

Original Article

Consensus Validated List of Potentially Inappropriate Medication for the Elderly and Their Prevalence in South Korea[☆]

CME



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SUMMARY

Background: The aims of this study were to generate a comprehensive potentially inappropriate medication (PIM) list applicable for Korean elderly based on the international PIM lists (Beers, Screening Tool for Older Person's Prescriptions, and PRISCUS), and to determine the PIM prevalence rate in the elderly who utilized long-term care services.

Methods: We generated a list of drug ingredients included in all the three criteria, and also the current Korean national formulary list. Twenty-six drug ingredients belonging to seven drug classes were finally selected. A two-round Delphi survey consisting of 20 experts was conducted to make a consensus on the PIM criteria applicable to Korean elderly. Individual questions regarding PIM criteria were answered using a 5-point Likert scale. The PIM prevalence rate in elderly was analyzed using the National Health Insurance claims data and the Long-term Care Benefit claims data over a 6-month period (from July 2011 to December 2011).

Results: All 26 drug ingredients were determined to be PIMs for Korean elderly. The prevalence rate of PIM in elderly under long-term care was 41.4% (98,158/237,285 individuals). Benzodiazepines were the most prevalent PIM drug class (28.9%), followed by first generation antihistamines (26.9%). The use of nonsteroidal anti-inflammatory drugs and tricyclic antidepressants were 9.3% and 6.4% of total individuals, respectively.

Conclusion: The comprehensive PIM list may be helpful for clinical practitioners to optimize drug choices for their elderly patients. A relatively high PIM prevalence in the elderly suggests that efficient strategies should be designed to reduce PIM in elderly populations in long-term care settings.

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1. Introduction

Inappropriate prescribing in the elderly is associated with negative outcomes including adverse drug events, increased hospitalization, and resource utilization^{1–4}. Accordingly, avoiding inappropriate drug use is an important and effective strategy in reducing medication-related problems and reducing health care costs⁵. Several explicit criteria to screen potentially inappropriate medication (PIM) use in the elderly were used to evaluate

inappropriate drug use status. Beers' criteria developed in the United States is the most frequently used⁶, but concerns about the generalizability to other populations are increasing⁷. Thus, other criteria such as the Canadian criteria⁸, Screening Tool for Older Person's Prescriptions (STOPP), and PRISCUS (Latin for old and venerable elderly) have been generated to apply to other regions. A new set of explicit criteria called STOPP was validated in Ireland and Britain and has been used in other European countries⁹, and the PRISCUS list was specifically designed for its applicability in Germany¹⁰. We recognize the necessities of localized explicit criteria that reflect a country- or region-specific health care system, circumstances, cultures, drug market (especially reimbursement policy), and practice patterns. In Korea, Beers' criteria or STOPP criteria have been used in medicinal and pharmacological researches for identifying PIM^{11–13}, but they have not been verified

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for their applicability of foreign country-based PIM criteria to Korean settings yet.

Recently, the importance of medication use management in the elderly has been magnified since national long-term care services for the elderly were incorporated into the National Health Insurance (NHI) scheme since July 2008 in Korea. It is well known how important medication management in the elderly population at a higher risk of adverse drug events is. As one of the medication management strategies, reduction of PIM prevalence is crucial. In this regard, the generation of explicit criteria to evaluate PIM use in elderly should come first.

The aims of this study were to generate a comprehensive PIM list applicable for Korean elderly based on the three international PIM lists (Beers, STOPP, and PRISCUS), and to determine PIM prevalence rates in the elderly who utilized long-term care services.

2. Materials and Methods

2.1. Study design: A Delphi survey

To generate a PIM list specifically applicable to Korean elderly, two-rounds Delphi surveys with a number of questions were undertaken from July 9, 2013 to August 13, 2013. The Delphi method, as an expert consensus process, provides a systematic way to converge the expertise of people working in a particular area and gives guidance that is readily applicable to a particular context¹⁴. Three international PIM lists (Beers 2012 version, STOPP 2008 version, and PRISCUS 2010 version) often used worldwide, were used for drafting a PIM list for the Delphi survey in this study. Pharmacist researchers extracted a total of 31 intersectional drug ingredients which were included in all the three published PIM criteria as the above mentioned. Among them, five drug ingredients (doxepin, oxazepam, thioridazine, trimipramine, and zaleplon) which were not included in the current Korean national drug formulary list were excluded (Figure 1). Finally, 26 ingredients from seven drug classes were selected as PIM candidates (Table 1). Delphi panel experts were asked to rate their agreement levels on the inclusion of those 26 ingredients individually in the PIM list for

Korean elderly with given clinical conditions/diseases. Rating scores were given according to a 5-point Likert scale: 1 = strongly agreed; 2 = agreed; 3 = equivocal; 4 = disagreed; and 5 = strongly disagreed. They were allowed to answer “unable to decide” if it was too difficult to rate a score. They were also asked to describe the reasons for their ratings, if possible. Survey questionnaires were collected via e-mail from the panel participants for two sequential rounds. A summary of ratings by panelists was fed back to all the panel participants after Round 1. Panel members were allowed to change their first ratings in Round 2. This process resulted in a list of statements that had substantial consensus in its ratings.

2.2. Delphi participants

A total of 20 panel experts were invited to participate and complete the survey questionnaires in both Rounds 1 and 2. The panel size was a convenient sample number that was likely to yield stable results in this study. With a Delphi method, participants act as a panel of experts making private and independent ratings of agreement with a series of statements¹⁵. Expert panel participants in this study consisted of 14 physicians and six pharmacists who had experience in a wide range of specialties across the internal medicine, mental health, neurology, gerontology, preventive medicine, urology, family medicine, rheumatology, and clinical pharmacy fields, and who have been working in general hospitals or universities as clinical practitioners and/or researchers (Table 2).

2.3. Consensus validation of localized PIM list

After Round 2 was completed, the survey results were presented as mean scores of agreement levels for individual questions which were reported by 20 panel participants. A mean score of 3.0 was used as the cut-off point to be agreed on, including the drug in the localized PIM list for Korean elderly. Any items > 3.0 points were not eligible for the localized PIM list.

2.4. Data sources and data analysis

The NHI claims data and Long-term Care Benefit claims data were used to identify PIM exposure in the elderly. The administrative NHI claims data included information on patients' demographics (sex, age), clinical conditions (disease diagnosis ICD-10 codes), health care service utilization including inpatient and outpatient settings, drug prescriptions, and health care

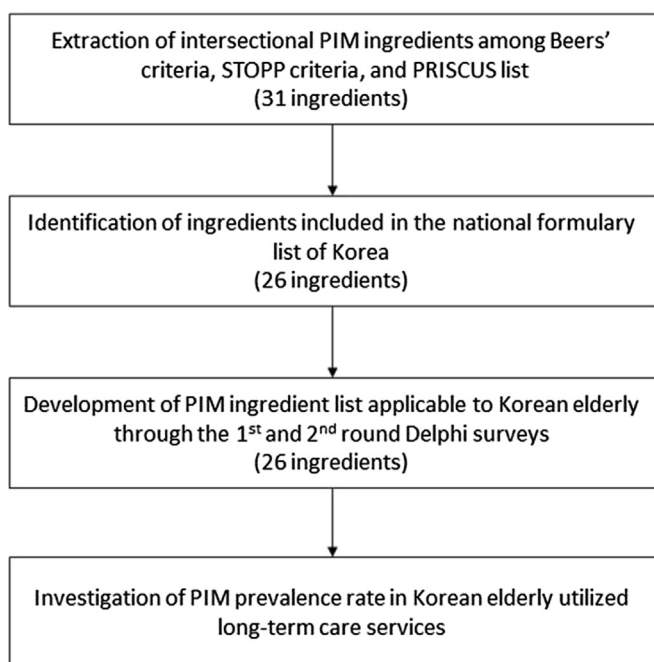


Figure 1. Flow chart of the study. PIM = potentially inappropriate medication; STOPP = Screening Tool for Older Person's Prescriptions.

Table 1
Drugs included in the national formulary list and listed as potentially inappropriate medication for elderly in the Beers, STOPP, and PRISCUS criteria.

Class of drug ingredients	Name of drug ingredients	No. of ingredients
TCA	Amitriptyline, clomipramine, imipramine	3
Benzodiazepines	• Short- & intermediate-acting: alprazolam, clorazepam, triazolam • Long-acting: chlorazepate, chlordiazepoxide, diazepam, flurazepam	7
Neuroleptic drugs	Perphenazine, clozapine, haloperidol, olanzapine	4
1st generation antihistamines	Chlorpheniramine, clemastine, doxylamine, triprolidine	4
Antimuscarinic drugs	Oxybutynin	1
NSAIDs	Indomethacin, piroxicam, ketoprofen, meloxicam	4
Alpha-blockers	Prazosin, doxazosin, terazosin	3
Total		26

NSAIDs = nonsteroidal anti-inflammatory drugs; STOPP = Screening Tool for Older Person's Prescriptions; TCAs = tricyclic antidepressants.

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