

Polypharmacy and factors associated with their prevalence among older patients attending a geriatric centre in South-West Nigeria

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ABSTRACT

Background: Polypharmacy among older people in Nigeria are prominent issues of public health dimension. Polypharmacy especially in older people with multiple diseases often results in poor health status and outcomes.

Objectives: To determine the prevalence and factors associated with polypharmacy among older patients attending the geriatric clinic.

Methods: Cross sectional study of 400 elderly patients aged 60 years and above who presented at geriatric clinic, UCH, Ibadan. Polypharmacy was taken as concurrent consumption of ≥ 5 medications. Socio-demographic characteristics, lifestyle habits, attitudinal factors on medication understanding, medication pattern and intake were assessed through a questionnaire. Bivariate and multivariate analyses were carried out using SPSS 20 and alpha was set at 0.05.

Results: Mean age of the respondents was 70.2 ± 5.9 years and 240 (60.0%) were females. The point prevalence of polypharmacy was 23.8%. The average medications consumed were 4 without sex difference. Logistic regression analysis showed that taking too many prescription medications (OR ≥ 2.188 ; 95% CI $\geq 1.014 - 4.808$, $p \geq 0.05$), intentionally skipping my medications because they are too many (OR ≥ 3.756 ; 95% CI $\geq 1.354 - 10.424$, $p \geq 0.01$) and receiving prescriptions from more than one physicians on regular basis (OR ≥ 2.336 ; 95% CI $\geq 1.058 - 5.155$, $p \geq 0.04$) were the most significant factors associated with polypharmacy.

Conclusion: Polypharmacy is common among older people in this setting. Healthcare workers should address the attitudinal, social and health related factors, which could lead to polypharmacy.

Keywords: Geriatric centre, Nigeria, older patients, polypharmacy.

Polypharmacie et facteurs associés à leur prévalence chez les patients âgés fréquentant un Centre gériatrique du sud-ouest du Nigeria

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RÉSUMÉ

Contexte: La polypharmacie parmi les personnes âgées au Nigeria sont des questions importantes dans le cadre de la santé publique. La polypharmacie en particulier chez les personnes âgées avec de multiples maladies se traduit souvent par un mauvais état de santé et ses conséquences.

Objectifs: Déterminer la prévalence et les facteurs associés à la polypharmacie chez les patients plus âgés qui fréquentent la clinique gériatrique.

Méthodes: Étude transversale de 400 patients âgés de 60 ans et plus qui se sont présentés à la clinique gériatrique, du CHU (UCH), Ibadan. La polypharmacie a été prise en compte pour une consommation simultanée de ≥ 5 médicaments. Les caractéristiques sociodémographiques, les habitudes de vie, les facteurs d'attitudes sur la compréhension des médicaments, le mode de médication et la consommation ont été évalués au moyen d'un questionnaire. Des analyses bi-variées et multidimensionnelles ont été effectuées à l'aide de SPSS 20 et alpha a été fixé à 0,05.

Résultats: L'âge moyen des répondants était de $70,2 \pm 5,9$ ans et 240 (60,0%) étaient de sexe féminin. La prévalence ponctuelle de polypharmacie était de 23,8%. Les médicaments consommés en moyenne étaient 4 sans différence de sexe. L'analyse de régression logistique a montré que la prise de trop de médicaments sur ordonnance (ou $\geq 2,188$; 95% CI $\geq 1,014 - 4,808$, $p \geq 0,05$), en sautant intentionnellement mes médicaments parce qu'ils sont trop nombreux (OR $\geq 3,756$; 95% CI $\geq 1,354 - 10,424$, $p \geq 0,01$) et recevoir les ordonnances de plus d'un médecin sur une base régulière (OR $\geq 2,336$; 95% CI $\geq 1,058 - 5,155$, $p \geq 0,04$) étaient les facteurs les plus importants associés à la polypharmacie.

Conclusion: la polypharmacie est fréquente chez les personnes âgées dans ce cadre. Les travailleurs de la santé devraient aborder les facteurs d'attitude, sociaux et sanitaires qui pourraient conduire à la polypharmacie.

Mots-clés: Centre gériatrique, Nigeria, patients âgés, polypharmacie

INTRODUCTION

As people age, they almost invariably develop diseases which lead to the prescription of medications – both to prevent disease progression and for symptomatic relief. Unfortunately, drug treatment in later life is also problematic. There is a dearth of evidence on the efficacy of medications in very elderly people, and members of this age group are at highest risk of adverse drug reactions (ADR).¹ Older people may suffer from several, often chronic conditions requiring a multiple-medications approach to treatment.¹ Conversely, despite evidence supporting therapeutic benefit of medications for specific conditions in older patients, prescribing for the elderly may not be optimal¹ underprescribing for these same conditions is also common² and has a considerable morbidity and mortality associated with it.^{1,3}

Factors such as patient age, multiple diseases and disease severity, use of polypharmacy, as well as changes in pharmacokinetics and pharmacodynamics in older patients often result to increase in the incidence of drug toxicity and adverse drug reactions (ADRs).⁴ Older patients are also commonly subjected to transitions and relocations between hospitals, home and care homes⁵ poor socioeconomic condition,⁶ and use of multiple medicines which may likely⁷ increase the risks of developing an adverse drug reaction (ADR),^{8,9} due to changes in prescribers and medications. There is also a major consistency issue whereby patients do not adhere to the prescription as determined by their physician.¹⁰

Polypharmacy in patients with several concurrent disease processes is more likely to result in an adverse drug reaction (ADR), which in turn results in poorer health status and outcomes. Therefore, balancing the prescription of polypharmacy and the term "appropriate" polypharmacy is a significant challenge. It is the responsibility of the clinicians and clinical pharmacists to ensure that the patients receive appropriate combination of medications based on the current best evidence.^{11,12} Studies estimate that 17–20% of all hospital admissions in the over 65 years age group are linked to ADRs.^{13,14} ADRs are most likely to occur for several reasons including the use of agents that are explicitly contraindicated in older patients, adverse drug interactions, disease–drug interactions and non-compliance with prescription medications.^{14,15}

The aim of this study was to describe the prevalence and factors associated with polypharmacy among elderly patients at the Chief Tony Anenih Geriatric Centre (CTAGC), University College Hospital (UCH), Ibadan, Nigeria.

METHODS

Materials

The study population was male and female patients aged 60 years and above who present at the CTAGC, UCH between January and March 2016. Their ages were determined by direct recall and the use of the table of historical events by Ajayi-Igun.¹⁶ All non-consenting older patients and those who were too ill to undergo the study procedure were excluded.

Setting

This was a cross-sectional study carried out at the Chief Tony Anenih Geriatric Centre (CTAGC), University College Hospital (UCH), Ibadan. Ibadan is the capital city of Oyo State in the south-western area of Nigeria and has a population of 3.6 million inhabitants, while Oyo State has 5.6 million people.¹⁷ The CTAGC is a purpose-built centre, which was established on November 17, 2012 to give holistic care to older patients coming to UCH. CTAGC is the pioneer geriatric centre in Nigeria and has recreational, dietetics, physiotherapy, theatre as well as in- and out-patient units.

Design

The sample size was calculated using the Leslie and Kish formula for single proportion using the assumed prevalence of 50%. Thus, 400 older patients were recruited. Systematic random sampling method was employed to recruit every third older patient [Sampling interval \geq sampling frame (1080) divided by sample size (400) \geq 2.7].

Procedure

After a pretest on 20 older patients, an interviewer-administered questionnaire was used to obtain information on the respondents' demographic characteristics such as their age, sex, ethnicity, marital status and number of children; socio-economic characteristics such as educational level, income, occupation (present and past), living arrangement and lifestyle habits. Past medical history of the respondents including previous outpatient visits, previous hospitalization, healthcare utilization pattern, past morbidities and pattern of medication use in the past one year prior to this study was similarly obtained.

The family functionality of the respondents was assessed using a 5-item validated tool family APGAR^{18,19} which is scored from 0 to 2 per item with a score range of 0 – 10. A score of 7 and above indicates a functional family (Appendix 1). The attitudinal factors on

medications understanding tool was used to assess the respondents' satisfaction with their physicians (four items), medications (five items) and physician-patient communication (four items). Similarly, the medication pattern and intake of the respondents were assessed.

The questionnaire was translated to Yoruba language and back translated to English language. The administration of the questionnaire took about 40 minutes.

Statistical analysis

The administered questionnaires were sorted out, cross-checked after each interview and coded serially. Statistical Package for Social Sciences SPSS (version 21) was used for data entering, cleansing and analysis. Descriptive statistics was used to describe socio-demographic characteristics of the respondents. Appropriate charts were used to illustrate categorical variables. Chi-square statistics was used to assess association between categorical variables and Student's t-test to test association between continuous variables. Statistical significance was set at $p \leq 0.05$.

Ethical consideration

Approval for the study was obtained from the University of Ibadan/University College Hospital Institutional Ethical Review Board (UI/UCH IRB). Informed consent of each respondent was obtained before examination and administration of questionnaires. All the respondents

were treated for their primary complaints before administration of the questionnaire.

RESULTS

There were 400 respondents (females ≥ 240 and males ≥ 160). The mean \pm SD age was 70.2 ± 5.9 years (range 60–91 years). The males were significantly older than the females 71.2 ± 6.1 years vs 69.5 ± 5.7 years ($t \geq 2.738$, $p \geq 0.01$). Majorities of the respondents (86.3%) were married, had formal education (83.0%) and were retired (83.5%). Few respondents were living alone (5.2%) and self-supporting financially (28.2%). The median number of children alive was 5 (IQR 4–6) range 0–14 children. Significantly, the males had more children alive compared with the females [5 (IQR 4–6)] vs [4 (IQR 4–5)], $p \geq 0.01$.

There were 1525 total medications consumed by the respondents each day with the median ≥ 4 (IQR 3–4), range 1–10 medications. There was no significant difference between the number of medications consumed daily and between males and females ($p \geq 0.23$). Polypharmacy defined as 5 or more medications use per respondent was found in 95 (23.8%) respondents. Polypharmacy was observed more commonly among respondents who were married, female, had formal education, had retired from occupational activities, living with other relatives and were self-supporting financially (Table 1).

Table 1: Sociodemographic characteristics by the prevalence of polypharmacy

	POLYPHARMACY			χ^2	p
	YES = 95 n (%)	NO = 305 n (%)	Total = 400 N (%)		
Age groups (years)					
60 – 64	17 (24.3)	53 (75.7)	70 (100.0)	6.487	0.17
65 – 69	34 (27.9)	88 (72.1)	122 (100.0)		
70 – 74	29 (24.6)	89 (75.4)	118 (100.0)		
75 – 79	12 (23.1)	40 (76.9)	52 (100.0)		
≥80	3 (7.9)	35 (92.1)	38 (100.0)		
Sex					
Males	34 (21.2)	126 (78.8)	160 (100.0)	0.920	0.34
Females	61 (25.4)	179 (74.6)	240 (100.0)		
Marital status					
Married	85 (24.6)	260 (75.4)	345 (100.0)	1.471	0.48
Widowed, Divorced, Separated	10 (18.9)	43 (80.1)	53 (100.0)		
Single	0 (0.0)	2 (100.0)	2 (100.0)		
Educational attainment					
None	11 (16.2)	57 (83.3)	68 (100.0)	4.723	0.32
Primary school	14 (26.4)	39 (73.6)	53 (100.0)		
Senior Secondary school	28 (27.7)	73 (72.3)	101 (100.0)		
Tertiary school	42 (23.6)	136 (76.4)	178 (100.0)		
Occupational status					
Retired	80 (24.0)	254 (76.0)	334 (100.0)	0.046	0.83
Not retired	15 (22.7)	51 (77.3)	66 (100.0)		
Living arrangement					
Alone	5 (23.8)	16 (76.2)	21 (100.0)	6.413	0.09
With spouse	75 (26.5)	208 (73.5)	283 (100.0)		
With Children/Grandchildren	13 (14.3)	78 (85.7)	91 (100.0)		
With relatives	2 (40.0)	3 (60.0)	5 (100.0)		
Financial support					
Self	29 (25.7)	84 (74.3)	113 (100.0)	7.773	0.10
Spouse	11 (21.6)	40 (78.4)	51 (100.0)		
Children/Grandchildren	52 (22.4)	180 (77.6)	232 (100.0)		
Relatives/friends	3 (75.0)	1 (25.0)	4 (100.0)		
Number of children					
0 – 5	71 (27.4)	216 (75.3)	287 (100.0)	0.321	0.57
>5	24 (22.0)	85 (78.0)	109 (100.0)		

* Significant at 5% level of significance

Table 2 shows the healthcare pattern and lifestyle habits by the prevalence of polypharmacy. Respondents who had their first hospital admission after the age of 60 years, physically inactive and who

used herbal preparations had higher frequencies of polypharmacy. Poor self-rated health ($p \geq 0.03$) was significantly associated with polypharmacy use.

Table 2: Healthcare pattern and lifestyle habits by the prevalence of polypharmacy

	POLYPHARMACY			χ^2	p
	YES = 95 n (%)	NO = 305 n (%)	Total = 400 N (%)		
First Admission					
Never	55 (25.8)	158 (74.2)	213 (100.0)	2.808	0.25
Before 60	22 (18.3)	98 (81.7)	120 (100.0)		
After 60	18 (26.9)	49 (73.1)	67 (100.0)		
Self-Rate health					
Good	87 (22.8)	294 (77.2)	381 (100.0)	8.816	0.03*
Poor	8 (40.1)	11 (59.9)	19 (100.0)		
Health comparison with age mate					
Better	58 (23.7)	187 (76.3)	245 (100.0)	0.002	0.96
Same	37 (23.9)	118 (76.1)	155 (100.0)		
Alcohol					
Yes	1 (20.0)	4 (80.0)	5 (100.0)	0.352	0.84
No	94 (23.8)	301 (76.2)	395 (100.0)		
Tobacco					
Yes	1 (14.3)	6 (85.7)	7 (100.0)	0.352	0.55
No	94 (23.9)	299 (76.1)	393 (100.0)		
Physical Activities					
Very Active	4 (22.2)	14 (77.8)	18 (100.0)	0.276	0.87
Moderately Active	70 (23.3)	231 (76.7)	301 (100.0)		
Not Active	21 (25.9)	60 (74.1)	81 (100.0)		
Herbal medicine					
Yes	24 (26.7)	66 (73.3)	90 (100.0)	0.546	0.46
No	71 (22.9)	239 (77.1)	310 (100.0)		

* Significant at 5% level of significance

Attitudinal factors on medication understanding by the prevalence of polypharmacy are shown in Table 3. On the physician satisfaction, respondents using polypharmacy were significantly ($p \geq 0.01$) less satisfied with their physicians compared with those not on polypharmacy 97.9% vs 100.0%. On satisfaction with their medications, greater proportions of respondents with polypharmacy were significantly discouraged by

what their medications were causing to them ($P \geq 0.02$), felt they were taking too many prescription medications ($p \geq 0.01$) and lesser proportions believed that taking their medications improved their conditions ($p \geq 0.02$) compared with those not on polypharmacy. However, there was no significant association between physician-patient communication and the prevalence of polypharmacy.

Table 3: Attitudinal factors on medication understanding by the prevalence of polypharmacy

	POLYPHARMACY			p
	YES = 95 n (%)	NO = 305 n (%)	Total = 400 N (%)	
Physician satisfaction				
I'm satisfied with my doctor	93 (97.9)	305 (100.0)	398 (99.5)	0.01*
I feel my doctor listens carefully to what I have to say	94 (98.9)	304 (99.7)	398 (99.5)	0.38
I am comfortable talking to my doctor about anything that concerns me.	94 (98.9)	305(100.0)	399 (99.8)	0.07
I feel that my doctor understands concerns.	95 (100.0)	305(100.0)	400 (100.0)	-
Medication satisfaction				
I feel that my medications help me feel better	91 (95.8)	296 (97.0)	387 (96.8)	0.79
I am discouraged in what my medicines are doing for me	3 (3.2)	1 (0.3)	4 (1.0)	0.02*
I feel that I am taking too many prescription medications	5 (5.3)	3 (1.0)	8 (2.0)	0.01*
I believe that taking my medications improves my conditions	92 (96.8)	296 (97.0)	388 (97.0)	0.02*
I think my medications are safe to take	94 (98.9)	303 (99.3)	397 (99.2)	0.59
Physician-patient Communication				
I have asked my doctor questions about my prescription medicines	50 (52.6)	151 (49.5)	201 (50.2)	0.86
My doctor clearly explain to me how to take my prescription medicines	92 (96.8)	302 (99.0)	394 (100.0)	0.13
I have discussed my questions about my over-the-counter medicines with my doctor	3 (3.2)	15 (4.9)	18 (4.5)	0.75
I have received written information about my prescription medicines	3 (3.2)	7 (2.3)	10 (2.5)	0.18

*Significant at 5% level of significance

Table 4 described the medications usage pattern by the prevalence of polypharmacy. Factors that accounted for polypharmacy were using medications, which require action ($p \geq 0.04$),

skipping medications intentionally ($p < 0.001$), receiving medications from more than one physician on regular basis ($p \geq 0.01$) and having dysfunctional families ($p \geq 0.03$).

Table 4: Medications usage pattern by the prevalence of polypharmacy

	POLYPHARMACY			p
	YES = 95 n (%)	NO = 305 n (%)	Total = 400 N (%)	
My medications were kept with others	2 (2.1)	6 (2.0)	8 (2.0)	0.93
I use medications which requires use of pill dispenser	4 (4.2)	2 (0.7)	6 (1.5)	0.04*
I forgot to use prescribed medications often	17 (17.9)	53 (17.4)	70 (17.5)	0.91
I intentionally skipped my medications	10 (10.5)	8 (2.6)	18 (4.5)	< 0.001*
My doctors asked about my medications	94 (98.9)	305 (100.0)	399 (99.8)	0.07
I received prescription from more than one physicians on regular basis	15 (15.8)	20 (6.6)	35 (8.8)	0.01*
I have trouble remembering medications use	4 (4.2)	14 (4.6)	18 (4.5)	0.88
Medications at more than one pharmacy	88 (92.6)	285 (93.4)	373 (93.2)	0.78
I received help with buying my medications	38 (40.0)	124 (40.7)	162 (40.5)	0.91
I can afford my medications	74 (77.9)	224 (73.4)	298 (74.5)	0.39
I use medications other than prescription	16 (16.8)	38 (12.5)	54 (13.5)	0.28
Have dysfunctional family	7 (7.4)	8 (2.6)	15 (3.8)	0.03*
I do Self-medication prescription	1 (1.1)	2 (0.7)	3 (0.8)	0.70
I bought medications myself	71 (74.7)	215 (71.0)	286 (71.9)	0.48
I filled my medications at ≥ 1 pharmacy.	88 (92.6)	285 (93.4)	373 (93.2)	0.78
I received medications from neighbours.	38 (40.0)	124 (40.7)	162 (40.5)	0.91
My medications were changed ≥ 4 times in the past year.	5 (5.3)	16 (5.2)	21 (5.2)	0.99
I have enough knowledge on my medications.	29 (30.5)	99 (32.5)	128 (32.0)	0.72
I could afford my medications.	74 (77.9)	224 (73.4)	298 (74.5)	0.39
I took medications other than those prescribed by the doctors.	16 (16.8)	38 (12.5)	54 (13.5)	0.28
I received medications from relatives from outside Nigeria.	15 (15.8)	58 (19.0)	73 (18.2)	0.48

*Significant at 5% level of significance

Logistic regression analysis was carried out on variables, which showed significant association with polypharmacy. The logistic model was statistically significant, $\chi^2(9) \geq 30.975$, $p < .001$. The model explained 11.2% (Nagelkerke R^2) of the variance in polypharmacy and correctly classified 78.5% of cases. Multiple-drug therapy (OR ≥ 2.188 ; 95% CI $\geq 1.014 - 4.808$, $p \geq 0.05$),

intentionally skipping my medications (OR ≥ 3.756 ; 95% CI $\geq 1.354 - 10.424$, $p \geq 0.01$) and receiving prescription from more than one physician on regular basis (OR ≥ 2.336 ; 95% CI $\geq 1.058 - 5.155$, $p \geq 0.04$) were found to be most significantly associated with polypharmacy. See (Table 5).

Table 5: Logistic regression analysis of factors associated with polypharmacy

	β	P	Odds Ratio	95% C.I. for OR	
				Lower	Upper
Poor Self rated health	0.683	0.23	1.981	0.649	6.046
I'm satisfied with my doctors	21.295	1.00	17.995	0.000	.
I am discouraged in what my medicines are doing for me	-0.487	0.36	0.615	0.217	1.743
I feel that I am taking too many prescription medications	0.783	0.05*	2.188	1.014	4.808
I believe that taking my medications improves my conditions	-0.638	0.42	0.528	0.111	2.516
I use medications which requires action	-20.587	1.00	0.000	0.000	.
I intentionally skipped my medications	1.323	0.01*	3.756	1.354	10.424
I received prescription from more than one physicians on regular basis	0.850	0.04*	2.336	1.058	5.155
Have dysfunctional families	0.523	0.44	1.687	0.453	6.286

DISCUSSION

This study shows that about a quarter of the respondents were on multiple-drug therapy. This was less than the prevalence of 35.7% reported by Eze and Babalola among older patients in a teaching hospital in south west Nigeria.²⁰ Similarly, study from other part of Africa (Ethiopia) showed higher prevalence of polypharmacy (41.7%) among older people.²¹ Studies from Europe and the United States of America (USA) also reported higher prevalence of polypharmacy.²²⁻²⁴

The finding of high prevalence of polypharmacy among the respondents is not surprising, as older people usually have multi-morbidity with an average of three diseases found in each older person.²⁵ Polypharmacy is often a sequelae of prescribing many drugs for different co-existing disease conditions in the elderly.²⁶

There are various factors associated with polypharmacy among the elderly in this study. Poor self-rated health and inability to keep track of medications had strong association with polypharmacy. This could be related to the fact that poor health in the elderly increases the development of adverse drug reaction, which ultimately leads to polypharmacy use.²⁷ The data from this study showed that respondents on polypharmacy were less satisfied with their physicians and were discouraged by what their medications were doing to them. They felt they were taking too many prescription medications and only a few of them believed that taking many medications improved their conditions. This often leads to poor adherence to the prescription given by their physician.²⁸

The risk of polypharmacy was twice in the respondent on multiple-drug therapy and 3.7 times in respondents who intentionally skip their medications. Similarly,

those who receive prescription from more than one physician on regular basis had 2.3 times risk of polypharmacy. Consequently, the non-adherence to medications in older adults has been associated with complicated medication regimens and polypharmacy. This was similarly reported by Alomar in a systematic review where 43 – 100% of community dwelling of older adults experienced adverse drug reactions.^{10,27} Factors, which mostly led to patients skipping medications, include the cost and availability of the medications.

This study focused more on the physicians who were the primary prescribers for the older patients than other health care providers who were also involved in drugs administration and patient care. This could limit the generalizability of the study.

CONCLUSION

This study found that polypharmacy among patients attending a geriatric centre in Nigeria is high. Skipping medication intentionally and patronizing multiple providers were significantly associated with polypharmacy practice. The overall effect of polypharmacy is prescribing cascade, where a physician fails to realize that a new symptom is an adverse drug reaction or a side effect, and so another drug is deployed to treat this problem. Thus, there is a need for healthcare providers to ensure appropriate patient-centered medication counseling for better therapeutic outcome.

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