The effect of exercise on the quality of life amongst people with a respiratory disease

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Abstract

Exercise is an evidence-based, multidisciplinary, comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and whose daily living activities are often restricted. Exercise programs are designed to improve the physical and emotional condition of people with chronic respiratory disease and to promote long-term adherence to health-enhancing behavior. This study was a semi-experimental study on 50 patients who were older than 60 years and had chronic respiratory disease. The patients were divided randomly into two groups of intervention and control. In the experiment group the exercise program was initiated with a pattern of 3 times per week for 2 months, according to the walking check list. The walking distance for the patients was 400 meters, following a physician's approval and its duration was 15 to 35 minutes each time. At the end of the 2 months intervention, the quality of life was evaluated in both groups for the second time. the results showed a statistical significant relation between the quality of life in patients and some of their demographic characteristics. It was also proved that an exercise program can lead to an increase in the quality of life of patients with respiratory disease. It concluded that walking exercise program improved quality of life in chronic respiratory diseases.

Keywords: Exercise, Quality of Life, Respiratory disorder

Introduction

Chronic non transmissible diseases are of great importance in developed and developing countries around the world. In many countries in the world the prevalence of chronic disease is increasing for many reasons. The chronic diseases are important as they shorten the life span of the patients, cause disabilities and even have socio-economic effects on the families [1]. Patients with chronic diseases often experience diverse tensions such as pain, feeling of confusion and a change in their mental image of their body. Chronic obstructive pulmonary disease (COPD) is one of the most common chronic diseases. This disease is poorly reversible and is characterized by the limitation of the air flow. This disease is a hereditary disease that can be triggered by environmental factors and if left untreated the patient may develop respiratory failure [2]. There are now about 300 million people with COPD in the world and in the past decades the prevalence and mortality and morbidity of this disease have increased. Between 100 to 150 Experimentals of death due to COPD is reported each year. Among Iranian population,

about 10% of people have some levels of COPD and this percentage varies between 1 to 40% in people living in different geographic locations in Iran [3]. The COPD patients have many financial and social problems and difficulties as they have to deal with the treatment expenses such as recurrent hospital admission and follow up fees and having communication with their friends and families and colleges. They even have difficulties when they want to exercise, do their favorite hobby or even use public transportation. This disease makes the patients dependent to others and this causes many mental problems for the patients such as: stress and depression [4].

This disease may also alter the patient's mental image of his or her own body and thus initiates many mental, social and emotional disorders that can decrease the quality of life QOL of the patients. The patients with chronic illness have different insight of the QOL according to their disease and their level of disability. COPD causes many limitations for the patients when they want to do their daily routine and therefore decreases the QOL in the patients [5]. Marquis et al showed that many chronic unpleasant situations may be significantly related to the physical aspects of the QOL [6]. Many factors such as the duration and numbers of hospital admissions, the treatment expenses as well as the disease signs and symptoms and the patients' inability to do daily routines can cause many mental and social impacts on the patients that cannot be treated with the drug therapy alone. Exercising programs are thought to have beneficial effects on the patients as a non-drug treatment [7]. The exercising programs are different and they include: body sports (walking) and respiratory specific exercises for improving the breathing methods for a maximum usage of the existing respiratory function. These methods can lead to an increase in the QOL in patients [4]. Learning the correct methods for exercising such as walking; leads to a better heart and lung condition and improves the muscle function which can have a great effect on the mental condition of the patients and improve the QOL

[3]. There are previous studies that confirmed the importance of walking in COPD patients as it can improves the QOL, decreases the signs and symptoms and lessens the hospital admission of the patients [1]. Reports have shown that physical sports)such as walking(with a moderate severity and for a long period may improve the endothelial function of the vessels, lessens the peripheral resistance and alters the autonomic function of the body. It also causes less shortness of breath, and improves the QOL [8].

Marquise et al showed that walking decreases the blood pressure and adjusts the heart rate and increases the QOL in the patients [6]. Resseing et al also showed that sport programs have an improving effect on the QOL and decrease the signs and symptoms in patients. However walking is not yet included in the routing care programs for COPD patients as its effectiveness is not confirmed [9]. Deher et al showed that there is no significant relation between a 6 to 12 minutes walking and the QOL of the patients [10]. On the same way, the study that was performed by Sonas et al in 2009, showed no correlation between a 12 minutes walking and QOL in patients [11]. Also Pooroza et al in 2003 showed that walking has no improving effect on the QOL in senile COPD patients [12]. In the studies that have been previously performed on COPD patients the average period of walking was between 6 to 12 minutes that is while in this study, the walking time in the COPD patients was 15 to 35 minutes (and it was confirmed by references)[11,13]. In a study by Ezanoli et al in 2006, it was suggested that the time of walking must be increased to more than 12 minutes [14]. As COPD is a chronic disease, sport programs are one of the proper methods for controlling and improving this disease [12]. The studies that have been published on the effect of walking for COPD patients in Iranian population are very limited and even controversial when examine on senile patients, this study was designed to assess the effect of a regular walking program on the QOL of patients with COPD in educational hospitals.

Method

This research study is a semi-experimental study. The participants consisted of 50 patients older than 60 years old, diagnosed with COPD from Isfahan Medical University hospitals included conveniently. The participant size in each group was determined based on the following assumptions: power = 0.80, α = 0.05, the minimum expected difference in standard deviation = 3.6, and the minimum expected difference in means to be 2.40. According to the formula, the participant size in each group was 30 members. The participants then were divided into Experimental (30 subjects) and control (30 subjects) groups, randomly; while odd bed numbers were selected as Experimentals and even numbers as controls. Then in control group 10 subjects declined to participate. Therefore, 20 subjects assigned into control group. It was tried to select patients with the same treatment protocol and this process was checked by the pulmonary specialist who visited all the patients in the hospital.

The severity of COPD was evaluated by spirometer. All included patients had FEV1/FVC < 70% and FEV1 between 30%-80% of predicted value. Sign and symptoms such as productive coughs can be present or not. All data were included into a demographic checklist and a short form questionnaire regarding a self-monitoring of walking time. This questionnaire is a modified Persian form of short from health survey (SF-36), which has been evaluated for validity and reliability in Iran [15], consisting of 12 questions (SF-12) in 2 subgroups of physical (function, limitations, General condition and pain) and psychological (limitations, energy, mental state and social function) state. The value of the questionnaire varies between 0 (worst) to 100 (best). The SF-12 questionnaire was used in Iran before, and its reliability and validity have been approved (Cronbach's alpha between 0.77 - 0.95) (15).

The inclusion criteria were: moderate COPD regarding spirometer results, hospitalized at the time of diagnosis, 60 years or older, not participating in any other routine physical activity program nor participating in any other workgroup or workshops regarding COPD, not suffering from other chronic diseases such as malignancies, cardiovascular complications and rheumatic diseases. Exclusion criteria were: suffering from higher severity of disease of respiratory distress during our experiment.

Before any intervention, all patients completed the SF-12 forms. The Experimental group had a walking exercise program for 8 weeks, 3 times a week according to the printed format (400 meters in 15-35 minutes); which the first 4 weeks was in the hospital under close observation of the attendant physician and the 2 second 4 weeks was done in home under researcher observation. The patients were advised to use their sprays (Salbutamol, Atrovent, Beclomethasone) before the start of the walking program. The control group did not walking and received routine treatment.

Before including any individual in our study, all subjects signed a consent form stating that they willing to participate in our study. All subjects could exit the trial whenever they want and no charges were defined for the participant. None of the information will be released individually and all participants were included as anonymous. The data were analyzed using software of SPSS-18. Data are expressed as mean ± SD unless otherwise stated. Independent and paired t-test, Man-whitney-U and Chi-square tests was used.

All participants signed a written informed consent before participation in the study. The researchers also prepared educational pamphlet about the effects walking on pulmonary disease for the control group at the end of the study. The respondents were anonymous and all the information were kept confidential in this study. The participants were free to leave the study at any time. The researchers observed all ethical issues in accordance with the Helsinki declaration.

Results

Most of the patients included in both groups (Experimentals 73.3% and Controls 55%) were male. Mean age of

the patients was 65 years in controls and 64 years in Experimentals. 70% and 63.3% of controls and Experimentals were married, respectively. Level of literacy of

Table 1 *Comparison of demographic characteristics of patients in both the control and experimental groups*

		Control group		Experimental group		P-value*
		number	Percent	number	Percent	
sex	man	9	45	8	26.7	0.65
	female	11	55	22	73.3	
Age (years)	60-69	11	55	23	76.6	0.3
	70-79	9	45	7	23.	
Marital status	Just	---	---	2	6.6	0.05
	Married	14	70	19	63.3	
	Spouse	4	20	7	23.3	
	Divorced	2	1	2	6.6	
Level of Education	Illiterate	5	25	8	26.6	0. 5
	The Diploma	12	60	15	50	
	High School Diploma	3	15	7	23.3	
Disease duration (years)	2-3	30	40	5	16.6	0.21
	4-5	9	45	17	56.6	
	More than 5	5	25	8	26.6	

*Chi-square

60% of controls and 50% of Experimentals was under diploma (Table 1).

No significant difference was found in smoking, usage of bronchodilators and underlying disease between the groups (P>0.05).

Pearson correlation coefficient demonstrated that there was a statistical significant correlation between SF-12 value after our intervention and age (r=0.50, P=0.04) and disease duration (r=0.20, P=0.02). Furthermore, one way ANOVA showed significant differences between level of literacy and SF-12 values (P=0.01). The mean value of SF-12 in the control group was 44.4 and 45.9 in first and second 4 weeks, and in Experimentals group was 49.1 and 55.9, respectively.

The physical function had the highest value before and after the program in the

Table 2 *Mean quality of life in patients with chronic obstructive pulmonary disease in control group*

Dimensions quality of life		Before walking program	Second month walking program	P-value*
		M ± SD	M ± SD	
Physical subscales	Physical performance	42.2±12.3	46.5±13.4	0.06
	Role limitations due to physical problems	48.3±10.2	49.6±6	0.05
	Understanding of public health	43.5±5.4	46.6±7.2	0.08
	Physical pain	43.3 ±9.1	45.5±7.8	0.05
	Mental status	43±7.1	44.6±7.7	0.09
Psychological subscales	Social performance	42.5±9.2	43± 8.3	0.08
	Role limitations due to emotional	48± 4.9	49.4±4.1	0.06
	Problems Vitality	44.7± 5.4	42.4±5.9	0. 1
Mean quality of life score		44.4± 7.9	45.9±7.5	0.07

*Paired t-test

Table 3 *Mean quality of life in patients with chronic obstructive pulmonary disease in Experimental group*

Experimental group Dimensions of quality of life		Before walking program	Second month walking program	P-Value*
		M ± SD	M ± SD	
Physical subscales	Physical performance	65.2±5.7	73.3±5.7	0.02
	Role limitations due to physical	51.4±8.9	45.5±9.9	0.04
	problems			0.01
	Understanding of public health	42.1±7.1	53.4±6.7	
				0.001
	Physical pain	50.5±9.8	41.2±6.2	
Psychological subscales	Mental status	44.3±8.2	52.8±9.1	0.04
	Social performance	40.4±4.5	47.7±5.2	0.03
	Role limitations due to emotional	46.3±6.2	52.1±5.6	0.01
	problems			0.04
	Vitality	45.3±7.6	50±10.6	0.04
Mean quality of life score		48.1±9.1	51.9±7.3	

*Paired t-test

Experimentals group, and physical limitations

had the highest value before and after the

Table 4 *The mean score of quality of life in patients with chronic obstructive pulmonary disease after the Experimental and control groups*

Quality of life score	Second month walking program		P-Value*
	Experimental group	Control group	
	M±SD	M±SD	
Physical subscales	53.3± 7.1	47.05±8.6	0.002*
Psychological subscales	50.6± 6.6	44.8±6.5	0.03*
Mean quality of life score	51.9±7.3	45.9±7.5	0.01*

*Independent t-test

program in the control group. QOL and its various aspects scores have been shown in experimental and control groups in tables 2 and 3.

However, the difference in the QOL score was significant in the Experimental group in comparison to the control group (P=0.01) (Table 4).

Discussion

This study shows that there was significant a difference in age, gender and SF-12 in the Experimentals group after our intervention. This means that patients between 60 and 65

years gave better response to our trial in contracts to over 65 year old patients. In a study by Azaloli et al in 2006, QOL was better in younger COPD patients before and after exercise [16]. most of the patients in our study were men. Katz et al study demonstrated that most of COPD patients are women, which does not match our results [17]. Perhaps this difference is due to weather conditions in the area study. Furthermore, Rosenberg et al in 2009 demonstrated that age and gender are important factors in COPD but Burscher et al stated that these factors do not have any

impact on the QOL values [18].

Our study showed that level of literacy and the duration of the disease have an influence on SF-12 values; which demonstrate a reverse correlation between literacy and QOL. Hasanpour et al showed a significant relation between literacy and QOL in chronic patients [19].

Our study demonstrates reverse relation between smoking and QOL. Landi and Azaloli have also approved these results in their studies [16,20]. Furthermore, our results exhibits that our subjects had higher values in physical function of SF-12, which Bagheri et al have also reported the same results. This study has also reported that a routine walking program for 35 minutes 3 times a day for 2 months can increase the QOL values in COPD patients significantly. [21] In a study in 2006, Helsink et al has demonstrated a significant increase of QOL in near 70% of COPD patients after routine exercise program [22]. However, Garode et al did not find any significant difference between Experimental and control group [23]. Lisbo et al demonstrated a significant increase of QOL after 6-12 hours of intermittent walking program in 91% of patients with COPD [24]. And in Sue et al study, no higher QOL was detected after walking program and instead they demonstrated a lower QOL after the trial [25]. Marcuis et al suggests that routine daily walking must be advised and taught to COPD patients in COPD patients [6]. It seems that using a guideline of exercise in these patients can be beneficial due to low cost and availability as a second line prevention and therapy. However, the age and gender of the patients must be considered before any advice. Dulfer & et al. showed that exercise program did not change the QOL of young adults [26]. This may be due to the fact that most adolescents had best possible scores at baseline. Rhodes et al [27]. Only showed non significant improvements on all self-reported QOL domains after rehabilitation. They assessed QOL 1 year after the exercise program with a health status questionnaire. Health status, however, is a different concept than health-related QOL,

which we assessed [28]. In addition, their control group consisted of volunteers,who could not participate in the exercise program because of geographical or social constraints. The difference with our findings may also relate to their smaller participant size [27]. Two other intervention studies used a 3-day multi-sports camp as intervention [29,30] and reported improvements on several QOL domains. However, findings are difficult to compare because the content of their intervention was very different, no control group was used, and their recall time frame of 3 days might have influenced their results. Belfer et al (2009) showed that exercise program (6 minute walking) improves QOL domains in patients with COPD [31]. These findings are consistent with those observed by Griffiths et al. [32]

Conclusion

Our study had some limitations: interpersonal variation in completing the questionnaire, the variability of psychological mood and affect at the time of the study,participant size, study design, non blindness in two groups .Also the patients may receive some exercise on their QOL from other recourses that was not under control of the researchers. We suggest that this study should be done on different times of walking periods to answer this question: "do different walking times have different impact on COPD patient's QOL?"

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Contributions

Study design: NM,MH
Data collection and analysis: NM,MH,MA
Manuscript preparation: NM,MA

Conflict of interest

"The authors declare that they have no

competing interests."

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