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Concept Analysis of Pulmonary Rehabilitation

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Abstract. Pulmonary rehabilitation is a process of multi-disciplinary and comprehensive evidence-based for patients with chronic respiratory disease who are symptomatic and decreased daily living activities. Some literature discusses pulmonary rehabilitation, but no one has analyzed the concept of pulmonary rehabilitation, particularly in the field of nursing. The concept of this analysis aims to explain the concept of pulmonary rehabilitation by using Walker and Avant's concept analysis framework. Some attributes influence pulmonary rehabilitation, such as the patient's condition, disease severity, and the environment that supports pulmonary rehabilitation. Antecedents concerning pulmonary rehabilitation include a history of past illnesses and the patient's lifestyle. The consequence of pulmonary rehabilitation can be seen in two aspects, namely the patient and the health care system. Therefore, the pulmonary rehabilitation conceptual model should be based on attributes and antecedents to improve the quality of life of patients and the quality of nursing services

Keyword: pulmonary rehabilitation, respiratory disease, nursing services

INTRODUCTION

Pulmonary rehabilitation is needed for the mechanically ventilated patient because the patient is facing the weakness or failure of respiratory conditions. Pulmonary rehabilitation is a process of multi-disciplinary and comprehensive evidence-based for patients with chronic respiratory disease are symptomatic and often have decreased daily of living activities (1). Meanwhile, the problem of pulmonary rehabilitation for the critically ill patient will impact to Length of Stay (LOS) and quality of life after discharge from the critical unit. Patients with protractedly LOS can lead several complications include muscle weakness, prolonged symptoms, psychological changes, and decreased quality of life associated with the illness condition (1).

All conditions might contribute to physical limitations, and lung function decreased, which ordinary happened in critically patients. Other problems are contractures and pressure palsies. Also, muscle weakness experienced a significant decline in patients (2).

There is some literature that discussed pulmonary rehabilitation but a limited number of papers that published the concept analysis of pulmonary rehabilitation, particularly in critical care nursing. The strength of concept analysis is to clarify the unclear concept in theory, and to initiate a precise operational definition which reflects it is the theoretical base (3). In this study, the concept analysis of pulmonary rehabilitation for a critically ill patient under ventilator support. Therefore, the concept will explain the importance of pulmonary rehabilitation nursing interventions in the clinical practice to improved quality of care and decrease the length of stay

OBJECTIVE

The concept of this analysis aims to explain the concept of pulmonary rehabilitation and to describe the attributes of the pulmonary rehabilitation program.

METHOD

This concept analysis applied Walker and Avant's concept framework (3) in the majority of nursing analysis concepts. There are several steps used in this framework, include: 1) the concept, 2) determine the purpose of analyzing a concept, 3) determine the attributes, 4) create a model case and contrary case, identify antecedents and consequences, and 5) defining reference empirical.

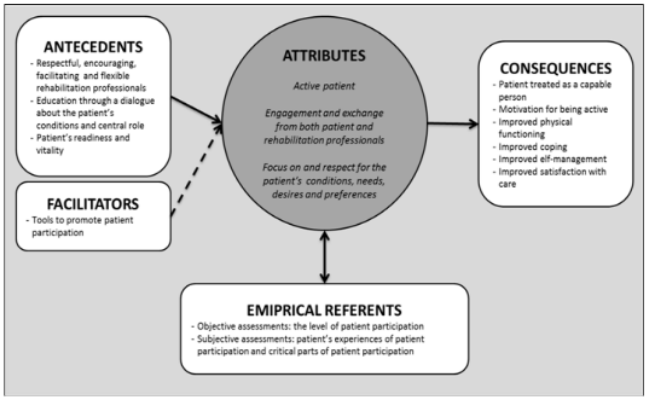

Figure I. An illustration of antecedents, facilitators, attributes, consequences, and empirical referent

RESULTS AND DISCUSSION

Some patients require treatment in the ICU due to conditions of acute illness, major postoperative surgery, or trauma. This condition is often referred to as Intensive Care Unit Acquired Weakness (ICU-AW) (6). Most of the patients treated in the ICU have ICU-AW experience impaired bodily functions. One of the impaired bodily functions present in critical patients is respiratory disorders.

Impaired respiratory function patients require pulmonary rehabilitation to improve his condition. Pulmonary rehabilitation is a program of education and training to help patients to maintain their respiratory problems through increased energy and decreased stamina or breathlessness (7). Education in a pulmonary rehabilitation program teaches patients to be more involved in the management of their breathing. The family is also expected to play an active role in assisting patients in the pulmonary rehabilitation phase.

Pulmonary rehabilitation is a program of education and training to help patients in managing respiratory problems, improve stamina, and reduce fatigue due to breathing. In the pulmonary rehabilitation program, nurses will learn how to improve breathing to increase the activity. In addition, patients also learn when they must come to the health service (1). Pulmonary rehabilitation can be started with useful exercise based on the appropriate level of ability of the patient. Practice time will increase the following levels of exercise. If the breathing muscles begin to increase, the patient will be able to perform the activity for longer without fatigue and hard to breathe. The goal of pulmonary rehabilitation is to reduce the complications of bed rest in bed and dependence on mechanical ventilation.

The process in pulmonary rehabilitation includes mobilization, exercise, and limb peripheral muscle training, as well as respiratory muscle training. Early mobilization intervention is safe and can be performed in patients after cardio-respiratory conditions and neurological stable. In this approach, along with the specific muscle exercise, can improve cognitive function and respiratory function (8). Patients with thoracic trauma, recovery of collapsed lung capacity ventilation are assisted by release secretion and prevent additional complications so that another goal of pulmonary rehabilitation is to restore lung function of the patients (9,10).

Table 1. Nursing interventions to improve pulmonary rehabilitation for critical care patients

	Nursing Interventions	Description
1	Give position through (11)	Positioning is the use of body position as a specific treatment technique. Positioning strategies used in the ICU include prone positioning (PP), semi-recumbent positioning, and lateral positioning (10,11)
	a. Prone position	a. The inclined position is defined as lying in a horizontal position with the abdomen facing downward and the face facing either downward or to one side. The prone position is the opposite of the supine position, which is defined as lying face-up in a horizontal position with the back of the head, spinal column, and heels resting directly on a supporting surface (10,12)
	b. Semi-recumbent position	b. The semi-recumbent position is an upright positioning of 45^0 (10,13)
	c. Lateral position	c. Lateral position is defined as the patient lies on the side of the body with the top leg over the bottom leg. This position helps relieve pressure on the coccyx (10,14)
2	Do early mobilization (12)	Early mobilization is an active exercise where the patient can assist with an activity using their muscle strength and control although the patient still receiving invasive ventilator (11,15)

Pulmonary rehabilitation pretreatment for mechanically ventilator patients is done by taking into account the patency of the airway. This is very important, so oxygen can enter optimally into the lungs that are needed to increase the breathing muscles. Another essential factor in pulmonary rehabilitation in critically ill patients is increasing therapeutic effects through a multidisciplinary approach where treatment goals are planned. The rehabilitation team consists of doctors, nurses, and physiotherapists (6).

Physical activity and training carried out in the ICU must be appropriate for the patient's condition (17). In particular, early mobilization therapy refers to the use of the bed longitudinal axis up to 60^0 on each side. In addition to prevention, these measures can reduce the risk of airway closure and lung atelectasis, reduce the incidence of lower respiratory tract infections and pneumonia, and reduce the duration of use of the endotracheal tube (ETT) as well as patients, especially in ICU LOS.

Evaluation of pulmonary rehabilitation can be seen from improvements in physiological and psychological status (18). Improvements in physiology such as patient able to weaning mechanical ventilator immediately and better function of ventilation and perfusion. Whereas, the psychological development can be demonstrated by decreasing patient's anxiety

1) The attribute of Pulmonary Rehabilitation

Pulmonary rehabilitation has some attributes, such as the patient's condition, illness severity, and the environment that supports the pulmonary rehabilitation program. The difference in the patient's condition at the time of the pulmonary rehabilitation program will determine the type of rehabilitation that will be given. Patients with critical conditions receive a different rehabilitation program based on unstable conditions. Pulmonary rehabilitation can be given to patients who are restless or sedated, including the application of a semi-recumbent position to get a head-up position $\geq 45^0$ can be given to patients with critical conditions with unstable hemodynamics (19). In addition, regular position changes every 2 hours, and Passive exercise every day in all joints can be done in critical patients with functional hemodynamic status. Passive bed cycling and electrical stimulation can be performed on patients with stable hemodynamics and can exercise on the bed.

The weakness of the respiratory muscles, the imbalance between muscle strength, also load respiratory and cardiovascular system function disorders are the leading cause of failure pulmonary rehabilitation process. These factors may contribute to the rapid decline diaphragms function in a patient with critical conditions (20). However, rationalization exercise muscle strength in patients with critical conditions remains controversial to this day, and it is not a common practice for an institution. An adaptive change that refers to the fast or slow increase in respiratory muscle seen in lung volumes appear to have improved by respiratory muscle training (21).

In its implementation, the family and nurse play a critical role. There are several obstacles to participating in a pulmonary rehabilitation program. Some of them are transportation difficulties and lack of motivation (22). Therefore, full support from families is needed to improve pulmonary rehabilitation programs. The family has a role in providing emotional support to patients and facilitating the implementation of pulmonary rehabilitation so that pulmonary rehabilitation can run well. In addition to the family, nurses can help patients independently in carrying out rehabilitation. Nevertheless, nurses still need other professionals to collaborate to do pulmonary rehabilitation in patients. Nurses can work with respiration therapists, physical therapists, occupational therapists, psychologists, dieticians, social workers, and spiritual advisors (23).

2) Antecedence of Pulmonary Rehabilitation

Antecedents are events or events that appear before a particular concept. Pulmonary rehabilitation antecedents include a history of past illnesses as well as the patient's lifestyle. For example, patients with COPD with primary postoperative patients have different success rates in implementing pulmonary rehabilitation. Patients who have a previous history of lung disease more adequate rehabilitation than other patients. The patient's lifestyle also plays an essential role in the pulmonary rehabilitation process. Patients with poor lifestyles, for example, smoking, can have an impact on lung function directly. Nurses help patients adapt to lifestyle changes and also provide a therapeutic environment to develop patients and families (23). Thus, nurses design and implement strategies based on nursing theories related to self-care and promote physical, psychosocial, and spiritual health.

3) Case

a. Model Case

Mr. A, 56 years old, seven days ago, experienced severe shortness of breath and admitted to the ICU with mechanical ventilation. Mr. A does exercise pulmonary rehabilitation programs properly. During mechanical ventilation installed, he regularly follows the pulmonary rehabilitation program, including practice Deep Breathing Exercise, changes in sleep position every 2 hours, head up, and Range of Motion. After four days in intensive care with mechanical ventilation later, he was transferred to regular treatment for two days. When Mr. A treated at the ward, he does exercise stool and walking in the corridor room with the assistance of nurses and physiotherapists. Mr. A admitted to the inpatient unit two days later and allowed to discharge. Although Mr. A has been discharged from the hospital, he still regularly performs rehabilitation program. Mr. A gain does pursed-lip breathing exercises and start doing exercises to walk on a treadmill. Mr. A accompanied by nurses, doctors, and physiotherapists when the rehabilitation process. Currently, Mr. A feeling is rarely experienced shortness of breath. Before being treated in hospital, he was almost every day felt hard of inspiration. Mr. A just experienced hard of breath if he has substantial activity and cannot control his breathing pattern. In addition, Mr. A changes the pattern of life that used to frequent smoking and less exercise into exercising and avoiding smoking.

b. Contrary Case

Mr. B, 54 years old, often experience shortness of breath. At first, he regularly checked himself in health care. Mr. B also got a pulmonary rehabilitation program. However, he felt his condition was well only with control and taking medication, so he decided not to do the rehabilitation. Currently, Mr. B often felt shortness of breath, especially while doing the activity. Then he despairs and assumes no improvement at all in him. The nurse who cared for Mr. B suggests coming to physiotherapy and educating the importance of physiotherapy to improve respiratory function. However, he was reluctant to do physiotherapy because it was assumed that the results would be the same, will not impact on his physical condition.

c. Antecedents of the Case

The antecedent in the case above is a history of the underlying disease in patients undergoing pulmonary rehabilitation. The patient has a history of pulmonary disease to experience respiratory failure and thus requires pulmonary rehabilitation to improve the condition of the patient's lungs.

d. Consequence

The consequence of pulmonary rehabilitation can be seen in two aspects. The first consequence is the consequence regarding patients. Patients who receive a pulmonary

rehabilitation program that is planned and evaluated correctly will improve the quality of life of the patients.[14] Second consequence is the health care system. Compliance of patients in pulmonary rehabilitation can shorten the length of stay and may reflect the success of the system of collaboration among officials in a health ministry (7).

4) Empirical References

According to Walker and Avant, the empirical reference used to measure the concept of the tool at the time (3). Pulmonary Rehabilitation is a process and program that can be evaluated through physiological and psychological responses to the response of the patient. Physiological responses include hemodynamic status, the ability of the patient's activity, as well as the degree of patient dependency. While the psychological response can be assessed from anxiety, self-concept, and also stress experienced by the patient (24). Several tools can be used on each aspect of the assessment that can be applied to the patient to see the evaluation of pulmonary rehabilitation.

Self-reported Chronic Respiratory Disease Questionnaire (25) measures how the patient responds to his pulmonary condition. The Hospital Anxiety and Depression Scale is used to assess anxiety and depression in patients with impaired respiratory function treated in the hospital (26). Another frequently used tool is the Pulmonary Rehabilitation Adapted Index of Self-Efficacy (PRAISE questionnaire) (27). PRAISE questionnaire is designed from a general adaptation self-efficacy scale that has been well validated and comprehensively integrated. The relationship between self-efficacy in general and specific is complicated. PRAISE combines general and particular self-efficacy well so that the assessment is easy to apply

CONCLUSION

Some studies define pulmonary rehabilitation purposes as well as discuss the attributes and significant antecedents while developing pulmonary rehabilitation to improve physiological and psychological responses in patients. Some studies also identify and develop theoretical and conceptual frameworks in pulmonary rehabilitation. Therefore, the conceptual model of pulmonary rehabilitation should be based on attributes and antecedents to improve the quality of life of patients and the quality of health services.

RECOMMENDATION

For healthcare professionals expected more intensive monitoring, the patients with pre-eclampsia postpartum, do cross-sector cooperation for the implementation of the control and referral. For further research is expected to develop a discharge planning application to extend the application of network systems for long-term monitoring in the pre-eclampsia postpartum through midwives, community health centers, other health services that connect with hospital websites

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