Knowledge, Behavior, Attitude and Practice of Hospital Pharmacists to Adverse Drug Reactions in the Elderly in a Tertiary Hospital in Nigeria

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ABSTRACT

Introduction: Adverse drug reactions (ADRs) including interactions is a drug therapy problem worldwide in the elderly and are a common cause of hospitalization. **Objectives:** To assess the knowledge, behavior and attitude of hospital pharmacists to adverse drug reactions in elderly patients in University College Hospital (UCH), Ibadan. **Methods:** A descriptive cross-sectional random sampling of 100 pharmacists in UCH, Ibadan with a self-administered structured questionnaire that assessed the knowledge on the safety of specific drugs, adverse drug reactions, behavior and attitude of pharmacists to ADRs reporting in the elderly. **Results:** The response rate was 95%, mean age was 37.55 ± 5.62; females were 53.7% and males 46.3%. The majority, 90.5% were married and 45.3% had a B.Pharm degree. Many 67.4% had poor knowledge of ADR; however, 63.2% within the age range of 31-40 years had good knowledge. Those trained in pharmacovigilance had a moderate knowledge of 22.2% while those without training had 50% of them with poor knowledge. Majority 86.3% did not have knowledge of STOPP/START as well as Beer's criteria as a screening tool in the elder. However, the majority had good behavior and attitude on ADR reporting. There was statistical significance between knowledge score and age, cadre and training in pharmacovigilance with P-values of 0.012, 0.015 and 0.021 respectively. **Conclusion:** Many of the respondents had poor knowledge of ADR in the elderly but they have good behavior and attitude towards ADR reporting. Therefore, educational intervention for hospital Pharmacists on ADR in the elderly is needed.

Key words: Adverse drug reaction, Elderly, Knowledge, Attitude, Behavior.

INTRODUCTION

The WHO defines elderly as individuals who are 60 years and above. The percentage of people in this age category continues to rise and the total is expected to reach 2 billion by 2050.[1]

The chronological age of sixty-five years as a definition of 'elderly' was accepted by most developed nations which however do not suit the conditions in Africa. Presently, the United Nations accepted cutoff is 60+ years for the elderly population. In Africa, it should be either 50 or 55 years of age although this constitutes another issue of data compatibility over nations. Traditional Africans define the elder or 'elderly' as someone within the chronological ages of 50 to 65 years based on the setting, region and the country[2-4]

Adverse Drug Reaction (ADR) is a response to a drug which is noxious and unintended and which occurs at doses normally used in man for prophylaxis, diagnosis, or therapy of disease or the modification of physiologic function.[5] ADR is acknowledged widely as a contributing factor to morbidity and mortality; despite the high awareness, research, publications, past errors or experiences and tough controls; ADRs and interactions in the elderly are prevalent and a high reason for hospitalization.[6,7]

There is a lot of argument on increasing age as a high risk of ADRs. Patient-specific physiological, as well as applicable characteristics, is likely more cavalier than age in forecasting the detrimental and beneficial results linked with definite medication therapies.[8] Thus, many studies worldwide show a relationship between advancing age

and ADR rate for some medical issues.[9,10]

Type A reactions is a primary factor for greater than 80% of ADRs, leading to hospitalization or happening in hospital settings.[11,12] These reactions are avoidable and predictable because they are connected to an enhancement of the pharmacological actions of the medications. Type A reactions are dose-dependent, reversible and disappear after decreasing the dose or withdrawal of the drug. Antibiotics, anticoagulants, digoxin, diuretics, hypoglycemic agents, antineoplastic agents and nonsteroidal anti-inflammatory drugs account for 60% of ADRs leading to hospitalization and 70% of ADRs happening in the hospital.[13] They are drugs with narrow therapeutic window, commonly used in geriatrics and linked with adverse drug reactions. Type A adverse drug reaction occurs more than the unpredictable type B reactions ('bizarre' or idiosyncratic) in the elderly. However, some type B toxicity like hepatotoxicity in relations with flucloxacillin or the combination of amoxicillin-clavulanic acid antibiotics are more common in geriatrics than pediatrics.[14]

Identification of ADRs can be difficult because it can present as common symptoms or problems prevalent in the elderly such as vertigo, falls, or mental confusion.[15] The physician can easily overlook ADR possibility which can lead to polypharmacy and symptomatic treatment of using one medication to manage the adverse effect of another. In a study involving long-term care patients, over sedation, falls and delirium were commonest manifestations of adverse drug events.[16] Many factors add to ADR episodes in elderly patients, thus making the development of a strong ADR prediction instrument that applies to a heterogeneous or diverse population and this implies that one single instrument cannot rightly predict all ADR in all elderly patient.[17]

Prescribing indicators like American Geriatrics Society Beers Criteria® (AGS Beers Criteria®) for potentially inappropriate medication that is widely used in older adults by clinicians and others in the healthcare team. They affect updates in a 3-yearly cycle since 2011. This AGS Beers Criteria® is a specific list of potentially inappropriate medication that is best avoided by the elderly in certain diseases or conditions.[18] Also, the Irish STOPP (Screening Tool of Older Person's Prescriptions) criteria or START (Screening Tool to Alert doctors to Right, i.e. appropriate, indicated Treatment) is a reliable, valid, all-embracing screening instrument that enables the clinicians to appraise the geriatric's prescription medications in the ambient their coexisting diagnoses. The Beers and STOPP/START were both developed based on reviews of primary research evidence by consensus

expert opinion that are most widely cited.[17] Using the STOPP criteria has an edge over the Beers criteria because it covers a wide range of drugs used in practice and are more sensitive to the possible effects of inappropriate medicines.[19] STOPP can be used together with START.

MATERIALS AND METHODS

The study was done at the University College Hospital (UCH), Ibadan. The hospital has over 56 clinical departments and services and also operates 96 consultative outpatients' clinic in 45 specialties. The participants were Registered Pharmacists working in the UCH, Ibadan. Using the Yamane Taro formula with a 10% attrition sample size of 95 was determined but 100 questionnaires were distributed. Participation was voluntary and respondents were assured of confidentiality, informed consent was also obtained from the respondents.

Ethical approval

This was obtained from the Institute for Advanced Medical Research and Training (IAMRAT) of the College of Medicine, University of Ibadan, Nigeria with protocol number UI/EC/18/0287.

Inclusion Criteria

Those included were all consenting registered pharmacists working in UCH.

Exclusion criteria

Those excluded were Youth Corps Pharmacists, Intern Pharmacists and Students on industrial attachments and non-consenting Pharmacists working in UCH.

Data collection

A cross-sectional study with a validated structured questionnaire that was divided into four sections which were demographics, knowledge on the safety of specific drugs, adverse drug reactions, the attitude and behavior of pharmacists to adverse drug reactions reporting in the elderly was conducted. Data collected was sorted, the descriptive and inferential analysis was done with IBM-SPSS version 21.0 (SPSS, Atlanta, GA, USA). Descriptive statistics such as frequency count, percentages, mean and standard deviation were used to summarize and present the result. Chi-square test was used to test the association between knowledge and attitude of the participants, a P-value ≤ 0.05 was considered significant. The knowledge, behavior and attitude of the pharmacists towards ADR reporting and affiliated aspects were determined with scoring for various parameters. The maximum total

score for knowledge was 12, 0-6 was categorized as poor knowledge, 7-9 was moderate knowledge while 10-12 was good knowledge. The categorization for behavior and attitude was carried out by calculating the mean score which was 5.5 out of 11. The respondents with scores above 8 were categorized as having a good attitude, while those with scores below 5 were categorized as having the wrong attitude.

RESULTS

Ninety-five questionnaires were returned from the 100 that were shared, giving a response rate of 95%. The minimum age was 24 and the maximum was 56, with a mean value of 37.55 ±5.626. The females were 53.7%, while the males were 46.3%. The majority of the participants were married 90.5% and 45.3% with Bachelor of Pharmacy (B.Pharm.) degree. The Pharmacists 1, who were at the lowest end of the cadre were 58.9%, while the deputy directors were 3.2%, also 66.3% of respondents claimed to have received training in Pharmacovigilance as seen in Table 1.

A good percentage of the males 77.3% had poor knowledge, while 58.8% of the females had poor knowledge. None of the males had good knowledge, compared with 7.8% for the females though it was not statistically significant (p-value 0.061).

The overall grouped knowledge score of adverse drug reaction revealed a very high percentage of poor knowledge (67.4%), followed by moderate knowledge (28.4%) and good knowledge (4.2%), which is discouraging as shown in Figure 1. However, 92.6% of respondents showed a good attitude, 5.3% moderate attitude and 2.1% wrong attitude as seen in Figure 2.

Majority of the respondents 86.3% did not have the knowledge of STOPP or START criteria and 85.3% the Beer's criteria as shown in Table 2.

The right attitude was observed towards ADR related activities, such as awareness or observance of the National Pharmacovigilance program 87.4% and Pharmacovigilance activities within the hospital 95.8%. About 96.8% of the respondents disagreed that not only ADRs to new drugs should be reported and 90.5% disagreed on not reporting ADRs observed with topical agents. Overall, the respondent's practice of ADR reporting tends to agree with all the parameters with the weighted mean (WM) range of 2.80-2.98 as well, they also tend to disagree that they should only report new drugs and need not report observed ADR of the topical agent with WM range of 1.06-1.16 as seen in Table 3.

The training received in pharmacovigilance revealed that 22.2% had moderate knowledge and 1.6% had good knowledge and the rest had poor knowledge (76.2%) despite the training in pharmacovigilance. For those without training, 50% out of 32 respondents had poor knowledge, 40.6% had moderate knowledge and 9.4% good knowledge. Respondents in the age bracket of 31-40 years had the highest percentage of good and moderate knowledge (63.2 and 16.8% respectively). There was statistical significance between knowledge score and age (P-value 0.012), cadre (P-value 0.015) and training in pharmacovigilance (P-value 0.021) as seen in Table 4.

Also, 96.8% agreed that reporting of ADRs increases the known knowledge of ADRs to old and new medications while 91.6% agreed that ADR reporting is a professional responsibility of the pharmacists, which are the right attitudes. Also, 95.8% revealed good behaviour by asking and documenting the history of allergy the patient before dispensing the drug and 98.9% informed patients of important side effects of drugs as in Table 5.

DISCUSSION

As the population of the world increases in age, the health care systems are forced to bear the weight of chronic diseases, resulting in the utilization of many drugs (polypharmacy) in the elderly population. Pharmacy education has evolved from the traditional functions of drug dispensing to an active role in direct patient

Table 1: Sociodemographic of Respondents' $N = 95$.			
Variable		**Frequency**	**Percent**
Gender	Male	44	46.3
	Female	51	53.7
Age	21-30	10	10.5
	31-40	60	63.2
	41-50	21	22.1
	51-60	4	4.2
Marital status	Single	9	9.5
	Married	86	90.5
Qualification	BSc/BPharm	53	55.8
	MSc/MPharm	27	28.5
	PharmD	2	2.1
	FPCPharm	12	12.6
	Ph.D	1	1
Designation	Pharmacist 1	56	58.9
	Principal Pharmacist	11	11.6
	Chief Pharmacist	18	18.9
	Assistant Director	7	7.4
	Deputy director	3	3.2

Table 2: Respondent's knowledge of the safety of specific drugs and behavior to ADR.		
Variables	F	%
What is an adverse drug reaction (ADR)?		
Detrimental effects that occur at the usual dose of the drug only	88	92.6
Allergic/hypersensitivity reactions to the used drug	4	4.2
Effects occurring only at drugs overdose	1	1.1
Which among the statement regarding ADRs is correct?		
ADRs are preventable always	6	6.3
ADRs are to some extent preventable	33	34.7
ADRs are not at all preventable	50	52.6
ADRs is only the serious harmful effects of drugs	6	6.3
The most common ADRs with lipid-lowering drugs include		
Alopecia	2	2.1
Hepatotoxicity	38	40.0
Skin rash	35	36.8
Renal toxicity	20	21.1
Side effects which commonly can occur with anticholinergic drugs administered to elderly patients include the following except		
Sedation	7	7.4
Delirium	8	8.4
Decreased body temperature	28	29.5
Dry mouth	52	54.7
These symptoms may be worsened by prolonged use of NSAIDS, except?		
High blood pressure and heart problem	27	28.4
Memory	47	49.5
Stomach ulcers or bleeding	16	16.8
Swelling of the ankles	5	5.3
Very high risk of toxicity is associated with these drugs in the elderly		
Azithromycin	1	1.1
Artemether/lumefantrine	2	2.1
Digoxin	92	96.8
NSAID induced ulcer is most likely to occur in		
Elderly	8	8.4
Those taking steroid with NSAIDs	7	7.4
Persons taking Alcohol	6	6.3
All of the above	74	77.9
Do you know the beer criteria?		
Yes	14	14.7
Do you know the STOP/START criteria?		
Yes	13	13.7

management and collaborative team-based care.[20] there is an urgent need for pharmacists in Nigeria to flow with this tide of best practices to give the older generation a good quality of life.

This study assessed the knowledge, behavior and attitude of hospital pharmacists to ADRs in elderly patients. The respondents' answers to basic questions on drug safety in the elderly in routine practice revealed that the few responded correctly to most questions while a good number still gave incorrect answers. This shows that the knowledge of pharmacists about adverse drug reactions is still not optimal and so there is a need for further training and specialization of the pharmacist in geriatric pharmacy for optimum care of elderly patients. This correlates with what obtains worldwide, that healthcare professionals have inadequate and poor knowledge about adverse drug reactions.[21] Statistical significances were however noted in designation or cadre of respondents and in those that had prior training in pharmacovigilance. The significance observed in respondents that had pharmacovigilance training is similar to a study which found out that training in pharmacovigilance was correlated with improved practice and knowledge of pharmacovigilance amidst healthcare providers.[22]

Also, the majority of the pharmacists lack knowledge about the tools used in screening for possible unsuitable
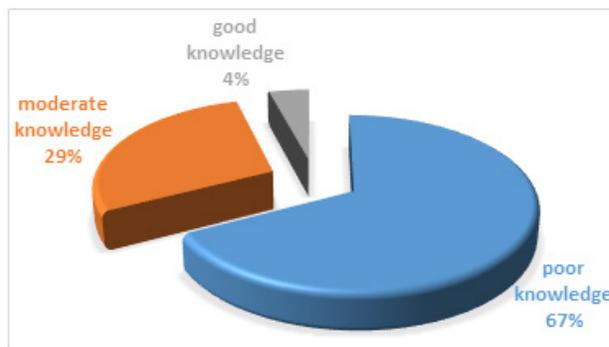

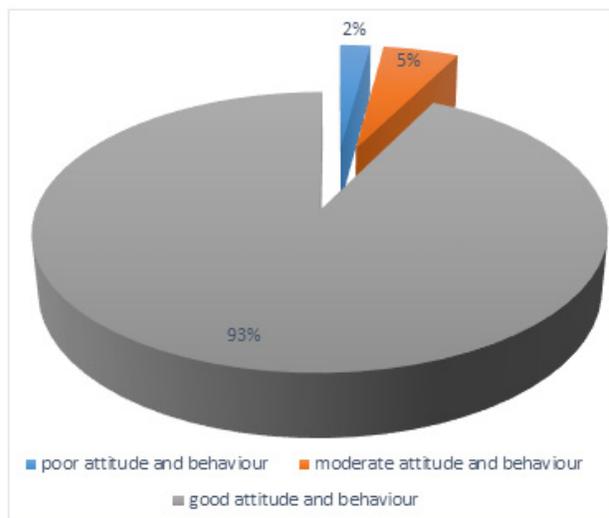**Figure 1: Knowledge of Respondents about ADRs.**

Figure 2: Attitude and Behaviour of respondents on ADR.

Table 3: Respondents knowledge and Practice of ADR reporting.

Variables	Agree	Undecided	Disagree	Weighted means
I am aware of the National Pharmacovigilance program	83(87.4)	7(7.4)	5(5.3)	2.82
I am aware of the Pharmacovigilance unit in the hospital	91(95.8)	4(4.2)	0(0.00)	2.95
I should only report ADRs to new medications	3(3.2)	0(0.00)	92(96.8)	1.06
There is no need to report ADRs observed to topical agents.	6(6.3)	3(3.2)	86(90.5)	1.16
Reporting increase my existing knowledge of ADRs to old and new medications	92(96.8)	1(1.1)	2(2.1)	2.95
Is my professional responsibility as a pharmacist to reporting ADRs	87(91.6)	3(3.2)	5(5.3)	2.86
ADRs reporting adds to unnecessary workload	6(6.3)	0(0.00)	89(93.7)	1.13
I should report ADRs to the regulatory agency/drug company	88(92.6)	4(4.2)	3(3.2)	2.90
I should take the history of allergy of the patient before dispensing their medication	91(95.8)	1(1.1)	3(3.2)	2.93
I should tell the patient the important side effects of the medication	94(98.9)	0(0.00)	1(1.1)	2.98
I should inform the patient on the ways to prevent ADRs of dispensed medication	83(87.4)	5(5.3)	7(7.4)	2.80

Table 4: Association between demographics and knowledge score.

Variables		Poor knowledge (%)	Moderate knowledge (%)	Good knowledge (%)	P-value
Gender	Male	34(77.3)	10(22.7)	0(0.0)	
	Female	30(58.8)	17(33.3)	4(7.8)	0.061
Marital status	Single	7(77.8)	1(11.1)	1(11.1)	
	Married	57(66.3)	26(30.2)	3(3.5)	0.312
Age group	21 to 30 years	6(6.3)	4(4.2)	10(10.5)	
	31to 40 years	44(46.3)	16(16.8)	60(63.2)	
	41 to 50 years	57(12.6)	5(5.3)	21(22.1)	
	51 to 60 years	2(2.1)	2(2.1)	4(4.2)	0.012
Qualification	M Pharm	5(71.4)	1(14.3)	1(14.3)	
	Pharm D	1(50.0)	1(50.0)	0(0.0)	
	FPC Pharm	7(58.3)	3(25.0)	2(16.7)	0.198
	Ph.D.	0(0.0)	1(100.0)	0(0.0)	
Designation	Pharmacist 1	38(67.9)	18(32.1)	0(0.0)	
	Principal pharmacist	11(100.0)	0(0.0)	0(0.0)	
	Chief pharmacist	10(55.6)	5(27.6)	3(16.7)	
	Assistant director	4(57.1)	2(28.6)	(14.3)	
	Deputy director	1(33.3)	2(66.7)	0(0.0)	0.015
Training in pharmacovigilance	Yes	48(76.2)	14(22.2)	1(1.6)	
	No	16(50.5)	13(40.6)	3(9.4)	0.021

Table 5: Respondents behaviour and attitude to ADR reporting.

Variables	Right	Wrong
Awareness of the National Pharmacovigilance program	83(87.4)	12(12.6)
Awareness of the Pharmacovigilance unit in the hospital	91(95.8)	4(4.2)
Only ADRs to new medications are to be reported	92(96.8)	3(3.2)
ADRs observed to topical agents need not be reported	86(90.5)	9(9.5)
Reporting of ADRs increase existing knowledge of ADRs to old and new medications	92(96.8)	3(3.2)
Reporting of ADRs is a professional responsibility of the pharmacists	87(91.6)	8(8.4)
ADRs reporting adds to unnecessary workload	89(93.7)	6(6.3)
Reporting of ADRs to the regulatory agency/drug company	88(92.6)	7(7.4)
Ask for the history of allergy of the patient before dispensing the medication	91(95.8)	4(4.2)
Tell the patient the important side effects of the drug	94(98.9)	1(1.1)
Inform patient on the methods to prevent ADRs of the dispensed drug	83(87.4)	12(12.6)

or inappropriate medication use in the elderly (Beer's Criteria) as well as STOPP/START criteria for inappropriate prescribing. This is consistent with inadequate knowledge observed from a study carried to determine the knowledge of physicians and clinical pharmacists on inappropriate medication prescribing for elderly patients with a focus on Beers criteria and the STOPP/START criteria.[23,24]

A good number of respondents had good behavior and attitude towards ADRs reporting. This is in contrast to a study that showed that the attitude and practice of the pharmacist's respondents constituted a challenge and these accounted for the poor level of reporting.[25] It is also good to know that the majority of respondents are aware of the National pharmacovigilance program as well as the existence of the pharmacovigilance unit within the hospital. It can also be deduced that the overall attitude and behavior of respondents that participated in this study are good.

Also, the pharmacist's knowledge of adverse drug associated issues in the elderly could greatly impact their behavior, thereby contributing to the safety of this category of patients. This will go a long way in reducing the cost to healthcare in terms of hospital admission and readmission as well as ensuring good clinical and humanistic outcomes.

CONCLUSION

It can be deduced that the majority of the hospital pharmacists had poor knowledge of the safety of the drug in the elderly, even though they had good behavior and attitude towards ADR reporting. There is a strong need for pharmacy specialization in the area of Geriatric pharmacy as it is being practiced in developed countries. Training and re-training of these Geriatric pharmacists will ensure optimum pharmaceutical care for this vulnerable population of patients.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

ADRs: Adverse drug reactions; **UCH:** University College Hospital; **ADR:** Adverse drug reaction, **STOPP:** Screening Tool of Older Person's Prescriptions; **START:** Screening Tool to Alert doctors to Right Treatment; **AGS:** American Geriatrics Society; **IAMRAT:** Institute for Advanced Medical Research and Training.

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