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ORIGINAL RESEARCH

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THE DEVELOPMENT OF PHYSICAL ACTIVITY PROTOCOL IN PATIENTS WITH CONGESTIVE HEART FAILURE IN THE HOSPITAL INPATIENT WARDS

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Abstract

Background: Patients with congestive heart failure need a comprehensive rehabilitative program to restore post-attack physical ability and prevent re-attacks, therefore, it is necessary to develop physical activity protocols for these patients.

Objective: This study aims to develop physical activity protocols for patients with congestive heart failure in the inpatient wards of the Level II Putri Hijau Hospital, Indonesia.

Methods: This was an action research with 3 cycles consisting of four stages, namely: (1) reconnaissance, (2) planning, (3) action and observation, and (4) reflection. Data were collected quantitatively and qualitatively. Qualitative data were collected using in-depth interview, focus group discussion, and self-report, while quantitative data were collected using nursing knowledge questionnaire to 35 nurses selected using total sampling, and self-efficacy questionnaire about physical activity exercise to 9 patients with congestive heart failure selected using accidental sampling. Qualitative data were analyzed using content analysis, while quantitative data using descriptive statistical test.

Results: Findings showed the completed compilation of physical activity protocols for patients with congestive heart failure. The results of observation showed a decrease in blood pressure of patients with congestive heart failure on the average of 3.12 mmHg after given physical activity protocol by nurses.

Conclusion: The physical activity protocols for patients with congestive heart failure have been developed, and it has an impact on the increase of nurses' knowledge concerning physical activity exercise for CHF patients as well as the improvement of patients' self-efficacy or self-confidence in doing the physical activities.

Keywords: protocol development; physical activity; congestive heart failure

INTRODUCTION

Heart failure is the inability of the heart to pump adequate blood to meet the tissue needs for oxygen and nutrients. The cause of this inability is a heart muscle disorder and other heart diseases that result in cardiac output lower than normal cardiac output (Smeltzer et al., 2010). Clinical manifestations of heart failure usually found are tiredness, shortness of breath during activities, shortness of breath

at night (paroxysmal nocturnal dyspnea), orthopnea, tachycardia, increased jugular venous pressure, S3 gallops, wilted smooth rhonchi, hepatomegaly and edema (Alwi, 2012). This condition causes the inability to perform daily activities, interfering with or limiting the work or activities preferred. Heart failure incidence has consistently improved, despite technological advances in diagnostic

and management of heart failure. In the United States, 5.7 million people suffer from heart failure, and 670,000 new cases are diagnosed each year. American Heart Association estimates that the cost required for heart patients is \$33 million each year ([AHA, 2013](#)). Despite recent advances in the evaluation and treatment of heart failure, the occurrence of symptomatic heart failure still brings a poor prognosis ([Bonow, Mann, Zipes, & Libby, 2011](#)).

Patients with congestive heart failure need a comprehensive rehabilitative program to restore physical abilities after attacks and to prevent re-attacks. Physical exercises of congestive heart failure (CHF) patients is aimed at optimizing the physical capacity of the body, providing counseling to patients and families in preventing worsening and helping patients to return to their physical activities as before the occurrences of congestive heart failure ([Arovah, 2010](#)). Structured physical exercise is safe for patients with heart failure. This is supported by some accurate evidence, one study stated that heart failure patients who conducted heart exercise tests in which the physical exercises performed did not harm their health and wellbeing and at the same time enhanced the physical functioning of patients with heart failure ([Leslie & Buckley, 2010](#)). Physical exercise is clearly proven to be effective and safe for heart failure patients. Being aware of the importance of physical exercise for heart failure patients. Another study recommends physical exercise as part of standard management of heart failure. A programmed and regular physical exercise will give maximum results ([Conraads & Beckers, 2010](#)). It is also stated that physical exercise shows to improve some such as changes in skeletal muscle, blood vessel and the ventilation system of CHF patients ([Chung & Schulze, 2011](#)).

Based on the previous studies ([Badriyah, 2014](#); [Yenni, Nurchayati, & Sabrian, 2015](#)) stated that the majority of patients did not complete cardiac rehabilitation continuously, and most of them knew nothing about cardiac rehabilitation exercise. In addition, the patients

admitted that they had never done any cardiac rehabilitation exercises while at home because there were no friends to do the activity.

Initial survey conducted by the researchers through observation and interviews on the nurses of the Putri Hijau Hospital obtained the data that the nurses did not explain about physical activity to CHF patients, intervention was only intended to reduce edema in lower extremity, such as fluid restriction. The physical activity protocol in CHF patients has not yet existed. Thus, this study aimed at developing physical activity protocol in patients with congestive heart failure.

METHODS

Study design

This was an action research with four stage, namely: (1) reconnaissance, (2) planning, (3) action and observation, and (4) reflection to develop physical exercise protocol to be used as guidance in performing CHF patient care in the inpatient room of the Putri Hijau Hospital.

Setting

The study was conducted from June to August 2017 in the Putri Hijau hospital, which is considered as a referral hospital in North Sumatra, Indonesia. Putri Hijau hospital is a non-education type B hospital and a pride owned by Indonesian Armed Forces. Aside from being a health service center for soldiers, civil servants, and their families, it also provides health services for the general public

Samples

A total of 44 participants included in this study, which consisted of 35 nurses selected using total sampling and 9 patients using accidental sampling. The inclusion criteria of nurses were those who have experienced in a direct situation or event related to the giving of physical activity exercises in congestive heart failure patients, able to express opinions, and willing to engage in research activities. The inclusion criteria of patients were those with congestive heart failure treated at least 48 hours after cardiac disturbances in the

inpatient ward, stable condition characterized by having no chest pain, no shortness of breath at rest, pulse 50-90 x/min at rest, systolic blood pressure greater than 100–150 mmHg, and diastolic blood pressure greater than 60–90 x/min, New York Heart Association (NYHA) functional class I–III, and possession of a recommendation from a doctor to perform physical activity, willing to participate and well communicate. The exclusion criteria of patients were those with weight gain ≥ 1.8 kg in 1-3 last day, currently using continuous or intermittent dobutamine therapy, and having a decrease in systolic blood pressure over 20 mmHg with physical exercise and NYHA class IV.

Instrument

For qualitative data, in-depth interview and focus group guidelines were used to interview nurses with the following questions: 1) Do you think this hospital should set up a physical activity protocol for CHF patients? 2) What strategies can be undertaken to formulate a protocol for exercise of physical activity in CHF patients? 3) Do you think physical activity for CHF patients should be provided by the nurse in the hospital? 4) What should be prepared to support the implementation of physical activity protocols in CHF patients? and 5) What are the benefits of physical activity in CHF patients? For quantitative data, the instruments consisted of: 1) nurse knowledge questionnaire about physical activity in CHF patients. The instrument was developed by the researchers themselves. There were 12 items of questions using Likert scale were developed with the category of 1 - 12 (do not know) and 13 - 24 (know). The instrument was validated by 3 experts. The result of the content validity index of the three experts was 1. The reliability of the instrument was examined in another hospital (Haji Adam Malik Hospital) in 30 nurses, which its findings showed Cronbach Alpha of 0.83. 2) Self-efficacy questionnaire or self-confidence of patients with *congestive heart failure* developed by the researchers themselves. There were 12 items of questions developed with Likert scale with the category of 13 - 26

(not sure), 27 - 39 (sure), and 40 - 52 (very confident). The instrument was validated by 3 experts and its content validity index results were 1. The measurement of reliability test in Haji Adam Malik Hospital with 30 CHF patients using Kuder Richardson obtained value of 0.87. Thus, it is concluded that the two questionnaires are valid and reliable.

Ethical consideration

This study has obtained ethical approval from the Ethics Committee of the Faculty of Nursing University of North Sumatra with a code number of ethics: No. 1230/VI/SP/2017.

Data analysis

Data analysis was conducted qualitatively and quantitatively. Qualitative data were analyzed by means of content analysis. Quantitative data were with descriptive statistical test.

RESULTS

This action research is carried out in three cycles, namely: 1) Cycle 1 with three stages: (i) reconnaissance, (ii) planning, (iii) action and observing, and (iv) reflecting; 2) Cycle 2 with two stages: (i) planning and (ii) action and observing; and Cycle 3 with two stages: (i) reflecting and (ii) planning. .

Demographic Characteristics of Nurses

Table 1 shows that participants involved in this research are both nursing staff and CHF patients in the wards of Putri Hijau Hospital. The nursing staff who serves in the inpatient ward amounted to 35 nurses led by a head nurse with bachelor level degree of nursing. The mean age of nurses is 32.6 years old, with the youngest is 26 years old and the oldest is 51 years old. Those who have reached the category of 25-50 years old are 34 participants (97.10%). Nurses who worked as civil servants are 20 nurses (57.14%), and volunteers are 15 nurses (42.86%). There are 25 nurses (71.40%) holding diploma degree in nursing, and 10 nurses (28.60%) holding bachelor level of nursing. And the majority of nurses have a length of work between 5-10 years (71.43%).

Table 1 Demographic characteristics of nurses

Characteristics	F	%
Age:		
25-50 years	34	97.10
> 50 years	1	2.90
Sex:		
Male	10	28.60
Female	25	71.40
Education		
Bachelor Nursing	10	28.60
Diploma III Nursing	25	71.40
Employment status		
Government employees	20	57.14
Volunteers	15	42.86
Religion		
Islam	22	62.90
Christian	11	31.40
Catholic	2	5.7
Length of work		
<5 years	6	17.14
5-10 years	25	71.43
> 10 years	4	11.43
Training that has been followed		
Ward Management	6	17.14
Basic Trauma Cardiac Life Support	21	60
Critical Care	2	5.71
Nutrition	1	2.85
ECG	1	2.85

The development process of physical activity exercise protocol for CHF patients in the inpatient wards is described in the following:

Cycle 1

Stage 1: Reconnaissance

This stage also called preliminary study stage. It is considered necessary to execute a reconnaissance stage to make an initial analysis and get the problems experienced by nurses as the basis for them to decide the planning and action to be implemented in the inpatient wards. The reconnaissance stage was conducted to obtain data on: 1) participants' perspectives on the implementation of physical activity in congestive heart failure (CHF) patients, 2) nurses' knowledge about physical activity of CHF patients, and 3) self-efficacy or self-confidence of CHF patients in the physical activity. In this stage, the researchers conducted an in-depth interview and FGD (Focus Group Discussion) with 3 nurses, and distributed questionnaire of nursing knowledge, as well as patients' efficacy or self-confidence in physical activity to 35 nurses.

Based on the interview, there were 4 themes identified, namely: 1) the need for Standard Operating Procedures (SOP) concerning physical activity training for CHF patients, 2) nurses' knowledge about physical activity for CHF patients, 3) the need for support from related parties in terms of the implementation of physical activity for CHF patients; and 4) the expectations for the implementation of the physical activity.

The researchers conducted a triangulation technique to ensure the credibility of the data, i.e. by using the FGD method, which was divided into 2 sessions, namely the hospital management session and the nurse session. Based on FGD results, there were 4 themes emerged, namely: 1) the need for SPO on physical activity training for CHF patients, 2) the increased knowledge for nurses, 3) the need for support from related parties in terms of the implementation of physical activity in CHF patients, and 4) the expectations for the implementation of physical activity.

While the result of the distribution of nurse's knowledge questionnaires showed that 31 nurses (88.60%) stated that they knew and 4 nurses (11.40%) did not know about physical activity for patients with congestive heart failure (See **Table 2**).

The result of the distribution of self-efficacy questionnaire or self-confidence of CHF patients on physical activity showed that in majority 6 patients (66.70%) said they were confident and 3 patients (33.30%) were less confident (See **Table 3**).

Table 2 Nurse's knowledge about physical activity exercise for CHF patients

Nurse's Knowledge	f	(%)
Do not know	4	11.40
Know	31	88.60

Table 3 self-efficacy or self-confidence of CHF patients on physical activity

Efficacy or Confident	f	(%)
Less Confident	3	33.30%
Confident	6	66.70%

Stage 2: Planning

Planning is the second stage of research in developing tentative protocol of physical activity in CHF patients. The results of pre-conference meeting with the hospital management are: 1) a meeting with the management will be coordinated. 2) formation of a team for the formulation of physical activity protocols for CHF patients will be coordinated to the head of nursing, and 3) it will be confirmed whether the available place for the application of physical activity protocols for CHF patients can be performed in the inpatient ward.

Stage 3: Action and Observing

The activities at this stage are: 1) meeting with the structural officials of the hospital, 2) the establishment of training team for physical activity protocols for CHF patients, 3) formulation of physical activity protocol for congestive heart failure, and 4) socialization of physical activity protocols in CHF patients at the hospital management level.

The discussion result between the researchers and the management of the hospital showed that: 1) the head of nursing department approved the research on the development of the physical activity protocol for CHF patients, 2) the need of formation team of physical activity protocol consisting of 3 persons i.e. lead nurse, charge nurse, and staff

nurse, 3) the formation team and the researchers will work together to formulate the physical activity protocol for CHF patients.

The formulation of physical activity protocol for CHF patients was performed 3 times. The results of the discussions were: 1) all team members have already understood the so-called action research, 2) each team member needs to look for any references related to the formulation of the physical activity protocol for CHF patients and forward the reference to the next meeting, and 3) team formulation meeting will be held every working day until the finalization of the physical activity protocol training format for congestive heart failure to be applied in the ward can be achieved.

The results of the second meeting were: 1) the preparation of physical activity protocol for CHF patients was guided by the policy of Putri Hijau Hospital No: SK/66/X/2013 in regards to the provision of equal service procedures at Putri Hijau Hospital, 2) the format and contents of the protocol according to the meeting outcome and the review of the contents of the physical activity protocol format for CHF patients have been completed, 3) cardiologist gave an input to add exclusion criteria to the Standard Operating Procedure, 4) the explanation of the physical activity protocol for CHF

patients will be performed by nurses according to the inclusion and exclusion criteria to the CHF patients, 5) all results of the team's discussion will be restored for the following day, 6) the flow of physical activity for CHF patients is completed, and 7) the protocol format that has been prepared and agreed to be submitted to the head of the hospital.

The discussion results at the last meeting were: 1) the contents of the protocol are in accordance with the policy of the head of hospital in regards to the provision of equally the same service procedures in Putri Hijau Hospital, and are ready to be applied to the ward, 2) planned socialization of physical activity protocol for CHF patients to the management of the hospital, and staff nurses in inpatient wards.

Stage 4: Reflecting

The result of post conference results in cycle 1 on reflecting stage shows that: 1) Based on the meeting result with the management that the team formation of physical activity protocols for CHF patients has been implemented, 2) Inpatient ward of Putri Hijau Hospital will apply physical activity protocols for CHF patients, 3) In addition to the formation of physical activity protocols for CHF patients, other formats are required to support the protocol application that will be prepared by the team and researchers, in line with the need of protocol implementation in the field, 4) The formation team and researchers will work together in terms of socialization, training and observation of the protocol implementation in the wards of Putri Hijau Hospital, and 5) the protocol contents are guided by the policy of Putri Hijau Hospital with No: SK/66/X/2013 in regards to the provision of equally the same service procedures at Second-Level Putri Hijau Hospital.

The socialization of physical activity protocol for CHF patients in inpatient wards is aimed at enhancing participants' understanding of matters related to physical activity exercise for CHF patients. There are two materials given in this socialization i.e. physical

activity in CHF patients, and the role-play of physical activity exercise protocol for CHF patients. The socialization materials were given by the researchers in a percentage of 45 minutes, and followed by a role-play about the physical activity protocol for CHF patients. During the presentation of socialization materials and role-play, the participants seemed enthusiastic and attentive. The nurses were very interested at the time of discussion by asking many questions. One of the nurses revealed that they had never performed the physical activity for CHF patients, and they very welcomed if the physical activity protocol for CHF patients would be applied in the hospital wards. The role-play ran successfully. After it finished, the nurses said that the physical activity exercise protocol for congestive heart failure (CHF) patients should be on the run due to the advantage the patients could get as the service recipients.

Cycle 2

Stage 5: Planning

The activity carried out in this stage is the training for inpatient nurses. The result of the training showed that: 1) the nurses stated that they understood the contents of the physical activity protocol for CHF patients, 2) nurses understood the procedure of applying the physical activity protocol for CHF patients, and 3) the application of the protocol.

Stage 6: Acting and Observing

At this step, there were 10% of participants failed on the second day due to shortness of breath with blood pressure of 190/100 mmHg and pulse of 105x/min. Observations were conducted on 10 participants so as to see how far the application of physical activity protocol was successfully applied to the CHF patients by using observation sheets. Before given physical activity, an assessment for patients was done with the following inclusion criteria as explained in the sample part. The result of the study showed that 9 patients (90%) experienced changes in blood pressure and heart rate after doing the entire contents of the physical activity protocol for CHF patients.

Table 4 The average distribution of systolic blood pressure before and after physical activity for CHF patients

Variable	Mean	Median	SD
Systolic Blood pressure (mmHg)			
Before	131.67	135.00	11.651
After	127.22	128.00	6.261

Table 5 The average distribution of diastolic blood pressure before and after physical activity for CHF patients

Variable	Mean	Median	SD
Diastolic Blood Pressure (mmHg)			
Before	84.00	82.00	6.690
After	82.00	83.00	2.345

In this study, researchers also made an observation so as to see how far the effect of the implementation of physical activity protocol for CHF patients (assisted by an assistant from the team member of Putri Hijau Hospital. **Table 4 and 5** illustrate that the systolic blood pressure decreased on average after 5 days of physical activity with 4.31 mmHg. The result showed that diastolic blood pressure decreased on average after 5 days of physical activity with 1,933 mmHg. Blood pressure had average decrease on after 5-day physical activity with 3.12 mmHg.

Cycle 3

Stage 7: Reflecting

This stage is linked to the tentative activity process of physical activity exercise protocol model for CHF patients, which showed that: the application of physical activity protocol for CHF patients has been implemented, and during its application, the nurses had found and observed an improvement on patients' blood pressure and heartbeat, the only obstacle

was patients underwent a sudden changing condition marked by their increased blood pressure and heartbeat.

The impact of the implementation of the physical activity exercise protocol in CHF patients would be evaluated through a post conference by means of in-depth interviews with implementing nurses who participated in the application of physical activity protocol for CHF patients in the inpatient ward. The research team at the Putri Hijau Hospital would do monitoring and evaluation (MONEV) to the process of applying the protocol of patients' rights fulfillment.

The result of the distribution of self-efficacy and self-confidence questionnaires of congestive heart failure showed that 7 patients (77.80%) became very confident in doing the physical activity. The distribution result of frequency of patients' efficacy or confidence in performing the physical activity is shown in the **Table 6**.

Table 6 Self-efficacy or self-confidence of CHF patients in doing physical activity

Confidence	f	(%)
Confident	2	22.20
Very confident	7	77.80

Three themes were obtained based on the findings from the nurses involved during the implementation of physical activity protocol in CHF patients, i.e. 1) the benefits of protocol implementation for CHF patients, 2) obstacles in the application of protocol, and 3) support for the application of physical activity protocol in CHF patients. Based on in-depth interviews with the nurses, they said that the application of protocols of physical

activity gave some benefits i.e. 1) the benefits of protocol for hospital management such as good service improvement and increased public confidence in hospital, 2) the benefits of protocol for patients such as patients' self-confidence to undergo the physical activity increased, and so did matters of safety for patients and nurse, and 3) the benefits of protocol for nurses' work legality. Support for the implementation of this physical activity

protocol includes patients' support such as being more cooperative, confident in nurses greater than that prior to protocol application, closer to nurses, more enthusiastic, and more self-confident after the implementation of the physical activity protocol. In addition, support from nurses is getting better after the socialization as well as the support from hospital management in the form of infrastructure facilitation that supports the activities.

Stage 8: Planning.

The final stage is planning. The activities are: 1) monitoring and evaluating the activities of physical activity protocol for CHF patients, and 2) preconference.

The action research process carried out in the inpatient room has resulted in several outcomes, such as the physical activity protocol for CHF patients and the flow of the physical activity. The participants' experience during the action research on the physical activity protocol has a positive impact on the increase of their knowledge and skills in providing nursing care especially in the physical activity. The impact on patients was the changes in their blood pressure and heart rate. It is expected that CHF patients with can perform physical activities like before they suffered from congestive heart failure (**Table 7 & 8**).

Table 7 The comparison of quantitative analysis of nurses' knowledge before and after the application of physical activity protocol for CHF patients

Knowledge	Before			After		
	f	%	Mean	f	%	Mean
Know	31	88.60	10.31	35	100	10.69
Do not know	4	11.40		0	0	

Table 8 The comparison of quantitative analysis of patients' self-confidence before and after application of physical activity protocol for CHF patients

Self-efficacy	Before			After		
	f	%	Mean	f	%	Mean
Less confident	3	33.30	28.67	0	0	42.67
Confident	6	66.70		2	22.20	
Very confident	0	0		7	77.80	

DISCUSSION

There are similarities and differences between the development of action research of physical activity protocol in CHF patients and the action research carried out by previous study ([Smith, Garton-Smith, Briffa, & Maiorana, 2015](#)). The similarity is on the number of participants involved, which are 8 people, conducted in 3 cycles, with in-depth interview as the data collection method, self-report, and observation. According to the study that the data sources for action research can be collected through a combination of in-depth interviews, focus groups and patient records ([Sullivan, Hegney, & Francis, 2013](#)). FGD and in-depth interview are often used to identify information from issues in research

settings. The result will provide positive or negative input from the research settings.

The researchers conducted in-depth interviews on 3 participants, nurses at FGD session and the hospital management. From the analysis result of transcripts of in-depth interview and FGD, researchers could identify 4 themes found in the research of development of physical activity protocol for CHF patients. In the reconnaissance stage, researchers could identify several themes in which there have been found differences and similarities with the preliminary studies ([Badriyah, 2014](#); [Yenni et al., 2015](#)) stated that cardiac rehabilitation had not been implemented properly and continuously; heart-failure patients' ignorance to perform rehabilitation exercise was still high. It was found on the survey that 4 out of 5

heart-failure patients said they had no information about cardiac rehabilitation exercise. They admitted to have never done any cardiac rehabilitation exercises while at home due to lack of friends to perform the activity. Similarly, according to the research ([Suharsono, 2015](#)) stated that physical exercise in Indonesia is usually carried out centrally at the hospital. Based on official data on the coverage and program participation of patients with heart failure in Indonesia, there are currently no reports of physical exercise and physical exercise guidelines whether centralized in hospitals or carried out on home-based exercise training (HBET) for patients with heart failure. Nurses are also not provided yet with adequate health education due to the unavailability of physical exercise protocols in the hospital.

The research similarity from previous studies is on the category of 1) the need for SOP (Standard Operating Procedure) due to the implementation of physical activity for CHF patients which is not optimal, 2) the enhancement of nurses' and patients' knowledge, and 3) the need for support from hospital management. The difference category is the expectation on the implementation of the physical activity. Difference in category is because the study design used is different. Study design by previous study ([Yenni et al., 2015](#)) is a quantitative study, while research on the development of protocol of physical activity in CHF patients uses the study design of action research. Thus, there is a difference of category between the researches of protocol development of physical activity in CHF patients with previous study.

In the planning stage of Cycle 1, researchers conducted several strategies such as holding a meeting with the management to discuss the plan to develop a physical activity protocol for CHF patients, i.e. socialization of data collection at reconnaissance stage, plan of development team, and protocol formulation. This is in line with previous research ([Holter & Schwartz-Barcott, 1993](#)), in which researchers enter the collaboration stage with identified problems and specific interventions.

At the stage of action/observation in cycle 1, researchers undertook the activities planned previously at the planning stage. The activities performed were fully in accordance with the plan. At this stage, the team had been formed and the team had produced an SOP (Standard Operating Procedure) on physical activity exercise for CHF patients based on literature review, the results of the nurses' knowledge of physical activity for CHF patients, and the results of in-depth interview and FGD analysis. The SOP was to be used as guidance in giving nursing care, especially concerning physical activity for CHF patients. This is in line with previous study ([Halimuddin, 2013](#)) which states that developing an activity model which is based on indicators for improvement of heart muscle ability is highly needed, and other study ([Nofiyanto & Adhinugraha, 2016](#)) states that early and ongoing mobilization programs for critical patients need to be carried out progressively based on the patients' functional ability and their ability to tolerate the given program.

The Standard Operating Procedure on physical activity for CHF patients is an expansion of the research by previous study ([Winkelmann, Dallazen, Bronzatti, Lorenzoni, & Windmüller, 2015](#)) carrying out a 7-day cardiac rehabilitation program. Another study ([Badriyah, 2014](#)) conducting directional physical exercise to post-acute coronary syndrome patients, and the other study ([Halimuddin, 2013](#)) conducting a model of activity and exercise of heart failure during the six-day of inpatient stage. Researchers implemented physical activity for CHF patients for 5 days because based on the in-depth interview result with the nurses, patients with congestive heart failure were allowed to be hospitalized only for 5 days according to regulation of BPJS (Social Insurance Administration Body), except in the event of complications that may result in special policy from the Head of Putri Hijau Hospital for patients with congestive heart failure to be hospitalized for more than 5 days.

At the stage of action/observation of cycle 2, the researchers undertook the application of

physical activity protocol for CHF patients and evaluated the application of the protocol. Then it had been found a decrease in blood pressure of patients with congestive heart failure on the average of 3.12 mmHg. This is in line with previous study ([Halimuddin, 2013](#)) which states that with the implementation of the model of activity and exercise of heart failure developed for 6 days, there was the difference in mean systole and diastole of blood pressure before and after intervention on the average of 2.25 mmHg. This is in line with the statement of previous study ([McTaggart & Kemmis, 1988](#)) that the observation steps are to observe the action process, the effects of the action, the state and the obstacles of action and other arising problems. The observation must be planned, responsive, critical, and should be sensitive to any unexpected problems.

Reflection step was carried out by researchers at the end of cycle 1 and cycle 2 of action research. Researchers evaluated the research activity related to physical activity protocol for CHF patients, nurses' knowledge of physical activity for CHF patients, and self-efficacy or self-confidence of CHF patients on the activity physical training that they had done. This is in line with the statement given by previous study ([McTaggart & Kemmis, 1988](#)) that the reflection stage seeks for understanding processes, problems, issues, and barriers which are manifested in strategic action, taking into account the various arising situations. Reflection has an evaluative aspect so as to consider the experience and assess the effect of the action taken.

The above qualitative analysis result was also supported by quantitative analysis. Prior to the socialization, the nurses' knowledge about physical activity exercise for CHF patients showed a mean of 10.31 and then after the socialization it obtained a mean of 10.69, so it can be concluded that there is a difference of knowledge the nurses had obtained before and after the activities of action research. This is in the physical activity exercise protocols in CHF patients conducted by researchers in action research process. Similarly, in accordance with previous research ([Novitarum, Setiawan, &](#)

[Fathi, 2013](#)) in the intensive care room of Santa Elisabeth Hospital Medan. The study showed that there had been a significant increase in knowledge after the seminar. Inpatient nurses in this study have new knowledge especially concerning the research process, and the physical activity exercise for CHF patients. The enhancement of their knowledge is clearly visible during the research process. This is in line with the statement ([Lesha, 2014](#)) that one of the greatest obstacle in integrating theory, practice, and research is the use of words and communication. Through the process of action research, theory will be much better understood and used in practice, that it can revise the language to be acceptable to all participants.

CONCLUSION

This research uses action research design aimed at developing the protocol of physical activity exercise for CHF patients at Putri Hijau Hospital. The outputs of this study are the compilation and the flow of physical activity protocols for CHF patients. The results of this study also have an impact on the increase of nurses' knowledge concerning physical activity exercise for CHF patients as well as the improvement of patients' self-efficacy or self-confidence in doing the physical activities.

Declaration of Conflicting Interest

None declared.

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Author Contribution

All authors contributed equally in this study.

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