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Original Research Article

The relation between polypharmacy and medication non adherence in elderly patients with non-communicable diseases in primary care, Phra Nakhon Si Ayutthaya Hospital

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ABSTRACT

Background: Most health problems in the elderly are non-communicable diseases. The elderly continuously take medication for treatment and prevent complications. This increases the chances of polypharmacy in the elderly, which may lead to medication non adherence, negatively affecting health and reducing quality of life.
Methods: This research aimed to study the relationship between polypharmacy and medication non adherence in elderly patients with non-communicable diseases in primary care services of Phra Nakhon Si Ayutthaya Hospital, compared with non-polypharmacy. This study was a cross-sectional study with participants divided into two groups: Polypharmacy and Non polypharmacy. There were 276 participants aged over 60 years and who received services at the primary care services of Phra Nakhon Si Ayutthaya Hospital, from October 2023 to April 2024. Baseline data and Medication adherence data were collected.
Results: The results of the study found that the sample group of 276 people had the most of age at 60-69 years. The most common non-communicable disease was hypertension. Most participants had a daily dose of 1-5 pills, self-managed their medication and had medication compliance. Polypharmacy was significantly associated with medication non adherence (p value 0.04) (odd ratio 2.43, 95%CI 1.06-5.58) and Polypharmacy was significantly associated with inappropriate drug use (p value <0.01) (odd ratio 6.62, 95%CI 3.47-12.61).
Conclusions: The conclusion of the study found that polypharmacy had a statistically significant effect on medication non adherence and inappropriate drug use in elderly patients with non-communicable diseases. Physicians should consider prescribing drugs for the treatment of non-communicable diseases appropriately to reduce the chance of medication non adherence and inappropriate drug use in the elderly.

Keywords: Elderly, Medication adherence, Polypharmacy

INTRODUCTION

Globally, there has been a significant increase in the elderly population, driven by declining birth rates and longer life expectancy. According to statistics from 2020, there were approximately 727 million people aged 65 and older worldwide. Projections suggest this number may rise to 1.5 billion by 2050, leading to the emergence of an aging society.[1] This phenomenon has wide-reaching implications, both at the individual and national levels, prompting many countries to develop comprehensive policies to mitigate the impact of this aging demographic.

In Thailand, according to a survey conducted in 2021, 19.6% of the population is aged 60 and above and it is anticipated that Thailand will fully transition into an aging society by 2022.[2,3] The aging population in Thailand brings about various issues and challenges, particularly regarding health problems in the elderly, which have significant impacts on both individuals and the nation. This has led to an increased focus on improving the health of elderly individuals and ensuring their well-being, enabling them to maintain a good quality of life. The most common health issues among the elderly are non-communicable diseases (NCDs) such as hypertension, diabetes, stroke, cardiovascular diseases and chronic kidney disease. These conditions often require continuous medication to manage and prevent complications.

Furthermore, elderly individuals frequently suffer from multiple chronic conditions, leading to an increased likelihood of polypharmacy. Previous studies have reported that the prevalence of polypharmacy in patients ranges from 29% to 54%.[4-9]

Polypharmacy has been identified as a key factor contributing to medication-related issues in elderly patients, such as inappropriate drug use, drug interactions, adverse drug reactions and medication non-adherence. Studies have found that 61% of patients on polypharmacy experience non-adherence to medication.[15]

The consequences of these issues can negatively affect health outcomes, potentially leading to complications, worsening of diseases and increased healthcare costs. These problems significantly impact both individuals and the healthcare system, emphasizing the need for further research to develop comprehensive policies for elderly care, improving their quality of life in the emerging aging society.In Thailand, research on the impact of polypharmacy, particularly inappropriate drug use, drug interactions and non-adherence to medication in elderly patients with non-communicable diseases, is still limited.

A study by the Faculty of Medicine, Thammasat University, found that among elderly patients with chronic diseases on polypharmacy, 61% experienced non-adherence to medication. However, this study focused on only six specific chronic diseases.[15] Therefore, the objective of this research is to investigate the relationship between polypharmacy and non-adherence to medication in elderly patients with non-communicable diseases receiving primary care services at Phra Nakhon Si Ayutthaya Hospital.

The study will compare the impact of polypharmacy on medication adherence and examine other potential consequences of polypharmacy, such as inappropriate drug use.

METHODS

Study design

This research is a descriptive cross-sectional study. The data collection period will be from October 2023 to April 2024, utilizing questionnaires.

Population

The study will include elderly patients aged more than 60 years who have non-communicable chronic diseases at primary care units

Inclusion criteria

The inclusion criteria for participants are patients with at least two chronic diseases, including hypertension, diabetes mellitus, dyslipidemia, cardiovascular disease, cerebrovascular disease, chronic obstructive pulmonary disease (COPD) or asthma, gout, and chronic kidney disease (stage 3 or higher).

Patients who have been on medication for at least 6 months. Patients who can communicate in Thai

Exclusion criteria

The exclusion criteria for participants are patients with dementia, bedridden patients, patients who are totally dependent, end-of-life patients (palliative care).

Study size

The participants in this study will be elderly patients aged 60 years and older receiving services at the primary care units of Phra Nakhon Si Ayutthaya Hospital.

The participants will be divided into two groups, one group with polypharmacy (use of multiple medications) and another group with non-polypharmacy (use of fewer medications). The data collected will include demographic information and medication adherence assessments.

The sample size was estimated and calculated based on a previous study conducted in Thailand, which examined the prevalence and factors associated with non-adherence to medication in elderly patients with chronic diseases.[18] The study found that:

Among patients with non-adherence to medication using ≥5 medications, the prevalence was 31.12%. Among patients with non-adherence to medication using <5 medications, the prevalence was 15.78%. The study will use a two-sided test with a significance level of 5% and a power of 80%. The ratio of the study group to the control group will be 1:1.

To ensure completeness, a 5% increase in sample size will be added, resulting in a total of 276 participants, 138 in the case group (polypharmacy) and 138 in the control group (non-polypharmacy).

Measurement and tools

The questionnaires used in this study will consist of two parts.

Part 1

General demographic information of the participants, including gender, age, underlying chronic diseases and type and number of medications taken for chronic diseases.

Part 2

Medication adherence assessment based on the past 2 weeks, which includes questions regarding non-adherence behaviors, such as missing doses of medication, stopping medication on their own.

Adjusting the medication dosage according to personal preference, using medications prescribed by other healthcare providers besides their primary doctor and using alternative treatments such as herbs, supplements, or vitamins more than 4 days in the past 2 weeks.

The participants will complete the questionnaire in 5-10 minutes (As the study flow in the Figure 1).

Definition of terms

Elderly

The population aged 60 years and above, which can be further categorized as early elderly (60-69 years), middle elderly (70-79 years), late elderly (80 years and above)[2,3]

Polypharmacy

The use of five or more medications[10]

Medication non-adherence

When patients do not comply with the prescribed medications, even after understanding the treatment plan.[38]

Inappropriate drug use

The prescription of medications that may not be suitable for elderly patients, based on the criteria of the American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults.[39]

Data analysis

The data will be processed using statistical software to present the following information gender, age, number of chronic diseases.

Number of non-communicable chronic disease medications used, number of pills taken per day, medication adherence assessment and Inappropriate drug use.

Ethical statement

Protection of research participants' rights

All research participants will be fully informed and asked to provide written consent before participating in the study. Their names will not be recorded on the questionnaire. If any participant experiences any adverse effects during the study, the researcher will stop the questioning immediately. The data obtained will be processed and stored for one year, after which it will be destroyed. This research does not receive any funding from pharmaceutical companies or related entities. This study has been approved by the Human Research Ethics Committee of Phra Nakhon Si Ayutthaya Hospital on August 30, 2023 (Research Project No. 052/2023).

RESULTS

Demographic characteristics

A total of 276 participants were included in the study. Of these, 87 (31.52%) were male and 189 (68.48%) were female. The majority of participants were in the 60-69 age group, with 148 participants (53.62%).

Most participants had 2-3 chronic diseases, totaling 212 (76.81%) participants, with hypertension being the most common condition, affecting 259 participants (93.84%).

The majority of participants were taking 1-5 pills per day, managed their own medications and showed adherence to their prescribed medications.

Study results

The study examining the relationship between polypharmacy and medication non-adherence in elderly patients with non-communicable chronic diseases who received primary care services at Phra Nakhon Si Ayutthaya Hospital, compared to those without polypharmacy, found that medication non-adherence in elderly patients using polypharmacy had an adjusted odds ratio (AOR) of 2.43, with a p-value of 0.04, compared to those not using multiple medications (Table 2). Inappropriate drug use in elderly patients using polypharmacy had an Adjusted Odds Ratio of 6.62, with a p-value of<0.01, compared to those not using multiple medications (Table 3).

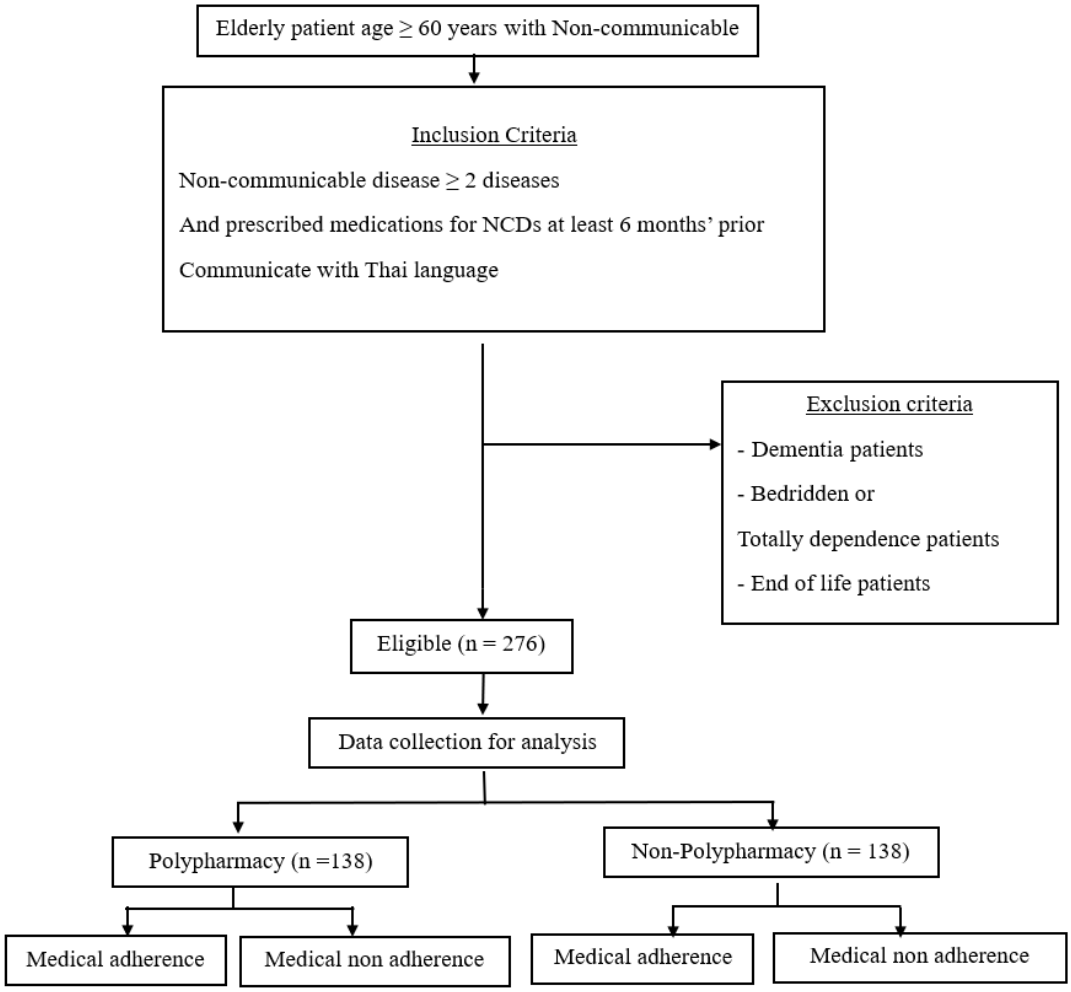

Figure 1: Study flow.

Table 1: Demographic characteristics (n=276).

Demographic characteristics	N (%)
Sex	
Male	87 (31.52)
Female	189 (68.48)
Age (in years)	
60-69	148 (53.62)
70-79	92 (33.33)
More than 80	36 (13.05)
Underlying disease/NCDs	
2-3 diseases	212 (76.81)
4 -5 diseases	63 (22.83)
More than 5 diseases	1 (0.36)
Non communicable disease	
HT	259 (93.84)
DM	135 (48.91)
DLP	266 (96.38)
CVA	16 (5.80)
CVD	10 (3.62)
Gout	22 (7.97)
COPD/Asthma	11 (3.99)

Continued.

Demographic characteristics	N (%)
CKD	
Stage 3a	58 (21.01)
3b	27 (9.78)
4	4 (1.45)
5	4 (1.45)
Medication (tab) per day	
1-5	143 (51.81)
5.5-10	88 (31.88)
10.5-15	39 (14.13)
More than 15.5	6 (2.18)
Drug management	
By patients	256 (92.75)
By others	20 (7.25)
Medicine adherence	
Yes	226 (81.88)
No	50 (18.12)

Table 2: Analysis of polypharmacy and its effect on medication non-adherence.

Medication non-adherence				
Polypharmacy	**Crude OR (95% CI)**	**P value**	**Adjusted OR* (95% CI)**	**P value**
	2.49 (1.25-5.11)	<0.01	2.43 (1.06-5.58)	0.04

*Adjust the influence of variables such as gender, age, medication management, the number of non-communicable chronic diseases and issues with improper medication use

Table 3: Results of the analysis of polypharmacy affecting issues of improper medication use.

Improper medication use				
Polypharmacy	**Crude OR (95% CI)**	**P value**	**Adjusted OR* (95% CI)**	**P value**
	4.29 (2.51-7.33)	<0.01	6.62 (3.47-12.61)	<0.01

*Adjust the influence of variables such as gender, age, medication management, the number of non-communicable chronic diseases and the lack of cooperation in medication use

DISCUSSION

This study found that polypharmacy significantly affects the lack of cooperation in medication use. The odds of non-cooperation in medication use among polypharmacy patients were 2.4 times higher. This result is consistent with the studies by Sirilak Phongjitsiri, Phasitphon Wacharawongwan, Hajar ER, Sorensen L, Erica Zelko, Francesco Napolitano and Roy NT, which found that polypharmacy increases the likelihood of non-cooperation in medication use.[15,16,25-29]

Previous studies on the reasons for non-cooperation in medication use found multiple reasons, such as the use of herbal medicine, vitamins and dietary supplements for various purposes, absence of disease symptoms, the number of medications, or complicated administration methods.[16] Therefore, in practice, when doctors choose to use polypharmacy in the treatment of chronic non-communicable diseases, they should consider the potential for non-cooperation in medication use. They may consider managing medications in a way that is not overly complicated, alongside non-pharmacological treatments and lifestyle modifications.

Furthermore, the study found that polypharmacy significantly impacts improper medication use in elderly patients with non-communicable chronic diseases. This is also consistent with studies by Kristine Thorell, Carine Teles Sangaleti and Shotaro Hagiwara.[31-33] Previous studies have shown that when a proper medication ordering system is implemented, it can help reduce polypharmacy and improper medication use.[30,34-37] Physicians and the interdisciplinary team involved may set up a monitoring system for appropriate medication prescriptions and may also implement non-pharmacological treatments to reduce the chances of improper medication use in elderly patients.

This study found that 18.12% of elderly patients with non-communicable chronic diseases experienced a lack of cooperation in medication use. The result was lower than previous studies that assessed non-cooperation in medication use by asking about medication management methods.

For example, Weerasak Muangpaisan's study at the geriatrics clinic, Siriraj Hospital, Phasitphon Wacharawongwan's study in a primary care unit in

Pathum Thani Province and Sirilak Phongjitsiri's study found non-cooperation rates of 54.9%, 61% and 47.8%, respectively.[15,16,19] In previous studies using the Morisky Medication Adherence Scale to assess non-cooperation in medication use, non-cooperation was found to be between 36.9% and 60.7%.[20-22] It can be seen that the evaluation of medication adherence can be done using various methods, including pill counts, interviews and medication adherence scales.[23,24] Researchers may choose various methods to obtain results that are closer to reality.

Strengths of this study include its comprehensive coverage of various non-communicable chronic diseases, which are common in medical practice, as well as its examination of other impacts related to polypharmacy. It also had an adequate sample size for statistical analysis.

Limitations of this study include that it only focused on medications used to treat seven specific non-communicable chronic diseases. Additionally, this was a cross-sectional study and medication adherence may change over time based on different circumstances. Furthermore, in evaluating medication adherence through questionnaires, some patients may not provide truthful answers, which could lead to lower-than-actual results.

Limitations

This study is limited to medications used for the treatment of only seven non-communicable chronic diseases. Future studies might consider examining medications used for both non-communicable chronic diseases and other conditions treated concurrently. Longer follow-up periods could be included to identify clearer relationships. Additionally, using self-reporting medication adherence assessments could yield results that are closer to actual behaviors.

CONCLUSION

The findings from this study conclude that polypharmacy significantly affects both the lack of cooperation in medication use and improper medication use in elderly patients with non-communicable chronic diseases. It is recommended that in practice, when choosing polypharmacy to treat non-communicable chronic diseases, healthcare providers should consider the potential for non-cooperation in medication use, as well as the increased likelihood of improper medication use in elderly patients, which may lead to subsequent health consequences.

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