo and Day [10]. The Federal Democratic Republic of Ethiopia, Ethiopian Science and Technology Commission, and the Universities of California and Temple Human Subjects Research Protection Program approved all studies.

Results

Of 200 autopsies conducted, 12 were excluded due to age, >24 h postmortem interval, or lack of information regarding circumstances of death or missing data in the final autopsy report. Age of subjects included in the study ranged from 18 to 82, with a mean of 38.9 years and a median of 35 years (Table 1). Of the 188 cases included in this report, 152 were male (81%). Death in 98 cases (52%) was reported to have resulted from natural causes and in 90 cases from injury (48%) (Table 1). The mean age in the natural causes group was 42.6 ± 15.2 years (median 40 years) (Table 2). The mean age for intentional injury-related deaths was 34 ± 9.6 (median 32.5 years), and 35 ± 13.5 years (median 30 years) for accidental injury-related deaths (Table 3).

Sixty percent of all cases were reported as having signs of chronic illness, 20% of which were suspected of having some type of CNS infection, 45% suspected of *Tuberculosis* infection with pneumonia, and 4% and 7%

Table 1. Demographics and pathological findings from all cases.

Case demographics ($n = 188$)	
Mean age (years)	38.9 ± 15.5[a]
% Male	152 (81%)[b]
Natural cause	98 (52%)
Injury related (accidental and intentional)	90 (48%)
Pathological observations reported at autopsy by gross examination ($n = 188$)	
Suspected chronic illness	112 (60%)
Suspected CNS infection	37 (20%)
Suspected pulmonary TB[c] with pneumonia	84 (45%)
Cachexia	8 (4%)
Cardiac disease	14 (7%)

[a] ±, standard deviation years.
[b] Percent of total cases.
[c] *Tuberculosis*, TB.