Review Article

All-cause Mortality among Elderly Patients Admitted to the Medical Wards of Hospitals in Africa: A Systematic Review

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Abstract

Geriatric medicine as a speciality is just evolving in Africa. There is scanty data on the mortality and associated factors among elderly patients admitted to the hospital medical wards in Africa. The objective of this review was to identify, describe, and analyze systematically the available studies on all-cause mortality and associated factors among elderly patients admitted to the medical wards of a hospital in Africa. Online and hand-based systematic searches were conducted for literature (primary and secondary) describing the mortality in elderly patients admitted to the medical wards of a hospital in Africa. These included original research, review articles, proceedings, and transactions from 1969 to 2014. All identified studies were screened using the Population, Intervention, Comparison, and Outcomes criteria. Five studies describing 3427 hospitalized elderly patients reported 773 deaths giving an unadjusted proportion of admissions which resulted in in-hospital deaths of 22.6% (range: 6.8–44.7%). This was higher among the males (38.8–48.0%) compared with the females (29.4–40.7%). There was no significant association between the age and mortality. Mortality was high among patients who had stroke, meningitis, septicaemia, renal failure, chronic liver disease, chronic obstructive pulmonary disease, severe asthma, and heart failure. High mortality was associated with high serum creatinine and urea, tachycardia, reduced length of stay from admission to death, and low serum protein. In conclusion, the few available data showed high unadjusted all-cause mortality among hospitalized elderly patients in Africa. More studies are needed in Africa to quantify this health burden and identify the major factors causing the high mortality in elderly patients.Key words: Africa, elderly patient, medical ward, mortality, systematic review

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INTRODUCTION

In-hospital admission and mortality of elderly patients is high globally and is increasing, especially in Africa. This increase is due to the increasing proportion of the elderly in many communities. The proportion of elderly people in Africa is lower (4%) than the proportion for the global population (8%) and the proportion in developed countries (17%).[1] Africa has the highest rate population growth with projections estimating that the continent will double her elderly population between 1998 and 2050 unlike the one-third growth in the elderly population projected for developed countries during the same period.[2,3] Most countries in Africa are in the stage 2 of the demographic transition (falling death rate and high birth rate), resulting in increasing the proportion of the elderly people within an expanding population.[4]

Hospitalization for medical illnesses is considered to be a risk factor for death among elderly people, because it is associated with adverse effects including nosocomial infections, loss of independence and autonomy, disability, social isolation, and iatrogenic conditions.[5] Hospitalization results in progressive functional, physical, and cognitive decline of the normal aging process. Thus, most hospitalized elderly do not return to their previous functional level following hospitalization.[5]

The pattern of death among hospitalized elderly patients in Africa is poorly described. The global median life expectancy years after the age of 60 years increased from 17 years in 1990 to 19 years in 2009. The global median life expectancy years remained 15 years for the same period for elderly Africans.[6]

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Noncommunicable diseases (NCD) may account for the highest probability of deaths in Africa between 2010 and 2020.[7]

In most parts of Africa, the management plans of elderly patients vary widely within hospitals and various specialities. Elderly patients admitted in the hospital are often managed as general adult cases due to the nonavailability of standard protocol for managing elderly patients in the most of hospitals. There is also a dearth of geriatric physicians as geriatrics as a field of specialty is just evolving on the continent.[8] For example in 2013, South Africa had eight registered geriatric doctors serving a population of 4 million elderly people.[8]

Health seeking behavior of people in the most part of Africa is generally, with elderly patients presenting to the hospital late. This is mainly due to poverty[9,10] and sociocultural norms which promotes poor healthcare seeking behaviors.[10,11] There is also an implicit assumption on the part of the healthcare workers that little can be done to treat the ailments of the elderly patients.[9,11] The elderly and their relations often see hospitalization as a transit to death,[10] thus many often decline hospital admission and often present late to the hospital.[9,10] Unfortunately, this process sets of a vicious cycle that results in elderlies who present to the hospital getting hospitalized and hospitalized persons dying. The vicious cycle continues to reinforce the notion that hospitalization of the elderly results in death. The high mortality associated with the hospitalization of elderlies may be stemmed if healthcare workers are trained on how to manage elderly patients.

The aim of this review was to describe the causes of mortality among elderly patients admitted to the medical wards of hospitals in Africa. It conducts a systematic review of epidemiological studies that assessed admissions of elderly persons in the general and acute care medical wards, and identifies the prevalence of mortality and causes of deaths while on admission.

METHODOLOGY

Literature search

PubMed, Medline, EMBASE, African Journal Online, and African Index Medicus were searched for studies describing the mortality among elderly patients admitted to the hospital medical wards in Africa. The search items were "mortality" or "death," "hospital" or "admission," "elderly" or "older," "medical," and "Africa," We conducted this search on 1st and 2nd of September 2014. We included studies written in English and French languages.

All the 4842 abstracts of studies found were screened to identify the relevant studies, which met the specific inclusion criteria by having the combinations of the search items. This yielded 14 studies, which were later subjected to further screening using the Participants, Intervention, Comparison, and Outcomes (PICO) criteria.[12] Five studies are meeting the inclusion criteria. The nine studies excluded by PICO criteria were those which had no extractable data on the proportion of elderly patients on admissions which resulted in mortality, and those which had figures on mortality cases in adult patients admitted to the medical wards but did not have extractable data on elderly patients. In addition, we reviewed the references cited in these studies to find other studies that could be relevant. We included additional two studies which did not meet the PICO criteria for the primary review but have extractable data for the sub-analysis to enable us conduct secondary review of the factors associated with mortality among elderly patients admitted to the medical wards of hospitals.

Search strategy

We used the PICO worksheet and search strategy. We define our question using the PICO criteria. We include studies where study participants were persons aged 60 years and above. The intervention was defined as admission to medical wards of hospitals and the outcome was mortality. There was no need for comparison for this study. The search included all publications that were systematic reviews, case–control study, case series, case reports, and cohort studies.[12,13]

RESULTS

The flow chat for the online and manual search is shown in Figure 1. Of the five studies, which met the PICO inclusion criteria, one was written in French language.[14]

Table I shows the studies from which data were extracted using the PICO criteria. This was translated to English language by one of the authors. Three of the studies were from West Africa,[14-16] one was from North Africa[17] and one was from East Africa.[18]

The nine studies[19-26] excluded in the primary review are shown in Table II. The total number of hospitalized elderly patients from the included studies was 3427. The number of deaths was 773. The unadjusted proportion of admissions which resulted in all-cause mortality was 22.6% (range: 6.8–44.7%). The highest proportion of mortality (42.8–44.7%) was in the elderly hospitalized for acute illnesses in the medical intensive care wards, followed by those hospitalized at the tertiary care level (31.7%).

Two studies[15,17] reported the sex differences among 527 elderly patients studied. There were 149 deaths among 341 hospitalized elderly males and 63 deaths among the 186 hospitalized females. The mortality was higher among the males (38.8–48.0%) compared with the females (29.4–40.7%). Unadjusted risk ratio = 1.20, 95% confidence interval = 0.51–1.19 [Figure 2].

One study[17] found no significant difference between the ages of the hospitalized elderly and the outcomes (mortality vs. survival = 71.7 years vs. 71.7 years).

We tabulated the diagnoses according to the International Classification of Primary Care diseases classification.[27] Three (60.0%)[16,18,19] out of the five studies that met the inclusion criteria and two additional studies[21,22] reported the mortality among different disease conditions diagnosed in the hospitalized
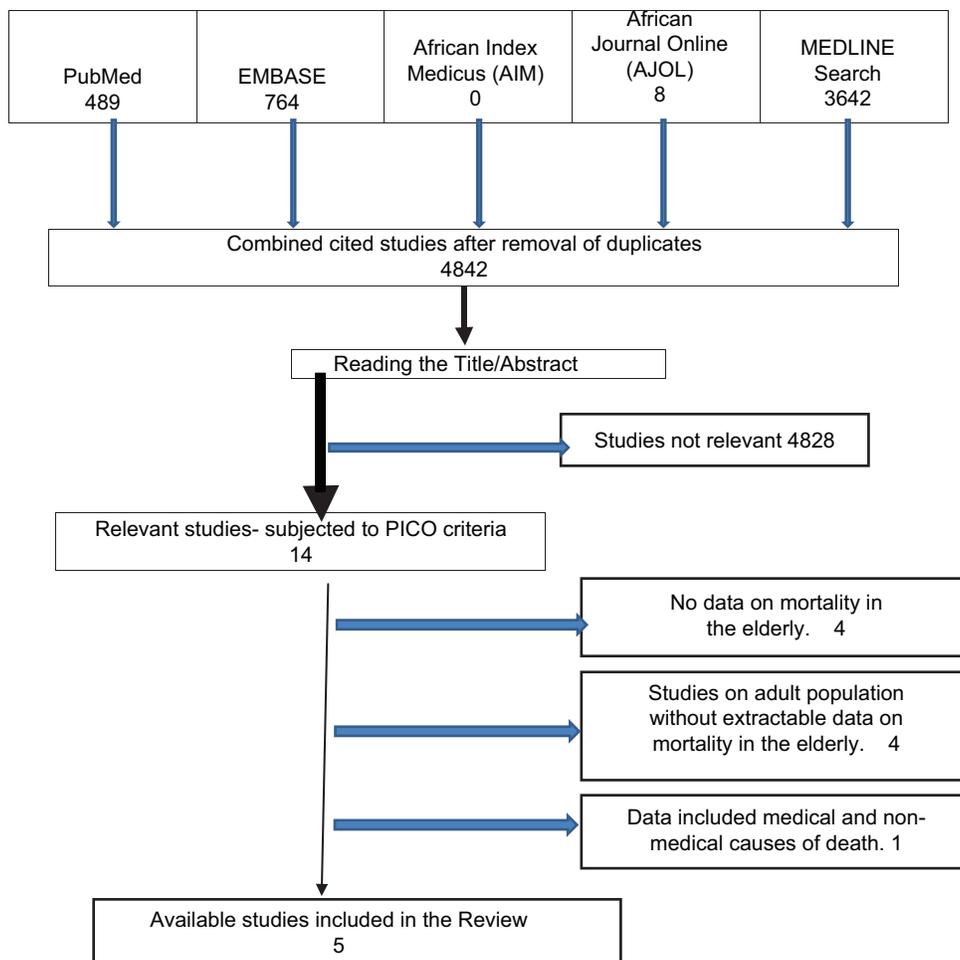
Figure 1: The flow chart for the study selection using the Participants, Intervention, Comparison and Outcomes criteria.

older patients. Mortality among hospitalized elderly patients with stroke ranged between 19.8% and 52.8%. Mortality varied widely among patients who had meningitis (3–66.7%), septicemia (2.5–50.0%), renal failure (3.8–57.1%), chronic liver disease (1.8–60.0%), chronic obstructive pulmonary disease (COPD) (3.9–57.1%), severe asthma (55.6%), and heart failure (6.2–60.9%) as shown in Table III.

Five studies[14,15,17,19,20] reported the average length of stay to either death or discharge. Two studies compared the length of stay between elderly patients who survived and those who died during hospitalization. Sanya *et al.*[15] reported the average length of stay of those survived hospitalization as 18.5 (4.1) days and those who died during hospitalization as 10.4 (8.8) days. Belayachi *et al.*[17] reported an average length of stay of 6.9 ± 4.9 days among survivors and 6.3 (7.3) days among those who died during hospitalization. Two studies[15,17] reported on some laboratory results of the hospitalized elderly patients. Sanya *et al.*[15] reported significant higher values of mean serum sodium (136.1 vs. 134.3 mmol/L; $P = 0.07$), potassium (4.2 vs. 3.7 mmol/L; $P < 0.0001$), urea (10.5 vs. 6.8 mmol/L; $P < 0.0001$), and creatinine (187.2 vs. 122.8 μmol/L; $P < 0.001$) among those who died and those who survived hospitalization, respectively. The mean serum urea (>16.6 mmol/L) and

creatinine (159 μmol/L) were found as the predictors of mortality by Belayachi *et al.*[17] The mean blood glucose level of elderly who died during hospitalization was 11.2 mmol/L, while it was 10.9 mmol/L in those who survived the hospitalization.[17]

Discussion

We found five studies, which met the inclusion criteria for the primary review and two additional studies, which were used for the secondary review from four countries in Africa. The unadjusted all-cause mortality among elderly patients admitted to the medical wards of hospitals in this African series was of 22.6%. Highest mortality was reported among elderly hospitalized for acute illnesses in the medical intensive care wards. All-cause mortality was higher among the elderly male patients and there was no significant association between the age of the elderly patients and all-cause mortality. There were wide variations in the mortality reported by various authors among elderly patients who had stroke, meningitis, septicemia, renal failure, chronic liver disease, COPD, severe asthma, and heart failure. Laboratory predictors of mortality from all-causes among patients in the intensive care setting were high serum urea and creatinine.

Table I: Data extraction using the PICO criteria

Studies	Participants	Intervention	Comparison	Mortality (%)	Factors identified	Study design
Wade KA, Diaby A, Niang EM, Diallo A, Diatta B. Med Sante Trop 2012; 22: 223-224	≥65 years (*n*=374) Dakar, Senegal	ICU admission	Yes. With population <65 years	42.8	Cardiogenic pulmonary edema	Retrospective study (5 years) 01/01/2005-31/12/2009
Belayachi J, El khayari M, Dendane T, Madani N, Abidi K, Abouqal R, *et al*. S Afr J Crit Care 2012; 28: 22-27	≥65 years (*n*=179) Rabat, Morocco	Medical ICU admission	None	44.7	Alcohol misuse Pneumonia Shock Dehydration Urine output ≤0.5 mL/kg/h Serum urea >16.6 mmol/L Serum creatinine >159 µmol/L	Retrospective study (2 years) 01/01/2005-31/12/2006
Sanya EO, Akande TM, Opadijo G, Olarinoye JK, Bojuwoye BJ. Afr J Med Med Sci 2008; 37: 375-381	≥60 years (*n*=456) Ilorin, Nigeria	Medical Ward University Teaching Hospital	None	31.7	Mean serum potassium Mean serum urea Mean serum creatinine LOS <7 days	Retrospective study (4 years) January 2001-December 2004
McLigeyo SO. East Afr Med J 1993; 70: 37-39	≥60 years (*n*=1296) Nairobi, Kenya	Medical Ward Kenyatta National Hospital	None	6.8	Heart failure (from cardiomyopathy or hypertension)	Retrospective study (1 year) March 1990-March 1991
Onwuchekwa AC, Asekomeh GE. Geriatric admissions in a developing country: Experience from a tertiary center in Nigeria. Ethnicity and Disease 2009; 19: 359	≥60 years (*n*=1122) Port Harcourt, Nigeria	Medical Ward University Teaching Hospital	None	26.7	None reported	Retrospective study (4 years) June 2002-May 2006

PICO: Participants, intervention, comparison and outcomes, ICU: Intensive care unit, LOS: Length of stay

Table II: Studies excluded from the review

Reasons for exclusion	Studies excluded
No data on mortality in the elderly and full article not extractable	Olubuyide IO, Hart PD, Alli-Gombe A, Adesanya JW, Okosieme OD, Otunla TA, *et al*. Disease pattern in the elderly. Cent Afr J Med 1991; 37: 247-9.
	Mets TF. The disease pattern of elderly medical patients in Rwanda, central Africa. J Trop Med Hyg 1993; 96 (5):291-300.
No data on mortality in the elderly	Abiodun AA. Survival analysis of mortality data among elderly patients in the university of Ilorin teaching hospital Ilorin. Nigeria. Scientia Africana 2012; 11: 14-24.
	Ogun Y. Commentary. Annals of African Medicine 2011; 10: 283-284.*
Data included both the medical and nonmedical causes of death. Mortality figure for medical causes in the elderly could not be extracted	Uchendu OJ, Forae GD: Elderly diseases mortality patterns in Irrua, Nigeria. Nigerian Medical Journal 2013; 54: 250-3.*
Studies on adult population with no extractable data on mortality in the elderly	El Bingawi HM, Hussein MB, Bakheet MY. Characteristics of Patients Admitted to Medical Ward of a Referral Hospital in a Developing Country. International Journal of Sciences: Basic and Applied Research (IJSBAR) 2014; 14: 86-92.
	Garko SB, Ekweani CN, Anyiam CA. Duration of hospital stay and mortality in the medical wards of Ahmadu Bello University Teaching Hospital, Kaduna. Annals of African Medicine 2003: 2: 68-71
	Okunola OO, Akintunde AA, Akinwusi PO. Some emerging issues in medical admission pattern in the tropics. Journal of Dentistry Medicine and Medical Sciences 2011; 1: 5-8.
	Odenigbo CU, Oguejiofor OC. The pattern of medical admissions at the Federal Medical Centre, Asaba - a two-year review. Nigerian Journal of Clinical Practice 2009; 12: 395-397.

*Data on medical causes of mortality extracted for secondary review

The limitations of this review are principally the few studies published on the mortality among elderly patients in the medical wards of hospitals in Africa making meta-analysis of the data difficult. Thus, we could not employ the risk adjustment technique. In addition, all the studies found were retrospective studies in view of poor record keeping in Africa. Sociocultural practices such as low healthcare utilization (3.2–31.5%)[28,29] delay in seeking health care, concealment of deaths of elderly within families and aversion for autopsy might have contributed to the few elderly patients in the hospitals and difficulty in ascertaining the definitive diagnoses. Special interests of authors for younger population also account for the few data on the elderly patients in the hospitals.
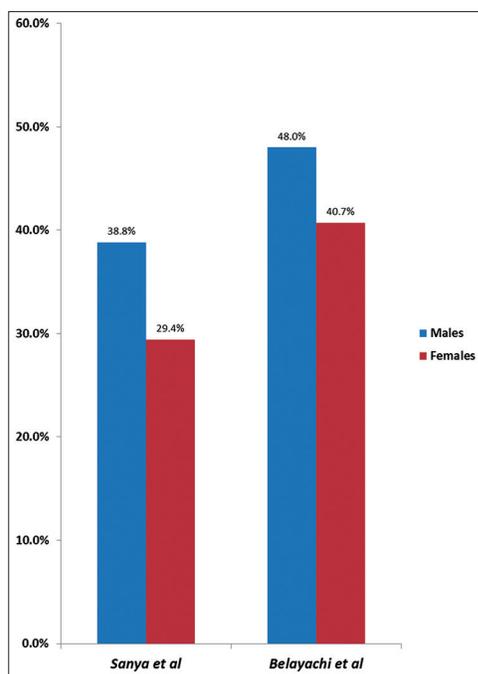
Figure 2: Mortality rates by sex.

The unadjusted all-cause mortality among elderly patients admitted to medical wards of hospitals in this African series is high compared with studies in South America (16.4%), North America (8.2%) and Europe (5.0%).[30-32] Compared with young adults, there is a higher mortality among elderly patients in the hospital medical wards.[15,16,21] The most common factors associated with mortality among hospitalized elderly patients reported in studies were complications or acute exacerbation of chronic morbidities.[17] In this review, the leading causes of mortality were stroke, meningitis, septicemia, renal failure, chronic liver disease, COPD, severe asthma, and heart failure. This was similar to the mortality pattern seen among the Europeans, with the most common causes of mortality among hospitalized elderly patients being heart failure, chronic renal failure, and COPD.[33] However, in Asia, Nakajima *et al*. reported a mortality pattern led by neoplasm, pneumonia, cardiovascular disease, stroke, and renal failure among the older Japanese.[34] Naidoo reported that cardiovascular diseases, especially hypertension and diabetes mellitus accounted for most deaths in hospitalized elderly patients in South Africa.[35] In Nigeria, hypertensive heart failure (19%), stroke (12%), and tuberculosis (11%) were

Table III: Mortality among cases

	Mortality among cases (%)				
	Sanya *et al*. (2001-2004)	Belayachi *et al*. (2005-2006)	Wade *et al*. (2005-2009)	Uchendu *et al*. (2007-2011)	Ogun (2005-2007)
Neurology					
Stroke	52.4	-	52.8	25.1	19.8
Meningitis	66.7	-	-	3.0	-
Seizure	-	-	-	1.1	-
General					
Malignancy	45.5	-	-	15.2	-
Shock	-	-	38.5	1.1	-
Blood					
Septicemia	50.0	2.5	37.5	5.2	16.5
Viral hemorrhagic fever	-	-	-	2.9	-
HIV/AIDS	-	-	-	2.3	-
Severe malaria	-	-	54.4	-	-
Endocrine, metabolic, nutrition					
Diabetes mellitus	30.0	-	8.3	8.0	-
Renal					
Renal failure	-	3.8	57.1	5.5	-
Digestive					
Peptic ulcer disease	-	-	-	2.8	-
Chronic liver disease	60.0	5.0	-	1.8	-
Gastroenteritis	11.1	-	-	-	-
Respiratory					
COPD	25.0	-	57.1	3.9	-
Pneumonia	21.1	-	37.5	2.9	8.1
Tuberculosis	23.1	-	-	2.5	-
Respiratory failure	-	20.0	-	-	-
Severe asthma	-	-	55.6	-	-
Cardiovascular					
Heart failure	18.0	25.0	60.9	6.2	-

-: Not available, COPD: Chronic obstructive pulmonary disease

the leading causes of death among hospitalized elderly patients in Ilorin.[15] Cardiovascular disease (43.7%) was the leading cause of deaths among hospitalized elderly patients in Port-Harcourt Nigeria, followed by infection (18.8%) and endocrine problems (15.4%).[20]

The individual characteristics of age, gender and genetic constitution, which are termed nonmodifiable or immutable factors also impact on mortality among hospitalized elderly patients. Some studies reported advanced age to be significantly associated with this outcome.[30] However, no such association was not reported by Belayachi *et al.*, among the Moroccan elderly patients during hospitalization.[17] Male sex has been found to be significantly associated with mortality.[30] This review showed higher mortality among elderly male patients compared with their female counterparts. Studies have shown that higher proportion of elderly admissions to the medical wards are males (69.8–74.6%).[15,20,21] The findings of significantly higher serum creatinine and urea among elderly patients who died while on admission in the medical ward may make a case for routine testing of these parameters within 24 h of admission.

Socioeconomic characteristics strongly influence the life-course of an individual and thus, the biological health of the individual. Long-terms interaction between societal social structure and an individual's life events (such as employment and occupation) produce patterns of cumulative advantages and disadvantages which affect the biological health and mortality of the individual in old age.[36] Being in the low socioeconomic class has been found to be related to poor access to healthcare services and adoption of unhealthy lifestyles such as tobacco smoking, excessive consumption of alcohol, and poor dietary habits which are also partially a consequence of adverse social conditions.[33,36] None of the studies reviewed reported on the impact of socioeconomic factors on the mortality among elderly patients admitted to the hospital medical wards in Africa.

CONCLUSION

This review has shown high all-cause mortality among elderly patients admitted to the medical wards of hospitals in Africa. The major morbidities causing mortality are acute episodes and/or complications of preventable chronic medical diseases which can be addressed in primary care settings and thus prevent hospitalization. Furthermore, this review has shown that studies giving insights into the medical causes of mortality among hospitalized elderly Africans are scarce despite the numerous healthcare challenges facing this fast-growing population sub-group in Africa. The future is for more research to be conducted in the field of geriatrics, especially in the clinical settings as Africa is witnessing a transition from infectious to NCD and an exponential growth in the elderly population.

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Conflicts of interest
There are no conflicts of interest.

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