

Relationships between Lung Function, Dyspnea Experience, Social Support, and Quality of Life in Patients with Chronic Obstructive Pulmonary Disease*

Le Thi Trang¹, Wimolrat Puwanawuttipanit, RN, PhD¹, Wallada Chanruangvanich, RN, DNS¹

Abstract

Purpose: To identify the relationships between lung function (FEV1), dyspnea experience, social support, and quality of life (QOL) in patients with chronic obstructive pulmonary disease (COPD).

Design: Descriptive correlational design.

Methods: The sample composed of 115 participants including males and females aged 18 years and older with COPD who were treated at Thanh Hoa General Hospital in Thanh Hoa City, Vietnam. Data were collected using the patients' hospital records, lung function test, and 3 questionnaires: 1) the dyspnea-12 scale, 2) the Multidimensional Scale of Perceived Social Support (MSPSS), 3) the Clinical COPD Questionnaire (CCQ) to measure QOL. Descriptive statistics and Spearman's Rho Correlation were used to analyze the data.

Main findings: The findings revealed that dyspnea experience was negatively related to QOL ($r_s = -.587, p < .05$), lung function (FEV1) was positively related to QOL ($r_s = .336, p < .05$), while the social support was not correlated with QOL ($p > .05$).

Conclusion and recommendations: The researcher recommended that nurses should promote QOL of COPD patients by developing an intervention program to prevent dyspnea and increase lung function.

Keywords: COPD, quality of life, social support, dyspnea experience, lung function (FEV1)

J Nurs Sci. 2017;35 Suppl 2:31-37

Corresponding Author: Associate Professor Wimolrat Puwanawuttipanit, Faculty of Nursing, Mahidol University, Bangkok 10700, Thailand; e-mail: wimolrat.puw@mahidol.ac.th

* Master thesis, Master of Nursing Science in Adult Nursing, Faculty of Nursing and Faculty of Graduate Studies, Mahidol University

¹ Faculty of Nursing, Mahidol University, Bangkok, Thailand

ความสัมพันธ์ระหว่างความสามารถในการทำงานของปอด ประสบการณ์การหายใจลำบาก การสนับสนุนทางสังคม และคุณภาพ ชีวิตในผู้ป่วยโรคปอดอุดกั้นเรื้อรัง*

Le Thi Trang¹ วิมลรัตน์ ภู่วราวุฒินานิช, PhD¹ วัลย์ลดา ฉันทะเรืองวณิชย์, พย.ด.¹

บทคัดย่อ

วัตถุประสงค์: ศึกษาความสัมพันธ์ระหว่างความสามารถในการทำงานของปอด ประสบการณ์การหายใจลำบาก การสนับสนุนทางสังคม และคุณภาพชีวิตในผู้ป่วยโรคปอดอุดกั้นเรื้อรัง

รูปแบบการวิจัย: การศึกษาเชิงสหสัมพันธ์

วิธีดำเนินการวิจัย: กลุ่มตัวอย่าง จำนวน 115 คน ทั้งเพศชายและเพศหญิงอายุ 18 ปีขึ้นไป ที่เป็นโรคปอดอุดกั้นเรื้อรัง และมาับการรักษาที่โรงพยาบาล Thanh Hoa ในเมือง Thanh Hoa ประเทศเวียดนาม เก็บรวบรวมข้อมูลทั่วไปจากแฟ้มประวัติโรงพยาบาล การประเมินค่า FEV1 และแบบสอบถาม จำนวน 3 ชุด 1) แบบสอบถามการหายใจลำบาก (Dyspnea-12 scale) 2) แบบสอบถามการรับรู้การสนับสนุนทางสังคม (MSPSS) และ 3) แบบสอบถาม Clinical COPD Questionnaire (CCQ) ประเมินคุณภาพชีวิต

ผลการศึกษา: ประสบการณ์การหายใจลำบากมีความสัมพันธ์ทางลบกับคุณภาพชีวิต ($r_s = -.587$, $p < .05$) ความสามารถในการทำงานของปอดมีความสัมพันธ์ทางบวกกับคุณภาพชีวิต ($r_s = .336$, $p < .05$) ทั้งนี้ การสนับสนุนทางสังคมไม่มีความสัมพันธ์กับคุณภาพชีวิต ($p > .05$)

สรุปและข้อเสนอแนะ: ผลการวิจัยพบว่า ประสบการณ์การหายใจลำบากมีความสัมพันธ์ทางลบกับคุณภาพชีวิต ขณะที่ความสามารถในการทำงานของปอดมีความสัมพันธ์ทางบวกกับคุณภาพชีวิต ดังนั้นพยาบาลควรส่งเสริม คุณภาพชีวิตของผู้ป่วยโรคปอดอุดกั้นเรื้อรัง โดยการพัฒนาโปรแกรมป้องกันภาวะหายใจลำบากและส่งเสริมความสามารถในการทำงานของปอด

คำสำคัญ: โรคปอดอุดกั้นเรื้อรัง คุณภาพชีวิต การสนับสนุนทางสังคม ประสบการณ์การหายใจลำบาก
ความสามารถในการทำงานของปอด

J Nurs Sci. 2017;35 Suppl 2:31-37

Corresponding Author: รองศาสตราจารย์วิมลรัตน์ ภู่วราวุฒินานิช, คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล บางกอกน้อย กรุงเทพฯ 10700, e-mail: wimolrat.puw@mahidol.ac.th

* วิทยานิพนธ์หลักสูตรพยาบาลศาสตรมหาบัณฑิต สาขาการพยาบาลผู้ใหญ่ คณะพยาบาลศาสตร์ และบัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล

¹ คณะพยาบาลศาสตร์ มหาวิทยาลัยมหิดล

Background and Significance

Chronic obstructive pulmonary disease (COPD) is a chronic condition characterized by airflow limitations that is not fully reversible. The airflow limitations are progressive and associated with the abnormal inflammatory response of the lungs to noxious particles or gases primarily caused by cigarette smoking¹. A chronic obstructive pulmonary disease with high prevalence worldwide is becoming a leading cause of mortality and morbidity². In Vietnam, COPD has emerged as the third leading cause of death and is currently the main burden for the healthcare system³. The prevalence of COPD patients with severity from moderate to severe level is 6.7% of the population in Vietnam; which is the highest rate when compared to other Asia-Pacific countries⁴.

According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2015¹, the criteria for classifying obstructive lung disease on the basis of post-bronchodilator lung function was divided into the following categories: Stage 1 (mild), Stage 2 (moderate), Stage 3 (severe), and Stage 4 (very severe)¹; as an important clinical tool to measure the degree of airflow limitation. A diagnosis of COPD was not only based on measuring respiratory function, but also depended on the presence of symptoms including, dyspnea, cough, sputum production, and wheezing.

Dyspnea experience is the most debilitating symptom in COPD which most patients seek medical attention. If these symptoms are not well controlled, all aspects of life will be affected including physical, psychological, social, and spiritual dimensions. Eventually, QOL will be affected⁵.

According to previous researches, social support might play a significant role in managing and slowing the progression of a variety of chronic degenerative diseases⁶. The study of Koo, et al. showed that perceived social support was associated with better mental health, particularly in patients with chronic illnesses such as rheumatic disease, COPD, asthma, and heart disease⁷. In persons with COPD receiving

positive social support was associated with fewer hospitalizations and acute disease exacerbations in addition to improved health status, better health promotion, and illness management behaviors, such as smoking cessation and engaging in physical exercise⁶. Social support should not be limited to support from families, but should include support from other parties such as health care personnel, friends, and neighbors. The more support patients received; the higher QOL they had⁷.

Quality of life (QOL) can be considered from multiple perspectives in COPD patients, which has been taken into account as a significant health burden due to its chronicity and the severity of its symptoms. Evidence has reported that patients with COPD perceived the effects of the disease to all aspects of their lives such as activities of daily living, morbidity, and mortality rate^{2,8,9}. Moreover, some evidence has confirmed that COPD patients' poor QOL not only involved impairment of physical function, psychological well-being, and social behavior, but also associated with patients' increasing care dependency¹⁰.

Few studies have been conducted on the factors related to QOL in Vietnam. Therefore, this study aimed to identify whether pulmonary function, dyspnea, and social support were related to QOL in patients with chronic obstructive pulmonary disease (COPD). The findings of this study will be significant for health care providers in deciding which factors could be the target for COPD management.

Objective

To identify the relationships between lung function (FEV1), dyspnea experience, social support, and QOL in patients with COPD.

Hypotheses

1. Lung function (FEV1) and social support were positively related to QOL in patients with COPD.

2. Dyspnea experience was negatively related to QOL in patients with COPD.

Methodology

This study was a descriptive correlational design.

Population and Sample

Population was patients both males and females with COPD who were treated at Thanh Hoa General Hospital in Thanh Hoa City, Vietnam.

Sample was selected from the population with the inclusion criteria as follows: 1) age 18 years and older, 2) able to communicate in Vietnamese language, and 3) no critical illnesses such as respiratory failure with respiratory rate > 30 times/minute; SpO₂ < 80%; purple lips, fingers, or body; heart rate > 90 times/minute; and severe pain.

The sample size was calculated using the G*power program to determine the minimum number of participants needed for a correlational design¹¹. The level of significance was set at $\alpha = .05$, Power $1 - \beta = .9$, Medium Effect size $R = .3$ ¹². The calculated sample size was 109 COPD patients. Additional 5% was added to cover attrition or missing value, therefore the total sample was 115 COPD patients.

Research Instruments

1. Demographic and health information included age, gender, marital status, educational level, FEV₁ (Forced Expiratory Volume in one second), medical payment method, comorbidities, risk factors, and smoking.

2. The Clinical COPD Questionnaire (CCQ)¹³ was used to measure Quality of life (QOL). The CCQ was a self-administered questionnaire consisting of 10 items rating scale; ranged from 0 (no limitations/asymptomatic) to 6 (totally limited/extremely symptomatic). Higher score indicated lower QOL.

3. The Dyspnea-12 scale¹⁴ contained 12 statements assessing the severity of difficulty breathing by using descriptors of the physical and emotional components of breathlessness. Each descriptor item was rated as “none” (0), “mild” (1), “moderate” (2), or “severe” (3). The total score ranged from 0-36, higher score representing more severe dyspnea.

4. The Multidimensional Scale of Perceived Social Support (MSPSS)¹⁵ was used to measure social support. This 12-item composed of three subscales assessing the level of family support, peer support, and support from significant others. Each item was a rating scale ranged from 1 = very strongly disagree to 7 = very strongly agree; higher score suggesting higher level of perceived social support.

All instruments received permission to use and were back translated by bilingual experts. The content validity was verified by 5 experts including head of ICU department, doctor, head nurse, and nurses who have experienced to care COPD patients.

The internal consistency reliability was tested with 30 COPD patients who had characteristic similar to the studied subjects. Cronbach's Alpha coefficient of the instruments was as follows: 1) the CCQ = .74; 2) the Dyspnea-12 scale = .82; and 3) the MSPSS = .79.

Protection of Human Subjects

This study obtained research ethical clearance from the Institutional Review Board of the Faculty of Nursing, Mahidol University (COA No.IRB-NS 2016/353.0205), and the IRB of School of Medicine and Pharmacy, Vietnam National University. The researcher collected data from the subjects based on the standard process approved from the IRB. The issues of informed consent with voluntary participation, anonymity, and confidentiality were warranted.

Data Collection

Data were collected as follows:

1. After receiving permission to collect data from the studied hospital, the researcher met the director of Thanh Hoa General Hospital, the head nurse, doctors, and staffs of the department to explain the objectives and process of data collection; and request cooperation to recruit subjects.

2. The research assistant recruited potential subjects by explaining details of the research project, data collection process; and invited those who were interested to participate in the study. The voluntary subjects will be asked to sign the

consent form. Then, the research assistant collected some demographic data from patients' hospital records and introduced the researcher to the subjects.

3. The researcher arranged a private room to interview the subjects with 3 questionnaires or let the subjects complete the questionnaire by themselves. The data collection process required approximately 20-30 minutes to complete.

Data Analysis

Data were analyzed using a computer statistical program with the significant level of .05 as follows:

1. Descriptive statistics including frequency, percentage, range, mean, and standard deviation.

2. The studied variables did not have a normal distribution; therefore, Spearman's Rho correlation was used to examine the relationships between FEV1, dyspnea experience, social support, and quality of life in patients with COPD.

Findings

The findings revealed that 80.00% of subjects were males with the mean age of 60.9 years ($SD = 7.5$ years), 88.69% were married, 44.34% finished elementary school, 8.71% finished bachelor degree or higher, 47.95% were farmers, 46.08% were retired, 92.17% had health insurance.

Regarding health information, 64.34% had been diagnosed with COPD less than 1 year, 87.82% had length of stay in hospital less than 1 week, 22.60% were current smokers and 58.27% were ex-smokers, 48.69% had COPD Stage 2 (moderate), 31.30% had COPD Stage 3 (severe), and 18.28% had COPD Stage 4 (very severe).

Correlation between lung function, dyspnea experience, social support, and QOL

The findings partially supported the proposed hypotheses that lung function was positively correlated with QOL ($r_s = .336$, $p < .05$), and dyspnea experience was negatively correlated with QOL ($r_s = -.587$, $p < .05$), while social support was not correlated with QOL ($p > .05$). (Table 1)

Table 1: Correlation between lung function, dyspnea experience, social support, and QOL

Variable	1	2	3	4
1. QOL (The CCQ score)	1.00			
2. Social support (The MSPSS score)	.180	1.00		
3. Dyspnea experience (The Dyspnea-12 score)	-.587*	.047	1.00	
4. Lung function (FEV1)	.336*	.279*	-.270*	1.00

* $p < .05$

Discussion

Hypothesis 1: Lung function (FEV1) and social support were positively related to QOL in patients with COPD.

The results revealed that lung function as measured by FEV1 was positively correlated with QOL ($r_s = .336$, $p < .05$). This meant that subjects with mild degree of disease as measured by FEV1 will have better QOL; which could be explained that patients with mild disease had better control of their disease than patients with more severity of disease resulted in better QOL.

This result was similar to a study authored by Van der Molen, et al¹³. Most of subjects in this study had moderate to severe of FEV1 resulted in moderate level of QOL.

Social support was not related to QOL. However, subscale of social support from significant others was related to QOL ($r_s = .292$, $p < .05$). This could be explained that the social support from the significant others was a strong supplement to the family and peer support because it taps a different support source for COPD patients in the form of medical staff,

medical equipment, counselors, and organizations^{14,16}. Therefore, in the complexity of COPD during the acute phase when functional status was limited, support of medical staff was believed to affect the quality of patient care as well as patient's physical and psychosocial well-being, disease outcome, and QOL for patients with COPD.

Hypothesis 2: Dyspnea experience was negatively related to QOL in patients with COPD.

The result supported hypothesis 2 that dyspnea experience was negatively related to QOL in patients with COPD ($r_s = -.587$, $p < .05$); which meant that patients with high degree of dyspnea would have low QOL. This result was similar to a study by Lin et al¹⁷.

Chhabra, Gupta and Khuma¹⁸ showed that dyspnea experience as measured by the Dyspnea-12 scale could estimate COPD severity and foretell the QOL of the affected patients. The critical aspect in the assessment and therapy of patients with COPD was represented by dyspnea experience. Since patients with dyspnea are frequently not able to perform everyday activities due to the discomfort associated with breathing, clinical methods used for dyspnea measuring primarily depend on the level of effort needed to accomplish a particular task that provokes the appearance of dyspnea. Moreover, early dyspnea assessment could have a positive influence on patients' functional status, and, therefore, promote and prolong active and independent lifestyles.

Conclusion and Recommendations

The results from this study found that there were correlations among dyspnea experience, lung function, and social support from significant others with quality of life in patients with COPD. Therefore, nurses and other health care team should provide care to promote QOL of patients with COPD by controlling level of dyspnea, promoting lung function and social support.

References

1. Vogelmeier CF, Criner GJ, Martinez FJ, Anzueto A, Barnes PJ, Bourbeau J, et al. Global strategy for the diagnosis, management and prevention of chronic obstructive lung disease 2017 report: GOLD executive summary. *Respirology*. 2017;22(3):575-601.
2. Marin JM, Cote CG, Diaz O, Lisboa C, Casanova C, Lopez MV, et al. Prognostic assessment in COPD: health related quality of life and the BODE index. *Resp Med*. 2011;105(6):916-21.
3. Van Minh H, Giang KB, Ngoc NB, Hai PT, Huyen DT, Khue LN, et al. Prevalence of tobacco smoking in Vietnam: findings from the global adult tobacco survey 2015. *Int J Public Health*. 2017;62(1):121-9.
4. Idolor LF, De Guia TS, Francisco NA, Roa CC, Ayuyao FG, Tady CZ, et al. Burden of obstructive lung disease in a rural setting in the Philippines. *Respirology*. 2011;16(7):1111-8.
5. Decramer M, Janssens W, Miravittles M. Chronic obstructive pulmonary disease. *Lancet*. 2012;379(9823):1341-51.
6. Dinicola G, Julian L, Gregorich SE, Blanc PD, Katz PP. The role of social support in anxiety for persons with COPD. *J Psychosom Res*. 2013;74(2):110-5.
7. Koo MB, van Middendorp H, Lumley MA, Bijlsma JW, Greenen R. Social support and invalidation by others contribute uniquely to the understanding of physical and mental health of patients with rheumatic diseases. *J Health Psychol*. 2013;18(1):86-95.
8. Vestbo J, Hurd SS, Agustí AG, Jones PW, Vogelmeier C, Anzueto A, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: gold executive

- summary. *Am J Respir Crit Care Med*. 2013;187(4):347–65.
9. Polatli M, Bilgin C, Saylan B, Baslilar S, Toprak E, Hasan, E, et al. A cross sectional observational study on the influence of chronic obstructive pulmonary disease on activities of daily living: the COPD-life study. *Tuberk Toraks*. 2012;60(1):1-12.
 10. DiBonaventura Md, Paulose-Ram R, Su J, McDonald M, Zou KH, Wagner JS, et al. The impact of COPD on quality of life, productivity loss, and resource use among the elderly United States workforce. *COPD*. 2012;9(1):46-57.
 11. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav Res Methods*. 2009;41(4):1149-60.
 12. Cohen J. A power primer. *Psychol Bull*. 1992;112(1):155-9.
 13. van der Molen T, Willemse BW, Schokker S, ten Hacken NH, Postma DS, Juniper EF. Development, validity and responsiveness of the clinical COPD questionnaire. *Health Qual Life Outcomes*. 2003;1:13. PubMed PMID: 12773199; PubMed Central PMCID: PMC156640.
 14. Yorke J. Editorial: Dyspnoea and pain: an interesting analogy. *J Clin Nurs*. 2008;17(7):841–2.
 15. Cauty-Mitchell J, Zimet GD. Psychometric properties of the Multidimensional Scale of Perceived Social Support in urban adolescents. *Am J Community Psychol*. 2000;28(3):391-400.
 16. Bhanurekha B, Sasisekhar TVD, Saireddy Y, Indrakeela Girish M. Correlation of MRC dyspnoea scale and Forced Expiratory Volume in First Second (FEV1) in chronic obstructive pulmonary diseases. *IOSR Journal of Dental and Medical Sciences*. 2013;7(2):55-7.
 17. Lin WC, Huang TY, Liu CY, Yeh ML, Yu CH, Hwang SL. Validation of the clinical COPD questionnaire in Taiwan. *COPD*. 2016;13(3):360-6.
 18. Chhabra SK, Gupta AK, Khuma MZ. Evaluation of three scales of dyspnea in chronic obstruction pulmonary disease. *Ann Thorac Med*. 2009;4(3):128–32.