Physiological and Psychological Status Related to Dyspnea in Patients with Cardiopulmonary Disease

الحالة الجسمية والنفسية لدى مرضى القلب المصابين بضيق التنفس

Hakima S. Hassan/ PhD/*Professor, Adult Health Nursing Department, College of Nursing, University of Baghdad

**Salah M S. Hassan/ PhD / Adult Health Nursing Department, College of Nursing, University of Kirkuk

الخلاصة

خلفية الدراسة: VC,FEV1,FEV1% قد تكون لها أهمية تشخيصية مساعدة في حالات عسر التنفس لأسباب قلبية ورئوية في وحدة الإسعافات الأولية ودور الممرضات في تلك الوحدات هو تقييم الحالة النفسية والفيزيولوجية التي لها علاقة بعسر التنفس للمرضى المصابين بأمراض الرئة والقلب في مراحلها الأولى واتخاذ التدابير التمريضية حسب الحالة.
الهدف: تقييم الحالة الفيزيولوجية والنفسية وعلاقتها بضيق النفس في مرضى الرئة والقلب
المنهجية: اجري فحص وظائف الرئة على ستين مريضا مصابا بأمراض الرئة والقلب محالين بالتتابع الى العيادة الخارجية لفحص وظائف الرئة في مستشفى بغداد التعليمي و-استمارة لقياس الحالة النفسية طبقت على المرضى لمعرفة وجود أي مشكلة نفسية وعلاقتها بضيق النفس .
النتائج: تشير نتائج الدراسة إلى وجود علاقة ذات دلالة إحصائية بين FEV1% و مستوى عسر التنفس العالي وإشارة نتائج الدراسة إلى وجود علاقة ذات دلالة إحصائية بين حالة الكآبة والقلق و مستوى عسر التنفس العالي.
الاستنتاج: استنتجت الدراسة بان الأوصاف اللفظية عن عسر التنفس في إمراض الرئة والقلب مرتبطة بمستوى حدة عسر التنفس ، و عسر التنفس لا يؤثر على الحالة الفيزيولوجيه فقط بل يؤثر على الحالة النفسية أيضا.
التوصيات: توصى الدراسة بتطوير وتطبيق برامج تطبق على الممرضات والممرضين عملي ونظري حول العناية التمريضية بمرضى الرئة والقلب
مفردات البحث: ضيق النفس ، الحالة الفيزيولوجية ، الحالة النفسية و أمراض الرئة والقلب

Abstract
Background: Vital Capacity (VC); Force Expiratory Volume (FEV1) and Force Expiratory Volume percentage (FEV %) are useful adjunctive tool in diagnosis of cardio pulmonary dyspnea in the emergency department. Nurses' role in this department is to assess the psychological and physiological status related to dyspnea in patients with cardiopulmonary disease at an early stage and nursing management according to their conditions. **Objective**: to assess the physiological and psychological status related to dyspnea in patients with cardiopulmonary disease.
Method: Pulmonary function test was carried out on (60) patients suffering from cardiopulmonary disease referred consecutively to the outpatient clinic for pulmonary function test in Baghdad Teaching Hospital, For every patients participate in this study a proper psychological review was done to know the presence of the psychological problem related to dyspnea.
Results : Results of the study show that there is highly significant difference increased in FEV1% and high level of dyspnea and the results of this study also show that there is significant difference with increasing depression and anxiety status and high level of dyspnea.
Conclusion: Verbal descriptors of dyspnea in cardiopulmonary disease are related to the intensity level of dyspnea, and dyspnea is influenced not only by physiological status but also by psychological status.
Recommendation: The development and implantation of educational instructional program for nurses (theory and practice) for the care of patients with cardiopulmonary are very important.
Keywords: Dyspnea; Psychological Status ; Physiological Status; Cardiopulmonary Disease

INTRODUCTION:

Although Dyspnea may occurs in healthy individuals, however it is more common in patients with respiratory disease even at lower levels of physical exercise or at high altitude. .Dyspnea usually manifested by the use of accessory muscles or pursed-lips breathing. Dyspnea in especially important when it interferes with activities of daily living. Dyspnea is cardiac and pulmonary patients especially in relation to medication

effects and the impact of exercise training [1]. The carotid and aortic bodies and central chemoreceptors respond to the partial pressure of oxygen (Po2) and the partial pressure of carbon dioxide (PCO2) and PH of the blood and cerebrospinal fluid. When stimulated these receptors they cause change in the rate of ventilation, the rate and pattern of breathing are also influenced by signals from neural receptors in the lung parenchyma, large and small airways, respiratory muscles, and chest wall [2]. Dyspnea most often has a cardiac or pulmonary etiology although other causes such as anemia, acidosis, or neuromuscular disorders must be considered [3]. The objective of our study is to assess the physiological and psychological status related to dyspnea in patients with cardiopulmonary disease.

PATIENT AND METHOD:

For the purpose of achieving the aims, A descriptive study has been used through out the present study during the period from 1st January 2009 to First April 2010. The study population included (60) patients (34 females and 26) males with cardiopulmonary disease referred consecutively to the outpatient clinic for pulmonary function test in Baghdad teaching hospital. These patients were chosen according to the following criteria:

a. Patients were diagnosed as having a definite cardiopulmonary disease depends on symptomatology, complete history and physical examination carried for all patients were done by cardiologist in the outpatient. The cardiac causes include congestive heart failure and carcinogenic pulmonary edema (according to Framingham Criteria of CHF [4] and the pulmonary disease causes asthma and cor pulmonary disease.

b .They had   no evidence of recent respiratory infection

c. They were non-smoker, drinkers

d. They were all adults; they were alert; They were free of any concomitant neurological, medical or psychological deficit that might impair their sensory perception. Content validity of the instrument was determined through a panel of (10) experts in Al-Kadhmia teaching hospital and Baghdad teaching hospital. The study instruments consist of 3 parts. **Part I** Sociodemographic and clinical characteristics .**Part II** Assessment of dyspnea were measured at high, medium, and low level of dyspnea; Depth of respiration were measured at normal, shallow, and deep and used or not used of Accessory Muscles. All subjects were tested by pulmonary function test which was performed in sitting position using a new generation of total spirometer which is a computerized Discom -14 Auto spirometer (chest corporation Tokyo –Japen), which can measure the following parameters automatically, These are Vital Capacity (VC), Forced Expiratory Volume (FEV1) and Forced Expiratory Volume percentage (FEV1%). All the readings are measured using the same instruments throughout the study. **Part III** Psychological domains: It consist of (2) sections which are Depression and Anxiety format. The investigator used a measure designed by Crown Crisps (1979) [5]. It was modified and translated into Arabic language by (Magazje, 1982 and Salem, 1987) [6,7]. The rating of (0) indicates the absence of the problem as(never), (1) indicates the presence of the problem as(sometimes), while a score of (2) indicates the persistent   of the problem as (always).A total score above (6) indicates of the presence of this problem. The time average required to complete the interview 25- 30 minutes

 Statistical analysis

Percentage was used to describe the sample .mean, standard deviation, and ANOVA Test to estimate the differences between low, high, medium dyspnea levels.

RESULT

Table (1) Socio Demographic and Clinical Characteristics of 60 patients with Cardiopulmonary disease

Characteristics of Patients		
Gender	Fi	%
Male	26	43.33
Female	34	56.66
Age		
20-29	6	10
30-39	6	10
40-49	14	23.33
50-59	30	33.33
60-69	4	23.33
Mean of age	51.13	
(SD)	13.17	
Occupation		
House wife	20	33.33
Self-employee	12	20
Retired	16	26.66
Government employee	12	20
Past medical history		
Hypertension (HT)	36	60
Diabetes mellitus (DM)	24	40
IHD	20	33.33
Heart failure	20	33.33
Pulmonary edema	24	40
Chronic Obstructive Pulmonary Disease	12	20
Asthma	12	20

Fi=frequency; %= percentage

Table -1-indicates that the majority of the study sample were female (56.66) whereas the remaining (43.33) were male, and this table also shows that (33.33%) of the patients were (50-59) years old, the mean age was (51.13). Our study revealed that (60%) of the patients having hypertension, (40%) of the patients having diabetic mellitus and the same number of patients having Pulmonary edema. This table also shows that (20%) of the patients having Chronic Obstructive Pulmonary Disease and the same number of patients having Asthma

Table-2- Means, Standards deviations and analysis of variance results for Vital Capacity, FEV 1 and FEV% and Depth of respiration, Accessory Muscles and dyspnea at high, medium and low levels

	Psychological status	
	Depression	Anxiety
Dyspnea Level	Mean + SD	Mean + SD
High	14.13 + 4.014	12.93+5.39
Medium	7.89+ 3.34	11.34+3.18
Low	5.63+ 4.25	4.93+4.52
F ratio	63.236 (H.S)*	38.606 (H.S)

*with least significant difference at two levels of significant (0.05) as significant difference, and (0.01) as a highly significant differences; S=Significant; N.S=No Significant;

Table-2- shows that there is highly significant difference increased in FEV1% , Depth of respiration and accessory muscles and high level of dyspnea when analyzed by F ratio

Table-3- Means, standards, deviations and analysis of variance results for Psychological Status (depression and anxiety)

Dyspnea Level	VC	FEV1	FEV%	Depth of respiration	Accessory Muscles
	Mean + SD	Mean + SD	Mean + SD	Mean + SD	Mean + SD
High	3.23+ 1.8	1.8 + 0.78	52.53 + 10.00	2.55+0.53	2.6 + 0.62
Medium	3.81+ 2.6	2.6+ 0.90	63 .70+10.08	2.30+0.53	25+ 0.82
Low	4.48+2.8	2,8+0.7	64.25+10.10	1.42+0.72	1.2+0.4
F ratio	2.375 (S)*	0.599 (N.S)	20.399 (H.S)	47.88 (H.S)	109.38 (H.S)

*with least significant difference at two levels of significant, (0.05) as significant difference and (0.01) as a highly significant differences

Table-3- shows that there is highly significant difference increased in psychological (Depression and anxiety) status and high level of dyspnea in patients with cardiopulmonary disease when analyzed by F ratio

DISCUSSION

Dyspnea was defined as difficult laboured uncomfortable breathing. It is a common symptom for patients who presented to the emergency unit ,and it does not only causes distress and suffering for the patient, but it also results in major socio-economic consequences by limiting activity, wasting working time and the cost of hospitalization and treatment. Abnormalities of cardiopulmonary function are most commonly associated with dyspnea [1].The findings of our study showed that the majority of the samples were female (56.66), whereas male were (43.33) table (1).

Our findings were similar to those of other studies, which stated that women are almost twice as likely as men to suffer from Dyspnea [8].Regarding their age, the study indicated that the higher percentage (50-59) years was (33.33%) with mean of ages (51.13) years old (table-1).

Supported our study, { Schiecht etal.,2005} who reported that dyspnea appears in middle –aged individuals with mild heart or lung disease .The patients of inability to take deep breath at rest so periodically makes a conscious effort to sign, which is invariably unsatisfactory since physiologic sighing is an involuntary action [9]. Our study revealed that (60%) of the patients have hypertension, (40%) of the patients have diabetic mellitus and (33.33%) of the patients have heart failure (table-1-). Supported our study (Stulbarg and Adams, 2000) who stated that cardiovascular disease is a prominent cause of breathlessness. Many times the underlying problem is evident, such as in pulmonary edema or in acute myocardial infarction. At other times, the cause is less clear, as in atrial septal defect or early mitral stenosis. Particularly in patients with diabetes mellitus, myocardial ischemia from coronary artery disease can present, as intermittent dyspnea without chest pain. Chronic heart failure is a troublesome cause of breathlessness since the complaint will sometimes last longer after apparently adequate treatment. In these cases, the clinician must reevaluate the efficacy of treatment and look for other causes such as anemia or pulmonary embolism; the non-invasive pulmonary function test can be done safely at bedside for the patients with cardiopulmonary disease [10]. The measurement of VC and FEV1 is very useful to predict the cases of cardiopulmonary and the improvement in PFT can be helpful for the assessment of the response to bronchodilator, which can

be used to relieve the airway obstruction in these patients [11]. Our study revealed that there is highly significant difference increased in FEV% and high level of dyspnea in patients with cardiopulmonary disease (table 2).

Spirometry is a fundamental component of cardiopulmonary diagnosis and can be performed accurately in primary care [11] [12].Our results shows there is highly significant difference increased in related between Depth of respiration and accessory muscles and level of dyspnea in patients with cardiopulmonary disease (table-2-) The lack of a relationship between dyspnea level and respiratory rate is unexplained. Respiratory rate is a commonly used indicator of anxiety that would be expected to rise as the persons' anxiety level rose. However, the respiratory rates exhibited by these subjects are high even at low levels of dyspnea and anxiety and the relationship between anxiety and respiratory rate may not be as sensitive within this relatively narrow range [11]. Paradoxical breathing was not observed in the subjects in the present study, for sighing has been reported as an indicator of psychogenic dyspnea ' and the presence of documented respiratory disease in the subjects of this study may be explained by the measurement technique used. Since it was essential that all subjects in this study may be measured during the fits times of acute distress, every efforts was made to minimize discomfort. Subjects refused to lie down during times of high dyspnea, so an attempt was made to observe for paradoxical breathing while the subject remained seated. It was not possible to observe for this clinical sign with subjects in this position. Psychological dyspnea is a particularly interesting type of breathlessness because it is usually a diagnosis of exclusion. The malady occurs more commonly in woman than men and tends to appear in third or fourth decades of life. The condition should be considered when the physical examination, chest x ray, ECG, and spirometery are all normal [10]. Our study showed that there was highly significant difference increased in psychological (depression and anxiety) status and high level of dyspnea in patients with cardiopulmonary disease when analyzed by F ratio (table -3-). The lake of a significant relationship between dyspnea level and depression is inconsistent with the findings of others [12]. Yet it may be related to the design of this study, the measures of depression might have not been sensitive enough to detect subtle changes occurring within person at different dyspnea levels even when they have been found to be sensitive to differences between subjects. The means obtained for depression were for high, medium, and low level s of dyspnea, respectively. These scores represent moderate or mild depression and show little variability over the three levels of dyspnea Patients with psychogenic dyspnea often exhibit extreme anxiety with concurrent dyspnea.

CONCLUSION:

Conclusion from the study VC FEV1, FEV1 % particularly high and low reading may be a useful adjunctive tool in the assessment of cardio pulmonary dyspnea at the outpatient clinic for pulmonary function test.

RECOMMENDATION:

Based on the results and conclusions of the present study; the researcher recommends the following:
1- Educational programs should be developed and implemented focusing on the exercise training and pulmonary rehabilitation

2- The development and implementation of educational instructional program for nurses (theory and practice) for the care of cardiopulmonary patients are very important.

3- Educating cardiopulmonary clients how to manage their medication is necessary.

4- More studies on a larger sample for prolonged time and more cardiopulmonary clients should be included in different cities in Iraq.

5- Wider studies to evaluate the quality and quantity of cardiopulmonary clients in the outpatients' clinics.

REFERENCES

1- Jim Christenson, Grant Innes, Douglas Mcknight, Barb Boychuk, Eric Grafstein, Christophern R, Thompson, Frances Rosenberg, Aslam H, Anis ,Ken Gin, Jessica Tilley, Hubert Wong and Joel Singer: Safety and efficiency of emergency department assessment of chest discomfort .Canadian Medical Association Journal 2004; 170;. 12: P.P.1-7

2- Haave E,ME Hyland and S Skumlien :The relation between measures of health status and quality of life in COPD .Chronic respiratory disease Journal2005 ;.3:;4: 195-199

3- Marks .R;J.P. Allegrante and Lorig K:R :A review and synthesis of Research Evidence for self Efficacy Enhancing Interventions for Reducing Chronic Disability Implications for Health Education Practice (Part I) Health Promot Pract 2005;.6;1 : 37-43

4- McKee PA, Castelli WP, McNamara PM, Kannel WB: The natural history of congestive heart failure: the Framingham study. N Engl J Med1971 ; 285: 1441–1446

5- Crown ,S and Crips A:Manual of the Crown –Crips .Experimental index ,London ,Hodder1979:: 121-120;

6 ـسالم غسان، الخصائص النفسية للمراة ومدى اسهامها في تحديد اتجاهها نحو الانجاب ، رسالة ماجستير كلية الاداب \ جامعة بغداد   1987

7 -المغازجي ،حيدر اسماعيل وطارق الكبيسي ، تطبيق كروان كرسب المعرب على وحدات مختلفة من القوات المسلحة   1982

8- Rupert CM Jones; Maria Dickson Spiltmann; Marfin JC Mather and Dawn Marks: Accuracy of diagnostic registers and management of chronic obstructive Pulmonary disease: the Devon primary care audit. Respiratory Research J 2008; 9; 62: 1-9

9- Schiecht NF, Schwartzman K, Bourbeau, J: Dyspnea as clinical indicator in patients with chronic obstructive pulmonary disease.Chron Respir Dise J 2005; l.2; 183-191

10- Stulbarg M, Adams L. Dyspnea. In: Murray J, Nadel J: Textbook of respiratory medicine. Philadelphia, PA: WB Saunders2000: 541–552

11-Gudmundsson G, Gislason T, Janson C, Lindberg E, Suppli Ulrik C, Brondum E, Nieminen MM: Depression, anxiety and health status after hospitalization for COPD: A multicenter study in the Nordic Countries .Respiratory Med J 2006;.100: 87-93

12-Nguyen H. Q and V .Carrieri Kohlman: Dyspnea Self Management in Patients with Chronic Obstructive Pulmonary Disease: Moderating Effects of Depressed Mood .Psychosomatics J2003; 46;5 : 402-410.