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Evaluation of Prescription Pattern of Analgesic Use among Ambulatory Elderly in South-Western Nigeria

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Abstract

Background: Inappropriate prescribing of analgesics has a global impact on the health of elderly patients and the society. Empirical evidence on the prescription of analgesics among elderly Nigerians is scarce. **Objectives:** The objective of the study was to evaluate the prescription pattern of analgesics and describe the co-prescribing of gastroprotective agents with non-steroidal anti-inflammatory drugs (NSAIDs) among elderly patients at the geriatric center, University College Hospital, Ibadan. **Methods:** A retrospective cross-sectional, hospital-based study was carried out among elderly patients (≥ 60 years) who were prescribed analgesics. Using a data extraction sheet, information on demographic characteristics, drug utilization pattern, and morbidities was obtained from patients' case files via electronic health records. **Results:** A total of 337 patients case files were reviewed, the mean age was 72 ± 8.8 years, and 210 (62.3%) were females. There were a total of 2074 medications prescribed, with 733 (35.3%) being analgesics. Majority of the elderly patients (259, 76.9%) were on nonopioids, with 252 (74.8%) on NSAIDs. Paracetamol was the most commonly prescribed analgesics (181, 24.6%), followed by diclofenac/misoprostol (177, 24.1%), opioid analgesic prescribed was 88 (12.0%), with paracetamol/codeine 58 (65.9%), and tramadol 16 (18.2%) being the most prescribed opioid. A significant proportion of the hypertensive elderly patients (160, 78.8%; $P < 0.036$) were on NSAIDs. The oral route of administration (302, 89.6%) was the most common route of administration. Majority (310, 92%) of elderly patients taking NSAIDs had a co-prescription for gastroprotective agents. **Conclusions:** Majority of hypertensive patients were on NSAIDs. This calls for prompt awareness of rational analgesic use among the elderly to improve management and their survival.

Keywords: Analgesic, elderly, nonsteroidal anti-inflammatory drugs, prescription pattern, proton pump inhibitors

Résumé

Contexte: La prescription inappropriée d'analgésiques a un impact mondial sur la santé des patients âgés et la société. Les preuves empiriques sur la prescription d'analgésiques chez les Nigériens âgés sont rares. **Objectifs:** L'objectif de l'étude était d'évaluer le schéma de prescription des analgésiques et de décrire la co-prescription d'agents gastroprotecteurs avec des anti-inflammatoires non stéroïdiens (AINS) chez les patients âgés du centre gériatrique, University College Hospital, Ibadan. **Méthodes:** Une étude rétrospective transversale en milieu hospitalier a été menée auprès de patients âgés (≥ 60 ans) à qui l'on avait prescrit des analgésiques. À l'aide d'une feuille d'extraction de données, des informations sur les caractéristiques démographiques, le mode d'utilisation des médicaments et les morbidités ont été obtenues à partir des dossiers des patients via les dossiers de santé électroniques. **Résultats:** Un total de 337 dossiers de patients ont été examinés, l'âge moyen était de $72 \pm 8,8$ ans et 210 (62,3%) étaient des femmes. Au total, 2074 médicaments ont été prescrits, dont 733 (35,3%) étaient des analgésiques. La majorité des patients âgés (259, 76,9%) étaient sous nonopioïdes, avec 252 (74,8%) sous AINS. Le paracétamol était l'analgésique le plus couramment prescrit (181, 24,6%), suivi du diclofénac / misoprostol (177, 24,1%), l'analgésique opioïde prescrit était de 88 (12,0%), avec le paracétamol / codéine 58 (65,9%) et le tramadol 16 (18,2%) étant l'opioïde le plus prescrit. Une proportion importante des patients âgés hypertendus (160, 78,8%; $P < 0,036$) étaient sous AINS. La voie d'administration orale (302, 89,6%) était la voie d'administration la

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plus courante. La majorité (310, 92%) des patients âgés prenant des AINS avaient une co-prescription d'agents gastroprotecteurs. **Conclusions:** La majorité des patients hypertendus étaient sous AINS. Cela nécessite une prise de conscience rapide de l'utilisation rationnelle des analgésiques chez les personnes âgées pour améliorer la prise en charge et leur survie.

Mots-clés: analgésiques, personnes âgées, anti-inflammatoires non stéroïdiens, schéma de prescription, inhibiteurs de la pompe à protons

INTRODUCTION

The control of pain is essential in sustaining the quality of life in elderly patients. With age occurs more prevalence of chronic disease and disabilities which are mostly associated with pain. Care of elderly patients is becoming progressively significant, as the population ages. Analgesics comprising nonopioid (e.g., paracetamol and nonsteroidal anti-inflammatories [NSAIDs]) or opioids are usually prescribed for the control of pain and inflammation in the elderly patients.^[1] It has been documented that analgesic is the most primarily prescribed drug in a secondary health-care facility in Nigeria^[2] and accounts for 12.3% of the total prescription in a primary care setting in South Africa.^[3]

It has been discovered by the American Geriatrics Society Panel on Persistent Pain among the elderly^[1] that nonopioid analgesics are the most commonly used drugs for pain management, although studies^[4] have established a rise in the use of opioid analgesics in Europe and North America.

There is an increase in sensitivity to certain analgesic drugs, due to the physiological changes in older people, notwithstanding analgesics should be titrated to the patients' response. Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly prescribed analgesic; however, they are associated with a risk of adverse events, involving gastrointestinal (GI) ulceration and bleeding^[5] and cardiovascular effect, which can increase morbidity and mortality among the elderly.^[6,7] Pharmacokinetics and medication metabolism change with age,^[8] and elderly patients mostly have circumstances or medications that predispose them to greater risk for NSAID use associated GI symptoms.^[9] The use of NSAIDs could result in an increase in a mean arterial blood pressure of 5 mmHg.^[10] The administration of opioids to elderly patients may be associated with less risk than that of NSAIDs, especially in those elderly who are at particular risk of NSAIDs-related events. There is rising awareness of possible damages of opioid therapy affecting the elderly, such as constipation, fractures, and cardiovascular events,^[11,12] although dependence and overdose-related death are considerably unusual in elderly when compared with younger patients.^[13] The various side effects of opioid use, such as sedation, nausea, and vomiting, can be pronounced usually during the initiation of opioid and dose increase and could resolve within 2 or 3 days.^[14] Drowsiness and dizziness are the central side effects of opioids, and they could be associated with an increased incidence of falls and fractures among the elderly.^[15] A major barrier to a long-term opioid therapy is the fear of addiction.

Though there is a high occurrence of side effects with drug therapy in the elderly patients, analgesics can still be safe and efficient when comorbidities and additional concurrently prescribed medications are carefully put into consideration.

Medication monitoring and reconciliation by health-care workers can detect medication errors while prescribing and dispensing and providing feedback to prescribers, hence ensuring awareness of the rational use of medications. It has been documented that analgesics is one of the top medications used among elderly patients and diclofenac an NSAID is one of the potential inappropriate medications prescribed for the elderly patients in a geriatric center in Nigeria.^[16]

Guidelines developed under the auspices of the American College of Gastroenterology recommend gastroprotective agents (e.g., proton-pump inhibitors [PPIs] or misoprostol) for high-risk patients (defined as >65 or 70 years in most guidelines) taking nonselective (NS)-NSAIDs.^[17-19]

In the absence of data on the prescribing pattern of analgesics use among elderly patients in Nigeria, more information are needed about the benefits and challenges of analgesic therapy in the elderly for better understanding of its utilization in this population to define practice patterns and identify ideas for improved prescribing and management." Therefore, we sought to evaluate the prescribing patterns of analgesic medications and co-prescribing of gastroprotective agents in geriatric patients taking NSAIDs in South-Western Nigeria.

METHODS

Study sites and settings

The study site was the Chief Tony Anenih Geriatric Centre (CTAGC), University College Hospital (UCH), Ibadan, which is the capital city of Oyo State in the South-Western area of Nigeria. Oyo state has 5.6 million people according to the Nigerian 2006 census, while Ibadan's population is 3.6 million.^[20] The CTAGC is a purpose-built geriatric facility commissioned on November 2012. Each day, an average of 20 elderly patients was newly registered at the geriatric center. The CTAGC currently added a 10-bedded geriatric rehabilitation center and has nine beds for inpatient admission. Ethical approval for the study was obtained from the joint University of Ibadan/UCH Institution Review Board (Approval Number: UI/EC/18/0325).

Study design

This was a retrospective cross-sectional, hospital-based study carried out at the CTAGC, UCH, Ibadan.

Study population

The study was carried out by reviewing case files of older patients prescribed analgesics between the January 1, 2017, and June 30, 2018, using a data extraction sheet. The case files were provided via electronic health record by the Medical Records Department of the CTAGC, which commenced on the January 1, 2017. During 18-month period of the study, there were a total of 1280 case files of elderly patients using analgesics.

Inclusion criteria

Patients who were prescribed analgesic and attended the CTAGC, UCH, Ibadan between January 1, 2017, and June 30, 2018, were recruited for the study.

Exclusion criteria

Patients who were not prescribed analgesic medications, those with incomplete information such as age, sex, morbidity, and laboratory results in their medical records, or whose records were unavailable during the study were excluded from the study.

Sample size determination

The sample was calculated using the Leslie and Kish formula for a single proportion. The best estimate of the proportion of elderly patients using analgesics (32.4%)^[21] was used to derive the sample size of 337 at a precision of 5%.

Sampling technique

Systematic random sampling method was used to enlist every fourth elderly patient's case file until the sample size was complete (sampling interval $k = NT/NS = 3.8$), where NT is the sampling frame (1280) and NS = sample size 337.

Data collection

All the case files of elderly patients who met the inclusion criteria during the study period were extracted and serially numbered. Thereafter, one in every four of these case files was selected for the study. The data files were structured and numbered according to the dates of attendance at the clinic. A data extraction sheet was used to obtain information from the patients' prescription and physician notes in the case files on sociodemographic characteristics of the patients, prescribed medications, number of prescribed medications, diagnoses, and laboratory results. Data extraction was carried out by the investigators of the study. Missing or unclear information was verified with the professional in charge (physicians, nurse, or pharmacist).

Data analysis

Data were sorted, coded, and entered into the Statistical Package for the Social Sciences statistical software version 21.0 (SPSS, IBM Corporation, Armonk, NY, USA) for cleaning and analysis. Descriptive statistics were used to summarize the data. Continuous variables were presented as mean \pm standard deviation (SD), while categorical variables were presented as frequency and percentages. Chi-square statistics was used to determine the association between categorical variables. The value of significance was set at $P < 0.05$.

Table 1: Sociodemographic characteristics and anthropometric measures of the reviewed patients

Variable	Category	n (%)
Sex	Male	127 (37.7)
	Female	210 (62.3)
Age-group (years)	60-64	74 (22.0)
	65-69	76 (22.6)
	70-74	58 (17.2)
	75-79	58 (17.2)
	80-84	34 (10.1)
	85 and above	37 (11.0)
Marital status	Married	239 (70.9)
	Widowed	96 (28.5)
	Separated	2 (0.6)
Body mass index	Underweight	9 (2.7)
	Normal	57 (16.9)
	Overweight	175 (51.9)
	Obese	96 (28.5)

Table 2: Frequency distribution of the classes of drugs used by the reviewed patients

Class of drug	n (%)
Analgesics	733 (35.3)
Antihypertensives	417 (20.1)
Antibiotics	263 (12.7)
Proton-pump inhibitors	160 (7.7)
Oral hypoglycaemic agent	128 (6.2)
Haematinics	108 (5.2)
Antiplatelets	104 (5.0)
Anti-lipids	31 (1.5)
Others	130 (6.3)
Total	2074 (100)

RESULTS

There were 337 patients (females = 210). The mean age was 72 (SD \pm 8.8) years (range 60–96 years). Majority of the patients were either overweight (175, 51.9%) or obese (96, 28.5%) [Table 1].

In total, 2074 medications were used by the patients, with analgesic (733, 35.3%) being the most common followed by antihypertensives (417, 20.1%), antibiotics (263, 12.7%), and PPIs (160, 7.7%), as shown in Table 2.

Hypertension (230) was the most common morbidity among the reviewed elderly patients, followed by spondylosis (113) and osteoarthritis (OA) (108); the frequency of morbidity is shown in Table 3.

As shown in Table 4, among the analgesics, 645 (88.0%) were nonopioids, 88 (12.0%) were opioids, while 420 (65.1%) were NSAIDs. The oral route of administration (302, 89.6%) followed by the topical route (84, 24.9%) was the most frequently used route of administration.

Majority of the reviewed patients (252, 74.8%) were on NSAIDs alone, while 78 (23.1%) were on opioids alone

Table 3: Morbidity profile of the reviewed patients

Disease	n (%)
Hypertension	230 (26.2)
Spondylosis	113 (12.9)
Osteoarthritis	108 (12.3)
Diabetes	70 (8.0)
Dyslipidemia	32 (3.6)
UTI	25 (2.8)
PUD	24 (2.7)
Sepsis	24 (2.7)
Malaria	23 (2.6)
Cataract	14 (1.6)
Osteoporosis	14 (1.6)
COPD	11 (1.3)
Prostate cancer	10 (1.1)
Insomnia	9 (1.0)
CVD	9 (1.0)
Dementia	8 (0.9)
Others	154 (17.7)
Total	878 (100.0)

CVD=Cardiovascular disease, COPD=Chronic obstructive pulmonary disease, UTI=Urinary tract infection, PUD=Peptic ulcer disease

Table 4: Prescribing pattern and route of administration of analgesic use among the reviewed patients

Opioids n=88	n (%)	Nonopioids n=645	n (%)
Paracetamol/codeine	58 (65.8)	paracetamol	181 (28.0)
Tramadol	16 (18.2)	Diclofenac/misoprotol	177 (27.4)
Morphine	7 (8.0)	Diclofenac	84 (13.0)
Dihydrocodeine	5 (5.7)	Celecoxib	51 (7.9)
Pentazocine	2 (2.3)	pregabalin	44 (6.8)
		Ketoprofen	31 (4.8)
		Aspirin	20 (3.1)
		Acceclofenac	19 (2.9)
		norgesic	15 (2.3)
		Meloxicam	10 (1.6)
		Dexketoprofen	6 (1.0)
		Naproxen	6 (1.0)
		Zetgel	1 (0.2)
Route of administration	Number of patients, n (%)		
Oral	302 (89.6)		
Topical	84 (24.9)		
Parenteral	75 (22.3)		

and 7 (2.1%) were on other medications such as pregabalin. However, 70 (20.8%) were on both NSAIDs and opioids.

More than half (177, 52.5%) of the patients are on a combination product of diclofenac and misoprostol, which contains a gastroprotective agent, and further 39.5% received a co-prescription of a PPI such as omeprazole (118, 35%) and esomeprazole (15, 4.5%) [Table 5].

Table 6 shows the most common morbidities among the reviewed patients using NSAIDs; there was a significant

Table 5: Nonsteroidal anti-inflammatory drugs and gastroprotective agent use separately or as combination product in the studied patient (n=337)

Class of medications	Medication	n (%)
Proton-pump inhibitor	Omeprazole	118 (35)
	Esomeprazole	15 (4.5)
Combination product	Diclofenac/misoprostol	177 (52.5)

Table 6: Most common morbidities among the reviewed patients using nonsteroidal anti-inflammatory drugs

Disease state	Group	NSAIDs		P
		Present, n (%)	Absent, n (%)	
Hypertension	Yes	160 (78.8)	92 (68.7)	0.036*
	No	43 (21.2)	42 (31.3)	
Osteoarthritis	Yes	96 (89.7)	156 (67.8)	0.001*
	No	11 (10.3)	74 (32.2)	
Spondylosis	Yes	99 (87.6)	153 (68.3)	0.001*
	No	14 (12.4)	71 (31.7)	
Diabetes	Yes	49 (70.0)	203 (76.0)	0.301
	No	21 (30.0)	64 (24.0)	
Dyslipidemia	Yes	26 (83.9)	226 (73.9)	0.221
	No	5 (16.1)	80 (26.1)	
UTI	Yes	17 (68.0)	235 (75.3)	0.417
	No	8 (32.0)	77 (24.7)	
PUD	Yes	16 (66.7)	236 (75.4)	0.342
	No	8 (33.3)	77 (24.6)	
Sepsis	Yes	11 (45.8)	241 (77.0)	0.001*
	No	13 (54.2)	72 (23.0)	
Malaria	Yes	8 (34.8)	244 (77.7)	0.001*
	No	15 (65.2)	70 (22.3)	
Cataract	Yes	13 (92.9)	239 (74.0)	0.204
	No	1 (7.1)	84 (26.0)	

*Significant at 5% level of significance. UTI=Urinary tract infection, PUD=Peptic ulcer disease, NSAIDs=Nonsteroidal anti-inflammatory drugs

proportion of patients with hypertension, spondylosis, and OA using NSAIDs, ($P \leq 0.036$, $P \leq 0.01$, and $P \leq 0.01$), respectively.

DISCUSSION

The knowledge on benefits and challenges of analgesic therapy in the elderly is essential and critical for a better understanding of its utilization in this population to enhance the prescribing pattern of analgesic use. The findings from this study show that more females are prescribed analgesics, with approximately two-third of the reviewed patients being female. The higher prevalence of females in this study may explain the better health-seeking behavior of elderly women than men as documented by Abdulraheem.^[22] This could also be attributed to the fact that women consume more anti-inflammatories and analgesics because of higher prevalence of arthritis, OA, and rheumatism pain than men as documented by a vast majority of studies.^[23-26] Most of the elderly patients were either overweight or obese; this could contribute to increase the complication of OA or joint

problems in this population of patients. Appropriate measures to support weight reduction are essential such as introducing physical exercise the patient can accommodate and may be dietary and lifestyle modifications.

It is not surprising that analgesics account for around one-third of the utilized medication at the study site during this study. Furthermore, the high prevalence of spondylosis and OA could account for the volume of analgesics used. OA is generally the consequence of “wear and tear” that complements aging. This is a usual cause of pain in the elderly and the knee is the most affected site; however, any joint of the body can be affected. While spondylosis is equally common and worsens with age, it is often described as degenerative arthritis (OA) of the spine.

Paracetamol is the most prescribed analgesic in this study, and it is an efficient analgesic for the relief of musculoskeletal pain symptoms such as OA and is a first choice analgesic recommended in consensus guidelines^[1,27-29] and National Institute for Health and Care Excellence (NICE) clinical guidelines for OA.^[30] It was suggested by the American Geriatrics Society that paracetamol should be prescribed prior to the use of oral anti-inflammatory medications. Paracetamol is usually well tolerated with little adverse effects but has a toxic metabolite that can accumulate in the liver. Thus, elderly patients should be prescribed lower doses, especially those with liver disease, and they should be advised not to exceed the maximum daily dose.^[4,31]

NSAIDs accounted for 65.1% of the nonopioid analgesic used by the reviewed elderly patients. They are more effective for assiduous inflammatory pain than paracetamol,^[1] and these classes are one of the commonly prescribed medications for pain and inflammation. The NICE guideline recommends the use of oral NSAIDs for OA where paracetamol or topical NSAIDs offer insufficient pain relief.^[30] Nonetheless, the appropriate efficiency of NSAIDs must be used with caution in the elderly because of its potentially severe and life-threatening adverse effects. NSAIDs have been associated with hospital admissions among the elderly due to adverse drug reactions and overdoses.^[1,32] Prostaglandins present in NSAIDs have a vital role in the physiological functions of the GI tract, renal, and cardiovascular systems, among others. In this study, majority of the elderly patients on NSAIDs are either on a combination product of diclofenac/misoprostol or a co-prescribed PPI to prevent NSAID-associated GI events. This is in accordance with the guidelines developed under the auspices of the American College of Gastroenterology that recommends gastroprotective agents (e.g., PPIs) or misoprostol for high-risk patients (defined as >65 or 70 years in most guidelines) taking NS-NSAIDs.^[17-19] However, a significant proportion of the hypertensive elderly patients are on NSAIDs; it has been documented that the use of NSAIDs could result in an increase in a mean arterial blood pressure of 5 mmHg.^[10,33] Thus, it might be beneficial if alternative therapy could be adopted for the management of most elderly

hypertensive patients to manage their pain. An alternative such as physiotherapy and other nonpharmacological therapies could be beneficial for hypertensive patients with OA and needs to relieve pain. It might be possible to manage some clinical features of OA such as pain, joint stiffness and functional limitation in hypertensive patients with physiotherapy alone and thus avoid NSAIDs-antihypertensive drug-drug interaction and NSAIDs-hypertensive drug-disease interaction. Physiotherapy has been found to be effective in the management of OA pain.^[34,35] On the other hand, the topical administration of analgesic may be tolerable than other routes of administration and may be preferable for older people. Furthermore, when paracetamol or topical analgesic is not effective for the management of pain in OA, NSAIDs can be administered sporadically. When continuous use is required, it should be assessed and monitored,^[24] especially for patients with hypertension, and if possible, should be avoided for long-term use.

A major limitation of this study is the inability to associate the prescribed analgesic data with clinical information of each patient. This, combined with better clarity on the indications for NSAIDs and guidelines for appropriate use, would allow additional decisive conclusions on the relative advantages and challenges of NSAID therapy.

CONCLUSIONS

Paracetamol was the most prescribed analgesic in this study. From the findings in this study, it is observed that NSAIDs use should be moderated among elderly patients with hypertension. Alternative treatment for musculoskeletal disorders, especially arthritis, should be encouraged. Increased awareness concerning vital contraindications, such as chronic kidney disease, GI ulcers, and risk of cardiovascular disease, including clinically relevant drug interaction with analgesics use among the elderly, is required to improve the management and survival of these patients.

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Conflicts of interest

There are no conflicts of interest.

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