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Pharmacist Intervention Model by Collaborating with Health Professionals and Family Empowerment to Increase Medication Adherence among Rural Elderly Hypertensive Patients

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ABSTRACT

Medication adherence among elderly hypertensive patients, particularly in a rural area, is one of the public health problems for which health professionals need to find measures to resolve. This study aimed to develop a pharmacist intervention model by collaborating with health professionals and family empowerment to increase medication adherence among elderly hypertensive patients in the rural area. This research was a mixed-method consisted of 2 stages: stage 1, a descriptive survey study; and stage 2, the development of intervention model with grounded theory by focus group discussion (FGD) and literature studies. Participants were 15 health professionals recruited with purposive sampling and 220 elderly hypertensive patients, along with their families, recruited with quota sampling. Participants were mostly women, had a middle level of knowledge about hypertension, the middle level of perception about the role of the pharmacist, and middle level of perception in terms of the pharmacists' ability in family empowerment. Fifty-seven participants participated in focus group discussion, and the result indicated the need to socialise the role of pharmacists, to allow pharmacists to have the opportunity to attend training, and the need for collaboration to empower families. This led to the recommendations for the pharmacist's role, in which two stages were proposed, pre-intervention and intervention. Based on the data from a model trial with elderly hypertensive patients, it was found that there was a significant increase in the adherence to taking medication in elderly hypertensive patients after the intervention. This model was expected to be an alternative in providing services to elderly hypertensive patients to improve patient adherence.

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INTRODUCTION

The majority of people with chronic diseases have poor adherence to their therapeutic regimen (Nikhitha *et al.*, 2020). Previous results of studies in the different settings showed that the level of adherence to antihypertensive medication, especially among elderly, was still low (Al-Ramahi, 2014; Amaral *et al.*, 2015; Yang *et al.*, 2016). In the rural population, it was reported that 80-90% of patients with hypertension could not reach their blood pressure targets (Chow *et al.*, 2013). This

problem can lead to higher cardiovascular mortality (Wong *et al.*, 2013). In Indonesia, hypertension control has been one of the critical indicators of health development targets in the 2015-2019 national mid-term development planning (Indonesian Ministry of Health, 2015). To implement this program, pharmacists, as part of the health professional team, need to take part due to their essential role in community health. One of the pharmacists' role is to assure patient adherence, and in the case of hypertensive patients, to control blood pressure so that complications can be prevented (Albrecht, 2011). Based on the study of (Wu *et al.*, 2006) using telephone counselling, it was demonstrated that pharmacist involvement could reduce mortality rates in the elderly.

In Indonesia, most of the hypertensive patients who check-up at primary healthcare (*Puskesmas*) only get antihypertensive drugs for seven days. As a result, some patients cannot take medication regularly, so the percentage of controlled blood pressure in Indonesia is estimated to be even lower. This, of course, will affect the level of adherence to take medication and the consequent clinical outcomes (Ayuchecaria *et al.*, 2018). A review by Banning (2009) stated that one of the factors that led to non-adherence was poor access to drugs, which could cause uncontrolled blood pressure, particularly in elderly patients with hypertension. This problem is experienced by people living in a rural area in Pekanbaru region of the Province of Riau, Indonesia. They live in a remote area far from the health care centre, let alone well-equipped hospitals. A solution to the problem is, therefore, needed by emphasising the pharmacist's contribution. This study aimed to develop a model of pharmacist intervention through collaboration among health professional and family empowerment in increasing adherence to taking medication in elderly hypertensive patients in the rural area. However, as far as the researchers observed, this is a new pharmacist intervention model that can be applied to elderly hypertensive patients in rural areas who have limited access. This study used a mixed-method, consisted of a survey using questionnaires and FGD. This method was chosen because to build an intervention model, a survey using a questionnaire would be insufficient.

MATERIALS AND METHODS

Study design and participants

This study was a mixed-method consisted of 2 stages: stage 1 is a descriptive survey study and stage 2 was the development of the intervention model using the grounded theory approach carried out by FGD and literature studies. The samples were elderly hypertensive patients and their families who lived far from health care centres in Pekanbaru region of the Province of Riau, Indonesia. Calculation of sample number for patients and their families was carried using a quota sampling technique. Meanwhile, for health professionals, a purposive sampling technique was used. The inclusion criteria of patients were ambulatory elderly hypertensive patients under antihypertensive therapy. The patients must be able to communicate well and consented to become research respondents. The family members' inclusion criteria were women/men who lived with patients (spouse, off-spring, sibling). Those who could not finish/withdraw from the study were excluded. All subjects signed informed consent before the study and received compensation for their participation. The Ethical Committee of Faculty of Medicine Padjadjaran University, Bandung, has approved this study (certificate No. 501/UN6.KEP/EC/2018).

Data collection

Stage 1 - Quantitative data collection is carried out by distributing questionnaires to respondents. The questionnaire collected data on demographic profile, level of knowledge about hypertension, perception about the role of the pharmacist, collaboration among health professionals, and family empowerment carried out by the pharmacist. Morisky Green Levine (MGL) adherence scale was used to collect the patient's adherence data to be classified into high, middle or low adherence (Morisky *et al.*, 1986).

Stage 2 - To complement and balance quantitative data, qualitative data was collected. In this case, we used grounded theory so that every data obtained was always compared with other data. We continued to do a literature review to find out which theories have been applied for the research on this topic. Qualitative data was collected through FGD, carried out for three times. The first FGD was participated by all pharmacists; the second involved ten other health professionals, while the third one was dedicated to 42 patients and their family members. Each FGD could be repeated until saturation was achieved. After the intervention model was developed, it was then tested on elderly hypertensive patients.

Data analysis

Statistical analysis for quantitative data was performed with descriptive statistics using SPSS version 21. Information was compiled a using frequency and percentage tables, to test the model, bivariate analysis with the Mann Whitney test was

Table 1: Demographic profile of pharmacist and other health professionals

Characteristics	Pharmacist		Other Health Professionals	
	n=5	%	n=10	%
Gender				
Male	1	20.0	0	0.0
Female	4	80.0	10	100.0
The range of age				
Early adulthood (18-40 years)	4	80.0	5	50.0
Middle adulthood (40-60 years)	1	20.0	5	50.0
Advanced adulthood (>60 years)	0	0.0	0	0.0
Level of Education				
Diploma	0	0.0	5	50.0
Professional education	4	80.0	5	50.0
Postgraduate	1	20.0	0	0.0

Table 2: Demographic profile of patients' family

Characteristics	n=110	%
Gender		
Male	51	46,4
Female	59	53,6
The range of age		
17-25 years	3	2,7
26-35 years	28	25,5
36-45 years	39	35,5
46-55 years	19	17,3
56-65 years	16	14,5
>65 years	5	4,5
Level of education		
No formal education	10	9,1
Elementary school graduate	53	48,2
Junior high school graduate	22	20,0
Senior high school graduate	22	20,0
Undergraduate	3	2,7
Correlation with patient		
Spouse	38	34,5
Off-spring	69	62,7
Sibling	3	2,7

Table 3: Profile of the level of knowledge about hypertension

Subject Group	Level		
	High	Middle	Low
	%	%	%
Patients' Family (n=110)	9.1	79.1	11.8
Other Health Professionals (n=10)	0.0	80.0	20.0
Pharmacists (n=5)	0.0	100.0	0.0

Table 4: Profile of perception about the role of pharmacists, pharmacist's collaborative ability, and family empowerment by pharmacists

Subject Group	Perception about the role of a pharmacist			Perception of pharmacist's collaborative ability			Perception about family empowerment by pharmacists		
	Upper %	Middle %	Lower %	Upper %	Middle %	Lower %	Upper %	Middle %	Lower %
Patients' Family (n-110)	0.0	88.2	11.8	-	-	-	0.0	93.6	6.4
Other Health Professionals (n=10)	10.0	60.0	30.0	0.0	80.0	20.0	0.0	90.0	10.0
Pharmacists (n=5)	0.0	80.0	20.0	0.0	80.0	20.0	20.0	80.0	0.0

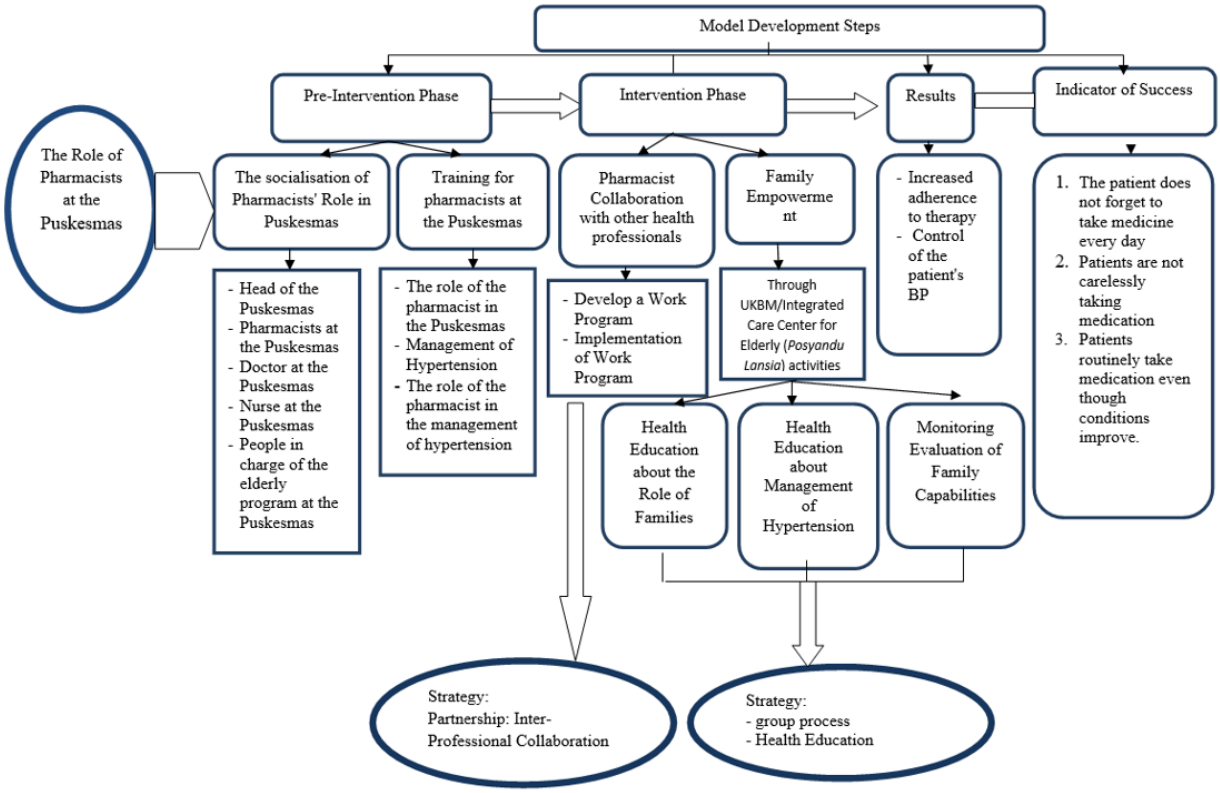

Figure 1: Pharmacists Intervention Models

used. For qualitative data, the data transcript (verbatim) process was first performed. The coding of transcription results was then performed. The next step was to create a categorisation, by referring to the data, checking the terminology in transcription, and confirming data saturation. Only when these steps have been completed, a theory could be developed. The intervention model was then verified and confirmed by all respondents to meet the actual condition in the field. The model was then validated by three experts, consisting of two clinical pharmacists and an expert in public health. After that, the model trial was done in elderly hypertensive patients.

RESULTS

Results of a quantitative study

As shown in Table 1, four of the five pharmacists and ten other health professional respondents were female. The pharmacists were mostly in their early adulthood as were half of the other health professionals. One of the pharmacists was a graduate degree holder.

Table 2 shows that most of the patients' family were female and have a low level of education.

Table 3 indicates that more than half of the subjects in all groups had a middle level of knowledge about hypertension.

Table 5: Results of a quantitative and qualitative study

Domain	Quantitative findings	Qualitative findings	Mixed methods meta-inferences
Perception about the role of a pharmacist	**Pharmacist:** 80% middle level	**Pharmacist:** Overall, the role of the pharmacist is limited to the delivery of drugs and the provision of brief information at the time of delivery of the drug. Some pharmacists have started conducting counselling during the physical exercise session.	**Confirmation** The result on the role of pharmacist according to the pharmacist, other health professionals and patients confirm the result of a quantitative study
	Other health professionals: 60% middle level	**Other Health professionals:** Most of the doctors and nurses stated that the role of the pharmacists is in the delivery of drugs at the pharmacy. However, some stated that there were pharmacists who participated in counselling at the Integrated Care Center. (Posyandu) for the physical exercise session.	
	Patients: 80.9% middle level	**Patients:** The services provided are only limited to drug delivery and brief information related to drug use	
Perception of pharmacist's collaborative ability	**Pharmacist:** 80% middle level	**Pharmacist:** Collaboration has not been done well	**Confirmation** The results of FGD confirm the quantitative results.
	Other health professionals: 80% middle level	**Other health professionals:** The collaboration is only limited to the provision of drugs	
Perceptions about family empowerment by pharmacists	**Pharmacist:** 80% middle level	**Pharmacist:** Family empowerment has not been well implemented.	**Confirmation** Responses of the pharmacist, other health professionals, and patients at FGD confirm the survey results.
	Other health professionals: 90% middle level	**Other health professionals:** Pharmacist only involved when their Family accompanies the patients	
	Patients: 79,1% middle level	**Patients:** Majority of patients agreed that so far the services provided by the pharmacist did not involve Family	

Table 6: Steps to developing the model

Perspective	Roles that have been done	Obstacles	Needs	Strategy
Pharmacist	• Delivery of medication and delivering brief drug information • Some pharmacists have started to take part in counselling during elderly gymnastics and providing education • For collaboration points related to drug availability and Family, empowerment has not been implemented well	• high workload • lack of training provided for pharmacists.	• increase in the number of personnel and • given the opportunity to attend training/seminars as well • Need to socialise the role of pharmacists so that pharmacists are more comfortable in providing services • Overall the pharmacists expect to be able to go directly to the patient or do counselling	• Making a pharmaceutical service flow begins with: Socialisation of the role of the pharmacist in the community health centre • Training for Pharmacists about the role of pharmacist especially in puskesmas, hypertension and its management, and the role of the pharmacist in the management of hypertension • Collaboration with other health workers in compiling and implementing the program • Family Empowerment through education and monitoring evaluation of patient medication adherence by the Family (system model)
Doctors and Nurses	• The role of a pharmacist in drug delivery at the pharmacy, • Some pharmacists have participated in counselling during a physical exercise session. • Collaboration and family empowerment have not been well implemented.	• the limited number of pharmacists (1 person) in 1 community health centre, even no pharmacist in some centres • Some pharmacists have multiple positions • Patients often come without being accompanied by the Family	• addition of personnel, • other health workers do not yet know the role of the pharmacist in puskesmas and • pharmacists also need training	
Patients /Family	• the services provided are limited to the delivery of drugs and brief information regarding the rules for using drugs	• pharmacists have not involved the Family in the treatment of patients		

Concerning perception about the role of the pharmacist, pharmacist's collaborative ability, and family empowerment by pharmacists, majority of pharmacists, other health professionals, patients as well as their families fell into the category with middle level Table 4.

Results of a quantitative and qualitative study (FGD)

The results of the mixed-method study (quantitative and qualitative) are presented in Table 5.

Table 6 shows the steps to develop a model based on a quantitative and qualitative study.

Based on the results of literature studies, FGD, and questionnaire response evaluation, we developed the model as shown in Figure 1.

Table 7 demonstrates the mean of adherence in the intervention and control group for three months. The adherence assessment was carried out four times; before the intervention, one month after the intervention, two months after the intervention, and three months after the intervention.

DISCUSSION

The majority of pharmacists were women with an age range of 18-40 years. Women had historically been attracted to pharmacy because it was widely perceived as a profession that offers them an opportunity to combine a professional career with a family (Janzen *et al.*, 2013). The result also indicated that all of the other health professionals were mostly female, who was at early adulthood (18-40 years). Based on the level of education, they had a diploma and professional education. As presented in Table 2, more than half of patients' family were women, at age the range of 36-45 years, having a relationship with the patients as their off-springs. These results indicate that most of the patients lived with their children. This is very useful for the development of a model that empowers families as patient caretakers. The study of Woodham *et al.* (2018) found that patients who had a caretaker were more likely to have higher medication adherence.

The present study results further showed that no one of pharmacist and other health professionals had good knowledge about hypertension and more than half of patients' family only had a middle level of knowledge about hypertension. This result was in line with the interview result in FGD with health professionals, especially pharmacists, who stated that they were less confident because they lacked the opportunity to update their knowledge, primarily related to hypertension, and the fact that the majority of patients' family had low education level and low level of knowledge about hypertension.

It is interesting to find that pharmacists did not have a good perception of their role. The questionnaire related to this aspect contained statements on the role of pharmacists in public health centres. Results of FGD revealed that most pharmacists did not know and had not carried out all of the roles they were responsible for in public health centres, due to limited time number of workers and the lack of opportunities to update their knowledge. Meanwhile, in terms of pharmacist collaborative ability, it was demonstrated that no one of pharmacists and other health professionals has a good perception about it. This was probably the reason why the collaboration between pharmacists and other health professionals had not gone well. More than half of patients' family, pharmacists, and other health professionals have a middle perception of family empowerment by pharmacists. FGD among patients and their families unveiled the perception that the families were rarely involved in inpatient treatment.

Concerning the model, the first step carried was socialisation on the roles of pharmacists in the community health centres to the centre's officials and health workers involved in serving elderly hypertensive patients. This aimed at facilitating cooperation among pharmacists and other health professionals and, at the same time, emphasising the existence of pharmacists along with their roles and responsibilities. Training, the second step, has been found useful for assessing and increasing knowledge (Wu *et al.*, 2006). Nguyen *et al.* (2018) reported that a short training program significantly improved the knowledge score of pharmacists. Good collaboration with other health professionals as the third step of the model has been addressed to be essential in improving patients' treatment, which eventually led to patients' independence in their treatment (Lelubre *et al.*, 2015). The last step of the model was family empowerment, which was essential in helping patients at home to adhere to medication therapy. Several studies have shown that the first and foremost approach to improving the adherence of the elderly to control their health and to meet all the health needs was through bringing them closer to the primary support system of the Family (Potter and Perry, 2010). A study by Cunha *et al.* (2015) showed that the higher the level of family empowerment, the greater the adherence. Therefore, this model is expected to be applied as a form of pharmacist intervention in the framework of community pharmacy practice. In turn, policymakers could adopt the model as an integral part of the management of hypertension. Adherence was shown to improve significantly in patients who received

Table 7: Effect of intervention on the mean score of adherence

Measurement	Mean of adherence's score	
	Intervention Group	Control Group
1	2.61±1.09	2.55±0.93
2	1.87±0.85	2.58±1.05
3	1.39±0.88	2.54±0.96
4	0.86±0.79	2.53±0.98

the intervention. This result is consistent with a report of a systematic review (Gwadry-Sridhar *et al.*, 2013) that unveiled significant improvement in medication adherence and blood pressure control in hypertensive patients exposed to interventions.In this context, clinical pharmacist counselling on medication adherence was shown to have positive impacts (Ramanath *et al.*, 2012). Albeit promising results from implementing the developed intervention model on adherence, some limitations, including limited access to the health service centre, need to be resolved.

CONCLUSIONS

A pharmacist intervention model involving other health professionals and the patients' family has been developed to improve adherence among elderly hypertensive patients. The model may serve as an avenue in providing better service in health facilities, especially in the rural area.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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