International Journal of Nursing Care
Volume 10 No. 2, July-December 2022

Application of Orem's Self-Care Deficit Nursing Theory on Self-Efficacy and Quality of Life Among Patients with Bronchial Asthma: Randomized Controlled Study

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How to cite this article: Malarvizhi JayaKumar, Ester Mary Pappiya, Ibrahim Mubarak Al Baalharith et. al. Application of Orem's Self-Care Deficit Nursing Theory on Self-Efficacy and Quality of Life Among Patients with Bronchial Asthma: Randomized Controlled Study. International Journal of Nursing Care 2022;10(2):31-37.

Abstract

Background: Asthma is a serious public health problem and a major cause of disability. Asthma is a chronic inflammatory disorder of the lungs that can lead to structural and functional changes, resulting in bronchial hyper responsiveness and airflow obstruction. Achieving optimal asthma control relies upon the patient's behavior factors namely treatment compliance and self-monitoring using peak flow meter and that may be influenced by monitoring the self-efficacy and quality of life, these ingredients turn the behavior into the desired outcome, significantly predicts the quality of life. Reducing asthma related expenses and less hospitalizations and emergency department visit with bronchial asthma is essential. The present study aimed to determine the effect of self-monitoring behaviors based on Orem's nursing theory on the quality of life and self-efficacy in patients with bronchial asthma.

Methods: This randomized controlled trial study was conducted in Outpatient department, Tertiary care hospital, Chennai. 250 patients were selected using random sampling and divided equally into two control and experimental groups based on random allocation number generated by computer. A teaching program based on Orem's nursing theory and according to the needs of patients was conducted in the experimental group. Data were collected before, immediately after one month, and third and 6th month the intervention using Asthma Self-efficacy and Asthma Quality of Life Questionnaires. Data were analyzed using SPSS 21; Chi-square test, Mean-Whitney, Wilcoxon signed Rank test and KruskalWalli's Test were used to analyze the data.

Results: The mean score of the self-efficacy in the experimental group was significantly higher than the control group six months after the intervention (56.31±4.82 vs. 58.30±5.83; P=0.0001). However, this difference was not significant immediately after the intervention (58.23±2.32 vs. 55.86±4.321, P=0.01). The mean scores of quality of life were not significantly different from those of the control group immediately after (104.96±6.32 vs. 66.43±6.21, P=0.001) and six months after the intervention (130.48±12.432 vs. 78.82±4.34, P=0.0001).

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Conclusion: The results showed that emphasizing self-care based on Orem's theory can improve the quality of life of patients with bronchial asthma. Therefore, it is recommended that nurses in outpatient care of patients with bronchial asthma should apply this theory.

Keywords: Bronchial asthma, nursing theory; Orem's self-care deficit nursing theory, Quality of life; Selfcare; Self-efficacy, peak flow monitoring.

Introduction

Asthma is a serious public health problem and a major cause of disability[1]. Asthma is a chronic inflammatory disorder of the lungs that can lead to structural and functional changes, resulting in bronchial hyper responsiveness and airflow obstruction[2]. Symptoms of asthma include recurrent episodes of wheeze, cough, breathlessness and chest tightness, together with episodes of marked worsening of symptoms, known as exacerbations.[3]

Asthma is a common long- term respiratory condition, and people can have episodes of exacerbations of symptoms which are also known as asthma attacks. The most common reasons are non -adherence to treatment, poor knowledge and skills in disease management.[4]Uncontrolled asthma and ineffective management remains a public health challenge in the developing countries like India. Rai et al., emphasizes on the asthmatic patients need for adequate information on disease process and self-care[5].

Ignacio-Garcia JM et al., stated that when patients understand the risks of non-compliance and benefits of compliance and believe the treatment is safe, it will increase their motivation and confidence to improve their self-management practices[3].

The control of asthma symptoms is a realistic goal and studies have shown that this can be achieved in most asthma patients leading to a higher quality of life. Bateman ED, Boushey HA, In spite of this, the control of asthma is generally poor. The Asthma Insights and Reality in Europe study reported persistence of day time symptoms of up to 46% among asthmatics under treatment[6]. Raber Surveys from other parts of the world reveal a similar picture of suboptimal control[7]. Local studies are in agreement with the world-wide picture with more than two- thirds of patients having sub-optimal control in some surveys.[8]

World Health Organization (WHO) statistics show that about 235 million people worldwide have asthma and the burden of this disease to government, health care systems, families, and patients is increasing worldwide. There are only a few studies from India on epidemiology of asthma. In a study conducted more than 30 years ago, prevalence of asthma was reported to be 2.78 % in an urban population aged 30-49 years. The prevalence was found to vary from 4.3 % to 6.9% in the Indian population[18].

Clinically diagnosed asthma in adults has been reported to be 2.7 % to 4.0 % in 12 most of the European countries, while in England and U. S, it accounts to 12% and 7.1% respectively. Patient education is becoming an essential area of service provision, with our increasing population of people with chronic disease and conditions requiring long term management in the community[9].

Asthma patients should be made aware that a positive attitude towards treatment is a pre-requisite for good disease management. The lack of understanding about asthma may be crucial if the patient is not able to judge the severity of his/ her disease or symptoms or does not know the right treatment. The primary focus of patient education and asthma management strategies should be to identify negative behaviours and work towards positive behavioral changes. Asthma needs to be managed by the individual, or by their career, and it is important that people understand how to manage asthma (gained through education, personal experience or professional guidance) to help them manage exacerbations/ attacks[10].

Asthma is associated with poorer quality of life, with disease severity and the level of control both having an impact. Asthma may have varying degrees of impact on the physical, psychological and social wellbeing of people living with the condition.

There is increasing evidence that comprehensive patient education programs are cost The resulting increase in patient drug use, observed in some studies

especially in low income populations, and in the number of physician visits per patient are outweighed by the reduction in emergency department visits and hospitalizations[11]. Educational programs are usually more effective when offered to asthmatic patients with high morbidity. Intensive programs were found to improve forced expiratory volume in one second (FEV1), and Peak expiratory flow (PEF), nonspecific bronchial hyperresponsiveness, and health-related quality of life.[13]

The objective of the ideal asthma education program is to improve self-management skills for both the prevention and treatment of asthma and to help families in decision making while encouraging them to work closely with the physician to resolve management problems .Studies have shown that simple information programs are ineffective in improving self-management or reducing asthma morbidity .Based on the available literature and background research this investigator decided to look into the quality of life of patients with asthma using the Asthma Quality of life questionnaire. It is not just aimed to investigate the quality of life and self-efficacy but the effect of education on their severity, asthma control and pulmonary functional measures[14]. This investigator also postulated that based on the available literature that poor symptom management could possibly worsening symptoms and affect the quality of life among patients with asthma.

Learning is the addition of new knowledge and experience interpreted in the light of past knowledge and experience. Teaching and learning is an integral part of nursing. Nurses have the responsibility to educate patients related to various aspects and keep themselves updated. Various teaching strategies are used to increase knowledge, such as lecturing, demonstration, discussion and self-education. Thus, education can be incorporated as part of lifestyle measures in promoting health and thereby maximizing the quality of life by applying the Orem's self-care theory as a part of the intervention to elicit the changes in their morbidity status.

Materials and Methods

Design and setting

Randomized controlled trial study was conducted in Outpatient department, Tertiary care hospital, Chennai. 250 patients were selected using random sampling and divided equally into two control and experimental groups based on random allocation number generated by computer. A teaching program based on Orem's nursing theory and according to the needs of patients was conducted in the experimental group. Data were collected before, immediately after one month, and third and 6th month the intervention using Asthma Self-efficacy and Asthma Quality of Life Questionnaires.

Participants

The sample comprised of 250 bronchial asthma patients equally distributed to both study and control groups. The sample size was determined by the following formula. $n = 2 (Z\alpha + Z1\text{-}\beta)\sigma 2 / \Delta 2$ It was determined using power analysis and effect size. The estimated sample size was 220 to achieve a significance of 0.05 and power of 0.8 for 10 % improvement in the symptom reduction and pulmonary functions FEV1, FVC, FEV1/FVC ratio.

The inclusion criteria being physician diagnosed asthma who met GINA criteria of being mild to moderate asthma, attending OPD on regular basis and exclusion criteria being severe airflow limitation and with co-morbid illness other than asthma.

Application of Orem's Self-Care Deficit Nursing Theory

Based on Orem's nursing theory, self-care is considered as activities that people engage in to maintain, restore or improve their health. Nurses do not consider patients as inactive and mere recipients of health services; rather, they consider patients as strong, reliable, responsible, and capable of decision-making who can take care of their health appropriately. Orem defined three nursing systems including wholly compensatory, partially compensatory, and supportive-educative systems. The nurse's roles in the supportive educational system are taken when the patient is ready to learn something, but he/she cannot do it without help and guidance. Therefore, the present study aimed to determine the effect of self-care education based on Orem's nursing theory on the quality of life and self-efficacy in patients with asthma.

Ethical considerations

After obtaining the Institutional ethical committee permission, and content validity from the experts, All participants who met the inclusion criteria were informed about the study protocol and what is expected from them as study participants. The written consent from the participants were secured and confidentiality was maintained throughout the study.

Data collection procedure

Quantitative research with evaluative approach was used. The experimental research design adopted was Randomized controlled trial. The study had two arms a study group and a control group.

After the selection of the subjects, self-care education was implemented by the researcher to the patients with bronchial asthma. The independent variable is education and the dependent variables are self-efficacy and Quality of life. The independent variable education is given as the intervention to improve the self-efficacy, asthma control and Quality of life. The patients were given structured teaching on disease process and importance of using peak flow meter as a small group of 3-5 members in the Chest OPD for 15 minutes. This was followed by demonstration on proper technique of using peak flow meter for 15 minutes which would reduce the symptoms, improve pulmonary function and enhance Quality of life. Teaching was imparted by the researcher, through lecture, discussion and demonstration by using visual aids like booklet, video demonstration. The patients were asked to do the return demonstration and their doubts were clarified. After the demonstration session a booklet on the "Wheezer's anonymous" in local language and English which contained the same information of the teaching was issued. The patients were taught how to maintain the symptom, peak flow meter reading, and symptom diary. The entire session was planned for 10-15 minutes and the patients continued the practices at their home set up. Twice weekly direct and telephonic reinforcement were given. On the 3 rd and 6th month the patients were motivated to continue the practices and maintain the diary. The posttest was performed on 1st, 3rd and 6th month. The control group patients received the routine care during the study period and received the education session after the completion of study period.

The Self-efficacy subscale contains 20 questions, a 5-point Likert-type scale, from "True" to "False". There are no correct or incorrect responses. It has both positive and negative statements. The positive statements were 4, 8, 9, 13, 15, 19, 23, 26, 29, 32, 35, 36, 42, 46, 47, 57, 59, 60 and the options were scored as 5, 4, 3, 2 and 2. The negative statements were 52, 55 and reverse scoring was used as 1,2,3,4 and 5. Total scores ranged from 20 to 100. The summed up scores indicated higher the score, the more confident the individual is in his or her ability to manage and control the asthma. The total score is 100 and for identifying the level of self-efficacy the scale was graded into Highly confident: 81-100 Confident: 61-80 Uncertain: 41-60 Somewhat confident: 21-40 Not confident <20.

Asthma Quality of Life was used to measure a disease-specific healthrelated quality of life instrument that taps both physical and emotional impact of disease. This tool is a standardized tool developed by Elizabeth Juniper in the year 2003 and the reliability of the tool is 0.90. The tool has 32 items, 2-week recall with 4 components. It takes 4-5 minutes to complete the questionnaire. For each component the score assigned is from 1-7 with higher scores indicating better quality of life. The components are symptom experiences (12), activity limitation (11), emotional (5) and environmental stimuli (4). Permission was obtained from the author to use the tool. Scoring and Interpretation Severe impairment: 32 to 79 Moderate impairment: 80 to 127 Mild impairment: 128 to 175 No impairment: 176 to 224[15].

Statistical analysis

The collected data was analyzed with R software 3.2.3 version. Descriptive and inferential statistics were used to analyze the acquired data. The effect of application of Orem's self-care theory in the experimental groups was determined using a Wilcoxon signed test. Statistical significance was defined as a probability of 0.05 or less.

Results

Description of the socio demographic data

Most of them, 28 (22.4%) in study group and 33 (26.4%) in the control group were in the age group of 31-40 years. With respect to the gender, 70 (56%) in study group and 69 (55.2%) in control group were males. With regard to education, 65 (52 %) and 57 (45.6%) had primary level of education in the study and control groups respectively. 98 (78.4 %) in the study group and 96 (76.4%) in the control group were married. In occupation, 64 (50.4%) in the study group and 65 (52%) in the control group were in the category of Employed, 58 (46.4%) and 53 (42.4%) had an income of below Rs.3001-6000 in the study group and control groups respectively. 79 (63.2%) in the study group and 76 (60.8%) in the control group account for nuclear family. Most of the subjects 67 (53.6%) in the study group and 64 (51.2 %) hailed from the urban area. 79 (63.2%) and 83 (66.4%) has family history of asthma in the study and control group respectively. Homogeneity was maintained in the distribution of socio demographic variables in both the groups.

Table 1: Comparison of Pretest, Posttest I, Posttest II and Posttest III Mean score of Self-efficacy among patients with bronchial asthma between the Study and Control group (N=243)

Duration of Study	Study group (n=120)		Control group (n=123)		Mean Difference	Z score and p –value
	Mean	SD	Mean	SD		
Pretest [a]	56.31	4.823	55.43	3.532	0.88	-1.284 0.628 NS
Posttest I	58.23	2.321	55.86	4.321	2.37	-5.645 0.01**
Posttest II	62.32	3.126	56.38	2.468	5.94	-10.367 0.001***
Posttest III	68.82	5.912	58.30	5.834	10.52	-14.328 0.0001****

Table : There was a significant improvement in the Self-efficacy score which is depicted by increased in mean score of 56.31 at pretest and 68.82 during Posttest III in the study group, which was highly significant at $p<0.0001$. In the control group, mean score was increased from 55.43 to 58.30 during Posttest III, which was not statistically significant. This detail conveys the information that there is an improvement in the self-efficacy score among the study group patients since the integrated approach had a great influence.

Table 2: Comparison of Pretest, Posttest I, and Posttest III Mean score of Quality of Life among patients with bronchial asthma between the Study and Control group (N=243).

Duration of Study	Study group (n=120)		Control group (n=123)		Mean Difference	Z score and p –value
	Mean	SD	Mean	SD		
Pretest [a]	64.91	7.112	62.32	5.436	2.59	-6.543 0.471 NS
Posttest I	104.96	6.321	66.43	6.231	38.53	-32.659 0.001***
Posttest III	130.48	12.432	78.82	4.348	52.16	-46.874 0.0001****

Table:2 Findings indicate that there was a significant improvement in the quality of life score which is depicted by increased in mean score of 64.91 at pretest and 130.48 during Posttest III in the study group, which was highly significant at p<0.0001. In the control group, mean score was increased from 62.32 to 78.82 during Posttest III, which was not statistically significant.

Discussion

The findings of this study, by implementing Orem's self-care teaching intervention based on the needs of the patients with bronchial asthma along with the follow-ups can be effective in improving their quality of life. These changes were significant after 6 months of intervention. The role of follow-up and the availability of nurse and other health care professionals are important in sustaining this improvement and have accomplishment of the self-care program to see the positive impact in long term care. This study showed the significant effect both on self-efficacy and the quality of life[16].The findings is supported by Joan K.Wigal., exhibited a significant mean increase in self-efficacy of 11.71, from 77.50 at baseline to 89.21 following intervention. In contrast, the control group exhibited a non-significant mean decrease in self-efficacy of 1.69, from 76.63 to 74.94, during the same time period. Another study conducted by Caro A.Mancuso et found that self-efficacy was moderate (mean score = 76, possible range 20–100, higher is more self-efficacy) and not having had a recent emergency department visit for asthma were associated with more self-efficacy ($p \leq .07$ for all variables). In additional multivariate analyses, more self-efficacy ($p = .01$) were associated with better AQLQ scores[17].

The present study is supported by Van Cauwenberg P shown that asthma can adversely affect the physical, psychological and social domains[18]. When we compared the degree of limitation in each domain it was found that most of the patients had severe limitation in the symptoms, emotional function and environmental stimuli. But in the activity domain most of the patients had mild limitation. This is paradoxical to the study conducted in Nigeria where there was severe limitation in the activity domain. One of the limitations of this study was a single setting, the study can be implemented in other settings to generalize the findings.

Conclusion

Patient counselling is one of the most important aspects in developing patients' knowledge about disease, management, precautions and improving overall quality of life. Even this study revealed that majority of patients had lack of knowledge about the disease condition. The current study also showed the positive effect of self- care promotion through teaching and adapting Orem's self-care theory among asthmatic patients. It is recommended that in the further studies, the follow up intervention should be continued in a longer term, to examine the effect of self-efficacy and quality of life.

Conflicts of Interest: The authors declare no conflict of interest.

Source of Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgment: The authors extend their sincere appreciation to the study participants.

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