

## Improvement of family caregivers' knowledge of polypharmacy in the elderly after health education

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### ABSTRACT

The different health problems in elderly patients require complex management. However, if the use of medicines is uncontrolled, it will lead to polypharmacy. This study aimed to analyze the effect of health education on family caregivers' knowledge of polypharmacy particularly to prevent drug therapy problem in elderly patients. This quasi-experimental study used one-group pre-test post-test design. The population was family caregivers who had elderly members in their care and lived within the working area of Bengkuring Public Health Center. The population members were selected according to the inclusion criteria until a minimum sample size was reached. Having met the criteria, the respondents were asked to fill in a pre-test questionnaire before they partook in the health education for polypharmacy and a post-test questionnaire after their participation. The pre-test and post-test information were then analyzed using a paired t-test. This study revealed that the family caregivers' knowledge of polypharmacy improved by 32.5% with a probability value ( $p= 0.000 < 0.001$ ) less than the level of significance (5%). The contribution of the health education to the family caregivers' knowledge of polypharmacy was 74.3%. There was an improvement in the family caregivers' knowledge of polypharmacy after participating in the health education.

**Keywords:** elderly, family caregiver, health education, polypharmacy

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## INTRODUCTION

One indicator of successful development is the improvement of living standards and life expectancy. However, increased life expectancy may lead to an epidemiological transition in the health sector due to the growing number of morbidity caused by degenerative diseases. As people grow old, the degenerative process reduces their physiological function and exposes them to various non-communicable diseases. Moreover, this process lowers their immune system and increases their vulnerability to infectious diseases (Kementrian Kesehatan RI, 2013).

Various health problems in the elderly require complex treatment particularly related to the administration of multiple medicines, which may increase the risk of polypharmacy. Polypharmacy usually occurs in elderly patients with many health problems, each of which needs drug therapy (Hanlon *et al.*, 2008). Polypharmacy is defined as multiple treatments on one patient and commonly found in the elderly population. It is one of the predisposing factors of drug-related problems (DRPs), including drug side effects, drug interactions, and drug non-compliance, especially in this demography (Stewart *et al.*, 1994). Viktil *et al.*, (2007) state that a higher amount of medicines used by a patient results in more occurrences of DRPs. DRPs can turn therapy into giving a negative effect on patients.

Focusing on the issue of drug delivery in elderly patients in the ward of Saiful Anwar Public Hospital, Malang, Rahmawati *et al.*, (2014) affirm that polypharmacy occurs in 72% of the elderly patients with 72% prevalence of DRP. Also, the most common incidence of DRP is drug interaction potential (66%), improper doses (17.3%), and unnecessary drug use (16%).

This research aimed to analyze the effect of health education on the family caregivers' knowledge of polypharmacy to prevent drug therapy problems in elderly.

## MATERIALS AND METHODS

This research was a quasi-experimental study with one-group pre-test post-test design. The identity of this study was to reveal a causal relationship by involving a single subject group that was observed before and after a specified intervention (Nursalam, 2008). The knowledge of the family caregivers was measured before (pre-test) and after (post-test) their participation in the health education.

The research population consisted of caregivers who cared for the elderly members of their families and resided within the working area of Bengkuring Public Health Center. The sample was the population members who had signed informed consent and met the inclusion criteria. The inclusion criteria were family caregivers who were recorded as living in the working area of Bengkuring Public Health Center with family members aged 60-74 years and were literate and could read and understand the given questions. The sample size in this research was 47 respondents.

### Tools and Materials

The instrument used in this research was a questionnaire containing 15 questions about polypharmacy, which were further divided into 8 favorable and 7 unfavorable items. This questionnaire used the Guttman scale that involved true and false answers. The score was 1 for when the respondents answered correctly and 0 for no or wrong answer. The total score was within the range of 0-100. The number of the correct answers was multiplied by 100 and, then, divided by the total number of the questions, i.e., 15. The questionnaire was designed according to the specified conceptual framework. This instrument was first tested on 30 respondents with the same characteristics as the research sample, and the results were analyzed for validity and reliability. Based on Pearson correlation analysis, the *r*-value of all questions was higher than the *r*-table (0.4438), indicating that each item in the questionnaire was valid. Based on the Cronbach's alpha= 0.768, this instrument was also reliable.

### Research Procedure

The research data were collected from the pre-test questionnaires filled by the respondents after signing informed consent and before provided with health education about polypharmacy. The health education was in coordination with Bengkuring Public Health Center. This three-month program was conducted two times a month at the same schedule of the elderly care at the health center. The respondents were family caregivers who fully participated in the health education about polypharmacy (100% attendance), and those who were literate even though they did not complete their elementary school. The health information was delivered with lectures and demonstrations using video, as well as during the Q & A session. To facilitate the respondents in receiving this information and remembering it for a long time, the researchers used several media like leaflets, flip charts, and videos. The knowledge of the respondents was re-measured using the post-test questionnaire one week after the health education.

### Data Analysis

The research data was computerized and analyzed using SPSS program, particularly paired t-test for statistical analysis.

## RESULTS AND DISCUSSION

The respondents in this research differed by educational attainment, exposure to information, and employment status (Table I). Based on the latest educational attainment, most of the respondents (27.7%) did not complete primary school, but they were literate. Around 76.6% of them had never been exposed to information about polypharmacy. Almost half of the respondents (40.4%) worked as a homemaker. All of these characteristics are claimed to have implications to family caregivers' knowledge of polypharmacy. The results proved that the average family caregivers' knowledge before (pre-test) was lower than after their participation in the health education (post-test). This finding is in line with Kristina *et al.*, (2008), which reveal that respondents with higher education are less susceptible to media advertisements as they read the labels on the drug package more carefully before consumption. Therefore, the risk of polypharmacy is reduced.

Table II shows the average improvement of family caregivers' knowledge of polypharmacy after health education. The paired t-test revealed that the knowledge of the family caregivers before the health education was averagely  $66.4 \pm 15.8$  ( $p = 0.000 < 0.001$ ), which increased up to  $87.9 \pm 6.5$  after participating in the health education. The correlation between the knowledge before and after the health education was 0.862, implying the significant positive effect of health education on the improvement of the family caregivers.

The results also showed that the contribution of the health education to the improvement of the family caregivers' knowledge of polypharmacy was 74.3% ( $R^2 = 0.743$ ). The remaining 25.7% was due to the contribution of other factors, namely educational attainment and exposure to information. The health education had successfully improved the family caregivers' knowledge of polypharmacy by 32.5%.

**Table I. The respondents in the working area of bengkuring public health center by educational attainment, exposure to information, and employment status**

No.	Characteristics	n	%
1.	Educational Attainment		
	Less than elementary school	13	27.7
	Elementary school graduate	8	17.0
	Junior high school graduate	9	19.1
	Senior/vocational high school graduate	9	19.1
	Higher education degree	8	17.0
2.	Exposure to Information		
	Never been exposed to information on polypharmacy	36	76.6
	Ever been exposed to information on polypharmacy	11	23.4
3.	Employment Status		
	Public Servant	4	8.5
	Private Sector Employee	6	12.8
	Self-employed	18	38.3
	Homemaker	19	40.4

**Table II. The average difference of family caregivers' knowledge before and after health education**

Knowledge	Mean $\pm$ SD	Correlation	$R^2$	95% CI		$t$	%	$p$
				Lower	Upper			
Before	66.4 $\pm$ 15.8	0.862	0.743	-24.7	-18.4	-13.706	32.5	<0.001
After	87.9 $\pm$ 6.5							
Difference	21.6 $\pm$ 10.8							

Multiple uses of medicines are a predisposing factor of serious drug therapy problems in elderly patients as they increase mortality and morbidity (Bushardt *et al.*, 2008). Polypharmacy is commonly found in the elderly as a result of various illnesses that leads to the use of irrational medicines. It is caused by several factors that increase the risk of multiple drugs prescription, namely lack of communication between patients and health personnel, patients who are treated by different doctors, and lack of communication between healthcare providers. Andriane *et al.*, (2016) report that polypharmacy is most prevalent in elderly patients who seek treatments in outpatient polyclinics. Doctors' limited time and a paucity of communication between patients and health personnel (e.g., about the medicines that the patients take) prevent doctors from being able to evaluate and discontinue the administration of certain drugs, resulting in polypharmacy.

Family supports, which in this case is family caregivers, are necessary to avoid the occurrence of polypharmacy. Family caregivers are a necessary choice for assisting in the treatment of older family members as they have the most interaction. They are significant in actualizing a successful treatment because they continually remind the elderly patients in the families to take the prescribed medicines, prevent them from taking irrational drugs, and subsequently increase their drug obedience.

Meanwhile, the health personnel can prevent the occurrence of polypharmacy by organizing health education about the appropriate drug use to improve the knowledge of the family caregivers about polypharmacy in the elderly and how to deal with it (Kim *et al.*, 2014). Such improvement is crucial in understanding the cause of polypharmacy in the elderly and, therefore, become the reference for polypharmacy prevention.

Table II presents the average increase of family caregivers' knowledge after participating in health education. The paired t-test results showed that there was an increase of knowledge from averagely  $66.4 \pm 15.8$  ( $p = 0.000 < 0.001$ ) to  $87.9 \pm 6.5$  after the health education. These figures prove that health education about polypharmacy is instrumental in improving family caregivers' knowledge of polypharmacy in the older population. This finding is in line with Tang et al. (2015), which report that health education affects the cognitive, affective, and psychomotor capacity of family caregivers so that their knowledge of polypharmacy can increase.

In this research, the health education given to the family caregivers was part of a teaching and learning process. To facilitate the family caregivers in receiving information, it was delivered with different media, such as leaflets, flip charts, and videos. Moreover, instead of using a long-term process, it was conducted in a relatively short time so that the participants could give their most concentration. The increase of family caregivers' knowledge about polypharmacy after participating in the health education affirms this assertion. Furthermore, the health education methods were designed to properly meet the condition of the respondents and the situation of the venue. These methods are based on Tang *et al.*, (2015), which reveal that health education delivered using CD-ROM and print media, such as leaflets and flip charts, is effective in improving the knowledge of family caregivers.

As presented in Table II, the correlation between the family caregivers' knowledge before and after the health education is 0.862 ( $R^2 = 0.743$  (74.3%)), which signifies the influence of health education on knowledge improvement. This figure means that the health education contributes 74.3% to such increase, while the remaining 25.7% represents the role of other factors (i.e., educational attainment and exposure to information). Around 27.7% of 47 respondents did not complete primary school. Furthermore, 76.6% of the respondents had not been exposed to information related to polypharmacy. The low education level is closely associated with the risk of polypharmacy occurrence in the elderly (Ahmed *et al.*, 2014).

The knowledge of family caregivers about polypharmacy is expected to last long because the health education in this research used several media such as leaflets, flip charts, and video, which helped them to understand the impact of polypharmacy easily. Moreover, the program used a two-way method allowing family caregivers to actively participate in expressing their arguments about the polypharmacy problems in the society. Also, a video containing information of polypharmacy was played at the end of the program. All of these information delivery methods are expected to raise the interest and curiosity of the family caregivers about the impact of polypharmacy on the elderly.

This finding is in line with Notoatmodjo (2012), which states that knowledge is influenced by several internal factors, such as education, occupation, and age. Age determines the compliance in antibiotic use, as well as the occurrence of polypharmacy (Muljabar *et al.*, 2014). Meanwhile, knowledge is affected by external factors, such as environment, socio-economic situation, culture, and information. Higher educational attainment and higher frequency of exposure to information widen the family caregivers' knowledge of polypharmacy and, therefore, reduce the risk of polypharmacy in the elderly.

The weakness of this research is the small number of respondents due to time inadequacy and financial limitation for large sample size. Further research is recommended to use more respondents from different working areas of a public health center. This study also does not use a control group as a comparison.

## CONCLUSION

The results showed that the family caregivers' knowledge of polypharmacy after participating in the health education increased by  $21.6 \pm 10.8$  or 32.5%.

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