Smoking Cessation and Quality of life among Patients with Chronic Obstructive Pulmonary Disease after Motivational Interviewing

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Abstract: Smoking cessation is the single most important thing that can improve quality of life of patient with COPD. The aim: The aim of this study was to evaluate the effect of educational intervention incorporating motivational interviewing on smoking cessation and quality of life of patients with COPD. Methods: A quasi-experimental design was utilized to conduct this study on 60 patients (intervention & control), smokers with COPD in Chest department and outpatient clinic of Ain Shams University Hospitals. Four tools were used for data collection at the beginning included; Socio-demographic characteristics sheet, patient's knowledge assessment questionnaire, Fagerstrom test for nicotine dependence and St. George's respiratory questionnaire. Then, educational intervention incorporating motivational interviewing was conducted for the intervention group followed by reassessment of quality of life, number of cigarettes smoked per day and level of dependence on nicotine one month after intervention and 3 months later for the intervention and control group. Results: There were statistically significant differences between both groups (intervention & control) one month post intervention and 3 months later regarding their number of cigarettes smoked per day, level of dependence on nicotine and quality of life. Conclusion and recommendations: The current study proved the positive effects of the educational intervention incorporating motivational interviewing on the smoking cessation and quality of life of patients with COPD. The study recommended providing accurate information to stop smoking using open questions, and focusing on motivation to assess and support patient's ability to quit smoking.

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a preventable and treatable disease. Its pulmonary component is characterized by airflow limitation that is not fully reversible **(Al Moamary *et al.*, 2012)**. It is a major cause of morbidity and mortality worldwide. However, its epidemiology in many developing countries is poorly characterized **(Tageldin *et al.*, 2012)**. The mortality varies in different countries, where it is related to the prevalence of smoking in the population. Smoking is by far the strongest risk factor of COPD **(Godtfredsen *et al.*, 2008).**

Smoking has a high prevalence of 29.5% in the general population and of 80% in patients with COPD **(Valero *et al.*, 2009)**. Cigarette smokers have a higher prevalence of respiratory symptoms and lung function abnormalities, while on the contrary, smoking cessation has been found to reduce the rapid decline in forced expiratory volume in one second (FEV1) **(Pauwels *et al.*, 2001)**.

Because smoking is the greatest risk factor for COPD, early smoking cessation improves the prognosis and leads to less severe symptoms as it is the only effective key intervention that can prevent the disease, modify its clinical course and slow its progression **(Rabe *et al.*, 2007)**. Even at a late stage of the disease, it can significantly reduce the rate of deterioration in lung function and delay the onset of disability and death **(Kumar & Clark, 2005)**. The sooner a smoker stops, the greater the gains in life expectancy **(Catley *et al.*, 2012)**.

Because of the addictive properties of components of cigarettes, giving up the habit of smoking is often very hard. Motivational interviewing (MI) is a useful tool for promoting change in addictive behavior **(Soria *et al.*, 2006)**. It is a promising approach to encourage cessation among less motivated smokers, and a treatment approach that focuses on fostering motivation for, and commitment to behavior change **(Miller & Rollnick, 2009).**

MI is a person centered, guiding method of counseling to elicit and strengthen motivation for change. Counselors employ the principles of expressing empathy, avoiding arguing, managing resistance without confrontation and supporting the individual's self-efficacy **(Miller &, Rollnick, 2002).** Principles of MI include using a collaborative style, eliciting individuals' reasons for change rather than persuading, and supporting autonomy so that individuals do not feel pressured to change and can

feel autonomously or "internally" motivated. These principles are manifested in using counseling technique and communication methods (e.g., open-ended questions, affirming, reflective listening, summarizing, and eliciting client self motivational statements). These strategies are thought to be more effective than questioning, persuading, or giving advice **(Lai *et al.,* 2011)**.

COPD patients are prone to acute exacerbations, dyspnea, chronic cough, and fatigue and often requiring hospitalization. These episodes significantly reduce quality of life for them **(Caverley, 2003).** Researches indicate that physiological, psychological and social aspects of quality of life (QOL) are affected in patients with COPD **(Efraimsson *et al.,* 2008).** The term QOL is used to 'signify the gap between desires and achievements that is specifically due to the disease **(Heyworth *et al.,* 2009)**. In patients with COPD factors such as exacerbations, determine QOL **(Zakrisson *et al.,* 2011).**

Significance:

World-wide, approximately 5 million people die each year because of smoking. Tobacco smoking is regarded as the greatest preventable cause of death **(Edwards, 2004)**. It is prevalent in Egypt, as 19 billion cigarettes are smoked annually in the country **(Knell, 2010)**. Smoking cessation is the most crucial and evidence-based intervention for patients with chronic obstructive pulmonary disease. Motivational interviewing is often used in healthcare to support patients to quit smoking **(Efraimsson *et al.,* 2011)**. Therefore, evaluation of the effect of educational interventions incorporating motivational interviewing on smoking cessation and quality of life of COPD patients is of necessity.

Aim of the Study:

The current study aimed to evaluate the effect of educational interventions incorporating motivational interviewing on smoking cessation and quality of life of patients with COPD.

Study hypotheses:

It was hypothesized that:

- Educational intervention incorporating MI is effective on smoking cessation in patients with COPD compared with simple advice.
- Educational intervention incorporating MI has positive effect on quality of life of patients with COPD.

2. Subjects and Methods

Research design:

A quasi-experimental design was utilized to conduct this study.

Research setting:

The study was conducted at chest department and outpatient clinic in Ain Shams University Hospitals.

Subjects:

A purposive sample of 60 patients with COPD (intervention and control groups) was included in this study. Criteria for inclusion were; adult, smokers, asymptomatic COPD patients of both gender and free from any mental illness, serious physical, psychological co-morbidity, acute exacerbation of COPD and/or respiratory failure.

The sample size (26 patients in each group) was determined according to statistical calculation which guided by power of test 80% (β=0.2), confidence level 95% and accepted level of error 5%. To allow for drop outs, 30 patients were enrolled in each group.

Tools for data collection:

1. Socio-demographic characteristics sheet:

This sheet was developed by the researchers for the purpose of collecting socio-demographic characteristics of smokers with COPD disease which include; age, gender, marital status, level of education, working, monthly income, residence and smoking duration.

2. Patient's knowledge assessment questionnaire:

This questionnaire was developed by the researchers in Arabic language after reviewing the recent related literatures to assess patients' knowledge regarding smoking cessation (Benefits of quitting smoking, craving and coping with it, strategies for quitting smoking, withdrawal symptoms and their management and stress management techniques). This tool aims to assess patients' learning needs. It consists of thirty multiple choice questions. The wrong answers had got zero scores, and the right answers had got one score, and the total scores were summed for every item of the questionnaire. For every item of the questionnaire 60% or more was considered satisfactory level and less than 60% was considered unsatisfactory.

The tool has been validated by a jury of five experts from medical and nursing staff from faculty of medicine, chest department and faculty of nursing, to review the tools for clarity, relevance, comprehensiveness, understanding and applicability. Reliability was tested through test retest reliability on a sample of five patients.

3. Fagerstrom Test for Nicotine Dependence (FTND):

This questionnaire was developed by **Heatherton *et al.* (1991)** to assess one's level of dependence on nicotine. It contains 6 multiple choice questions to choose the best fitting answer for patient.

- In scoring the Fagerstrom Test for Nicotine Dependence (FTND), the three yes/no items are

scored 0 for "No" and 1 for "Yes". The three multiple-choice items are scored from 0 to 3. The scores of 6 items are summed to give a total score of 0-10. The scoring system for FTND includes five levels of dependence; 0-2 Very low dependence, 3-4 Low dependence, 5 Moderate dependence, 6-7 High dependence, and 8-10 Very high dependence.

4. **The St. George's Respiratory Questionnaire (SGRQ):** It is a standardized disease-specific questionnaire developed by **Jones et al. (1991)** to measure the impact of chest disease on health related quality of life and well being. It involves 50 questions covering three domains; symptoms (frequency and severity of respiratory symptoms/8 items), activity (effects on and adjustment of everyday activities/16 items), and impact (social functioning and psychological trauma caused by the respiratory disease/26 items).
   - The number of response options per question varies from two to five. Responses are weighted and scores are calculated by dividing the summed weights by the maximum possible weight for all items of the questionnaire and expressing the result as a percentage of 0–100, with 0% being the best possible score and 100% the worst.
- The previous two tools were translated into Arabic then back translation was done into English to ensure translation accuracy.

Pilot study:

A pilot study was conducted on number of 10% of the study sample with the same inclusion criteria to evaluate the applicability of the study and clarity of tools. Necessary modifications were carried out. Patients who participated in the pilot study were excluded from the study sample.

Administrative and Ethical aspects of the study:

Letters including the aims of the study were directed to the hospital and departments' directors to obtain their cooperation and permission to carry out this study. Consents were obtained from the patients before starting the procedure. Data confidentiality of the patients was maintained at all times. Patients were assured that data will be used only for the scientific purposes of the study and anonymity is guaranteed in the presentation of the results.

Field work:

- The study started in February 2013 and completed by the end of July 2013.
- Extensive review of current and previous related literature, local and international was done for the preparation of the knowledge assessment sheet and developing the content of the educational sessions.
- The content of the educational sessions were developed based on assessment of educational needs. It included: Effect of smoking on the respiratory system, benefits of quitting smoking for COPD patient, factors leading to craving, management to cope with craving, strategies for quitting smoking, withdrawal symptoms, strategies to face withdrawal symptoms and stress management techniques. Educational pamphlets motivating for quitting smoking were prepared and used to facilitate the participants' learning process.

- The researcher met each patient individually in the chest department after introducing self to them, explained the aim of the study emphasizing the confidentiality of the collected data and obtained approval consent. In some instances when participants were discharged before completion of sessions, the sessions were conducted on the outpatient clinic at time of follow up. Sometimes patients were contacted through telephone.

- Each patient was assessed to obtain baseline data and assess educational needs of patients using the previously mentioned four tools. The average time needed to complete the tools ranged from 25-35 minutes.

- Patients were randomly assigned to either one of two relatively equal control and intervention groups of 30 patients each. Control group was given anti-smoking advice to `quit smoking for five minutes.

- The educational sessions started by dividing the intervention group into small groups including 2-4 patients. The researchers made two visits per week (on Saturday and Wednesday).

- Three educational sessions for the intervention group started using rapport with patient and providing an overview of sessions in the first one. Each session lasted for 30- 40 minutes. Every session began with briefly summarizing the previous session.

- In order to incorporate motivational interviewing into educational sessions the researchers helped patients express their concerns, describe why they want to change, and encouraged them to explore their motivations.

- The researchers listened to the patients and conveyed a sense of understanding by talking and discussion with patients using open questions as "what brought you to smoke?"

- Positive reflections were offered to the patients in order to move the session along reflective listening e.g. "I hear you, this is important, and please tell me more". The patients are not pressured to change during sessions.

- One month upon the completion of educational intervention and three months later, both groups were reassessed for level of nicotine dependence through Fagerström's test, and quality of life through St. George's Respiratory Questionnaire.

- The only limitation of the study was the unsuitable place for educational sessions sometimes.

Statistical analysis:

The collected data were tabulated and analyzed with SPSS version 13. Mean, percentage, paired T-tests and chi-square tests were used to analyze the collected data. *P* value >0.05 was considered statistically non significant. *P* value ≤0.05 was considered statistically significant. *P* value ≤0.001 was considered statistically highly significant.

3. Results

The socio-demographic characteristics of smokers with COPD in the intervention and control groups are shown in Table 1 which reveals presence of no statistically significant difference between them regarding age, sex, marital status, working, education, Income, residence and smoking duration (*P* >0.05). The mean ages of patients were 49 ± 12 in the intervention group and 50 ± 8 in the control group. The same table also reveals that, the mean duration of smoking in the intervention and control groups were 19±4 and 19±9 respectively.

Table (1) Socio-demographic characteristics of the intervention and control group

Patients' Characteristics		Intervention group (n=30)		Control group (n=30)		X^2 Test	*P* value
		No	%	No	%		
Age	• 30 - <40	6	20	8	26.7	0.66	>0.05
	• 40 - <50	7	23.33	8	26.7		
	• 50 - <60	9	30.0	7	23.3		
	• ≥ 60	8	26.67	7	23.3		
Mean age ± SD		49 ± 12		50 ± 8			
Sex	• Male	30	100	29	96.67	1.02	>0.05
	• Female	0	0.0	1	3.33		
Marital status	• Single	1	3.33	2	6.67	2.42	>0.05
	• Married	27	90.0	28	93.33		
	• Widowed	2	6.67	0	0.0		
Working	• Working	20	66.67	23	76.67	0.97	>0.05
	• Housewife	6	20.0	5	16.67		
	• Retired	4	13.33	2	6.67		
Education	• Illiterate	1	3.33	0	0.0	1.2	>0.05
	• Read/write	9	30.0	10	33.33		
	• Intermediate education	16	53.34	15	50.0		
	• Higher education	4	13.33	5	16.67		
Income/ month	• Adequate	24	80.0	21	70.0	0.75	>0.05
	• Inadequate	6	20.0	9	30.0		
Residence	• Outside Cairo	20	66.67	23	76.67	1.8	>0.05
	• In Cairo	10	33.33	7	23.33		
Smoking duration	• <10	6	20.0	6	20.0	0.1	>0.05
	• 10 - 20	16	53.33	15	50.0		
	• > 20	8	26.67	9	30.0		
Mean duration± SD		19±4		19±9			

As regards knowledge of COPD patients in the intervention and control group about quitting smoking, Table 2 indicates that, there are no statistically significant differences between them regarding all items of knowledge. Moreover, their level of knowledge was the same regarding managing withdrawal symptoms, as none of patients in both groups have satisfactory level of knowledge.

Concerning level of nicotine dependence for the intervention and study groups, Table 3 clarifies that, there is no statistically significant difference between level of nicotine dependence for the two groups before intervention (P>0.05), while there are statistically significant differences between them after intervention and during follow up (*P* <0.05). As well, there is statistically significant difference

between level of nicotine dependence for the intervention group before and after intervention ($X^2(1)$ =10.2/ *P* <0.05), also, after intervention and during follow up for the same group ($X^2(2)$ =2.9/ *P* <0.05).

In relation to the number of cigarette smoked per day for the intervention and study groups, Table 4 shows that, there is no statistically significant difference between number of cigarette smoked per day for the two groups before intervention (*P* >0.05), while there are highly statistically significant differences between them after intervention and during follow up (*P* <0.05). As well, there is highly statistically significant difference between number of cigarette smoked per day for the intervention group before and after intervention (X^2 (1) =36.9 / *P*

<0.001), while there is statistically significant difference between number of cigarette smoked per day for the intervention group after intervention and during follow up (X^2 (2) =2.2 / P <0.05).

Regarding quality of life of intervention and study group, Table 5 reveals that, there is no statistically significant difference between mean scores of the domains of quality of life according to SGRQ (symptoms, activity and impact) for the two groups before intervention (P >0.05), while there are statistically significant differences between them after intervention and during follow up (P <0.05), with apparent improvement in quality of life as indicated by the decrease in the mean scores for all domains of QOL and total scores of SGRQ.

Table (2) knowledge of the intervention and control group about quitting smoking

Patient's knowledge regarding quitting smoking		Intervention group (n=30)		Control group (n=30)		X^2 Test	P value
		No	%	No	%		
• **Benefits of quitting smoking**	- Satisfactory	14	46.6	17	56.7	0.34	>0.05
	- Unsatisfactory	16	53.4	13	43.3		
• **Factors leading to craving**	- Satisfactory	23	76.7	25	83.3	0.41	>0.05
	- Unsatisfactory	7	23.3	5	16.67		
• Coping with craving	- Satisfactory	6	20.0	4	13.3	0.49	>0.05
	- Unsatisfactory	24	80.0	26	86.7		
• Strategies for quitting smoking	- Satisfactory	5	16.7	3	10.0	0.53	>0.05
	- Unsatisfactory	25	83.3	27	90.0		
• Withdrawal symptoms	- Satisfactory	9	30.0	8	26.7	0.08	>0.05
	- Unsatisfactory	21	70.0	22	73.3		
• Managing withdrawal symptoms	- Satisfactory	0	0.0	0	0.0	--	--
	- Unsatisfactory	30	100	30	100		
• Stress management techniques	- Satisfactory	1	3.3	0	0.0	1.02	>0.05
	- Unsatisfactory	29	96.7	30	100		

Table (3) Level of nicotine dependence among intervention and control groups pre/post and during follow up

Assessment time		Dependency Level										T Test	P Value
		Intervention group (n=30)					Control group (n=30)						
		Very low	Low	Moderate	High	Very high	Very low	Low	Moderate	High	Very high		
Pre	No	2	3	2	10	13	1	1	3	11	14	0.36	>0.05
	%	6.7	10	6.7	33.3	43.3	3.3	3.3	10	36.7	46.7		
Post	No	26	4	0	0	0	2	3	5	10	10	11.5	<0.05
	%	86.6	13.4	0.0	0.0	0.0	6.7	10	16.7	33.3	33.3		
Follow up	No	27	2	1	0	0	1	1	4	10	14	6.7	<0.05
	%	90	6.7	3.3	0.0	0.0	3.3	3.3	13.4	33.3	46.7		
Chi-square	X^2 (1) &P	10.5 /< 0.05					1.33/ >0.05						
	X^2 (2) &P	2.9 /< 0.05					1.33/ >0.05						

X^2 (1): between before & after X^2 (2): between after & Follow up

Table (4) Number of cigarettes smoked/day for intervention and control groups pre/post and during follow up

No of cigarettes/ day		Intervention group (n=30)				Control group (n=30)				X^2 test	P valve
		Non	1-3/ day	4-10/ day	More than 10	Non	1-3/ day	4-10/ day	More than 10		
Pre	No	0	0	7	23	0	0	5	25	0.47	>0.05
	%	0.0	0.0	23.3	76.7	0.0	0.0	16.7	83.3		
Post	No	24	6	0	0	2	1	4	23	49.2	<0.001
	%	80	20	0.0	0.0	6.7	3.3	13.3	76.7		
Follow up	No	20	5	5	0	1	0	5	24	46.0	<0.001
	%	66.6	16.7	16.7	0.0	3.3	0.0	16.7	80		
Chi-square	X^2 (1) & P	36.9 / <0.001				6.64 / <0.05					
	X^2 (2) & P	2.2 / <0.05				1.7 / >0.05					

X^2 (1): between before & after X^2 (2): between after & Follow up

Table (5) Quality of life of intervention and control groups pre/post and during follow up

Domains of Quality of life (0-100)	Intervention group (n=30)			Control group (n=30)			X² Test	P valve
	Pre	Post	Follow up	pre	Post	Follow up		
• **Symptoms**	47.8±2.0	40.6±1.9	43.1±2.1	48.5±2.0	47.3±2.1	47.3±2.0	(1) 0.31	>0.05
• **Activity**	50.7±2.3	42.8±2.2	43.4±2.3	51.9±1.9	50.1±2.0	52.3±2.0	(2) 16.5	<0.05
• **Impact**	26.2±1.6	20.7±1.6	22.4±1.7	26.5±1.6	28.1±1.5	28.8±1.6	(3) 6.8	<0.05
Total score SGRQ	37.2±1.6	30.3±1.6	34.4±1.7	37.4±1.7 6	37.4±1.7	37.4±1.7		

Data are presented as mean ± SD, X^2 (1): between pre for intervention & pre for control, X^2 (2): between post for intervention & post for control, X^2 (3): between follow up for intervention & follow up for control

4. Discussion

Although MI is a promising tool for smokers, stronger evidence for its efficacy is needed to justify the use of this approach **(Catley *et al.*, 2012)**. The primary objective of this study was to determine whether educational intervention incorporating MI is effective in smoking cessation and improving quality of life of COPD patients on not.

One of the results of this study indicates presence of no statistical significant differences between the intervention and control groups regarding socio-demographic characteristics, with mean age 49±12 in the intervention group and 50 ± 8 in the control group. These results are not in agreement with what was found by **Al Moamary *et al.* (2012)** who found that mean age of the study group in their study was 63.3 ± 7.3 years. This difference can be attributable to environmental factors e.g. occupational exposures and air pollution that are known to play an important role in the prevalence of COPD in younger age in Egypt.

This study also revealed that all the intervention group (100%) and 96.6 % of the control group are male, these findings are consistent with **Zamzam *et al.* (2012)** who found in their study on COPD Egyptian subjects that 97.5% of the study sample were male and 2.5% of them were female. This finding could be due to the higher prevalence of smoking in this gender in Egypt; also, males are more exposed to smoking than females, and occupational exposures are significant in male. The study revealed that, the mean duration of smoking for the intervention and study groups were (19±4 &19±9) respectively, this finding is inconsistent with the study done by **Sherman et al. (2003)** who found that, the mean duration of smoking for patients with COPD is 42Yrs.

Another finding of this study is presence of no significant difference between the intervention and control groups regarding their knowledge about smoking cessation. Moreover, most of the study samples in both groups have unsatisfactory level of knowledge especially regarding managing nicotine withdrawal symptoms, this may be due to lack of detailed information provided for patients regarding nicotine withdrawal symptoms and their management through mass media, while the emphasis was only on the harms of smoking.

Concerning nicotine dependence level for the intervention and control groups, the current study indicated presence of no significant difference between the intervention and control groups pre-intervention, however, there are statistically significant difference between them post-intervention and during follow up, this reflect the positive effect of the intervention on smoking cessation. This result is congruent with **(Soria *et al.*, 2006)** who declared that, the measure of effectiveness of smoking cessation treatment showed that the action based on MI was 5.28 times more successful than anti-smoking advice.

Additionally, a previous study conducted in a primary care setting by **Butler et al., (1999)** comparing effectiveness of MI versus brief advice for smoking cessation in 536 smokers, showed moderately higher success. On the other hand this result is not in agreement with **Wilson et al., (2008)** who stated that, patients with COPD were unable to stop smoking regardless of the type of support they received.

The results of the current study may be due to the importance of motivation in assisting with smoking cessation, also, the patient-centered nature of the intervention, where smokers actively involve themselves in making habit changes, without imposition or blame by any person. Also, on the other hand, repeated advice may be perceived as preaching producing contrary behavior.

In the current study the number of cigarettes smoked per day decreased after intervention with highly statistically significant difference between pre and post-intervention, and highly statistically significant difference between the intervention and control groups post-intervention and during follow up, this result doesn't go in the same line with **Brown *et al.* (2003)** who found that, there is no significant difference between motivational interviewing and brief advice and their results indicated that

motivational interviewing did not lead to better smoking outcomes compared to brief advice.

The two previous findings concerning level of nicotine dependence and number of cigarettes smoked per day prove the first hypothesis related to the effectiveness of educational intervention incorporating motivational interviewing on smoking cessation.

Quality of life is an important factor in patient treatment and its scientific documentation is a necessity in clinical practice (**Ståh et al., 2005**). The importance of measurement of QOL in COPD patients is indicated because of the fact that no single measurement of lung function can satisfactorily summarize the various disturbances that may be caused by breathlessness in patients with COPD (**Zamzam et al., 2012**).

The current study results present that, there is significant difference between the mean scores of domains of QOL for patients with COPD in the intervention and control groups after intervention and during follow up. These differences between the two groups post-intervention were denoting the positive effect of the educational intervention incorporating MI on QOL of COPD, and proving the second hypothesis. In the same line, there is a statistically significant increase was noted in the intervention group on quality of life of patients who stopped smoking in a study done by **Efraimsson et al. (2008).** While this result is in contrast to **Zakrisson et al.(2011)** who reported that, the main results of their longitudinal study are that, there were no statistical differences in QOL between the intervention and control groups.

This improvement in the domains of QOL may be owing to the effect of quitting smoking by most of patients in the intervention group. This justification is supported by **Zamzam et al. (2012)** who stated that, a higher smoking index affects the COPD subjects' QOL. Additionally, **Papadopoulos et al. (2011)** stated that, smoking cessation among COPD patients was shown to lead within 2 months to an increase in the rated quality of life**.**

5. Conclusion

The current study concluded that, educational intervention incorporating motivational interviewing is effective in achieving smoking cessation or decreasing the number of cigarettes smoked per day and in improving quality of life of COPD patients.

6. Recommendations

- Replication of the current study on a larger sample and conducting follow up for them after one year or more after intervention.

- Health professionals need to provide accurate, understandable information to stop smoking using open questions, and focus on motivational dialogue to assess and support patient's ability to quit smoking.
- Studying the relation between smoking cessation and quality of life.
- Support for recent quitters who may not be able to maintain their smoke-free status, for example by scheduling regular checks at post quit date.

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