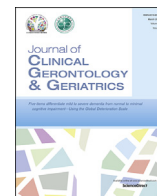




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## Original article

## Chronic diseases and multimorbidity among elderly patients admitted in the medical wards of a Nigerian tertiary hospital



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## ABSTRACT

**Background/Purpose:** Morbidity patterns vary for different age groups. As people grow older, chronic noncommunicable diseases become prominent causes of diseases. Our aim was to determine the frequency of occurrence and the patterns of chronic diseases and multimorbidity among elderly inpatients.

**Methods:** A longitudinal prospective survey was conducted among patients aged  $\geq 65$  years who were admitted to the medical wards of a tertiary hospital (Nnewi, Nigeria) over a period of 12 months. Chronic diseases were defined and counted using the World Health Organization definition, and multimorbidity was defined as the co-occurrence of two or more chronic diseases in the same individual, at a given time.

**Results:** The records of 345 patients aged between 65 years and 92 years were reviewed. There were 221 (64.1%) males and 124 (35.9%) females. A total of 223 (64.6%) patients were aged 65–74 years (early elderly), and 122 (35.4%) patients were aged  $\geq 75$  years (late elderly). Chronic morbidities were present in 92.5% ( $n = 319/345$ ) of the patients, whereas 49.0% ( $n = 169/345$ ) had multimorbidity. The diseases of the circulatory system and endocrine and metabolic diseases ranked the highest among the chronic diseases.

**Conclusion:** The high frequency of occurrence of multiple chronic diseases in the same individual highlights the challenges awaiting the current healthcare delivery system in developing countries as the populations in these parts of the world grow older.

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## 1. Introduction

Morbidity patterns vary with age, and chronic non-communicable diseases become prominent causes of morbidities and mortalities as people grow older.<sup>1</sup> Starting from age 45 years onwards, chronic noncommunicable conditions begin to account for the majority of morbidities and mortalities.<sup>1</sup> These non-communicable diseases are now the world's leading causes of death, and their burden is increasing rapidly.<sup>2</sup> The majority of the health burden in developed countries is attributable to chronic conditions, and a similar trend is emerging in developing nations.<sup>3–5</sup> Chronic conditions, consist of noncommunicable conditions, long-term mental disorders, and ongoing physical/

structural impairment, as well as persistent communicable conditions such as tuberculosis and human immunodeficiency virus infections/acquired immunodeficiency syndrome which were also included recently.<sup>1</sup>

Chronic disease conditions tend to cluster, and people with one chronic condition are more likely to have other types of chronic conditions.<sup>6,7</sup> The co-occurrence of two or more chronic disease conditions in the same person over a specific period is termed multimorbidity.<sup>7</sup> Multimorbidity occurs in all ages and in both sexes, and the prevalence of multimorbidity tends to increase with age.<sup>8</sup>

The prevalence of chronic conditions continues to rise, and in the United States, about one-half of all adults have one or more chronic health conditions.<sup>9</sup> Nigeria is Africa's most populous country, with well over 160 million people. Although the population of Nigeria is currently a relatively young one, the United Nations estimated that the proportion of elderly Nigerians will

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increase from 2.7% in 2010 to 3.8% by 2050, when Nigeria is projected to be the third most populous nation on earth.<sup>10,11</sup> The country's elderly population, however, appears to be increasing faster than estimated, as the elderly account for 3.2% from the 2006 population census.<sup>12</sup> The data on the patterns and prevalence of chronic disease and multimorbidity among elderly Nigerians are grossly lacking and warrant investigation. This rising elderly population will, in the near future, be a burden to the healthcare delivery system in this country, which is currently only suitable for treating patients with individual diseases as opposed to the treatment of patients with multiple chronic diseases. Furthermore, very few centers with adequately trained medical personnel, specializing in elder care, are available at present.

## 2. Methods

This longitudinal prospective study focuses on patients aged  $\geq 65$  years, who were admitted to the medical wards of the Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria, from January 1, 2009 to December 31, 2009. NAUTH is the largest tertiary hospital and referral center in Anambra State, Southeast Nigeria. The 350-bed hospital has two medical wards (a male ward and a female ward), with 36 beds each. Patients requiring care from all clinical subspecialties in internal medicine are admitted to these wards via the emergency department or from the medical outpatient clinics.

On admission, the patients' relevant demographic data, diagnosis on admission, and other clinically relevant details were obtained and recorded. The patients were subsequently followed up on a daily basis until discharge. During the follow ups, the newly diagnosed disease and the disease being treated at the time of admission were recorded.

The diseases that qualified in our study as chronic diseases were compiled and counted based on the World Health Organization's definition of chronic disease.<sup>1</sup> The World Health Organization defined chronic diseases as health problems that require ongoing management over a period of years or decades.<sup>1</sup> The diseases were classified using the *International Classification of Diseases and Health-Related Problems*, 10<sup>th</sup> Revision, 2007.<sup>13</sup> Multimorbidity was defined as the co-occurrence of two or more chronic disease conditions in the same person at a specific period.<sup>7</sup>

Ethical approval for the study was obtained from the ethical committee of the Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria. Informed consent was obtained from the patients. Caregivers acted as proxy for patients who were unable to communicate.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 15 (Chicago, USA). Relevant percentages, frequencies, means and standard deviations were calculated. The Chi-square test was used to calculate the relevant associations and proportions with the level of significance at  $p < 0.05$ . The findings are presented in Tables 1 to 4.

## 3. Results

A total of 345 patients, whose age ranged from 65 years to 92 years (mean age,  $72.41 \pm 6.6$  years), were admitted during the study period, and all had given their consent to participate in the study. There were 221 (64.1%) males and 124 (35.9%) females, with a male/female ratio of 1.8:1. Table 1 shows the demographic and socioeconomic status of the patients. Two hundred and twenty-three (64.6%) patients aged 65–74 years (early elderly) and 122 (35.4%) were aged  $\geq 75$  years (late elderly) (Table 1). Of those 248 (71.9%) patients were married, 95 (27.5%) were widowed, and two (0.6%) were never married. Primary education was the highest level of

**Table 1**  
Demographic and socioeconomic data of the elderly.

Characteristics	Frequency	Percentage (%)
Age (y)		
65–74 (early elderly)	223	64.6
$\geq 75$ (late elderly)	122	35.4
Mean age (y)	$72.41 \pm 6.6$	
Age range (y)	65–92	
Sex		
Male	221	64.1
Female	124	35.9%
Marital status		
Married	248	71.9
Widower	95	27.5
Single	2	0.6
Highest educational level		
Primary	143	41.5
Secondary	30	8.7
Tertiary	46	13.3
No formal education	126	36.5
Previous occupation		
Managers	5	1.5
Professionals	11	3.2
Technicians	26	7.5
Clerical support workers	46	13.3
Service and sales workers	141	40.9
Craft and related trade workers	19	5.5
Elementary occupations	97	28.1

education attained by 41.5% ( $n = 143$ ) of the patients and 36.5% ( $n = 126$ ) had no formal education. Those who worked as service and sales workers accounted for 40.9% ( $n = 141$ ) of the study population, 28.1% ( $n = 97$ ) served in elementary occupations, and 3.2% ( $n = 11$ ) and 1.5% ( $n = 5$ ) served as professionals and managers, respectively (Table 1).

Chronic morbidities were present in 92.5% ( $n = 319$ ) of the patients, whereas 7.5% ( $n = 26$ ) had no chronic morbidities (Table 2). The mean number of chronic disease was  $1.7 \pm 0.84$ . A chronic disease was present in 43.5% ( $n = 150$ ) of the patients and two chronic diseases were present in 39.4% ( $n = 136$ ), whereas three or more chronic diseases were present in 9.6% ( $n = 33$ ) (Table 2). The overall prevalence of multimorbidity among the elderly population studied was 49.0% ( $n = 169/345$ ), whereas the prevalence of multimorbidity among those elderly patients with chronic diseases was 53.0% ( $n = 169/319$ ).

The early elderly with multimorbidity accounted for 32.2% ( $n = 111$ ) of the study population, whereas the late elderly with multimorbidity accounted for 16.8% ( $n = 58$ ). There were no statistically significant differences between those with multimorbidity and those without multimorbidity in the two age groups,  $p > 0.05$  ( $\chi^2 = 0.158$ ,  $d = 1$ ,  $p = 0.691$ ; Table 3).

The chronic diseases associated with the study population were as follows: hypertension in 51% ( $n = 176$ ) of the patients, cerebrovascular accident (CVA) in 26.0% ( $n = 90$ ), and hypertensive heart disease with congestive cardiac failure in 12.5% ( $n = 43$ ). Diabetes mellitus was present in 42.9% ( $n = 148/345$ ) of the patients and neoplasms were noted in 8.1% ( $n = 28/345$ ). Other diseases present are listed in Table 4.

**Table 2**  
Age and sex distribution of number of chronic morbidities.

Number of chronic morbidities	Females	Males	Total
0	8 (2.3)	18 (5.2)	26 (7.5)
1	62 (18.0)	88 (25.5)	150 (43.5)
2	44 (12.7)	92 (26.7)	136 (39.4)
3	10 (2.9)	23 (6.7)	33 (9.6)
Total	124 (35.9)	221 (64.1)	345 (100.0)

Data are presented as  $n$  (%).

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