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Chapter

Physical and Cognitive Therapy (PCT) in Critically Ill Patient

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Abstract

The condition of Critically ill patients in the Intensive Care Unit (ICU) can make heavier impairment physical and cognitive functions. The research objective is to prove that physical-cognitive therapy affects towards increasing physical and cognitive functions to Critically ill patients in ICU. The research design was a Randomized Controlled Trials (RCTs). The samples were Critically ill patients in the ICU of Kediri Baptist Hospital as many as 64 Critically ill patients according to inclusion and exclusion criteria. The research has got ethical clearance from the Committee Ethics Medical Faculty of Diponegoro University. The research instrument used Physical Function ICU Test (PFIT) Indonesian Version and Mini-Mental State Examination (MMSE) Indonesian Version. The differential test used Independent t-test on physical function and Mann-Whitney test on cognitive function towards the intervention group and control group. The results showed that physical-cognitive therapy significantly affected increasing physical function ($P < 0.001$) with a mean increase of 3.2 points and cognitive function ($P < 0.001$) with a mean increase of 7.3 points. The difference test of influence between the intervention group and the control group was done by testing the posttest data on physical function ($P < 0.001$) and cognitive function ($P < 0.001$) in both groups. Effect size >0.8 (Physical Function: 3.2; Cognitive Function: 1.9). In conclusion, there was affecting physical-cognitive therapy towards increasing physical and cognitive functions to Critically ill patients in ICU.

Keywords: critically ill patient, intensive care unit, physical-cognitive therapy, physical function, mental stage

1. Introduction

1.1 Background

Critically ill patients with impaired physical function have a picture of the weakness of muscle quadriceps femoris, decreased strength, and decrease in daily activities. Critically ill patients will experience mechanical unloading and decreased neuromuscular activity. Patients critical during Intensive Care Unit (ICU) will lose 20% of muscle volume, and 70% of protein for 1 week are admitted to ICU. The study also found 476.862 patients (60% -80% of the total Critically ill patients in ICU with 30% of them unable to return to work (nonproductive) due to loss of muscle strength of 1% -2% each day after patient out of ICU [1–13]. Critically ill patients with decreased physical and cognitive functioning are caused by various

treatment measures and the accompanying illness. Patients with physical and cognitive impairment were caused by a history of using a mechanical ventilator (33%), infection or sepsis (50%), patients receiving treatment 2 days up to >1 week in ICU (> 50%), delirium and critical illness or sepsis (70%), coronary heart disease (CHD) (36.6%), Unstable Angina (UA) (41.5%), Hypertension (19.5%), Supraventricular Tachycardia (SVT) (2.4%) [1, 2, 14, 15]. The main causal factors causing it are long-term care (≥2 days) and minimal mobilization. Other causative factors include previous medical history (health status and previous disease history), acute illness, critical illness (delirium, hypoxia, hypotension, glucose dysregulation, respiratory failure, shock, Congestive Heart Failure (CHF), sepsis and others), severity diseases, inflammation, loss of muscle strength, sedation, and anxiety levels (communication dissatisfaction, sleep disturbances) [4, 7, 9, 16, 17]. The critically ill patient decline in physical and cognitive functioning if not promptly prevented during ICU treatment may have an impact on increasing health problems when treated in the ICU and when out of the ICU. Critically ill patients with reduced physical and cognitive functioning if not promptly prevented during ICU may have the effect of aggravating and weakening the function of other organs.

Critical illness is associate with impaired brain function like cognitive impairment and mental health [9]. Brain function will reduce and patients in ICU will be Delirium. Neurotransmitters involved in delirium. There are a number of neurotransmitters believed to be involved in the pathogenesis of delirium, including acetylcholine, serotonin, dopamine, and gamma-aminobutyric acid (GABA) [18]. Peripheral inflammation (due to infection, surgery, or trauma) can induce brain parenchyma cells to release inflammatory cytokines. As a result, neurons and synapses dysfunction. In delirium patients, elevated levels of C-Reactive Protein (CRP), Interleukin-6 (IL-6), Tumor Necrois Factor alpha (TNF-α), Interleukin 1 Reseptor Antagonist (IL – 1RA), Interleukin-10 (IL-10), and Interleukin-8 (IL-8) were found. Critically ill patients may experience hemodynamic disturbances, blood pressure, heart rate, and other heart and brain conditions. This can worsen the critical condition of the patient while in the ICU.

Critically ill patients with decreased physical function were a condition that often arose. Which is characterized by a decrease in muscle and functional function [19]. Critically ill patients with decreased function can experience muscle atrophy which is caused by many factors, including inflammatory processes and responses, immobilization, nutritional deficiencies, administration of corticosteroids, and so on. Critically ill patients with impaired physical function have a picture of weakness in the musculus quadriceps femoris, decreased strength, and decreased in carrying out daily activities. Critically ill patients will experience mechanical unloading and decreased activity neuromuscular. Critically ill patients who experience decreased activity neuromuscular at a later stage experience stimulation of a complex adaptation response by producing a mechanism process protein synthesis, increased protein degradation, and increased apoptosis of muscle cells which are major contributors to muscle atrophy, decreased or lost muscle strength in patients.

Critically ill patients with decreased cognitive function can be described as a decrease in memory function and brain function, attention, executive function, mental processing speed visuospatial ability. Critically ill patients with decreased cognitive function are caused by a lack of knowledge about ICU care, ICU delirium, sedation, sleep disturbances, and hypoxia [3]. Critically ill patients with decreased cognitive function are associated with decreased brain oxidative metabolism that causes changes in regional neurotransmitters in the brain. Prefrontal and subcortical or there is a decrease in cholinergic and increased dopaminergic activity when the levels of serotonin and levels of GABA (Gamma-Aminobutyric Acid) are significant. The results of the study found that patients with decreased cognitive function

occurred in 24% -34% of critically ill patients and were similar to the symptoms of traumatic brain injury (34%) and patients were similar to Alzheimer's disease and delirium (24%) [3–6, 8–11]. Decreased physical function can have an impact on weakness in other functions and reduce the quality of life of Critically ill patients.

Critically ill patients with decreased physical and cognitive function caused by various treatment measures and also the accompanying diseases. Critically ill patients with decreased physical and cognitive function due to a history of using mechanical ventilators (33%), infection or sepsis (50%), patients receiving 2 days to >1 week in ICU (> 50%), delirium and various critical illnesses or sepsis (70%), coronary heart disease (CHD) (36.6%), Unstable Angina (UA) (41.5%), Hypertension (19.5%), Supraventricular Tachycardia (SVT) (2,4%) [2, 14, 20, 21]. The main contributing factors that cause it are prolonged care (≥2 days) and minimal mobilization. Other contributing factors are previous medical history (health status and previous medical history), acute illness, critical illness (delirium, hypoxia, hypotension, glucose dysregulation, respiratory failure, shock, CHF (Congestive Heart Failure), sepsis. and others), disease severity, inflammation, loss of muscle strength, sedation, and anxiety levels (communication dissatisfaction, sleep disturbances) [4, 5, 22, 23]. Critically ill patients with decreased physical and cognitive function if not immediately prevented during ICU treatment can have an impact on increasing health problems while being admitted to the ICU and when leaving the ICU.

Critically ill patients with physical and cognitive decline if not prevented immediately while in the ICU, it can have an impact in the form of worsening and weakening the function of other organs [24]. Critically ill patients with decreased physical and cognitive function can have an impact on prolonged treatment time, decreased cognitive function, physical function (organs, muscle contractility, functional capacity and pain, vitality, fatigue) that persist, and worsening mental health (anxiety), emotional response, depression, reflection, loneliness, disability doing activities and using instruments in everyday life [4, 9, 23, 25–27]. Critically ill patients with the phenomenon of decreased physical and cognitive function based on the accompanying impact indicate the need for strategi preventive interventions while the patient is in the ICU. Function improvement in critically ill patients in the ICU increases with interventions given to each problem patient in the ICU and post ICU [3, 10, 20, 26, 28, 29].

1.2 Critical patient health problems

Problems of Critically ill Patients in the ICU is a health problem in the form of physical to psychological disorders that often appear and persist for a long time in patients who are through critical conditions in the ICU or when the patient is discharged from the ICU. The problem can be described as a collection of symptoms or an acute condition worsening the status of weakness in physical, cognitive, or mental health functions in the form of anxiety (physical, cognitive, and mental health) during critical illness. is a collection of symptoms from the patient's experience after the patient survives or is out of a critical period and/or at least ≥2 days in the ICU [4, 30, 31]. Problems during treatment in the ICU can be concluded in the form of a collection of symptoms shown in patients who have successfully passed critical conditions. From ICU and 3 symptoms or areas of damage shown, namely physical function impairment, cognitive impairment in the form of impaired orientation, registration, attention, calculation and language, and mental health impairment.

Causes of various patient problems while being treated until the patient is discharged from the ICU are Critically ill patients who have successfully passed their

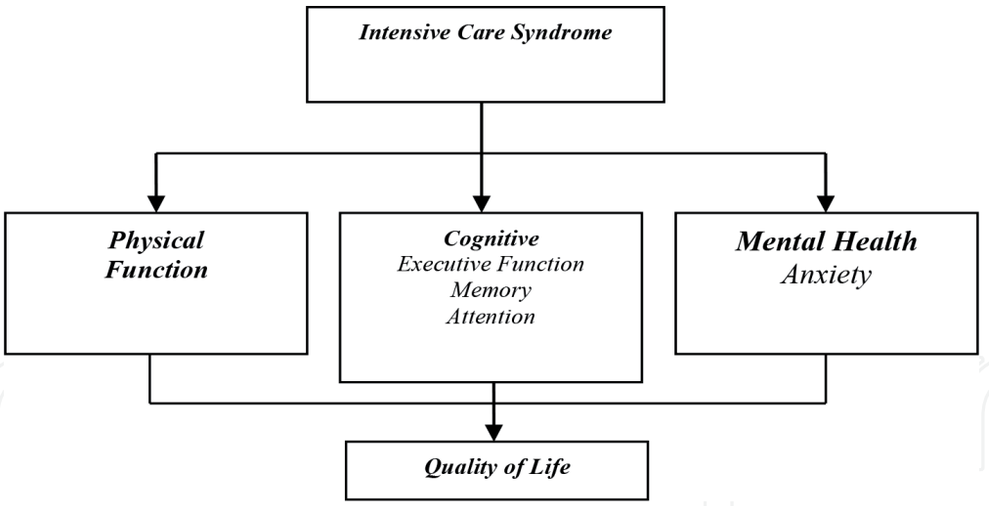

Figure 1.
Intensive care syndrome problems.

critical condition, being treated in the ICU ≥2 days with experiences that respond to patients [4]. A collection of symptoms of problems in the ICU can appear until the patient out of the ICU and the patient after being discharged from the hospital. Other causes include Critically ill patients who are treated in the ICU for a minimum period of 2 days with minimal mobilization, acute disease conditions, sepsis, and delirium. The impact is increasing the length of treatment time, mental health damage in the form of anxiety, physical function, and cognitive function [4, 10]. Critically ill patients with prolonged immobilization have an impact on physical function during the patient's stay in the ICU and after discharge from the ICU. These effects result in decreased organ function and decreased muscle contractility, functional capacity, and quality of life for patients [26]. Other causes based on the research include patients experiencing these problems, including Critically ill patients with acute illness, heart failure, Congestive Heart Failure (CHF), patients with sepsis, delirium, shock, etc. [3]. The results of research on Critically ill patients in the ICU found that 60% -80% of patients have functionally impaired, 50–70% patients have cognitively impaired (executive function, memory, and attention), and 10–40% of patients have experienced health deficits (anxiety, depression, and posttraumatic stress disorder (PTSD)) [3]. The magnitude of the impact that patients get after receiving treatment in the ICU can disrupt and reduce the patient's quality of life. Critically ill patients who are admitted to the ICU experience a decrease in muscle strength by 1–2% every day [10]. This can weaken physical function in the form of disuse atrophy, weakness in daily activities caused by immobilization or bed rest, ICU acquired illnesses, and age [3, 5, 32]. Post Intensive Care Syndrome (PICS) patients with the impaired physical function will interfere with life and health activities in patients in the form of productivity, activity daily, to the patient's quality of life. Symptoms in the ICU include physical impairment, cognitive impairment, and mental health in the form of degrees of anxiety (**Figure 1**).

2. Cognitive and physical impairment

2.1 Cognitive impairment

The results of post ICU patient research can cause cognitive impairment, with severity 34% of patients have damage cognitive impairment is similar to traumatic brain injury, and 24% of patients have cognitive impairment similar to Alzheimer's

disease, and delirium, which is a separate risk factor for long-term cognitive impairment [8]. The study of 637,867 patients who survived the ICU from 1999 to 2008 showed that patients experience cognitive impairment and functional and is increasing significantly [4].

The results investigations Pre and post ICU found that the prevalence of cognitive impairment increased from initially moderate to a more severe scale with an increase in the value of 6.1% [6]. Cognitive impairment in Critically ill patients who are treated in the ICU can have manifestations of acute brain dysfunction to delirium. Delirium is characteristic of changes in mental status and fluctuating course [24]. Long-standing cognitive impairment can lead to cognitive deficits by following the severity of the pain, which in turn worsens and weakens other functions [24]. Decreased cognitive function is also associated with decreased brain oxidative metabolism causing neurotransmitter changes in the prefrontal and subcortical areas. There was a decrease in cholinergic activity and an increase in dopaminergic activity, at a time when the significance of serotonin and GABA levels remained unclear.

2.1.1 Measurement of cognitive function of patients in the ICU

1. Questionnaire on Cognitive Decline in The Elderly (IQCODE)

Critically ill patients have a form of cognitive dysfunction in the long term that still needs further research. This cognitive dysfunction is characterized by pre-existing mild exacerbation deficits, global and executive cognitive function. Long-term cognitive impairment after a patient can pass through a critical illness can become a new problem and reduce the quality of life. The results of the study found that the cognitive function of Critically ill patients can be measured using the Questionnaire on Cognitive Decline in The Elderly (IQCODE). Questionnaire on Cognitive Decline in The Elderly (IQCODE) has 26 question items that have good correlation, test–retest reliabilities [33]. This instrument can also be given to dementia patients, the results of other studies also show that Questionnaire on Cognitive Decline in The Elderly (IQCODE) has high reliability.

2. The Mini-Mental State Examination (MMSE)

Measurement of a patient's cognitive status uses the mini-mental state examination (MMSE). The mini-mental state examination is a tool to measure mental status which in this case is cognitive impairment. The mini-mental state examination is a measuring tool that has high reliability and validity so that it can describe cognitive functions. The mini-mental state examination has 11 questions in which there are five areas of cognitive function, namely orientation, registration, attention, and calculation, recall, and language the maximum score is 30. Scores of 23 and below indicates cognitive impairment. Long duration measurement The mini-mental state examination (MMSE) for 5–10 minutes [34].

2.2 Physical impairment

Critically ill patients in the ICU during bed rest will experience mechanical unloading and decreased activity neuromuscular, which in turn stimulates a complex adaptation response by showing protein synthesis, increased protein degradation, and increased apoptosis of muscle cells. This mechanism is a major contributor to muscle atrophy and decreased or loss of muscle strength in patients, it can be seen after the patient's bed rest. Muscle metabolism disorders that occur

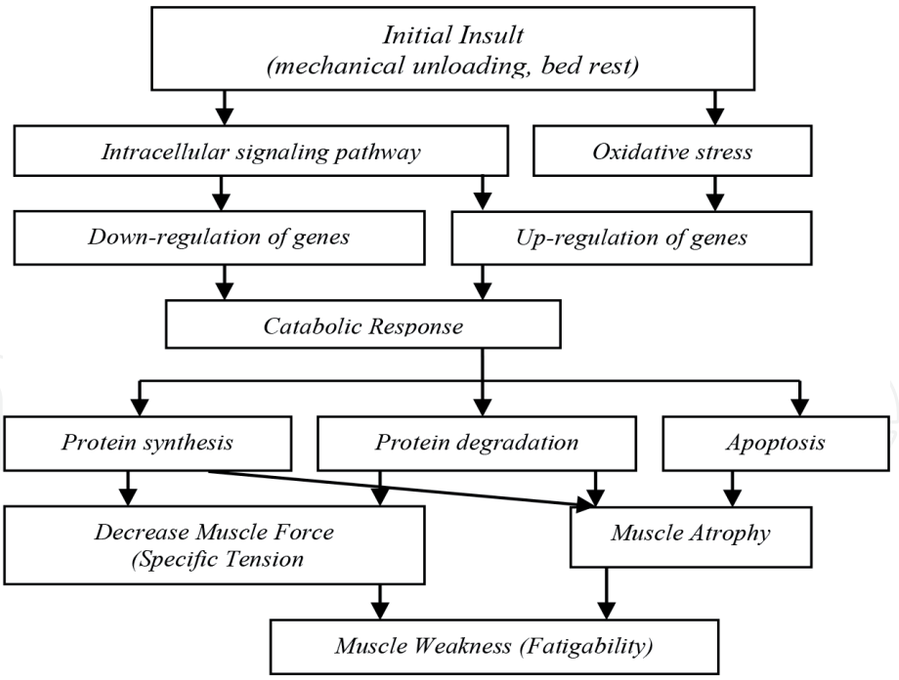

Figure 2.
The immobilization-induced catabolic response.

reduce protein formation to energy breakdown during patient immobilization or bed rest.

Critically ill patients in the ICU show that 70% of the minimum activity will lose muscle mass after bed rest, especially in the lower extremities [19]. The results of a study on Critically ill patients who were treated in the ICU with a research method using RCTs (Randomized Controlled Trials) found that patients who hospitalized in the ICU > 48 hours will experience impaired physical function and sleep disturbances [35]. Critically ill patients in the ICU with minimal mobilization, disease prognosis, unusual environment, and sedation response affect the patient's comfort response and affect the response of the hormone oxytocin.

A decrease in the quality of sleep of a critical patient will increase the patient's anxiety so that the patient is unable to be oriented and cooperative. Physical response muscle weakness can increase the discomfort response so that the patient's body is in a state of oxidative stress. Oxidative stress occurs because several free radicals in the body exceed the body's capacity to neutralize them. The impact of this is that the intensity of the oxidation process in normal body cells becomes higher and causes significant and more damage. Oxidative stress is the main cause, one of which is the emergence of chronic diseases such as cancer, heart disease, Alzheimer's, and others (**Figure 2**).

2.2.1 Measurement of physical function of critically ill patients in the ICU

Measurement of physical function can be done with several measuring instruments including Time up and Go (TUG) Test

a. Time Up and Go [36]

TUG is a physical function measuring tool by assessing balance and the risk of falling. The tools used are a stopwatch, a chair, a meter with a minimum length of 3 meters, or 10 feet. The patient is instructed by the nurse and the patient must follow suit. The patient performs mobilization from sitting to standing and walking. The interpretation of Time up and Go (TUG) is the time taken from sitting to standing.

Interpretation of ≤ 10 seconds is normal, ≤ 20 seconds is good mobilization, can walk alone, mobilize without the aid of tools, ≤ 30 seconds is a problem, cannot go independently, requires tool assistance, ≥ 14 seconds the patient has a high risk of falling.

b. 6 Minute Walk Test (MWT)

Physical function measurement with instruments 6 Minute Test (6 MWT) to measure the patient's physical functioning endurance. The tools needed for this measurement are a stopwatch, rolling tape, aisle. The measurement carried out is the distance the patient has walked for 6 minutes [37]. The measurement is stopped if it finds the following criteria, signs, and symptoms of angina (chest pain), dizziness, confusion, ataxia, staggering, unsteadiness, pallor, cyanosis, nausea, dyspnea, fatigue, signs of peripheral circulatory insufficiency, claudication or significant pain, and the patient develops distress. Discontinue if there are hemodynamic changes such as systolic blood pressure decreases >10 mmHg, systolic blood pressure increases >250 mmHg, diastolic blood pressure rises >120 mmHg, and HR falls >15 beats per minute.

c. Physical Function ICU Test (PFIT)

The physical strength of patients in the ICU is usually measured by looking at the patient's ability to perform or meet the needs of daily activities. The physical function of a critical patient can be measured to determine the degree of physical function impairment in the patient. Examination or measurement of physical function is expected to be able to present the real condition of the critical patient's condition in the ICU or after the patient is discharged from the ICU. physical in the ICU are responsibility, reliability and validity can use Physical Function ICU Test (PFIT). Physical Function ICU Test (PFIT) is a physical function measurement tool that can be used by critical nurses in the ICU to identify the condition of critically ill patients in the ICU. The Physical Function ICU Test is proven to be safe with high clinical utility, responsiveness to all changes, and PFIT is recommended in testing the physical function of patients in the ICU [38–40]. PFIT shows good reliability and responsiveness to changes and the respondents who take measurements safe and flexible [39]. The PFIT test was carried out on 20 respondents and all respondents measured the results obtained $P < 0.05$. The Physical Function ICU Test can show an increase in the progress of muscle function and muscle strength in Critically ill patients [39]. The Physical Function ICU Test can be performed on patients with a tracheostomy attached, a ventilator, the patient can follow orders, can sit, and not. Performed in patients with a fraction of inspired oxygen (Fio_2) > 0.6 (> 60%); positive end-expiratory pressure (PEEP) > 8 cmH_2O; patients with spinal cord injuries, stroke, and unstable fractures [39]. There are 4 Physical Function ICU Test (PFIT) domains measured, namely:

3. Physical-cognitive therapy

3.1 Definition

Early activity therapy intervention in the ICU is an effort to prevent the worsening of the patient's muscle condition or weakness after the patient is discharged from the ICU [41]. Cognitive therapy is therapy in Critically ill patients to reduce the possibility and insecurity of the patient while in the ICU. Due to decreased cognitive function [24]. Physical-cognitive therapy is a critical ICU patient intervention that allows cognitive and physical damage due to short or long bed rest [24]. Based

on the results of the study showed that cognitive therapy was effective in improving cognitive function in ICU patients.

Physical-cognitive therapy-pharmacological is a nonprevention and management to improve cognitive quality and physical function (Miller and Ely, 2007) intervention physical-cognitive therapy can improve the cognitive and physical function of Critically ill patients in the ICU and after the patient leaves the ICU. Therapy is given for no more than 20 minutes due to the response fatigue patients during ICU treatment and the response to hemodynamic changes during fatigue.

Physical and cognitive exercise interventions are appropriate and recommended by the Nursing Interventions Classification (NIC). Physical exercise can be done by teaching exercise prescribing (5612), positioning (0840), neurological positioning (0844), increasing strength training (0201), stretching exercises (0202), improving body mechanics (0140), and rehabilitative cardiac care (4046). Cognitive exercise can be done with delusional management (6440) which supports the comfort and orientation to the reality of the patient [42].

3.2 Physical-cognitive therapy screening

Interventions Physical-cognitive therapy (PCT) is implemented to the patient once a day at ±10.00 a.m. because at that time it is the body's metabolic response in the best conditions. Intervention is carried out for a maximum of 20 minutes for 3 days according to the patient's condition or adjusted to the Richmond Agitation Sedation Scale (RASS) so that patients get intervention according to their needs and abilities because muscle and neurotransmitter metabolism can achieve maximum function if therapy is carried out continuously.

Physical-cognitive therapy can be performed in Critically ill patients with respiratory failure, patients on noninvasive ventilators pressure ventilation, high flow nasal cannula, shock (Dopamine ≥7.5 mcg/kg/min, Norepinephrine ≥5 mcg/kg/min, Dobutamine ≥5 mcg / kg / min, Phenylephrine ≥75 mcg/kg/min, Epinephrine, Vasopressin >0.03 mcg/min). This intervention should be avoided in patients >72 hours after the development of respiratory failure or shock, cardiac surgery, and post-cardiac arrest. This intervention is only given a maximum of 20 minutes [24].

The first intervention procedure physical-cognitive therapy, namely Critically ill patients in the ICU, is first assessed by RASS. Patients with RASS score of -5 to −4 and − 3 to −2, started to physical therapy intervention using passive Range of Motion (ROM). Patients with RASS score of −3 to −2 patients started to learn cognitive training in the form of space, place, time, and people orientation. The patients with RASS score of −1, 0, +1, would start for physical exercise in the form of active exercise, including sitting beside the bed, standing or moving, Activity Daily Living (ADL) training such as eating, drinking, eliminating, changing positions and finally walking. Meanwhile, for the patient's cognitive training, orientation training Interventions were carried out, digit span forward, matrix puzzle, digit span reverse, noun list recall, paragraph or story recall, letter-number sequences, pattern recognition. Patients with RASS score of −3 to −2 started to learn cognitive training in the form of space, place, time, and people orientation. The patients with RASS score of −1, 0, +1 would start physical exercise in the form of active exercise, including sitting beside the bed, standing or moving, training of Activity Daily Living (ADL) such as eating, drinking, eliminating, changing positions, and finally walking.

3.3 Intervention procedures cognitive therapy

Intervention therapy Cognitive is a cognitive exercise given to patients for a maximum of 20 minutes for 1 time a day for at least 3 days of implementation.

Before implementing the intervention, an assessment of the patient's level of consciousness was carried out using RASS. The goal intervention cognitive therapy is to increase or prevent cognitive decline during treatment in the ICU or after being discharged from the ICU. The patient was not intervened if the patient was stupors or comatose (RASS -4 to −5). The patient was able to respond to sound but was unable to maintain it (awake) or maintain eye contact for >10 seconds (RASS -3 to −2), then the patient was subjected to orientation training intervention. A series of exercises given to the patient's alert (RASS -1 to +1). The patient is subjected to cognitive stimulation from orientation exercises to the stages for a maximum of 20 minutes. Patients are given Interventions to the extent that the patient achieves them within a time limit of 20 minutes [24, 29].

1. Orientation Exercises

Patients are asked to answer 10 orientation questions and are assessed. Five questions are questions related to time orientation (current year, season, month, date, and day). The next five questions assessed the orientation of the place including city, state, province, where the patient is (ICU hospital), and what floor the patient is currently hospitalized for. The orientation of time and place is instantaneous. Correctly answered questions were repeated starting over for all or 10 orientation questions.

2. Digit Span-Forward

The patient is asked to repeat a sequence of numbers, starting with a 4-digit sequence (for example, 4–1–2-8) and advancing to a 9-digit sequence (for example, 6–1–4 – 2-9- 3- 5-7-8).

3. Matrix Puzzle

Patients are asked to choose the correct answer from a series of five answers that complete a matrix pattern.

4. Digit Span Reverse

Similar to "Digit Span-Forward" above, the patient is asked to repeat the sequence in reverse order. For example, suppose the patient is given the sequence 5–7 – 3, and the patient is asked to repeat it in the reverse order, "3–7-5". Exercises start with a 3-sequence digit and progress to an 8-sequence digit.

5. Noun List Recall

The patient reads a series of seven words and is asked to repeat them in any order, for example, "cat, cat, clock, foot, guitar, knife, button".

6. Paragraph or Story Recall

Patients read a story that contains many details and are asked to repeat it back to the nurse or researcher as they have read. For example, "On March 14, two cows escaped from their pen through a hole in the fence and went to a busy highway, three cars collided trying to avoid the cow, fortunately, no one was injured. After four hours the cow just went down. can be caught".

7. Letter-Number Sequences

Patients are asked to read a sequence of letters and numbers after which they are asked to arrange letters and numbers and the numerical sequence is first ordered then alphabetical order. This exercise starts with a series of 1 number and letters (for example, "L, 2", and the patient will answer, "2-L") and progresses to 4 numbers and 4 letters (for example, "7, M, 2, T, 6, F, 1, Z", to which the patient will answer "1–2–6-7-FMTZ").

8. Pattern Recognition

The patient is presented with a sequence of letters or numbers with some of the sequences omitted. The patient is then asked to complete the sequence by recognizing the pattern of the components. Which is missing and fills in the missing letters or numbers (for example, the sequence: 1 -__- 3 - __ - 5 - __ - 7 - __ will finish by filling in the missing even numbers, 1–2 - 3 - 4 - 5 - 6 - 7 - 8).

3.4 Intervention procedures physical therapy

Physical therapy is physical activity therapy carried out on Critically ill patients in the ICU by paying attention to the patient's condition with the hope of improving the patient's physical function recovery. The goal of physical therapy is to improve the patient's physical function while the patient is in the ICU contractures, or atrophy during the patient's life emphasizes the treatment and, in the end, the patient's physical function after leaving the ICU is getting better. is a physical activity therapy performed on Critically ill patients in the ICU by paying attention to the patient's condition with the hope of improving the recovery of the patient's physical function. Intervention physical therapy Before, necessary screening is.

Criteria Patients who receive physical exercise interventions have the following signs and symptoms 43:

1. Decreased pulse pressure (e.g., lightheadedness and syncope).

2. Heart rate is 40 to 130 beats/minute

3. Respiratory rate is 5 to 40 breaths/minute.

4. Systolic blood pressure > 180 mmHg.

5. Pulse oximetry <88%.

6. Marked ventilator desynchrony.

7. Patient distress (nonverbal cues, gestures, physical combativeness).

The intervention was immediately stopped, the patient was instructed in a resting position (for example, sitting in a chair, on the edge of the bed or supine on the bed), but if the intervention was able to be completed within 5 minutes, the next intervention was based on the clinical judgment from the intervention provider or the therapist. If the patient presents with an arrhythmia, or if there is any concern that new myocardial ischemia, impaired breathing and airway patterns of the patient, or if the patient has fallen, then the intervention is stopped immediately. If the patient is found to have a change in the RASS value to +2, +3,

or + 4, the procedure is immediately stopped. If there is a change in the RASS value on a different day, then the therapy is stopped (drop out) Physical exercise procedures, namely:

1. Patients in a coma or stupor (RASS −4 or − 5): passive ROM intervention is performed (Abduction of the shoulder, elbow, and groin. Knee extension., flexion and dorsiflexion of the ankle).

2. Patients with RASS -3 or − 2: passive ROM intervention was performed and the patient was positioned to sit in bed for at least 20 minutes.

3. Patients with RASS -1 to 1: identified as capable of active ROM, then the patient performs active ROM in all major joints and/or sleep mobility exercises (for example, lateral and supine tilts and sitting), sitting on the edge of the bed, doing daily activities -day (eating or simulating eating, bathing or brushing teeth, dressing), changing positions from sitting to standing and from bed to chair, and ambulation (with or without assistance).

Measurement of physical and cognitive function outcomes can be done 72 hours after the intervention or the patient is discharged from the ICU [24].

4. Theory the symptom management

Symptom management model first was introduced at the University of California, San Francisco (UCSF) by Larson in 1994, and developed by Dodd, M., Janson, S., Facione, N., Faucett, J., Froelicher, ES, Humphreys, J., Taylor, D. in 2001 in the publication of the Journal of Advanced Nursing with the title Advancing the Science of Symptom Management. (Dodd et al., 2001) Symptoms are defined as subjective experiences that reflect changes in the biopsychosocial function, sensation, or cognition of the individual. Signs and symptoms are defined as disease indications detected by individuals or other people. (Smith & Liehr, 2014) Signs and symptoms of problems are in the form of cognitive and physical dysfunction, which are important aspects of health status and diseases that interfere with the health of other patients such as social function. Acute symptoms that often appear will make patients come back to health services to have their health checked and make the patient's quality of life decrease (**Figure 3**).

Patients during treatment in the ICU may develop symptoms or a group of symptoms that can be the first indication in identifying the prognosis of further disease progression. These symptoms are the effect of previous treatment while in the ICU or symptoms of decreased health function can also be caused by pharmacologists or nursing services performed by health personnel. Theory of Symptom Management can help provide information to relieve or prevent symptoms or to minimize the stress of experiencing symptoms that can occur while a patient is in the ICU. This middle-range theory serves to guide symptom assessment and Interventions in nursing practice [20, 43].

Three important concepts of Symptom Management Theory (SMT) namely, symptom experience, symptom management strategies, and symptom status outcomes. This concept focuses on three domains of nursing science, namely the domain of people, environment, and health or disease (person domain, environmental domain, and health/illness domain) as contextual considerations for nursing research [43].

Figure 3.
Symptom management [44].

Critical patients in the ICU will have various illness symtoms, depending on age and reproductive status as well as other factors. These factors include genetic risk factors (person domain), cultural beliefs, the representative meaning of a symptom based on reported laboratory and the diagnosis of the disease (health or disease domain). Experience history of pain while in the ICU is a simultaneous perception, evaluation, and response to changes in a person. Changes can be identified how often (frequency) the condition is sick or how severe (how bad) the condition or illness is. The frequency or severity may not change, but the stress associated with symptom problems in the ICU can be altered by preventive intervention strategies. Symptomatic experiences can include not one but several synergistic symptoms. Strategies Symptom management to prevent, delay, or minimize the experience of symptoms of patient problems while in the ICU should be applicable. This strategy can be effective in three ways: (1) reducing the frequency of symptom experiences, (2) minimizing symptom severity, or (3) eliminating the pain associated with symptoms (**Figure 3**) [44].

5. Result

In this work, our objective is to prove that physical-cognitive therapy (PCT) affects towards increasing physical and cognitive functions to critical patients in ICU with design was Randomized Controlled Trials (RCTs). This research data was obtained by determining the criteria for respondents. The Inclusion criteria include Patients who have been treated in ICU ≥ 24 hours, RASS -5 to +1, No visual disturbance, and hearing. Exclusion criteria include RASS +2, +3, and + 4, Patients who change RASS values to +2, +3 and + 4 when intervened or different days, Patients screening scores change during intervention, Patient forcibly return home or refer to another hospital, Patient dies, Initial assessment or ongoing intervention in patients is found with Cardiac Surgery, Neurodegenerative

No	Characteristic	Group		Z	P-Value (N = 64)
		Intervention (N = 32)	Control (N = 32)		
1	**Gender**				
	Male	19 (59.4%)	16 (50%)	0.74	0.455
	Female	13 (40.6%)	16 (50%)		
2	**Age** ($\bar{x}$ ± SD)	59.9 ± 10.94	48.03 ± 11.4		<0.001
	12–16-Year-old	—	1 (3.1%)	3.78	
	26–35-Year-old	—	2 (6.4%)		
	36–45-Year-old	4 (12.5%)	10 (31.3%)		
	46–55-Year-old	7 (21.9%)	11 (34.4%)		
	56–65-Year-old	11 (34.4%)	7 (21.9%)		
	> 65-Year-old	10 (31.3%)	1 (3.1%)		
3	**Diagnose**				
	CHD -UA	5 (15.6%)	10 (31.3%)	1.01	0.312
	CHD- OMI	11 (34.4%)	7 (21.9%)		
	decomp cordis phase class III-IV	7 (21.9%)	7 (21.9%)		
	HHF	3 (9.4%)	3 (9.4%)		
	Pneumothorax	2 (6.3%)	—		
	Acidosis metabolic	1 (3.1%)	—		
	DKA	1 (3.1%)	—		
	COPD	1 (3.1%)	—		
	Asthma Attack Emergency	1 (3.1%)	—		
	Observation Ileus	—	2 (6.3%)		
	Stroke Hemorrhagic	—	1 (3.1%)		
	GEA	—	1 (3.1%)		
	Hyperglycemic	—	1 (3.1%)		
4	**RASS**				
	+1	1 (3.1%)	3 (9.4%)	2.06	0.039
	0	16 (50.0%)	19 (59.4%)		
	-1	—	4 (12.5%)		
	-2	10 (31.3%)	6 (18.8%)		
	-3	4 (12.5%)	—		
	-4	1 (3.1%)	—		
5	**Sedation**				
	Yes	23 (71.9%)	22 (68.8%)	3.07	0.002
	No	9 (28.1%)	10 (28.1%)		

Notes: [a]: Chi-Square test, [b]: Mann- Whitney test; Z: Z count (Z table: 1.96); CHD: Coronary Heart Disease; UA: unstable angina; OMI: old myocardia infarct; HHF: Hypertension heart failure; DKA: diabetic ketoacidosis; COPD: chronic obstructive Pulmonary Disease; GEA: gastroenteritis acute.

Table 1.
Respondent characteristic.

Group	Mean Rank	Sum Rank	U	P-value
Physical Function			13.00	<0.001
Intervention	48.09	1539.00		
Control	16.91	541.00		

Table 2.
Differences of physical function test results between intervention group and critical patient control group (N = 64).

disease, Post cardiac arrest with suspected anoxic brain injury, Unstable fracture, long bones and open abdomen, Psychotic disorder. The population in the study were all critical patients treated at Kediri Baptist Hospital. Based on ICU RS. Baptist Kediri in May–June 2017 there were 267 patients treated in ICU. The samples were critical patients in ICU of Baptist Hospital Kediri as many as 64 critical patients according to inclusion and exclusion criteria. Independent variable in this research is physical-cognitive therapy. Dependent variable in this research is physical function and cognitive function. The research tool in this research is physical function measurement tool (PFIT) and cognitive function. Data collection has been done after completing the research proposal. Researcher get ethical clearance from KEPK Medical Faculty of Diponegoro University, and Researcher apply research permission from Diponegoro University Semarang to Director of RS. Baptist Kediri. The Wilcoxon test was used to determine differences in cognitive-physical function before and after physical cognitive therapy in each group, whereas the Mann Whitney test was used to determine the posttest of cognitive-physical function between the intervention group and the control group. The value of confidence interval applied is 95% with significance level 5% ($\alpha = 0.05$). The data obtained is used to support the discussion regarding factors that can affect the research variables.

The characteristic information of subjects is listed in **Table 1**. There were slightly gender differences in the two groups; including more than 50% male in the intervention group while balanced amount between male and female sex in the control group. The subjects of the study in both groups had an average adult age to the early elderly. Diagnosis symptoms varied in the two groups; for example, less than 50% (34.4%) had diagnoses of OMI CHD for the intervention group of the research subjects, while only 21.9% in the control group. More than 50% Research subjects in the two groups had a calm and alert awareness level of 0 (RASS = 0). Majority subjects received sedation in the intervention group (71.9%) and the control group (64%) (**Table 1**).

The result of the test result is the mean rank of the control group is 16.91 and the intervention group is 48.09, with each sum rank is 1539.00 and 541.00. The mean rank result is known that the physical function in the intervention group is better than the control group. The value of U arithmetic is (13 < 105) with the significance of P-value (<0.001), indicating that there was a significant influence difference in the physical function between the intervention group and the control group (**Table 2**).

The result of the test result is the control group's mean rank is 19.28 and the intervention group is 45.72, with each sum rank is 1463.00 and 612.00. The mean rank result is known that cognitive function in the intervention group is better than the control group. The value of U arithmetic is (13 < 105) with significance P-value (<0.001), which means that there is a significant effect difference in the cognitive function between the intervention group and the control group (**Table 3**).

Group	Mean Rank	Sum Rank	U	P-value
Cognitive Function			89.00	<0.001
Intervention	45.72	1463.00		
Control	19.28	617.00		

Table 3.
Results of differences in cognitive function assessment of intervention groups and critical patient control groups (N = 64).

6. Discussion

Brain function will be impairment if there is not preventive intervention in ICU. Patients will get impairment cognitive, physical functional, delirium, impairment hormone in the brain. The brain will release oxidative stress, the body compensates by reducing oxidative metabolism in the brain. As a result, brain dysfunction occurs which causes delirium symptoms. This condition also triggers the formation of reactive oxygen and nitrogen which worsens the damage to brain tissue. This damage is permanent and causes complications in the form of permanent cognitive decline. Disturbance in Critically ill patients will also create an imbalance of neurotransmitters, especially acetylcholine and dopamine. Acetylcholine levels were found to be decreased in delirium patients in the ICU. These levels return to normal after the patient is no longer delirium. Additionally, anticholinergic drugs (acetylcholine blockers) have been shown to cause delirium. Dopamine and acetylcholine have a reciprocal (opposite) relationship. There is an increase in dopamine levels in delirium. The administration of dopamine blockers can also reduce symptoms of delirium. Serotonin is increased in hepatic encephalopathy and septic delirium. Serotonin agonists (hallucinogenic drugs) can also cause delirium. In critically ill patients with delirium, changes in gamma-aminobutyric acid (GABA) and histamine levels occur. Changes can be either increasing or decreasing, depending on the cause of the delirium. Neuroendocrine disorders can also occur where this hormone is associated with increased proinflammatory cytokines in the brain and neuronal damage. The neuroendocrine hypothesis also explains the development of delirium in patients receiving exogenous glucocorticoids. Circadian cycle disruption can affect sleep quality and physiology. Lack of sleep can lead to delirium, memory deficits, and psychosis. Melatonin is a hormone that regulates the circadian cycle. One study shows a link between low melatonin levels and the incidence of delirium. Another study says that administering exogenous melatonin to hospitalized patients reduces the incidence of delirium.

Physical Cognitive Therapy significantly affects physical function in critically ill patients in the ICU. The subjects of the study intervention group increased physical function after intervention with a mean difference of the increase in the intervention group of 3.2, whereas in the control group decreased physical function with a mean of 0.2. The intervention group increased physical function because of physical exercise that is done properly and regularly. Physical exercise at each joint can increase the activity of mechanisms neuromuscular Critically ill patients during bed rest. Physical activity done regularly prevents apoptosis activity. The control group decreased physical function due to a decrease in neuromuscular muscle-debilitating up until the occurrence of cell apoptosis. Improved physical function occurs along with increased functionality and functional use of aid mobilization, step, shoulder strength, and the strength of the knee. Physical-cognitive therapy is expected to be physiologically capable of activating mechanical neuromuscular patients, it is supported by the theory that in principle, the physical exercises to stimulate muscle

nerves to recognize that when the patient bed rest does not happen mechanical unloading and decreased neuromuscular activity. The results of research supported by the theories Margaret that moment activity neuromuscular becomes better, it will inhibit the complex adaptation response (protein synthesis), protein degradation, and apoptosis of muscle cells [1, 2, 6, 7–13, 15, 21, 30, 31, 45–56]. Mechanisms that occur are the main contributor muscle atrophy, loss of muscle strength in critically ill patients during bed rest. Physical-cognitive therapy is expected to increase muscle metabolism which further increases the formation of protein to energy solution for patient immobilization or bed rest. Physical-Cognitive therapy can improve physical function declined over the patient in the ICU, it was supported by the results of research Thomsen stated that ambulation and early mobilization in critically ill patients in the ICU were able to improve the patient's physical function and also decrease the use of sedation [57]. Critically ill patients in ICU should be done as soon as possible physical mobility exercises to improve muscle metabolism and does not activate a response or apoptosis mechanism. The results of research supported by Elliott in the prevention of damage to physical function after discharge from the ICU who stated that early mobility can mitigate the negative impact of critical illness and improved its physical function [20].

Physical-cognitive therapy significantly impacts on improving the cognitive functions of Critically ill patients in ICU. These results correspond with the results of a study that critically ill patients in the ICU can experience mental health disorders such as anxiety and they have cognitive impairment and poor sleep quality.[5] Improved cognitive function was not affected by the characteristics of the study subjects from the intervention group. The decline in cognitive function is influenced also by gender by the statistical results and strengthened by the results of cognitive function decline Wreksoatmojo is motivated by a variety of risk factors that cannot be avoided such as age and gender, as well as some physical conditions and diseases [58]. The decline in cognitive function can slow recovery in patients. The research subjects in the control group were restless anxiety and pain scale settled on the first day to the third day.

The results also showed increased cognitive function occurred in all subdomains variable orientation, regression, attention-calculation, recall, and language. Research shows that physical-cognitive therapy can improve the function of any existing variables. The results of research supported by the results of studies that suggest that cognitive therapy can change the perception of self in patients with heart problems [59]. Research subjects most heart problems with a variety of conditions and consciousness and care in the ICU. The subjects of the study intervention group experienced an increase in all indicators of cognitive function. Cognitive function has several major functions in which work is recertified function, memory function, the function of thinking, and repressive function. This repressive function involves the ability to make the selection process, clarify and integrate the information provided. Researchers on the provision of physical-cognitive therapy provide the stimuli of orientation, registration, attention-calculation, recall until the language with the hope of the study subjects were able to do the selection process to integrate more complex information. The research subjects' control group decreased cognitive function have a significant relationship to independence by the results of research conducted by Balquis [60]. Subjects have been unable to carry out compliance activities of daily needs and also experience pain at a mild to moderate level. It also can affect the patient's condition, especially the condition of his illness. Based on the results that research subjects have the most control group cognitive impairment in moderate time in the ICU.

The research subjects in the control group with a decline in cognitive function may occur and demonstrate emotional response after discharge from the ICU such

as anxiety, depression, fatigue, reflection, and solitude in accordance expressed by Strahan.[21]cognitive decline will worsen and weaken the function of other organs if not prevented in treatment in the ICU [29]. These results are also supported by another theory which states that the impact of the decline in cognitive function for patients in ICU that increase the treatment time, a decline in cognitive function, physical function (organs, muscle contractility, functional capacity and pain, vitality, fatigue), and worsening mental health (anxiety), emotional responses, depression, reflection, loneliness, inability to perform the activity and the use of instruments in everyday life. Condition of patients with worsening cognitive function for patients in ICU should be prevented to maintain the patient's quality of life and function as whole human beings with various functions in carrying out daily activities. Approach to symptom management theory indicated expected any problems can be overcome by a specific patient. Specific Nursing Interventions applied and overcome specific problems as well. The results also were able to study the possible factors that need to be improved in the provision of Interventions, to provide maximum benefit to patients on the signs and symptoms of health problems in critically ill patients in the ICU.

Acknowledgements

I would like to offer my special thanks to patients in ICU Kediri Baptist Hospital. I would like to thank dr. Jati Listiyanto Pujo, Sp. An., KIC., Erina Purwanti (intensivist), Dr. dr. Awal Prasetyo, Sp.THT-KL, M. Kes, and Ns. Reni Sulung Utami, S. Kep, MSc for their help in this research.

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References

[1] Davidson JE, Hopkins RO, Louis D, Iwarshyna T (2013) Post-intensive care syndrome. Soc Crit Care Med 1:1-4

[2] Iwashyna TJ (2014) Post-intensive care syndrome: improving the future of icu patients. 24nd Crit Care Congr Rev 1:13-16

[3] Needham DM, Davidson J, Cohen H, et al (2012) Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference. Crit Care Med 40:502-509

[4] Iwashyna T (2014) What you need to know about post-intensive care syndrome (PICS). Heal Syst Michigan 1:1-3

[5] Rahimi RA, Skrzat J, S. RDR, Zanni JM, Fan E, Stephens RS, Needhan DM (2013) Physical rehabilitation of patients in the intensive care unit requiring extracorporeal membrane oxygenation: a small case series. Phys Ther 93:248-255

[6] Iwashyna TJ, Cooke CR, Wunsch H, Kahm JM (2012) Population burden of long-term survivorship after severe sepsis in older americans. J Compil © 2012, Am Geriatr Soc 60:1070-1077

[7] Needham DM (2012) Improving long-term outcomes after discharge from intensive care unit: Report from a stakeholders' conference. Crit Care Med 40:502-509

[8] Pandharipande P, Girard T, Morandi A, Thompsom J (2013) Long-term cognitive impairment after critical illness. New Engl J Med 369:1306-1316

[9] Jackson J, Pandharipande P, Girard T, Brummed N, Thompson J (2014) Depression, post-traumatic stress disorder, and functional disability in survivors of critical illness in the brain-icu study: a longitudinal cohort study. Lancet Respir Med 2:369-379

[10] Sottile, Peter, Amy Nordon-Craft, Daniel Malone, Darcie M. Luby, Margaret Schenkman MM (2015) Physical therapis treatment of patients in the neurogical intensive care unit: description of practice. Phys Ther 95:1006-1014

[11] Cartwright MM (2012) The high incidence of post intensive care unit (ICU) anxiety and depression. Psychol Today 1

[12] Suwardianto H (2015) Buku ajar keperawatan kegawatdaruratan (perspektif, konsep, prinsip, dan penatalaksanaan kegawatdaruratan), 1st ed. PT. REVKA PETRA MEDIA, Surabaya

[13] Suwardianto H, Selvia D (2015) Buku Ajar Keperawatan Kegawatdaruratan (Perspektif, Konsep, Prinsip, dan Penatalaksanaan Kegawatdaruratan). PT. REVKA PETRA MEDIA, Surabaya

[14] Hoffman LA, Guttendorf J (2015) Post Intensive care syndrome: risk factors and prevention strategies. AHC media 1

[15] Suwardianto H (2016) Tardive dyskenesia, motor activity, sedation scale, and cardiac workload in baptis kediri hospital. World Soc Disaster Nurs 4:1

[16] Hopkins RO (2013) Strategies to ensure long-term quality of life in ICU survivors. Soc Crit Care Med 1:1

[17] Needham DM, Davidson J, Cohan H, PharmD, Hopkins R (2012) Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference.

Soc Crit Care Med Lippincott Williams Wilkins 40:502-509

[18] Ali S, Patel M, Jabeen S, Bailey RK, Patel T, Shahid M, Riley WJ, Arain A (2011) Insight into delirium. Innov Clin Neurosci 8:25-34

[19] Poulsen JB (2012) Impaired physical function, loss of muscle mass and assessment of biomechanical properties in critical ill patients. Dan. Med. J.

[20] Davidson JE, Harvey M a, Bemis-Dougherty A, Smith JM, Hopkins RO (2013) Implementation of the pain, agitation, and delirium clinical practice guidelines and promoting patient mobility to prevent post-intensive care syndrome. Crit Care Med 41:S136-45

[21] Suwardianto H (2016) Tardive dyskenesia, motor activity, sedation scale, dan cardiac workload pasien IPI pada pemberian analgesik di instalasi perawatan intensif RS. baptis kediri. Keperawatan Krit. Penelit. Hibah YBI

[22] Morton T (2013) Hyperobjects: Philosophy and Ecology after the End of the World. The Johns Hopkins University Press, USA

[23] Disler RT, White H, Franklin N, Armari E, Jackson D (2019) Reframing evidence-based practice curricula to facilitate engagement in nursing students. Nurse Educ Pract 41:102650

[24] Nathan E B, TD G, Ely, et al (2014) Feasibility and safety of early combined cognitive and physical therapy for critically ill medical and surgical patients: the activity and cognitive therapy in ICU (ACT-ICU) trial. Intensive Care Med 40:370-379

[25] Abelha FJ, Santos CC, Maia PC, Castro MA, Barros H (2007) Quality of life after stay in surgical intensive care unit. BMC Anesthesiol 7:1-12

[26] Bonita A G (2009) Home cardiac rehabilitation for congestive heart failure: a nursing case management approach. Rehabil Nurs 24:143-147

[27] Strahan EH., Brown RJ (2005) A quantitative study of the experiences of patients following transfer from intensive care. Intensive Crit Nursing-ICCN 21:160-171

[28] Ernst, Edzard, Max H. Pittler, Clare Stevinson and AW (2001) The desktop guide to complementary and alternative medicine: an evidence-based approach. White eds London UK 1:459

[29] Nathan E, Brummel, James C. Jackson TDG (2013) A combined early cognititive and physical rehabilitation program for people who are critically Iil: The activity and cognitive therapy in the intensive care unit (ACT-ICU) trial. Phys Ther Crit Illn 92:1580-1592

[30] Suwardianto H, Rimawati (2018) Explicit Instruction Model (EIM): Daily Training Emergencies Preparedness (DTEP) Toward Skills of Participants the Youth Red Cross. Conf 2nd Jt Int 2:403-410

[31] Suwardianto H (2013) Deep breathing relaxation as therapy to decrease blood preassure on hypertension patients. Proc Fac Nurs Airlangga fourd Int Nurs Conf Improv Qual Nurs Care Though Nurs Res Innov 1:1-12

[32] Elliott D, Davidson JE, Harvey MA, et al (2014) Exploring the scope of post–intensive care syndrome therapy and care and Care: engagement of non–critical care Providers and survivors in a second stakeholders meeting. Crit Care Med 42:2518-2526

[33] Christensen H, Batterham PJ, Mackinnon AJ, Jorm AF, Mack HA, Mather KA, Anstey KJ, Sachdev PS, Easteal S (2008) The association of APOE genotype and cognitive decline in interaction with risk factors in a 65-69 year old community

sample. BMC Geriatr. https://doi.org/10.1186/1471-2318-8-14

[34] Kurlowics L, Wallace M (1999) The mini mental state examination (MMSE). Hartford Institude Geriatr Nurs 1:1

[35] Corner EJ, Brett S (2014) Early identification of patien at risk of long-term critical-associatted disability: is it possible? Crit Care 18:629

[36] Lusardi M, Pellecchia G, Schulman M (2003) Functional Performance in Community Living Older Adults. Funct Perform Community Living Older Adults 26:14-22

[37] Society AT (2002) ATS Statement: Guidelines for the Six A Minute Walk Test. Am J Respir Crit Med 166:111-117

[38] Parry SM, Denehy L, Beach LJ, Berney S, Williamson HC, Granger CL (2015) Functional outcomes in ICU – what should we be using? - an observational study. Crit Care. https://doi.org/10.1186/s13054-015-0829-5

[39] Skinner EH, Berney S, Warrilow S, Denehy L (2009) Development of a physical function outcame measure (PFIT) and a pilot exercise training protocol for use in intensive care. Crit Care Resusc 11:110-115

[40] Denehy L, Morton NA de, Skinner EH, Edbrooke L, Haines K, Warrilow S, Berney S (2013) A physical function test for use in the intensive care unit: validity, responsiveness, and predictive utility of the physical function ICU test (scored). Phys Ther 93:1636-1645

[41] Hoppkins R, RR M, L R, Spuhler V, G.E T (2012) Physical therapy on the wards after early physical activity and mobility in the intensive care unit. Phys Ther 92:1518-1523

[42] Bulechek GM, Butcher HK, Dochterman JM, Wagner CM (2013) Nursing interventions classification (NIC), 6th ed. Elsevier Inc, United Kingdom

[43] Smith A, Carey C, Sadler J, Smith H, Stephens R, Frith C (2019) Undergraduate education in anaesthesia, intensive care, pain, and perioperative medicine: The development of a national curriculum framework. Med Teach 41:340-346

[44] Smith MJ, Liehr PR (2014) Middle range theory for nursing thrid edition, 3rd ed. Springer Publishing Company, New York

[45] Suwardianto H, Sari D (2020) Environmental Factors of Sleep Hygiene That Influence The Level of Pain on Criticall ill Patients in Intensive Care Unit. Str J Ilm Kesehat. https://doi.org/10.30994/sjik.v9i1.266

[46] Suwardianto H (2018) Cognitive therapy dengan pendekatan symptom management theory di intensive care unit rs. Baptis kediri. J. Penelit. Keperawatan 4:

[47] Suwardianto H, YC A (2016) Kemandirian Fungsional Lansia Diabetes Melitus Di Kelurahan Bangsal Kota Kediri. J. STIKES RS Baptis Kediri 9:

[48] Suwardianto H, Prasetyo A, Utami RS (2018) Effects of Physical-Cognitive Therapy (PCT) on Criticaly ill Patients in Intensive Care Uni. Hiroshima J Med Sci 67:63-69

[49] Rimawati, Suwardianto H, VW A (2018) Resilience of Knowledge and Perception Skills on the First Aid on Employees. 2nd Jt Int Conf 2:535

[50] Suwardianto H, Sari DAKW (2019) Pain Level in Critical Patients With Sleep Hygiene Care In Intensive Care Unit. J Nurs Pract. https://doi.org/10.30994/jnp.v3i1.61

[51] Suwardianto H (2018) Level Of Perception Emergency Skills In Youth Red Cross. J Nurs Pract 2:17-24

[52] Suwardianto H, Prasetyo A, Utami RS (2017) PHISICAL FUNCTION (MOTOR ACTIVITY) PADA PASIEN KRITIS DENGAN SEDATION DI INTENSIVE CARE UNIT (HASIL TURNITIN).

[53] Suwardianto H Sleep Hygiene, Strategi Mengurangi Tingkat Nyeri Pasien Kritis. Lembaga Chakra Brahmana Lentera

[54] Suwardianto H, Prasetyo A, Utami RS (2017) PHYSICAL COGNITIVE THERAPY MENINGKATKAN FUNGSI FISIK DAN FUNGSI KOGNITIF PASIEN KRITIS DI ICU.

[55] Suwardianto H, Prasetyo A, Utami RS (2017) Phisical Function (Motor Activity) Pada Pasien Kritis Dengan Sedation Di Intensive Care Unit. J Ilmu Kesehat 5:91-102

[56] Astuti VW, Suwardianto H (2016) PENGETAHUAN GURU TAMAN KANAK-KANAK TENTANG ALAT PERMAINAN EDUKATIF DI TAMAN KANAK-KANAK BAPTIS SETIA BAKTI KEDIRI. J. STIKES RS Baptis Kediri 9:

[57] Thomsen GE, Snow GL, Rodhiquez, Ramona, Hopkins (2008) Patients with respiratory failure increase ambulation after transfer to anintensive care unit where early activity is a priority. Crit Care Med 36:1119-1124

[58] Wreksoatmojo BR (2014) Beberapa kondisi fisik dan penyakit yang merupakan faktor resiko gangguan fungsi kognitif. CDK-212 4:25-32

[59] Wijayanti F (2012) Pengaruh terapi kognitif dan latihan asertif terhadap depresi dan kemampuan menguah persepsi diri caregiver Pasien Jantung di RS Jantung Harapan Kita Jakarta.

[60] Balqis UM, Wati NK (2013) Penurunan fungsi kognitif berhubungan dengan ketidakmandirian lansia di Panti Sosual dalam melakukan aktivitas kehidupan sehari-hari. FIK UI 1:1