



Abstract: *The study titled “The Importance of Exercise Therapy in Rehabilitation of Lungs Cancer Patients: An Analysis of The Patients Through Exercise Therapy” was conducted in Shaukat Khanam Memorial Hospital and Institute of Radiotherapy and Nuclear Medicine hospital, Peshawar, Khyber Pakhtunkhwa. The data were collected on exercise therapy (independent variables) and Pulmonary Rehabilitation of lungs cancer (dependent variable). Whereas the Chi-square test was used to test the association among the study variables. The association of pulmonary rehabilitation was found highly significant with regular exercise increases exercise tolerance ($P=0.000$), recreational physical activities enhance disease tolerance ($P=0.000$), physical exercise improves the better health condition of the victims ($P=0.003$), physical exercise-based rehabilitation improves life expectancy ($P=0.022$), the universe for the present study was Shaukat Khanam Memorial Hospital and Institute of Radiotherapy and Nuclear Medicine hospital, Peshawar, Khyber Pakhtunkhwa. A sample size of 152 respondents was selected through a simple random sampling procedure. The main aim of therapy is to reduce the severity of the disease, which in turn would lead to proper rehabilitation and the rest of the patients was suggested as policy recommendation.*

Key Words: Exercise Therapy, Pulmonary Rehabilitation, Lungs Cancer

Introduction

The lung is the human breathing organ located in the chest. Lungs are made up of two lobes. i.e., right and left lobes. During the breathing process, air goes through the nose, windpipe (trachea), and into the lungs, where it spreads through tubes called bronchi. Most gaseous wastes are removed from blood in the lungs, whereas; the blood is also oxygenated in this body part. Most lungs disease including lung cancer starts in the cells that line bronchi. There are multiple disorders related to the lungs; the most lethal of all these disorders is lung cancer (Gallus, 2004). Lung cancer is also known as lung carcinoma, is the main reason for mortality and morbidity all over the world, with a rate of 1.3 million cases each year. Most by far (85%) of instances of lung cancer are because of tobacco smoking, while 10– 15% of cases happen in individuals who have never smoked. Since the dominant part of lung cancer is analyzed at a moderately late stage, just 10% of all lung cancer patients are at last cured. Most lungs cancer is named either small cell or non-small cell lung cancer (Zipser, 2014). The main symptoms of lung cancer are intense cough, cough with blood, chest torment, repetitive pneumonia, and TB. There are chances of treatment of lung cancer if diagnosed in the early

stage before it spreads. Lung cancer is categorized into four stages. In the first stage, cancer is found in the lung, but it has not spread outside the lung. In the second stage, cancer is found in the lung and nearby lymph nodes. In the third stage, cancer is in the lung and lymph nodes in the middle of the chest, and in the last stage, cancer has spread to both lungs, into the area around the lungs, or to distant organs (ASCO, 2018). After the lung cancer is analyzed, the method of treatment is chosen by the patient's condition. Surgery is the best treatment choice, yet radiotherapy and chemotherapy can likewise be utilized relying upon the phase of the ailment (Siddiqui et al., 2010).

Lung Cancer in Pakistan

Lung cancer is the major cause of all deaths all over Pakistan. Smoking habit is the major cause of lung cancer in males; however, nonsmoker males and females also fall victim to lung cancer. In changing social scenarios, smoking by females, once a taboo, is diffusing in Pakistani females. Family history of lung cancer and TB are causes of lung cancer. The late diagnosis of lung cancer makes it a lethal disease in Pakistan. However, there is still hope as renowned

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institutions and hospitals are using the latest studies and advanced technical facilities to develop cures for these deadly daisies. With the advancement in therapeutic sciences, the survival rate for lung cancer persistent has expanded for a long time (Pliro, 2017). Lung cancer is increasing at an alarming rate in Pakistan, and it is extremely heartbreaking that young people are experiencing this deadly disease. Smoking in Pakistan is unrestricted and legal. Cigarettes are openly sold in the market, and even children can purchase them from the shops. As per the World Health Organization, smoking in Pakistan has expanded by 30 percent in the course of the most recent decade. As per most recent research, more than 80 percent of grown-up's smokers started smoking before they turned 18 years old. Kids younger than 18 years say that it's easy to purchase tobacco items, which is a reason for worries for guardians. Around 1,200 youngsters begin smoking every day, which is likewise expanding the chances of lung cancer (Munaj, 2016).

Lung Cancer in Peshawar

There were 40,000 instances of the disease reported from Khyber Pakhtunkhwa territory in 2014. Just four healing centers exist in Khyber Pakhtunkhwa to provide treatment for a great many cancer patients from Khyber Pakhtunkhwa and neighbouring Afghanistan. IRNUM is one of the four healing center treating disease in Khyber Pakhtunkhwa. It was set up by Zulfiqar Ali Bhutto in 1975 as a 75-bed hospital facility and with the ability to give treatment to 1,000 patients annually. However, the rate increases in cancer patients are increasing. Be that as it may, the frequency rate of cancer is by all accounts increasing at a disturbing rate, and the quantity of cancer patients enlisted with IRNUM right now has outperformed 6,000. 33% of these are patients from Afghanistan (Zia, 2014).

Exercise tests can be used to assess patients' exercise capacities and, to a reasonable extent, their ability to tolerate the necessary stresses induced by lung cancer treatment. Use of direct or indirect measures of $\dot{V}O_2$ max/peak (volume, oxygen maximum/peak) is fairly well established in risk stratification for lung cancer resection. Conceptually, physiological parameters from maximal exercise testing (CPET or ISWT) (Cardio- Pulmonary Exercise Test) or (incremental shuttle walk time) may be more predictive of outcomes, including postoperative functional limitation, after surgical stresses that are acute, intensive, and short-lived. In contrast, for stresses that are slow in onset, less intensive, and longer-lasting (e.g., chemotherapy and/or

radiotherapy), submaximal exercise tests (e.g., 6MWT, the endurance shuttle walking test) in addition to maximal exercise testing may potentially be predictive of outcomes (Duc, Ha et al., 2016).

Aerobic exercise is recommended to improve fitness. It not only improves cardiac function but also improves oxygen capacity. Examples of aerobic exercise include walking, dancing, or any activity that increases heart rate. Low-intensity exercise, such as walking, is a safe way to begin. Those with lung cancer should participate in an activity that is enjoyable.

Review of Literature

Cesario et al. (2007) studied the effectiveness of the six-minute walk test (6MWT) in the physical improvement of lung cancer cases. The researchers reported that exercise therapy informs of 6minute walk (94m) for a period of 2 months was effective as it brought 8% improvement in patients' respiratory system. This improvement was pre-operative level. Continuous of 6mwt in the post-operative scenario was effective to bring 32-43% improvement and overall rehabilitation of lung cancer.

Caspersen et al. (1985), in their experimental research, reported that the use of skeletal muscle through body movement is the major source of energy expenditure in the body. A normal person maintains their body structure and shapes through physical exercise activity in the same way as regular physical exercise is helpful in the reinstatement of physical fitness in people with a chronic disease like cancer.

Holden et al. (1992) studied that the effect of physical exercise and physical activity on lung cancer. The group of researchers reported that people that had a high tolerance to sustain exercises like 6-minute walk, stair climbing and cycling rested in higher postoperative outcomes.

Quist et al. (2012) the improvement of physiotherapists in connection physical exercise to lung cancer patients at the hospital and home were effective to improve oxygen uptake, tolerate exercise status and sustain emotional wellbeing by 10%.

Fernando et al. (1997) added that physical activity not only improved the physical structure of the patient's but also their state of mood. The physical exercise enabled the patient to rebuild self-confidence and to come over the problem of depression. Gain of physical independence was the main reason behind the psychological and physical rehabilitation of patients.

Spruit et al. (2006) noted that rehabilitation program for any chronic disease is multidisciplinary.

The group of research is stated that exercise training is the cornerstone of such diverse rehabilitation programs, which included walking, gymnastics, cycling and weight training etc. the cycling and trade mile walking of exercise therapy was carried out for 20 min along with weight training for the lower and upper body muscles was performed in three sets of 15 repetitions. The gymnastics were exercised for 30 min to improve the flexibility and mobility of the muscles. All these physical exercise interventions were effective in the restatement of the overall rehabilitation of lung cancer patients.

[Backer et al. \(2007\)](#), in their experiment, performed physical exercises in a group of 2.6 patients. The physiotherapist supervised the exercise process in session for a total time of 60 min. The exercise included warm-up, exercises included 10min cycling, whereas the strength comprised of machines that included exercises of a long and large group of muscles. The presence of a physiotherapist during the exercise program ensured the use of the right techniques of exercise and effective rehabilitation of patients.

Methodology

The study universe includes two hospitals i.e IRNUM and Shukat Khanam Memorial hospitals, located in District Peshawar, Khyber Pakhtunkhwa. The lungs cancer patients admitted/visiting these hospitals were the respondents for this study.

As per the record of IRNUM and Shaukat Khanam Memorial hospitals, 252 patients were admitted or under treatment in these hospitals. A sample size of 152 respondents, as per [Sekaran, 2003](#), is required for the said population. The sample was proportionally allocated to each hospital by using the proportional allocation formula [\[Cochran, 1977\]](#). A simple random sampling technique was used for the selection of respondents. The study variables included exercise therapy (independent variable) and pulmonary rehabilitation of lungs cancer patients (dependent variable) (table 1). The Chi-square test was used to test the association of study variables.

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{ij} - e_{ij})^2}{e_{ij}}$$

Table 1. The Conceptual Framework of the Study

Independent Variables	Dependent Variable
Exercise Therapy	Pulmonary Rehabilitation

Results and Discussions

Exercise therapy plays an important role to reduce the negative effect of the disease. Physical exercise reduces the chances of lungs cancer and reduces the symptoms of the disease. Exercise therapy is improving the life expectancy of the patients. Regular exercise increases the tolerance of the patient's body, which can help them to recover from the disease. Some of the questions with respect to exercise therapy were asked from the patients' results of which are given in Table 2 and explained also.

The result shows that the majority of (84.2%) respondents were of the view that physical exercise reduced the chances of lung cancer, and (9.8%) negated this view. Similarly (75.7%) respondents agreed that physical exercise improved the health condition of the victims, and (18.8%) disagreed with it. In addition, (60.5%) respondents were of the view that during progressive stages of lung cancer, the patients do not commonly practice physical exercise, while (32.2%) respondents negated this view. Recent developments in exercise therapy for lung cancer treatment show encouraging results. Those who carry out exercise therapy are more likely to

overcome the complications of lung cancer and their early recovery. However, the patient in the study area, despite their awareness, are less inclined to exercise therapy. These findings are in line with the findings of Carlyon (2011), who reported that exercise therapy is an important contributor in reducing the miseries of lung cancer patients. However, the use of exercise therapy is less popular in patients due to the physical fatigue involved.

The result further shows that (59.9%) of the respondents were of the view that patients with lung cancer are guided by professional guides in their routine exercise, while (28.8%) did not agree with it. In addition, (59.9%) Lung cancer patients are motivated by professionals to undertake physical exercise, and 25.7% negated this view. The study examined that the hospitals lack the specialist who prescribes exercise to the patients as their daily routine. In addition, the patients are involved in undertaking the exercise in their daily routine. Those who act upon these instructions are more likely to be rehabilitated. These findings are similar to the findings of [Fernando et al. \(1997\)](#), who reported that

exercise improves the physical performance of cancer patients recovering from lungs cancer.

The result further shows that (65.1%) respondents disclosed that exercise reduced the symptoms of lung cancer while (13.2%) disagreed with it. Similarly, (65.1%) of the respondents were of the view that exercise-based rehabilitation improved life expectancy, (77%) of the respondents reported that regular exercise enhances exercise tolerance, and (72.4%) of the patients expressed their view that recreational physical activity enhanced the disease tolerance. This result shows that exercise decreases the symptoms of cancer patients, which can help them to a better life and the early recovery of the diagnosed patients. In the initial stages, the rehabilitation of lungs cancer through exercise improved the health of the patients. Exercise decreases the symptoms and increases exercise

tolerance, which enhances their quality of life. These findings are similar to the findings of [Coats et al. \(2014\)](#), who reported that rehabilitation through exercise therapy is good for the health and increasing the tolerance of the patients.

It is evident from these results that exercise therapy is an important ingredient in the rehabilitation process of lung cancer patients. The patients were aware of the importance of exercise, and they were provided proper training and guidance by the doctors and exercise experts. Those patients who are motivated and are involved in exercise therapy feel comfortable as the symptoms of the disease are reduced, and their tolerance and healing level is enhanced.

Table 2. Frequencies and Percentage Distribution of Respondents Regarding Exercise Therapy

S. No	Statement	Agree	Disagree	Uncertain
1	Physical exercise reduces the chances of lung cancer.	128 (84.2)	14 (9.2)	10 (6.6)
2	Physical exercise improved better health condition of the victims?	115 (75.7)	28 (18.4)	9 (5.9)
3	Patients with lung cancer do not commonly practice physical exercise during progressive stages?	92 (60.5)	49 (32.2)	18 (7.2)
4	Patient with lung cancer is guided by professional guides in their routine exercise.	91 (59.9)	43 (28.3)	18 (11.8)
5	Lung cancer patients are motivated by professionals to undertake physical exercise.	91 (59.9)	39 (25.7)	22 (14.5)
6	Exercise reduces the symptoms of diseases.	99 (65.1)	19 (12.5)	34 (22.4)
7	Exercise-based rehabilitation improves life expectancy.	99 (65.1)	20 (13.2)	33 (22.7)
8	Regular exercise increases exercise tolerance.	117 (77)	19 (12.5)	16 (10.5)
9	Recreational physical activities enhance disease tolerance.	110 (72.4)	23 (15.1)	19 (12.5)

Source: Field Survey, 2018. Note: Values in Parentheses are Percentages.

Association between Pulmonary Rehabilitation and Exercise Therapy

Exercise is the major contributor to the pulmonary rehabilitation process. It helps the patients to develop resistance against disease and effectively recover the breathing process. However, there is always the question of whether the patients know what exercise they will do and how to carry out the exercise? The association of pulmonary rehabilitation and exercise therapy is given in Table.

The result in table 3 shows the Association between Pulmonary Rehabilitation was significant with physical exercise to improve the health condition of the victims ($p=0.003$). The significant value indicates that the respondents improved their health condition through physical exercise. Similarly, pulmonary rehabilitation had a highly significant

association with physical activity enhances the tolerance of the diseases ($p=0.000$) and regular exercise increasing the tolerance of exercise ($p=0.000$). Moreover, pulmonary rehabilitation had a significant association with exercise-based rehabilitation that improves life expectancy ($p=0.022$). Patients with lungs cancer require to undertake physical activities. These physical activities can be in terms of normal daily life activities or physical exercise. Those patients who undertake these physical exercises are in a better position to recover from their illness and rehabilitation their breathing process. Carylton 2012 had also reported similar findings, which found that physical activities in terms of daily life activities and exercise enabled the patients to recover their health status.

Conversely, a non-significant association existed pulmonary rehabilitation and physical exercise

reduced the chances of lung cancer ($p= 0.561$) pulmonary rehabilitation, and Patients with lung cancer do not commonly practice physical exercise during progressive stages ($p=0.136$). Patients with lung cancer are guided by professional guides in their routine exercise ($p=0.067$), and lung cancer patient are motivated by professionals to undertake physical exercise ($p=0.078$).

It is evident from these results that although undertaking physical exercise is important in the pulmonary rehabilitation process. However, there were lacking available facilities in terms of the

availability of professional trainers and guides that motivates the patients to take regular exercise.

Exercise therapy is an important contributor to the rehabilitation of lung cancer patients. Those who take regular exercise are comfortable with their breathing process. However, the availability of experts' trainers and guides in instructing the patients about the right way to undertake exercise is the lackey feature. Due to these reasons, motivation in patients to take exercise and taking the exercise in the right way is lacking.

Table 3. Association between Pulmonary Rehabilitation and Exercise Therapy

Statements	Attitude	Pulmonary Rehabilitation			Total	Chi-square (χ^2) P-value
		Agree	Disagree	Uncertain		
Physical exercise reduced the chances of lung cancer	Agree	72(47.4)	50 (32.9)	6(3.9)	128(84.2)	$X^2=2.978$ ($P=0.561$)
	Disagree	6(3.9)	6(3.9)	2(1.3)	14(9.2)	
	Uncertain	6(3.9)	3(2)	1(0.7)	10(6.6)	
Physical exercise improved better health condition of the victims	Agree	67 (44.1)	45 (29.6)	3(2)	115(75.7)	$X^2=15.802$ ($p0.003$)
	Disagree	11 (7.2)	11 (7.2)	6(3.9)	28 (18.4)	
	Uncertain	6 (3.9)	3 (2)	0 (0)	9 (5.9)	
Patients with lung cancer do not commonly practice physical exercise during progressive stages?	Agree	47(30.9)	40(26.3)	5(3.3)	92(60.5)	$X^2= 6.998$ ($p=0.136$)
	Disagree	27(17.8)	18(11.8)	4(2.6)	49(32.2)	
	Uncertain	10(6.6)	1(0.7)	0(0)	11(7.2)	
Patients with lung cancer are guided by professional guides in their routine exercise.	Agree	53(34.9)	33(21.7)	5(3.3)	91(59.9)	$X^2=8.764$ ($p=0.067$)
	Disagree	17(11.2)	22(14.5)	4(2.6)	43(28.3)	
	Uncertain	14(9.2)	4(2.6)	0(0)	18(11.8)	
Lung cancer patients are motivated by professionals to undertake physical exercise.	Agree	53(34.9)	33(21.7)	5(3.3)	91(59.9)	$X^2=8.390$ ($p 0.078$)
	Disagree	15(9.9)	20(13.2)	4(2.6)	39(25.7)	
	Uncertain	16(10.5)	6(3.9)	0(0)	22(14.5)	
Exercise reduces the symptoms of diseases	Agree	52(34.2)	41(27.0)	6(3.9)	99(65.1)	$X^2=5.233$ ($p 0.264$)
	Disagree	8(5.3)	9(5.9)	2(1.3)	19(12.5)	
	Uncertain	24(15.8)	9(5.9)	1(0.7)	34(22.4)	
Exercise-based rehabilitation improves life expectancy.	Agree	56(36.8)	38(25)	5(3.3)	99(65.1)	$X^2=11.415$ ($p 0.022$.)
	Disagree	5(3.3)	12(7.9)	3(2)	20(13.2)	
	Uncertain	23(15.1)	9(5.9)	1(0.7)	33(21.7)	
Regular exercise increases exercise tolerance.	Agree	67(44.1)	48(31.6)	2(1.3)	117(77)	$X^2=30.586$ ($p 0.000$)
	Disagree	5(3.3)	8(5.3)	6(3.9)	19(12.5)	
	Uncertain	12(7.9)	3(2)	1(0.7)	16(10.5)	
	Agree	63(41.4)	45(29.6)	2(1.3)	110(72.4)	$X^2=22.249$ ($p 0.000$)
	Disagree	8(5.3)	9(5.9)	6(3.9)	23(15.1)	

Statements	Attitude	Pulmonary Rehabilitation			Total	Chi-square (x ²) P-value
		Agree	Disagree	Uncertain		
Recreational physical activities enhance disease tolerance.	Uncertain	13(8.6)	5(3.3)	1(0.7)	19(12.5)	

Source: Field Survey, 2018. Note: Values in Parentheses are Percentages.

Conclusions And Suggestion

It was induced from the inferences the regular therapy reduced the pains of the cancer patients. The proper expert instructions were proved fruitful in reducing the severity of cancer patients in the study

area. Proper physical exercise, as well as counselling for the patients, is the dire need of the time is necessary to adjust them with the daily life activities were suggested as policy recommendations.

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