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IDENTIFICATION OF DRUG THERAPY PROBLEMS AMONG ELDERLY IN-PATIENTS OF A NIGERIAN TEACHING HOSPITAL

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ABSTRACT
Categorizing and identifying drug related problems will enable the practitioner with the co-operation of the patient to construct a care plan to resolve the drug therapy problems (DTPs). The aim of this study was to investigate the occurrence of drug related problems among elderly in-patients and to identify those at risk of DTPs. A two-fold study combining retrospective and prospective was carried out in a teaching hospital using elderly inpatients prescriptions and self assessment questionnaires. Ninety in-patient prescriptions (from case notes) were randomly selected for the retrospective study. Majority of the patients were males 54(60%). Most occurring disease was diabetes mellitus 9 (10.5%) followed by hypertension 8 (9.3%). Major therapeutic groups associated with drug related problems were cardiovascular drugs 113 (21.5%) and central nervous system drugs 92 (17.5%). Promethazine 7 (33.3%) occurred most as a potentially inappropriate medication using the Beers Criteria. Drug related admissions was 12 (13.3%) while drug related problems that occurred include major Polypharmacy 60 (66.7%), unnecessary drug therapy 29 (32.2%), adverse drug reactions 28 (31.1%), need for additional therapy 27 (30%) and non compliance 13 (14.4%). Twelve inpatients were assessed for the prospective study. Hypertension 5 (26.3%) was the highest diagnosis. Out of the 120 responses of the self assessment questionnaire, 99 (82.5%) were 'No' indicating a reduced risk. Drug therapy problems were evident in this survey especially in the retrospective study. This calls for pharmaceutical care intervention in the elderly.

Key words- Drugs, Problems, Elderly in-patients.

INTRODUCTION

Pharmaceutical care is that component of pharmacy practice which entails the direct interaction of the pharmacist with the patient for the purpose of caring for the patients drug related needs (Hepler and Strand, 1990).

Brodie et al suggested that pharmaceutical care includes the determination of the drug needs for a given individual and the provision not only of the required drugs but also of the services necessary (before, during or after treatment) to ensure optimally safe and effective therapy (Brodie *et al*., 1980).

Over the past 40 years, advances in drug therapies have improved patient care and have led to an apparent increase in the incidence of drug related problems (Strand *et al*., 1990).

Drug related problems or drug therapy problems can be defined as an undesirable event, a patient experience that involves or is suspected to involve drug therapy and that actually or potentially interferes with a desired patient outcome (Hurwitz, 1969).

Although drug t 49 problems occur in all patients, older people are more likely to suffer from multiple conditions as they are the greatest

consumer of prescription medicines. Older people are more susceptible to drug related problem due to altered pharmacokinetic and pharmacodynamic properties of drugs (Nikolaus, 1996).

An elderly patient is more likely to be taking a medication that has been prescribed inappropriately, one that is unnecessary, ineffective or potentially dangerous and to suffer an adverse drug reaction (Simon et al 2005).

Identifying DTPs is therefore very paramount in this special population.

By identifying the cause of the drug therapy problem, the practitioner and patient can rationally construct a care plan to resolve the drug therapy problem, thereby making it possible for the patient to achieve his/her goals of therapy(Cipolle et al 2004).

A study by Peters et al found a 78% decrease in preventable drug events with pharmacist rounding on an inpatient internal medicine service (Peters *et al.*, 2003). Also a study by Leape et al found out that pharmacist participation on rounds at the time medications were ordered, decreased preventable adverse drug events by 72% (Leape *et al.*, 1993).

In this study we intend to investigate the occurrence of drug related problems among elderly in-patients and to identify those at risk of DTPs.

METHODOLOGY

Location

The study was carried out using in-patients admitted at the male and female medical wards of Olabisi Onabanjo University Teaching Hospital Sagamu Ogun State.

Study design

The study was in 2 folds, retrospective and prospective

Retrospective Study**:** It was carried out using in-patient prescriptions for the elderly from prescriptions issued from the period of Jan 2008 – Dec. 2008. Prescriptions were selected based on the presence of any drug related problem.

Population And Sample Size

The total population of elderly patients admitted at OOUTH from Jan. 2008 – Dec. 2008 was 375 males and females. A quarter of the 375 was taken as sample size=93.75 ~90 using a random systematic method.

Data Collection

Data on demographics age and sex, the diagnosis, the different group of drugs and the total number of drugs were collected using a self designed data collection format

Prospective study**:** Between April – May 2009, 12 elderly in patients admitted in the hospital were issued self assessment questionnaire developed by Levy (2003) to determine those who are at risk of medication related problems.

Data analysis

The data collected were entered into Microsoft Excel for easy sorting and double checked to ensure accurate data entry. Graph Pad, version 2.05a (Graph Pad Software Inc, San Digeo USA) was used for further analysis. $P < 0.05$ was interpreted as significant.

Polypharmacy was categorized as minor or major as described by Lars (1998) and Students t test was used to detect the relationship between demographics and major/minor Polypharmacy.

Drug therapy problems were classified based on the categories given by Cipolle et al (2004).

The extent of potentially inappropriate outpatient prescribing for these elderly patients was ascertained using Beer's

updated criteria (Fick *et al*., 2003).

Limitations of the study

Limitations encountered in course of this study were **s**low retrieval of the case notes, time constraints, unwillingness to fill questionnaires by the inpatients, cumbersome nature of getting answers from the ill in-patients among others.

Ethical issues

Ethical consent was sought from the Institutional Review Board of OOUTH before commencement of the study.

To protect confidentiality, the prescription data were extracted without personal identification of patient.

Verbal consent was sought form in-patients before commencing the prospective study.

RESULTS

Retrospective study

Of the 90 prescriptions, 54 (60%) were males and 36 (40%) were females. The modal age was 60 – 64 years 27 (30%), the major occupation was trading, 35 (38.9%) followed by farming 15(17%).

Drug related admissions occurred in 12 (13.3%) case notes and the categories of drug therapy problems that occurred are shown in Table I.

Therapeutic groups associated with drug related problems are outlined in Table II with cardiovascular drugs 113 (21.5%) occurring most.

Diagnosis showed that diabetes mellitus was the highest occurring 9 (10.5%) followed by hypertension 8 (9.3%). The drug mostly used from beers criteria is promethazine. Table III shows the most commonly prescribed drugs in this study based on updated Beers list, by generic drug name and severity of potentially adverse events.

Major polypharmacy occurred in 60 (66.7) while minor polypharmacy occurred in 27(30%).

Relationship between demographics and major/minor polypharmacy showed no significant difference between males and females of all ages as regards major (P=0.6646, t=0.4674, df=4) and minor polypharmacy (P=0.4199, t=0.8980, df=4) .

multiple medications, physicians' lack of training in geriatrics as well as changes in pharmacokinetics and pharmacodynamics in elderly patients often result in increase in the incidence of drug toxicity and adverse drug reactions (ADRs) (Mayo Clinic 2004).

Practitioners need to be vigilant in monitoring for Adverse Drug Events (ADEs). Since the symptoms of ADEs vary widely and it may be difficult to distinguish the adverse effects of a drug from the symptoms of disease, it is wise to consider any new sign or symptom to be drug-related until proven otherwise (Conry 2000; Will multiple medications, physicians' lack of training in geriatrics as well as changes in pharmacokinetics and pharmacodynamics in elderly patients often result in increase in the incidence of drug toxicity and adverse drug reactions (ADRs) (Mayo Clinic 2004).

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Problems Occurring.

Classification	Frequency	Percent (%)
Unnecessary drug therapy	29	32.2
Adverse drug reaction	28	31.1
Need for additional drug therapy	27	30
Ineffective drug	18	20
Dosage too low	7	7.8
Dosage too high	6	6.7
Non compliance	13	14.4

Table II:Therapeutic groups associated with drug therapy Problems

Therapeutic Group	*Frequency*	*Percent(%)*
Cardiovascular	113	21.5
Central nervous system	92	17.5
Drugs affecting blood and nutrition	82	15.6
Anti infective	81	15.4
Endocrine system drugs	32	6.0
Musculoskeletal & joint disease	29	5.6
Antiallergics and drugs used in anaphylaxis	17	3.2
Maligniant disease & immunosuppression	14	2.7
Gastrointestinal	7	1.4
Others	61	11.4
TOTAL	**528**	**100**

Table III: Occurrence of potentially inappropriate medications by generic drug name and severity of potentially adverse events (Beers Criteria) .

Generic name of drug	*Frequency (N=21)*	*(%)*
High severity		
Promethazine	7	33.3
Diazepam	3	14.3
Amitryptyline	2	9.5
Methldopa	1	4.8
Naproxen	1	4.8
Bisacodyl	1	4.8
Pentazocine	1	4.8
Low severity		
Dypyridamole	4	19.1
Cimetidine	1	4.8

Table IV-In-patients response to self assessment questionnaires to identify risk for medication – related problems.

Question	*No No. (%)*	*Yes No.(%)*
1. .Do you currently take five or more medication?	2 (16.7)	10 (83.3)
2. .Do you take 12 or more medication doses each day?	12 (100)	0
3. .Do you take any of the following medications? Carbamazepine, lithium, quinidine, warfarin, digoxin, Phenobarbital, procainamide, theophylline	11 (91.7)	1 (8.3)
4. .Are you currently taking medications for three or more medical problems?	11 (91.7)	1 (8.3)
5. Have your medications or instructions changed four or more times this past year?	11 (91.7)	1 (8.3)
6. .Do more than one physician prescribe medications for you at regular basis?	11 (91.7)	1(8.3)
7. Do you get your prescriptions filled at more than one pharmacy?	9 (75.0)	3 (25.0)
8. Does someone else bring any of your medications to your home for you (such as a delivery person)?	11(91.7)	1 (8.3)
9. Is it difficult for you to follow your medication regimen or do you sometimes choose not to?	11(91.7)	1 (8.3)
10. Of all your medication is there any particular medicines for which you do not know the reason for taking it?	10 (83.3)	2 (16.7)

Prospective study

Of the 12 elderly in patients, 7 (58.3%) were males and 5 (41.7%) were females with an average age of 63.25±9.32. Their occupations were mostly trading 7 (58.3%) and most of them had no formal education, 7(58.3%). Ten (83.3%) were married while 2(16.7) were widowed.

Out of the 120 responses of the self assessment questionnaire, 99(82.5%) were 'No' indicating a reduced risk. Table IV shows the response to self assessment questionnaires to identify risk for medication – related problems.

Ten (83.3%) inpatients answered yes to the question 'Do you currently take five or more medication?.' High blood pressure occurred most among the elderly 5 (26.3%).

Chronic diseases were prevalent in this study with diabetes and hypertension leading. This may be because physiological alterations induced by the aging process make the elderly more susceptible to chronic diseases and consequently to increased drug utilization (Braga 2004).

In this study therapeutic groups most associated with drug related problems were cardiovascular drugs. This finding has been verified in previous studies(Chen et al 2001; Narinder B et al 2003; Braga et al 2004) and is linked to the high index of cardiovascular problems in the elderly, which are one of the main causes of death in this population(Ali Raza and Moyahed 2002; Flores and Mengue 2005).

"Potentially inappropriate medications" were identified with Promethazine and Dypiridamole occurring most as high and low severity respectively (Table III)

Inappropriate use of medication occurs most in patients taking many medications" (Steinman et al 2006).

One way to protect elderly patients from potentially harmful consequences of Polypharmacy is by knowing which drugs frequently cause problems in this age group. The most common culprits are listed in the Beers Criteria, a system first developed in 1991 to identify those medications that are potentially harmful to the elderly.(Fick et al 2003)

Many healthcare organizations use the Beers Criteria to evaluate the drug regimens of their elderly patients (Lin 2004). However, it is important to remember that the criteria do not ban the use of certain medications for all elderly patients; rather, they emphasize those that 'should generally be avoided' either because they are ineffective or because they pose a high risk and a safer alternative is available(Lin 2004). As always, the prescribers need to rely on their clinical judgment and knowledge of their patients' conditions.

Major Polypharmacy of above 60% was high. Elderly patients are particularly susceptible to polypharmacy issues not only because aging affects how their body handles medication but because they take more medications than younger patients(Williams 2002). At any given time, an elderly patient takes on average, four or five prescription drugs and 2 over the counter (OTC) medications[24] Beers 2003.

In addition, complementary and alternative medicines such as herbal therapies are becoming increasingly popular among all patients, including the elderly(Fulton and Allem 2005)

There were no significant difference in the occurrence of major /minor polypharmacy for sex and age groups. This implies that the different groups were exposed equally to PolyPharmacy.

There was a high negative response to risk of DTP. This is ironical since the risk assessment questionnaire had a high percentage of the inpatients exposed to more than five medications

(Major PP) and concurred with findings in the retrospective study.

CONCLUSION.

In this study, we described the occurrence of drug therapy problems in the elderly. Drug therapy problems was evident in this group especially in the retrospective study, there was evidence of polypharmacy and potentially inappropriate medications. New studies are necessary to evaluate the needs of the elderly with regard to their drug use. Pharmaceutical care programs can be developed to identify, resolve and prevent drug therapy problems.

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