Original Research

Assessment of drug prescribing pattern and prescription errors in elderly patients

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Abstract

The rate of aging is rapidly increasing and the term of geriatric refers to offer a medical care to elderly people. Drug consumption study on geriatric population is a vital issue since this group is totally neglected in Libya. The aim of this study was to assess drug utilization pattern among elderly patients in terms of world health organization core prescribing indicators and to evaluate the treatment cost. A total of 106 prescriptions were randomly collected from different community pharmacies located in Tripoli during the summer 2019, and were evaluated (total number of prescribed drugs is 359) for their clinical efficacy and safety. The findings revealed that 60 drugs acting on GIT (16.7%), 50 antimicrobial drugs (13.9%), 31 antihypertensive drugs (8.6%) and 30 drugs for respiratory diseases (8.4%) were prescribed to patients who are 65 years old or more. With regard to disease pattern in the elderly Libyan patients, 27 drugs were prescribed for diabetes mellitus (7.5%), 24 drugs for cardiovascular drugs (6.7%) and 14 drugs for anti-hyperlipidemia (3.9%). According to the WHO core drug use indicator pattern, the average number of drugs prescribed per encounter was 3.3. Prescription by generic name was low (41.5%). Antibiotics were 36.8% while injections were 26.6%. Thus, this study suggest that geriatric medicine and rational drug use should strongly be implanted in medical schools and teaching hospitals. Besides, a drug pattern use of the Libyan community is urgently required to avoid drug prescribing errors.

Introduction

Drug utilization research is defined by World Health Organization (WHO) as marketing, distribution, prescription and use of medicines with highlighting on the resulting medical, social and economic consequences [1]. The evaluation of drug utilization is a vital tool for clinical, educational and pharmaco-economics purposes [1]. It provides insights into different drug use and prescribing such as pattern of use, quality of use, determinants of use and outcomes [2]. The goal of drug utilization study is to promote rational and appropriate use of medicines at lowest possible dose and cost as defined by WHO [3]. In several countries, rational drug use is a major health issue that public health providers face [4]. Over the last years, the concept of rational drug use was the main subject of several local, regional and international assemblies. Previous published studies regarding safe and effective use of medicines showed that irrational drug use is a global phenomenon and few prescriptions justify rational drug use [5, 6]. The general advancement in medicine and knowledge has contributed to the increase in life expectancy of the population in the word. This has led the people to live longer but has led to an increase in risk of diseases and injuries. Despite the fact that number of elderly people in Libya in 2018 is 6.2%, but this percentage is expected to rapidly increase as a result of the improved economic status, health services coverage. Libya annual reports indicate that life expectancy of the population has increased in the past few years and peaked 73.1 years (men 72.1 and women 74.1 years) [7]. It is identified that safe and effective drug therapy is most possible only when patients are well informed about the medications and their use. The criteria for rational drug use are accurate diagnosis, proper prescribing, correct dispensing and patient adherence [3].

Physicians should make accurate diagnosis and prescribe rationally and pharmacists should ensure that effective form of the drug reaches the right patient in prescribed dosage and quantity with a clear instruction on its appropriate use. Pharmacists should have an easy access to complete and unbiased information on the drugs used and undergo prerequisite programmers for pharmacist training [8, 9]. Factors such as patient age, multiple diseases and its severity, use of poly-medications, changes in pharmacokinetic and pharmacodynamics aspects in elderly patients often result in high incidence of drug toxicity and adverse drug reactions. The identification of the quantity and type of prescribing problems are fundamental first steps in trying to improve the quality of prescribing and medication safety. These require that rational drug prescribing be promoted and potentially dangerous prescribing patterns be detected quickly and discouraged. Much drug related morbidity in the elderly population may be avoidable as it is due to inappropriate prescribing [10]. By keeping the above-mentioned issues, this study was carried out to determine the possible irrational use of medications among the prescribed medications in the elderly Libyan patients**.**

Materials and methods

For ethical considerations, a document was submitted to the departmental review board at Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, University of Tripoli, Tripoli, Libya. The committee provided unconditional approval to this study, agreed to the use of unwritten consent and provided this study a registration number: 2109. The sample size was calculated by Slovin's formula, with a population size of about 1.5 million living in Libya (10% are more than 65 years old), confidence interval (CI) 0.95 and margin of error 5%. The required number of elderly patients was 106 patients to achieve the required CI. The study was carried

out for three months from June to August, 2019. Potential participants have randomly been approached in Al Mokhtar and Oya Clinics and other private Pharmacies located in Tripoli using a simple random sampling method. Data collectors were well-trained senior pharmacy students and certified pharmacists. The questionnaire included formal information of the patient as (name, age and gender), disease, diagnosis and drug prescribed for the patient and drug parameter (name of drug, strength, frequency, duration together with starting and ending dates, dosage form and route of administration). Descriptive statistical analysis was applied for demographic variables including percentage (frequency) for each part.

Results

The demographic characteristics of the geriatric patients are shown in **Table 1**. Out of 106 prescriptions studied, 44 (45.8%) belonged to males and the rest 52 (54.2%) belonged to female patients, giving male to female ratio of 1.0: 0.6. Most of the patients in the age group is 65 - 70 years old received the highest percentage (52.5%) of the prescriptions, whereas the lowest percentage (4%) of the prescriptions was in the 90 years' age group (**Table 2**). Based on Beers criteria (95%) patients received potentially appropriate prescriptions and 5% were prescribed inappropriately it by personal communication.

Table 1: Gender distribution of Libyan elderly patients

Gender	No. of patients	Percentage
Male	44	45.8
Female	52	54.2

Table 2: Age-related distribution of the elderly patients according to prescriptions

No.	Age, years	No. of prescriptions	Percentage
1	65 – 70	53	52.5
2	71 – 75	24	23.8
3	76 – 80	09	9.0
4	81 – 90	11	10.9
5	≥ 90	04	4.0

In **Table 3**, disease's pattern present was found to be three. It was observed that the total number of 359 drug products were prescribed to 106 elderly patients. Thus, 60 drugs (16.7%) were as analgesic and anti-inflammatory drugs, 50 drugs (13.9%) were as GIT agents, antimicrobial drugs

were found to be 43 (11.1%), 31 (8.6%) as antihypertesive drugs and 30 drugs (8.4%) for respiratory diseases. A total of 27 (7.5%) drugs were prescribed for diabetes mellitus, 24 drugs (6.7%) for cardiovascular diseases, 19 drugs (5.3%) as vitamins, minerals and dietary supplements, 14

drugs (3.9%) for hyperlipidemia. 13 drugs (3.6%) for CNS disorders, five drugs (1.4%) as antihistamines. Two drugs (0.6%) for hematological disorders and 41 drugs (11.4%) were for other diseases and disorders (**Table 3**). According to WHO core drug use indicator pattern, the average number of drugs prescribed per encounter was 3.3. The total number of drugs prescribed by generic name was 41.5% which may not be in favor of the elderly patients. Antibiotics were prescribed in 36.8% while injections in 26.6% of the prescriptions (**Table 4**).

Table 3: Therapeutic classes of the prescribed medicines for elderly patients

Category of drugs	No. of drugs	Percentage
Analgesics, anti-inflammatory drugs	60	16.7
Drugs acting on G.I.T	50	13.9
Antimicrobial drugs	43	11.12
Antihypertensive drugs	31	8.60
Drugs acting on Respiratory system	30	8.35
Drugs used in Diabetes mellitus	27	7.52
Drugs used in Cardiovascular disease	24	6.68
Vitamins, minerals, dietary supplements	19	5.29
Drugs acting on Hyperlipidemia	14	3.90
Drugs used in CNS disorders	13	3.60
Antihistamines	05	1.39
Drugs acting on hematological system	02	0.55
Others	41	11.4

Table 4: WHO core drug indicator for drug prescribing for elderly Libyan patients

Prescribing indicators	Findings
Average number of drugs per encounter	3.3
Percentage of drugs prescribed by generic name	41.5%
Percentage of encounters with an antibiotic prescribed	36.8%
Percentage of encounters with an injection prescribed	22.6%
Percentage of drugs prescribed from national essential drugs list	

The occurrence of some missing items in the prescriptions as date of consultation, diagnosis, frequency and duration of medications is shown in **Table 5**.

Table 5: Parameters not given in the prescriptions of the elderly Libyan patients

Identification of data	Percentage
Family health record number	
Name of the patient	25.7
Age of the patient	0.99
Sex of the patient	1.98
Nationality of the patient	NA
Name of the physician	29.7
Date of the consultation	30.0
Diagnosis and medications	
Diagnosis	49.0
Frequency of medication	01.0
Duration of medication	02.0

Missing items regarding the patient as name (25.7%), age (1.0%), sex (2.0%) and name of the physician (30.0%), date of consultation (30.0%) and diagnosis of the disease (49.0%). Frequency and duration of the medications are 1.0% and 2.0%, respectively, which is an indicator of positive prescribing pattern

Discussion

Elderly peoples are more vulnerable to certain diseases and therefore poly-drug-therapy is more used to treat these diseases. However, almost 50% of all the drugs are prescribed, dispensed or sold incorrectly and half of the patients fail to take them correctly. Similarly, about 30% of the world's population lacks access to essential drugs. People also believes that herbal medicinal products are better than synthetic drugs and use these herbal products concurrently with pharmaceutical drugs. Globally, with these regard, several activities have proved useful and effective in promoting rational drug use and recommended for general use. By keeping the above mentioned issues, this study was established with the goal of gaining an understanding drug utilization patterns in elderly people in Libya where the health care system is weak. The main finding of the present study of evaluation of pattern of drug use in elderly Libyan patients is under the standard recommendation of WHO and does not correlate with most of the international published data.

This is an alarm finding to the Libyan society and health authorities to have an action to avoid both prescribing and dispensing errors. In this study, the male patients are less than the female patients which is in accord with the previous study [11]. However, the prevalence of the diseases among the male patients is greater than the female patients but this is not in line other reported studies [12, 13] while in line with one study [14]. Interestingly, some demographical data of the present finding is in well-accord to the previous published studies [11, 15]. With regard to the prevalence of drug prescribing for geriatric patients, the most common prescribed drugs were for GIT disorders followed by cardiovascular diseases, respiratory diseases and diabetes mellitus. This finding is similar to the previous study [16] who reported that GIT disorders is a main cause for hospital admission followed by cardiovascular and respiratory diseases in addition to diabetes mellitus. In a study by John and others [17], the prevalence of cardiovascular diseases is high followed by respiratory diseases and diabetes mellitus. Abraham and others [5] reported that cardiovascular drugs were the most commonly prescribed drug followed by GIT agents and antimicrobial agents. Cardiovascular diseases are account for more hospitalization, for hypertension and heart diseases which are the most common as well as for respiratory diseases (frequency of COPD is high). The presence of co-morbidities in our study is low which could be explained by low number of patients engaged in this study. The most commonly co-morbidities are hypertension, diabetes mellitus and GIT disorders. Interestingly, CNS disorders drugs were not common in our current study (3.6%) and is closely similar to Jszan work [16]. The low finding could only be explained by the fact that elderly patients in Libya live with their family and receiving a proper family support and care, consequently avoiding numerous CNS disorders as anxiety, insomnia, depression, etc. Elderly peoples are more vulnerable to certain diseases The percentage of drugs prescribed by generic name at Tripoli is 25.7% which consider to be low in comparison with WHO recommendations. This finding is also not in line with most of the previous studies [18 - 20] as well as with the standard derived to serve as ideal (100%). Thus, there is a need to encourage the prescribers to dispense drugs by their generic names especially in teaching hospitals. This should be reinforced by all health authorities to prescribe and dispensing medicines only by generic name. Prescription by generic name also reduces the drug cost. The drugs prescribed from WHO NLEM was 48.4%. A study conducted by Sapkota and associates [21] reported that 55% drugs were prescribed from WHO NLEM. The antimicrobial agents were prescribed to about 10% of the patients in this study and this is less than the previous published study [22] which reported that 16.9% antimicrobials were prescribed. The overuse of antibiotics is a major issue for bacterial resistance and complications of the infections especially for elderly patients. This indicating not an overuse of antibiotic in Libya, but usually spreading of infections in summer time is low comparing with winter time. Currently, the average number of drugs per prescription is 3.3 which demonstrates a high prevalence of polypharmacy (67.0%) which is not similar to other findings as in India [22] and in Nepal [23] where the incidence was 88.7% and 73%, respectively. However, this is not parallel to other studies [5, 20, 24]. The prevalence of polypharmacy is high and it is due to presence of multiple diseases. As per WHO, prescriptions containing more than five drugs are fall in the polypharmacy and it should have eliminated by stopping the use of unnecessary drugs and PIMs. The high prevalence of polypharmacy among geriatrics tends to drug-drug interaction, adverse drug reactions and increase in the cost. There is no doubt that there is rapid increasing in ageing of population throughout the world. In this study, a total of 359 drug formulations were prescribed to 106 patients for different diseases. Polypharmacy cannot be deemed inappropriate as it is more important to evaluate its benefits in specific settings. Inappropriate and high risk drugs should be avoided in the elderly as it effectively reduces the problems that are related to medicines and adverse drug effects. To evaluate the prescribing for geriatric patients, Beers criteria was 5% is low when compare with study in Saudi was first developed in 1991 and was recently updated in 2019 [25, 26]. In the present study, according to Beers criteria, it is revealed that 15.6% of total drugs prescribed were inappropriate. These findings are not different from that found in a study from India [27, 28] and Japan [29] in which it was observed that the use of inappropriate medicine in 23.9%, 27.3% and 21.1% of the prescriptions, respectively. The morbidity pattern in these patients was quite similar to what is commonly found in Indian geriatric patients. In addition, to the high percentage of drugs prescribed is analgesic and anti-inflammatory drugs (16.7%). With regard to the missing item (prescription errors), prevalence in this study was 20% which was much less in comparison to 535 [21, 30]. The major omission was date of consultation which accounted for 30%. A positive outcome of this study was that the frequency of medication was not missing in any prescription and the duration of medication. However, it can be suggested that if all prescriptions are printed, the short comings in completing prescriptions can be easily avoided. Nevertheless, it is essential to aware the prescriber about inappropriate - appropriate drugs and encourage them to follow appropriate prescribing pattern strictly for a better

health care to elderly population at the all level health care [31].

Conclusion

This study shows a clear deviation from WHO standard recommendations. Drug use evaluation for Libyan elderly people should be checked whether are appropriately prescribed or not. Consequently, medical education systems should be revised to promote rational drug prescribing by medical staff and by future generations of health providers.

Conflict of Interest

The authors declare that no competing interest at all.

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