

タイ東部の地域病院における高齢者の医薬品適正使用のための実態調査

Potentially Inappropriate Medications of Elderly in Community Hospital in Eastern of Thailand

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Background and rationale

Thailand is an upper-middle income country in South East Asia, whose population is quickly aging. Almost older Thai citizens have been continuously prescribed multiple medicines that associated with the high risk of adverse drug reaction (ADRs). These problems are related to potentially inappropriate medication (PIM) use in the elderly. PIM has been defined as a medication that puts patients at risk rather than having benefits and includes prescription medications with drug–drug and drug–disease interactions. Currently there are several screening tools to identify PIM. The original tool was the Beers Criteria, which was published in 1991 in the United States and updated in 2015. Medicines should be avoided in the elderly owing to drug-disease interactions, drug-drug interactions, the need for caution in elderly, and effects on kidney function. The screening tool of older people's prescriptions (STOPP) was explicit criteria published in 2008 in Europe and updated in 2014. The medication lists were organized by physiological organ systems and should be avoided drug-drug interactions, drug-disease interactions, drugs that increase the risk of falls, and duplicate drug class prescriptions. Irrational prescribing is a problem in the Thai health care system, especially PIM prescribing to elderly patients. A large-scale prevalence of PIM was found 30–60% in community hospitals by identifying Beer and STOPP criteria. Over half of PIM and ADR problems are associated with the prescribing process by physicians. In 2011, the Ministry of Public Health (MOPH) launched the Rational Drug Use (RDU) policy for improving drug safety in patients especially PIM use. The Lists of Risk Drugs for Thai Elderly (LRDTE) as the Thai explicit for identifying

PIM was developed from the Beers and STOPP Criteria by Christine M et al. (J Am Geriatr Soc 2012) and Gallagher P et al. (Int J Clin Pharmacol Ther 2008). The medication lists considered the age group in elderly aged over 60 years and the severity of medication risk. In addition, a novel computerized decision support systems (CDSS) as the automated alert system integrated PIM lists base on LRDTE criteria into the electronic prescribing of the hospital software to make appropriate prescription changes by physician. LRDTE criteria and CDSS for PIM associated with the RDU policy and were supported by MOPH to improve patient's safety. The prevalence of PIM using the LRDTE has not been determined and the effectiveness of this CDSS for PIMs has not been clearly established in Thailand. Therefore, this study aimed to examine the prevalence of PIM use based on the LRDTE, to address the PIM problem by identifying factors that influenced PIM use, and to evaluate the effect of a CDSS on PIM prescriptions for elderly patients in Thai community hospitals.

METHODS

Phase I

A retrospective cross-sectional descriptive study was conducted using the computerized database at four community hospitals in Thailand between April 1, 2014 and March 31, 2015. PIMs were defined using the LRDTE that is categorized by age and severity of medicine. Age was separated into two categories: 60-74 years and 75 years and over. Medicine was categorized into three severity levels: mild is used within the short term or with intensive monitoring, moderate is avoid by using alternative choices, and severe is not recommended and no benefit.

The population studied included elderly patients aged 60 years and older who had at least 2 pharmacy claims and visited as an outpatient over a 1-year period during fiscal year 2014. Four hospitals participated in the study. Descriptive statistics and multivariate logistic regression were used to identify common factors (patient and health service utilization) and Thai region-specific predictors of PIM use including 1) health insurance schemes, 2) hospitals, and

3) physicians. There are three health insurance schemes; the civil servants medical benefit scheme (CSMBS) for government employees, the social security scheme (SSS) for private employees, and the universal coverage scheme (UCS) for the remaining population including elderly. CSMBS are still the best in Thailand because CSMBS get free choice of the contractor providers and can access both essential drug (ED) and non-essential drug. Each hospital had different characteristics in terms of the number of bed and physician. Hospital A was a first-level hospital (F1), which has 60 beds and more, general practitioners (GP), and specialized practitioners (SP). The other three hospitals (B to D) were second-level hospitals (F2), which have 30 beds and more and were without SP.

Phase II

The CDSS for PIM detection in this study, the alert system was incorporated with LRDTE criteria into electronic prescribing at four hospitals and was developed by Ploylearmsang et al. (J Health Syst Res 2017). The retrospective cohort study design comprised two phases with a duration of 12 months each: pre-CDSS (October 2015 to March 2016) and post-CDSS (October 2016 to March 2017). A descriptive analysis was used to analyse the common PIM used in each PIM level pre- and post- CDSS. Chi-square tests were used to compare the rate of PIM prevalence in each PIM level pre- and post-CDSS implementation.

RESULTS AND DISCUSSION

I. Applying the Lists of Risk Drugs for Thai Elderly (LRDTE) as a mechanism to account for patient age and medicine severity in assessing potentially inappropriate medication use

Prevalence of PIM use identified using the LRDTE

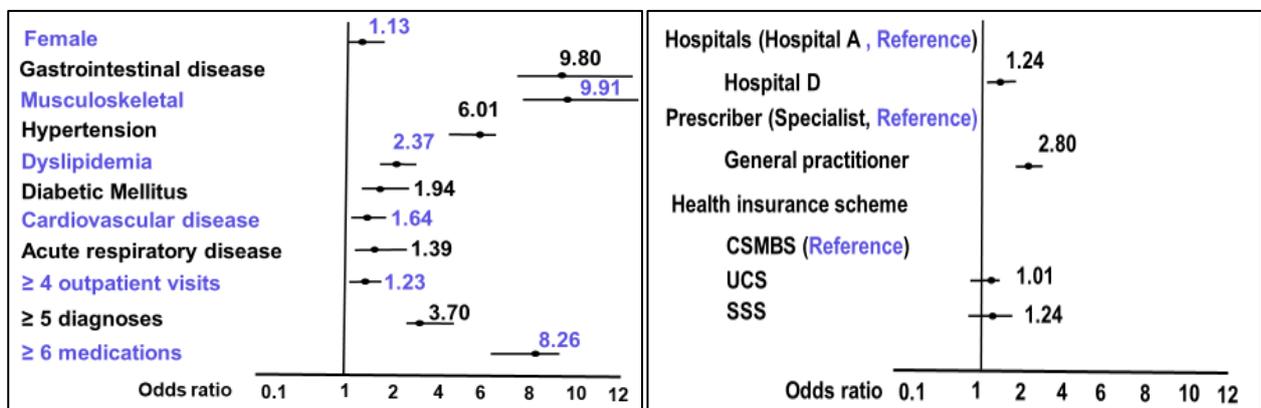
Of a total of 13,274 elderly patients, 79% (10,536/13,274) were prescribed at least one PIM. Amlodipine (32%), omeprazole (30%), and tramadol (18%) were the most commonly prescribed PIMs in elderly patients. The high PIM prevalence was found in this study because the medicine lists in the LRDTE criteria covered current standard treatment guidelines and

hospital formularies. Therefore, the new LRDTE criteria should suggest to fulfill the RDU policy to improve the medicine safety among Thai elderly.

Factors influencing PIM use in elderly patients for drug policy perspective

After adjustment for patient and utilization factors (Model 1), positive associations were identified between female gender, all comorbidities except COPD/asthma, 4 or more outpatient visits, 5 or more diagnoses, and 6 or more medications (Figure 1-a). By adding Thai region-specific factors (Model 2), most factors remained statistically significant predictors (excluding female and outpatient visits). Moreover, Hospital D [OR 1.24; 95% CI 1.07-1.43] and general practitioner prescribers [OR 2.80; 95% CI 2.44-3.21] were independent predictors for PIM use as Thai region-specific factors. Health insurance schemes were not independent predictors after adjustment for common factors (Figure 1-b).

The factors positively associated with PIM use in this study were multi comorbidities, increased number of diagnoses, frequency of outpatient visits, and polypharmacy. After including the Thai region-specific factors in the model, the hospital and general practitioner factors were an important predictor that associated with PIM use. The revision of formularies and educational programs or the PIM alert system for physicians are needed to improve prescribing.



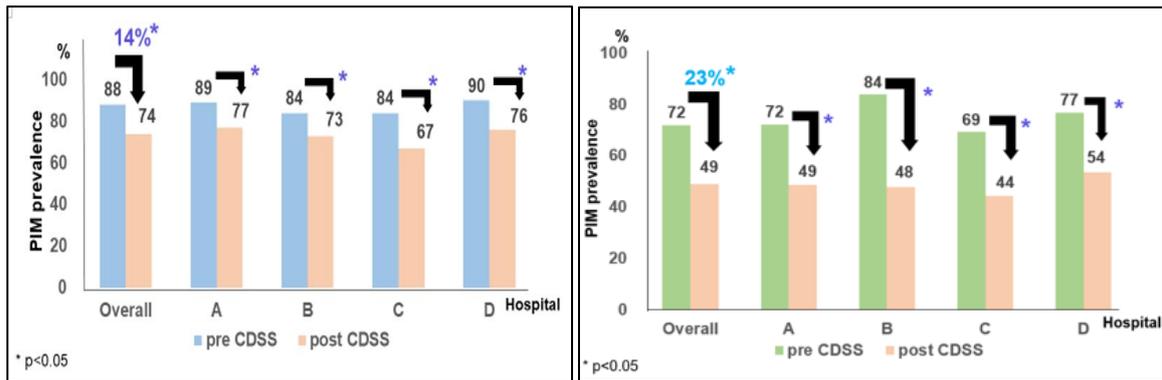
a) Patient and utilization factors (Model 1) b) Thai region-specific factors (Model 2)

Figure 1 Factors that influenced potentially inappropriate medication use in Thai elderly.

II. Effect of a computerized decision support system on potentially inappropriate medication prescriptions for elderly patients in Thailand

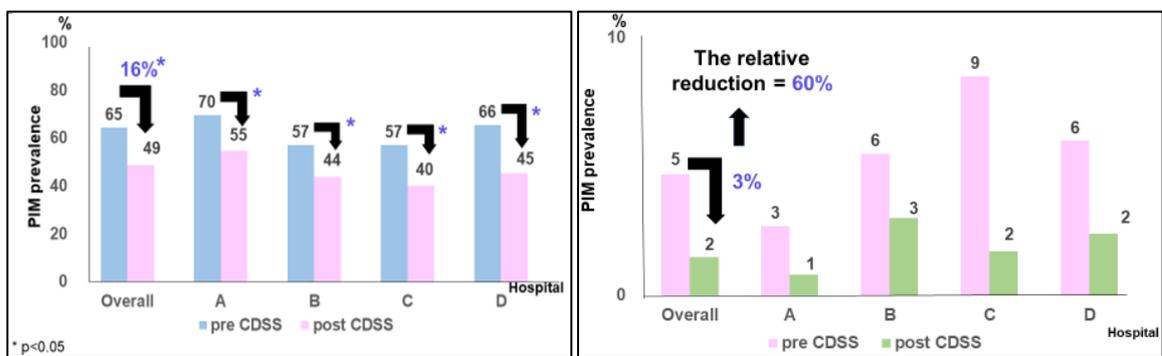
A total of 11,258 patients were included in the period in pre-CDSS and 11,915 patients were included in post-CDSS. The overall prevalence of PIM prescriptions post-CDSS significantly decreased from 88% to 74% (Figure 2-a). The tendency of PIM prevalence post-CDSS between overall and each hospital were similarly reduced. Mild and moderate PIM levels were significantly reduced from 72% to 49% (Figure 2-b) and from 65% to 49%, respectively (Figure 2-c). All hospitals had only one severe PIM, which was hyoscine, and its prevalence was reduced from 5.0% to 2.0% (Figure 2-d), but the change was not significant ($p = 0.74$).

CDSS of PIM change physician's prescription behaviour to avoid PIM because PIM prevalence of overall and each hospital reduced. The CDSS for PIM showed specific medication warnings, was easy to use, and provided real-time alerts for physicians. Even though, the tendency of PIM prevalence was similarly reduced in overall and each hospital, PIM prescription was still high. The main cause might be the restriction of hospital formulary. Physician have no alternative medicine to avoid PIM prescription. Therefore, the hospital formulary should be revised for preventing PIM prescription. The prescriptions of mild and moderate PIMs were reduced but still had a high proportion of PIM prescriptions. Those PIM levels may have the benefits more than risk in elderly patients. Therefore, the continuous monitor for preventing long-term prescription, should be realized. For the CDSS on severe PIM, PIM level was not significantly reduced. The prevalence of severe PIM in pre-CDSS was very small because only limited elderly patients received it. When considering the relative reduction, a big change was observed between pre-and post-CDSS accounting for 60% reduction. Even though, severe PIM in each hospital should be zero, this PIM was still prescribed. All hospital has only Hyoscine (Antispasmodic medicine) as severe PIM so physicians have no alternative medicine to avoid PIM prescription. Therefore, formulary should be revised to avoid PIM.



a) Overall PIM

b) Mild PIM (medicine use within short term use or with intensive monitoring)



c) Moderate PIM (medicines are not recommend, avoid by using alternative choices)

d) Severe PIM (medicines are not recommend and no benefit)

Figure 2 PIM prevalence of overall and each PIM level pre- and post-CDSS

CONCLUSION

The prevalence of PIM was 79% by using LRDTE. The hospital and general practitioners as the Thai region- specific factors associated with PIM use. Using CDSS for PIM can reduce PIM prescription can change physician’s prescription behaviour but the effort to revise hospital formulary is still important to avoid PIM.

REFERENCES

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