Rehabilitative Nursing Intervention Protocol and Quality of Life among Patients with Lung Cancer

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Abstract

Background: Recently, there was an increase of lung cancer incidence in Egypt compared to other cancers; reaching about 35.7%. The high frequency was confirmed by early reports in which that tumor contributed 27.6 % of all cancers in Egypt. **Purpose:** to examine the effect of rehabilitative nursing intervention protocol on quality of life among patients with lung cancer. **Design:** A Quasi-experimental research design was used. **Setting:** out-patient clinic in oncology department, Menoufia university hospital, Shebin El Kom district at Menoufia Governorate. **Sample:** A purposive sample composed of 100 patients with lung cancer. They were divided into two groups 50 patients for each. A study group who received rehabilitative nursing interventions protocol (RNIPs) along with routine hospital care and control group who received routine hospital care. **Study Instruments:** An interviewing questionnaire related to lung cancer and functional assessment of cancer Therapy Lung, Version 4 (FACT-L v. 4) to assess quality of life. **Results:** The majority of the cases were male (86%) and were working in chemical and fertilizers factories (53.5%). The majority of study group (70%) was detected as had lung cancer because of recurrent chest infection, (56%) of them had stage II at the time of diagnosis. The mean score of total QOL was 82.78±7.58 pre interventions, while was 79.13±5.62 post intervention. **Conclusion:** rehabilitative nursing interventions protocol (RNIPs) play an important role in improving quality of life for patients with lung cancer. The study revealed a significant improvement in the total means score QOL as well as all QOL domains among study group than controls. **Recommendation:** Developing an educational unit in Oncology department for providing rehabilitative care of lung cancer patients to improve their QOL.

Keywords: Lung cancer, Quality of life, Rehabilitation, Pulmonary exercise and walking.

1. Introduction

One of the most prevalent malignancies in both men and women is lung cancer. It is commonly recognized that having a lower socioeconomic background as indicated by one's level of education, occupation, ownership of a home, and income raises one's chance of developing lung cancer. However, given the poor prognosis for lung cancer patients, quality of life is seen to be a crucial factor for those who contract the illness (American Lung Association, 2020).

Lung cancer has now reached almost epidemic proportions. It was the most commonly diagnosed cancer worldwide as well as the leading cause of cancer death. It is the most common in men while among females it is the third type of cancer in women. Two million new cases reported in 2018. Worldwide, lung cancer occurred in approximately 2.2 million patients in 2020 (Sung et al., 2021). The increase rate is much higher in women, possibly due to the role of estrogens in increasing risk of lung adenocarcinoma (Bray et al., 2018)

In Egypt, more than 6.200 incident lung cancer cases are diagnosed each year, where lung cancers deaths reached 4.429 or 0.96% of total deaths of cancer (WHO, 2015). Also, in Egypt, lung cancer incidence is much higher than reported in Western countries. According to study of the NCI report there was an increase of lung cancer incidence in Egypt compared to other cancers, reaching about 35.7%. In addition to study which mentioned that lung cancer represents the fifth and the ninth most common cancer among males and females, respectively. It accounts for nearly 3% of cancers in women owing to low prevalence of female smoking (World Health Organization, 2020).

Manifestations may result from local effects of the tumor, regional or distant spread, or from distant effects unrelated to metastases. Almost three-fourths of unscreened individuals exhibit one or more symptoms at the time of diagnosis (American Cancer Society, 2019). The most prevalent symptoms of lung cancer are cough, hemoptysis, and wheezing, dyspnea, dysphonia, asthenia, thoracic pain and loss of appetite and weight (Bogdan, 2014). About 60- 70% of patients with lung cancer experience metastatic and Para neoplastic symptoms, which are typically only found in advanced stages of the illness (CDC, 2022).

Palliative care for lung cancer patients should include rehabilitation as a quality-of-life intervention. Combining the art and science of clinical care, physiological, and behavioral, pulmonary rehabilitation can rebuild the functional capacity of patients limited by breathlessness and other factors. Rehabilitation is increasingly being included in the

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supportive care provided to lung cancer patients treated with chemotherapy. The patient's self-efficacy is increased, and their quality of life is enhanced when they are able to engage in more activity without experiencing the negative effects of dyspnea during exertion (Kaasa et al., 2018).

Rehabilitation is a comprehensive intervention based on a detailed and systematic patients' assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behavior (Alfano & Pergolotti, 2018).

A pulmonary rehabilitation programme combines education, exercise, dietary support, and behavioral modification. It is recommended that treatment should be tailored for each patient based on initial and ongoing assessment of the disease's severity, comorbidities, and complexity. This can help people with dynamic hyperinflation's dyspnea by decreasing their breathing problems (Collins et al., 2016).

Pulmonary training exercises are considered as the cornerstone in a pulmonary rehabilitation program. Although training exercise does not improve gas exchange or lung function (Casaburi, 2015), it does improve the functions of other body systems, and reducing the impact of decreased lung function. Gains from exercise training are increased exercise tolerance, reduced dyspnea and increased quality of life (Casaburi and ZuWallack, 2013).

Quality of life is defined as "an individual perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". The term quality of life" refers to a person's physical, psychological and social aspects of health. Quality of life is a crucial aspect of nursing care for oncology patients in clinical setting. As a concept, it fits in well with nursing goals (Knaul et al., 2018)

The role of nurse as educator and client advocate has changed as improvements in treatment, care, prevention, and diagnosis have increased. The ability of nurses to lead changes and offer desperately needed continuity of care. Nursing research has achieved significant outcomes in patient education, cost-effectiveness of health care and treatment adherence. This aspect has allowed evidenced based nursing interventions to be incorporated into clients" plans of care. The challenge of making a difference in the clients" lives after treatment has made this an opportunity for a mutually gratifying and rewarding nurse client experience (Zhu, Peng, & Li, 2021).

Significance of the study

Lung cancer is a complex disease to diagnose and treat and represents a significant burden to patients and their families. It estimated the second most common cancer and is by far the leading cause of cancer deaths. Each year, more people die of lung cancer than of colon, breast, and prostate cancers (Sung et al., 2021). Worldwide, lung cancer incidence is nearly 1.83 million new cases that were estimated and have been diagnosed in 2014, the incidence rates are varying across the world (WHO, 2015). Based upon data of National Center Registry Program in Egypt (NCRP, 2014-2015); there was an increase of lung cancer incidence in compared to other cancers, reaching about 35.7% (Stout et al.,2021) and more than 6.200 incident lung cancer cases are diagnosed each year and deaths reached 4.429 or 0.96% of total cancer deaths ((Stout et al.,2021).

Rehabilitative nursing interventions improve the quality of life of lung cancer patients. Such interventions include pulmonary training programs and dietetic support which are reported to be beneficial for improving functional capacity, lung muscle strength, cancer-related fatigue and preventing malnutrition (Stout et al.,2021).

Purpose of the study

The present study purpose was to examine the effect of rehabilitative nursing intervention protocol on quality of life among patients with lung cancer.

2. Research hypothesis

1. Patients who will receive rehabilitative nursing interventions protocol for lung cancer have better quality of life scores than patients who receive routine hospital care.

3. Subjects &Method

Design: A quasi experimental research (study & control) design was utilized to accomplish the purpose of the current study.

Setting: The current study was conducted at the outpatient clinic of oncology department, University Hospitals, Menoufia Governorate, Egypt.

Sample: A purposive sample including 100 patients diagnosed with lung cancer and willing to participate and complete the study and fulfilled the inclusion criteria. The study's patients were divided into two equal groups (50 patients), the study group received rehabilitative nursing interventions protocol (RNIPs) while control group received routine hospital care only.

The sample size in the present study was calculated according to small effect size that is expected to be 0.3 (Cohen, 1988). To achieve 80% power to detect this difference with significance level of 0.05. The sample size was determined and calculated using EPI info program and it was estimated to be 50 patients per group was required. The both of two groups were selected and matched by the age and the lung cancer grade. With a withdrawal/non-evaluated subject rate of 10% a total of 50 per group. Subjects finally were recruited leading to total required sample size of 91 subjects (46 for study group and 45 for controls) at post intervention phase. They were chosen according to the following criteria:

4. Inclusion criteria

Adult patients from both genders aged from 19 to 59 years old were diagnosed with Stage I and II lung cancer as a primary origin cancer and without any metastasis to assure that the disease is not progressed, eliminate the influence of accumulated effect of more than one tumor and to allow the effect of RNIPs to become clear and efficient.

Study instruments

The following three instruments were used to accomplish the study's purpose and collect the required and necessary data:

Instrument I: Structured Interview Questionnaire

1. This questionnaire was designed and used by the researchers after an extensive review of literature and discussion with the experts to collect data from lung cancer patients. It included the following parts:
2. Part one: Socio-demographic data such as name, age, gender, occupation, marital status, education, residence
3. Part two: Present medical history of patients with lung cancer including questions about onset of disease, grade, treatment regimin (initiation time and side effect of treatment).
4. Part three: it included data related to the following:

A. a smoking habits as number of cigarettes per day and for how many years or exposure to passive smoking for how many hours per day and for how many years

B. Narcotics addiction including type of the narcotics used, amount that was taken per day and for how many years

InstrumentII: Functional Assessment of Cancer Therapy Lung, Version4 (FACT-L v. 4)

It is modified version of instrument (Cella, 2014). It consisted of 36 items to measure five conceptual domains of QOL (Physical, social/family, emotional, and functional well-being). It is a four-point scale from (0-4), while 0 means not at all and 4 means very much.

Scoring of Quality of life (QOL) domains

Quality of life questionnaire included 5 domains, out of them three domains with negative directed questions and two domains with positive directed questions. QOL domains of negative questions including physical domain (7 questions), emotional domain (6 questions) and additional concern domain (9 questions), each answer of negative questions ranged from 4 (not at all) to 0 (very much), with total scores of the three domains ranged from (88-0); **i.e.** The lower the score of QOL domains, the better improvement of QOL among lung cancer patients and the better effect of RNIPs.

QOL domains of positive questions including social domain (7 questions) and functional domain (7 questions), each answer of positive questions ranged from 4 (very much) to 0 (not at all), with total scores of the three domains ranged from (0-56); **i.e.** The higher the score of QOL domains, the lower improvement of QOL among lung cancer patients and lower effect of RINPs.

Total QOL tool included 22 negative questions with total scores ranged from (88-0) and 14 positive questions ranged from (0-56), with total QOL scores ranged from (88-56); **i.e.** The lower the total score of QOL domains, the better improvement of QOL among lung cancer patients and the better effect of RNIPs. Finally, the level of total QOL was classified as scores ranged from 88 to 81 denoted poor QOL; scores ranged from 80 to 76 denoted fair QOL while scores ranged from 75 to 56 denoted good QOL.

Validity of the instrument

The of FACT-L v.4 was translated into Arabic version and tested for its content by jury of three experts in the field of community health nursing and medical surgical nursing to ascertain relevance and completeness of the instrument and the needed modifications were done.

Reliability of the instrument

Reliability of FACT-L v.4 was assessed by using test and retest for a group of 10 patients who were asked to fill the same questions after two weeks. The answers of the two testes were analyzed and computed for reliability (Test –Retest reliability). It reached 80% (r=.85) which is considered reliable.

5. Methods

1. Ethical considerations and human rights: An approval was granted by Menoufia Nursing faculty's ethical and scientific committee to carry out this study.
2. Written consent to participate in the study was obtained from all patients after explaining the purpose of the study.
3. Confidentiality of the information was assured. Patients were informed that refusal to participate in the study would not affect their care and subsequently their health.
4. Pilot study: A pilot study was conducted before data collection on 10 patients (10% of the whole sample) using developed questionnaire to test all instruments for clarity, objectivity, feasibility and the applicability of the instruments. Also, it was conducted to identify any obstacles or confusion that might arise during data collection. Also, it was conducted to estimate the time needed to fill the sheet with the total sample of the study and the necessary modification and clarification was done. The pilot sample was excluded from the total study's sample to assure stability of the results.

6. Procedure of Data Collection

1. The actual data was collected over a period of eleven months extended from beginning of October 2020 to the end of August 2021.
2. Before data collection, an interview was done with the patients to explain the purpose of the

study and its importance.
3. The study intervention's components including the following:
4. Physiotherapeutic breathing retraining techniques: that included three maneuvers to improve pulmonary symptoms as cough, dyspnea and shortness of breath. The maneuvers were pursed lip breathing diaphragmatic breathing and blow as the patient go.
5. Standardized therapeutic diet for lung cancer.
6. Physical activity including walking.
7. The study group patients received the rehabilitative nursing interventions RNIPs (physiotherapeutic breathing retraining techniques, standardized therapeutic diet for lung cancer and physical activity as walking) at oncology outpatient clinic along with routine medical care, while the control group patients received routine hospital care which included receiving chemotherapy session once every 21 day and filling the medication.
8. Session's schedule: study group patients received four sessions at the oncology outpatient hospital clinic. Each session was conducted once every 21 days after chemotherapy cycle. Each session took about 20 to 30 minutes.
9. The researchers used group discussion and PowerPoint presentation after dividing study subjects into two groups (each group were 25 patients), they were coming two days Sunday and Monday every month.
10. A telephone call was done by the researchers the day after each session to each patient to ascertain the fixation of guidelines and intervention.
11. The 1st session: included acquisition of knowledge related to lung cancer, types, causes, symptoms and complications if symptoms not treated because knowing nature of lung cancer aided in gaining cooperation of subjects. The researchers used laptop and slides showed anatomy of lung, function, and types of lung cancer, causes, symptoms and complications. At the end of the session allowed patients to ask questions about the disease and answered them. Repeat the first session with the remaining subjects of the study group.
12. The 2nd session: A copy of the booklet was supplemented to all 50 patients (study group), it included illustrated pictures and steps of the three maneuvers of breathing retraining techniques (pursed lip breathing, diaphragmatic breathing and blow as the patient go) and they were told to repeat the diaphragmatic breathing exercise up to 4-7 times per once (according to his tolerance) and instruct to repeat the same exercise up to 7 times per /day in his home. Also the researcher explains the importance of walking in improving pulmonary circulation, alleviating fatigue and relieving muscles tension. Moreover, the researchers used videos, data show and demonstration to explain the three maneuvers of breathing retraining exercises and steps related walking (patients were instructed to walk at least 4 times per week for half an hour).

- A copy of the booklet was given to the patients/or caregivers of the study group.
- At the end of the study, the researcher distributed a copy of the booklet to the control group.
- Posttest was done after 4 months to all patients (study and control group) when the interventions were completed and the related instructions were followed.
- A comparison between both study and control groups was carried out to examine the effectiveness of rehabilitative nursing intervention protocol on quality of life among patients with lung cancer.

7. Statistical Analysis

The collected data were prepared, tabularized and statistically analyzed using Statistical Package for the Social Sciences, version 16 (SPSS software). For quantitative data, the mean and standard deviation were calculated. For qualitative data, can describe a group of facts with categories by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test ($\chi 2$). For comparison between means of two groups of parametric data of independent samples, student t-test was used. For comparison between means of two groups of non-parametric data of independent samples, Z value of Mann-Whitney test was used. For comparison between means of two related groups (pre and post intervention data) of parametric data, paired t-test was used. For comparison between percent of change, testing of proportion was done (Z test). Significance was adopted at $p<0.05$ for interpretation of results of tests of significance (Dawson and Trap, 2012).

8. Results

Table (1): It illustrated the sociodemographic data of the studied patients with lung cancer. The finding revealed that the mean age of the intervention group was 43.02±6.22 compared to 42.92±9.50 among control group. Regarding educational level 60% of the intervention group had a high education level (the difference was significant), 58% of study group lived in rural areas while 28% of control group were illiterate and 50% lived in urban areas, 86% of the intervention group were working and 53.5% of them worked in chemical and fertilizers factories while 72% and 44.1% among control group were working in other jobs.

Table (2): It showed the medical data of the studied patients with lung cancer, this table illustrated that, more than half (58%) of study group were diagnosed with lung cancer since 6 -12 months duration. While half 50% were diagnosed 3-6 months among the control group. Regarding causes of lung cancer, 44% and 50% was occurred due to recurrent pneumonia among intervention group and control group respectively. Among intervention group and control group had grade two at their diagnosis respectively. More than half of

study group had a positive family history of the tumor (related to the father relationship), while 74% of the control group have no family history to tumor.

Figure (1) Represented family history of tumor among the studied patients with lung cancer (Study and control group). There was a significant difference between study group and control regarding family history of tumor. The figure illustrated that the higher percent (52%) of study group had family history to tumor compared to 26% among control group.

Table (3): Clarified the mean scores of qualities of life (QOL) domains among the studied patients with lung cancer (study and control group) pre and post rehabilitative nursing intervention.

I. Regarding QOL domains negative questions: the table clarified the mean score of the physical domain for the study group was 19.22±2.28 at pre intervention, it improved to become 9.30±2.20 post intervention. While among control group the mean score was 17.84±3.2, it reached 26.40±1.56 post intervention (not improved). The difference was significant. Moreover, the emotional domain, the mean score among the study group, was 16.16±2.22 pre intervention; it improved to reach 8.19±1.38 post intervention, while among control group, the mean score was 15.08±1.38 changed to (not improved) to reach 16.73±1.53 post intervention. The difference was significant. As regards additional concern domain, among the intervention group, the mean score was 22.16±2.41 pre intervention, it improved to reach 19.17±1.38 post intervention. While among control group, the mean score was 21.34±2.56 and changed (not improved) to become 25.38±2.75 post intervention. The difference was significant

II: Concerning QOL domains positive questions: this table revealed that Regarding social domain, the mean score among the study group was 14.00±4.63 pre intervention and reached to 23.39±2.72 post intervention, while among control group, the mean score was 12.64±3.10 and changed (not improved) to 9.22±1.81 post intervention with significant statistical difference. In relation to functional domain, among the study group, the mean score was 11.24±2.21 pre intervention; it improved to reach 19.87±1.34 post intervention. While among control group, the mean score was 10.74±1.99 changed to (not improved) 7.59±1.42 post intervention. The difference was significant.

Table (4) Mean scores of total qualities of life (QOL) among the studied patients with lung cancer (Study and control group) pre and post rehabilitative nursing intervention this table illustrated that mean score of total QOL in intervention group was 82.78±7.58 pre intervention, it decreased to reach 79.13±5.62 post intervention compared to control group where it was 77.64±6.89 and turned to become 85.49±3.39 post intervention.

Table (1): Socio-demographic data of the studied patients with lung cancer (Study and control group) (n=100).

Socio-demographic data	The studied lung cancer patients (n=100)				χ^2	P
	Study group (n=50)		Control group (n=50)			
	N	%	N	%		
Sex:						
-Male	43	86.0	38	76.0	1.624	0.202
-Female	7	14.0	12	24.0		
Age years:						
-23-<40	15	30.0	17	34.0		
-40-<50	26	52.0	22	44.0	0.658	0.720
-50-67	9	18.0	11	22.0		
-Range	29-60		23-67			
Mean±SD	43.02±6.22		42.92±9.50			
t-test	0.062					
P-value	0.950					
Educational level:						
-Illiterate	8	16.0	14	28.0		
-Basic education	6	12.0	13	26.0		
-High school educ.	30	60.0	10	20.0	16.7954	0.001*
-University educ.	6	12.0	13	26.0		
Marital status:						
-Married	40	80.0	42	84.0		
-Single	1	2.0	3	6.0		
-Divorced	6	12.0	4	8.0	2.449	0.485
-Widow	3	6.0	1	2.0		
Occupation:						
-Working	43	86.0	36	72.0	2.954	0.086
-Not working	7	14.0	14	28.0		
If working, place of work:						
-Tobacco factory	*3*	*7.0*	*4*	*11.1*		
-Syntic and cloth factory	*6*	*13.9*	*8*	*22.2*		
-Battery factory	*6*	*13.9*	*2*	*5.5*	*17.670*	*0.001**
-Chemical and fertilizer factory	*23*	*53.5*	*6*	*16.7*		
-Others	*5*	*11.6*	*16*	*44.1*		
Previous work:						
-No previous work	44	88.0	36	72.0		
-Work in tobacco factory	3	6.0	4	8.0	5.029	
-Work in textile / cloth factory	1	2.0	4	8.0		0.284
-Work in chemical and	2	4.0	5	10.0		
-Fertilizer factory	0	0	1	2.0		
Residence:						
Rural	29	58.0	25	50.0	0.644	0.422
Urban	21	42.0	25	50.0		

(*) Statistically significant at P < 0.05

Table (2): Medical data of the studied patients with lung cancer (Study and control group) (n=100).						
Medical data	The studied lung cancer patients (n=100)				χ^2	P
	Study group (n=50)		Control group (n=50)			
	N	%	N	%		
Duration since diagnosis of lung cancer (months): 2-<3 3-<6 6-12	 2 19 29	 4.0 38.0 58.0	 5 25 20	 10.0 50.0 40.0	3.757	0.153
Previous respiratory conditions leading to detection: Recurrent pneumonia Recurrent bronchitis Hemoptysis Others.	 22 13 15 0	 44.0 26.0 30.0 0	 25 4 20 1	 50.0 8.0 40.0 2.0	6.670	0.083
Degree of tumor at diagnosis: Stage I Stage II	 22 28	 44.0 56.0	 24 26	 48.0 52.0	0.161	0.688
Suffer from previous tumor: No	 50	 100	 50	 100	-	-
Family history of tumor: Yes No	 26 24	 52.0 48.0	 13 37	 26.0 74.0	7.104	0.008*
If yes, type of relationship Father Mother Brothers or sisters	*13* *8* *5*	*50.0* *30.8* *19.2*	*5* *3* *5*	*38.5* *23.1* *38.5*	*1.680*	*0.431*
(*) Statistically significant at P < 0.05						

Table (3): Mean scores of quality of life (QOL) domains among the studied patients with lung cancer (study and control group) pre and post rehabilitative nursing intervention (n=100).									
Physical domain items of QOL	No. of questions Score	Mean scores of QOL domains among the studied lung cancer patients (n=100)						t-test P	
		Study group		Paired t-test P	Control group		Paired t test P	Pre intervention	Post intervention
		Pre intervention (n=50)	Post Intervention (n=46)		Pre intervention (n=50)	Post intervention (n=45)			
Physical domain (-) Range Mean±SD	7 (0-28)	12-24 19.22±2.28	7-21 9.30±2.20	21.606 0.0001*	9-25 17.84±3.29	23-28 26.40±1.56	15.911 0.0001*	2.434 0.017*	42.698 0.0001*
Social domain (+) Range Mean±SD	7 (0-28)	6-21 14.00±4.63	15-27 23.39±2.72	11.976 0.0001*	7-18 12.64±3.10	5-12 9.22±1.81	6.467 0.0001*	1.725 0.088	29.199 0.0001*
Emotional domain (-) Range Mean±SD	6 (0-24)	8-19 16.16±2.22	7-17 8.19±1.38	20.934 0.0001*	7-19 15.08±2.13	13-21 16.73±1.53	4.294 0.0001*	2.481 0.015*	28.014 0.0001*
Functional domain (+) Range Mean±SD	7 (0-28)	7-18 11.24±2.21	12-21 19.87±1.34	22.881 0.0001*	7-14 10.74±1.99	0-10 7.59±1.42	8.867 0.0001*	1.190 0.237	42.564 0.0001*
Additional concern domain (-) Range Mean±SD	9 (0-36)	16-26 22.16±2.41	14-23 19.93±1.97	4.926 0.0001*	14-27 21.34±2.56	19-29 25.38±2.75	7.411 0.0001*	1.649 0.102	10.873 0.0001*
(*) Statistically significant at P < 0.05									

Table (4): Mean scores of total qualities of life (QOL) among the studied lung cancer patients (Study and control group) pre and post rehabilitative nursing intervention (n=100).

Total domain of QOL	Mean scores of QOL domains among the studied lung cancer patients (n=100)				t-test P	
	Study group (n=50)		Control group (n=50)			
	Pre-intervention	Post intervention	Pre-intervention	Post intervention	Pre-intervention	Post intervention
Total QOL Scores: -Range (56-88) -Mean±SD	63-88 82.78±7.58	70-83 79.13±5.62	56-88 77.64±6.89	79-88 85.49±3.39	3.547 0.001*	6.518 0.0001*
Paired t-test P	2.660 0.0001*		7.005 0.0001*			
(*) Statistically significant at P < 0.05						

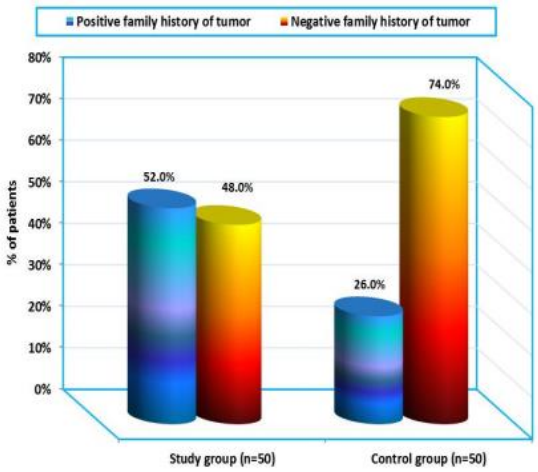

Figure (1): Family history of tumor among the studied patients with lung cancer (study and control group)

9. Discussion

Rehabilitative Nursing Interventions (RNIs) are a wide range of nursing activities including physical, psychosocial, occupational and dietetic therapy, such activities aimed at enabling people with lung cancer to reach and maintain their optimal physical, sensory, intellectual, psychological and/or social functional levels (Nici et al., 2014). The aim of the present study was to assess the effectiveness of rehabilitative nursing intervention on quality of life for patients with lung cancer. By analyzing the distribution by sex, the present study revealed that the prevalence in men was higher than in women.

This was consistent with Bogdan et al., (2014) conducted a study in Australia;" Epidemiology of chronic lung diseases with massively expansion" and they found that the prevalence in men was higher than in women, this may be due to the buildup of risk factors for this disease in males, who are exposed to various industrial and air pollutants owing to their occupation, they subjected to be more stressed due to social position and smoking habits that prevalent in this sex. On the other hand, another study was done in Russia by Lienert and Serke, (2014) "Lung cancer in young females" revealed that the higher prevalence was higher among women than men this was due to the increase number of adenocarcinomas diagnosed in this sex, fact which was due to the role of estrogens in the increase of risk in lung adenocarcinoma and the increase of the woman's role in social life.

In relation to age, the present study revealed that, the majority of the studied subjects who had lung cancer were at age group between 40-50 years compared to other age group. This was consistent with Târlea and Dediu, (2010) who conducted a study about" Epidemiology and risk factors in lung cancer" they found that, the age group with the highest rate of lung cancer in Germany was in the age group of 45-50 years. The most cases of lung cancer are met at these ages, due to the accumulation of risk factors with long evolution of dysplastic and pre-cancerous meta-plastic lesions in cancerous lesion.

On the other hand, Van der et al., (2014) reported that, lung cancer was most frequent in the age group in between 60-69 years in their study that carried out in Craiova because the sample size was bigger (780) than the present study. By analyzing the distribution of patients depending on the residency area, the present study revealed that the higher percentage was from rural areas, this may be due to difficult access to population with means of investigations and the higher level of illiteracy in rural areas. This was consistent with Alberg and Samet, (2013) who conducted a study in Greece about the "Epidemiology of Lung Cancer" in which the higher percentage was from rural areas.

On contrast, in a study done in Sweden by Târlea and Dediu, (2010), they revealed that, the percentage of that disease was higher in Urban areas this is clarified by the increased addressability of persons living in urban areas as compared to the rural ones, the greater number of patients from urban area would be due to the easy access in this area to means of investigation, and to a higher exposure to air pollutants, the risk factors having an increased incidence in urban zones due to the existent industrialization.

The present study revealed that the higher percentage of the sample was high school education and worked in chemical and fertilizer factories. This was consistent with Alberg and Samet, (2013) who conducted a study in Finland, explaining this finding due to unemployment, low level of education, ignorance with symptoms and investigations and the kind of work those people are forced to make them

expose to respiratory irritants. On the other hand, Van der et al., (2014) who reported that the prevalence was higher in university education and working in offices. This was due to the occupation, subject to stress and anxiety due to habits of smoking and social position.

Regarding the causes of disease, the present study revealed that the higher percentage was due to exposure to recurrent chest infection. This was consistent with Ciuleanu, (2013) who conducted a study in France entitled" Lung carcinomas: principles and practice". The higher percentage appears to be involved in the incidence of cancer lung as a second neoplastic localization. On the other hand, Kusunoki et al., (2014) conducted a study in Japan about" Early detection of lung cancer", he reported that there was an association between cold and occurrence of lung cancer, also due to the implication of smoking in the etiology of both diseases.

Regarding the degree of tumor at diagnosis, the present study revealed that the higher percentage were grade two at diagnosis time. This was consistent with Franklin, (2013) who conducted a study in South Africa about the diagnosis of lung cancer, pre-invasive and invasive neoplasia pathology. The higher percentage was due to ignorance with means of investigations and symptoms. On contrast, Ciuleanu, (2013) who study "Lung carcinomas: principles and practice" he reported that the higher percentage was grade one at diagnosis. This was as a result of an improvement of means of diagnosis due to technical progress, increase of addressability, the echo of the anti-smoking campaign in the last years, as well as the careful follow-up of patients with increased risk of lung cancer.

Regarding heredity and family history to lung cancer, the present study revealed that the higher percentage had a family history to tumors. This was consistent with Franklin, (2013) who conducted a study in South Africa and examined the diagnosis of lung cancer, pathology of invasive and pre invasive neoplasia. This is a result of genetic abnormalities that raise risk of developing lung cancer by up to 60% whether they smoke or not. Concerning to the distribution of patients reliant on the smoking history, the present study revealed that the higher percentage actually active smokers and smoke more than eight cigarettes per day for more than ten years. It was consistent with Didilescu et al., (2016) who conducted a study in Poland about" Smoking on road from health to illness". They found that many of the study participants were smokers.

Another study was conducted by Hecht, (2015) in Germany and study Tobacco Smoke Carcinogens and Lung Cancer" he revealed that the higher percentage of lung cancer were smokers and had been smoking for more than ten years. If the duration of smoking was longer, if the number of smoked cigarettes/days was big, if the number of cigarette package/year was big and if the inhaling way was profound, this increases the risk of lung cancer.

Regarding passive smoking, the present study revealed that the higher percentages were exposed to passive smoking. It was in the same line with Trofor et al., (2013) who conducted a study in Newegg including "Tobacco risk factor in lung cancer: current level of knowledge". The study confirmed that passive smoking had the similar risk of incidence of lung cancer as active smoking. Relating to smoking shisha, the present study revealed that the higher percentage were shisha smokers. This was consistent with two studies done in Egypt. The first one by El-Heneidy et al., (2011) the study findings illustrated that smoking shisha is associated with early asthma onset, severe atopic features, higher serum IgE levels and decreased value of the peak expiratory flow rate for age. Compared to other environmental pollutants, such as exposure would also be a significant risk factor for lung cancer.

The second study was in Al Azhar University (Sherief, 2013) the study showed that water pipe smoking was more prevalent among adults with lung cancer. Regarding smoking hashish, the present study revealed that the higher percentages were smoking hashish. This was consistent with Hassan et al., (2014) who conducted a study in Egypt explaining the "possible role of hashish smoking as a carcinogen in the development of lung cancer at a young age" the study revealed a strong association between smoking hashish and lung cancer. This may be due to chronic cough; asthma and recurrent pneumonia associated smoking hashish thus increase the risk for development of lung cancer.

Participants were impressed with the range of and strategies they learned in the program. They expressed being completely unaware that, there was so much they could do to manage their disease. Participants expressed that they would not have achieved the same level of awareness regarding managing their lung cancer without the pulmonary rehabilitation program. Regarding patients' practicing walking exercises, the results of this study showed that the higher percentage (82.6%) started walking post intervention and found an improvement in QOL scores among intervention group compared to control group. This was consistent with Jennen and Uhlenbruck, (2014) who conducted a study in Denmark to study the effects of walking exercise on QOL among lung cancer patients and reported a significant increase in QOL scores in exercise group compared to control group.

Another study conducted in Philippine by Basen-Engquist et al., (2016) they examined the "Randomized pilot test of a lifestyle physical activity intervention for lung cancer survivors" they found that, exercises such as walking can significantly increase QOL of patients with lung cancer. They proposed that physical aspect of QOL improve more persistently than other aspects. This may be

attributed to, these activities are easily available, don't require special equipment, costs, don't require detailed instructions, and have no negative or harmful effects on the disease.

Regarding levels of quality-of-life domains, the present study revealed that the majority (86%) of study group in physical domain had fair level pre intervention, while (97.8%) had good level (category) after the intervention. This was consistent with Hürny et al., (2016) who conducted a study in Iran entitled: "Impact of adjuvant therapy on quality of life in women with node-positive operable lung cancer". In this study the majority (89.9%) had fair pre intervention and (95.6%) good post intervention. This may be due to application of rehabilitative program.

On contrast, Oldridge et al., (2015) conducted a study in Germany named "Predictors of quality of life with pulmonary rehabilitation after lung cancer" which revealed that 92% of study cases had poor level in physical domain pre intervention turned to be 77.2% fair after six months post intervention. This was due to large sample size (800 patients) that the researcher used. Regarding emotional domain, the present study revealed that the majority (80%) in emotional domain had fair level pre intervention, while (97.8%) had good level after the intervention. This was consistent with Mauer et al., (2014) who conducted a study in Poland named "Evaluating quality of life and symptom burden in lung cancer patients", the study revealed the majority (84.4%) had fair level pre intervention and (98.6%) good level post intervention. This may be due to application of rehabilitative program including the three components.

On contrast results of Chen et al., (2015) conducted a study in China named" Quality of life in lung cancer patients undergoing chemotherapy" revealed that (87.6%) of study cases had poor level in emotional domain pre intervention; it turned to become (90.5%) fair level after six months post intervention. This was due to small sample size (50 patients) that the researcher used.

Regarding additional concern domain, the present study revealed that the majority (64%) in additional concern domain had fair level pre intervention, while (88.8%) had good level after the intervention. This was consistent with Nematollahi, (2016) who conducted a study in Iran examining:" Quality of life in Iranian lung cancer women"; the study revealed the majority (70.3%) had fair level pre intervention and (91.7%) good post intervention. This may be due to the effect of rehabilitative program. On contrast, Vedat, et al., (2013) who conducted a study in Baltimore, the results of this study revealed that (93.6%) of study cases had poor in additional concern domain pre intervention turned to be (95.5%) fair after six months post intervention. This was due to large sample size the researcher used.

Regarding social domain, the current study revealed that more than half (54%) had poor level in social domain pre intervention, while (76.1%) had good level after the intervention. This was consistent with Thatcher et al., (2014) conducted a study in France named "Improving quality of life in patients with non-small cell lung cancer", the study revealed more than half (59.3%) had poor level pre intervention and (73.7%) good level post intervention. This may be due to application of rehabilitative program.

In addition, a study was conducted by Kornblith et al., (2013) conducted a study in Russia named" Long-term adjustment of survivors of early-stage lung carcinoma, 20 years after adjuvant chemotherapy". The study revealed that (60.2%) of study cases had poor level in social domain pre intervention turned to be good (75.5%) after six months post intervention. There was evidence that the whole study group had poor functional domain pre intervention while (97.8%) had fair level post intervention.

This was consistent with Northouse et al., (2014) conducted a study in America named "Quality of life of African American women with lung cancer "Their study revealed that (98.5%) had poor functional domain pre intervention while (94.9%) had fair post intervention. This may be due to the effect of rehabilitative program. Another study named "Clinical value of quality-of-life assessment in oncology practice-a qualitative study of patient and physician views" was done by Velikova et al., (2015) revealed that (95.3%) had poor functional domain pre intervention while (98.8%) had fair post intervention.

Moreover, in a study conducted by Sanders, Bantum et al., (2014) in Newegg named "Rehabilitative needs in patients with lung cancer" supported this result and reported, quality of life had improved after rehabilitation. This might be due to the significant role of RNIs from healthcare personnel.

10. Conclusion

Based on the results of this study, it was concluded that

Rehabilitative nursing interventions protocol (RNIPs) play an important role in improving quality of life for patients with lung cancer. The study revealed a significant improvement in the total mean score QOL and all QOL domains of the intervention group than control. A significant relationship between family history and occurrence of lung cancer was appeared.

11. Recommendations

Based on the results of the study, the following recommendations were suggested:

- Developing an educational unit in Oncology department to educate lung cancer patients about RNIPs and its effect on QOL.
- Careful and periodic assessment for industrial workers especially who are working in chemical and fertilizers factories and patients have a

positive family history.
- Further studies are needed to ensure the importance of RNIPs in improving quality of life among lung cancer patients.

For patients

- Educating patients about the importance of walking exercises for improving pulmonary circulation.
- Educate patients about the importance of breathing retraining techniques for improving pulmonary symptoms such as dyspnea and cough.
- Integrate RNIPs in routine hospital care to improve lung cancer patients' quality of life.

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