

Diagnosis, Prescription Drug Use and Potentially Inappropriate Medications among Adults aged ≥ 50 years in a Nigerian HospitalU.I.H EZE^{1*}, O. ODUSAN², M.S.C. EZE³ AND S.A. SAKA¹

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Older adults are peculiar in diagnosis, medicine use and medication related problems. To categorize diagnosis, evaluate drug use and determine potentially inappropriate medications among ≥ 50 year olds, a 12 months retrospective audit was conducted using 300 medical files of adults aged 50 years and above attending outpatient clinics of Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun State, Nigeria. Information on sex, age, occupation, diagnosis and medicines prescribed was retrieved consecutively. Statistical Package for Social Science Version 20 was used for frequencies. Diagnosis was categorized using the International Statistical Classification of Diseases Tenth Revision Clinical Modification (ICD-10-CM). Potentially inappropriate medications (PIMs) were evaluated using the 2012 American Geriatric Society Beers Criteria. A majority of encounters were females, 173 (57.6%); traders by occupation, 144 (48.2%) and 60-69 years old, 107 (35.6%). Based on ICD-10-CM, hypertension (I10) 53 (17.7%) and osteoarthritis (M17), 47 (15.7%), were the most prevalent. Diseases of the musculoskeletal system and connective tissue (M00-M99), 85 (28.3%), was the most occurring title. The average number of medicines was 1.99. Antihypertensives (65.3%) were the most prescribed medicines. Diazepam, 35 (11.5%), and naproxen, 15 (5%), were the most prescribed Potentially Inappropriate Medications. Although numerous diagnoses and co-morbidities were encountered, medicine use was adjudged optimal. It is recommended that benefits be weighed against risk before use of such medicines.

Key words: Categorize, Diagnosis, ICD-10-M, Olabisi Onabanjo University Teaching Hospital, OOUTH, Sagamu

INTRODUCTION

According to Balogh *et al.* the diagnostic process is a complex, collaborative activity that involves clinical reasoning and information gathering to determine a patient's health problem [1]. The World Health Organization (WHO) introduced a medical classification list in an effort to categorize diagnoses. ICD-10 is the 10th revision of the *International Statistical Classification of Diseases and Related Health Problems* (ICD). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases [2]. Despite this provision, diagnosis is often challenging particularly in

older adults, because they are not well studied and many signs and symptoms are nonspecific coupled with co morbid issues [3].

In addition, studies conducted over the past decades indicate that drug related problems (inappropriate medicine use) are common in the older adults and cause significant injury and death [4-9]. Inappropriate medicine use can be assessed using a clinical tool, based on The American Geriatric Society 2012 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults [10]. From the foregoing there are questions to ponder considering older adults in a country like Nigeria: what patterns of diagnoses exist in this special population?; is the prescription and

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use of medicines optimal?; are there instances of potentially inappropriate medicine prescription among older adults in this setting? The objective of this study was to categorize diagnosis, evaluate drug use and determine potentially inappropriate medications among older adults.

MATERIALS AND METHODS

A retrospective 12 months audit was conducted using 300 medical case files belonging to ambulatory adults aged 50 years and above attending outpatient clinics of Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu, Ogun State, Nigeria. Inpatients and patients younger than the sampled age were excluded. A sample size of 300 was estimated using the Raosoft online Sample Size Calculator with a confidence interval of 95%, a margin of error of 5.62%, a response distribution of 50% and an assumed population size of 20,000. Approval was obtained from the Ethical Review Board of OOUTH.

Data on age, occupation, diagnosis, gender and medicines prescribed to the patients was retrieved from 300 medical case files consecutively. The total number of diagnoses, average number of diagnoses per patient and most occurring diagnosis were obtained. Data were entered into Microsoft Excel spreadsheet using the variables as headings. Descriptive statistics were obtained using Statistical Package for Social Science Version 20. Percentages for therapeutic groups of medicines were obtained by dividing the total occurrence of each medicine by the total number of all medicines and multiplied by 100 while percentage encounter of potentially inappropriate medications were obtained by dividing each occurrence by the total number of occurrence of potentially inappropriate medications multiplied by 100. Diagnosis was categorized based on International Statistical Classification of Diseases Tenth Revision Clinical Modification (ICD-10-CM) [2].

Frequencies of disease conditions were categorized into the block code, title, diagnoses (code) based on ICD-10CM Classification. Potentially inappropriate medications (PIMs) were evaluated by applying a clinical tool based on The AGS

2012 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults (AGS 2012 Beers Criteria) [10].

RESULTS

Table 1 details the socio-demographic characteristics of the surveyed patients. There were more females 173 (57.7%) than males. Most of the patients were 60-69 years old 107 (35.6%). With regard to occupation, most patients, 144 (48.2%), were traders.

Table 1. Socio-demographic characteristics of older adults (n=300)

Characteristic	Number (%)	
Age (yrs)	50-59	83 (27.6)
	60-69	107 (35.7)
	70-79	47 (15.7)
	≥80	63 (21.0)
Sex	Male	173 (57.7)
	Female	127 (42.3)
Occupation	Trader	144 (48)
	Retiree	59 (19.8)
	Artisan	27 (9.0)
	Farming	25 (8.4)
	Clergy	13 (4.3)
	Housewife	13 (4.3)
	Civil servant	13 (4.3)
	Other	6 (2.0)

Table 2 displays Frequencies of Categories of Diagnosis encountered based on ICD-10-CM. A total of 339 diagnoses were obtained from case notes with a co-morbidity rate of 1.13 diagnoses per patient. Hypertension was the most prevalent disease with 51 cases (17.1%), followed by osteoarthritis, 47 (15.7%), and diabetes, 42 (14.0%). Diseases of the musculoskeletal system and connective tissue were the most prevalent group, 85 (28.3%). A referral rate of 85 (28.3%) was obtained.

Figure 1 displays the therapeutic groups of medicines prescribed. A total of 564 medicines were prescribed. Antihypertensives, 166 occurrences (29.4%) and nonsteroidal anti-inflammatory drugs, 155 occurrences (27.5%) were the most prescribed medicines. The average number of medicines per prescription was 1.89.

Table 2: Frequencies of categories of diagnosis encountered based on ICD-10-CM

Chapter/ Block Code	Title	Diagnosis (Code)	Frequency No (%)	Total No (%)
I(A00-B99)	Certain Infectious and Parasitic Infections	Malaria (B50.9)	10 (3.3)	16 (5.3)
		Herpes infection (B00)	3 (1)	
		Helminthiasis (B83.9)	3 (1)	
IV(E00-E90)	Endocrine, Nutritional and metabolic diseases.	Diabetes (E11)	42 (14)	42 (14.0)
V(F00-F99)	Mental and Behavioral Disorders	Anxiety (F41.1)	21 (7)	39 (13.0)
		Neurosis (F48.9)	4 (1.3)	
		Psychotic disorder (F31)	1 (0.3)	
		Dementia (F03.90)	13 (4.3)	
VI(G00-G99)	Disease of the Nervous System	Parkinsonism (G20)	4 (1.3)	4 (1.3)
VII(H00-H59)	Diseases of the eye and adnexa	Blindness (both eyes) (H54.0)	2 (0.6)	11 (3.6)
		Poor vision (H54)	1 (0.3)	
		Unspecified otitis media (H66.90)	8 (2.6)	
VIII.(H60-H95)	Diseases of the ear and mastoid process	Hearing impairment (H90.5)	6 (2.0)	6 (2.0)
IX. (I00-I99)	Diseases of the circulatory system	Hypertension (I10)	53 (17.7)	53 (17.7)
X. (J00-J99)	Diseases of the respiratory system	Acute tonsillitis (J03.90)	2 (0.6)	7 (2.3)
		Bronchitis (J41.0)	1 (0.3)	
		Asthma (J45)	3 (1)	
		URTI (J06.9)	1 (0.3)	
XI. (K00-K93)	Disease of the digestive system	Hernia (K40-K46)	4 (1.3)	4 (1.3)
XIII (M00-M99)	Diseases of the musculoskeletal system and connective tissue	Unspecified knee pain (M25.569)	11 (3.6)	85 (28.3)
		Osteoarthritis (M17)	47 (15.7)	
		Back ache (M54.9)	14 (4.7)	
		Joint pain (M25.5)	4 (1.3)	
		Rheumatoid arthritis (M05)	6 (2.0)	
		Myalgia (M99.1)	2 (0.6)	
		Osteomyelitis (M86.019)	1 (0.3)	
XIV. (N00-N99)	Diseases of the genitourinary system.	Mastodynia (N64.4)	16 (5.3)	29 (9.6)
		Unspecified lump in breast (N63)	3 (1)	
		Bladder fistula (N32)	3 (1)	
		Scrotal swelling (N50.8)	7 (2.3)	
XVIII. (R00-R99)	Symptoms, signs and Abnormal clinical and laboratory findings not elsewhere classified	Cough (R05)	2 (0.6)	39 (13.0)
		Throat pain (R07)	2(0.6)	
		Paresthesia of skin (Numbness) (R20.2)	4 (1.3)	
		Generalized abdominal discomfort (R10.84)	5 (1.7)	
		Frontal Headache (R51)	4 (1.3)	
		Retention of Urine (R33.9)	4 (1.3)	
		Palpitations (R00.2)	8 (2.6)	
		Diarrhea (Unspecified) (R19.7)	2 (0.6)	
		Fever(unspecified) (R50.9)	4(1.3)	
		Anorexia (R63.0)	4(1.3)	
XXI. (Z00-Z99)	Factors influencing health status and contact with health services	Non -compliance (Z91.14)	4(1.3)	4 (1.3)

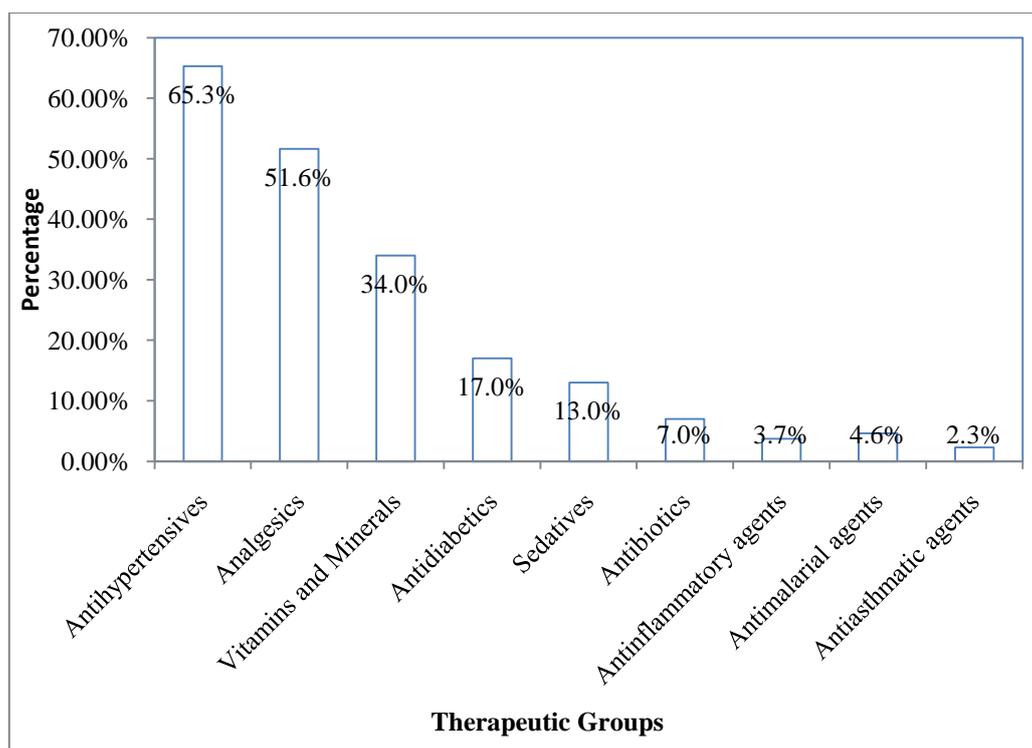


Figure 1: Therapeutic groups of medicines prescribed

Based on the Beers' lists for medication inappropriateness; 35 medicines (11.7%) were judged inappropriate (Table 3). Diazepam, 15

occurrences (4.9%) and naproxen, 15 occurrences (4.9%) were the most prevalent PIMs.

Table 3: Frequency of Potentially Inappropriate Medications based on AGS* Beers Criteria

Therapeutic Category/Drug	Frequency (%)	Recommendation Rationale	
		Quality of Evidence (QE)	Strength of Recommendation (SR)
Diazepam	15 (5.0%)	High	Strong
Naproxen	15 (5.0%)	Moderate	Strong
Amprityline	2 (0.6%)	High	Strong
Hyoscyamine	2 (0.6%)	Moderate	Strong
Bisacodyl	1 (0.3%)	Moderate	Strong
Total	35 (11.5%)		

*AGS = American Geriatric Society

DISCUSSION

Participants in this study were mostly females and aged 60-69 years old. This gender spread is similar to that obtained in previous studies [11-13] but differs from results obtained by Song *et al.* who concluded in their study that gender differences in health and the use of health services are long-standing concerns and vary according to the type of services used and are largely consistent across racial/ethnic groups [14]. Health needs are substantially greater among older women with fewer economic resources compared with men [11].

Gender differences in medical use is an important issue in developing healthcare policy and designing public health strategies to promote equitable use of healthcare resources by both women and men [14].

Classified by occupation, most respondents were traders, which is typical of the local setting. Almost 20% of the encounters claimed to be retirees. Since this was a retrospective study, an assumption could be that this group do not engage in any meaningful daily work. A study by Hearle *et al.* [15] showed that a majority of participants spent their time in the

lounges and remained passive, interacting infrequently with staff and one another. To avoid physical and psychological problems associated with ageing, it becomes important for the older adults to engage in self directed purposeful and enjoyable activities which will mentally stimulate them leading to active productive lives. New approaches towards creating 'age-friendly' societies are emerging worldwide [16].

Hypertension, osteoarthritis and diabetes were the most prevalent diseases. The prevalence of hypertension (Diseases of the Circulatory System) in this study was within the overall prevalence in Nigeria (8%-46.4%) depending on the study target population, type of measurement and cut-off value used for defining hypertension [17]. Diseases of the musculoskeletal system and connective tissue comprised the largest occurring title, were the most common cause of severe long-term pain and physical disability and are considered a multi-factorial problem involving both work-related and non-work-related stressors [18]. These diseases affect hundreds of millions of people around the world and are major burden on individuals, health systems, and social care systems, with indirect costs being predominant. This burden was recognized by the United Nations and WHO, by endorsing the Bone and Joint Decade 2000–2010 [19]. Low back pain was the most prevalent musculoskeletal condition. Similar results were obtained in studies by Akinpelu *et al.* [20] while a higher figure (44%) was reported by Omokhodion [21]. Low back pain affects nearly everyone at some point in life and about 4-33% of the population at any given moment [19].

Overall, the use of medicines in this study could be rated as optimal since the average number of medicines was less than 3. Caution must be taken in older adults who may be self medicating with other medicines, herbals and food supplements as is common in developing countries like Nigeria.[22] Antihypertensives were the mostly prescribed medicines, in agreement with the observation that hypertension was the most prevalent disease. The use of NSAIDS was high and may be associated with a high risk of potential drug therapy problems.

Potentially Inappropriate Medicines for older adults like Diazepam and Naproxen among others were encountered in this study. The strength of recommendation of all medicines occurring as inappropriate was strong (AGS 2012) [11]. Drug therapy interventions are required to reduce and prevent drug related problems and ensure safe, effective and appropriate indications of medicines.

CONCLUSION

Diverse diagnoses were encountered with hypertension being the most prevalent and musculoskeletal diseases title comprising the largest category. Drug prescribing seemed optimal based on number of medicines. However inappropriate medicines occurred in more than a tenth of the cases. Educational interventions are required for the prescribers on use of potentially inappropriate medicines in older adults. Finally benefits must outweigh risk before any medicine is recommended for prescription.

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