Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 224 - 230
Received 05 March 2021; Accepted 01 April 2021.

Comparison of Beers Criteria with START/STOPP Criteria for Detecting Potentially Inappropriate Medications in a Geriatric Setting

Govind Rajesh Kartha
Pharm DDepartment of Pharmacy Practice, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, The Nilgiris, Tamil Nadu, India.

Deepu Varghese Babu
Pharm D, Department of Pharmacy Practice, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, The Nilgiris, Tamil Nadu, India.

Tenzintsering
Pharm DDepartment of Pharmacy Practice, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, The Nilgiris, Tamil Nadu, India.

Shahbanahmed
Pharm D, Department of Pharmacy Practice, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, The Nilgiris, Tamil Nadu, India.

Deepalakshmi Mani
Department of Pharmacy Practice, JSS College of Pharmacy, JSS Academy of Higher Education & Research, Ooty, The Nilgiris, Tamil Nadu, India.

Abstract
Potentially Inappropriate Medications and Adverse Drug Events combined with several Age- related risk Factors and other comorbidity conditions in the elderly group can increase the risk factors of drug-drug interactions with the patient life style. To tackle the rising issue of PIM's (Potentially inappropriate medications) in primary geriatric care the use of detection tools is applied, such detection tool are Beer's criteria and STOPP (Screening Tool of Older Persons' Prescriptions) and START (Screening Tool to Alert to Right Treatment) criteria. This paper focuses on the comparison of the aforementioned techniques and assess whether which of the techniques are better for the suggested population. For this, the methods used was an extensive search in various biomedical databases like PubMed, Google scholar and Cochrane to obtain various literatures which focused on the objectives, reliability and validity of the use of Beer's & START/STOPP PIM's detection techniques in the primary geriatric setting. The result of the study made it understandable that to tackle the problems of Polypharmacy, Adverse drug events, and aid in reducing the average medical cost in a geriatric primary care setting the preferred tool would be the START/STOPP criteria for an Indian based Geriatric setting.

Keywords: Inappropriate prescription, AGS(American Geriatric Society) Beer`s criteria, START/STOPP criteria, Geriatrics.

INTRODUCTION

Potentially Inappropriate Medications (PIMs) can be defined as drugs for which use among older adults should be avoided due to the high risk of adverse reactions for this population and/or insufficient evidence of their benefits when safer and equally or more effective therapeutic alternatives are available. Several Age-related risk factors as well as other comorbidity conditions are placing the elderly at the

risk of PIM's. (Al Ameri. M.N et.al 2014)

Inappropriate prescribing encompasses the use of medicines where the risk of an adverse drug event (ADE) outweighs the clinical benefits, particularly when safer or more effective alternatives are available. It includes the use of medicines that increase the likelihood of drug–drug and drug–disease interactions, the overuse, the misuse, and the underuse of clinically indicated medicines.

Nearly, 7.7% of the Indian population are geriatrics (60 years old). Longer life expectancy, comorbidity, and the strict adherence to evidence-based clinical practice guidelines pave the way for polypharmacy. Cascade prescribing, i.e., medication resulting in an ADE (Adverse Drug Event) that is treated with another medication could be one of the factors involved in polypharmacy. (American Geriatric Society 2012 Beers criteria)

Polypharmacy in geriatrics is becoming a big problem because it is associated with greater health-care costs and substantial risk of ADEs, drug-drug interactions, medication noncompliance, decreased functional activity reduced functional capacity, and can increase the prevalence of drug associated morbidity and mortality.

In addition to polypharmacy, inappropriate prescribing is also a challenge. It is associated with detrimental effects on the elderly. To counter such issues, the use of different tools to assess appropriateness of prescription in geriatrics include Beers criteria, STOPP and START criteria.

The purpose of this review article is to help understand as to which would be the preferred tool (Beer's criteria or START/STOPP criteria) to help in determining PIM`s in geriatric primary care setting.

Methods

For this review article, an extensive search was done using MeSH terms such as 'Inappropriate prescription', 'START/STOPP, 'Beers', 'Geriatrics'. From the following databases PubMed, Google Scholar and Cochrane. A total of 115 articles were reviewed and out of which 15 articles were shortlisted and included.

Table 1: Research studies associated with START/STOPP and BEER`s screening tools

Sl. No.	Authors	Outcomes measured	Year of publication	Population studied	Important findings
1	Isabel Lozano - Montoya et al.	PIP`s detection using STOPP-START	2015	Patients aged 80 years and greater.	Potentially inappropriate drugs are usually discontinued, but many patients do not receive potentially recommended medications.

2	May PS Lam and Bernard MY Cheung	Assessment of medication appropriateness using STOPP/START and/or the Beers criteria	2012	Patients aged Between 65 and 74 years old.	Compared with Beers criteria, STOPP/START criteria is better organized and more sensitive in detecting potentially inappropriate medications.
3	PP. Gallagher, C. Ryan	Validating a new screening tool for older people prescriptions using START/STOPP method.	2008	Aged patient 65 years and above	STOPP/START is a valid, reliable and comprehensive screening tool that enables the prescribing physician to appraise an older person's prescription drugs in the context of his/her concurrent diagnosis.
4	Roger. E Thomas and Bennett. C Thomas	Percentage of patients meeting the 2015 START/STOPP criteria and 2015 Beers criteria.	2019	Patients 65 years and older.	PIP and PIM rates were higher in hospitalized patients and the reasons were not clarified.
5	American Geriatrics Society	Careful application of the criteria by health professionals, consumers, payers and health systems should lead to closer monitoring of drug use in older adults	2015	Patients 65 years and older.	Careful application of the criteria by healthcare professionals, consumers, payors, and health systems should lead to closer monitoring of drug use.

6	American Geriatrics Society	Grade the strength and quality of each PIM statement based on the level of evidence and strength of recommendation.	2019	The criteria are intended for use in adults 65 years and older in all ambulatory, acute, and institutionalized settings of care, except for the hospice and palliative care settings.	The AGS Beers Criteriais one component of what should be a comprehensive approach to medication use in older adults, and it should be used in conjunction with other tools and management strategies for improving medication safety and effectiveness.

Discussion

The challenges of appropriate management of medications in older adults can be broken down into the following areas: Multimorbidity, Polypharmacy PIMs in the elderly, underuse of medications, and adherence and access to medications. There are several challenges specific to primary care providers (PCPs) when managing these issues in older adults, which include the brevity of the typical office visit; medically complex patients; multiple specialists who contribute to a patient's overall polypharmacy; frequent hospitalizations and transitions of care; lack of high-quality evidence to guide prescribing for older adults, in particular the elderly, who are typically over 80 years of age; and the fact that evidence-based guidelines rely on clinical trials that typically exclude multimorbidity and frail older adults. (American Geriatric Society 2019 Beers criteria)

Inappropriate prescribing due to polypharmacy can lead to the use of medicines where the risk of an adverse drug event (ADE) outweighs the clinical benefits, particularly when safer or more effective alternatives are available. It includes the use of medicines that increase the likelihood of drug–drug and drug–disease interactions, the overuse, the misuse, and the underuse of clinically indicated medicine. (Denis. O. Mahony, 2019) This is a common concern in geriatric medicine and many elements play a role during the highest vulnerability of older patients to inappropriate prescribing (e.g. age-related, pharmacokinetic and pharmacodynamics changes; higher rates of multi-morbidity and polypharmacy; low adherence to complex treatment regimen; physical and cognitive impairment; poor evidence due to exclusion of frailer or older patients from clinical studies; and lack of skills of practitioners regarding the complex pharmacology in older age.(Dhanapal. C. K., 2014)

One of the important reasons for polypharmacy in geriatrics is because of the association of multiple comorbidities in them such as diabetes mellitus and hypertension. The increased proportion of polypharmacy in 60–79 years could be due to increased number of comorbidities seen in them. (Gallagher. Pet.al, 2008)

The assessed appropriateness of medications based on Beers criteria, STOPP criteria, START criteria. These criteria are widely used by researchers, regulators, and policy-makers. These criteria use an evidence-based approach to regularly update, thus making the criteria more relevant. All these criteria alert the physician and help in reducing the chance of prescribing inappropriate drugs

START/STOPP Criteria

First published in 2008, the STOPP and START set of explicit criteria was formed with the intention to capture common and important instances of PIM`s and Potential Prescribing Omissions (PPO) in persons aged 60 years or over.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 224 - 230
Received 05 March 2021; Accepted 01 April 2021.

STOPP/START criteria significantly improve medication appropriateness when applied at a single time point and significantly reduced ADEs and average length of stay in older people hospitalized when applied within 72 h of admission. Such improvement may be related to the increase in the number of criteria included in the updated version, namely antiplatelet/anticoagulant drugs, drugs affecting or affected by renal function and drugs that increase anticholinergic burden.

The aim of this criteria is to provide an explicit, evidence-based rules of avoidance for commonly encountered instances of potentially inappropriate prescribing and potential prescribing omissions where the final goal to be achieved is the improvement of medication appropriateness, prevent adverse drug events, as well as to reduce the increased drug cost due to polypharmacy. Since their first iteration in 2008, STOPP/ START criteria have demonstrated their interest, not only to improve PIM detection compared to Beers, but also of their significant association with ADEs.

One of the limitations of STOPP/START criteria is the transferability of the criteria. Although some studies were performed in North America and Asia (Lozano-Montoya et.al, 2015) the majority of the studies were carried out in Europe. Since the STOPP/START criteria was originally developed in Ireland, (May P. S. Lam et.al, 2012) it may not be applicable for them to be used worldwide, except in Europe or territories where healthcare practice follows those in Europe. It could also be argued that criteria of medication appropriateness should be adjusted for different ethnic groups.

BEERS Criteria

In 1991, to tackle the rising incidence of PIM`s in the geriatric society, The American Geriatrics Society (AGS) Beers Criteria for PIM use in Older Adults was widely used by clinicians, educators, researchers, healthcare administrators, and regulators. The AGS Beers Criteria are an explicit list of PIMs that are typically best avoided by older adults in most circumstances or under specific situations, such as in certain diseases or conditions.(Spine wine.A et.al, 2007)

The primary target audience for the AGS Beers Criteria is practicing clinicians, these criteria was meant for use in both ambulatory, critical, and institutionalized treatment environments in individuals 65 years and older. The intention of the AGS Beers Criteria is to improve medication selection; educate clinicians and patients; reduce adverse drug events; and serve as a tool for evaluating quality of care, cost, and patterns of drug use of older adults.

Since the last 2015 update Each of the five types of criteria in the 2015 update were retained in the 2019 update: medications that are potentially inappropriate in most older adults, those that should typically be avoided in older adults with certain conditions, drugs to use with caution, drug-drug interactions, and drug dose adjustment based on kidney function.

The limitations that would be noticed in the Beers list of inappropriate medications is of the same category of START/STOPP criteria. Since the AGS Beers criteria is an American based tool used in the detection of PIM`s, the drugs listed within the category are those that are usually available within the American market and does not extend towards other regions in the world. So, the selection of medication to withdraw while using the Beers criteria as a referral would be limited to the region where it used. Though the initial 2012 AGS Beers criteria was far more effective in detecting the PIM`s than the original START/STOPP tool, the current updated version of the latter proved to be more sensitive in detecting PIM's (Steinman M A et.al, 2015

Conclusion

According to the various studies conducted, the STOPP/START better addressed polypharmacy than the current list of Beers criteria due to its increased sensitivity in detecting PIM`s, and this even after it

addresses all PPO according to START criteria. STOPP/START tool can also identify more potentially inappropriate prescriptions of major clinical relevance in a population. Though these findings can only be confirmed through a study done in a larger population. (Thomas. et. Al, 2019)

In conclusion, it is understandable that to tackle the problems of polypharmacy, Adverse drug events, and aid in reducing the average medical cost in a geriatric primary care setting the preferred tool would be the START/STOPP criteria for an Indian based Geriatric setting.

Acknowledgement

"We acknowledge the generous research infrastructure and supports from JSS College of Pharmacy, JSS Academy of Higher Education & Research, Rocklands, Ooty, The Nilgiris, Tamilnadu, India".

References

1. Al Ameri MN, Makramalla E, Albur U, Kumar A, Rao P. Prevalence of polypharmacy in the elderly: Implications of age, gender, comorbidities and drug interactions. J Pharm Sci. 2014; 1:1-7.
2. American Geriatrics Society 2012 Beers Criteria Update Expert Panel. American Geriatrics Society updated Beers Criteria for potentially inappropriate medication use in older adults. J Am Geriatr Soc. 2012;60(4):616-631
3. American Geriatrics Society 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;63(11):2227-2246
4. American Geriatrics Society 2019 Updated AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. J Am Geriatr Soc. 2019 Apr;67(4):674-694.
5. Denis O'Mahony. STOPP/START criteria for potentially inappropriate medications/potential prescribing omissions in older people: origin and progress. Expert Rev ClinPharmacol. 2020 Jan;13(1):15-22. doi: 10.1080/17512433.2020.1697676. Epub 2019 Nov 30.
6. Dhanapal CK. Prevalence of polypharmacy in geriatric patients in rural teaching hospital. Am J PhytomedClinTher 2014; 2:413-9.
7. Gallagher P, Ryan C, Byrne S, Kennedy J, O'Mahony D. STOPP (Screening tool of older person's prescriptions) and START (Screening tool to alert doctors to right treatment). Consensus validation. Int. J. Clin. Pharmacol. Ther. 46, 72–83 (2008).
8. Lozano-Montoya I, Ve´lez-Diaz-Pallare´ s M, Delgado-Silveira E, Montero-Errasquin B, Cruz Jentoft AJ. Potentially inappropriate prescribing detected by STOPP-START criteria: are they really inappropriate? Age Ageing. 2015;44: 861–6
9. May PS Lam and Bernard MY Cheung. The use of STOPP/START criteria as a screening tool for assessing the appropriateness of medications in the elderly population. Expert Rev. Clin. Pharmacol. 5(2), 187–197 (2012)
10. Sganga F, Landi F, Ruggiero C, et al. Polypharmacy and health outcomes among older adults discharged from hospital: results from the CRIME study. GeriatrGerontol Int. 2015;15(2):141–6.
11. ShirinJatha. Polypharmacy, the Elderly, and Deprescribing. Consult Pharm. 2015 Sep;30(9):527-32.
12. Spinewine A, Schmader KE, Barber N, Hughes C, Lapane KL, Swine C. Appropriate prescribing in elderly people: how well can it be measured and optimized? Lancet. 2007; 370:173–84.

13. Steinman MA, Beizer JL, DuBeau CE, et al. How to use the American Geriatrics Society 2015 Beers Criteria: a guide for patients, clinicians, health systems, and payors. J Am Geriatr Soc. 2015;63(12):e1-e7.

14. Takeda-Raguin C, Vogel T, Ferahta N, Smith C, Poloni B, Lang PO. Adherence to long-term drug regimen after hospital discharge: the GPs' attitude. J Am Geriatr Soc. 2016; 64:657–9.

15. Thomas, Roger E, Thomas, Bennett C, A Systematic Review of Studies of the STOPP/START 2015 and American Geriatric Society Beers 2015 Criteria in Patients ≥ 65 Years. Current Aging Science. 2019oct1; 12(2): 121-154(34).