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RESEARCH ARTICLE

Practice module training to increase pharmacist knowledge and skills in identifying drug therapy problems in hypertensive patients

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Abstract

Background: Pharmacists are responsible for drug therapy given to patients to achieve therapeutic results in pharmaceutical services. Various studies state that there are still many hypertension sufferers who have not reached the target of therapy. This happens because there are still many problems with drug therapy. **Aim:** This study aimed to increase pharmacists' knowledge and skills in identifying drug therapy problems (DTP) in hypertensive patients at primary care centres (PHCs). **Method:** This study was attended by forty PHC pharmacists in the Surabaya area. The research was conducted in May-August 2020, with a pre-and post-test control group design. The research sample consisted of 20 pharmacists in the treatment group and 20 in the control group. The different test was carried out with the Wilcoxon test. **Result:** The results showed a difference between the pre-and post-test results of pharmacist knowledge ($p < 0.05$), indicating increased pharmacists' knowledge. There were differences in the skills of pharmacists in collecting patient demographic data, finding DTP, and conducting intervention ($p < 0.05$). **Conclusion:** Practice module training can improve pharmacists' knowledge and skills in identifying DTP.

Introduction

Pharmaceutical care is a form of patient-centred practice in which the pharmacist is responsible for meeting the patient's medication-related needs. In pharmaceutical care, pharmacists are responsible for drug therapy given to patients to achieve the desired therapeutic goals (Hepler *et al*., 1990; Cipolle *et al*., 2012; Ministry of Health of the Republic of Indonesia, 2017). Pharmaceutical care involves the pharmacist working with patients and other healthcare professionals to design, implement, and monitor a treatment plan to achieve the patient's therapeutic goals. Pharmacists in pharmaceutical care have three main functions: identifying actual and potential drug therapy problems (DTP), resolving actual DTP, and preventing potential DTP to achieve patient therapy goals (Cipolle *et al*., 2012; Costa *et al*., 2019).

Hypertension is a disease caused by a chronic increase in arterial blood pressure above a certain threshold value, whose incidence continues to increase and, if not treated immediately, will result in various complications such as stroke, coronary heart disease, kidney failure, and others (Saseen & Maclaughlin, 2012). The National Basic Health Survey 2018 data showed that the prevalence of hypertension based on measurement results in the population aged ≥18 years of age has increased from 25.8% (2013) to 34.1% (2018), with an estimated number of hypertension cases in Indonesia is 63.3 million people (Bayer Indonesia, 2022). The results of previous studies at the Surabaya area health centre showed that pharmacists had moderate knowledge, mostly good attitudes and practices that were still unsatisfactory in identifying DTP in hypertensive patients, and there were still many patients who had not reached the therapy target (Isaac *et al*., 2014; Inamdar S.Z *et al*., 2018; Wijaya *et al*.,

2020). This happens because there are many DTPs found in hypertensive patients, and there is a significant relationship between the number of DTPs and the therapy failure to achieve the target in hypertensive patients (Nasution *et al*., 2016; Weldegebreal *et al*., 2019; Wijaya *et al*., 2023). The purpose of this study was to increase pharmacists' knowledge and skills in conducting DTP assessment in hypertensive patients and to increase the knowledge and outcomes of patient therapy at Puskesmas in the Surabaya area.

Methods

The research was conducted in March-August 2021 with a control group pre-test and post-test design. The sample size was 40 pharmacists consisting of 20 pharmacists in the test group (selected based on the highest number of services for hypertensive patients) and 20 pharmacists in the control group (chosen voluntarily). The research instruments were questionnaires and worksheets for pharmacists as pharmaceutical care providers. The inclusion criteria were pharmacists who worked permanently at Primary Healthcare Centre (PHC) for at least six months, willing to participate in the study, and were willing to sign informed consent.

Before intervention

Before training in the DTP assessment module, a pre-test was conducted to determine the pharmacist's knowledge in both groups about the assessment of hypertensive patients. The pre-test contained 42 questions with details of six questions related to DTP unnecessary drug therapy, six questions related to DTP requiring additional drug therapy, six questions related to DTP ineffective drugs, six questions related to DTP drug doses too low, six questions related to DTP adverse drug reactions, six questions related to DTP drug doses too high, and six questions related to DTP non-compliance. Knowledge scores were assessed and classified as "*poor*", "*average*", and "*good*" based on the standard scoring system. A correct answer for each question of knowledge was given a score of 1, while a wrong answer was marked 0. Thereafter, the knowledge category of respondents was calculated based on the correct answer score of each sub-variable. The knowledge category was good if the mean score was ≥5, knowledge was average if the mean score was 3≤5, and knowledge was poor if the mean score was <3.

At the training stage

Participants in the control group received no treatment and practiced as usual that is, they do not extract complete information and do not document services properly. While participants in the test group received practical module training treatment. The practice module contains the concepts of pharmaceutical care, hypertension pharmacotherapy, categories of DTP, causes of DTP, and how to identify DTP.

After intervention

After the training and coaching were performed for approximately three months, a post-test with the same questions as the pre-test was administered to find out the increase in the knowledge of the pharmacist regarding the DTP evaluation in both groups. Pharmacist practice worksheets in identifying DTP were viewed and evaluated, to see differences in skills between the two groups. Pharmacist skills on the worksheet include completing the information obtained, finding DTP, counselling, and providing brochures to patients.

Analysis statistics

Relevant statistical analyses were performed using Microsoft Excel and SPSS. The validity and reliability of the questionnaire were tested before it was distributed to participants. A data normality test is carried out to select appropriate statistical tests. All *p*-values were two-sided and $p > 0.05$ was taken to indicate statistical non-significance.

Results

Demographic data of the respondents

The training activity was attended by 20 test group pharmacists. Based on Table I, it is known that the largest percentage distribution for the pharmacists in the test group was female with a percentage of 75.0%, those aged 30-37 years or >37 years were 45.0%, and those with working period >11 years 50.0%. On the other hand, the highest percentage distribution for pharmacists in the control group was 85.0% female, 50.0% of the population were between 30-37 years, and 60.0% had worked for >11 years.

Table I: Demographic data of test and control group respondents

Characteristics of pharmacists	Test group (n=20)		Control group (n=20)	
	Frequency	Percentage	Frequency	Percentage
Sex				
Woman	15	75.0	17	85.0
Man	5	25.0	3	15.0
Age (years)				
<30	2	10.0	1	5.0
30-37	9	45.0	10	50.0
>37	9	45.0	9	45.0
Experience (years)				
<5	4	20.0	1	5.0
5-10	6	30.0	7	35.0
>11	10	50.0	12	60.0

Pre- and post-test of pharmacist knowledge in control group

The highest means score of the pre-test of the pharmacist control group was the subvariable of too low dosage (4.60 ± 1.05) and the non-compliance sub-variable (4.75 ± 1.29) for the post-test. There were no differences between each of the pre-and post-test knowledge sub-variables ($p > 0.01$) (Table II).

Table II: Pre- and post-test of pharmacist knowledge in the control group

Sub-variable	Pre-test			Post-test			*p*-value	Explanation
	Mean	SD	Category	Mean	SD	Category		
Unnecessary drug therapy	3.35	1.46	average	3.65	1.53	average	0.03[ǂ]	difference
Need additional drug therapy	1.60	1.05	poor	1.65	1.04	poor	0.33	no difference
Ineffective drug therapy	3.75	1.12	average	3.70	1.08	average	0.58	no difference
Dosage too low	4.60	1.05	average	4.55	1.05	average	0.33	no difference
Adverse drug reaction	2.90	1.29	poor	2.85	1.31	poor	0.33	no difference
Dosage too high	3.70	1.30	average	3.75	1.45	average	0.58	no difference
Non-compliance	4.60	1.31	average	4.75	1.29	average	0.32	no difference

Note: [ǂ] There is a difference in the pre-and post-test ($p < 0.05$)

Pre- and post-test of pharmacist knowledge in the test group

The highest pre-test mean score of the test group was the non-compliance sub-variable (4.20 ± 1.44) and the unnecessary drug therapy sub-variable (5.85 ± 0.37) for the post-test. There were differences between each of the pre-and post-test sub-variables in the pharmacist test group ($p < 0.05$) (Table III).

Table III: Pre- and post-test of pharmacist knowledge in the test group

Sub-variable	Pre-test			Post-test			*p*-value	Explanation
	Mean	SD	Category	Mean	SD	Category		
Unnecessary drug therapy	3.70	1.72	average	5.85	0.37	good	0.000 ǂ	difference
Need additional drug therapy	2.50	1.39	poor	5.35	0.75	good	0.000 ǂ	difference
Ineffective drug therapy	3.20	1.85	average	5.65	0.49	good	0.000 ǂ	difference
Dosage too low	3.95	1.76	average	5.60	0.99	good	0.001 ǂ	difference
Adverse drug reaction	3.65	1.35	average	5.60	0.75	good	0.000 ǂ	difference
Dosage too high	3.50	1.76	average	5.60	0.60	good	0.001 ǂ	difference
Non-compliance	4.20	1.44	average	5.55	0.61	good	0.002 ǂ	difference

Note: ǂ There is a difference in the pre-and post-test ($p < 0.05$).

Control and test group pharmacist skills

There were differences in pharmacist skills in collecting patient demographic data from patients, finding DTPs, and conducting interventions between the control and test groups ($p < 0.05$) (Table IV).

Table IV: Skills of the pharmacists in the control and test group

Parameter	Control group		Test group		*p*-value	Explanation
	Mean	SD	Mean	SD		
Before intervention						
Gathering information	3.100	1.030	3.450	0.930	0.080	no difference
Finding DTP	0.400	0.500	0.500	0.560	0.317	no difference
After intervention						
Gathering information	4.300	0.650	13.000	0.000	0.000ǂ	difference
Finding DTP	0.900	0.380	2.730	1.010	0.000 ǂ	difference
Doing intervention	0.630	0.490	2.000	0.000	0.000 ǂ	difference

Note: ǂ There is a difference in the pre-and post-test ($p < 0.05$)

Discussion

The data showed that most PHC pharmacists were women, mainly at a young age, and had long work experience. This is a very strategic investment in the development of the practice of pharmaceutical care in PHC. The pharmacists of the test group selected in the study were pharmacists practising in PHC, which served the most hypertensive patients according to data from the 2018 Surabaya city health profile Surabaya (City Health Office, 2019).

Increased pharmacist knowledge regarding unnecessary drug therapy sub-variable in the control group could occur as a result of pharmacists attending seminars, reading books, or other things during the treatment period in the test group. Based on the pre-test results on the test group pharmacists, it was shown that almost all the sub-variables were in the average category. The same result occurred in the control group. After the provision of DTP assessment module training, the results of increasing pharmacist knowledge regarding DTP assessment were obtained. The same results have been conducted in India regarding the provision of pharmaceutical care training interventions using modules for hospital, community, and corporate pharmacists, which resulted in interventions after training significantly increased knowledge of pharmaceutical care. Continuing education modules can be used to improve pharmacists' learning and professional development to

improve practice towards pharmaceutical care (Pawar *et al*., 2018; Al-Tameemi & Sarriff, 2019).

Before treatment, there was no significant difference in all parameters between the pharmacists in the control and test groups ($p < 0.05$). All pharmacists had insufficient knowledge and skills related to DTP assessment. DTP assessment skills related to collecting information from patients, which pharmacists mostly carried out before the application of the DTP assessment practice module, included the name, address, and age of the patient. However, after applying the practice module, extracting and collecting information from patients became more comprehensive, including information regarding patient demographics, medical history, drug history, allergy history, patient lifestyle, etc. Before applying the DTP assessment practice module, generally, the DTPs found by pharmacists at the PHC were DTPs of patient non-compliance and drug side effects. After applying it, DTPs found were more numerous and varied. Based on a different test conducted to see differences in pharmacist skills in collecting information related to patient demographic data, finding DTP, and providing interventions to patients after being trained, there was a difference between pharmacists in the control and test groups ($p < 0.05$). Training on the DTP assessment module provided to the treatment group pharmacists improved their knowledge and skills. Extracting patient information is very important in conducting a DTP assessment; the more comprehensive the data needed for a DTP assessment, the more accurate the DTP will be. For good and proper patient assessment, pharmacists must collect relevant and complete information through various sources such as patient interviews, electronic medical records, prescription drugs, lab values, diagnostic tests, and physical examinations (Mahmoud *et al*., 2019). Pharmacists provide interventions to patients, including counselling and providing brochures related to hypertension therapy. Counselling is an important part of pharmacy services, influencing patient behaviour and compliance. Guaranteeing the expected treatment results, good counselling requires communication and relationship skills to provide the best possible patient care. Counselling aims to establish a permanent partnership with the patient, thereby supporting patient empowerment, self-care abilities, medication adherence, and better health-related behaviours (Costa *et al.*, 2019).

Conclusion

Training and coaching practice modules can increase pharmacists' knowledge and skills in identifying DTP. In this way, pharmacists can find solutions to resolve DTPs to achieve the patient's therapy targets.

Limitations

In this study, the selection of participants was not carried out randomly; it was only based on the number of services provided to hypertensive patients. Observations of changes after being given DTP assessment module training pharmacists for only three months, so they could not see whether these changes persisted. Measurements before and after training were carried out for pharmacists. Researchers only measured knowledge and practice in identifying DTP, not measuring pharmacist attitudes.

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Conflict of interest

None declared.

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Ethical approval and consent to participate

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Contribution

INW, project leader, contributions to the basic concept of the work, funding acquisition, manuscript writing, and revision; UA, substantial contributions to the design of the experiments; F, project administration, data acquisition, and interpretation; AH, critically revising the manuscript for important intellectual

content. All authors approved the final version to be published.

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