

# CCM

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# Chronic Care Model Based Nursing Interventions Improve Hypertension Patient's Medication Compliance by Preventing Patients Forget and Fear

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**ABSTRACT.** The goal of nursing intervention on chronic disease such as Hypertension is to improve the patient self-care, in which the Chronic care model could help to reach the best outcome. Research suggests the community, health workers, and regulations could improve the health. The purpose of this study was to apply nursing intervention based on chronic care model to medication adherence in hypertensive patients. The method used in this study was quasi-experimental, where the treatment group with a sample of 25 Hypertension Patients was given treatment with guidance in the form of modules and a control group with a sample of 25 patients was not given any treatment, only followed for 14 days. This is quasi-experimental research used pre-post test control group design. 50 respondents of hypertension patients were recruited from Pucang Sewu, Pacar Keling and Tambak Rejo Surabaya Health Centres. The intervention was applying nursing interventions based on the Chronic Care Model. The Mann Whitney U statistical analysis used to understand the effect of the intervention to the medication adherence in patients with hypertension. A total of 50 respondents who were divided into two groups, control and treatment, with each (n = 25). The distribution of characteristics in the two groups is homogeneous. Different test in the control group, there was no difference. The treatment group shown a significant difference in adherence before and after the intervention with p value 0.000 (p < 0.05). This study found the reason of disobedient patient to medication, which is forget and fear to the side effect. The patient and the health care agree frequent reminder could be the solution to this problem. Chronic Care Model based nursing interventions can improve medication adherence in hypertensive patients by encourage the health care system to frequently remind patients.

**INDEX TERMS:** Chronic care, Hypertensive patients, Nursing interventions, Medication adherence.

## I. INTRODUCTION

Hypertension is the number one cause of death in the world every year and is one of the most common cardiovascular diseases and the most prevalent in society [1][2]. Hypertension is also one of the main causes of mortality and morbidity in Indonesia. Many hypertensive patients with uncontrolled blood pressure and the numbers are increasing [3][4]. Hypertension is a chronic illness which have a different problem compared to the acute illness [5]. [6] Chronic illness care approach is opposite to acute illness which needs a complete and integrated care to improve the patient outcome [7][8].

The approach for chronic illness developed by Wagner which called the CCM (Chronic Care Model). It comprises of six foundations for the improvement of chronic care. It begins with build a well-defined team member to maximize information delivery system, planned home visit, regular follow up, and a manager for every cases. Followed by supportive system to enhance health care organisation, including provide work-based incentive. In the care core part, the clinical practice should implement the evidence-based which promote active two side information sharing with the patient. Supported by the clinical information system provide reminder and information sharing with the community. Which leads to the formation of

community health cadres and the local government integration on the health information and reminder. Lastly, since the subject of care is the patient then the every care should use patient centred care [9][10].

The CCM is reported significantly reduced the disparities of care for Hispanic patient which is used to be marginalized on the health care system. The outcome of integrating CCM into health care system successfully control the hypertension patient health profile and control the baseline of systolic blood pressure on the level of 153.8 on average [11][5][12]. Different study reported CCM increase the patient quality of life. The research was studying group of patients who received care from multi discipline health care and complete health advice comparing to group of patients who only receive usual care which is only given the medicine and got simple explanation. The result was significantly different, the measurement of QoL (Quality of Life) on the first group was improved 3 times higher than the second group [13]. Surabaya is one of the cities with the highest prevalence in Indonesia, namely 45,015 sufferers [14]–[17]. The prevalence of hypertension based on measurement results in the population aged 18 years was 34.1%. From the prevalence of hypertension of 34.1%, it is known that 8.8% were diagnosed with hypertension and 13.3% of people diagnosed with hypertension did not take medication and 32.3% did not regularly take medication [17][13]. Reasons for hypertension sufferers not taking medication, among others, because hypertensive sufferers feel healthy 59.8%, irregular visits to health facilities 31.3%, take traditional medicine 14.5%, use other therapies 12.5%, forgot to take medicine 11.5%, could not afford to buy medicine 8.1%, there were side effects of the drug 4.5%, and hypertension medication was not available at the health facilities 2% ([16][18]. Based on the description above, it is necessary to conduct experiments to understand the suitability of CCM integration with Indonesian nursing interventions to improve medication adherence. Because patient medication adherence in Indonesia is strongly influenced by the availability of medication, societal norms, and government push. Currently there were little evidence supporting the topic [15], [19][20]. The purpose of this study was to analyse the effect of chronic care model-based nursing interventions on medication adherence in hypertensive patients.

## II. METHODOLOGY

This research is a mixed method which is quasi-experimental research using pre-post test control group design and phenomenology [21]. The phenomenology design used to understand the subjects unique experience of the intervention and research process. The population in this study were hypertension patients in Surabaya who visited the Puskesmas (community health centre). The sample inclusion criteria were hypertensive patients, age 40-60 years, had hypertension for 2-5 years. The exclusion criteria were the patient who have comorbidities. To meet the predetermined criteria, the Puskesmas which became the reference for hypertension patients was chosen and the Puskesmas had the following characteristics 1) have many hypertension patients, 2) wide

working area, last year target of medication adherence was low. There were 3 Puskesmas that met the criteria, namely Puskesmas Pucang Sewu, Puskesmas Pacar Keling and Puskesmas Tambak Rejo.

The sample size in this study was 50 patients which equally divided into 2 groups, control and treatment. The sampling technique chosen was consecutive sampling, namely the sampling method by selecting according to predetermined criteria. Meanwhile, to determine the control and treatment groups, used simple random sampling [22][23]. The variables in this study were: Nursing Intervention based on Chronic care model (CCM) and medication adherence to hypertension patients[11][24][25]. Analysis of research data begins with the homogeneity test. The homogeneity test was carried out to ensure that the control and treatment groups had the same characteristics. If the characteristics between groups are the same, then the differences occur because of the treatment given, and not because of the characteristics of the research respondents. Homogeneity testing was carried out on the characteristics of the respondents consisting of education, gender, age, height, weight. The next analysis is the treatment adherence test, with the Wilcoxon signed rank test, because the data is ordinal scale. Furthermore, testing the differences between the two groups both pre and post intervention. The test used is the Mann Whitney U Test for data adherence to taking medication in hypertensive patients [26][27][28]. Statistical data analysis used SPSS version 26 full version.

Research ethics is submitted to the Ethics Committee of the Poltekkes Kemenkes Surabaya through the KEPPKN, followed by processing a research permit at the Bakesbangpol Linmas Surabaya city and proceeding to the Surabaya City Health Office. The research permit from the Surabaya City Health Office is used to proceed with the processing of research permits to the designated Puskesmas and those that have been approved by the Surabaya City Health Office, namely the Puskesmas Pucang Sewu, Puskesmas Pacar Keling, and Puskesmas Tambak Rejo. Purpose has been written in the background above. The results of this study are greatly felt by patients because after carrying out regular treatment, tension and cholesterol have a tendency to be within normal limits. The results of this study can also be carried out in various regions or other Puskesmas areas. This study can also be applied to hypertension patients and other chronic diseases such as Diabetes Mellitus.

## III. RESULTS

The three previously specified Puskesmas were used in the study. This condition was found on those Puskesmas 1) Community nurses were active in the community, 2) Have health information systems but not conveyed to patients, 3) No implementation of evidence-based practice, 4) Have little active health cadres, and 5) Actively hold posyandu activities for the elderly, 6) CCM is an outlandish term. Further explanation of the study result is presented below. There were 50 respondents recruited from the three Puskesmas's. They were divided as follows 25 respondents into the control group and 25 respondents into the treatment group. The characteristics of the

respondents from both groups were quite alike, there were no significant difference.

#### 1. RESPONDENTS CHARACTERISTICS

Table 1 showed that the two groups had general characteristics that were not much different. Sex in both groups was mostly women 60% in the control group and 72% in the treatment group. Almost half of the education was high school or equivalent 44% in the control group and 48% in the treatment group. The occupation of the control group was mostly 60% private, in the treatment group almost half 48% were housewives and 40% private. The proportion in the control group was for a minimum age of 41 years and a maximum of 60 years, while in the treatment group a minimum age of 43 years and a maximum of 60 years. The minimum height of the control group was 140 cm, and the maximum was 180 cm, while the minimum height of the treatment group was 142 cm and the maximum was 168 cm. Comparison of body weight for the control group was minimum 47 kg and maximum 90 kg, in the treatment group was minimum 49 kg and maximum 81 kg.

#### 2. COMPARISON TEST BEFORE AND AFTER TREATMENT

This study conducted a nursing intervention based on the Chronic Care Model on medication compliance in hypertensive patients in Surabaya. Observed before and after intervention. The variables measured were adherence, the patient's taking medication before and after treatment. Treatment adherence tested using Wilcoxon signed rank test because the data was ordinal scale. The full test results were presented in the Table 2. The results found that the control group had no significant difference in drug adherence between before and after the intervention with p value 0.177 ( $\alpha \leq 0.05$ ). Moreover, there was a decrease of medication adherence of control group post treatment. The opposite happened in the treatment group, it was found that there was a significant difference in drug adherence between the pre and post treatment with a p value of 0.000 ( $\alpha \leq 0.05$ ). Furthermore, there was an increase in the mean rank after the intervention. It was concluded that there were improve adherence in the treatment group but not in the control group. The result verified the benefit of CCM in the patient's adherence to take medication.

#### 3. CONTROL AND TREATMENT GROUP COMPARISON TEST

The second test was to see the differences between the control and treatment groups both before and after the intervention. The test used was the Mann Whitney U Test for compliance and ability data. Meanwhile, to see the difference in cholesterol between the treatment and control groups both before and after the intervention, using the two-sample free T test difference. In the activity variable, because the data was nominal, the test used chi square test. The full results were explained in the Table 3. The results of the Mann Whitney test both on the pre test and post drug adherence showed that there were significant differences between the treatment and control groups with p < 0.05. The treatment group had a higher post value than the control group. This showed that patient adhere medication

better if got nursing interventions based on the Chronic Care Model compared to those who did not get the intervention.

#### 4. RESEARCH SUBJECT EXPERIENCE

The different finding between the treatment and the control group was addressed deeper by conducting interview. The interview only conducted to the few respondents that represent the average respondents. They mention that the reason they were disobedient to the medication plan was either they were forgetting the medication, forget the medical check up schedule, or they are afraid. The respondents mentioned they were afraid if they found the medical check-up was bad, they will feel down and deteriorate. Other form of afraid was mentioned that they afraid by the side effect of the drug. They added that they have already took too many drugs since they were diagnosed Hypertension[11][7]. Other respondents reported that they feel that working is more important than following the treatment regiments.

### IV. DISCUSSION

The results showed that there were significant differences in treatment adherence before and after nursing interventions, as well as significant differences between the control group and the treatment group. It was found that the control group often did not take hypertension medication because of forgetting or fear of side effects and this habit continued until the completion of the study. Non-adherence to medication was happen because patient never have a fixed schedule and there were no information of check-up conveyed to the patients on regular basis. Non-adherence caused by forgetting take medication is frequently mentioned on studies [7], [11], [13]. Patient forgetfulness was classified into two categories, unintentional non-adherence and intentional adherence. The unintentional non-adherence mainly caused by caused by factors such as lack of understanding, or complexity of treatment regimens, forgetfulness, and physical problems. Meanwhile, intentional non-adherence occurs when the patient decides not to carry out his treatment as planned by the health worker. Measuring adherence to treatment is if the patient redeems and takes 80% to 120% of the prescribed medication for a certain period of time [29]. Busy at work is also reported by hypertension patients for the reason of abandoning treatment. It was supported by the majority of the respondents were active working and mentioned that working is more important. These characteristics make hypertensive patients still not very well adherent because they are actively working and find it difficult to always take hypertension medication [19][30][31].

The nursing intervention which enhanced by CCM improve patient's adherence to medication. Prior to the

intervention the habit of taking medication in the by the two groups were the same. All the respondents often forgot and only took medication when they felt symptoms such as dizziness, headache, and tingling sensation. After the intervention for two weeks, the medication adherence is gradually changed. Every day they always took anti-hypertensive drugs because they understood that the side effects that were obtained would not be a fatal health problem compared to if they did not take the drugs regularly, where complications could be fatal, such as stroke and even death. This finding is in line with the results of the research by Sendall et al. (2017), which found that CCM in Australia increases the participation and cooperation between health care institutions and health workers and patients suffering from chronic diseases.

According to Weber et al. (2014), in practice settings where patients experience difficulties and limitations in making regular clinic visits, monitoring is the most practical approach for drug therapy from an early stage of treatment. In general, lifestyle changes are seen as a supporter of drug therapy rather than as an alternative. Nundy et al. (2012), provides suggestions for bridging nursing interventions with CCM, where health institutions experience limited personnel including nurses, so they can use or optimize the use of mobile communication, such as cell phones by making news in writing so that it can be monitored when health worker is not handling patients at work directly [30], [32]–[34]. It is proven that nursing intervention based on CCM can increase medication adherence in hypertensive patients[7][1][35]. It is understandable that if patients get assistance from nurses for a sufficient period of time it will increase medication adherence. It is paramount that the health institution in this case is the Puskesmas to schedule assistance to hypertensive patients in an effort to prevent further complications to the patient[20][13]. The mentoring that has been carried out by the nurses in this study can be modified by involving an active role in health to make home visits every 3 to 4 days to accompany and monitor the patient's medication. This study is limited by the sampling technique. Consecutive sampling technique propose a possible bias to the results because the researcher subjectivity is involved on the recruitment process. The weakness of this study is this study was conducted during the Covid-19 pandemic, so there are several things that limit the space for data collection, namely the need for special permission to be able to visit patients from house to house, patient selection must be ensured that there are no additional diseases, interveners and examiners must use PPE. The most

difficult limitation felt by researchers is the reduction in research funds due to funds being diverted for handling Covid-19.

## V. CONCLUSION

Nursing interventions based on the Chronic Care Model (CCM) significantly improved medication adherence for hypertensive patients in Surabaya. Chronic Care Model-based nursing interventions can improve medication adherence in hypertensive patients by encouraging the health care system to frequently remind patients. The health care system mentioned is nurses working together with health cadres and local government.

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