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RESEARCH ARTICLE

Evaluating Potentially Inappropriate Medications in the Elderly Population at KAUH, Jeddah, KSA.
 Sami M. Bahlas, Neda'a W. Anshasi, Saad H. Alqurashi, Abdullah A. Elhosiny, Eman K. Kamal and Ranim A. Andijani.

Department of Internal Medicine, Faculty of Medicine, King Abdul-Aziz University Hospital, Jeddah, KSA.

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Abstract

Background: Previous studies utilized old explicit criteria to identify potentially inappropriate medications in the elderly, which undermines prevalence of these medications and their consequences.

Objective: To evaluate the prevalence of potentially inappropriate medications among geriatric patients at King Abdul-Aziz University Hospital in Jeddah using the latest Screening Tool of Older Persons Prescription criteria and Screening Tool to Alert to Right Treatment version 2. We, however, will be using only the Screening Tool of Older Persons Prescription criteria to assess potentially inappropriate medications as this is the aim of our study.

Design: Questionnaire based, cross-sectional study on geriatric patients.

Setting: King Abdul-Aziz University Hospital, outpatient department, the year 2016-2017.

Methods: This was a cross-sectional study performed on geriatric patients (aged 65 and above) at King Abdul-Aziz University Hospital, Jeddah, 2016-2017. 300 patients with chronic disease were selected and their medications reviewed. Patients were randomly selected from the outpatient clinic and the pertinent data was obtained using a questionnaire.

Results: Physicians should be meticulous when prescribing medications to the elderly by using explicit criteria's such as Screening Tool of Older Persons Prescription, as the prevalence of potentially inappropriate medications were found to be (41%). The remaining (59%) of the patients had no issues.

Limitations: Recall bias by some of the patients.

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Introduction:-

The size of the geriatric population interacting with the healthcare system is growing dramatically.⁴ As of 2010, 524 million people worldwide are above the age of 65, and by 2050, its estimated that this number will reach 1.5 billion of the world's population.⁵ Currently, Saudi Arabia's population is (31,742,308) of which 3.2% are older than 65.¹⁰ Furthermore, it is expected that the percentage of the people who reach 80 years or more will be 1.6 million, that is equivalent to (4%) of the country's total population by the year 2050.⁷

Corresponding Author: Dr. Neda'a W. Anshasi.

Address: - Department of Internal Medicine, Faculty of Medicine, King Abdul-Aziz University Hospital, Jeddah, KSA.

One of the major challenges when dealing with the geriatric population is “poly-pharmacy”. The definition of this term is variable amongst healthcare societies but most define it as the use of 5 to 10 prescribed medications to a patient, usually for prolonged periods of time i.e. chronic use.¹¹ This doesn’t include over-the-counter medications nor herbal drugs.¹ Poly-pharmacy alone is an independent risk factor for the increased rate of hospital admissions and reduced medication compliance, regardless of age.¹³ In the geriatric population, additional factors come into play, namely: multiple co-morbidities and deteriorating renal and hepatic functions –affecting pharmacodynamics and pharmacokinetics of drugs. Furthermore, poly-pharmacy might also lead to “prescribing cascade”¹⁴; that is, the patient develops symptoms due to adverse drug event (ADE) and this is misinterpreted by the physician as an evolving medical condition that requires even more drugs to be prescribed resulting in a vicious cycle. Another major factor is *potentially inappropriate medications* (PIMs), the focus of our study. PIMs are medications that should be avoided in geriatrics, due to their potentially harmful effects, bearing in mind factors that make this population more susceptible to harm as discussed previously.

With this in mind, expert panels from around the world developed criteria to limit these inappropriate medications and their complications. Quite a few exist, but till today, the most frequently used and cited is Beers criteria which was introduced in 1991 and underwent multiple revisions, the most recent being in 2015.¹ We decided to use a more recently introduced, evidence-based criteria known as the *Screening Tool Of Older Persons Prescription* criteria and *Screening Tool to Alert to Right Treatment* version 2 (STOPP/START) criteria

Version 2, which was first introduced in 2008 and was updated in 2015. Research comparing both criteria (i.e. Beers and STOPP) demonstrate that STOPP criteria was able to identify more PIMs compared to Beers^{15,16} and with the START criteria, it also addresses the potential prescribing omissions (PPOs). PPOs are the medications that will benefit the patient but has been omitted or missed by the physician, showing that the criteria is more comprehensive.¹⁷ It also contains adjustments for (age, sex, co-morbidities, dementia, number of medications etc.). Clinically significant ADEs were listed in STOPP 2.54 times more often than in Beers criteria and, identifying the risk of a severe, avoidable ADE is increased significantly with STOPP medications (OR=1.85, 95% CI 1.51-2.26, $p<0.001$) as opposed to Beers criteria which are not as significantly increased (OR=1.28, 95% CI 0.94-1.72, $p=0.11$).⁸ Moreover, Beers criteria don’t address drug-to-drug interactions and duplicate medications, unlike STOPP criteria.

Methods:-

This was a cross-sectional study, held at King Abdul-Aziz University Hospital (KAUH) -tertiary center- Jeddah, Saudi Arabia, 2016-2017. After reviewing the literature, the study was designed and the goals of the research were determined. The professional opinion of a statistical analyst and researcher was sought for any pitfalls in the design of the study. The proposal was formulated and sent to KAUH ethical committee for approval, which was granted. Then, we commenced with data collection using a questionnaire which was designed specifically for the study. It contained information such as file number, initials, age, sex, disease/conditions and medications with their generic names, form, dose, frequency, and duration. Over-the-counter medications and herbals were also included. Consent was obtained verbally from the patients.

Our sample size was 300 patients and the targeted population was geriatrics. Patients were randomly selected from the outpatient department at KAUH. Patients with acute conditions and their medications were excluded from the study as we were looking for chronic diseases and their drugs. We relied mainly on one inclusion criteria, that is, anyone aged 65 and above could participate in the study. Patients were interviewed, after obtaining verbal consent, by the research team and information were obtained accordingly using the aforementioned questionnaire. SPSS computer software version 19 was used for data entry and help with the analysis. After that, the STOPP criteria was applied individually to each patient to determine the prevalence of PIM.

Results:-

The mean age of the population studied was 71.9 years. From the 300 patients, 172 were males and 128 were females. The prevalence of PIM among the study group is shown in (figure 1)

The most commonly prescribed medications were anti-hypertensive drugs. Percentages of other medications used by the patients are also shown in (table 1).

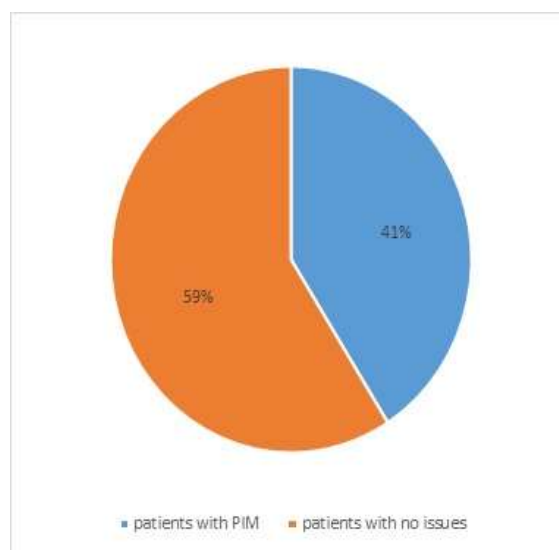


Fig 1:- PIMs prevalence in geriatrics.

Table 1:- percentages of various drug prescribed.

Medications	Percentage (%)
Anti-Hypertensive drugs	97.3
Anti-Diabetic drugs ^[1]	61.3
Anti-Thrombotic Drugs	60
NSAIDS	53
Acetaminophen	37
Statins	33
PPI	22.7
Diuretics	17.7
Alpha 1 Blocker	17.3
Antacids	9.3
Anti-Histamines	9.3
Vitamin D	9
Levothyroxine	9
Anti-Convulsions	8.3
Psychiatric Drugs	7
5-alpha Reductase inhibitors	5.3
Osteocare	5.3
Corticosteroids	4.7
Nitrates	3.7
Immunosuppressants	3.7
Ferrous Sulphate	3.7
Allopurinol	2.3
Laxatives	2.3
Digoxin	1.7
Folic acid	1.7
Anti-Parkinson drugs	1.3
Omega 3	1
Solpadine	0.7
Acetazolamide	0.7
Amiodarone	0.3

[1] Oral hypoglycemic drugs (45.3%) and insulin (16%).

Discussion:-

Patient safety is an elemental concept and principal in healthcare, especially when providing for the elderly which, due to their age-related changes in physiological functions makes the population frailer. This may result in injury or even death. In the US, medical errors are the third leading cause of death²⁷ most of which are preventable. In another study carried out in low to middle-income countries, adverse events were (8%) of which (83%) were preventable and (30%) were associated with mortality.²⁷ This will increase the rate of hospitalization and mortality as stated, which in turn will affect the care system costs and expenses in general.⁶

Thus, determining inappropriate medications in this population will improve drug prescribing, educate clinicians and patients alike, reduce adverse drug events and serve as a tool for evaluating the quality of care and patterns of drug use. Most importantly this will reduce morbidity and mortality along with the cost.

Several studies have also evaluated the economic burden associated with prescribing PIMs.²⁵ Bradley et al. using STOPP criteria carried a research in Ireland and found the cost of PIMs to be €6.1 million in 2009-2010.²⁸ Another study, also done in Ireland utilizing the same criteria estimated the cost of expenditure on the elderly to be €45.6 million in 2007.²⁴ Leikola et al. in Finland used beers criteria and calculated the expense at €2.9 million in 2007.²⁹ In 2016, a paper published in Germany found the costs to be € 387.8 million.³⁰ In Saudi Arabia, as far as we know there is only one published research in 2012 that evaluated the cost of PIMs. It was found to be 518,314 Saudi riyals at the time of the study.³¹ This amount is expected to exponentially soar giving the increase in the geriatric population in KSA. Hence, explicit criteria like STOPP should be more recognized and utilized not only by doctors and pharmacists but also by policymakers, researchers and consumers if the health care system is to improve and to cut down on unnecessary expenses that could be put to better use elsewhere.

Limitations:-

The main limitation of this study is “recall bias” by some of the patients. However, to limit this, we asked the patients to present us with their actual medications -which the majority did- for proper reviewing to ensure accurate information and analysis.

Conclusion:-

By using criteria such as *Screening Tool of Older Persons Prescription*, physicians can improve elderly patients care, minimize adverse effects of drugs, decrease morbidity and mortality and reduce the hospitalization rate along with costs.

Disclosure:-

The authors declare no conflict of interest.

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