

Potentially Inappropriate Medications Use in A Population of Iraqi Geriatric Outpatients According to Beers Criteria

Ola Albaghdadi*, Salam W Ahjel, Mohammad Hassan Morteza, Firas Aziz Rahi

Department of Pharmacy, Alzahrawi University College, Karbala, Iraq

Received: 2nd Apr, 19; Revised: 20th Apr, 19, Accepted: 5th Jun, 19; Available Online: 25th Jun, 2019

ABSTRACT

Aims: Elderly in Iraq kept suffering multiple burdens, as they are a truly fragile and vulnerable segment. A major public health issue among elderly is adverse drug reactions. This study is aimed at contributing in overcoming this treatment gap by determining the prevalence of inappropriate medications used by a group of Iraqi elderly outpatients. **Methods:** A cross-sectional, questionnaire-based study was conducted in a sample of 85 Iraqi elderly aged ≥ 65 years of either gender. Participants had face-to-face interviews to answer a comprehensive questionnaire. Each drug taken by the patient was evaluated according to Beers criteria. **Results:** Females constituted 45.9% of the total. The average age was 69.9 years (± 4.6). Nearly 30% of the patients had 3 different diseases, and 17.8% had ≥ 4 different ones, with cardiovascular diseases were the most prevalent. Polypharmacy was notably identified in 47.1% of the total studied population. Twenty-eight out of 85 patients did not know the actual reason of taking at least one of their medications, and 42% were not taking their drugs as directed. Remarkably, 43.5% of patients were recognized as taking at least one medication to be avoided in elderly people according to the Beers criteria. The most common inappropriate drugs were glyburide, and proton-pump inhibitors. **Conclusion:** There was an obvious absence of any role of pharmacists in the health care system for our studied population. Health care professionals are encouraged to review the medications prescribed for geriatric patients using updated safety guidelines to prevent the risks associated with potentially inappropriate medications.

Keywords: Beers criteria, Elderly, Polypharmacy, Potentially Inappropriate Medications.

INTRODUCTION

A serious demographic transformation is being experienced worldwide. According to WHO, it is estimated that in 2050, fifth of the world's population will be 60 years and older, as mentioned in WHO's report on <http://www.who.int/features/factfiles/ageing/en/>. It is estimated that a large proportion, nearly two-thirds, of the total elderly people are found in the developing world, Asia in particular. Both development in health care domains and ability to eradicate the most common fatal infectious diseases are the leading factors for the noticed increasing in the quantity of elderly people in Arab countries¹. Demographic data in Iraq showed that the age groups of 55-64 years and 65+ years represent 4.2% and 3.2% of the population in 2014, respectively, whereas in 2005, just 2.8% of the population belonged to the age group of 65+¹. However, as demonstrated in a recent Iraqi review¹, the elderly in Iraq are vulnerable to suffering from lack of care, diseases and helplessness. Inefficient conducts of the Iraqi health care system to elderly's problems and needs are mainly responsible for that deteriorated situation. Another major public health issue among the elderly is adverse drug reactions (ADRs). Alterations in pharmacokinetics and pharmacodynamics properties while getting aged make elderly people more susceptible to ADRs². Therefore, polypharmacy is considered a widespread phenomenon in elderly

populations. It is estimated that nearly 33% of prescription medications are being purchased by elderly patients every year in USA, even though this age category does not exceed 13% of the total population³. Many efforts have been made to create guidelines that could help healthcare providers avoid ADRs. The American Geriatrics Society Beers Criteria⁴ are one of the most frequently consulted sources used to safely prescribe medications for the elderly. They are used widely in geriatric clinical care, education, and research. The Beers Criteria are characterized evidence-based recommendations on drugs to be avoided in the elderly, along with the rationale for use, the quality of evidence behind the recommendation, and the graded strength of the recommendation. The core of this study is to determine the prevalence of inappropriate drug therapies used by a group of Iraqi elderly outpatients. To our knowledge, this is the first study to focus on potentially inappropriate medications among the elderly in Iraq. Through this research we hope to contribute in overcoming this elderly treatment gap in order to decrease morbidity and mortality among this vulnerable population of society.

MATERIALS AND METHODS

The study protocol was approved by the Institutional Ethics Committee in the pharmacy department of Ibn

*Author for Correspondence: ola.baghdadi@hotmail.com

Table 1: Medications to be avoided according to 2015 Beers criteria that were used in elderly patients.

Groups	Drugs	N (%) of patients prescribed
Anticholinergics		
First-generation antihistamines	Diphenhydramine	1 (1.17)
	Triprolidine	1 (1.17)
Antispasmodics	Clidinium-Chlordiazepoxide	1 (1.17)
Cardiovascular	Methyldopa	1 (1.17)
Central alpha blockers		1 (1.17)
Digoxin		1 (1.17)
Amiodarone		1 (1.17)
Central nervous system		
Antidepressants	Amitriptyline	1 (1.17)
Antipsychotics		3 (3.52)
Endocrine		
Sulfonylureas	Glyburide	16 (18.82)
Gastrointestinal		
Proton-pump inhibitors		12 (14.11)
Pain medications	Diclofenac	2 (2.35)
NSAIDs	Ibuprofen	3 (3.52)
	Mefenamic acid	2 (2.35)
	Naproxen	1 (1.17)
	Tenoxicam	1 (1.17)
Skeletal muscle relaxants	Orphenadrine	3 (3.52)

NSAIDs: Nonsteroidal anti-inflammatory drugs.

Hayyan University College. Informed consents were obtained from all of the participants. From January to May 2018, a sample of Iraqi elderly were recruited in this cross-sectional, questionnaire-based study. Iraqi outpatients aged ≥ 65 years of either gender were considered eligible enough.

Patients had face-to-face interviews, and data were collected by means of fifth year students from the pharmacy department of Ibn Hayyan University College, who have got a good training to perform such interviews. The questionnaire included age, gender, occupation, marital status, education level, financial status, and questions pertaining to lifestyle. We also gathered information about health status, including number of hospital admissions and reasons for admission and all chronic diseases affecting the participant. A large proportion of the questionnaire was related to medications, including both prescribed and OTC. Data collected included dose, duration of treatment, reasons for taking the drug, the prescriber, whether the patient received any consultation about taking the drug, adherence, and reasons for non-adherence, if applicable. After that, each drug was studied to evaluate its appropriateness according to Beers criteria 2015, appropriate action was taken when possible. The statistical analysis was carried out using IBM-SPSS version 20. Statistical significance was set at <0.05 .

RESULTS

Eighty-five elderly patients were recruited in this study, of whom 54.1% were males and 45.9% were females. The average age of participants was 69.9 years (± 4.6). Their ages varied between 65 and 85 years. Participants that aged 65-69 years constituted the largest group with 57.6% of the total. Our findings showed that 25.9% of the total studied population were illiterate. The largest proportion (92.9%) of the patients are residents of the city (Karbala and Babil in most cases). The proportion of patients who had been hospitalized at least once during the last year of the study was 45.9%. The reasons for admission were various; the most common were elevated blood pressure, angina, and diabetes complications.

The average number of chronic diseases per elderly person was 2.75 diseases (± 1.3). More than quarter of the patients (29.4%) had 3 different diseases, and 17.8% of the total had ≥ 4 different ones. The lowest number of chronic diseases per patient was 1, and the highest was 8. Cardiovascular diseases (CVDs) were the most prevalent diseases among our group. Almost all patients (82 out of 85; 96.4%) had at least one of CVD, and the most frequently observed case was hypertension followed by coronary artery disease. Our findings revealed that endocrine diseases came next, with a prevalence percentage of 42.3%, and most cases were type 2 diabetes. More than third (35.2%) of the studied population suffered from gastrointestinal diseases (peptic ulcer and indigestion in most cases). Other observed diseases sorted by their prevalence were: orthopedic diseases (22.3%), kidney and urinary tract diseases (15.2%), neurological disorders (10.5%), and respiratory diseases (8.2%).

Every person was taking an average of 4.6 drugs (± 1.78 , rang: 1-10). And the use of five or more drugs, defined as polypharmacy, was remarkably detected in 47.1% of the total studied population.

In order to evaluate the level of awareness among patients regarding their treatment, we inquired whether each patient knows why he/she is taking his/her medications. Twenty-eight out of 85 patients (32.9%) answered that they did not know the real purpose of taking at least one of their medications. Moreover, 21 patients admitted that they do not take their drugs as directed, which constituted 42% of the total studied group. The main reason for their non-adherence was lack of belief of the importance of taking the drug. Other noticed reasons were high costs, forgetfulness, and side-effects.

About a quarter (22.3%) of the elderly participants do not take their medications independently, rather, they depend on help from family members. The reasons beyond that were forgetfulness in the first place, tremor, or impaired vision.

Most of the medications taken by the patients were prescribed for them by general or specialist physicians, except for a few cases in which pharmacists advised to use, however, these medications were limited to analgesics, muscle relaxants, and gastrointestinal drugs in most cases.

Table 2: Potentially inappropriate medication according to 2015 Beers criteria that were used in elderly patients.

Disease	Groups	Drugs	Total cases (%)
Cardiovascular			
Heart failure	NSAIDs and COX-2 inhibitors	Ibuprofen	1 (1.17)
		Nimesulide	1 (1.17)
Central nervous system			
Insomnia	Oral decongestants	Pseudoephedrine	1 (1.17)
Gastrointestinal			
History of gastric or duodenal ulcers	Non-COX-2 selective NSAIDs	Mefenamic acid	1 (1.17)
		Tenoxicam	1 (1.17)
		Diclofenac	1 (1.17)
Kidney and urinary tract			
Benign prostatic hyperplasia	Anticholinergic drugs	Clidinium-Chlordiazepoxide	1 (1.17)

NSAIDs: Nonsteroidal anti-inflammatory drugs; COX-2 inhibitors: Cyclooxygenase-2 inhibitors.

Surprisingly, 80% of our group did not receive any kind of consultation for at least one of the drugs being treated with. Few cases where the patient received a consultation, it was from his doctor, with an obvious lack of any role of pharmacists in educating those patients.

Regarding medication side effects, 36% of the elderly reported suffering from them.

According to the Beers criteria, 43.5% of patients were identified as taking at least one medication to be avoided in older adults. It is revealed that every patient was receiving an average of 0.61 potential inappropriate medication (\pm 0.86). As shown in [Table 1], glyburide (18.82%), proton-pump inhibitors (14.11%), antipsychotics (3.52%), ibuprofen (3.52%), and orphenadrine (3.52%) were the most commonly used inappropriate medications.

Five patients (8.23%) were receiving drugs that can worsen disease as a result of drug-disease interaction (the total number of these drugs were 7 medications), as illustrated in [Table 2].

A total of 26 patients were found to use at least one medication requiring cautious administration in geriatric patients as mentioned in Beers criteria, and this comprised 30.55% of the total. Diuretics (17.64%) and vasodilators (8.23%) were the most frequently prescribed medications which were to be used with caution among this particular category.

DISCUSSION

Potential inappropriate medications use by a population of Iraqi elderly participants is evaluated in the present study.

Approximately half (47.1%) of the patients in our study were on five or more medications. In a recent Indian study⁵, the polypharmacy phenomenon was even more prevalent with a percentage of 66.19%. On the contrary, polypharmacy did not exceed 5% in an Indonesian study⁶. However, polypharmacy was among the strongest predictors of potentially inappropriate medications use in this study.

One of the important reasons for polypharmacy in geriatrics is the association of multiple comorbidities in them. CVDs and type 2 diabetes were seen in majority of geriatric population in our study, which is similar to the one seen in a Lebanese study done by Zeenny et al⁷. This

is consistent with the fact that CVDs and diabetes mellitus were ranked among the top 10 diseases causing morbidity in Iraq, and come in the fourth and tenth stages respectively, as stated by the Iraq pharmaceutical country profile, which is published by the Ministry of Health of the Republic of Iraq in collaboration with the World Health Organization⁸.

Another factor that could contribute to the polypharmacy phenomenon among the elderly, is poorly coordination and duplicated care. This is due to the fact that this category of patients may visit multiple health care providers, rendering them more vulnerable to ADRs³.

The number of medications a person uses is a risk factor for ADRs. It also contributes to nonadherence, financial burden, drug-drug interactions, and worse outcomes⁹. Medication nonadherence, for example, results in 125,000 death cases in USA every year and increases the cost of health care by almost 177 billion dollars³.

Our findings revealed that, according to Beers criteria 2015, an overall 18 medications that are potentially inappropriate and should be avoided were used. In addition, 43.5% of our studied population were taking at least one inappropriate medication.

These results were in concordance with those mentioned in a recent Lebanese study⁷, which showed a high prevalence of potentially inappropriate medications use among older adults in Lebanon (medications that should be avoided accounted for 35.5%). They also reported central nervous system drugs, cardiovascular drugs, and antidiabetic agents as the commonly prescribed potentially inappropriate medications. In addition, our results compliant with those stated by a large Indonesian retrospective study⁶. Use of potentially inappropriate medications was detected in more than half (52.2%) of the Indonesian elderly participants, with chlorpheniramine, mefenamic acid, ibuprofen, and nifedipine were the most considerably repeated drugs.

Similarly in the developed world, prescription of potentially inappropriate medications is a concern. It ranges from 12% to 40% in the community residents elderly and nursing home dwelling respectively in the United States and Europe as demonstrated in a review conducted by Gallagher et al¹⁰.

These proportions are lower than what are stated in other studies from India¹¹ (87.3%), and Saudi Arabia¹² (72.6%).

On the other hand, the previous results were far higher than a proportion reported from an Indian study⁵, since only 8.45% of Indian patients were receiving drugs which were to be avoided as per Beers criteria. Authors assumed that the probable reasons for this low fraction were good knowledge, attitude, and practice among the treating physicians.

The differences in prescribing pattern, assessment, patient characteristics such as ethnicity and economic incomes, and physicians' awareness of the existence of an inappropriate drugs list for the elderly may be responsible for the variation seen in the prevalence of inappropriate prescriptions in various studies.

Curiously enough, 80% of the participants admitted that they did not receive any kind of educational consultation regarding their medications from any part of the health care system, despite the fact that this population is in urgent need for health care. Underscoring this is that we noted in our study that a large proportion of participants were not taking their medications as directed and do not know the aims of their treatments.

Raising awareness about inappropriate medications use with a goal of preventing complications is a vital importance among health care professionals. Moreover, it is approved that engaging the pharmacists in this process can significantly reduce the non-adherence and subsequently decrease its adverse consequences. In one recent Saudi study¹³, the clinical pharmacists' intervention have decreased the incidence rate of potentially inappropriate medications significantly ($p < 0.001$) from 61% to 29.5%. And by interventions they meant checking the physicians prescriptions, giving recommendations and feedback while rounding with physicians, and carrying out effective discussions with physicians. Furthermore, researchers have demonstrated a significant decrease in the prevalence rates of polypharmacy while the patients were hospitalized as well as after discharging among the intervention group.

It is worth noting that in our study, the data was patient-reported, and not compiled from medical records. This may have impacted our results in a way that skews the effects of patients' drugs. For instance, it is possible that the reasons for some hospital admissions were pharmacological, but were unrecognized as such by the patient because patients may have difficulty differentiating between symptoms of disease and pharmacological side-effects. Also, there was no assessment of benefit and risk in individualized pattern for every patient. It may have been reasonable purposes beyond these inappropriate medicine prescriptions, such as intolerance of substitutional drugs or potential drug interactions. Lastly, Beers criteria evaluates the appropriateness of medications according to American populations, while the Iraqi people may differ in many aspects like genetic, environmental, and prescribing conditions.

CONCLUSIONS

The prevalence of potentially inappropriate medications in our group of Iraqi geriatric patients was considerably high (43.5%). Health care professionals should be encouraged to use updated safety guidelines in reviewing geriatric medications in order to minimize the using of potentially inappropriate medications.

ACKNOWLEDGEMENTS

We thank all the students from the fifth year in pharmacy department, Ibn Hayyan University College, who did the interviews with the patients and collect all the data as the study was for their graduate project; Ali Talib, Ameer Majid, Ali Jubair, Ali Hatif, Zaid Sahib, Basheer Majed, Mohammad Almahdi Hassan, Husam Talib Hashem, and Ahmed Yassin Alwan.

DISCLOSURE

The authors declare no conflicts of interest in this paper.

REFERENCES

- Hussain HY. Elderly, health and socio-demographic profile in Iraq, the context of conflict, violence and social exclusion, systematic review. *Middle East Journal of Age and Ageing*. 2016;13(2):18-25.
- Laroche ML, Charmes JP, Nouaille Y, Picard N, Merle L. Is inappropriate medication use a major cause of adverse drug reactions in the elderly? *Br J Clin Pharmacol*. 2007 Feb;63(2):177-186.
- Golchin N, Frank SH, Vince A, Isham L, Meropol SB. Polypharmacy in the elderly. *J Res Pharm Pract*. 2015 Apr-Jun;4(2):85-88.
- The American geriatrics society 2015 beers criteria update expert panel. American geriatrics society 2015 updated beers criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc*. 2015 Nov;63(11):2227-2246.
- Rakesh KB, Chowta MN, Shenoy AK, Shastry R, Pai SB. Evaluation of polypharmacy and appropriateness of prescription in geriatric patients: A cross-sectional study at a tertiary care hospital. *Indian J Pharmacol*. 2017 Jan-Feb;49(1):16-20.
- Abdulah R, Insani WN, Destiani DP, Rohmaniasari N, Mohenathas ND, Barliana MI. Polypharmacy leads to increased prevalence of potentially inappropriate medication in the Indonesian geriatric population visiting primary care facilities. *Ther Clin Risk Manag*. 2018 Sep 4;14:1591-1597.
- Zeenny R, Wakim S, Kuyumjian YM. Potentially inappropriate medications use in community-based aged patients: a cross-sectional study using 2012 Beers criteria. *Clin Interv Aging*. 2017 Jan 4;12:65-73.
- The Ministry of Health of the Republic of Iraq in collaboration with the World Health Organization. Iraq Pharmaceutical Country Profile. 2011. Available on https://www.who.int/medicines/areas/coordination/Iraq_PSCPNarrativeQuestionnaire_01022012.pdf
- Steinman MA. Polypharmacy—time to get beyond numbers. *JAMA Intern Med* 2016; 176: 482–483.

10. Gallagher P, Barry P, O'Mahony D. Inappropriate prescribing in the elderly. *J Clin Pharm Ther.* 2007 Apr;32(2):113-121.
11. Jhaveri BN, Patel TK, Barvaliya MJ, Tripathi C. Utilization of potentially inappropriate medications in elderly patients in a tertiary care teaching hospital in India. *Perspect Clin Res.* 2014 Oct;5(4):184-189.
12. Jastaniah NA, Almaqati AS, Alsuraihi AK, Abughanim SA, Aseeri M. Inappropriate Prescribing in Elderly Inpatients at a University Hospital in Saudi Arabia. *Drugs Real World Outcomes.* 2018 Dec;5(4):211-216.
13. Najjar MF, Sulaiman SAS, Al Jeraisy M, Balubaid H. The impact of a combined intervention program: an educational and clinical pharmacist's intervention to improve prescribing pattern in hospitalized geriatric patients at King Abdulaziz Medical City in Riyadh, Saudi Arabia. *Ther Clin Risk Manag.* 2018 Mar 16;14:557-564.