

Knowledge of Guidelines of Drug Use in Geriatric Patients can Avoid High Misuse of Antibiotics in these Patients

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Abstract

Objective: To determine the knowledge of drug prescribers, its impact on their prescription and the basis of their decisions in geriatric patients.

Study design, settings and duration: Prospective cross sectional study in medical units of three tertiary care government hospitals of Karachi, Pakistan from 1st June till 31st August, 2014.

Subjects and Methods: Two hundred seven (207) house officers, Postgraduates, Residents and Medical officers who completed their undergraduate degree programs in five different medical universities and working in three tertiary care government hospitals, were asked to complete a questionnaire to check their knowledge about the selection of medications in the geriatric patients. The questions were aimed to check the awareness of prescribers regarding different facts which should be considered before prescribing drugs in geriatric patients and to explore the choice of drugs in these patients as per standard criteria. Detail of medications which were purchased from different medical stores outside the hospital and were used in geriatric patients was collected to link the knowledge of prescriber and its impact on prescription. Same physicians filled another questionnaire to justify their prescriptions when their knowledge of the use of drugs in geriatric patients was found to be poor.

Results: Assessment of knowledge of 124 prescribers (59.9% of 207 who responded the questionnaire) showed that only 32.2% knew the lower age limits of geriatric patients, 29.8% knew guidelines for drug use in elderly, 18.5% were aware of the factors effecting drug selection, 12.0% knew the factors causing over-prescription and 46.7% knew the factors influencing dose selection. Antimicrobial drugs were the most inappropriately prescribed drugs and 78.3% are prescribed irrationally. Cephalosporin was the most prescribed group and given to 71.2% of the patients. Within this group Ceftriaxone, a (3rd generation Cephalosporin) was mostly prescribed in 43.1% of the total patients. Fear was the most prevailing factor (41.1%) in prescribing an antibiotic in geriatric patients.

Conclusion: Results show that poor knowledge of prescribers for appropriate use of drugs in geriatric patients results in excessive use of broad spectrum antibiotics and the decision is mostly based on illogical basis.

Key words: Drug, geriatric patients, misuse, cephalosporin.

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Authors Contribution

MTA has done the conceptualization of project and statistical analysis. Data collection was done by HT. MTA and HT did the literature search drafting, writing and revision of the manuscript.

Introduction

World's elderly population is expanding at an unprecedented rate. WHO estimates that geriatric population is expected to increase by 1.5 times till mid of the century.¹ Similarly, United Nations reports that the elderly population will be responsible for the half of the increase in world population within three decades² and the population aged 60 years or above will be double by 2050 in developed regions of the world. Expansion of this segment of population will challenge the health policy makers for equal provision of facilities to all in need. The patients of this age carry arguments in diagnosis owing to unique symptoms and complex physiology with altered

fat/muscle ratio, decreased renal and hepatic function, comorbidities, poly-pharmacy and poor compliance to medicines.³ All these factors increase their vulnerability towards various drug-drug interactions, adverse drug reactions and unexpected drug responses especially antibiotic resistance. The understanding of complex physiology of this population and their treatment as per specific need will be most important to combat this problem. We assessed physician's knowledge regarding the factors important in prescribing drugs in elderly and its impact on prescription in a tertiary care hospital.

Subjects and Methods

A cross-sectional survey was conducted from 1st June till 31st August, 2014 in three tertiary care hospitals of Karachi, Pakistan regarding the drugs used by the aged patients. The whole study was completed in three phases: 207 House officers, Postgraduates, Residents and Medical officers with undergraduate study in five different medical universities and working in three tertiary care government hospitals, were asked to complete a questionnaire to check their knowledge about the selection of medications in the geriatric patients. The questions were arranged in two sets. 1st set was aimed to check the awareness of prescribers regarding different facts which should be considered before prescribing drugs in geriatric patients. 2nd set was to explore the choice of drugs in these patients as per standard criteria.⁴⁻⁶

Detail of medications which were purchased from different medical stores outside the hospitals and were used in geriatric patients, was collected.

Choice based Questionnaire was filled by same Physicians to explore the basis of their prescriptions in these patients after finding their poor knowledge.

The data was compiled and SPSS version 16 was used for Statistical analysis.

The study was approved by Ethical & Scientific Review Committee of Karachi Medical & Dental College, Karachi.

Results

Table-1 shows the knowledge of 124 prescribers who responded the questionnaire (59.9% of total). Majority of prescribers (68%) did not know the age limit of geriatric patients. Almost same number of prescribers did not know the guidelines for the drug use in elderly.

Most of them did not have any knowledge for the factors affecting drug selection or causing over prescription in these patients. However, almost half of them were aware of the factors to be considered at the time of dose selection in cardiac, hepatic and renal patients.

Table 1: Knowledge of drug use in geriatric patients in 124 doctors.

Profile	Correct Responders	%
Age limit of geriatric patients.	40	32.25
Guidelines for drug use in elderly	37	29.80
Factors effecting drug selection.	23	18.50
Factors causing over-prescription.	15	12.00
Factors influencing dose selection.	58	46.77

Table-2 shows the ability of prescribers to choose correct drug as per standard criteria applicable for the selection of drugs in elderly. Most prescribers made correct choices in Analgesics but incorrect choices in Antibiotics.

Table 2: Knowledge of appropriate drugs in geriatric patients among 124 doctors.

Drugs	Correct Responders	%
Among analgesics	91	73.30
Among cardiovascular drugs	55	44.35
Among anti diabetics	32	25.80
Among antimicrobials	27	21.70

Table-3 depicts the various groups of Antibiotics used in 132 patients. Cephalosporins constituted the major group prescribed in 71.2% of the total patients.

Table 3: Groups of Antibiotics Used 132 Patients.

Groups	No. of Patients	%
Cephalosporins	94	71.21
Flouroquinolones	54	40.90
Metronidazole	50	37.87
Penicillins	22	16.67
Aminoglycosides	11	8.33
Others	15	11.36

Table-4 shows the Cephalosporins arranged in descending order which were used in 94 patients. Ceftriaxone is the most commonly used Cephalosporin given to 43.1% of the patients.

Table 4: Members of cephalosporin as per descending order of their use.

Cephalosporins	No. of Patients	%
Ceftriaxone(3rd generation)	57	43.18
Cephadrine(1st generation)	14	10.60
Ceftazidime(3rd generation)	08	06.06
Cefoperazone(3rd generation)	05	03.78
Cefotaxime(3rd generation)	04	03.03
Others	06	06.81

Table-5 depicts the basis of antibiotic prescription by 124 prescribers. Fear is the most prevailing factor in prescribing an antibiotic in geriatric patients which was found in 41.1% of the prescribers.

Table 5: Rationale of prescription in 124 prescribers.

Reason	Agreed	%
Fear	51	41.12
Complacency	33	26.61
Derived from Senior tactics.	27	21.77
Scientific basis with laboratory support	13	10.48

Discussion

Our study shows a deficient knowledge of drug therapy in aged patients among our doctors. Similar results were obtained in the studies conducted in Purma,⁷ Taiwan⁸ and USA.⁶ This implies that this problem exists in many countries and is almost in same proportion in developing countries. It can be achieved logically that the education must be provided to tackle the problems of a prevalent population. However, it has been found that less time is devoted to basic sciences such as pharmacology because of integrated organ and disease based approaches and integration of pharmacology into the problem based teaching has over shadowed the education of separate topics, thus affecting the basis of pharmacology.^{9,10} This might contribute to deficient knowledge of pharmacology and drug therapy.¹¹ This believe is further supported by first year medical students who believe that they are poorly trained and taught clinical pharmacology and therapeutics.^{12,13} This becomes problematic also for pre-registration house officers since they lack the doctoral skills, including prescribing, decision making, treatment and handling emergencies.¹⁴ Similarly post- graduate trainees also lack clinical skills and commit more prescribing errors than other clinicians.¹⁵ The problem can be solved by emphasizing more on pharmacology as it has been found that undergraduate and post-graduate curricula stress relatively less on general and geriatric pharmacology.¹³

The antibacterial drugs are among the most prescribed medications in present study. It is also supported by many studies^{3,16,17} and such accelerated use has contributed significantly to antimicrobial resistance¹⁸ especially in elderly¹⁹ because of their depressed immune function, co-morbidities, poor drug compliance, thus making infections a common cause of their hospitalization. This intricacy needs attention and can be managed by effective antibiotic therapy, considering patients compliance and good supervision by the health care providers. However, this requires sound knowledge and keen judgment again.⁹

Our study supports the fact that poor knowledge of prescriber adversely affects the rationality in prescribing. Cephalosporin has been found as the most prescribed group, followed by Fluoroquinolones. Both the groups have wide spectrum of activity and are good for elderly patients as early use of broad spectrum antibiotic is indicated in them since they are weak and

affected by multiple organisms simultaneously.²⁰ According to the research published in 'Clinics in Geriatric Medicine', in order to achieve maximum benefits with minimum toxicity, the preferred approach in geriatric patients is to prescribe aggressively the carefully selected drugs and then to downsize them to appropriate drugs.²¹ But such an approach carries an increased risk of antimicrobial resistance, further augmented by prophylactic use of antibiotics rather than therapeutic.²² Ceftriaxone is the most prescribed drug in our study which is also supported by study of Borrego and Gleckman,²³ and is also the most used antibiotic in our setting. But such prevalent prescription of cephalosporin and empirical use has contributed to the emergence of extended spectrum beta- lactamases in gram negative bacteria, thus making them ineffective in life-threatening infections and a serious threat worldwide.²⁴ The prevalent prescription of Cephalosporin and Fluoroquinolones in our survey is the result of limited knowledge about the selection of appropriate drugs and their pharmacokinetic and pharmacodynamic, although their use is unexpectedly good in elderly.

We tried to Identify the reason of prescribing some particular antibiotics. Fear is found to be the most important factor. It is followed by complacency and learning from seniors. Scientific basis with laboratory support is the last in this queue. Cullinan and his colleagues in their recently published paper carried out a meta-analysis of the data in the original articles published up to the end of April 2013 extracted from Pubmed, Embase, CINAHL and web of knowledge, found four factors in potentially inappropriate prescribing which were the need to please the patient, feeling of being forced to prescribe, tension between prescribing experience and prescribing guidelines and prescriber fear. These were re-interpreted in a line of argument synthesis indicating that some doctors have self-perceived restrictions with regard to prescribing appropriately because of a combination of factors rather than any one dominated factor. However, the important factors is prescriber fear of insufficient treatment of infection in our case and can be related to knowledge of prescriber directly.²⁵

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