Implementation of Home Medication Review in Patients with Chronic Diseases: A Pilot Study in Indonesia

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Abstract

Background: The high prevalence of chronic diseases such as diabetes mellitus, hypertension, and dyslipidemia is a concern for pharmacists. Pharmacists are expected to participate in these efforts by implementing Home Medication Review (HMR). HMR is a community-based collaborative service outside of health facilities that involves physicians and pharmacists to improve the effectiveness of therapy. This study aimed to determine the incidence of drug-related problems (DRPs), the level of patient satisfaction, and the effect of improving the quality of life of patients with chronic diseases who received Home Medication Review services at the Banjarbaru Utara Primary Health Care.

Methods: This study used a quasi-experimental method with a single group pre-test and post-test design. Data were obtained prospectively, from January to May 2024. DRPs were measured by the Pharmaceutical Care Network Europe (PCNE) form. Patient satisfaction was measured using the five-dimensional service quality questionnaire. Quality of life was measured using the EQ-5D-5L questionnaire with the EQ-5D-5L Index and EQ Visual Analog Scale (VAS) parameters.

Results: The study showed that DRPs in patients with chronic diseases before undergoing HMR were 92.50%. Patient satisfaction with HMR services reached 91.33%. Quality of life in chronic disease patients increased, based on the EQ-5D-5L Index, from 0.802 + 0.199 before to 0.854 + 0.189 after HMR (p-value 0.002), and based on the EQ VAS from 72.25 + 12.80 before to 78.12 + 14.19 after HMR (p-value 0.001).

Conclusion: This study concludes that HMR services can identify DRPs, and improve satisfaction, knowledge, and quality of life of patients with chronic disease.

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Keywords: Chronic Diseases; Drug-Related Problems; Home Medication Review; Pharmacist

Introduction

Health problems in Indonesia are shifting from infectious diseases to non-communicable diseases. Risk factors for this condition include metabolic disorders, community behavior, and the environment. Metabolic disorders include high blood sugar, high blood pressure, obesity, dyslipidemia, and kidney diseases (1). Based on the 2018 Basic Health Research, South Kalimantan ranks first for hypertension in Indonesia, with a prevalence of 44.13 %. The prevalence of other chronic diseases in South Kalimantan includes diabetes mellitus at 1.3 %, asthma at 3.4%, heart disease at 1.3%, and stroke at 12.7%. This figure is quite high compared to several other provinces in Indonesia (2). Handling these diseases must involve various health workers from multiple professions, including community pharmacists.

Chronic diseases such as hypertension, dyslipidemia, and diabetes mellitus are among the five largest non-communicable diseases that cause death (3). The study results showed that the costs incurred were significantly higher in elderly patients with chronic diseases (4). The increasing number of chronic diseases caused an increase in the length of hospital stays, thereby increasing the cost of patient treatment (5). The increase in the number of chronic diseases suffered by patients is directly proportional to the increase in the possibility of drug-related problems (DRPs) (6).

Home medication review (HMR) is a community-based collaborative service outside of health facilities that involves physicians and pharmacists to improve the effectiveness of therapy (7). HMR aims to improve patient health and enhance the quality of treatment through collaboration between health workers in the community

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(8). HMR activities include a systematic assessment of patient treatment over time through identifying treatment problems, recommendations for problem-solving, patient interventions, and monitoring of patient treatment. Interventions can include providing counseling, education, and referrals to physicians. HMR is carried out in the community as an effort to prevent disease severity and the emergence of disease complications, thereby minimizing the possibility of patients being referred to the hospital (9). This study is a collaborative research model between physicians and pharmacists. Home medication review research has never been conducted in Indonesia so it can be applied as a model of community pharmacist services. The purpose of this study was to determine the incidence of drug-related problems (DRPs), the level of patient satisfaction, and the effect on the quality of life in patients with chronic diseases.

Methods

Study design

In this study, we used a quasi-experimental research method using a single group pre-test and post-test design. The research data were obtained prospectively. The research was carried out in the period January - April 2024. The research was conducted at Banjarbaru Utara Primary Health Care, Banjarbaru City, and South Kalimantan. The study has obtained ethical approval from the Ethics Committee of Muhammadyah University of Banjarmasin, with certificate number 0128226371.

Population and sample

The study population was chronic disease patients treated at the Banjarbaru Utara Primary Health Care in January - April 2024 who met the inclusion and exclusion criteria. The assessed chronic diseases were hypertension, diabetes mellitus, and hyperlipidemia. We considered a sample of 80 patients and used a saturated sampling technique,namely a sampling technique in which all populations areused as samples. The implementation of HMR over four months revealed the characteristics of patients, clinical disease patterns, and overall condition of patients in the health center. Patients received monthly check-ups at the health center according to the health insurance institution's regulations. As a result, new patient intake was infrequent, leading to a saturated number of patients.

nclusion criteria were adult patients with chronic diseases (hypertension, diabetes mellitus, or hyperlipidemia), using at least three types of drugs and willing to provide informed consent for the study.Exclusion criteria were patients who were deceased or lostto follow-up in the research period or refused to continuethe study.

Patients were also excluded if they had everparticipated in similar studies. All patients involved inthis study filled out informed consent.

Data collection and Research instruments

This study was conducted by two pharmacists who had practiced for at least three years and assisted by physicians who had practiced for at least five years. This HMR study consisted of preparation, implementation, and evaluation stages. The preparation stage included issuing a letter of assignment, patient announcement, patient and physician consent, explanation procedures, initial patient assessment, visit scheduling, and preparation of visit documents and equipment. The implementation stage included the first visit to the patient's home, checking the patient's condition, filling out the pre-test questionnaire, assessing DRPs, educational and counseling interventions, referrals to physicians if needed, the second visit, and the third visit accompanied by a post-test and patient satisfaction assessment. The evaluation stage included data analysis and preparation of HMR reports.

The study began with issuing a letter of assignment for implementing HMR. Patients treated at Banjarbaru Utara Primary Health Care who had met the criteria and gave the informed consent received an explanation of the HMR procedure. An initial assessment of the patient using the medical record was considered. Then, a schedule of visits to the patient's home and preparation of HMR documents were carried out. Primary data collection techniques were performed on patients with chronic diseases. Data were collected directly from patients or their families. Patient follow-up was conducted for three months with at least one home visit per month. Primary data was collected through structured patient interviews using patient data collection forms to obtain patient characteristics.

The instruments used were patient data forms, medical records, DRP identification sheets, modified TERRA questionnaires, and EQ-5D-5L quality-of-life questionnaires (10–12). Drug-related problems (DRPs) identification was carried out using the PCNE V9.1 form so that the DRPs experienced by patients at the first visit could be identified (10). Patients also filled in the modified TERRA questionnaire (a patient satisfaction assessment tool) on the third visit. The modified TERRA questionnaire has met the validity with a Pearson Correlation value in the range of 0.414-0.907 and Cronbach's Alpha showing a value of 0.939 (12).

Furthermore, patients were assessed for quality of life using the EQ-5D-5L questionnaire at the first pre-test and third (post-test) visits. The EQ-5D-5L questionnaire is a quality-of-life assessment created by the EuroQol Research Foundation. It consists of the EQ-5D-5L Index and the EQ Visual Analog Scale (VAS). The EQ VAS assesses the respondents' perception of overall health on a scale of 0 to 100. The EQ-5D-5L Index assesses five dimensions, including mobility, self-care, usual activities, discomfort, and depression, through a series of questions. Other researchers have validated the EQ-5D-5L questionnaire (11).

Data analysis

The frequency of DPRs and the level of patient satisfaction with HMR Services were analyzed descriptively. Data on quality of life improvement in patients were analyzed statistically with SPSS 23 using the Paired T-Test. If the data showed that it was not normally distributed and homogeneous, it was continued with the Wilcoxon Non-Parametric test. The p-value below 0.05 was considered statictically significant.

Results

This study involved 80 patients from the Banjarbaru Utara Primary Health Care. The characteristics of patients are presented in Table 1.

Table 1. Characteristics of the study patients

Characteristics	Category	Frequency (No.)	Percentage (%)
Age	19-44	14	17.50
	45-59	24	30.00
	> 60	42	52.50
Sex	Male	25	31.25
	Female	55	68.75
Body Mass Index	Underweight	5	6.25
	Normal	24	30.00
	Overweight	13	16.25
	Obesity I	29	36.25
	Obesity II	9	11.25
Residence Status	Alone	3	3.75
	No	77	96.25
Education	Elementary School	9	11.25
	Junior High School	13	16.25
	Senior High School	31	38.75
	Diploma	4	5.00
	Bachelor	20	25.00
	Master	3	3.75
Work	Yes	23	28.75
	No	57	71.25
Marital status	Married	79	98.75
	Single	1	1.25
Distance from Home	< 5 Km	62	77.5
	> 5 Km	18	22.5
Duration of Disease	< 3 years	31	38.75
	> 3 years	49	61.25
Number of Drugs	3 Medicines	34	42.5
	> 3 Medicines	46	57.5
Comorbidity	Yes	29	36.25
	No	61	76.25
Smoking	Yes	7	8.75
	No	73	91.25

The study patients generally did not have comorbidities outside the diagnosed disease. Table 2 presents the diseases experienced by the patients.

Table 2. Diseases experienced by the study patients

Disease	Frequency (No.)	Percentage (%)
Hypertension	19	23.75
Diabetes mellitus	7	8.75
Dyslipidemia	4	5.00
Hypertension + Diabetes Mellitus	18	22.55
Hypertension + Dyslipidemia	16	20.00
Diabetes Mellitus + Dyslipidemia	6	7.50
Hypertension + Diabetes Mellitus + Dyslipidemia	10	12.50
Total	**80**	**100**

Occurrence of Drug-related Problems (DRPs)

Identification of DRPs was conducted based on the Pharmaceutical Care Network Europe (PCNE) classification version 9.1. The results showed that DRPs occurred in 74 patients (92.50%), and only six patients (7.50%) did not experience DRPs. Interventions were given to 74 patients experiencing DRPs. The most common intervention was counseling – education in 57 patients (81.43%). Interventions in the form of referrals to physicians occurred in 17 patients (17.57%).

DRPs were evaluated by pharmacists and the research team and then validated by physicians. The references used were dyslipidemia management guidelines, managing and preventing type 2 diabetes mellitus guidelines, cardiovascular disease prevention guidelines, primary health care formularies, and Medscape's drug interaction checker application. The categories of DRPs experienced by patients are presented in Table 3.

Table 3. The frequency og drug-related problems categories

DRPs Categories	Frequency (No.)	Percentage (%)
The therapeutic effect is not optimal	24	14.72
Effectiveness - Untreated symptoms (non-drug indications)	46	28.22
Side effects	2	1.23
The patient took more medication than prescribed	7	4.29
Patients use less medication than prescribed	33	20.25
Patients store medications improperly	21	12.88
The patient was unable to use the medication as directed.	8	4.91
Medication preparation - Medication not given or incomplete	10	6.14
Prescribed medication not available	3	1.84
Incorrect timing or dosing interval	6	3.68
Drug selection (there are duplications)	2	1.23
Drug interactions	1	0.61
Total	**163**	**100**

Patient satisfaction level

The level of the patient satisfaction is presented in Table 4.

Table 4. The patients satisfaction level

Statement	Average Score	
Tangibles		
The health examination equipment (blood pressure, blood glucose check, blood cholesterol check) used during the implementation of HMR is adequate	90.00	
Equipment used during the implementation of HMR is clean	91.63	**90.31**
Reliability		
The HMR service received was as expected	90.94	
HMR services can be relied on when you have health and treatment problems	90.00	
The information provided in counselling and education during HMR is delivered clearly	90.31	**90.42**
Responsiveness		
HMR providers inform when to make a home visit	91.88	
Counseling and education delivered according to your needs	91.88	
HMR providers show a high level of attention in providing services	91.56	**91.77**
Assurance		
HMR providers build your confidence in carrying out treatment	90.31	
You feel confident about your health improvement after receiving HMR services.	90.94	
HMR providers make you feel comfortable and safe when interacting with them	92.50	
HMR providers should show a polite and friendly attitude when serving you	92.81	
HMR providers have extensive knowledge, so they can answer your questions about the disease and the treatment you are undergoing	92.50	**91.81**
Empathy		
HMR staff show individual attention and empathy towards your health.	92.50	
HMR officers show timeliness in carrying out HMR services	92.19	**92.34**
Total Average Satisfaction Score		**91.33**

Influence of Home Medication Review

The effect of HMR was measured based on the patient's quality of life. Quality of life was measured at the first visit (before) and the third visit (after). The results of measuring the patient's quality of life are presented in Table 5.

Table 5. The patients quality of life before and after HMR

Parameter	Score Mean ± SD		p-value
	Before	After	
EQ-5D-5L Index	0,802 ± 0,199	0,854 ± 0,189	0.002
EQ Visual Analog Scale	72,25 ± 12,80	78,12 ± 14,19	0.001

Discussion

The implementation of Home Medication Review was a pilot study program of collaboration between pharmacists and physicians in the primary health care. The patients involved in this study were mostly over 60 years old and women. The duration of the disease experienced by the study patients was mostly more than three years, the number of their concomitant drugs was more than 3, and also mostly had no comorbidities.

In the study of the implementation of HMR in Australia, data from 2009 to 2019 showed that the majority of patients were over 65 years old (13). Other studies show that the average age of patients undergoing HMR was 68.1 years (14). The onset of chronic diseases can occur at the age of 45 - 54 years due to an unhealthy lifestyle. Furthermore, chronic diseases will progress the highest at the age of 55 - 64 years (15,16). Other HMR studies have shown that female patients were more frequent, with a percentage of 73.5 - 77.1% (17). The results of other studies on patients suffering from 2 - 3 chronic diseases showed that in Asian, African, and European races, the frequency of chronic diseases was higher in women (18). The risk of chronic disease in women increases with age and increases after menopause, which is associated with decreased production of reproductive hormones. Estrogen has a protective effect on the cardiovascular system and oxidative stress, which

is responsible for the occurrence of chronic disease (19). Similar studies showed that patients involved in HMR had a BMI in the range of 27.56 - 28.02. This shows that the results of our study are not much different from similar HMR studies. Obesity is a risk factor for chronic diseases. Patients with chronic diseases are generally overweight. The Banjarbaru Utara Primary Health Care is an urban primary health care. Based on data from the Central Statistics Agency, the frequency of attending the high school at Banjarbaru was 77.52%, which is high compared to provincial data, which averages 57.93% (20).

Patients involved in HMR were predominantly elderly patients, so on average, these patients were no longer working (i.e. retirees and homemakers). These patients lived less than 5 km from the primary health care. The Banjarbaru Utara Primary Health Care has a working area in the Loktabat Utara Village and Mentaos Village, which are no more than 5 km away. Patients with homes closer to health facilities tend to be more obedient to going to primary health care when they experience health problems (21). The duration of the disease experienced by the patients was more than three years because chronic diseases are diseases that cannot be cured. Treatment is carried out for life, so the patient has been experiencing the disease for a long time (22). The drugs consumed were also more than three drugs because patients usually experienced more than one disease diagnosis, so they generally required treatment with more than three drugs. In another study patients with two or more chronic diseases were receiving more than five drugs (23). The patients involved also generally did not have comorbidities outside the diagnosed disease. Non-smoking patients were very dominant due to the large number of female patients involved in the study.

Identification of DRPs was carried out during the first visit to the patient's home. The results showed that DRPs occurred in 74 patients (92.50%), and only 6 patients (7.50%) did not experience DRPs. The most common DRP category experienced by the patients was untreated symptoms (28.22 %). The second most common DRP was patients using less medication than prescribed (20.25%). The third most frequent DRP was suboptimal therapeutic effects (14.72 %). Storing drugs inappropriately occurred in 21 patients, reaching 12.88% of all DRPs. Prescribed drugs were not available as one of the identified DRPs at 6.14 %. Patients who could not use the medication according to instructions also occurred in 4.91% of the cases. Seven (4.29%) patients, took more medications than prescribed.

Identification of DRPs showed that there were two patients (1.23%) who experienced drug side effects. Duplication of drug use occurred in two patients (1.23%). The wrong time or interval of dosing occurs in some patients (3.68 %).

The HMR study conducted by Jordan found that the incidence of identified DRPs reached 85% (24). Another study showed that the incidence of identified DRPs reached 158 cases, with an average of 1.6 incidents per patient (23). In a study of HMR implementation in patients with type 2 diabetes many DRPs were found (17). This shows the importance of monitoring drug use in patients with chronic diseases. The high incidence of DRPs should be a concern because it can reduce the patient's recovery rate. Based on other studies, the most frequent DRPs in patenets with chronic diseases was untreated symptoms (24.73 %). These patients generally need new or further therapy; they may also need additional drugs as a combination of treatment (25).

Patients who should take medication regularly sometimes take medication when they feel symptoms of the disease they are suffering from. For example, in our study, some patients only took a few amlodipine tablets, and they discontinued taking the medication when they felt better. Some patients with diabetes mellitus took metformin for only two days because they felt they were doing well. Non-compliance with medication use in other studies reached 13.9%, and the implementation of HMR was able to identify these DRPs. Research conducted in Australia showed that the incidence of DRPs related to non-compliance with medication use reached 12.9% (26). Suboptimal therapeutic effects occur in hypertensive patients who have been treated but have not experienced changes in blood pressure. In a different case, it also occurs in patients with diabetes mellitus who are known not to experience a decrease in blood sugar levels even though they have consumed oral antidiabetics. The results of interviews with patients showed that patients did not change their food consumption patterns. Patients with hypertension still consumed meat, patients with diabetes mellitus still consumed drinks containing sugar, and patients with dyslipidemia still consumed foods containing fat. The incidence of DRPs in suboptimal effects occurred in 21.6% of patients in another HMR study (24).

Patients stored drugs only on open cabinet shelves, not in medicine or tightly closed containers. Patients felt they were used to storing drugs in inappropriate places due to a lack of information obtained. Based on other studies, it is known that drug storage prolems occurrrd in 76% of cases, it included direct exposure of drugs to dust (23.6%) and sunlight (10.9%) and, expired drugs were generally disposed of together with household waste (27).

Interventions were given to patients experiencing DRPs. The most common intervention was counseling education (81.43%) in patients. Referring patients to a physician (28.75%) was done in patients with untreated symptoms. with counseling and education, patients will be more compliant in using drugs. Patient education is an important step to increase patient awareness and control. Community pharmacists are important in

educating patients so that actual and potential DRPs can be prevented and addressed (28, 29). This is based on a similar HMR study, which stated that the most frequent intervention during the implementation of HMR was patient counseling (48.18%) (13). Other studies showed that the most common interventions were patient education (27.2%), medication adherence counseling (16.5%), and patient monitoring (15.8%) (24). Mild symptoms that can be treated with over-the-counter or limited over-the-counter drugs were not referred to a physician. The high level of acceptance of a physician's recommendations is greatly influenced by the quality of the pharmacist's relationship with the physician. In addition, the pharmacist's clinical ability influences the physician's acceptance level (24). Another study stated that the overall recommendation acceptance rate reached 77.2%. Rejection of recommendations occurred most often in polypharmacy situations (23).

The level of satisfaction of patients who underwent HMR averaged 91.33%. The highest level of satisfaction was obtained from empathy, reaching 92.34%. This aspect includes the attention and empathy of researchers during the visit and the timeliness of providing HMR services to patients. The next highest aspect was responsiveness (91.77%) and assurance (91.81%). Responsiveness includes clarity of the visit schedule, counseling and education delivered according to needs, and great attention to providing services. The assurance aspects include the ability to foster self-confidence in treatment, belief in improving health, a sense of comfort and safety, a polite and friendly attitude, and the researcher's extensive knowledge to answer various patient questions.

Research conducted in Malaysia stated that the implementation of HMR was able to build a relationship of trust between pharmacists and patients, thereby increasing patient compliance with treatment (17). Another study stated that implementing HMR allowed patients to discuss treatment goals, the possibility of stopping some drugs, and the benefits of HMR. It was shown that patients who underwent home visits (intervention) had higher satisfaction scores than those who didnot receive this service (control) (23). Similarly, our results show that HRM provided by the pharmacists can increase patient satisfaction.

Patients receiving the HMR program have a high awareness of following the physician's instructions. The patient is also willing to receive regular visits from the pharmacist. This shows that HMR can increase patient trust and satisfaction toward pharmacist (23). Implementing HMR can build good relationships and trust between pharmacists and patients. A good relationship between pharmacists and patients will make patients more open in informing the conditions felt by the patient (17). Patients also feel that with HMR, the pharmacist provides an opportunity to discuss things so that patients better understand the purpose of the therapy given. Patients can discuss problems during drug use when to stop treatment, what they feel during treatment, and concerns during treatment (30).

The patient's quality of life was measured based on the EQ-5D-5L Index and the EQ Visual Analog Scale (VAS) before and after HMR. The results of measuring the quality of life based on the EQ-5D-5L Index before HMR obtained a score of 0.802 + 0.199, while after HMR, it increased to 0.854 + 0.189. In measuring the quality of life with the Visual Analog Scale (VAS), before HMR, the score was 72.25 + 12.80, while after HMR, it was 78.12 + 14.19. Statistical analysis showed a significant difference in quality of life before and after HMR (p values of 0.002 and 0.001). The quality of life of diabetes mellitus patients who underwent pharmacist home visits showed a significant increase of 4.30 % compared to the control group (p-value 0.04). This shows that the intervention carried out by pharmacists can improve the quality of life of patients (31). The HMR program carried out in Malaysia in diabetes mellitus patients has an impact on improving patients' quality of life from 82% to 90%. In the control group, it was found that patients' quality of life decreased from 82% to 80%. The increase in quality of life was found to be significantly different between the control group and the intervention group (p-value <0.001) (17).

The limitation of this research is that the implementation of this research was conducted in urban primary health care. Patients in rural primary health care have slightly different patient characteristics. This research was only conducted in first-level primary health care for outpatients, so the results may differ for post-hospitalization patients.

Conclusion

The results of this study indicate that the incidence of DRPs is high in patients with chronic diseases, indicating that there are problems related to drug use. HMR services in Primary Health Care have increased patient satisfaction. The implementation of HMR has been proven to improve the quality of life of patients with chroinc diseases. This study is a reference for the government to implement HMR services in various other health facilities.

Conflicts of Interest

The author claims they have no financial or other conflicts of interest.

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