

Medication Review in Turkish Older Adults at Community Pharmacy: A Pilot Study by Using Medication Appropriateness Index

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ABSTRACT

Objective: The study aimed to evaluate medication review in older adults (≥ 65 years) at a community pharmacy by identifying the prevalence of potentially inappropriate medication and calculating medication appropriateness index.

Methods: This descriptive study was carried out in a community pharmacy for six months. The older adults (≥ 65 years) using one or more medications were included. During clinical pharmacist-led medication review; the medication appropriateness index was calculated for each medication of older adults. Potentially inappropriate medications were evaluated according to the 2019 American Geriatrics Society Beers Criteria®.

Result: Among a hundred older adults, 46.0% were female. The median age of the patients was 75.5 (IQR, 68.0-78.8). The median number of medications was 9.0 (7.0-10.0). Polypharmacy has been detected in 97.0% of the patients. At least one potentially inappropriate medication was detected in 63.0% of them. The median score of medication appropriateness index score was 53.0 (IQR: 38.6-67.9).

Conclusion: To best our knowledge, this is the first study of clinical pharmacist-led medication review by calculating the medication appropriateness index carried out at a community pharmacy in Turkey. There was a high rate of potentially inappropriate medication with a higher score of medication appropriateness in older adults. This study highlights the importance of medication review led by the clinical pharmacist at community pharmacy to optimize medication usage in older adults.

Keywords: Older adults, clinical pharmacist, medication appropriateness index, potentially inappropriate medication

1. INTRODUCTION

The older adult (≥ 65 years) population is increasing worldwide with higher life expectancy. The ratio of the older adult population in Turkey was 8.2% in 2015, and it was increased to 9.5% in 2020 (<https://data.tuik.gov.tr/Bulten/Index?p=Istatistiklerle-Yasli-lar-2020-37227>, Date accessed: 17.03.2021). In 2020, older adults (individuals aged 60 and over) represented 13.5% of the world's population (<https://www.who.int/publications/i/item/978.924.0017900>, Date accessed: 17.03.2021). This population is estimated to reach approximately 2.1 billion by 2050 (<https://www.who.int/publications/i/item/978.924.0017900>, Date accessed: 17.03.2021). In parallel, it is predicted that the probability of problems related to medication use will increase even more in older adults and is resulted in hospitalization. It has been reported that the most common problems associated with medication use in older adults are polypharmacy, adverse drug reactions, drug-drug interactions, poor medication

adherence, and potentially inappropriate medication use (PIM) (1, 2).

Medication review is crucial in older adults to identify medication-related issues (including overdose, adverse drug reactions, possible drug-disease, drug-drug interactions, medication adherence) along with pharmacokinetic and pharmacodynamic changes during aging (<https://www.uptodate.com/contents/drug-prescribing-for-older-adults>, Date accessed: 17.03.2021) (3). Potentially inappropriate medication (PIM) is identified as the use of medications that are predicted to be ineffective in older adults or to pose a high risk if used (4). The prevalence of PIMs has been found to be between 21-63% according to some previous studies (5-11). It was found that one or more medications were used inappropriately in almost half of the older adults who used medications (12). Evaluation criteria such as "2019 American Geriatrics Society (AGS) Beers Criteria®" (13) and/or "STOPP/

START criteria” (The STOPP (The Screening Tool of Older Persons’ Prescriptions) and START (The Screening Tool to Alert to Right Treatment) criteria) (14) and “Ghent Older People’s Prescriptions Community Pharmacy Screening (GheOP³S)-tool” (15) and “Medication Appropriateness Index” (MAI) (16) can be used to identify appropriateness medication used by older patients during clinical pharmacist-led medication review. In recent studies, it was shown that Beers Criteria[®] had superiority in determining the prevalence of PIMs (17-20). Also, the Beers Criteria[®] had a more up-to-date version when compared with other tools (13, 14).

MAI is a tool that evaluates the appropriateness of medication with ten criteria: indication, efficacy, dosage, correct instructions, practical instructions, drug-drug interaction, drug-disease interaction, duplication, time, and cost (16). MAI is a useful implicit tool with a simple scoring system while providing a comprehensive medication review (21). However, during the application of MAI criteria, the practitioner should have sufficient clinical experience and knowledge (22). In addition, there are disadvantages of using MAI, such as the inability to evaluate the under-prescribing of current treatment with MAI criteria and the time-consuming evaluation for inappropriate drug use (22). MAI has been used in hospital services, home care services, and community pharmacies to assess patients’ medications, and it was determined that the decrease in MAI scores was associated with reducing hospitalization and improving their quality of life (23-26).

In Turkey, to the best of our knowledge, this study was first to evaluate medication appropriateness with MAI score in older adults at community pharmacy setting. Therefore, this pilot study aimed to evaluate clinical pharmacist medication review in older adults in a community pharmacy by determining the prevalence of potentiality inappropriate medication and calculating medication appropriateness index.

2. METHODS

2.1. Participant and Setting

This descriptive study was carried out between July 2018 and December 2018 in a community pharmacy located in Antalya, Turkey. Patients aged 65 and over who visited to a community pharmacy and used at least one medication were included in the study. There were no exclusion criteria. A hundred older adults, who visited the pharmacy, were consecutively included in the study by using convenience sampling method. The analysis of the collected data was carried out in April 2019.

The study was approved by the SBU Antalya Training and Research Hospital Clinical Research Ethics Committee at the meeting dated 05/07/2018 with the decision number 14/5. Informed consent was obtained from all participants.

2.2. Data Collection

Data of the patients, including their age, gender, education level (≥ 8 years and < 8 years), medications, and comorbidities were collected from patient interviews. All medications (including prescription or nonprescription drugs and dietary supplements) were recorded. Polypharmacy was defined as ≥ 4 concurrent drugs (27-32).

In this pilot study, both the MAI tool and the 2019 AGS Beers Criteria[®] were used by a single clinical pharmacist (NU) for medication review. Patient data were analyzed using the latest version 2019 AGS Beers Criteria[®] to assess the presence of PIM (13). MAI, which is used to evaluate the appropriateness of medications, consists of 10 criteria. Each criterion is evaluated as appropriate, neutral inappropriate, or unknown by the pharmacists. The maximum total score of MAI is 18. Higher MAI scores related to the inappropriateness of medication (16). In the study, the MAI score was calculated for each medication separately and total medication regimen.

2.3. Data Analysis

Kolmogorov-Smirnov test was used to analyze the normal distribution of data. Descriptive variables were expressed as median and interquartile range (IQR). The frequency of variables in the data is shown as a percentage (%) and number. The chi-square test was used in the analysis of nominal variables. The Mann-Whitney U-test was used to assess the differences between the two groups (defined as PIM user or not). The results were evaluated within a 95% confidence interval and P value of < 0.05 was considered statistically significant.

3. RESULTS

The characteristics of the older patients are shown in Table 1. The median age of the patients was 75.5 (IQR, 68.0-78.8). Among them, 46.0% of the patients were female. In addition, 77.0% of all patients had less than eight years of education. The median number of medications were 9.0 (IQR, 7.0-10.0). Polypharmacy was detected in most patients (97.0%).

The MAI score was calculated for a total of 874 drugs in the study. The medication review took about 10 minutes per drug. The median MAI score for total medication regimen was 53.0 (IQR, 38.6-67.9). The median MAI per medication was 6.25 (5.00-8.00). The rate of PIMs was 63.0%. The median MAI score of patients with PIM is statistically higher than the mean MAI score of patients without PIM ($P < 0.05$). The MAI scores of the older adults are summarized in Table 2.

The most common medication group with the highest MAI scores and the medication group with the most common PIMs are shown in Table 3. Accordingly, the therapeutic class of medications with the highest MAI score was Nonsteroidal Anti-inflammatory Drugs (NSAIDs) and/or paracetamol ($n=28$), while the most prevalent PIMs was proton pump inhibitors ($n = 42$).

Table 1. Characteristics of older adults

Characteristic	Total Sample (n=100)	Not PIM users (n=37)	PIM users (n=63)	P
Age Median (IQR)	75.5 (68.0-78.8)	72.0 (67.5-80.5)	74.0 (68.0-78.0)	NS
Age (%)				
65-80 years	77 (77.0%)	27 (73.0%)	50 (79.4%)	NS
> 80 years	23 (23.0%)	10 (27.0%)	13 (20.6%)	
Gender (%)				
Female	46 (46.0%)	17 (46.0%)	29 (46.0%)	NS
Male	54 (54.0%)	20 (54.0%)	34 (54.0%)	
Education level (%)				
<8 years	77 (77.0%)	29 (78.4%)	48 (76.2%)	NS
≥8 years	15 (15.0%)	5 (13.5%)	10 (15.9%)	
Missing data	8 (8.0%)	3 (8.1%)	5 (7.9%)	
Number of comorbid diseases				
Median (IQR)	5.0 (4.0-5.0)	4.0 (4.0-5.0)	5.0 (4.0-6.0)	NS
Number of medications				
Median (IQR)	9.00 (7.0-10.0)	7.0 (5.0-9.0)	9.0 (8.0-11.0)	<0.001
Polypharmacy (%)				
<4 medications	3 (3.0%)	3 (8.1%)	0 (0.0%)	<0.05
≥4 medications	97 (97.0%)	34 (91.9%)	63 (100.0%)	

PIM: Potentially Inappropriate Medication; NS: Nonsignificant IQR: Interquartile Rate

Table 2. The MAI scores in older adults

	Total Sample (n=100)	Not PIM users (n=37)	PIM users (n=63)	P
The Median MAI Score (IQR)	53.0 (38.6-67.9)	46.0 (34.8-62.8)	56.0 (39.5-71.5)	<0.05

PIM: Potentially Inappropriate Medication; MAI: Medication Appropriateness Index; IQR: Interquartile Rate

Table 3. The most common medication group with the highest MAI scores and PIMs

Medication with higher MAI score	n
NSAIDs and/or Paracetamol	28
Low dose Aspirin and/or dipyridamole	12
CNS-active agent	9
Cardiovascular agent	5
Proton pump inhibitors	5
PIMs	
Proton pump inhibitors	42
NSAIDs	18
CNS-active agent	15
Low dose Aspirin	8
Cardiovascular agent	7

n: Number of Medication; MAI: Medication Appropriateness Index; NSAIDs: Nonsteroidal Anti-Inflammatory Drugs; CNS: Central Nervous System; PIM: Potentially Inappropriate Medication

4. DISCUSSION

To the best of our knowledge, it is the first study conducted in community pharmacy in Turkey to identify PIMs and MAI scores in older adults. In general, our PIMs (63%) result was

higher than the studies in the literature. In a retrospective study evaluating the presence of PIMs in Canada, PIMs were detected in 48.3% of older patients (9). In another study conducted retrospectively in the United States, the rate of PIMs was found to be 21% (11). In line with the present study, a multi-center study in Kuwait found 53.1% of PIMs (5). In a research study carried out in Turkey, it was determined 75.3% of PIMs in Turkey using the GheOP³S tool (33).

Line with the studies in the literature, PIMs were associated with the presence of polypharmacy (5, 8, 17). Consistent with the research conducted previously (8), the most common medications related to PIMs, which were coincided with the findings of the present study, were proton pump inhibitors, NSAIDs, and central nervous system medications. In another study conducted with older patients receiving home health care services in Turkey (34), in parallel with the results of our study, the most common presentation of PIMs was proton pump inhibitors and nonsteroidal anti-inflammatory drugs.

In a previous study, the presence of PIMs was 53.1%, while the median MAI score per medication was determined as 0.0 according to the MAI criteria (5). In our study, the presence of PIMs was higher and the median MAI score per medication was higher when compared with this study (5). According to findings of previous studies conducted in Austria (99%) (23) and Denmark (94.3%) (35), the rate of inappropriate medication use the present study was lower. In other studies, MAI score was lower than the calculated scores in the present study (23, 26, 36).

MAI is a useful tool in medication review service involving the collaboration of pharmacists and physicians at primary care in previous studies (23, 36). In the study conducted by Olsson et al. (24), which included patients over 75 years of age and using more than five medications, and performed home medication reviews, the median MAI score was higher than our study (54.0). Since they included patients using 5 or more medications in their study and included patients in a relatively higher risk age group compared to our study, they may be more likely to determine a higher rate of inappropriateness in medication use.

The study includes some limitations. The generalizability of the results has been limited. However, this study is a pilot study to use MAI in older patients at community pharmacy setting. This study is conducted on older patients who visited the pharmacy by using convenience sampling; this can be led to selection bias.

5. CONCLUSION

To best our knowledge, this is the first study of clinical pharmacist-led medication review by calculating MAI score conducted at a community pharmacy in Turkey. There was a high rate of potentially inappropriate medication with a higher score of medication appropriateness in older adults. This study highlights the importance of medication review led by clinical pharmacist at community pharmacy to optimize medication usage in older adults. Our findings show that

MAI is a useful tool in detecting medication appropriateness in the community pharmacy setting and could be used in medication review led by the community pharmacist.

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Conflict Of Interest

None

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