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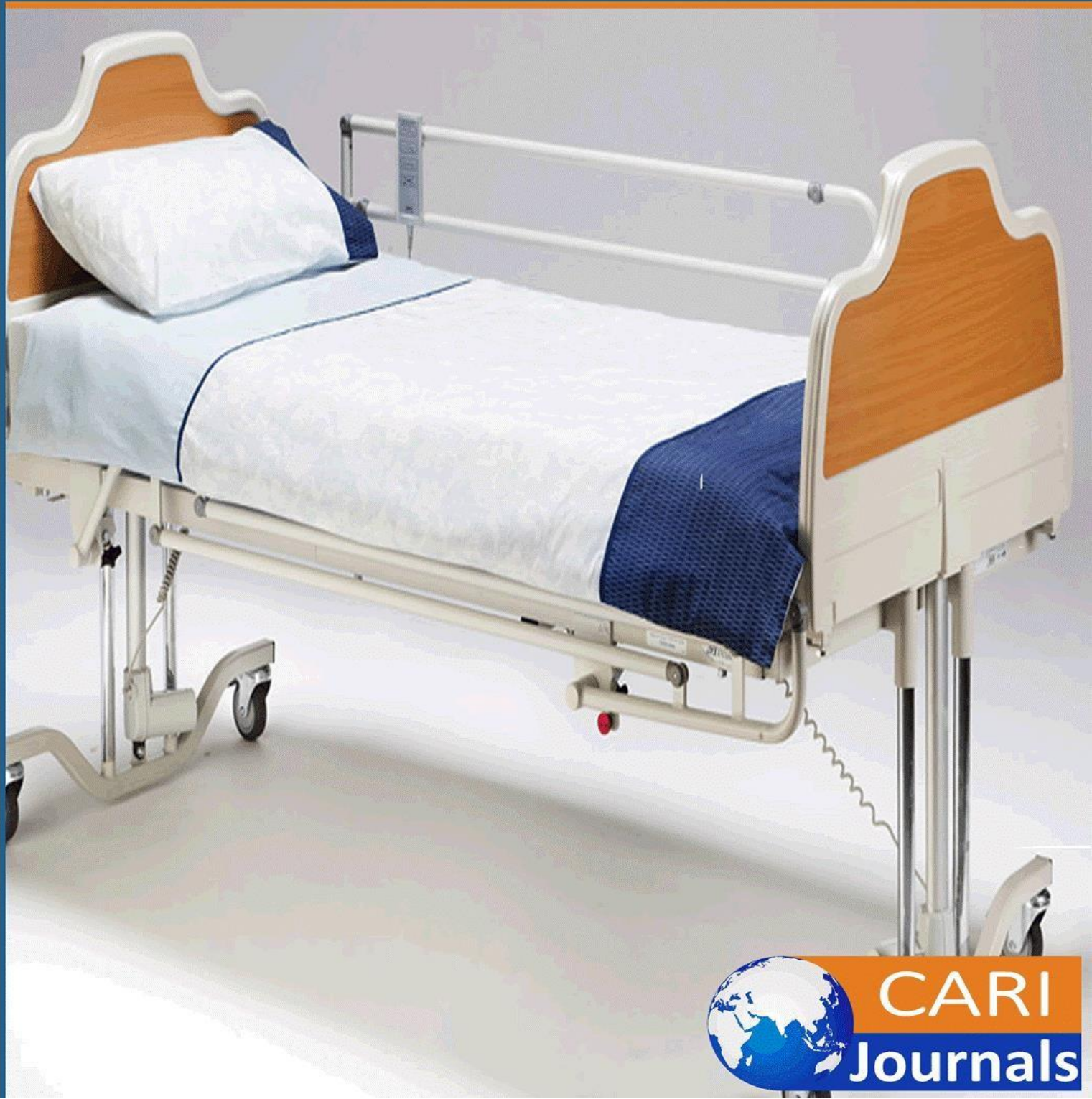

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Treatment Adherence of Out-Patients with Chronic Obstructive Pulmonary Disease: A Cross-Sectional Study

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Abstract

Purpose: The study conducted to identify the status of treatment adherence, and factors related to treatment adherence in COPD outpatient.

Methodology: A cross-sectional study was conducted on 420 COPD out-patients from April 2021 to August 2022. Treatment adherence was assessed through 2 checklists, including adherent inhaled drugs, and adherent breathing exercises. Descriptive statistics, multivariable logistic regression analysis was used to data analyzed.

Findings: 36.9% of participants were being assessed treatment adherence, of which 44.7% adhered to inhaled drugs using, and 36.9% adhered to breathing exercises practice. For correlated factor, smoking was related to treatment adherence ($p<0.05$).

Unique contributor to theory, policy and practice: Patient's knowledge about control COPD, practicing breathing exercises, and treatment adherence level were low. Therefore, intervention programs to support patients improving these problems, thereby enhancing patient's quality of life is necessary.

Keywords: *Breathing Exercies, Chronic Obstructive Pulmonary Disease (Copd), Inhaler Using, Treatment Adherence*

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is becoming a major global health challenge. According to the report of the Global Initiative for COPD in 2020, there was about 3 million deaths globally each year, of which the frequency is increasing due to smoking, aging population, and environmental pollution. It is estimated that by 2060, the world will record about 5.4 million deaths related to COPD [1]. In Vietnam, the prevalence of COPD for a population over 40 years accounted 4.2%, of which men was at 7.1%, and for women was 1.9%; and according to estimates, 1.3 million people with COPD are being needed to diagnosis and treatment recently [2]. Because of COPD's prevalence, prolonged progression, high treatment costs and complex complications, this disease has really become a burden of patients as well as of healthcare system with high morbidity and mortality in the world [1].

Reports of treatment adherence in people with COPD from previous studies were seperate and mainly focused on medication adherence with significantly different rates of non-adherence. In Greece, the rate of non-adherence was high (74.1%) [3], while a study of Dhamane in the USA expressed that 79.2% of patients did not adhere to treatment [4]. In Vietnam, the non-adherence to treatment rate also differed between geographical areas, while at Bach Mai (north area) were reached 70% [5] while Ngoc Thach hospital (south area) was 16.8% [6].

For COPD people at stable stage, adherence to medication and to respiratory rehabilitation through the practice of breathing exercises are key to managing and alleviating patient's symptoms, improve lung function, respiratory muscle strength, exercise capacity, reduce dyspnea, and improve quality of life [1]. Besides, after the COVID-19 epidemic was controlled in Vietnam, the overload of beds in respiratory departments of healthcare facilities are increasing due to the huge number of hospitalized patients with COPD exacerbations. One of the main reasons for this status is that patients do not adherent of treatment. However, we have not found any studies evaluating treatment adherence based on the above two criteria, and/or any study reporting the adherence rate of those patient at healthcare facilities in Danang city, currently.

Literature review

The Theory of Planned Behavior (TPB) is a theoretical model in the field of psychology and behavioral science developed by Scottish social psychologist Icek Ajzen to explain human behavior under “voluntary” control [7]. The main assumption of this theory was that humans are rational and will make predictable decisions under clearly defined circumstances. The prediction model assumes that action intention is the most immediate, direct determinant of behavior, and all other factors indirectly influence behavior through behavioral intentions.

Ajzen's (1991) Theory of Planned Behavior proposes that individuals will attempt a behavior if they believe that the benefits of success outweigh the risks of failure, if they feel that those who significant other (with whom they want to comply) believe they should perform the behavior and if they believe they have the resources and abilities to perform the behavior. Many

studies have applied the Theory of Planned Behavior to promote treatment adherence in people with chronic diseases and show specific effectiveness [3],[4]. Therefore, this study also evaluates the ability of COPD patients to adhere to treatment according to the theoretical framework of the Planned Behavior.

MATERIAL AND METHODS

Design

A cross-sectional study was conducted.

Sample/Participants

A convenient sample of COPD out-patients was recruited. The number of participants was calculated based on the formula:

$$n = \frac{(Z_1 - \frac{\alpha}{2})^2 \times P \times (1-P)}{d^2}$$

In these:

$Z_1 - \frac{\alpha}{2}$: corresponding value from a confidence level (equal to 1.96 if the confidence level is 95%)

P: treatment adherence rate (50%) [8]

d: absolute error 5%

As the formular, a sample size of the study was 384. In addition, the research team estimated about 10% of participants withdrawing even signing the consent form to participate, or not completing the survey form, thereby the minimum sample size was 420.

Inclusion criteria: Patient has been diagnosed with COPD; being treated by home drug therapy with inhaled drugs; had no exacerbations requiring hospitalization for at least 3 months; can speak, read, and understand Vietnamese; and voluntarily participate in the study.

Exclusion criteria: Patients with history of bronchial asthma, allergic rhinitis, lung surgery or other acute respiratory diseases; experiencing exacerbations of COPD or exacerbations of co-morbidities or have had a change in medication in the past 3 months; have a mental disorder or other serious illness.

Data collection

Data was collected by 2 parts. Specifically:

Part 1: Participant's demographic consited of 4 items (age, gender, education level,

employment), while clinical feature included smoking, year of illness, and commobidities.

Part 2: Treatment adherence was assessed through 2 contents, including adherent inhaled drugs, and adherent breathing exercises. Assessment of adherence to inhaled drugs by the Test of Adherence to Inhalers (TAI-10) that developed by Plaza et al. (2016), consisted of 10 questions [9]. Each item bases on a 5-Likert scale that ranged from 1- worst to 5 - best adherence. The total score was from 10 to 50 points, in which patients were seen as adherence with the score range from 46 to 50, and non-adherence for score ≤ 45. Additionally, adherence with breathing exercises assessed based on successful practice as well as maintaining the frequency of daily breathing exercises [10]. Patients were seen as adherence if they did the correct all steps through the practice checklist of breathing exercises, and did one or more times per day within 10 to 15 minutes per time, and/or gradually increases by their own ability. Non-adherence was recorded for the patient did not maintain daily practice, or maintains daily practice but practiced with "fail" result. Finally, the patient was assessed as adherence to treatment if there was concurrent adherence with inhaled drugs and breathing exercise therapy; conversely, non-adherent if adherence one of two contents or non-adherence with both.

Ethical Considerations: The study was approved by the Medical Ethics Committee of Nam Dinh University of Nursing with Decision No. 1681/GCN-HDĐD on 2nd August 2021. In addition, the research team also received the acceptance letters from C - Da Nang hospital, Da Nang hospital, Da Nang hospital for lung disease in the process of approaching, observing and collecting information from groups of patients managed by hospitals.

Data Analysis: Descriptive statistics were used to described variables. Additionally, to analyze and determine the influencing factors of qualitative variables, a research team used Chi-squared test and the odds ratio (OR) with 95% confidence (CL). Besides, logistic regression analysis was used to evaluate the correlation between independent variables and dependent variable (which was a status of treatment adherence).

RESULTS

General characteristic and clinical features of patients with COPD

Among 420 patients with COPD participating in the study, 79.8% of them was male, with the mean age reached at 59.5 ±8.2, while almost participants had already graduated high school (78.6%). For participant's employment, only 7.8% were free trader whilst most of them were retired (48.1%). Besides, the rate of smoker was higher than non-smoker, with 56% and 44%, respectively. The average years of illnesses was 11.39±546 years, and 31.2% of the patients having comorbidities (see Table 1).

Table 1. General characteristic and clinical features of patients with COPD

Cotents	C - Da Nang hospital (N, %)	Da Nang hospital (N, %)	Da Nang hospital for lung disease (N, %)	Total (N, %)
Groups of age	M= 59.5; SD= 8.2			
40 – 49	9 (6)	13 (10)	26 (18.6)	48 (11.4)
50 – 59	41 (27.3)	43 (33.1)	63 (45)	146 (34.8)
60 – 69	72 (48)	62 (37.7)	44 (31.4)	179 (42.6)
≥ 70	28 (18.7)	12 (9.2)	7 (5.0)	47 (11.2)
Gender				
Male	109 (77.9)	107 (82.3)	119 (79.3)	335 (79.8)
Female	31 (22.1)	23 (17.7)	31 (20.7)	85 (20.2)
Education level				
High school or under	40 (28.5)	65 (50.0)	69 (46.0)	74 (21.4)
Post-high school	100 (71.5)	65 (50.0)	81 (54.0)	346 (78.6)
Employment				
Worker and Famer	16 (11.5)	19 (14.7)	18 (12.0)	51 (12.2)
Civil servants	44 (31.4)	34 (26.1)	50 (33.3)	134 (31.9)
Retired	48 (34.3)	47 (36.2)	43 (28.7)	202 (48.1)
Free trade	32 (22.8)	30 (23.0)	39 (26.0)	33 (7.8)
Smoking				
No	86 (61.4)	75 547.7)	74 (49.4)	235 (56.0)
Yes	54 (38.6)	55 (42.3)	76 (50.7)	185 (44.0)
Year of illness	M=11.39; SD= 5.46			
<5 years	34 (43.3)	33 (25.4)	33 (22)	84 (20)
5-10 years	32 (22.9)	30 (23.1)	43 (28.7)	152 (36)
>10 years	74 (52.9)	67 (51.5)	74 (49.3)	184 (44)

Treatment adherence of patient with COPD

Among 420 patients participated to the study, 55.7% did not adhere to using inhaled drugs while 63.1% did not adhere to performing breathing exercise therapy. In addition, the total adherence rate of those patients was quite low, with only 36.9% (see Table 2).

Table 2. Treatment adherence of patients with COPD

Contents	C - Da Nang hospital (N, %)	Da Nang hospital (N, %)	Da Nang hospital for lung disease (N, %)	Total (N, %)
Adherence to inhaled drugs (by TAI-10)				
Adherence	99 (65.7)	62 (47.7)	80 (53.3)	234 (55.7)
Non-adherence	48 (34.3)	58 (52.3)	70 (46.6)	186 (44.3)
Adherence to breathing exercises				
Adherence	106 (75.7)	78 (60.0)	81 (54.0)	265 (63.1)
Non-adherence	34 (24.3)	52 (39.9)	69 (46.0)	155 (36.9)
Total of treatment adherence				
Adherence	84 (60)	34 (26.2)	37 (24.7)	155 (36.9)
Non-adherence	56 (40)	96 (73.8)	113 (75.3)	265 (63.1)

Factors related to treatment adherence in patients with COPD

The results of Table 3 show that patients who do not adhere to treatment have a smoking rate 1.5 times higher than those who adhere to treatment, the difference is statistically significant (p=0.037).

Table 3. Factors related to treatment adherence in patients with COPD

Contents	Adherence (N, %)	Non-adherence (N, %)	OR (95%Cl)	p
Age group				
40 – 49	8 (50.0)	8 (50.0)		
50 – 59	52 (34.4)	99 (65.4)		
60 – 69	69 (34.3)	132 (65.7)		0.11
≥ 70	26 (50.0)	26 (50.0)		
Gender				
Male	130 (40.1)	194 (59.9)	0.53	0.12
Female	71 (74.0%)	25 (26.0)	(0.32–0.87)	
Education level				
High school or under	27 (43.5)	35(56.5)		0.24
Post-high school	128 (35.8)	230 (64.2)		
Employment				
Worker and Famer	16 (34.8)	30 (65.2)		0.87
Civil servants	38 (40.4)	56 (59.6)		
Retired	87 (35.8)	156 (64.2)		
Free trade	14 (37.8)	23 (62.2)		
Smoking				
Yes	65 (31.9)	139 (68.1)	1.53	0.037
No	90 (41.7)	126 (58.3)	(1.02 – 2.28)	
Year of illness				
<5 years	25 (39.7)	38 (60.3)		
5-10 years	56 (31.1)	124 (68.9)		0.99
>10 years	74 (41.8)	103 (58.2)		

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is a medical condition characterized by airflow limitation that is not fully reversible; and has truly become a burden of disease and mortality in the world because of its common nature, long-term progression, high treatment costs and disabling consequences [10].

The study collected data from people with COPD at three respiratory clinics in Da Nang city, Vietnam. The average age of patients in the study was 59.5 (±8.2). The majority of patients are men (79.8%) and 44% are smokers. According to a report by the Ministry of Health, Vietnam is in the group of 15 countries with a high number of smokers in the world with about 15.3 million smokers and 33 million people affected by passive smoke. The smoking rate in men is 45.3%, in women it is 1.1% [9], this may be a factor affecting the higher rate of disease in men in the study population.

The study also showed that the majority of participants in the study had education levels from elementary/secondary/vocational and university or higher, of which the proportion of

participants with degrees above high school was 78.6%, the patient characteristics recorded in this study are also similar to the results of previous studies conducted in Vietnam [5],[6]. The survey results showed that the average number of years of disease of the subjects in the study was 5 years or more (80%), this result is consistent with other studies [12],[13].

For total treatment adherence, the rate in our study was low (36.9%), in which 55.7% did not adhere to using inhaled drugs, and 63.1% did not adhere to performing breathing exercise therapy. This result is completely consistent because 78.8% of the patients lacked disease knowledge, 37.1% did not use inhaled drugs, and 36.2% made mistakes when practicing using inhaled drugs.

Although the great benefits of pulmonary rehabilitation through performing breathing exercises have been demonstrated from previous studies, up to 33.8% of patients who practiced breathing exercises failed and 63.1% did not perform breathing exercises at all during the day [14]. Adherence in other studies was often assessed mainly based on medication adherence, however, our study assessed treatment adherence by 2 criteria simultaneously thereby our patient adherence rate was lower than other. Currently, we have not found any studies evaluating treatment adherence based on the above 2 criteria, so there are no results to compare.

However, this study found the correlation between treatment adhrence and smoking, specifically, patients who do not adhere to treatment have a smoking rate 1.5 times higher than those who adhere to treatment (p=0.037). This result similar to result of other study [15-17]. A key component of quitting smoking successfully is commitment to therapy. But the difficulty of sticking to pharmaceutical regimens for quitting smoking limits their effectiveness considerably [18]. So, for non-adherence treatment group, an intervention needs to be considered for decrease smooking for them.

CONCLUSION

The level of adherent inhaled drugs, and adherent breathing exercises were low. Therefore, treatment adherence was an important issue in controlling and preventing serious complications of the disease. In addition, we also found smoking as a factor related to the patient's adherence level. From the study result, managers, healthcare providers and especially nurses have specific strategies and practical measures to improve patient adherence.

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