T.C.

YEDİTEPE ÜNİVERSİTESİ

INSTITUTE OF HEALTH SCIENCE

DEPARTMENT OF PHYSIOTHERAPY

AND REHABILITATION

EVALUATION OF THE EFFECT OF EXERCISE AND RESPIRATORY PHYSIOTHERAPY EXERCISES ON THE IMPROVMENT OF RESPIRATORY DISORDERS IN PATIENT WITH COVID-19

MASTER THESIS

SHADI DOOSTIBASHEKANDI

Istanbul, 2022

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APPROVAL

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STATEMENT

I have stated that this thesis is my own work, that I have not had any unethical behavior from planning to writing, that I have obtained all the information in the thesis within academic and ethical rules, that I have cited all information and comments that were not obtained through the thesis study, and that I have included these sources in the reference list, and I declare that I have not acted in violation of copyrights.

Tarih: 26.10.2020

Shadi DOOSTİBABASHEKANDİ

DECLARATION

Dear Prof. Rasmi Muammar I sincerely thank you for helping me in this study and always benefiting from their valuable guidance. I would also like to thank all the patients participating in this study, the staff of the International Health Center where the samples were collected, my friends, and all the people who helped me write and write this dissertation.

I would like to thank my family for their endless love and support, which makes everything more beautiful.

Shadi DOOSTIBASHEKANDI

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ABSTRACT

Doostibashekandi, S. (2022). Evaluation of the effect of exercise and respiratory physiotherapy exercises on the improvment of respiratory disorders in patient with Covid-19. Yeditepe University, Institute of Health Scinece, Departmen of Physitherapy and Rehabilitation. Master thesis, İstanbul.

Covid-19 disease is a new disease that first appeared in December 2019 in Wuhan, China and started rapidly throughout China. Since respiratory disorders are one of the most important symptoms and complications in patients with Covid-19 and due to the role of exercise in improving respiratory disorders and since few studies to determine the effect of exercise on the course of recovery of respiratory disorders in patients with Covid-19 Therefore, this study was conducted to investigate the effect of exercise and respiratory physiotherapy exercises on the improvement of respiratory disorders in patients with Covid-19 in the first half of 2019 in an international health center in Tehran.

This study was a cross-sectional study that was perfonned in the first half of 2019 and the study population included patients with Covid-19 who had referred to an international health center in Tehran. In order to collect basic information and evaluate the effect of exercise, a 4- part researcher-made checklist was used and to evaluate the effect of respiratory physiotherapy exercises, a researcher-made checklist was used in accordance with the recommended respiratory physiotherapy exercises for patients. To report descriptive results of mean, standard deviation, absolute frequency and absolute frequency percentage, as well as for analyzes of two-group independent t-test and Chi-square test, Kruskal-Wallis and one-way analysis of variance (ANOVA) using SPSS software Version 16 (IBM SPSS statistics version 16) was used at the significance level of 0.05.

Hi the study of the effect of exercise in this study, 350 patients with Covid-19 participated and in the study of the effect of respiratory physiotherapy exercises, 91 patients who did not improve their respiratory disorders by the 16th week of follow-up participated. The prevalence of respiratory disorders in patients was 54.57%. Patients with Covid-19 with a sex ratio equal to (50.00%) participated in the study and the mean and age deviation of patients was 32.71. 10.93 years. The relationship between

unplanned exercise including walking and anaerobic bodybuilding with an 8-week improvement in respiratory disorders (p-value = 684) and a 16-week improvement in respiratory disorders (p-value = 0.848) in patients with covid-19 disease There was no significance. There was a significant relationship between performing respiratory physiotherapy exercises with increasing patients 'respiratory capacity (p-value = <0.000), reducing patients' respiratory secretions (p-value = <0.000) and improvement of respiratory disorders in patients (p-value = <0.000).

Respiratory disorders in patients with covid-19 disease is one of the most common disorders that should be followed up by pulmonologists and physiotherapists for at least 8 weeks in patients with mild respiratory disorders and in patients with severe respiratory disorders for 16 weeks. Due to the fact that irregular and planned exercise and anaerobic bodybuilding do not have a significant effect on the recovery of respiratory disorders in patients with covid-19 disease, while specialized exercises of respiratory physiotherapy have a significant effect on improving respiratory disorders, increasing respiratory rate and reducing respiratory secretions, hi these patients, and due to the importance of how these exercises are performed by patients on the effect of exercises, it is recommended that patients with covid-19 disease with follow-up be followed by physiotherapists from the beginning until recovery.

Keywords: Respiratory Disorders, Exercise, Corona, Recovery, Respiratory Physiotherapy.

ÖZET

Doostibashekandi, S. (2022). Covid-19'lu hastalarda egzersiz ve solunum fizioterapi egzersizlerinin solunum bozukluklarının düzelmesine etkisnin değerlendirilmesi. Yeditepe Üniversitesi, Fizyoterapi ve Rehabilitasyon Bölümü, İstanbul.

Covid-19, ilk olarak Aralık 2019'da Çin'in Wuhan kentinde başlayan ve Çin'de hızla başlayıp hızla yayılan yeni bir hastalıktır. Solunum bozuklukları, Covid-19 hastalarında en önemli semptom ve komplikasyonlardan biri olduğundan ve egzersizin solunum bozukluklarını iyileştinnedeki rolü nedeniyle ve Covid-19 hastalarda egzersizin solunum bozukluklarının iyileşme sürecine etkisini belirlemeye yönelik az sayıda çalışma olduğu için Bu nedenle bu çalışma Tahran'da uluslararası bir sağlık merkezinde 2020 yılının ilk yansında covi-19 hastalarda egzersiz ve solunum fizyoterapi egzersizlerinin solunum bozukluklannm iyileşmesine etkisini araştırmak amacıyla yapılmıştır.

Bu çalışma, 2020 ilk yarısında gerçekleştirilen kesitsel bir çalışmadır ve çalışma popülasyonu, Tahran'da uluslararası bir sağlık merkezine başvuran Covid-19 hastalarını içermektedir. Temel bilgileri toplamak ve egzersizin etkisini değerlendinnek için araştmnacı tarafından hazırlanan 4 bölümlük bir kontrol listesi ve solunum fizyoterapi egzersizlerinin etkisini değerlendirmek için hastalar için önerilen solunum fizyoterapi egzersizlerine uygun olarak araştırmacı tarafından hazırlanmış bir kontrol listesi kullanılmıştır. Ortalama, standart sapma, mutlak frekans ve mutlak frekans yüzdesinin tanımlayıcı sonuçlarının yanı sıra iki gruplu bağımsız t-testi ve Ki-kare testi, Kruskal-Wallis ve SPSS yazılımı kullanılarak tek yönlü varyans analizi (ANOVA) analizleri için rapor etmek Versiyon 16 (IBM SPSS istatistik versiyon 16) 0.05 anlamlılık seviyesinde kullanılmıştır.

Egzersizin etkisinin araştırıldığı bu çalışmaya 350 Covid-19 hastası ve solunum fizyoterapi egzersizlerinin etkisinin araştırılmasına 16. haftaya kadar solunum bozuklukları düzelmeyen 93 hasta katıldı. Hastalarda solunum bozuklukları prevalansı% 54,57 idi. Çalışmaya cinsiyet oranı (% 50.00) eşit olan Covid-19 hastaları katılmış olup, hastaların ortalama ve yaş sapması 32.71 10 10.93 yıldı. Yürüme ve anaerobik vücut geliştirme dahil planlanmamış egzersiz ile solunum bozukluklarında 8

haftalık bir iyileşme (p-değeri = 0.684) ve Covid-19 hastalarda solunum bozukluklarında 16 haftalık bir iyileşme (p-değeri = 0.848) arasındaki ilişki de anlamlı bir fark bulunmamaktadir. Solunum fizyoterapi egzersizlerinin hastaların solunum kapasitesinin artması (p-değeri = <0.000), hastaların solunum sekresyonlarmm azaltılması (p- değeri = <0.000) ve hastalarda solunum bozukluklarının düzelmesi (p-değeri = <0.000) ile anlamlı bir fark bulunmaktadir.

Covid-19 olan hastalarda, solunum bozuklukları, hafif solunum bozukluğu olan hastalarda ve şiddetli solunum bozukluğu olan hastalarda 16 hafta süreyle pulmonolog ve fizyoterapistler tarafından en az 8 hafta takip edilmesi gereken en yaygın hastalıklardan biridir. Düzensiz ve planlsiz egzersiz ve anaerobik vücut geliştirmenin Covid-19 olan hastalarda solunum bozukluklarının iyileşmesinde önemli bir etkisi olmadığı için, özel solunum fizyoterapisi egzersizlerinin solunum bozukluklarını iyileştirme, solunum hızını artırma ve solunum salgılarım azaltmada önemli etkisi vardır. Bu hastalarda ve bu egzersizlerin hastalar tarafından nasıl yapıldığının egzersizlerin etkisi üzerindeki önemli nedeniyle, Covid-19 olan hastaların baştan, tüm ileşme aşamasına kadar fizyoterapistler tarafından takibi ile takip edilmesi önerilmektedir.

Anahtar Kelimeler: Solunum Bozuklukları, Egzersiz, Korona, İyileşme, Solunum Fizyoterapisi.

1. INTRODUCTION

Covid-19 is a new disease that first started in December 2019 in Wuhan, China and has spread rapidly throughout China (1-3). Finally, on January 30, 2020, the World Health Organization (WHO) declared that covid-19 was an emergency problem for public health (2). With the spread of Covid-19 in the world, other countries gradually became infected with covid-19, which became a pandemic (4). . COVID-19 in almost all countries of the world such as Taiwan, Thailand, Vietnam, Malaysia, Nepal, Sri Lanka, Cambodia, Japan, Singapore, Republic of Korea, UAE, USA, Iran, Spain, Turkey, Austria, Philippines, India, It is common in Australia, Canada, Finland, France, Germany and many other countries. Some studies conducted in 2020 have stated that the mortality rate of Covid-19 is 2% (5, 6) and in others the mortality rate of Covid-19 has been reported to be 2.2% (7). According to the World Health Organization, 12 million 847 thousand 288 people in the world have been infected with the Covid-19 virus so far, of which 567 thousand 734 people have lost their lives, which due to the increasing spread of this disease Statistics are increasing in all countries involved in Covid-19 (8). Coronavirus family viruses are the cause of Covid-19 disease, which mainly attacks the respiratory system (9). The average period of Covid-19 commune is 14 days (10).

Symptoms of Covid-19 include numbness, diarrhea, abdominal pain, dizziness, headache, impaired consciousness, acute brain disease, ataxia, fatigue, acute respiratory syndrome, sore throat, arthritis, rhinorrhea, sneezing, and purulent discharge. Nose, myalgia, vomiting, nasal congestion, nasal irritation, cheek pain, cephalalgia, delirium, hoarseness, hypoglycemia, hyposemia, hypopsy, parosemia, unilateral facial paralysis, dizziness and skin rash (3, 5, 10-12) . Pulmonary involvement and shortness of breath to varying degrees is one of the most common complications of Covid-19 in patients in all age groups, especially in The elderly (13-15). A study by Sakika Tabata et al. Found that the prevalence of respiratory disorders in patients with COVID-19 was 7.00% (16). A study by Frank Grillet et al. Found that respiratory disorders were one of the most important symptoms in patients with Covid-19 and reported a prevalence of respiratory disorders in patients of 15.00% (17) In a study by Maximilian Ackermann et al., They

found that progressive respiratory failure was the leading cause of death in the Covid-19 pandemic (18).

With the Covid-19 epidemic and the sudden and widespread quarantine of people, including non-Covid-19 people, it changed people's lifestyles, and since exercise has been proven to be effective in treating many diseases such as diabetes, hypertension. , Has respiratory diseases, etc., it has been stated that physical exercise is a suitable solution to deal with mental and physical consequences in patients with Covid-19 (19). A study by James Hull et al. Found that six weeks of respiratory rehabilitation in patients with covid- 19, especially in the elderlies, could reduce respiratory function, quality of life, and anxiety (20). Exercise can improve the condition of patients with respiratory disorders such as Covid-19 by boosting the immune system by affecting T, B (B) and neutrophils, but strenuous exercise can predispose people to respiratory infections. Therefore, it can increase the risk of Covid-19 disease (21). Studies examining the effect of respiratory physiotherapy exercises have shown that respiratory physiotherapy exercises can improve respiratory disorders in patients with Covid-19 and also that physiotherapists have an important role in managing patients with Covid-19. (22, 23). These respiratory physiotherapy exercises generally include strengthening exercises for the respiratory muscles of the chest and ribs, various breathing exercises to increase lung function such as deep and slow breathing training, diaphragmatic breathing, and incremental exercises. Chest volume, training and training the ability to cough, lung cleansing exercises, improvement and correction of respiratory patterns, posture and elimination of possible airway secretions and elimination of causal and interfering factors in the disease (24). Since respiratory disorders are one of the most important symptoms and complications in patients with COVED-19 and due to the role of exercise and respiratory physiotherapy exercises in improving respiratory disorders (25) and since few studies to determine the effect of exercise and physiotherapy exercises Respiratory studies have been performed on the improvement of respiratory disorders in patients with Covid-19 (26). International Health was conducted in Tehran.

2. LITERATURE REVIEW

2.1. Review Articles

1. In a retrospective study conducted in 2020 by Franck Grillet et al. On 2003 patients with Covid-19 in the United States, 280 (13.98%) patients were hospitalized. They also mentioned that respiratory disorders are one of the most important symptoms in patients with Covid-19 and the prevalence of respiratory disorders in all patients was reported to be 15.00%. (17).

In a 2020 study by Maximilian Ackermann et al. In epidemic disease, it is -19 (18).

3. A study conducted by Chih-Cheng Lai et al. In 2020 to study the covid-19 epidemic and its challenges found that lung involvement is one of the most important disorders in patients with Covid-19. 13).

In a study conducted by David Jimenez-Pavon and colleagues on the role of exercise in improving the physical and mental condition of Covid-19 patients in 2020, they noted that the Covid-19 pandemic and sudden quarantine and Although it is one of the most important components of preventing individuals from developing Covid-19, it has changed people's lifestyles, and since exercise has proven to be effective in treating many It has diseases such as diabetes, hypertension, respiratory diseases, etc. Physical exercise is a good way to deal with the mental and physical consequences in patients with Covid-19. He recommended at least 150 to 300 minutes per week of aerobic exercise and 2 sessions of resistance training per week in patients with Covid-19, and in quarantine conditions, he stated that the exercise time can be increased to 200 - 400 minutes per week relatively. He noted that exercise strengthens the immune system and improves the condition of patients with Covid-19 (19).

5. In a 2020 study by JH Hull et al. On patients with Covid-19, it was reported that six weeks of respiratory rehabilitation in patients with Covid-19, especially in the elderlies, could improve respiratory function, quality Increase their life and reduce their anxiety (20).

In a 2020 study by Carol Gois Leandro and colleagues to detennine the role of exercise in Covid-19 patients, they found that having Covid-19 weakening the immune system and that exercise can prevent By strengthening the immune system by affecting T (T) lymphocytes, B (B) lymphocytes and neutrophils, it improves the condition of patients with respiratory disorders such as Covid-19. But sports can predispose a person to respiratory infections severely, so it can increase the risk of developing Covid-19 disease. They also mentioned that hypothalamic axis hormones, pituitary-adrenal honnones, glucocorticoid receptors and intracellular signaling (NF-kB) are involved in chronic inflammatory diseases of the respiratory tract, which increase and improve as a result of regular exercise in the body. Conditions of patients (21). In a 2020 study by Jeffrey Woods and colleagues to examine the relationship between exercise and the Covid-19 pandemic, they found that pathological conditions or comorbidities, as well as old age, were the main causes of premature death and increased mortality in patients with Covid-19, and it was also reported that quarantine due to Covid-19 has altered people's lifestyles, leading to inactivity, which in turn reduces the body's immune system's resistance to viral infections. As a result, the risk of damage to the respiratory system, heart and sweat, musculoskeletal and cerebral is increased. He noted that many patients with Covid-19 develop respiratory disorders during the course of their illness that become so widespread that many require artificial respiration, although artificial respiration is life-saving for these patients. It is vital, but in the long run, it weakens the diaphragm and respiratory muscles, and in the meantime, respiratory endurance exercises can be effective in improving a person's breathing and reducing respiratory disorders, or accelerating the recovery of respiratory disorders in these patients (27).

8. In a review study conducted in 2020 by Soleimanifar and Hazrati, it was stated that in order to improve the respiratory function of patients with Covid-19 and clear their airways of respiratory secretions, physiotherapy exercises and Respiratory rehabilitation, which includes chest physiotherapy and breathing exercises, plays an effective role (28).

9. In a review study conducted in 2020 by Ghanjal and Motaqi, it was stated that due to respiratory problems Respiratory physiotherapy can be considered and used as an important part in the treatment and reduction of respiratory problems in people with

covid- 19. He noted that respiratory physiotherapy exercises that affect the improvement of respiratory function in patients with COVID-19 generally include: 1. Retraining Breathing, which includes specific breathing exercises and exercises in order to achieve effective ventilation. And controlled, reducing respiratory work and correcting respiratory defects are planned and performed. These exercises fill the alveoli with air as much as possible, expand the muscles and eliminate anxiety. It also eliminates inappropriate patterns of respiratory muscle activity, slows down breathing, and works

They reduce breathing. 2. Pursed-Lip Breathing method, in which the patient is instructed to have normal breathing through the nose, then when exhaling by slowly closing the lips and with the help of abdominal muscles as much air as possible. Drain the inside of the lungs. The purpose of breathing with bud lips is to train the muscles to exhale. To perform this exercise, the patient should be advised to breathe through the nose and count to 3, then squeeze the lips almost together and slowly squeeze the air out of the lungs out of the mouth by squeezing the abdomen. Count to 7 while prolonging exhalation through bud lips. To facilitate this breathing, sit on a chair and bend your arms over your abdomen. When walking, take two steps through the nose and take 4-5 steps to expel the air inside the lungs through the bud lips. 3. Diaphragmatic breathing exercises which are:

Exercise 1: The patient puts his hands on the abdomen while sitting, inhales from the nose for 2 seconds and exhales from the mouth (in the form of a bud lip) for 4 seconds. . Exercise 2: This exercise is used to hold the breath and increase the volume of the alveoli and air sacs. In this exercise, after perfonning the inhale, a pause is performed for 2 seconds and then an exhalation is performed for 4 seconds, and immediately a pause is performed for a while (rest) and the next exercise movement begins. Exercise 3: The patient sits comfortably in a chair, leans forward slightly, and places his hands on his knees from the forearm And inhales through the nose and then exhales through the mouth (the exhalation time is longer than the tail) and repeats the movement after a short pause. Exercise 4: People who suffer from shortness of breath while walking can lean on a place such as a wall and rest their hands above the knees and inhale through the nose and then exhale through the mouth (exhale time is longer than the tail) and after a while. Repeat the movement for a short pause. 4. Local

Expansion of the Lung (Local Expansion) This maneuver is used in cases such as atelectasis, pneumonia, chest defonnity such as scoliosis, or after abdominal and thoracic surgeries where an area of the lung is not dilated enough. 5.Chest volume-increasing exercises, which are: Exercise 1: The patient sits on a chair and puts his hands to the front, when the tail (from the nose) opens the anns and moves them back and forth. Exhale (from the mouth and into the bud lips) turns the hands towards each other. Exhalation time should be longer than the tail and should be in the fonn of death of air outside the lungs. Exercise 2: The patient sits on a chair and puts his hand on his shoulders, moves his hand back when inhaling (from the nose) and brings his hand forward when exhaling (from the mouth and in the fonn of a bud lip). Exercise 3: The patient sits on a chair and puts his hand behind his head, when he inhales (from the nose) he moves his hand backwards and when he exhales (from the mouth and in the fonn of a bud lip) he brings his hand forward. Exercise 4: The patient sits on a chair and puts his hand in front of his body in the air, when he inhales (from the nose) he moves his hand backwards (away from each other) and when he exhales (from the mouth and in the form of a pouty lip) Brings forward (close together). Exercise 5: The patient is standing and crosses his anus in front of the trunk. When inhaling, open the arms apart (away from the trunk) and when exhaling (from the mouth and in the form of a bud lip) bring the hands forward and in the middle (close together). 6. Progressive lung expansion exercises, which include: Exercise 1: The patient locks his hand together, raises it several times, and takes a few deep breaths (nose-to-nose), then begins with a deep exhalation with pressure from the mouth. He coughs. Exercise 2: Sick the patient's hand He raises it with a stick and takes a deep breath at the same time (about 2 seconds from the nose). Then lower the hand and at the same time take a deep exhalation (from the mouth and in the form of a bud lip for 4 seconds). After 2 seconds of rest, repeat the movement again (29).

2.2. Epidemiology of Covid-19

The first outbreak of pneumonia occurred in December 2019 in Wuhan Province, China. The first patients from a center

They bought and sold animals, especially marine animals. Pathological examinations eventually revealed that the cause of the disease was a family of Covid-19 viruses. Eventually the disease was covid-19 and abbreviated to corona (9, 32-35).

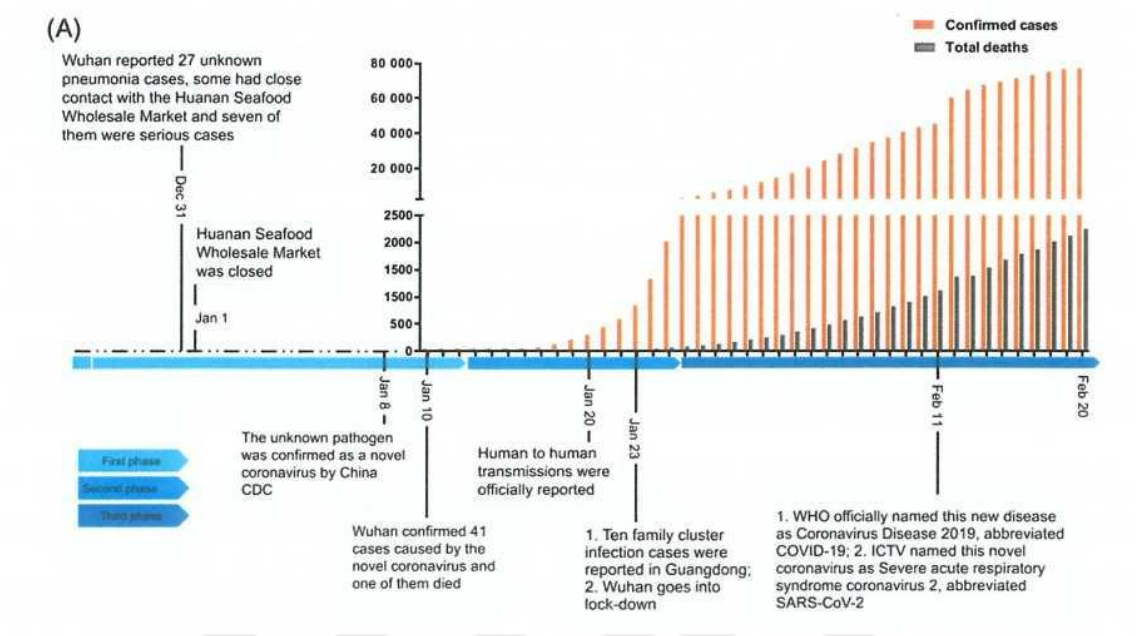

Figure 1. In the early stages, the prevalence of Covid-19 spread rapidly (32).

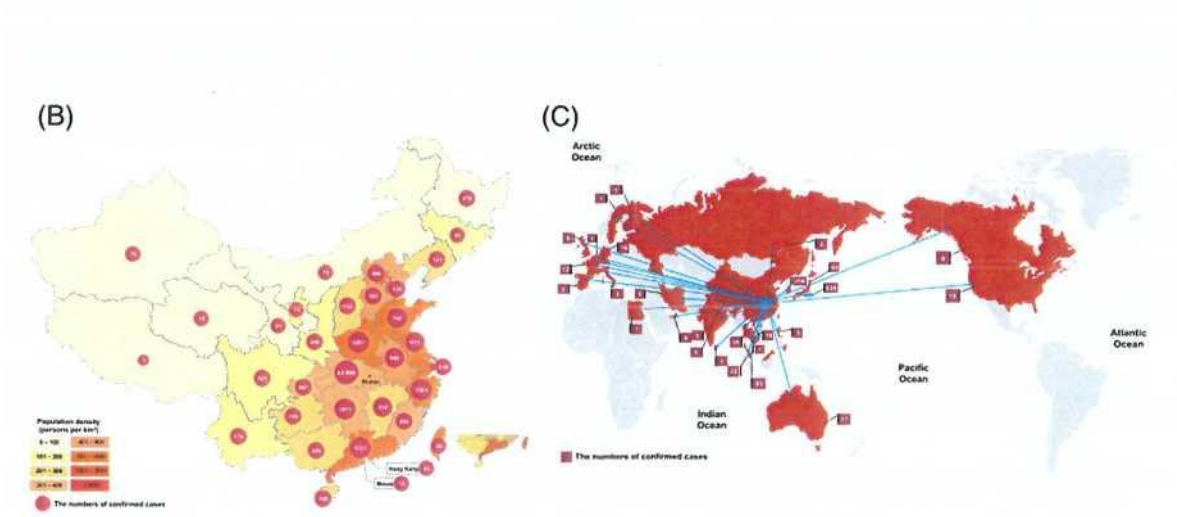

Figure 2. Early spread of Covid-19 disease in Wuhan, China

By March 31, 2020, the Covid-19 virus had become a pandemic, spreading to 192 countries worldwide, infecting 800,000 people of all ages and causing 7,700 deaths

(36). And it took about 6.40 to 7.40 days to double the spread of the Covid-19 epidemic (Figure 3).

Author	Data	Estimates	Estimation Period	Doubling Time
	Published (2020)			
Du et al. [7]	Number of confirmed cases outside China and travel data	12,400 in Wuhan	By 22 Jan 2020	7.31 days
Wu et al. [8]	Number of confirmed cases outside China and travel data	75,815 in Wuhan	By 25 Jan 2020	6.4 days
Nishiura et al. [9]	Proportion of asymptomatic cases among Japanese evacuated from Wuhan	20,767 in Wuhan	By 29 Jan 2020	-
Li et al. [10]	Case reports from Wuhan	-	By 22 Jan 2020	7.4 days
	Preprint			
Cao et al. [11]	Number of confirmed cases in China and travel data	18,556 in Wuhan	By 23 Jan 2020	-
Chinazzi et al. [12]	Number of confirmed cases outside China and travel data	58,956 in Wuhan	By 23 Jan 2020	4.6 days
Xiong et al. [13]	Number of confirmed cases in China	49,093 in China	By 16 Feb 2020	-
Q. Zhao et al. [14]	Number of confirmed cases outside China and travel data	–	By 23 Jan 2020	2.9 days

Figure 3. The time trend of doubling the Covid-19 epidemic to March 31, 2020 (33).

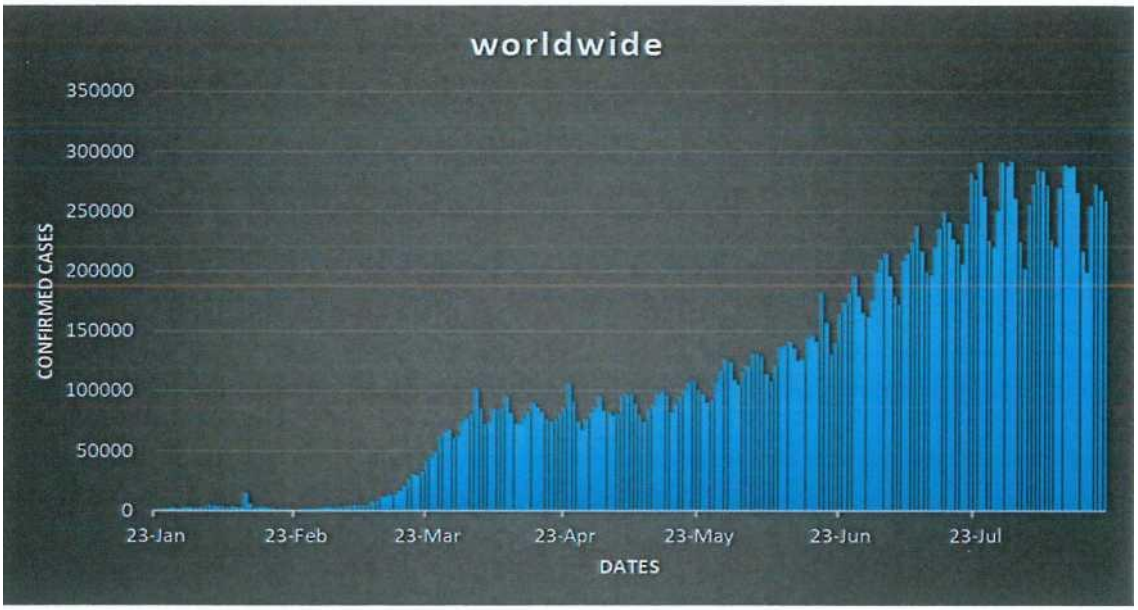

Figure 4. Increasing trend of Covid-19 mortality worldwide (37).

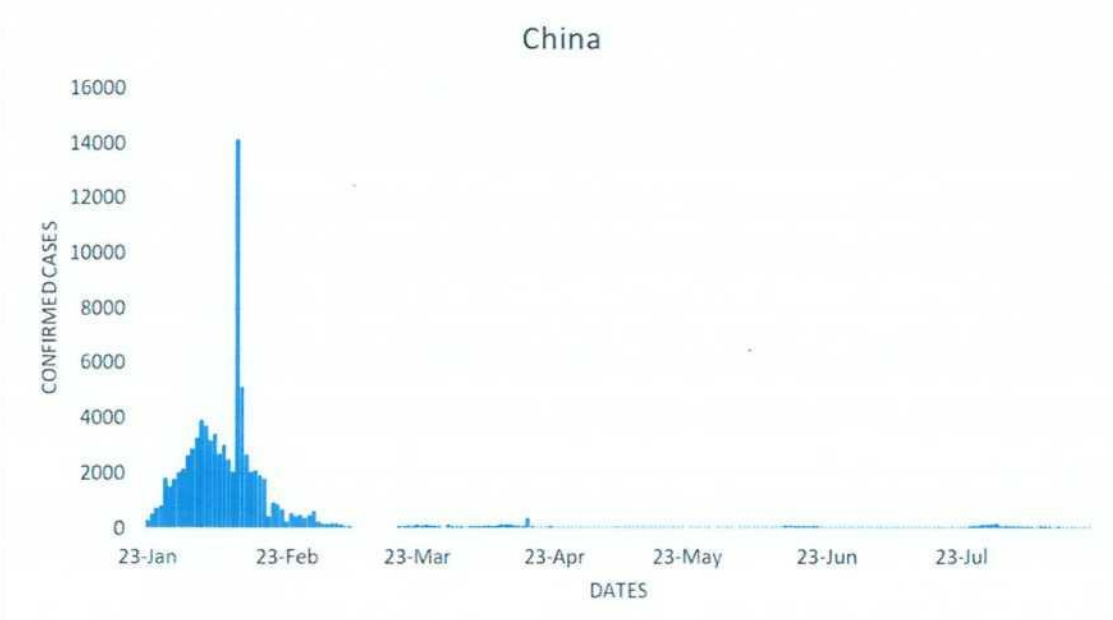

Figure 5. Covid-19 mortality chart in China (37)

	SARS	COVID-19 (95% CrI)	Influenza
Overall	14–15%	1·38% (1·23–1·53)	0·0962%
Age, years			
0–4	0·0%	0·00260% (0·000312–0·0382)	0·0073%
5–9			0·0028%
10–14		0·0148% (0·00288–0·0759)	
15–17	0·5%		
18–19			0·0206%
20–24		0·0600% (0·0317–0·132)	
25–29	1·6%		
30–34		0·146% (0·103–0·255)	
35–39	10·0%		
40–44		0·295% (0·221–0·422)	
45–49	13·0%		
50–54		1·25% (1·03–1·55)	0·0614%
55–59	25·3%		
60–64		3·99% (3·41–4·55)	
65–69	52·5%		0·8315%
70–74		8·61% (7·48–9·99)	
75–79	69·6%		
≥80		13·4% (11·2–15·9)	

Figure 6. Comparison of Covid-19 mortality with SARS and seasonal influenza mortality (37).

As of September 23, 2020, according to the World Health Organization (WHO), the global prevalence of Covid-19 has reached 31,375,325, with new cases reaching 1,940,404 and deaths reaching 9,663,999 (Figure 7) (38).

Figure 7. Distribution of Covid-19 worldwide until September 2020

A 2020 study by Jiangshan Lian and colleagues on 788 patients with Covid-19 reported that patients in all age groups developed Covid-19 (Figure 8) (39).

Characteristic	Age < 60 y (n = 652)	Age ≥ 60 y (n = 136)	*P* Value
Age, y, mean (SD)	41.15 ± 11.38	68.28 ± 7.31	< .001
Female sex	303 (46.47)	78 (57.35)	.021
Current smoker	46 (7.06)	8 (5.88)	.622
Coexisting condition			
Any	143 (21.93)	75 (55.15)	< .001
Hypertension	73 (11.20)	53 (38.97)	< .001
Diabetes	33 (5.06)	24 (17.65)	< .001
Chronic liver disease	25 (3.83)	6 (4.41)	.753
Cancer	3 (0.46)	3 (2.21)	.067
Chronic renal disease	5 (0.77)	2 (1.47)	.347
Heart disease	5 (0.77)	6 (4.41)	.005
COPD	0 (0)	3 (2.21)	.005
Immunosuppression	0 (0)	1 (0.74)	.173
Exposure history			
From Wuhan	350 (53.68)	43 (31.62)	< .001
Contact with patients	269 (41.26)	63 (46.32)	.276
Cluster	150 (23.01)	45 (33.09)	.013
Time from onset of illness to consultation, d, median (IQR)	2 (1–4)	2 (1–4)	.867
Time from onset of illness to confirm the diagnosis, d, median (IQR)	4 (2–7)	4 (2–7)	.410
Time from onset of illness to hospitalization, d, median (IQR)	3 (1–7)	3 (1–6)	.945
Clinical type on admission			
Severe/critical	44 (6.75)	34 (25.0)	< .001
Mild	608 (93.25)	102 (75.0)	< .001
Severe	39 (5.98)	22 (16.18)	< .001
Critical	5 (0.77)	12 (8.82)	< .001

Data are presented as no. (%) unless otherwise indicated.
Abbreviations: COPD, chronic obstructive pulmonary disease; IQR, interquartile range; SD, standard deviation.

Figure 8. Distribution of Covid-19 incidence in different age groups

Covid-19 disease occurs in patients with varying degrees of severity. For example, in a study conducted by Haiyan Qiu et al. On patients with Covid-19, they reported that some of their patients were mild and some were moderate in severity (Figure 9) (40), but generally based on reports from the organization. Global Health Approximately 80% of Covid-19 patients are either asymptomatic or have mild symptoms (38).

	Total (n=36)	Mild cases (n=17)	Moderate cases (n=19)	p value*
Epidemiological data				
Female patients	13 (36%)	7 (41%)	6 (32%)	0·70
Male patients	23 (64%)	10 (59%)	13 (68%)	..
Age, years (SD, range)	8·3 (3·5, 1–16)	7·5 (3·2, 1–16)	9·0 (3·6, 3–16)	0·099
Age ≤5 years	10 (28%)	8 (80%)	2 (20%)	..
History of exposure to epidemic area	12 (33%)	5 (29%)	7 (37%)	0·70
Family members with COVID-19	32 (89%)	16 (94%)	16 (84%)	0·60

Figure 9. Distribution of different intensities of Covid-19 infection

This information indicates that the health care system around the world is involved from the most basic level of service delivery to the most specialized level of service delivery as a result of Covid-19 disease, and this means creating a heavy burden on the health care system of all countries.

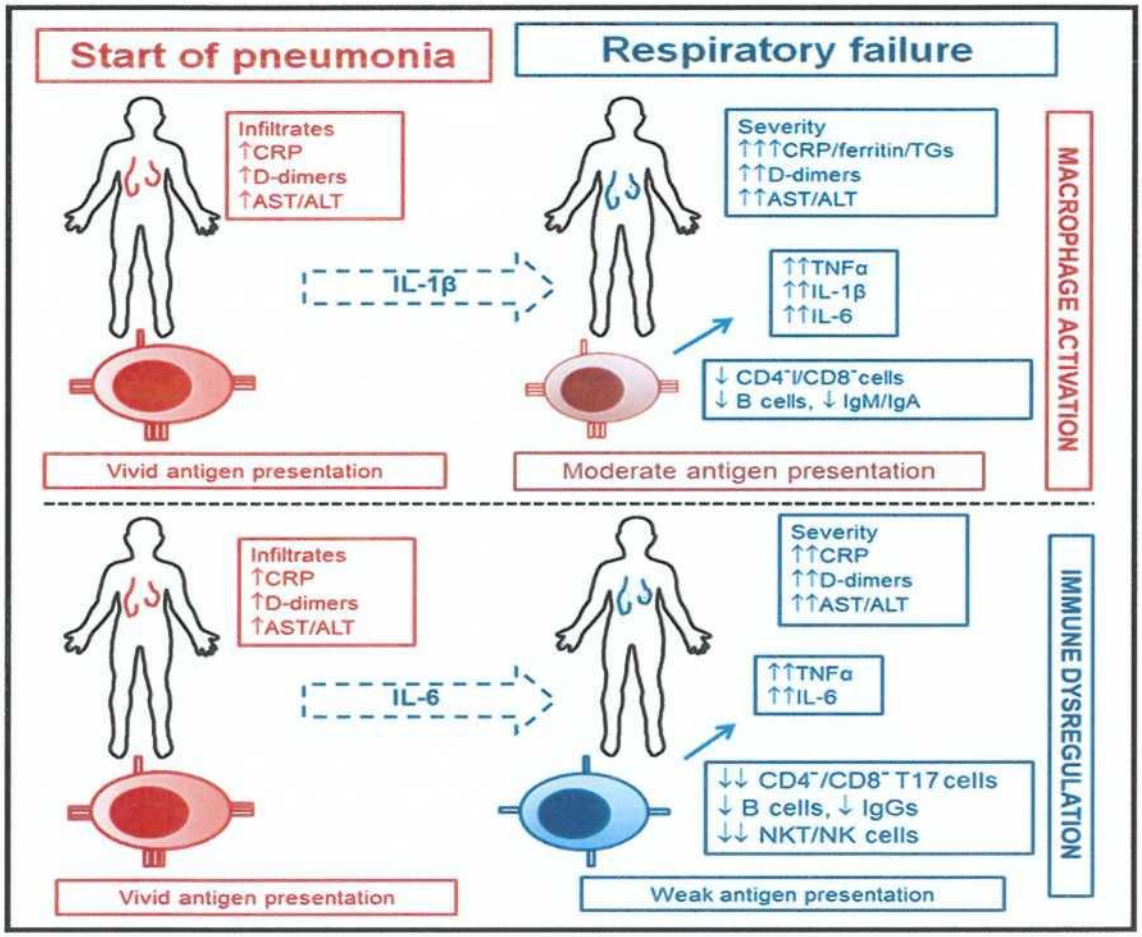

Figure 10. Wheel of Covid- 19 disease severity in the human body

At present, all measures that can be taken to combat Covid-19 are based on public health measures to prevent Covid-19 infection and the preparation of some vaccines that are not yet widely available in the community, relying solely on prevention methods such as The use of masks, gloves and disinfectants can be counteracted with Covid-19 (41).

In a study by Andrew Clark and colleagues in 2020, Nietzsche stated that approximately 1.7 billion people worldwide, especially the elderly, are at risk for Covid-19 disease (41).

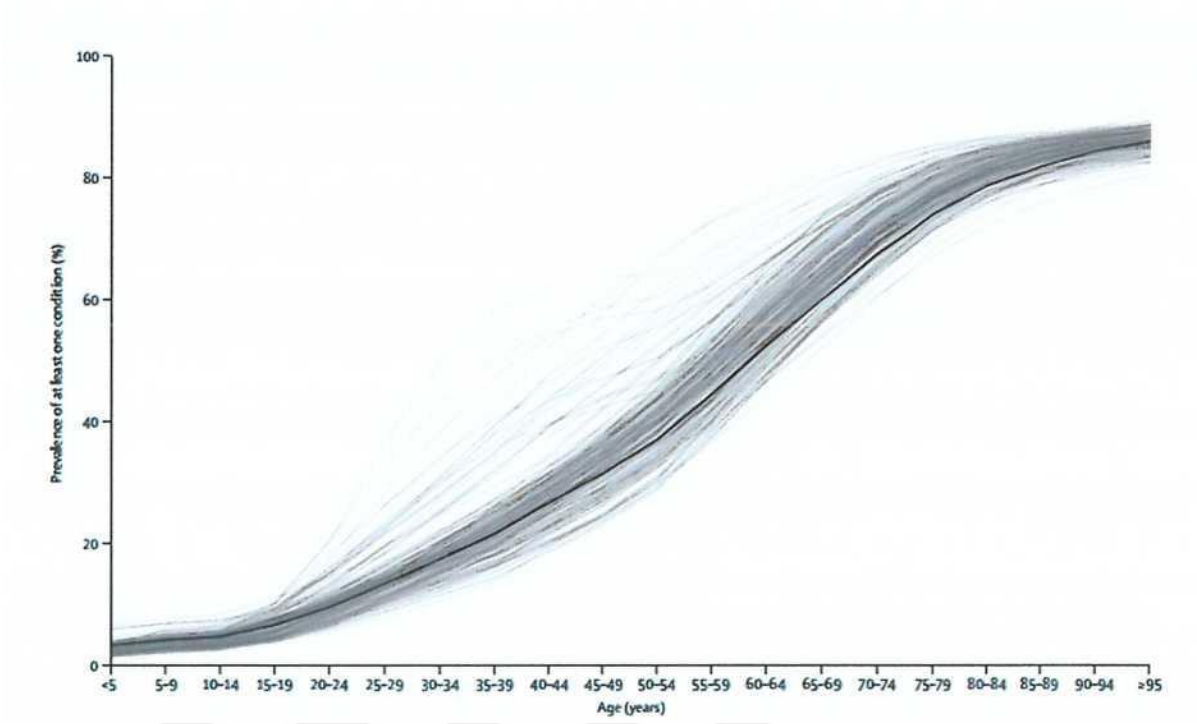

Figure 11. Predicting the population at risk of Covid-19

Covid-19 disease is a very changing disease and has a wide variety of symptoms that are constantly changing. In a study conducted by Forouzabadi et al. In 2020 on patients with Covid-19, they stated that there is still no clear picture of Covid-19 disease due to changes in the disease, and stated that the symptoms of Covid-19 disease are: From: anesthesia, diarrhea, abdominal pain, dizziness, headache, disturbance of consciousness, acute brain disease, ataxia, denervation, fatigue, acute respiratory syndrome, sore throat, arthritis, inhalation, rhinorrhea, sneezing, and purulent nasal discharge, myalgia Vomiting, nasal congestion, respiratory disorders, orbital pain, nasal irritation, cheek pain, cephalopathy, delirium, hoarseness, hypoglycemia, hyposemia, hypopsy, parosemia, unilateral facial paralysis, dizziness, and skin rash (12).

One of the most important and common signs and complications of Covid-19 disease is respiratory disorders, including mild respiratory disorders and severe respiratory disorders, which cause disability and cause many problems in patients with Covid-19 (42-45).

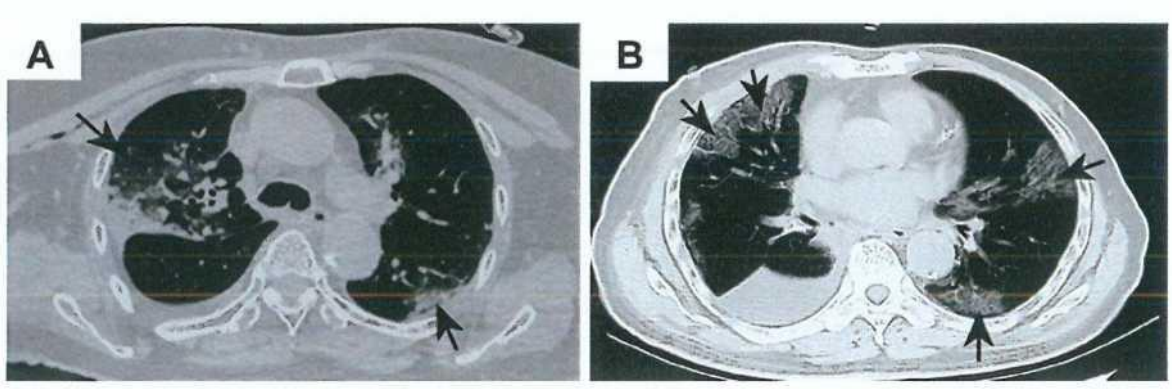

Figure 12. The effect of Covid-19 on the lung Covid-19 can cause lung tissue involvement and destruction to varying degrees

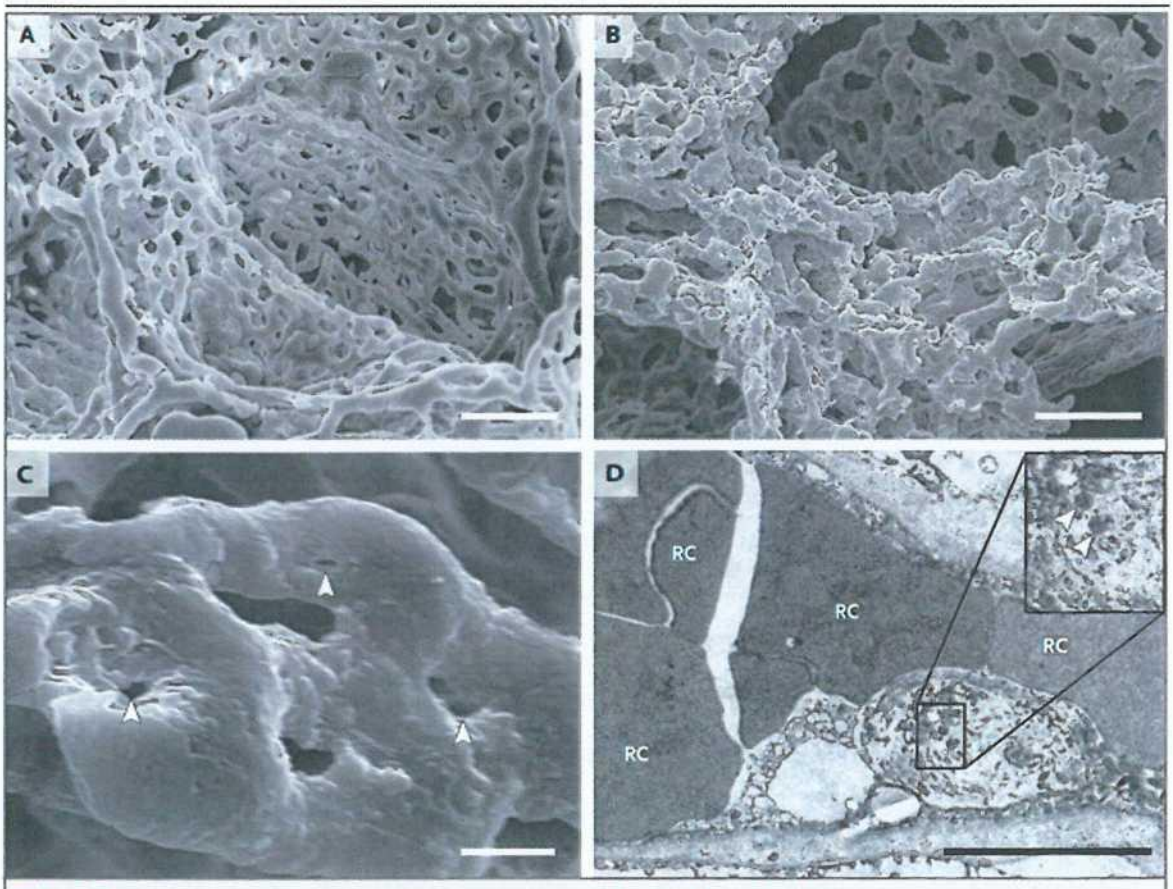

Figure 3. Microvascular Alterations in Lungs from Patients Who Died from Covid-19.

Panels A and B show scanning electron micrographs of microvascular corrosion casts from the thin-walled alveolar plexus of a healthy lung (Panel A) and the substantial architectural distortion seen in lungs injured by Covid-19 (Panel B). The loss of a clearly visible vessel hierarchy in the alveolar plexus is the result of new blood-vessel formation by intussusceptive angiogenesis. Panel C shows the intussusceptive pillar localizations (arrowheads) at higher magnification. Panel D is a transmission electron micrograph showing ultrastructural features of endothelial cell destruction and SARS-CoV-2 visible within the cell membrane (arrowheads) (the scale bar corresponds to 5 μm). RC denotes red cell.

Figure 13. The destructive effect of Covid-19 on lung tissue

3. MATERIALS AND METHODS

This study is a cross-sectional study that was performed in the first half of 2020 on patients with Covid-19. The research population of this study included people who used the services of an international health center in the first half of 2020 and had Covid-19 disease. In order to select patients for this study, we collected all personal details and contact information's, then we explained them the main objectives of our studying and also we informed them that besides their oral consents, we need their written consents by sending emails as well so we could complete our check lists.

Since all patients were followed up by the consulting physician of the study center according to the information in their file in the eighth and sixteenth weeks after the initial evaluation, we can only examine the effects of exercise, including aerobic exercise (such as walking) and anaerobic exercise (e.g. We were in the eighth and sixteenth weeks. The course of improvement of respiratory disorders in patients with COVID-19 was evaluated according to the information in the records of patients in the study center in the eighth and sixteenth weeks after patients with respiratory disorders. In order to minimize the drop in patients in this study, patients whose files were incomplete were contacted again by phone number or e-mail in their file and the required additional infonnation about demographic variations was completed by telephone interview with the patient himself. In order to investigate the relationship between exercise and the improvement of respiratory disorders caused by Covid-19 disease, in this study, a 4-part researcher-made checklist (ANKET No. 1) was used and analyzes were performed in the eighth and sixteenth weeks of follow-up. To evaluate the effect of respiratory physiotherapy exercises on the improvement of respiratory disorders caused by Covid-19, the researcher-made (ANKET No. 2), which was made based on respiratory physiotherapy exercises recommended by the physician or physiotherapist consulting the study center, was used for patients. Patients with respiratory disorders whose respiratory disorders did not improve by the end of the 16th week of follow-up and for whom respiratory physiotherapy exercises were prescribed by a physician or physiotherapist consulting the study center were admitted to the study with informed consent and 4 weeks after this Respiratory physiotherapy exercises were evaluated using checklist number 2.

These respiratory physiotherapy exercises are 11 respiratory physiotherapy exercises that have been recommended by the Iranian Physiotherapy Association to improve the respiratory disorders caused by Covid-19. (Includes strengthening exercises for the respiratory muscles of the chest and ribs, various breathing exercises to increase lung function such as deep and slow breathing training, diaphragmatic breathing, chest volume- increasing exercises, training and training the ability to cough, lung cleansing exercises, improvement and correction Respiratory patterns) and the patients participating in this study were trained by a physician or physiotherapist consulting the study center. Respiratory physiotherapy exercises were taught to Iranian patients by a physiotherapist or physician of the center through educational videos prepared by the Iranian Physiotherapy Association and for Arabic-speaking patients through educational videos prepared in Arabic by the physiotherapist of the center. Respiratory training videos for patients have been sent to patients through social media facilities. A number was assigned to each exercise to ensure that the patient understood the answers to the questions related to the checklist for evaluating the effectiveness of respiratory physiotherapy exercises. To evaluate the effect of respiratory physiotherapy exercises on patients' respiratory capacity, before performing respiratory physiotherapy exercises, all 91 patients with respiratory disorders whose respiratory disorders did not improve by the 16th week of follow-up, along with one of the study partners to private health centers with devices Spirometry referred. After spirometry test for these patients, Forced vital capacity (FVC) indices and Forced Expiratory Volume in 1 second (FEV1) and FVC to FEV1 ratio (FEV1 / FVC) It was measured and recorded using a spirometry device. After recording the mentioned indicators, the standard respiratory physiotherapy exercises recommended by the Respiratory Physiotherapy Association, which were studied in this study, after the approval of the physiotherapist, this study was taught to 91 patients through educational videos. In order to ensure the correct execution of the exercises by the patients, video contact was made with these patients and, if necessary, the exercises were re-taught to the patients who did not perform the exercises properly. Finally, after ensuring the correctness of the exercises performed by the patients, the mentioned respiratory physiotherapy exercises were performed for 4 weeks. Then, at the end of 4 weeks, all these 91 patients and one of the colleagues of this study went to private health centers with spirometry device. The studied indices were measured and

recorded for them using a spirometry device. To evaluate the effect of respiratory physiotherapy exercises, Forced vital capacity (FVC) indices and Forced Expiratory Volume in 1 second (FEV1) and the ratio of FVC to FEV1 (FEV1 / FVC) before and after Breathing exercises calculated and compared.

Descriptive statistics including mean, standard deviation, absolute frequency and absolute frequency percentage were used to report the results. In order to investigate the relationship between age variable and respiratory disorders and with reference to the return to mean (the sample size of the study is more than 30 people) and also due to the normal distribution of age variables based on skewness and elongation values of two independent groups t-test (Independent sample Test) and to examine the relationship between age and recovery in the eighth week of follow-up, to examine the relationship between age and the effect of respiratory physiotherapy exercises in improving respiratory disorders, to examine the relationship between age and the effect of respiratory physiotherapy exercises in reducing respiratory discharge, Respiratory physiotherapy in increasing respiratory capacity, the relationship between age and respiratory physiotherapy exercises and examining the relationship between age and the number of repetitions of respiratory exercises perfonned by patients from the one-way analysis of variance (ANOVA) test (PARAMETRDC) to examine the relationship between age and improvement. Relationship between previous illnesses and respiratory disorders, between exercise history and recovery in the eighth week of follow-up, between exercise and recovery in the eighth week of follow-up of respiratory disorders from Mann-Whitney test and to examine the relationship between previous illness and recovery in the eighth week of follow-up, Investigating the relationship between previous illness and recovery in the 16th week of following respiratory disorders, Investigating the relationship between exercising history and recovery in the 16th week of following respiratory disorders, Investigating the relationship between exercising and recovery in the 16th week of follow-up of respiratory disorders, Investigating the relationship between the type of exercise history before and after Covid-19 with respiratory disorders,

Investigating the relationship between the type of exercise history before and after Covid- 19 and recovery of the eighth week of follow-up of respiratory disorders in

patients, Investigating the relationship between the type of exercise history before and after Covid- 19 and recovery of the 16th week of follow-up of the disorder Patients' respiratory status, Evaluation of the relationship between gender and the improvement of respiratory disorders after respiratory physiotherapy exercises, Evaluation of the relationship between sex and reduction of respiratory secretions after respiratory physiotherapy exercises, Evaluation of the relationship between sex with increased respiratory capacity after respiratory physiotherapy exercises Between the job with the improvement of respiratory disorders after performing respiratory physiotherapy exercises, examining the relationship between job and reducing respiratory discharge after performing respiratory physiotherapy exercises, examining the relationship between job and increasing respiratory capacity after perfonning respiratory physiotherapy Exercises Investigating the relationship between gender and perfonning respiratory physiotherapy exercises, Examining the relationship between job and perfonning respiratory physiotherapy exercises, Examining the relationship between gender and the number of repetitions of respiratory physiotherapy exercises perfonned by patients and Examining the relationship between job and the number of repetitions of respiratory physiotherapy exercises performed by patients Chi square test (Nonparametric) was used. The Kruskal-Wallise test was used to investigate the relationship between performing respiratory physiotherapy exercises and the improvement of respiratory disorders, the relationship between perfonning respiratory physiotherapy exercises and reducing respiratory secretions, and the relationship between performing respiratory physiotherapy exercises and increasing respiratory capacity. In order to compare the changes in respiratory capacity of patients before and after breathing exercises, FVC, FEV1 and FEV1 to FVC indices will be compared using paired t-test. Significance level in this study was considered 0.05 and the analyzes were performed using (IBM SPSS Statistics version 16) software.

3.1. Respiratory Physiotherapy Exercise Tips

Respiratory physiotherapy exercises taught by the physician and physiotherapist of the study center to patients suffering from COVID-19 with respiratory disorders whose disorder had not improved by the end of the 16th week of follow-up were:

Exercise number 1:

Correct breathing pattern

Sit on a regular chair with your back leaning to the chair, then place your hands on your abdomen next to each other. Then inhale normally from your nose for 2 seconds (inhale into your lungs) and then exhale slowly (out of the lungs) without holding your breath. Note that the exhalation time should be 2 times the inhale, ie 4 seconds. Note that when exhaling, your hands should move slightly outward.

Throughout this exercise, the hands should remain on the abdomen and stick to it.

You should repeat this exercise 10 times in a row for 2 to 3 times a day.

Exercise 2:

Practice Breathing

Sit on a chair like exercise number one and then do a 2 second breath and then hold your breath for 2 seconds and then take a 4 second exhale and hold your breath again for 2 seconds and then Repeat this cycle again.

You should repeat this exercise 10 times in a row for 2 to 3 times a day.

Note that inhaling should be done only through the nose and exhaling only through the mouth (in the form of a bud lip).

The purpose of this exercise is to help open the air sacs.

Exercise number 3:

Discharge (active respiratory cycle)

Sit in a chair similar to the previous exercises and then place your hands on the abdomen in the diaphragm area similar to Exercise 1, then do abdominal breathing 3 to 5 times (breathing that is done with the help of the diaphragm, ie the abdomen when breathing upwards and Move down) and immediately clench your fists and place your

fists in the ribs on either side of your body and do the opening movements of the ribs (ie press your ribs slightly with your fists and then do a few inhales and exhales. In the next step, place your hand in front of your mouth and do the "high" with high power, as when you "do" on a glass. And after this step, repeat the first step of this exercise.

Repeat this exercise 5 to 6 times a day.

This exercise helps to expel respiratory secretions from the lower respiratory tract.

Exercise No. 4:

Relieve shortness of breath

Sit in a similar chair , put you forearms on your knees of your feet (in this case your body will be slightly stretched towards your knees) and then do an inhale for 2 seconds through your nose and then exhale Slowly for 4 seconds with stepping.

Repeat this exercise several times a day.

Exercises to improve breathing volume

Exercise 5:

As in the previous exercises, sit on a chair, then place your hands parallel to each other on your face (so that your hands are at a 90-degree angle to your body), then do a tail and spread your arms apart while inhaling. And move to the sides of the body. The movement of the hands should be done without causing a fracture in the elbows, and without holding your breath, take a slow exhale after the inhale and when exhaling, stick your hands together as before the inhale.

Note that the inhale should be about 2 seconds and the exhale should be 4 seconds.

Do this exercise 10 times in a row for 2 to 3 times a day.

Exercise number 6:

As in the previous exercises, sit on a chair and put your hands on your shoulders, then do a inhale and move your arms backwards as you do them, then exhale slowly and exhale slowly after the inhale. When exhaling, move your hands forward before inhaling.

Note that the inhale should be about 2 seconds and the exhale should be 4 seconds. Do this exercise 10 times in a row for 2 to 3 times a day.

Exercise number 7:

As in the previous exercises, sit on a chair and lock your hands behind your head, and then do a breath, and while inhaling, bring your hands back and take a slow exhale without holding your breath, and while exhaling. Move your hands forward as before the tail.

Note that the inhale should be about 2 seconds and the exhale should be 4 seconds.

Do this exercise 10 times in a row for 2 to 3 times a day.

Improve breathing volume

Exercise number 8:

Stand and place your hands crosswise in front of the abdomen with a slight distance, then make a inhale and open the arms to the sides when inhaling, then take an exhale and return to the shape before the inhale.

Note that the inhale should be about 2 seconds and the exhale should be 4 seconds.

Do this exercise 10 times in a row for 2 to 3 times a day.

Exercise number 9:

Stand with the palms of your hands facing your sides and move your shoulders up and back as you inhale, then exhale slowly and hold your shoulders down as you exhale. Return.

Be careful not to bend your elbows during this exercise.

Note that the inhale should be about 2 seconds and the exhale should be 4 seconds. Do this exercise 10 times in a row for 2 to 3 times a day.

Exercise number 10:

Stand and then bend your arms towards your face so that your elbows are not bent, then rotate your anus from the right side and do one tail at a time, and then start exhaling when your arms are rotating to the opposite side. In such a way that the exhalation lasts 4 seconds and the hands return to the first position at the end of the tail opening.

Note that the inhale should be about 2 seconds and the exhale should be 4 seconds.

Do this exercise 10 times in a row for 2 to 3 times a day.

Exercise number 11:

Stand and spread your legs shoulder-width apart, then move your right hand up with a tail from the side of your body, and after the tail, when opening, lower the tail of the raised right hand and bring it to your knees. Bend your back with your hands at this time, but never bend your knees. Do the same for the left hand.

Pay attention to the following points in these exercises:

In this guide, the meaning of inhaling is "bringing air into the lungs" and exhaling means "taking out the breathing air in the lungs".

Note that in all these exercises, the tail should be done only through the nose and exhale only through the mouth (in the fonn of a bud lip).

A typical chair in this guide is a chair with a short, one-piece backrest that covers the lumbar region, but the back should eventually be up to shoulder height, meaning that the chair should not have a backrest.

Inhale should be about 2 seconds and exhale 4 seconds.

Do this exercise 10 times in a row for 2 to 3 times a day.

3.2. Sampling

In this study, available sampling method was used to measure the effect of exercise on the improvement of respiratory disorders in patients with Covid-19. The research population at this stage included all patients with Covid-19 who had respiratory disorders and referred to the study center. Census sampling method was used to assess the effect of respiratory physiotherapy exercises on the improvement of respiratory disorders in patients with Covid-19. He was prescribed to enter the study.

3.3. Criteria for Entering and Leaving the Study

A) To evaluate the effect of exercise on the improvement of respiratory disorders:

Inclusion criteria:

1) Patients with Covid-19 who have contact information in the case study center.

2) Patients with Covid-19 in the study center who have infonned written consent to participate in the study.

Exit criteria

3) Incomplete records of patients with COVED-19 during the study period who have referred to the International Health Center in Tehran.

4) Patients whose files were incomplete and who did not want to participate in the study during the telephone follow-up by the researchers of this study.

B) To evaluate the effect of physiotherapy exercises on the improvement of respiratory disorders:

Inclusion criteria:

1) Patients with Covid-19 who have respiratory disorders due to Covid-19 disease and by the end of the 16th week after the onset of respiratory disorders, their respiratory disorders have not improved and the physician or physiotherapist consulting the health center under study Physiotherapy exercises They have prescribed respiration for them.

Exit criteria:

1) Patients with Covid-19 disease with respiratory disorders whose respiratory disorder has not improved by the end of week 16 and who have not perfonned the respiratory physiotherapy exercises recommended by the physician or physiotherapist consulting the center.

2) Patients with Covid-19 with respiratory disorders whose respiratory disorder did not improve by the end of week 16 and performed respiratory physiotherapy exercises prescribed by a physician or physiotherapist consulting the said health center but did not want to participate in this study.

3.4. Ethical Tips

1) Patients participating in the study who did not want to participate in the study by telephone follow-up were excluded from the study without any consequences.

2) Information without name was collected and analyzed and is non-refundable to the individual.

3) Finally, the data were collectively reviewed and reported.

4) The reluctance to participate in this study had no consequences for patients and patients could be excluded from the study at any stage.

5) Only patients who had written infonned consent to participate in this study were included in the study.

6) The results of the study will be communicated to the patients participating in this study.

7) This study had no consequences for the studied health center.

3.5. The Main Objective

Evaluation of the effect of exercise and respiratory physiotherapy exercises on the improvement of respiratory disorders in patients with Covid-19

Specific objectives:

1) Detennining the prevalence of respiratory disorders in patients with Covid-19

2) The effect of exercise on the improvement of respiratory disorders in patients with Covid-19

3) The effect of respiratory physiotherapy exercises on the improvement of respiratory disorders in patients with Covid-19

Sub-objectives of the project:

1) Detennining the prevalence of underlying diseases.

2) Check the demographic characteristics.

Practical goals of the project:

1) Evaluation of the course of respiratory disorders in the eighth and sixteenth weeks of follow-up after the first study in patients with Covid-19 who had respiratory disorders and were included in this study.

2) Determining the effectiveness of respiratory physiotherapy exercises in improving respiratory disorders in patients with Covid-19 who have respiratory disorders.

3.6. Assumptions

1) There is a significant relationship between contextual variables (age, gender, occupation) and respiratory disorders in patients with Covid-19.

2) There is a significant relationship between the history of previous diseases and respiratory disorders in patients with Covid-19.

3) There is a significant relationship between history of exercise and respiratory disorders in patients with Covid-19.

4) Exercise has a significant relationship with the progression of respiratory disorders in patients with Covid-19.

5) Respiratory physiotherapy exercises have a significant relationship with the improvement of respiratory disorders in patients with Covid-19.

6) Respiratory physiotherapy exercises have a significant relationship with the reduction of respiratory secretions in patients with Covid-19.

7) Respiratory physiotherapy exercises have a significant relationship with increasing respiratory capacity in patients with Covid-19.

3.7. Necessity of Conducting Research

Since respiratory disorders are the most important symptoms and complications in patients with Covid-19 and considering the role of exercise and respiratory physiotherapy exercises in improving respiratory disorders and other underlying diseases in patients with Covid-19 (25) and according to Although a small number of studies have been performed to determine the effect of exercise and respiratory physiotherapy exercises on the improvement of respiratory disorders in patients with COVID-19 (26), this study aims to investigate the effect of exercise and respiratory

physiotherapy exercises on the improvement of respiratory disorders in patients. With Covid-19 In the first half of 2020, it was performed in an international health center in Tehran.

4. RESULTS

In this study, 350 patients with Covid-19 disease were studied. The mean and standard deviation of patients' age was 32.71 10 10.93 years (Table 1).

Table 1: Age demographic information of the participants

Mean	32.71
Mead	30.00
Mode	30.00
Sd	10.93
Skewness	+0.50
Kurtosis	-0.658
Persentile 25	20.00
Persentile 25	40.00

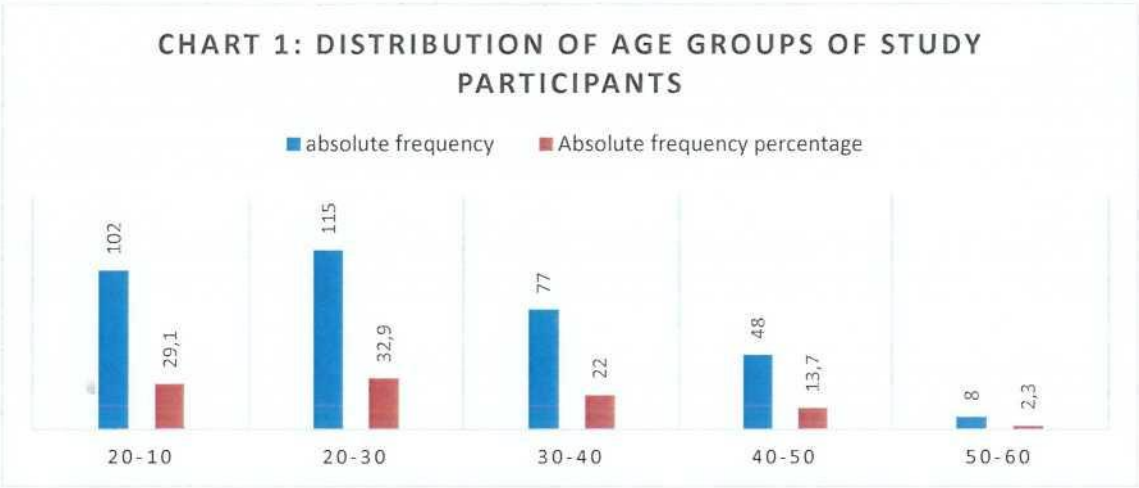

Chart 1. In the study of age groups, the highest participation was related to the age group of 20-30 years

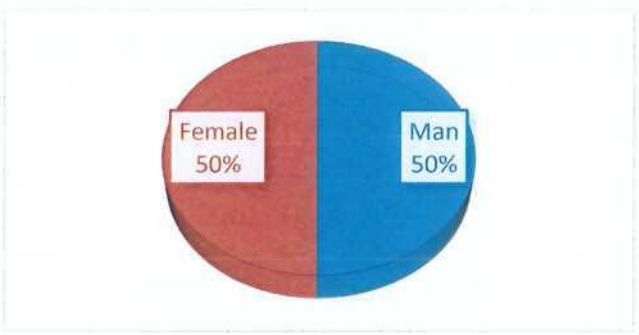

Chart 2. In tenns of sex distribution, both sexes participated in the study in equal proportions

Explaining the reason why patients with the same gender ratio participated in this study is that these patients are often couples who referred to the International Health Center as health tourists to receive the health services they needed.

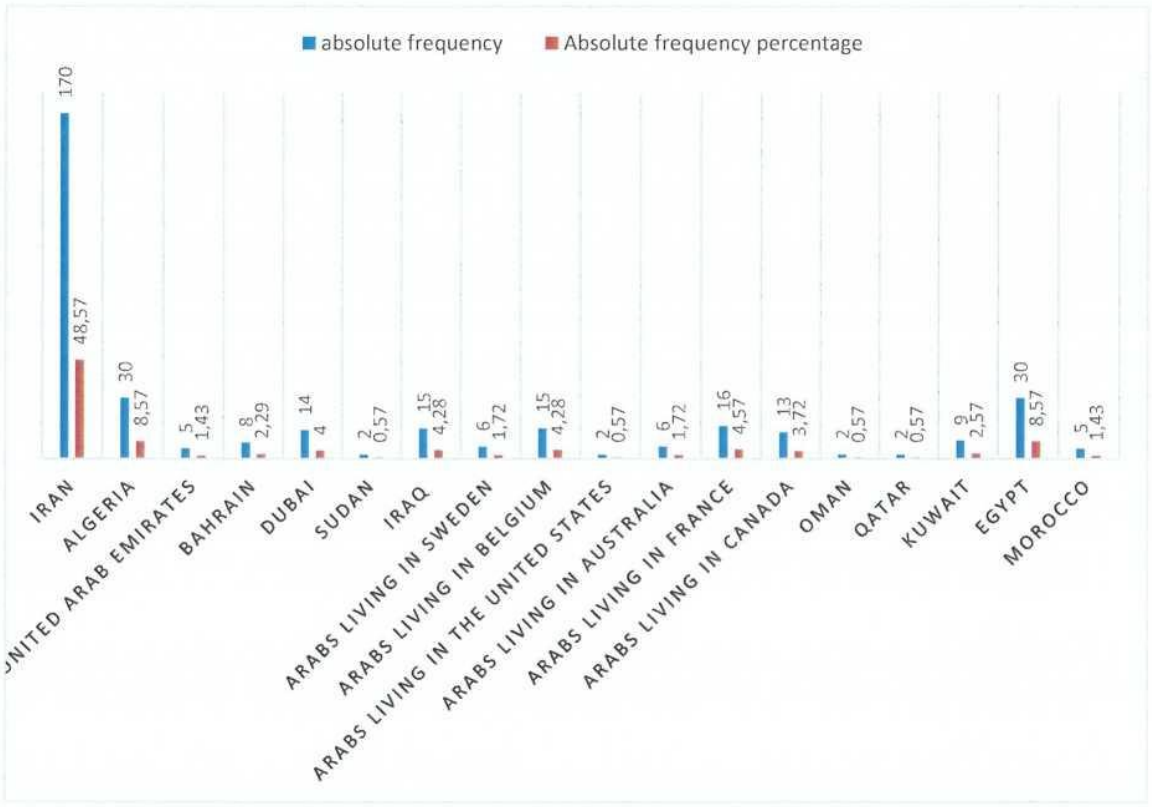

Chart 3. In terms of nationality, almost half of the patients (170 (48.57%)) were Iranian and the other patients were Arabic-speaking. These Arabic-speaking patients included Arabicspeaking patients residing in Arabic-speaking countries or in European countries.

The national diversity of the participants in this study is due to the wide range of services provided by the International Health Center, which has led to patients from different countries to refer to this center to receive health services.

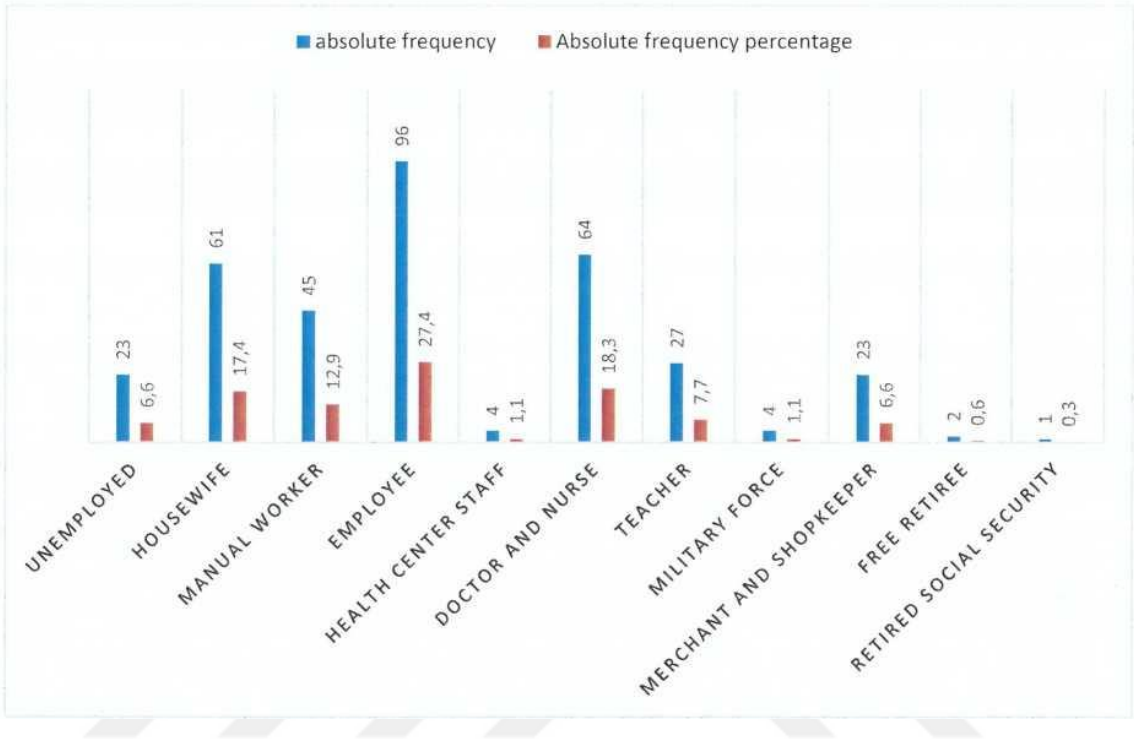

Chart 4. In terms of job distribution, the highest participation was related to the employee job (96 people (27.40%)).

In response to a question about previous contact with a patient with Covid-19, approximately half of the participants (173 (49.40%)) stated that they had had previous contact with a patient with Covid-19.

Table 2: In terms of the use of protective equipment, patients used more disinfectants.

Variable name	Use	absolute frequency	Absolute frequency percentage
Use mask	Yes	237	67.70
	No	113	32.30
Use disinfectants	Yes	287	82.00
	No	63	18.00

Out of the total number of patients, 304 (86.90%) had a diagnostic test for the diagnosis of Covid-19, of which 217 (71.40%) were positive. Out of the total number of patients, 212 (60.60%) underwent chest radiographs to diagnose Covid-19 and 269 patients (76.86%) underwent computed tomography scans, which were abbreviated. It is called a CT scan.

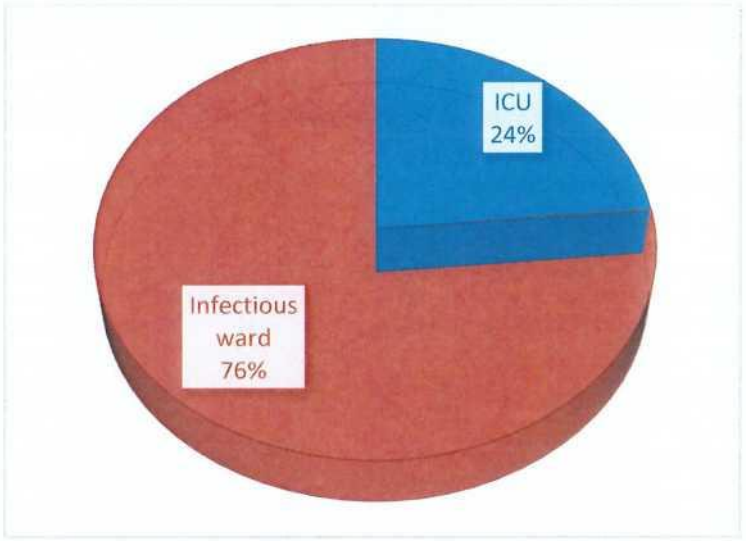

Chart 5. Among the patients, 34 (9.72%) had a history of hospitalization and 316 (90.28%) were in quarantine, of which 8 were in the ICU and 26 were in the infectious ward

The most common symptoms of patients participating in this study were odor disorder (349 (99.70%)) and weakness 254 (72.60%) and the least common symptoms of patients were severe shortness of breath (63 (00) / 18) and vomiting (118 people (33.70%) (Table 3).

Table 3: Distribution of symptoms of patients participating in this study

Variable name	Patient response	absolute frequency	Absolute frequency percentage
Cough	Yes	201	57.40
	No	149	42.60
	Total	350	100.00
Weakness	Yes	254	72.60
	No	95	27.10
	Total	350	100.00
Headache	Yes	160	45.70
	No	190	54.30
	Total	350	100.00
Vertigo	Yes	136	38.90
	No	214	51.10
	Total	350	100.00
Sore thoart	Yes	152	43.40
	No	198	52.60
	Total	350	100.00
Dry cough	Yes	125	35.70
	No	225	64.30
	Total	350	100.00
Sputum cough	Yes	120	34.30
	No	230	65.70
	Total	350	100.00
Milt shortness of brought	Yes	128	36.60
	No	222	63.40
	Total	350	100.00
Severe shortness of breath	Yes	63	18.00
	No	287	82.00
	Total	350	100.00

Table 3 (continues)

Variable name	Patient response	absolute frequency	Absolute frequency percentage
Odor disorder	Yes	349	99.70
	No	1	00.30
	Total	350	100.00
Stomach ache	Yes	124	35.40
	No	226	64.60
	Total	350	100.00
Diarrhea	Yes	119	34.00
	No	231	66.00
	Total	350	100.00
Vomit	Yes	118	33.70
	No	232	66.30
	350	350	100.00
Body pain	Yes	202	57.70
	No	148	42.30
	Total	350	100.00

In the study of other rare symptoms, 287 patients (82.00%) stated that they had no other rare symptoms and 63 patients (18.00%) stated that they had other rare symptoms (Table 4).

Table 4: Distribution of other rare symptoms in patients participating in the study

Type of disease	Absolute frequency	Absolute frequency percentage
No disease	287	82.00
Ataxia	4	1.14
Ataxia and chest pain	1	0.28
Oral plague	3	0.86
Mouth sores and skin rashes	1	0.28
Oral plague and skin allergies	1	0.28
Encephalitis	1	0.28
Skin rash	4	1.14
Skin rash and delirium	1	0.28
Skin rash and chest pain	1	0.28
Bradycardia and chest pain	1	0.28
Visual impairment and oral plague	1	0.28
Swelling of the joints	1	0.28
Swollen joints and severe bone pain	1	0.28
Skin allergy	3	0.86
Skin allergies and severe bone pain	1	0.28
Bone pain	8	2.28
Bone and joint pain	4	1.14
Bone pain and swelling of the joints	1	0.28
Severe chest pain and heartburn	1	0.28
Chest pain	6	1.17
Chest pain and bone pain	2	0.57
Chest pain and chills	1	0.28
Chest pain and mouth sore	1	0.28
joint's pain	1	0.28
Heart attack	2	0.57
Heart attack, chest pain and bone pain	1	0.28
Heart attack and imbalance	1	0.28

Table 4 (continues)

Type of disease	Absolute frequency	Absolute frequency percentage
Delirium	2	0.57
Delirium and Diplopia	2	0.57
Imbalance, delirium and chest pain	2	0.57
Tremors and sweat	1	0.28
Knee arthritis and bone pain	1	0.28
Total	350	100.00

Symptoms that were less than 0.05% prevalent among patients were considered as rare symptoms.

Table 5: Stability distribution of rare symptoms in patients participating in the study

Type of disease	Period of time	Absolute frequency	Absolute frequency percentage
Ataxia	2 weeks	3	75.00
	4 weeks	1	25.00
	6weeks and more	0	0.00
	total	4	100.00
Ataxia and chest pain	2 weeks	1	100.00
	total	1	100.00
Oral plague	1 weeks	2	66.66
	2 weeks	1	33.34
	total	3	100.00
Mouth sores and skin rashes	1 weeks	1	100.00
	total	1	100.00
Oral plague and skin allergies	1 weeks	1	100.00
	total	1	100.00
Encephalitis	1 weeks	1	100.00
	total	1	100.00
Skin rash	1 weeks		50.00
	2 weeks	1	25.00
	3 weeks	1	25.00
	total		100.00
Skin rash and delirium	1 weeks	1	100.00
	total	1	100.00
Skin rash and chest pain	1 weeks	1	100.00
	total	1	100.00
Bradycardia and chest pain	1 weeks	1	100.00
	total	1	100.00
Visual impairment and oral plague	1 weeks	1	100.00
	total	1	100.00

Table 5 (continues-1)

Type of disease	Period of time	Absolute frequency	Absolute frequency percentage
Swelling of the joints	1 weeks	1	100.00
	total	1	100.00
Swollen joints and severe bone pain	2 weeks	1	100.00
	total	1	100.00
Skin allergy	1 weeks	1	33.33
	2 weeks		66.67
	total		100.00
Skin allergies and severe bone pain	1 weeks	1	100.00
	total	1	100.00
Bone pain	1 weeks	5	62.50
	2 weeks	2	25.00
	4 weeks	1	12.50
	total	8	100.00
Bone and joint pain	1 weeks	2	50.00
	2 weeks	1	25.00
	4 weeks	1	25.00
	total	4	100.00
Bone pain and swelling of the joints	1 weeks	1	100.00
	total	1	100.00
Severe chest pain and heartburn	1 weeks	1	100.00
	total	1	100.00
Chest pain	1 weeks	5	83.33
	3 weeks	1	16.67
	total	6	100.00
Chest pain and bone pain	1 weeks	2	100.00
	total	2	100.00

Table 5 (continues-2)

Type of disease	Period of time	Absolute frequency	Absolute frequency percentage
Chest pain and chills	1 weeks	1	100.00
	total	1	100.00
Chest pain and mouth sore	1 weeks	1	100.00
	total	1	100.00
joint's pain	1 weeks	1	100.00
	total	1	100.00
Heart attack	1 weeks	2	100.00
	total	2	100.00
Heart attack, chest pain and bone pain	1 weeks	1	100.00
	total	1	100.00
Heart attack and imbalance	1 weeks	1	100.00
	total	1	100.00
Delirium	1 weeks	2	100.00
	total	2	100.00
Delirium and Diplopia	1 week	2	100.00
	total	2	100.00
Imbalance, delirium and chest pain	2 weeks	2	100.00
	total	2	100.00
Tremors and sweat	1 week	1	100.00
	total	1	100.00
Knee arthritis and bone pain	1 week	1	100.00
	total	1	100.00

In the history of previous diseases, patients with COVID-19 had the highest prevalence related to blood pressure (52 patients (14.90%)) and the lowest prevalence was related to schizophrenia (4 patients (1.14%)) (Table 6).

Table 6: Distribution of history of previous diseases in patients with Covid-19

Type of disease	Patient response	Absolute frequency	Absolute frequency percentage
Diabetes	Yes	37	10.57
	No	313	89.43
	Total	350	100.00
blood pressure	Yes	52	14.86
	No	298	85.14
	total	350	100.00
Heart disease	Yes	20	5.71
	No	330	9.29
	total	350	100.00
COPD	Yes	8	2.29
	No	342	97.71
	total	350	100.00
kidney disease	Yes	8	2.29
	No	342	97.71
	total	350	100.00
Liver disease	Yes	6	1.71
	No	346	98.29
	total	350	100.00
Nervous disease	Yes	11	3.14
	No	339	96.86
	total	350	100.00
Head trauma	Yes	14	4.00
	No	336	96.00
	total	350	100.00
Depression	Yes	48	13.71
	No	302	86.29
	total	350	100.00

Table 6 (continues)

Type of disease	Patient response	Absolute frequency	Absolute frequency percentage
Schizophrenia	Yes	4	1.14
	No	346	98.86
	total	350	100.00

In this study, 177 patients (50.57%) of patients with Covid-19 reported smoking (Table 7).

Table 7: Distribution of history of smoking, alcohol,drugs andillicit drugs in patients with Covid 19

Material used	Patient response	Absolute frequency	Absolute frequency percentage
Cigarettes	Yes	177	50.57
	No	173	49.43
	total	350	100.00
Alcohol	Yes	73	20.86
	No	277	79.14
	total	350	100.00
Illegal drugs	Yes	24	6.86
	No	325	93.14
	total	350	100.00

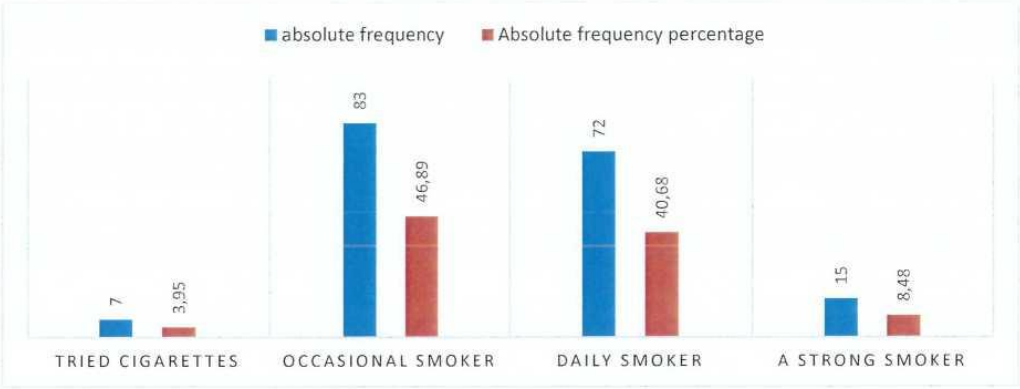

Chart 6. Among those who reported smoking, 69 smoked daily.

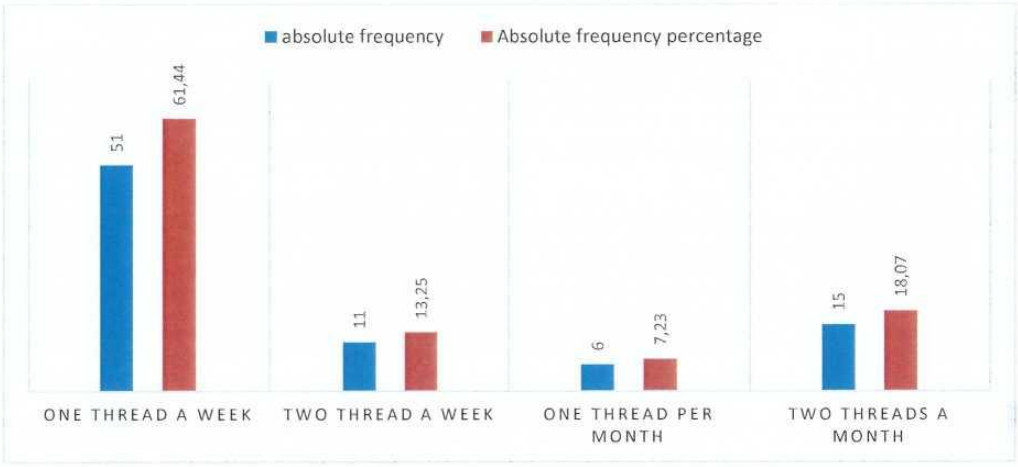

Chart 7. Among people who smoked cigarettes at any time, the highest (61.44%) was the type of consumption (one cigarette a week).

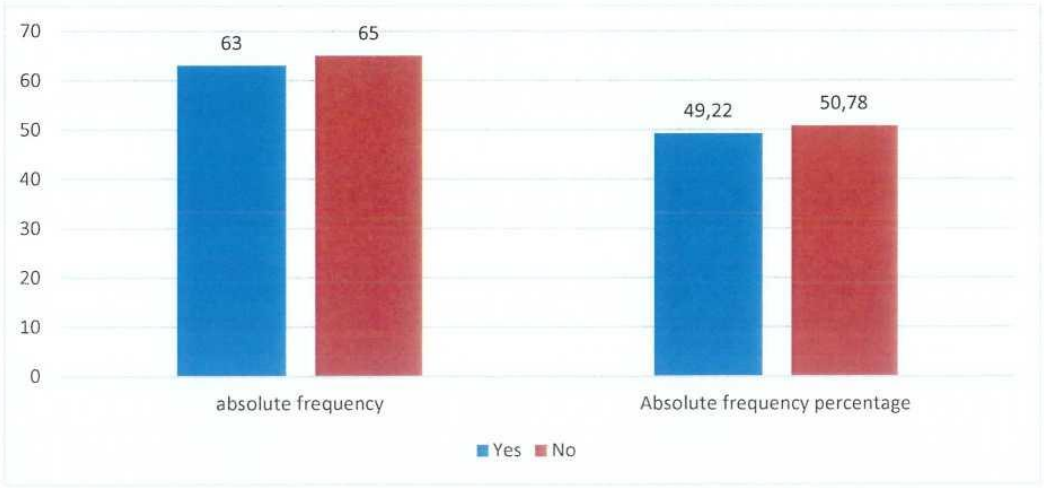

Chart 8. Among patients with mild respiratory disorders, 63 (49.22%) had a history of smoking.

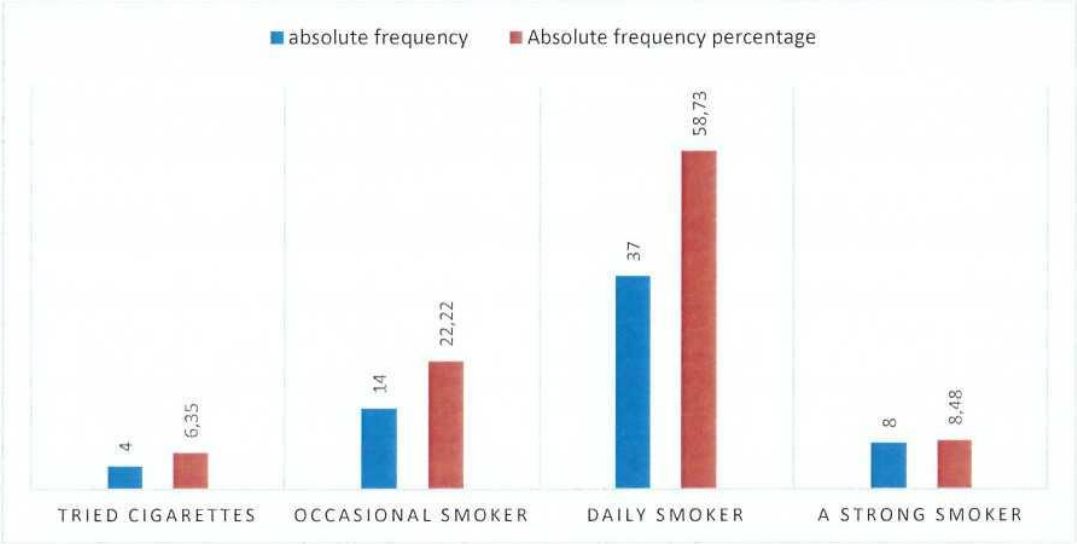

Chart 9. Most of the patients with mild respiratory disorders who smoked (58.73%) were daily smokers

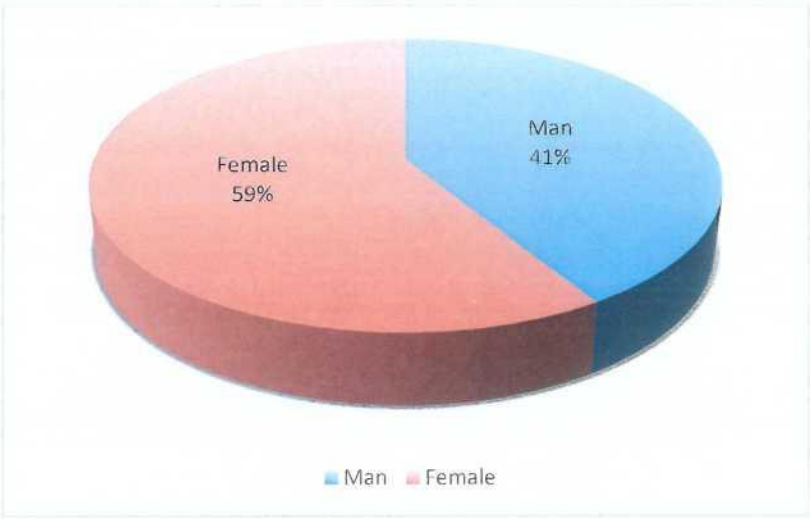

Chart 10. Most of the patients with mild respiratory disorders who smoked were female (59.00%)

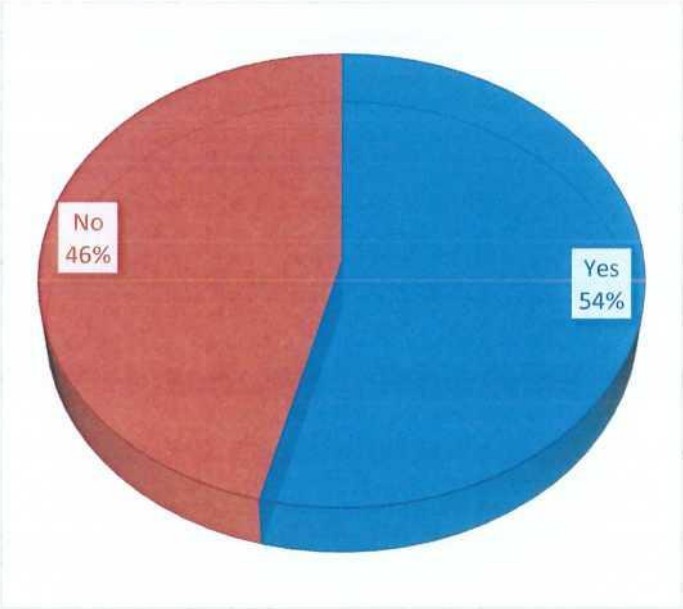

Chart 11. Most of the patients with severe respiratory disorder (54.00%) smoked

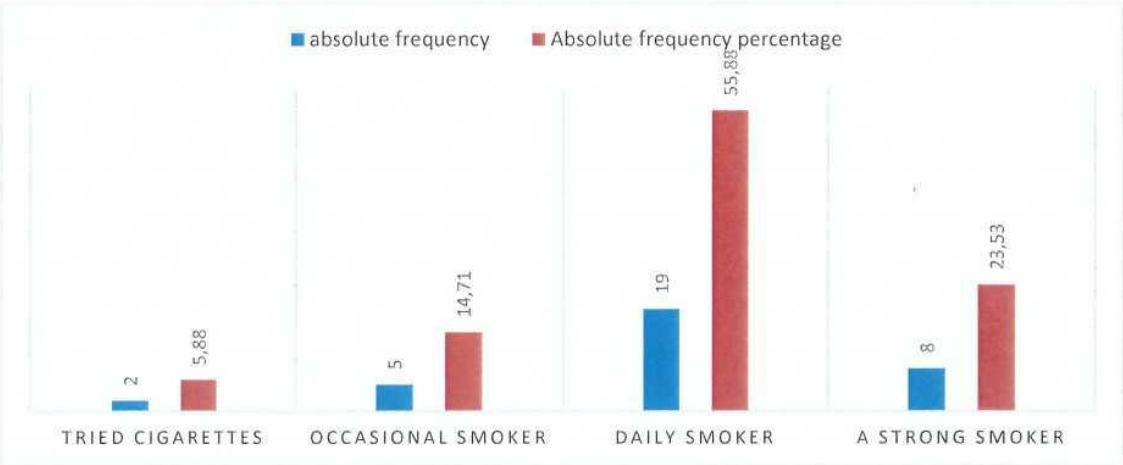

Chart 12. Most of the patients with severe respiratory disorders who smoked (55.88%) were daily smokers.

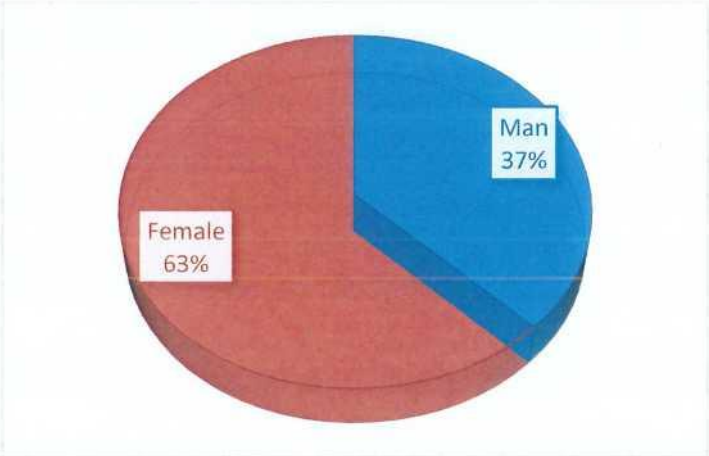

Chart 13. Among the patients who had a history of drug use and illicit drugs, most of them (63.00%) were female

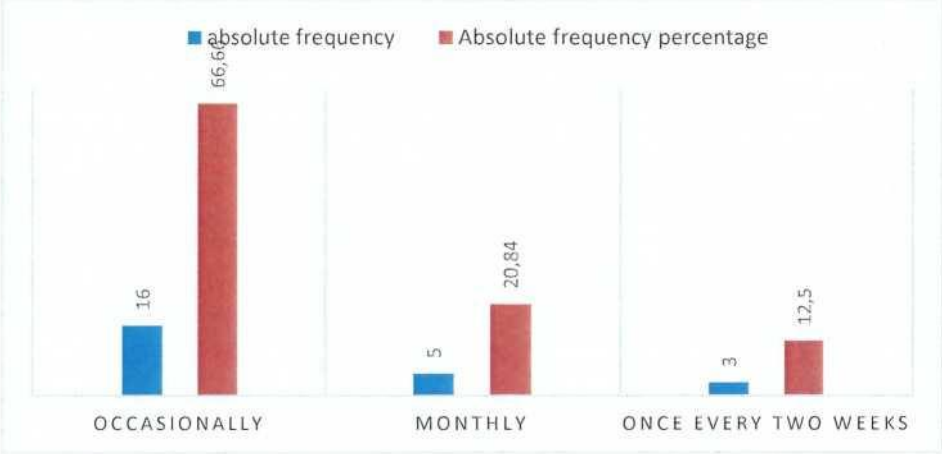

Chart 14. Among the patients who mentioned the history of using drugs and illicit drugs, the type of consumption was the highest (66.66%) at any time.

Chart 15. Most of the patients who had a history of alcohol consumption (55.00%) were female

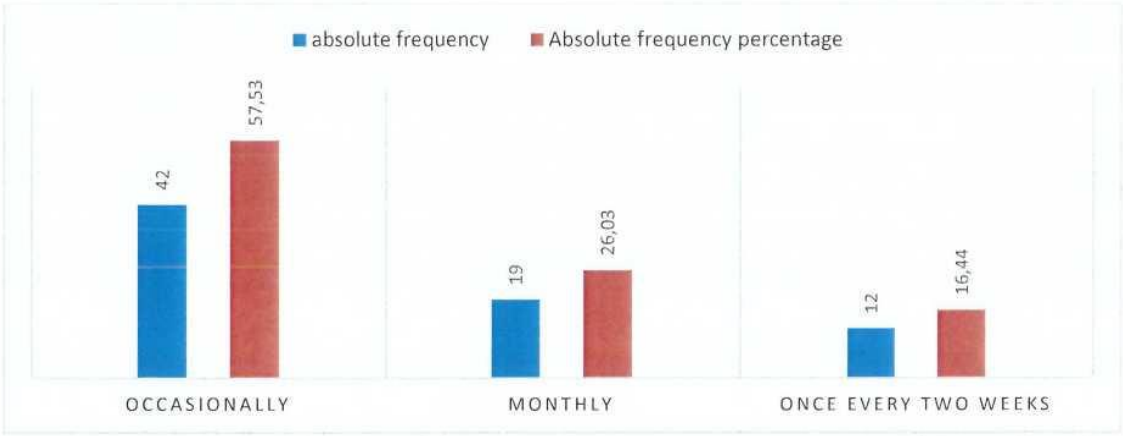

Chart 16. Among patients with a history of alcohol consumption, most of them (57.53 %) had their type of consumption at any time.

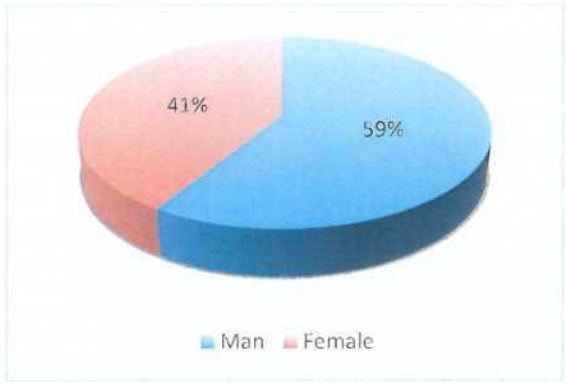

Chart 17. Most of the patients who had severe respiratory disorders and had a history of smoking (59.00%) were male.

In the previous history of allergies, only 13 patients (3.71%) had a history of previous allergies (Table 8).

Table 8: Distribution of history of previous allergy in patients with Covid-19

Type of allergies	Absolute frequency	Absolute frequency percentage
Medical allergy	2	0.57
Food allergy	3	0.86
Seasonal allergy	8	2.28
total	350	100.00

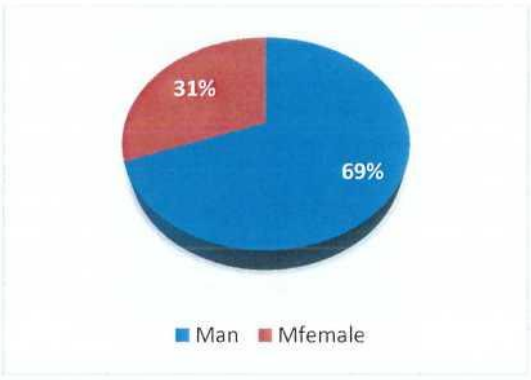

Chart 18. Most of the patients who had a history of allergies (69.00%) were male.

In the study of drugs, all patients with COVID-19 (350 patients (100.00%)) mentioned that they had used the drug during the course of the disease (Table 9).

Table 9: Distribution of drugs used in patients with Covid-19

Medicine Name	Patient response	Absolute frequency	Absolute frequency percentage
Corton Oral	Yes	5	1.43
	No	345	98.57
	total	350	100.00
Corton Injectable	Yes	64	18.29
	No	286	81.71
	total	350	100.00
Corton Spray	Yes	201	57.43
	No	149	42.57
	total	350	100.00
Zink	Yes	288	82.29
	No	62	17.71
	total	350	100.00
Captopril	Yes	20	5.71
	No	330	94.29
	total	350	100.00
Losartan	Yes	33	9.43
	No	317	90.57
	total	350	100.00
Valsartan	Yes	1	0.28
	No	349	99.72
	total	350	100.00
Analapril	Yes	0	0.00
	No	350	100.00
	total	350	100.00
Aspirin and nasal spray sodium chloride	Yes	13	3.71
	No	337	96.29
	total	350	100.00

Table 9 (continues-1)

Medicine Name	Patient response	Absolute frequency	Absolute frequency percentage
Azithromycin 500, dexamethasone, and sodium chloride nasal spray	Yes	41	11.71
	No	309	88.29
	total	350	100.00
Azithromycin 500, naloxone and multivitamins	Yes	1	0.28
	No	349	99.72
	total	350	100.00
Azithromycin 500, sodium chloride nasal spray and multivitamin	Yes	50	14.29
	No	300	85.71
	total	350	100.00
Azithromycin 500, dexamethasone, acaz anavir, and sodium chloride	Yes	1	0.28
	No	349	99.72
	total	350	100.00
Azithromycin 500, Sodium Chloride Nasal Spray, Multivitamin and	Yes	2	0.57
	No	348	99.43
	total	350	100.00
Azithromycin 500 and multivitamin	Yes	3	0.86
	No	347	99.14
	total	350	100.00
Azithromycin 500, multivitamin and dexamethasone	Yes	4	1.14
	No	346	98.86
	total	350	100.00
Nasal spray Chloride and multivitamin	Yes	11	3.14
	No	339	98.86
	total	350	100.00
Azithromycin 500, sodium chloride nasal spray and sodium chloride spray	Yes	1	0.28
	No	349	99.72
	total	350	100.00

Table 9 (continues-2)

Medicine Name	Patient response	Absolute frequency	Absolute frequency percentage
Decoxin 10 capsules and sodium chloride nasal spray	Yes	3	0.86
	No	347	99.14
	total	350	100.00
Azithromycin 500, multivitamin, inulin and sodium chloride nasal spray	Yes	7	2.00
	No	343	98.00
	total	350	100.00
Dexamethasone, azithromycin 500 and nasal spray sodium chloride	Yes	1	0.28
	No	349	99.72
	total	350	100.00
Dexamethasone, azithromycin 500, sodium chloride nasal spray and	Yes	2	00.57
	No	348	99.43
	total	350	100.00
Dexamethasone, azithromycin 500, naloxone, sodium chloride	Yes	25	7.14
	No	325	92.86
	total	350	100.00
Dexamethasone, Azithromycin 500, Hydrocaverine, Sodium	Yes	28	8.00
	No	322	92.00
	total	350	100.00
Azithromycin 500, multivitamin, metformin, hydrochloroquine and glide	Yes	3	0.86
	No	347	99.14
	total	350	100.00
Azithromycin 500, multivitamin, metfonnin, dexamethasone, vitamin, sodium chloride nasal spray and atazadavir	Yes	12	3.43
	No	338	96.57
	total	350	100.00

Table 9 (continues-3)

Medicine Name	Patient response	Absolute frequency	Absolute frequency percentage
multi vitamine	Yes	2	0.57
	No	348	99.43
	total	350	100.00
Multivitamins, acazadavir and nasal spray sodium chloride	Yes	4	1.14
	No	346	98.86
	total	350	100.00
Multivitamin, aspirin and nasal spray sodium chloride	Yes	1	0.28
	No	349	99.72
	total	350	100.00
Multivitamin, vitamin D and sodium chloride nasal spray	Yes	33	9.43
	No	317	90.57
	total	350	100.00
Naloxone and nasal spray sodium chloride	Yes	13	3.71
	No	337	96.29
	total	350	100.00
Naloxone, azithromycin 500 and sodium chloride nasal spray	Yes	9	2.57
	No	341	97.43
	total	350	100.00

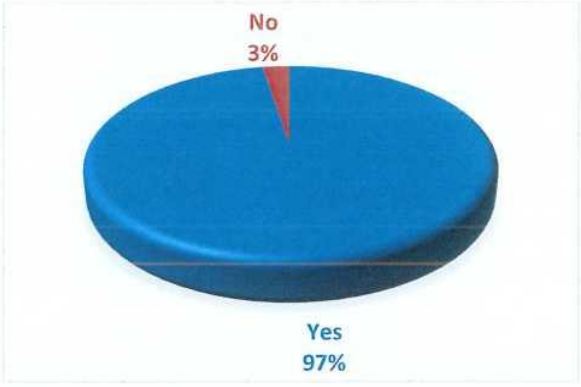

Chart 19. In the study of taste disorder, it was found that 341 patients (97.04%) had taste disorder.

Among the people who had lost their sense of taste, 341, 215 (63.05%) had suddenly lost their sense of taste and 126 (36.95%) had gradually lost their sense of taste.

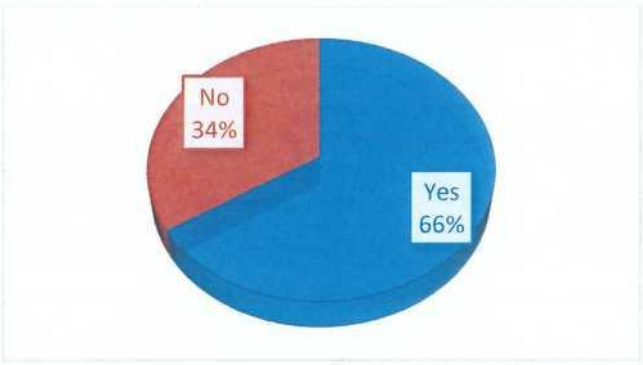

Chart 20. In terms of exercise history, 231 people (66.00%) mentioned non-professional exercise history without a doctor's prescription.

4.1. Study Objectives

4.1.1. Evaluation of the First Goal The Study

To determine the prevalence of respiratory disorders in patients with Covid-19 participating in this study. Among the patients participating in the study, 191 had respiratory disorders and the prevalence of respiratory disorders in these patients was 54.57 per 100, which means that out of every 100 patients with Covid-19, 54.57 had They had respiratory problems.

$$\text{Patients with respiratory disorders prevalence} = \frac{\text{Number of people affected}}{\text{The entire population is at risk}} x\ 100 =$$

$$\text{Prevalence of respiratory disorders in patients} = \frac{191}{350} x\ 100 = 54.57 \qquad (3\text{-}1)$$

Of these, 128 had mild dyspnea and 63 had severe dyspnea. Therefore, the prevalence of respiratory disorders by severity was equal to:

$$\text{Prevalence of mild respiratory disorders in patients} = \frac{128}{350}\ x\ 100 = 36.60 \qquad (3\text{-}2)$$

Prevalence of severe respiratory disorders in patients = $\frac{63}{350}\ x\ 100 = 18.00$

(3-3)

That is, among all patients with Covid-19 who participated in this study, 36.60 out of every 100 patients had mild respiratory disorder and 18.00 patients had severe respiratory disorder.

4.1.2. Prevalence of Disorder by Severity among Patients with Respiratory Disorder

That is, out of every 100 patients with Covid-19 who had respiratory disorders, 62.02 patients had mild respiratory disorders and 32.98 patients had severe respiratory disorders.

Prevalence of mild respiratory disorders among all patients with respiratory disorders = $\frac{128}{191}\ x\ 100 = 67.02$

Prevalence of severe respiratory disorders among all patients with respiratory disorders = $\frac{63}{191}\ x\ 100 = 32.98$

(3-4)

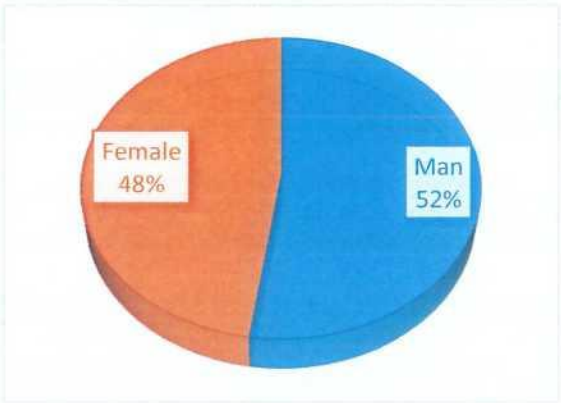

Chart 21. The gender distribution was almost the same among patients with mild respiratory distress

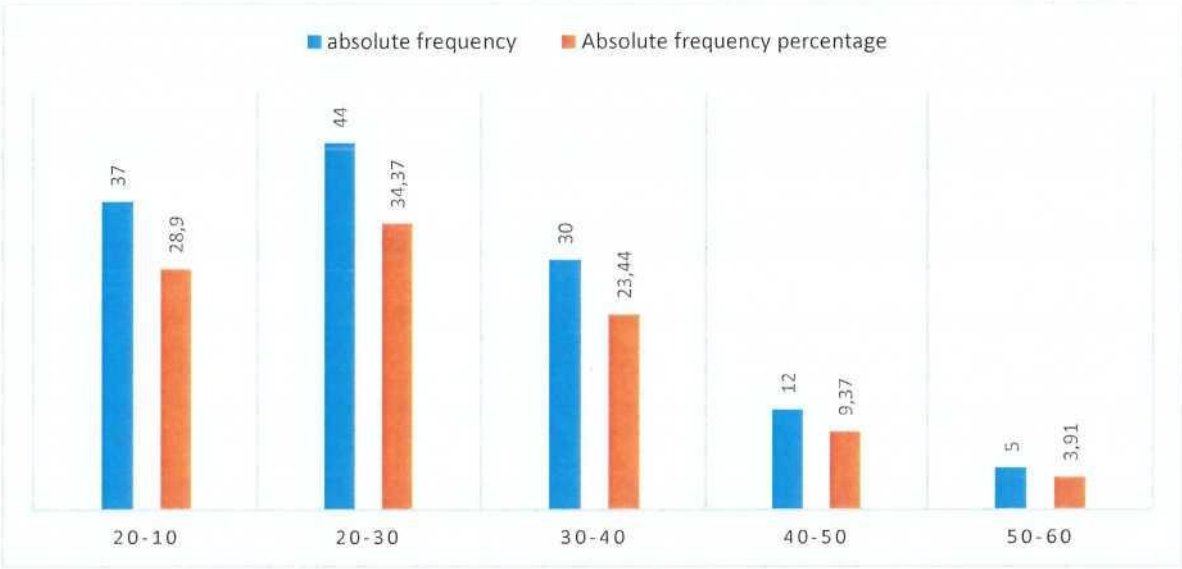

Chart 22. Among patients with mild respiratory disorders in terms of age group, the highest percentage (34.37%) belonged to the age group of 20 to 30 years

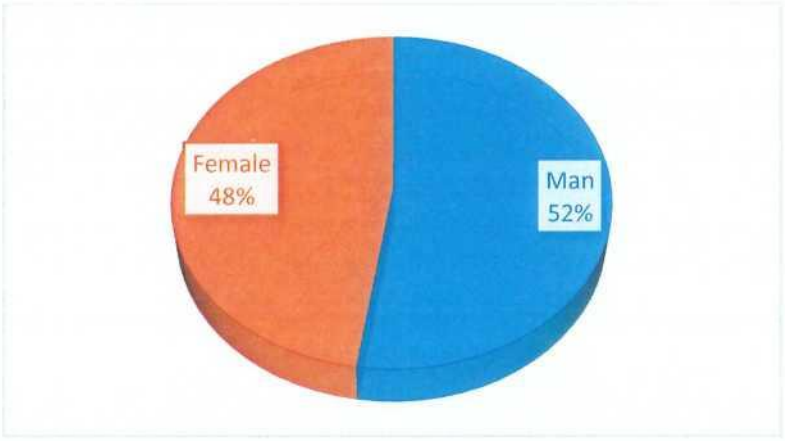

Chart 23. The gender distribution was almost the same among patients with severe respiratory distress

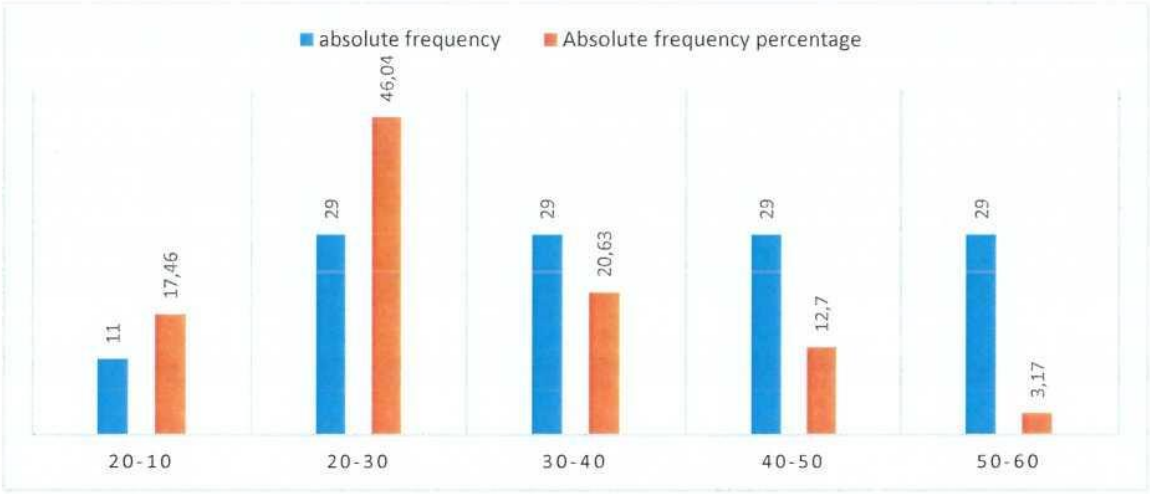

Chart 24. Among patients with severe respiratory disorders, the highest percentage (46.04%) was in the age group of 20 to 30 years

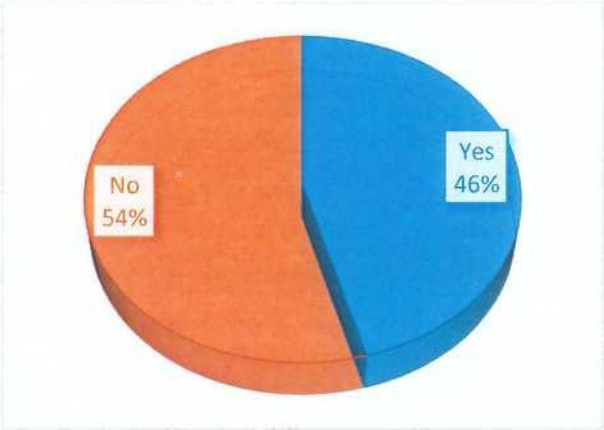

Chart 25. After people contracted Covid-19, a total of 160 people (45.71%) reported doing exercise.

Out of the total population, 108 (30.86%) exercised before and after Covid-19

Prevalence of exercise before and after corona = $\frac{108}{350}\ x\ 100 = 30.86$

(3-5)

This means that out of every 100 patients with Covid-19, 30.86 patients did exercise before and after Covid-19

Of all those who reported a history of exercising or exercising, 108 (46.75%) reported that they continued to exercise after developing Covid-19

$$\text{Prevalence} = \frac{108}{231}\ x\ 100 = 46.75 \quad (3\text{-}6)$$

This means that out of every 100 patients with Covid-19 who exercised before Covid-19, 46.75 patients still exercised after Covid-19.

Among those who mentioned in the past that they had not exercised before, 67 (56.30%) did not exercise after developing Covid-19.

$$\text{Prevalence} = \frac{67}{119}\ x\ 100 = 56.30 \quad (3\text{-}7)$$

This means that out of every 100 patients with Covid-19 who did not exercise before Covid-19, 56.30 patients did not exercise after Covid-19.

Of the total patients, 123 (35.14%) reported that they had exercised before Covid-19 but did not exercise after Covid-19

$$\text{Prevalence} = \frac{123}{350}\ x\ 100 = 35.14 \quad (3\text{-}8)$$

This means that out of every 100 patients with Covid-19, 35.14 patients exercised before Covid-19 but did not exercise after Covid-19.

Fifty-two patients also reported that they did not exercise before Covid-19 but did exercise after Covid-19.

$$\text{Prevalence} = \frac{52}{350}\ x\ 100 = 14.86 \quad (3\text{-}9)$$

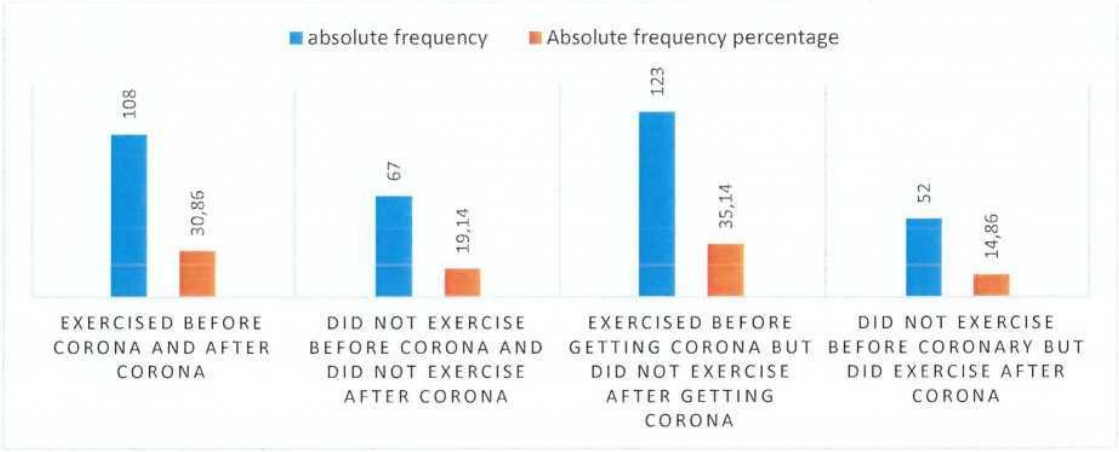

Chart 26. This means that out of every 100 patients with Covid-19, 14.86 patients did not exercise before Covid-19 but started exercising after Covid-19.

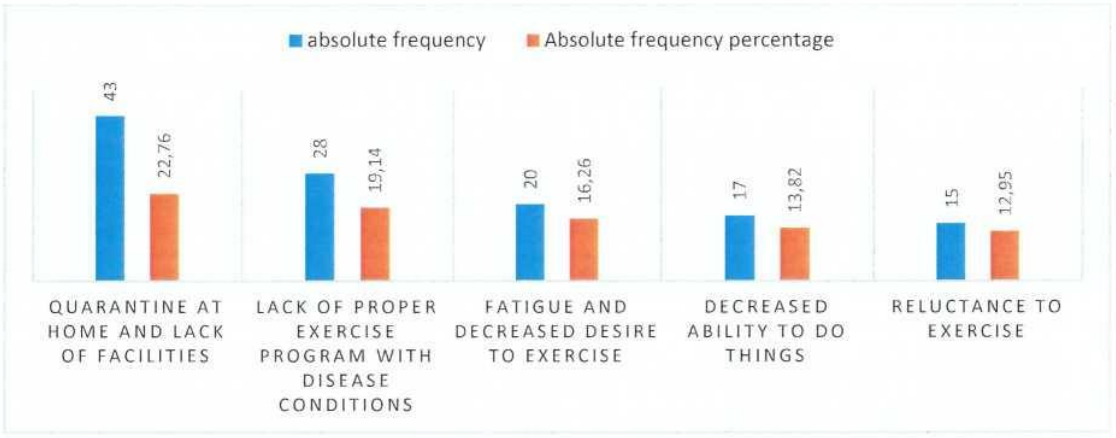

Chart 27. This finding indicates that the change in exercise status in people with Covid-19 was more of a decreasing approach than an incremental approach. Examining the causes of the decrease in people's desire to exercise after infection (similar to what they did before getting Covid-19), it was found that the most important factor was quarantine at home and lack of exercise program.

This finding suggests that if a suitable bed and exercise exercises are provided to patients in appropriate conditions, it can increase the percentage of patients who continue to exercise after developing Covid-19.

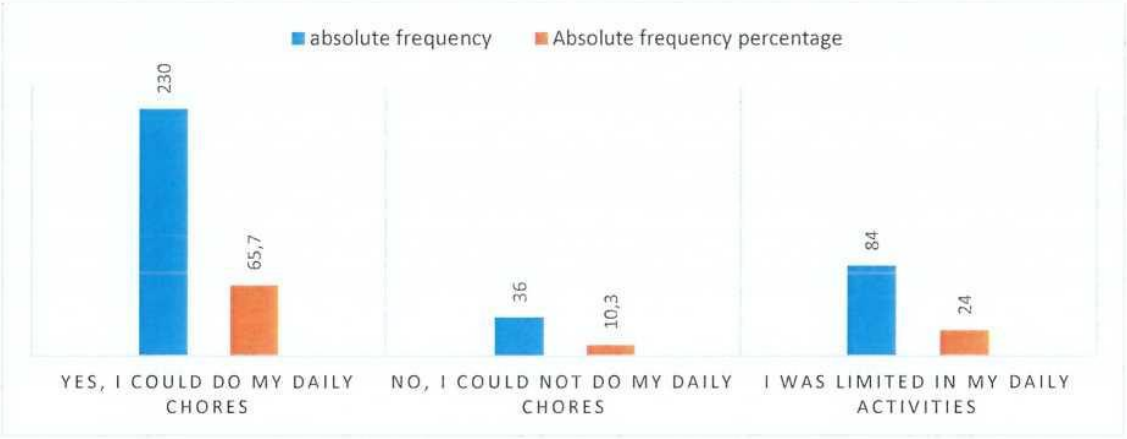

Chart 28. 230 patients (65.70%) of patients with Covid-19 participating in this study mentioned that they were able to perform their daily tasks after developing Covid-19

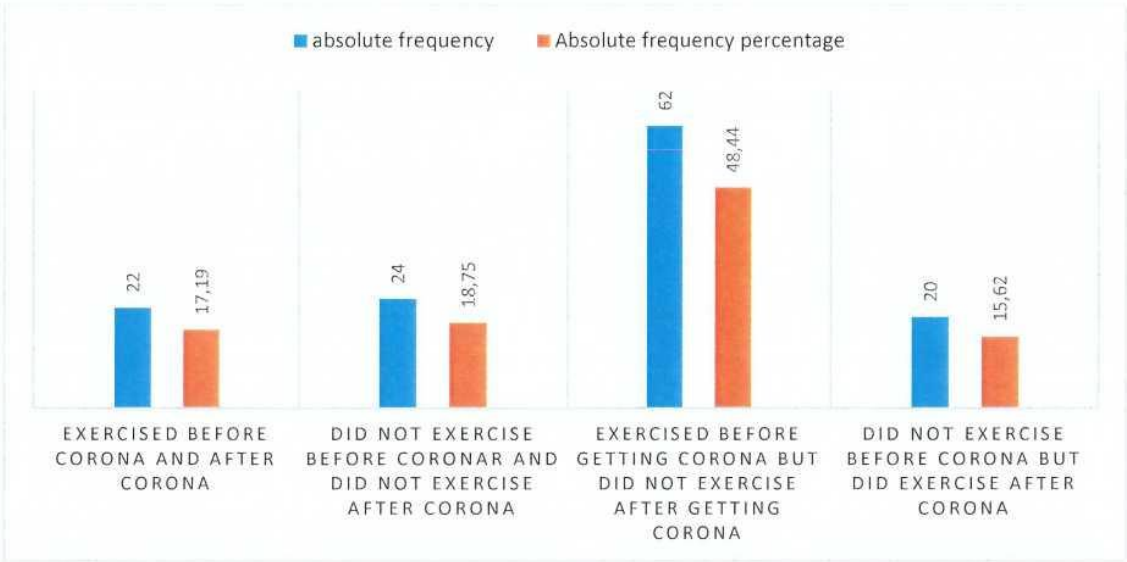

Chart 29. Among patients with mild respiratory disorders, 62 (53.97%) reported that they did not continue exercising after developing Covid-19 while exercising before Covid-19. This is similar to what happened to all patients.

In general, the tendency among patients with mild Covid-19 with mild respiratory distress is severely reduced because about half of these patients have not continued to exercise after developing Covid-19.

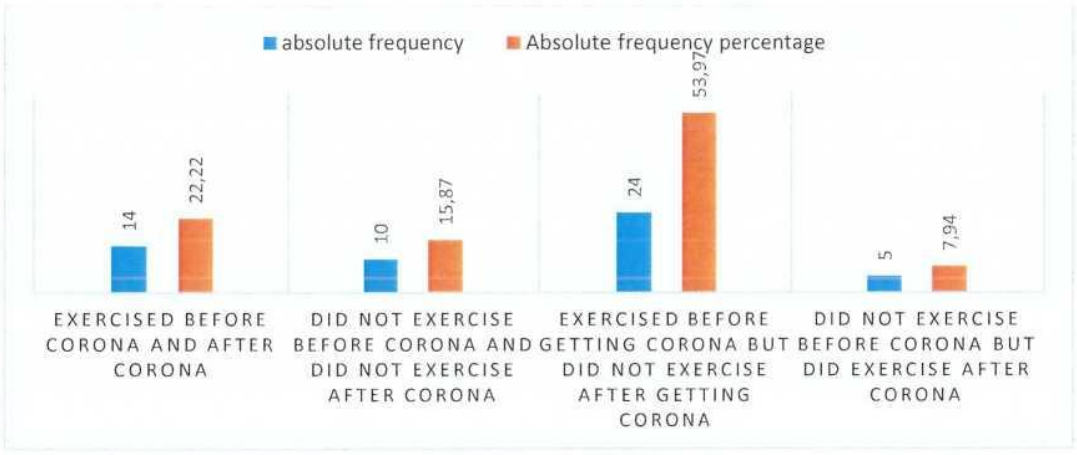

Chart 30. Among patients with Covid-19 with severe respiratory disorders, 34 (53.97%) reported that they had not continued to exercise after developing Covid-19. This is similar to what happened to all patients .

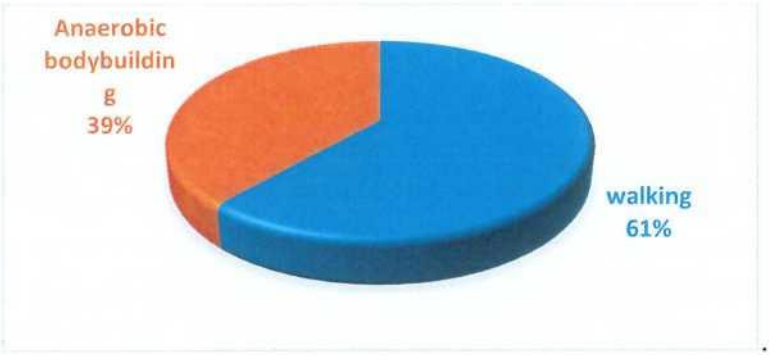

Chart 31. Among the patients who had a history of exercise before Covid-19, most (61.00%) exercised walking.

Chart 32. Of the patients who exercised after Covid-19, most (59.00%) walked

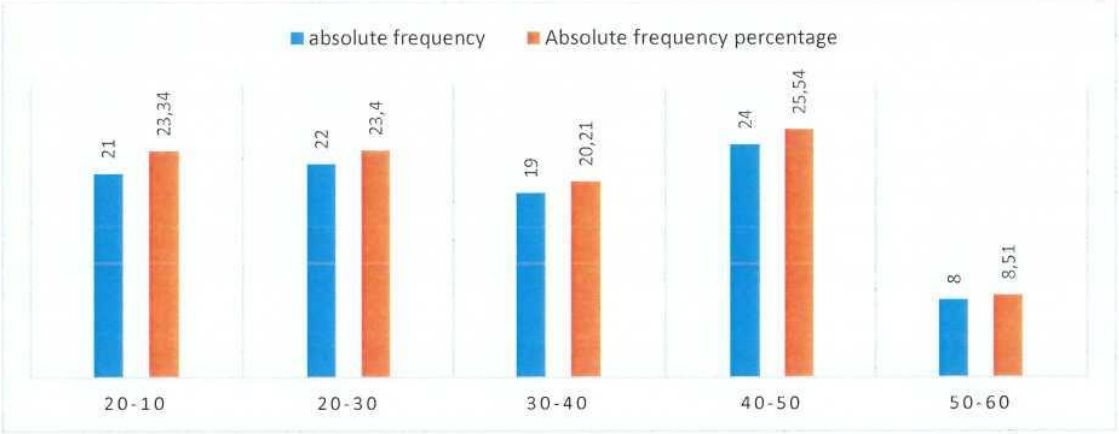

Chart 33. There was an almost unifonn distribution among age groups among patients who walked after Covid-19.

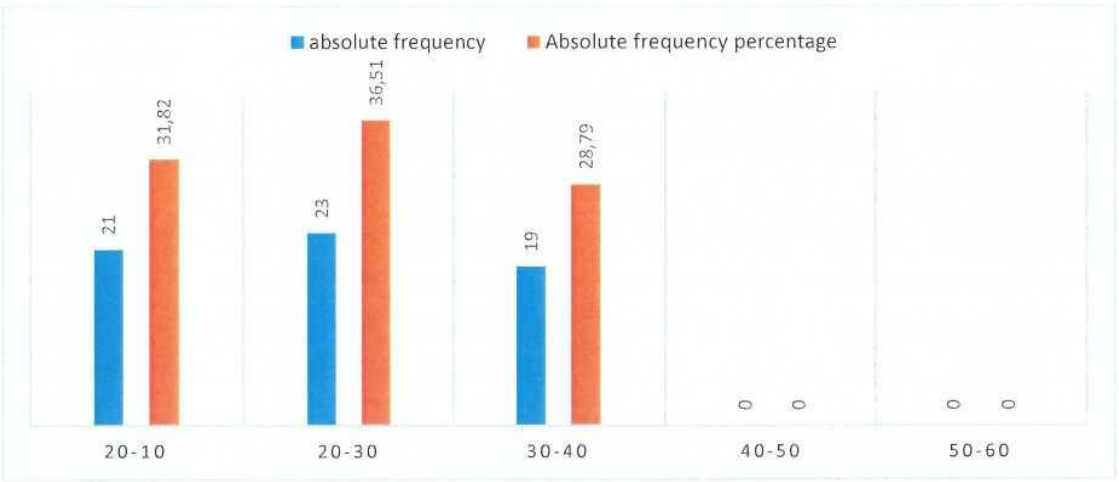

Chart 34. Among patients who did bodybuilding after Covid-19, the highest percentage (37/88%) was in the age group of 20 to 30 years.

The course of recovery of respiratory disorders in patients with Covid-19

Of the 191 patients with Covid-19 who had respiratory disorders, 175 were still on file until the eighth week after follow-up and had participated in the follow-up by telephone.

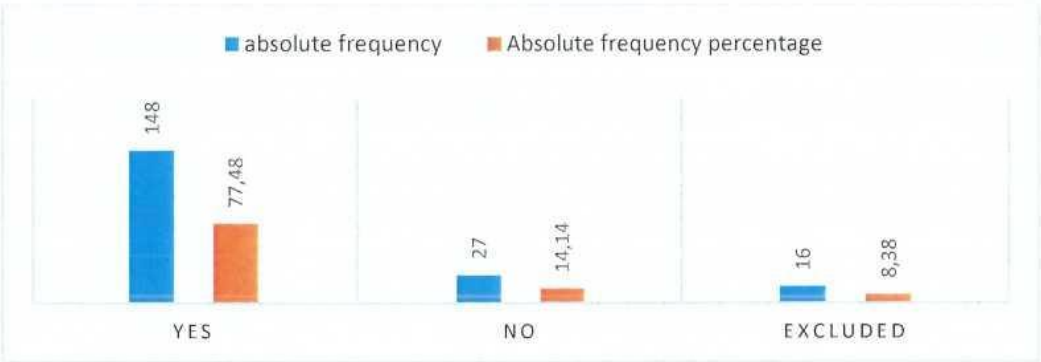

Chart 35. However, 16 people did not return to the study center after the eighth week and did not answer our call.

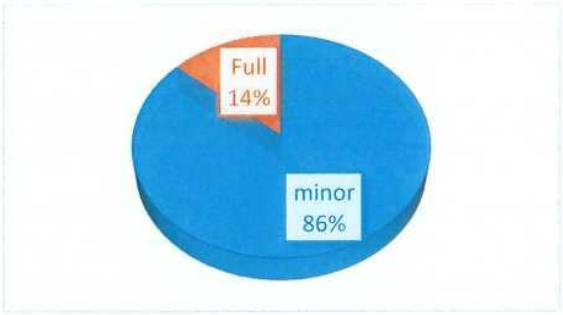

Chart 36. Of the patients with Covid-19 with respiratory disorders who improved after 8 weeks of follow-up, 128 had a partial recovery.

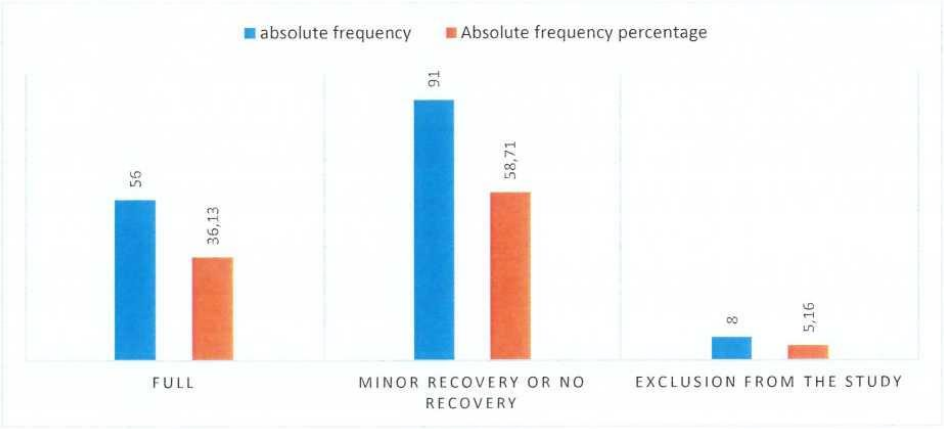

Chart 37. At 16-month follow-up, 8 patients with COVID-19 with respiratory disorders who had partial or no improvement in their follow-up at 8 weeks of follow-up were excluded from the study and 56 were completely cured.

4.2. Objective Two: To Investigate the Relationship between Underlying Factors and Exercise with the Improvement of Respiratory Disorders and Study Hypotheses

4.2.1. The Relationship between Age and Respiratory Disorders

A) The relationship between age and mild respiratory disorder There was no significant relationship between age and mild respiratory disorder (P-value = 0.860).

The lack of a relationship means that age has no significant effect on mild respiratory disorders in patients with Covid-19. Therefore, it is understood that the patient's youth or illness had no effect on patients' susceptibility to mild respiratory disorders.

B) The relationship between age and severe respiratory disorder

There was no significant relationship between age and severe respiratory disorder (P-value = 0.620).

C-8) The relationship between age and improvement in the 8th week of follow-up of respiratory disorders in patients with Covid-19

There was no significant relationship between age and improvement in the 8th week of follow-up of respiratory disorders in patients with Covid-19 (P-value = 0.08).

The absence of a relationship means that age has no significant effect on the improvement of the 8th week of follow-up of respiratory disorders in patients with Covid-19.

C-16) The relationship between age and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19

There was no significant relationship between age and improvement of 16th week of follow-up of respiratory disorders in patients with Covid-19 (F = 292, P-value = 0.590).

The absence of a relationship means that age has no significant effect on the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19.

4.2.2. The Relationship between Previous Illnesses and Respiratory Disorders

A) The relationship between diabetes and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of diabetes and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.866).

Due to the fact that there is no significant relationship between the history of diabetes and mild respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

B) The relationship between diabetes and severe respiratory disorders in patients with Covid-19

Examining the relationship between the variable of history of diabetes and severe respiratory disorder using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.544).

Due to the fact that there is no significant relationship between the history of diabetes and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples in this study.

C) Relationship between hypertension and mild respiratory disorders in patients with Quid- There was no significant relationship between age and improvement of 16th week of follow-up of respiratory disorders in patients with Covid-19 (F = 292, P-value = 0.590).

The absence of a relationship means that age has no significant effect on the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19.

D) The relationship between hypertension and severe respiratory disorders in patients with Covid-19

Examining the relationship between the history of hypertension and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.888).

Considering that there is no significant relationship between the history of hypertension with severe respiratory disorder, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

E) The relationship between heart disease and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of heart disease and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.420).

Due to the fact that there was no significant relationship between the history of the disease and mild respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

F) The relationship between heart disease and severe respiratory disorders in patients with Covid-19

Examining the relationship between the history of heart disease and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.401).

Due to the fact that there is no significant relationship between the history of the disease with severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

The relationship between chronic respiratory disease (COPD) and mild respiratory disorders in patients with Covid-19

Examining the relationship between chronic respiratory history (COPD) and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.956).

Given that there is no significant relationship between chronic respiratory history (COPD) and mild respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

G) The relationship between chronic respiratory disease (COPD) and severe respiratory disorders in patients with COV'D-19

Examining the relationship between chronic respiratory history (COPD) and severe respiratory disorders using Chi-square test, it was found that there is a significant relationship between these two variables (p-value = 0.001).

Considering that there was a significant relationship between chronic respiratory history (COPD) and severe respiratory disorders, so hypothesis zero was rejected and the study hypothesis was accepted and evidence for rejecting hypothesis zero was seen according to the samples of this study. F) The relationship between kidney disease and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of kidney disease and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.425).

Due to the fact that there is no significant relationship between the history of kidney disease and respiratory disorders, so the null hypothesis is not rejected and the

study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

H) The relationship between kidney disease and severe respiratory disorders in patients with Covid-19

In examining the relationship between the history of kidney disease and mild respiratory disorders using Chi-square test, it was found that there is a significant relationship between these two variables (p-value = 0.017).

Due to the fact that there was no significant relationship between the variables of kidney disease history and severe respiratory disorders, so the null hypothesis was rejected and the study hypothesis was accepted and evidence for rejecting the null hypothesis was seen according to the samples of this study.

I) Relationship between liver disease and mild respiratory disorders in patients with Covid- 19

Examining the relationship between the variable of history of liver disease and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.307).

Considering that there is no significant relationship between the variable of history of liver disease and mild respiratory disorders, so hypothesis zero

Not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

J) The relationship between liver disease and severe respiratory disorders in patients with Covid-19

Examining the relationship between the variable of history of liver disease and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.324).

Due to the fact that there is no significant relationship between the variables of liver disease history and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

K) The relationship between neurological disease and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of neurological disease and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.988).

Given that there is no significant relationship between the variables of neurological history and mild respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

L) The relationship between neurological disease and severe respiratory disorders in patients with Covid-19

The relationship between the history of neurological variables and severe respiratory disorders was detennined using Chi-square test.

There is no significant relationship between these two variables (p-value = 0.987).

Due to the fact that there is no significant relationship between the variables of neurological history and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

M) The relationship between head trauma and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of head trauma and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.618).

Due to the fact that there is no significant relationship between the history of head trauma and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

N) Relationship between head trauma and severe respiratory disorders in patients with Covid-19

Examining the relationship between head trauma and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.712).

Due to the fact that there is no significant relationship between the history of head trauma and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

O) The relationship between a history of depression and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of depression and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.266).

Considering that there is no significant relationship between the variables of history of depression and mild respiratory disorders, so hypothesis zero is not rejected and hypothesis of study is not accepted and there is no evidence to reject hypothesis zero according to the samples of this study.

P) The relationship between a history of depression and severe respiratory disorders in patients with Covid-19

Examining the relationship between the history of depression and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.582).

Due to the fact that there is no significant relationship between the history of depression and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

Q) Relationship between a history of schizophrenia and mild respiratory disorders in patients with Covid-19

Examining the relationship between the history of schizophrenia and mild respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.575).

Given that there is no significant relationship between the variables of schizophrenia and mild respiratory disorders, so the hypothesis is not accepted and there is no evidence to reject the zero hypothesis according to the examples of this study.

R) Relationship between the history of schizophrenia and severe respiratory disorders in patients with Covid-19

Examining the relationship between the variables of history of schizophrenia and severe respiratory disorders using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.714).

Due to the fact that there is no significant relationship between the history of schizophrenia and severe respiratory disorders, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

4.2.3. Relationship between Previous Diseases and Recovery in the Eighth Week of Follow-up of Respiratory Disorders in Patients with Covid-19

A) The relationship between diabetes and recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19

In the study of the relationship between the variable of history of diabetes with improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19

Eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.120).

Due to the fact that there is no significant relationship between the history of diabetes and the improvement of the eighth week of follow-up of respiratory disorders in patients with covid-19, so null hypothesis is not rejected and study hypothesis is not accepted and there is evidence to reject null hypothesis according to the samples does not have.

B) The relationship between hypertension and recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of hypertension and the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.400).

Considering that there is no significant relationship between the history of hypertension and the improvement of the eighth week of follow-up of respiratory disorders in patients with covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is evidence to reject the null hypothesis, does not have.

C) The relationship between heart disease and recovery in the eighth week of follow-up of respiratory disorders in patients with Alzheimer's disease

Examining the relationship between the variable of heart disease history with the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.739).

Considering that there is no significant relationship between the variables of heart disease history and improvement of the eighth week of follow-up of respiratory disorders in patients with covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

D) The relationship between chronic respiratory disease (COPD) and the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between chronic respiratory history (COPD) with improvement of the eighth week of follow-up of respiratory disorders in patients with COVID-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value 0.147 =).

Considering that there is no significant relationship between chronic respiratory history (COPD) and improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19, so hypothesis zero is not rejected and study hypothesis is not accepted. This study does not exist.

E) Relationship between kidney disease and improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of kidney disease and improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.818).

Considering that there is no significant relationship between the variable of kidney disease history and the improvement of the eighth week of follow-up of

respiratory disorders in patients with covid-19, so hypothesis zero is not rejected and hypothesis of study is not accepted and there is evidence to reject hypothesis zero according to the samples does not have.

F) Relationship between liver disease and recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19

In the study of the relationship between the variable of history of kidney disease with recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19 with

Using Chi-square test, it was found that there is a significant relationship between these two variables (p-value = 0.489).

Considering that there was a significant relationship between the variable of history of kidney disease and the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19, so null hypothesis is rejected and the study hypothesis is accepted.

G) The relationship between neurological disease and recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the variable of neurological history with the eighth improvement of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.002).

Considering that there is no significant relationship between the variable of neuropathic history and the eighth improvement of respiratory disorders in patients with mild Covid- 19, so the null hypothesis is rejected and the study hypothesis is accepted and there is no evidence to reject the null hypothesis according to the samples of this study. .

H) Relationship between head trauma and recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of neurological disease with the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.397).

Considering that there is no significant relationship between the variable of neurological history with the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19, so hypothesis zero is rejected and hypothesis of study is not accepted and there is evidence to reject hypothesis zero according to the samples of this study does not have

I) Relationship between history of depression and recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of depression and the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.322).

Considering that there is no significant relationship between the variable of history of depression and improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is evidence to reject the null hypothesis, does not have.

J) The relationship between the history of schizophrenia and the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of schizophrenia and the improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there was no significant relationship between these two variables (p-value = 0.692).

Considering that there is no significant relationship between the history of schizophrenia and the improvement of the eighth week of follow-up of respiratory

disorders in patients with Covid-19, so hypothesis zero is not rejected and hypothesis of study is not accepted and there is evidence to reject hypothesis zero according to the samples of this study, does not have.

4.2.4. Relationship between Previous Diseases and Improvement in the 16th Week of Follow-up of Respiratory Disorders in Patients with Covid-19

A) The relationship between diabetes and recovery in the 16th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of diabetes and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p- value = 0.847).

Due to the fact that there is no significant relationship between the history of diabetes and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is evidence to reject the null hypothesis, does not have.

B) The relationship between hypertension and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of hypertension and the 16th improvement in the follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.687).

Due to the fact that there is no significant relationship between the history of hypertension and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is evidence to reject the null hypothesis, does not have.

C) The relationship between heart disease and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of heart disease with the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.330).

Considering that there is no significant relationship between the variable of heart disease history and the improvement of the 16th week of follow-up of respiratory disorders in patients with covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is evidence to reject the null hypothesis, does not have.

D) Relationship between chronic respiratory disease (COPD) and improvement in the 16th week of follow-up of respiratory disorders in patients with CVD

Examining the relationship between chronic respiratory history (COPD) and improvement of the 16th week of follow-up of respiratory disorders in patients with COVID-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value 0.540 =).

Considering that there is no significant relationship between chronic respiratory history (COPD) and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19, so null hypothesis is not rejected and study hypothesis is not accepted. This study does not exist.

E) The relationship between kidney disease and improvement in the 16th week of follow- up of respiratory disorders in patients with Covid-19

Examining the relationship between the variable of kidney disease history and improvement of the 16th week of follow-up of respiratory disorders in patients with Covid- 19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.806).

Considering that there is no significant relationship between the variable of history of kidney disease and the improvement of the 16th week of follow-up of

respiratory disorders in patients with covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted, does not have

F) The relationship between liver disease and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of kidney disease and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.864).

Considering that there is no significant relationship between the variable of history of kidney disease and the improvement of the 16th week of follow-up of respiratory disorders in patients with covid-19, so hypothesis zero is not rejected and hypothesis is not accepted and there is no evidence to reject hypothesis zero according to the samples of this study.

G) The relationship between neurological disease and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of neurological disease and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid- 19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.305).

Due to the fact that there is no significant relationship between the variable of neurological history and improvement of the 16th week of follow-up of respiratory disorders in patients with mild Covid-19, so null hypothesis is rejected and study hypothesis is not accepted and there is evidence to reject null hypothesis according to the samples does not have.

H) The relationship between head trauma and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19

In the study of the relationship between the history of neurological disease with the improvement of the 16th week of follow-up of respiratory disorders in patients with

Covid- 19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.369).

Considering that between the variables of neurological disease history and improvement of the 16th week, follow-up of respiratory disorders in patients with Covid- 19 There is no significant relationship, so the null hypothesis is rejected and the study hypothesis is not accepted, and there is no evidence to reject the null hypothesis according to the examples in this study.

H) The relationship between the history of depression and recovery in the 16th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the history of depression and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p- value = 0.332).

Considering that there is no significant relationship between the history of depression and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19, so hypothesis zero is not rejected and hypothesis of study is accepted and there is no evidence to reject hypothesis zero according to the samples of this study.

J) The relationship between the history of schizophrenia and the improvement of the **1**6th week of follow-up of respiratory disorders in patients with Covid-19

Examining the relationship between the variables of schizophrenia with the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19 using Chi- square test, it was found that there is no significant relationship between these two variables (p-value = 0.201).

Due to the fact that there is no significant relationship between the history of schizophrenia and the improvement of the 16th week of follow-up of respiratory disorders in patients with covid-19, so the null hypothesis is not rejected and the study

hypothesis is not accepted and there is evidence to reject the null hypothesis, does not have.

4.2.5. The Relationship between Exercise History and Respiratory Disorders

A) The relationship between exercise history and mild respiratory disorders in patients with Covid-19

Examining the relationship between exercise history and mild respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.903).

Due to the fact that there is no significant relationship between the variable of exercise history and mild respiratory disorders in patients with Covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

B) The relationship between exercise history and severe respiratory disorders in patients with Covid-19

Examining the relationship between exercise history and severe respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.059).

Considering that there is no significant relationship between the variable of exercise history and severe respiratory disorders in patients with Covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

4.2.6. Relationship between Exercise History and improvement in the Eighth Week of Follow-up of Respiratory Disorders in Patients with Covid-19

Examining the relationship between exercise history and improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.941) There is no significant (p-value = 0.941).

Due to the fact that there is no significant relationship between the variable of exercise history and improvement of the eighth week of follow-up of respiratory disorders in patients with Covid-19, so hypothesis zero is not rejected and hypothesis of study is not accepted, does not have.

4.2.7. Relationship between Exercise History and Improvement in the 16th Week of Follow-up of Respiratory Disorders in Patients with Covid-19

Examining the relationship between exercise history and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.456).

Considering that there is no significant relationship between the variable of exercise history and the improvement of the 16th week of follow-up of respiratory disorders in patients with Covid-19, therefore, hypothesis zero is not rejected and hypothesis of study is not accepted, does not have.

4.2.8. The Relationship between Exercise and Respiratory Disorders in Patients with Covid-19

Examining the relationship between exercise and respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.941).

Due to the fact that there is no significant relationship between exercise and respiratory disorders in patients with Covid-19, so the null hypothesis is not rejected and the study hypothesis is not accepted and there is no evidence to reject the null hypothesis according to the samples of this study.

4.2.9. Relationship between Exercise and Recovery in the Eighth Week of Follow-up of Respiratory Disorders in Patients with Covid-19

Examining the relationship between exercise and improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19 using Chi-square

test, it was found that there is no significant relationship between these two variables (p-value = 0.684).

Due to the fact that there is no significant relationship between exercise and improvement in the eighth week of follow-up of respiratory disorders in patients with Covid-19, so hypothesis zero is not rejected and study hypothesis is not accepted and there is no evidence to reject hypothesis zero according to the samples of this study.

4.2.10. Relationship between Exercise and Improvement in the 16th Week of Follow- up of Respiratory Disorders in Patients with Covid-19

Examining the relationship between exercise and improvement in the 16th week of follow- up of respiratory disorders in patients with Covid-19 using Chi-square test, it was found that there is no significant relationship between these two variables (p-value = 0.848).

Considering that there is no significant relationship between exercise and improvement in the 16th week of follow-up of respiratory disorders in patients with Covid-19, so hypothesis zero is not rejected and hypothesis of study is not accepted and there is no evidence to reject hypothesis zero according to the samples of this study.

Table 10: Examining the relationship between exercise and recovery in the eighth week of follow-up and the sixteenth week of follow-up

	Relationship with improvement of respiratory disorders in the eighth week of follow-up	Relationship with improvement of respiratory disorders in the 16th week of follow-up
Exercise in general (after getting Covid-19)	P= 0.684	P= 0.848
Walking (after Covid-19)	P= 0.366	P= 0.494
Bodybuilding (after Covid-19)	P= 0.754	P= 0.423

Among 350 patients with covid-19 participating in this study, there was no significant correlation between walking exercise and bodybuilding with the improvement of respiratory disorders in the eighth and sixteenth weeks of follow-up (Table 11).

Table 11: Correlation between exercise and improvement of respiratory disorders in the eighth week of follow-up and the sixteenth week of follow-up

	Correlation between improvement of respiratory disorders in the eighth week of follow-up	Correlation between improvement of respiratory disorders in the 16th week of follow-up
Exercise in general (after getting Covid-19)	r'*= 0.011	R^{4}"=- 0.016
Walking (after Covid-19)	r^{2}"= 0.068	R^{5}'= 0.026
Bodybuilding (after Covid-19)	r^{J}*= - 0.052	R^{6}= - 0.066

(r): Index of the amount of correlation between the studied variables.

1) There was a very weak and positive correlation between the improvement of the eighth week of follow-up of respiratory disorders with exercise in general (regardless of the type of exercise) which was not significant.

2) There was a very weak positive correlation between recovery of the eighth week of follow-up of respiratory disorders and walking exercise, which was not significant.

3) There was a very weak negative correlation between the improvement of the eighth week of follow-up of respiratory disorders with bodybuilding exercise, which was not significant.

4) There was a very weak negative correlation between the improvement of the 16th week of follow-up of respiratory disorders with exercise in general (regardless of the type of exercise) which was not significant.

5) There was a very weak positive correlation between recovery of the 16th week of follow-up of respiratory disorders and walking exercise, which was not significant.

6) There was a very weak negative correlation between recovery from the 16th week of follow-up of respiratory disorders and walking exercise, which was not significant.

The results of the correlation study were consistent with the results of the relationship between walking and bodybuilding. These findings indicate that walking and bodybuilding exercise had no significant effect on the improvement of respiratory disorders in the eighth and sixteenth weeks of follow-up among 350 patients with covid-19 participating in this study who had respiratory disorders.

4.2.11. The Relationship between Sports History and Nationality

There was no significant relationship between sports history and nationality (p-value = 0.763).

There was no significant relationship between exercise history and nationality of patients with Covid-19 participating in the study, so patients' nationality did not affect their exercise history, which indicates that nationality did not affect exercise history.

4.2.12. The Relationship between Exercise and Nationality

There was no significant relationship between exercise and nationality (p-value = 0.056).

There was no significant relationship between exercise and nationality of patients with Covid-19 participating in the study, so patients' nationality did not affect their exercise, which indicates that nationality did not affect exercise.

4.2.13. Relationship between Nationality and Respiratory Disorder

A) The relationship between nationality and mild respiratory disorder

There was no significant relationship between nationality and mild respiratory disorder (p- value = 0.522). There was no significant relationship between nationality and mild respiratory disorder in patients participating in this study.

B) The relationship between nationality and severe respiratory disorder

There was no significant relationship between nationality and mild respiratory disorder (p- value = 0.472). There was no significant relationship between nationality and mild respiratory disorder in patients participating in this study.

The lack of a relationship between nationality and respiratory disorders (mild and severe) indicates that respiratory disorders are not related to nationality, so nationality is not a risk factor for respiratory disorders in patients with Covid-19.

4.2.14. Relationship between Nationality and the Course of Recovery of the Eighth Week of Follow-up of Respiratory Disorders in Patients with Covid-19

There was no significant relationship between nationality and the course of recovery in the eighth week of follow-up of respiratory disorders in patients with Covid-19 (p-value = 0.470). There was no significant relationship between nationality and the course of recovery of respiratory disorders in patients participating in this study.

4.2.15. Relationship between Nationality and the Course of Recovery in the 16th week of Follow-up of Respiratory Disorders in Patients with Covid-19

There was no significant relationship between nationality and the course of recovery in the 16th week of follow-up of respiratory disorders in patients with Covid-19 (p-value = 0.470). There was no significant relationship between nationality and the course of recovery of respiratory disorders in patients participating in this study.

4.3. Evaluation of the Effect of Respiratory Physiotherapy Exercises

Respiratory disorders did not improve in 91 patients with Covid-19 who had respiratory disorders by the end of the 16th week of follow-up, so these individuals had received a respiratory physiotherapy exercise program by a physician or physiotherapist consulting the study center. These exercises were taught to these 91 patients through educational videos, and after 4 weeks, the results of the trained respiratory physiotherapy exercises were evaluated by us through the checklist used in the study using telephone calls and video communication.

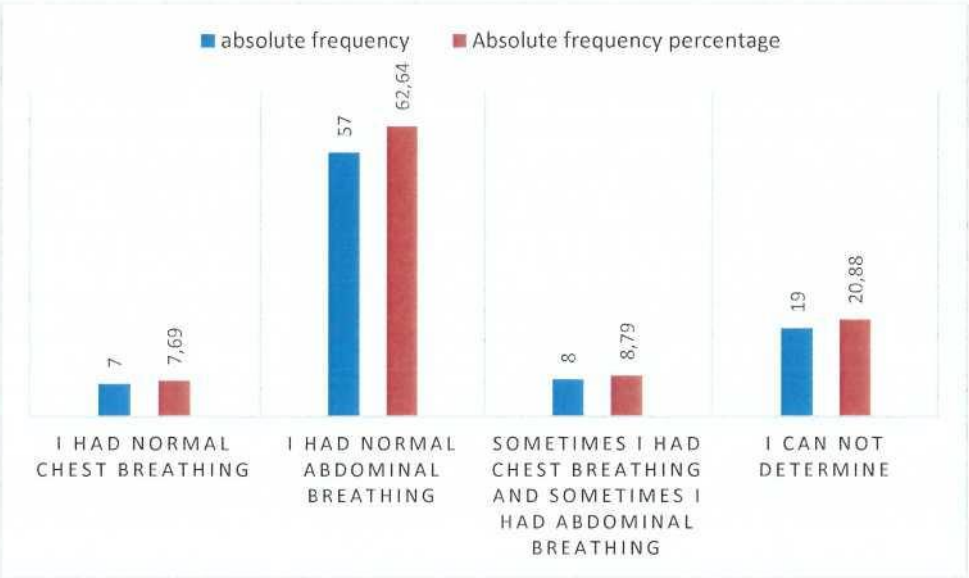

Chart 38. In the study of respiratory pattern in patients with respiratory disorders who received training, 57 (62.64%) had the correct respiratory pattern and 15 (16.48%) did not always follow the correct respiratory pattern or had a completely wrong respiratory pattern

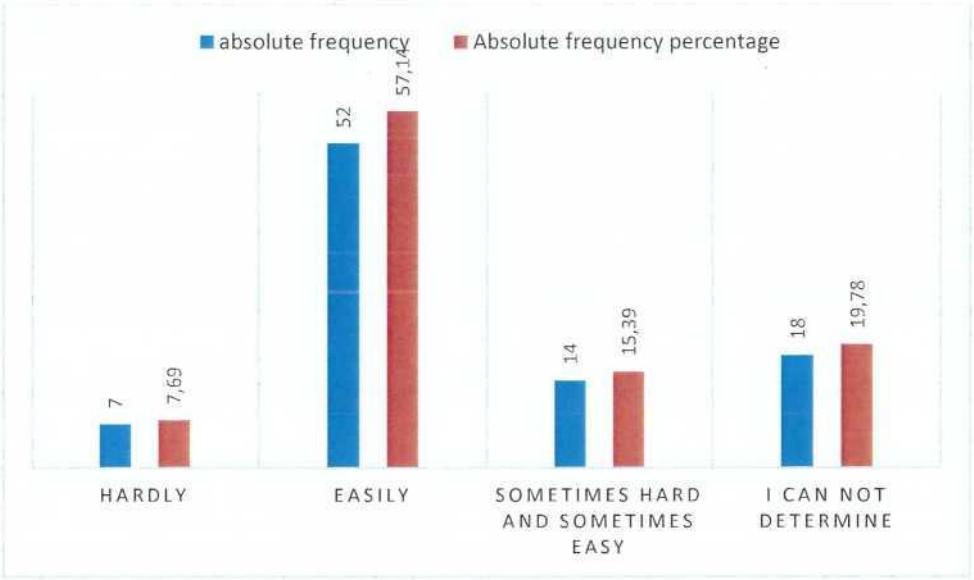

Chart 39. In the second question related to the respiratory pattern, which examined the effect of the respiratory pattern on the respiratory status of patients before developing Covid-19 disease, it was found that 21 patients (23.07%) of these patients had some difficulty in breathing and felt That it is difficult for them to breathe.

The results of Questions 1 and 2 of the Respiratory Physiotherapy Exercise Questionnaire, which assesses the correctness of the respiratory pattern of patients

receiving respiratory physiotherapy exercises, show that a significant percentage of patients have the wrong respiratory pattern or do not always use the correct respiratory pattern. On the other hand, the high percentage of patients who have mentioned that They cannot mention their respiratory pattern.

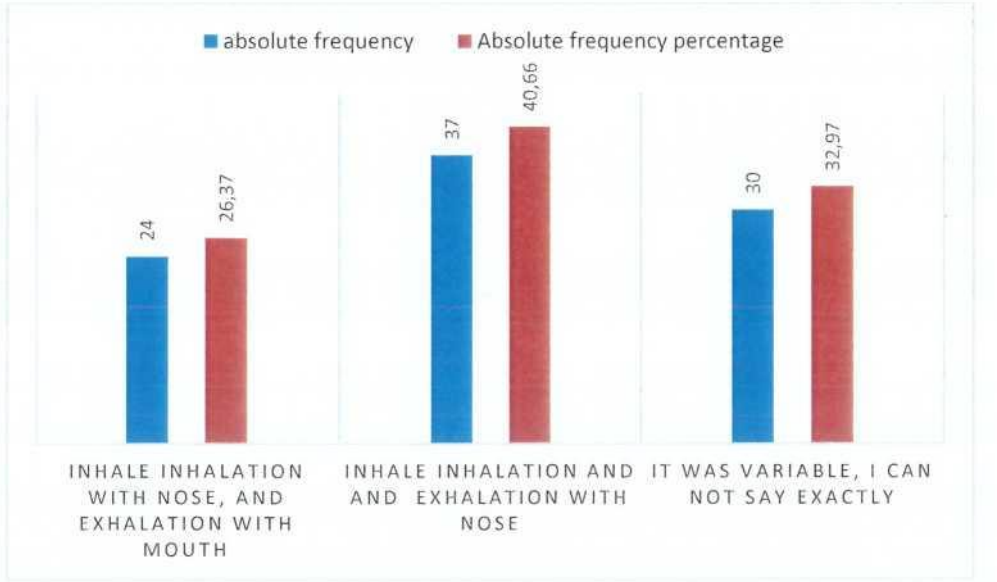

Chart 40. The correct breathing pattern is that in each breath, the tail should be inhaled and exhaled through the mouth. Examining the breathing pattern of patients receiving respiratory physiotherapy exercises before they developed Covid-19, it was found that only 24 (26.37%) of these patients had a correct breathing pattern in their tails and exhales, and other patients either had a wrong breathing pattern or this They did not always follow the correct breathing pattern. This question also indicated that patients' knowledge of the correct respiratory pattern was insufficient.

After teaching the correct respiratory pattern to the patients trained in respiratory physiotherapy exercises, it was found that 68 patients (74.72%) of these patients had corrected their respiratory pattern according to the training.

From the results of the study of 3 questions related to the correct breathing pattern, it can be concluded that teaching the correct breathing pattern to patients with Covid-19 who have respiratory disorders is a useful and necessary training. None of the participating patients had a history of developing Covid-19 and receiving respiratory physiotherapy training.

They did not have breathing exercises. This indicates that these patients were not aware of the importance of respiratory physiotherapy exercises in the treatment of respiratory disorders. This also indicates the need for training in respiratory physiotherapy exercises in patients with Covid-19 with respiratory disorders.

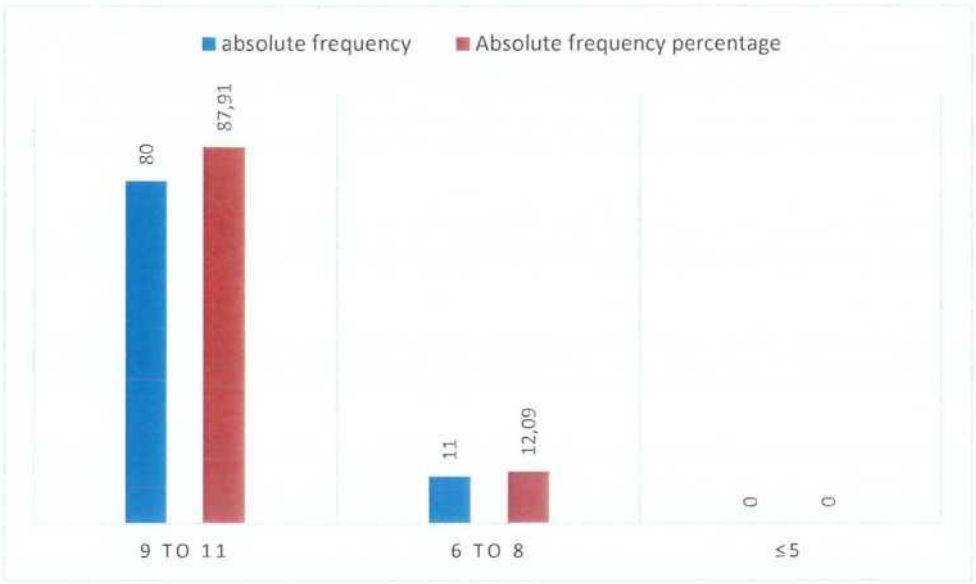

Chart 41. Out of 11 exercises taught to patients, 80 (87.91%) of the patients receiving training had performed 9 to 11 of the trained exercises

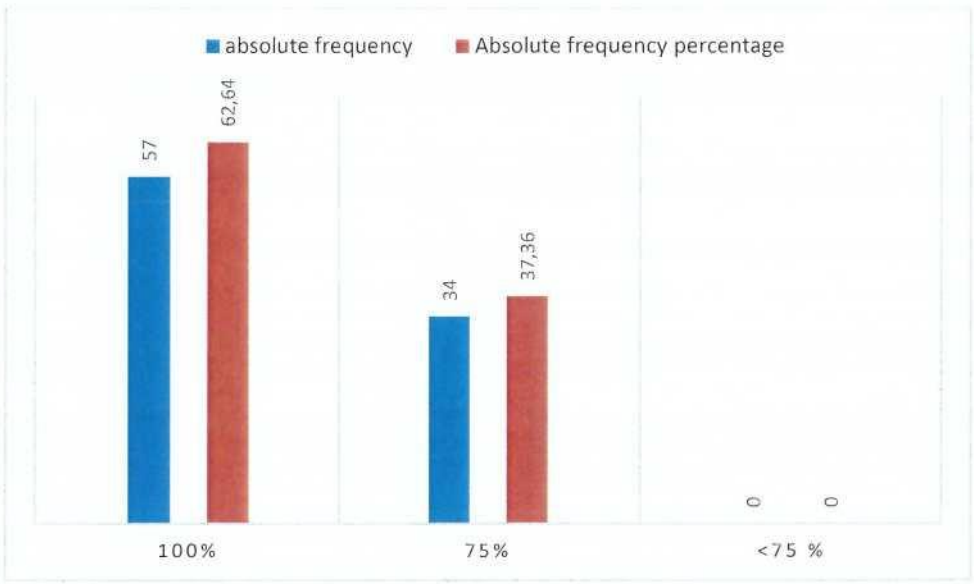

Chart 42. The standard number of repetitions for each exercise was specified, and patients receiving the exercises should perform all of these repetitions in accordance with the instruction. In a study performed after four weeks of these exercises, it was found that 57 patients (62.64%)

of these patients did 100.00% of the recommended number of repetitions for each exercise according to the training received.

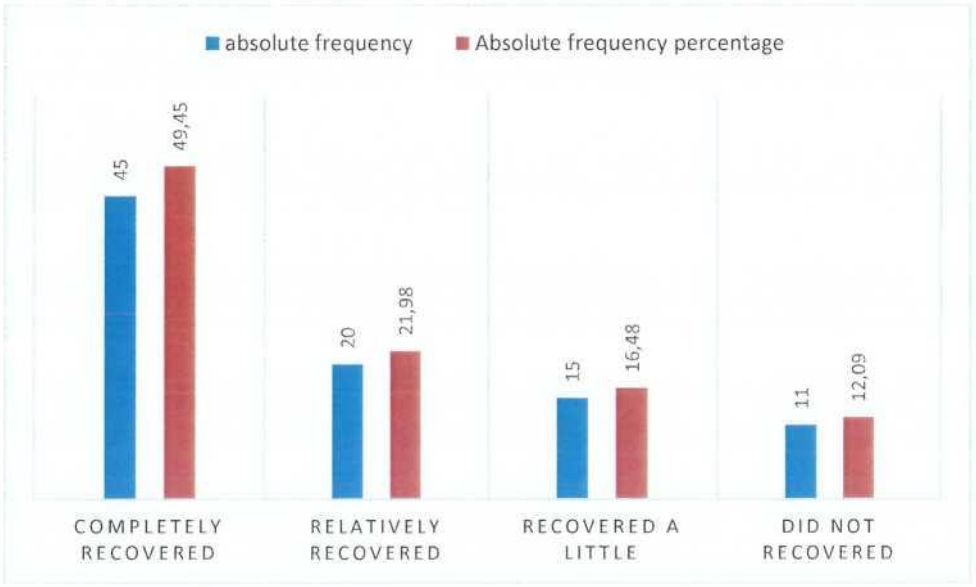

Chart 43. At the end of 4 weeks of receiving respiratory physiotherapy exercises, 45 patients (49.45%) reported that their respiratory disorder had completely improved and only 11 patients (12.09) reported that their respiratory disorder had not improved

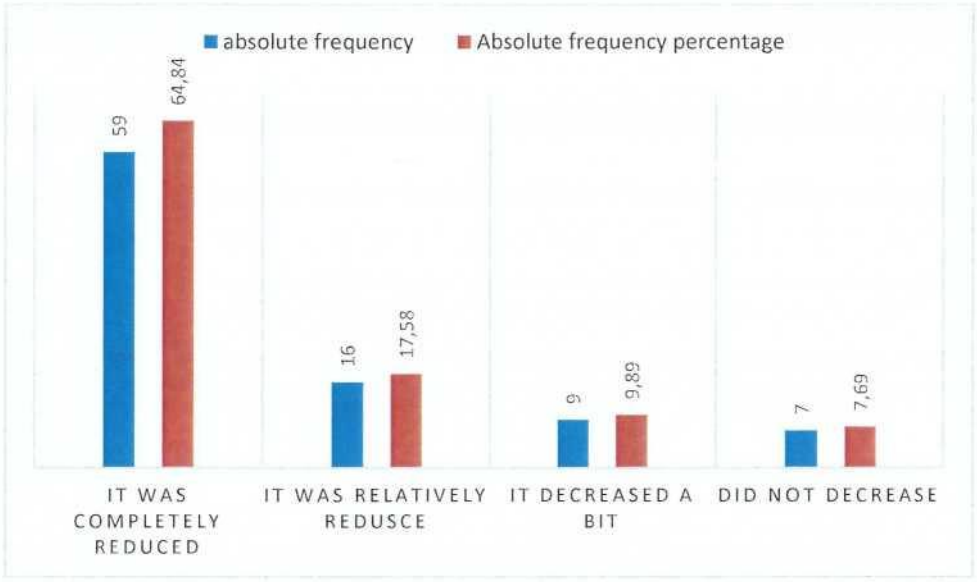

Chart 44. At the end of 4 weeks of respiratory physiotherapy exercises, 59 patients (64.84%) of the patients mentioned that their respiratory secretions had completely decreased and Only 7 patients (7.69%) reported that their respiratory secretions did not decrease.

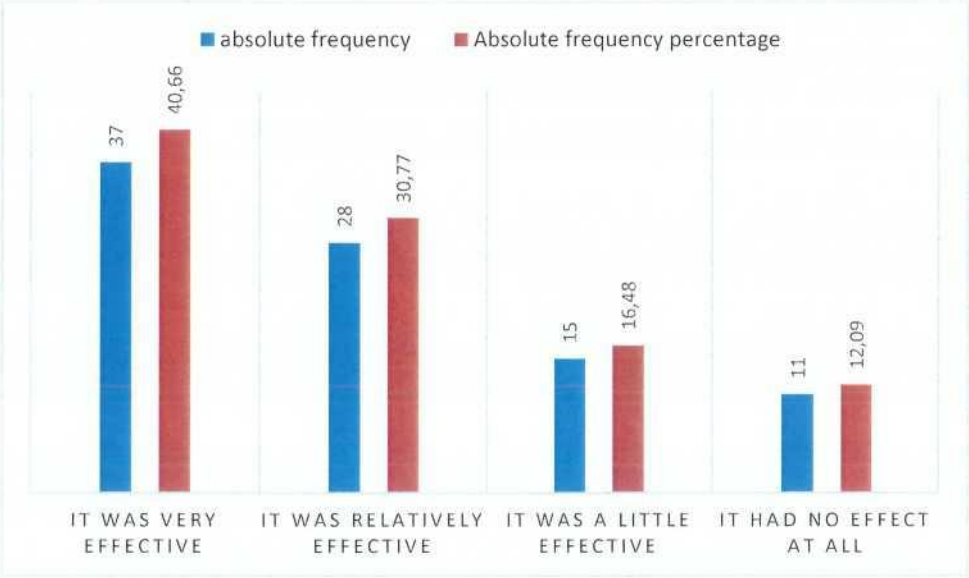

Chart 45. Out of the total number of patients receiving respiratory exercises, 37 (40.66%) stated that these exercises were completely effective in improving their respiratory disorders and only 11 (12.09) stated that the respiratory physiotherapy exercises trained in improving respiratory disorders. He had no effect.

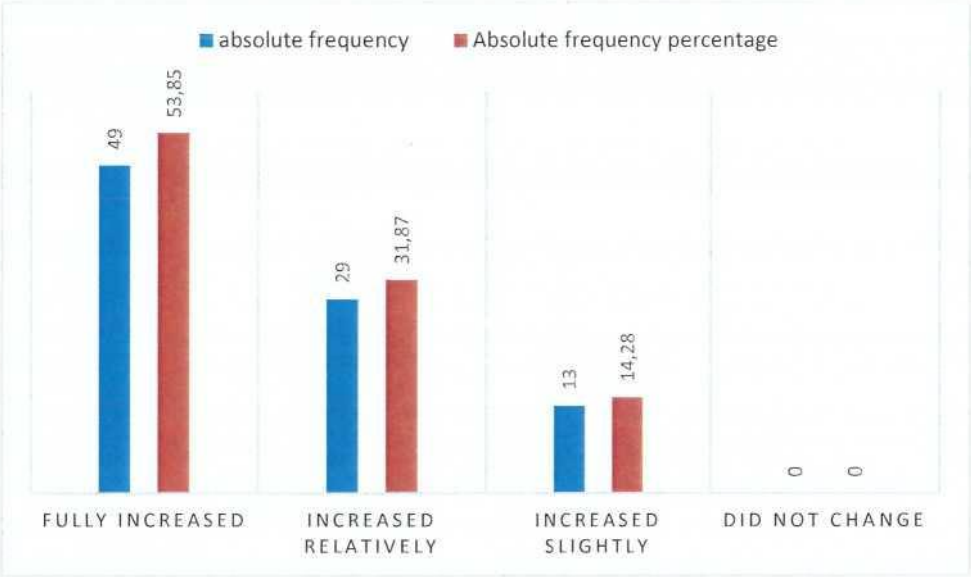

Chart 46. Examination that we performed through the use of virtual networking facilities and spirometry by patients and sending us the result of spirometry test, it was found that at the end of the study, the respiratory capacity of 49 (53.85%) of patients has completely increased.

4.3.1. Evaluation of the Relationship between Gender Variables and the Improvement of Respiratory Disorders in the Follow-up Performed after 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the gender variable and the improvement of respiratory disorders after breathing exercises (p-value = 0.380).

There was no significant relationship between gender and the improvement of respiratory disorders in patients with Covid-19 receiving respiratory physiotherapy exercises, so it can be said that gender has no effect on the effectiveness of respiratory physiotherapy exercises and these exercises are effective in improving Ishat disorders regardless of the patient.

4.3.2. Evaluation of the Relationship between Age Variable and Improvement of Respiratory Disorders in the Follow-up Performed After 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the age variable and the improvement of respiratory disorders after breathing exercises (p-value = 0.539).

There was no significant relationship between age and recovery of respiratory disorders in patients with Covid-19 receiving respiratory physiotherapy exercises, so it can be said that age has no effect on the effectiveness of respiratory physiotherapy exercises and these exercises are effective in improving their disorders regardless of age.

4.3.3. Evaluation of the Relationship between Job Variable and Improvement of Respiratory Disorders in the Follow-up Performed after 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the job variable and the improvement of respiratory disorders after breathing exercises (p-value = 0.954).

There was no significant relationship between job and improvement of respiratory disorders in patients with Covid-19 receiving respiratory physiotherapy

exercises, so it can be said that job has no effect on the effectiveness of respiratory physiotherapy exercises and these exercises are effective in improving their disorders.

4.3.4. Evaluation of the Relationship between Gender Variable and Reduction of Respiratory Secretions in the Follow-up Performed after 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the sex variable and the reduction of respiratory secretions after breathing exercises (p-value = 0.567).

There was no significant relationship between gender and reduction of respiratory secretions in patients with Covid-19 receiving respiratory physiotherapy exercises. Therefore, it can be said that gender has no effect on the effect of respiratory physiotherapy exercises in reducing patients' respiratory secretions. Their secretions are impressive.

He is influential.

4.3.5. Evaluation of the Relationship between Age Variable and Reduction of Respiratory Discharge in the Follow-up Performed after 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the age variable and the decrease in respiratory secretion after respiratory exercises (p-value = 0.960).

There was no significant relationship between age and reduction of respiratory secretions in patients with Covid-19 receiving respiratory physiotherapy exercises. Therefore, it can be said that age has no effect on the effect of respiratory physiotherapy exercises in reducing patients' respiratory secretions. Their secretions are impressive.

4.3.6. Evaluation of the Relationship between Job Variable and Reduction of Respiratory Discharge in the Follow-up Performed after 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the job variable and the reduction of respiratory secretions after breathing exercises (p-value = 0.840).

There was no significant relationship between job and reduction of respiratory secretions in patients with Covid-19 receiving respiratory physiotherapy exercises. Therefore, it can be said that job has no effect on the effect of respiratory physiotherapy exercises in reducing patients' respiratory secretions. Their secretions are impressive.

4.3.7. Evaluation of the Relationship between Gender Variable with Increasing Respiratory Capacity in Follow-up Performed after 4 Weeks of Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the gender variable and the increase in respiratory capacity after breathing exercises (p-value = 0.480).

There was no significant relationship between gender and increased respiratory capacity in patients with Covid-19 receiving respiratory physiotherapy exercises. Therefore, it can be said that gender has no effect on the effect of respiratory physiotherapy exercises on increasing patients' respiratory capacity. Their respiratory capacity is impressive.

4.3.8. Evaluation of the Relationship between Age Variable with Increasing Respiratory Capacity in Follow-up Performed after 4 Weeks after Performing Respiratory Physiotherapy Exercises by Patients

There was a significant relationship between the age variable and the increase in respiratory capacity after breathing exercises (p-value = 0.048).

There was a significant relationship between age and increased respiratory capacity in patients with Covid-19 receiving respiratory physiotherapy exercises, so it can be said that age is effective in increasing the effectiveness of respiratory physiotherapy exercises in increasing the respiratory capacity of patients.

4.3.9. Evaluation of the Relationship between Job Variable and Increase in Respiratory Capacity in Follow-up Performed after 4 Weeks after Performing Respiratory Physiotherapy Exercises by Patients

There was no significant relationship between the job variable and the increase in respiratory capacity after breathing exercises (p-value = 0.718).

There was no significant relationship between job and increase in respiratory capacity in patients with Covid-19 receiving respiratory physiotherapy exercises. Their respiratory capacity is impressive.

4.3.10. Investigating the Relationship between Performing Respiratory Physiotherapy Exercises and Improving Respiratory Disorders in Patients Receiving These Exercises

There was a significant relationship between the performance of respiratory physiotherapy exercises and the improvement of respiratory disorders in patients receiving these exercises (p-value = <0.000). Therefore, it can be said that the trained respiratory physiotherapy exercises have been effective in improving patients with respiratory disorders.

4.3.11. Investigating the Relationship between Performing Respiratory Physiotherapy Exercises and Reducing Respiratory Discharge in Patients Receiving These Exercises

There was a significant relationship between the performance of respiratory physiotherapy exercises and the improvement of respiratory disorders in patients receiving these exercises (p-value = <0.000). Therefore, it can be said that the trained respiratory physiotherapy exercises have been effective in improving patients with respiratory disorders.

27. Investigating the relationship between performing respiratory physiotherapy exercises and increasing respiratory capacity in patients receiving these exercises

There was a significant relationship between performing respiratory physiotherapy exercises and increasing respiratory capacity in patients receiving these exercises (p-value = <0.000). Therefore, it can be said that the trained respiratory physiotherapy exercises have been effective in increasing the respiratory capacity of patients.

4.3.12. Investigating the Relationship between Gender Variable and Performing respiratory physiotherapy Exercises by Patients Receiving These Exercises

There was no significant relationship between gender variable and respiratory physiotherapy exercises by patients receiving these exercises (p-value = 0.605). Therefore, it can be stated that gender has no effect on the number of respiratory physiotherapy exercises taught by patients.

This indicates that patients receiving trained respiratory physiotherapy exercises have performed the training according to the training, regardless of whether they are male or female.

4.3.13. Investigating the Relationship between Age Variable and Performing Respiratory Physiotherapy Exercises by Patients Receiving these Exercises

Respiratory by patients receiving these exercises

There was no significant relationship between age variable and performing respiratory physiotherapy exercises by patients receiving these exercises (p-value = 0.111). Therefore, it can be stated that age has no effect on the number of respiratory physiotherapy exercises taught by patients.

This indicates that patients receiving trained respiratory physiotherapy exercises have perfonned the training according to their age, regardless of their age.

4.3.14. Investigating the Relationship between job Variable and Performing Respiratory Physiotherapy Exercises by patients Receiving These Exercises

There was no significant relationship between the job variable and the perfonnance of respiratory physiotherapy exercises by patients receiving these exercises (p-value = 0.878). Therefore, it can be stated that the job has no effect on the number of respiratory physiotherapy exercises that patients have perfonned.

This indicates that patients receiving trained respiratory physiotherapy exercises have perfonned the training in accordance with their training, regardless of their occupation.

31. The relationship between the number of repetitions of breathing exercises taught by patients with the improvement of respiratory disorders in patients receiving these exercises.

There was a significant relationship between the number of repetitions of breathing exercises taught by patients and the improvement of respiratory disorders in patients receiving these exercises (p-value = <0.000). Therefore, it can be said that the number of repetitions of trained respiratory physiotherapy exercises is effective in improving respiratory disorders in these patients, therefore, patients should repeat the exercises according to the standard number taught.

Repeat according to the standard number taught.

4.3.15. Investigating the Relationship between the Number of Repetitions of Breathing Exercises Taught by Patients with the Reduction of Respiratory Secretions in Patients Receiving These Exercises

There was a significant relationship between the number of repetitions of respiratory exercises taught by patients and the reduction of respiratory secretions in patients receiving these exercises (p-value = <0.000). Therefore, it can be said that the number of repetitions of trained respiratory physiotherapy exercises is effective in reducing respiratory discharge in these patients, so patients should repeat the exercises according to the standard number taught.

4.3.16. The Relationship between the Number of Repetitions of Breathing Exercises Taught by Patients with Increasing Respiratory Capacity in Patients Receiving These Exercises

There was a significant relationship between the number of repetitions of respiratory exercises taught by patients with increasing respiratory capacity in patients receiving these exercises (p-value = <0.000). Therefore, it can be said that the number of repetitions of the trained respiratory physiotherapy exercises is effective in increasing the respiratory capacity in these patients, therefore, patients should repeat the exercises according to the standard number taught.

4.3.17. Evaluation of the Relationship between gender variable and the Number of Repetitions of Physiotherapy Exercises by Patients Receiving These Exercises

There was no significant relationship between the sex variable and the number of repetitions of physiotherapy exercises by patients receiving these exercises (p-value = 0.977). Therefore, it can be said that gender had no effect on the percentage of repetitions of exercises performed by the patient based on the teachings.

4.3.18. Investigating the relationship between Job Variable and the Number of Repetitions of Physiotherapy Exercises by Patients Receiving These Exercises

There was no significant relationship between the job variable and the number of repetitions of physiotherapy exercises by patients receiving these exercises (p-value = 0.429). Therefore, such an expression can be made

The patients' occupation had no effect on the percentage of repetitions of exercises that the patient performed based on the instructions.

4.3.19. Investigating the Relationship between Job age and the Number of Repetitions of Physiotherapy Exercises by Patients Receiving These Exercises

There was no significant relationship between the age variable and the number of repetitions of physiotherapy exercises by patients receiving these exercises (p-value = 0.631). Therefore, it can be said that the age of patients had no effect on the percentage of repetitions of exercises performed by the patient based on the instructions.

4.4. Evaluation of FVC, FEV1 and FEV1 / FVC Indices before Performing Respiratory Exercises in Patients

Mean and standard deviation of FVC, FEV1 and FEV1 / FVC ratios before respiratory training in 91 patients with respiratory disorders who underwent respiratory physiotherapy exercises were equal to 2.97 01 0.01, 06 03 0.03, respectively. / 2 and 0.69 00 0.009, respectively. The mean and standard deviation of these indices after respiratory physiotherapy exercises were 3.24 02 0.02, 2.89 03 0.03 and 0.89 00 0.006, respectively.

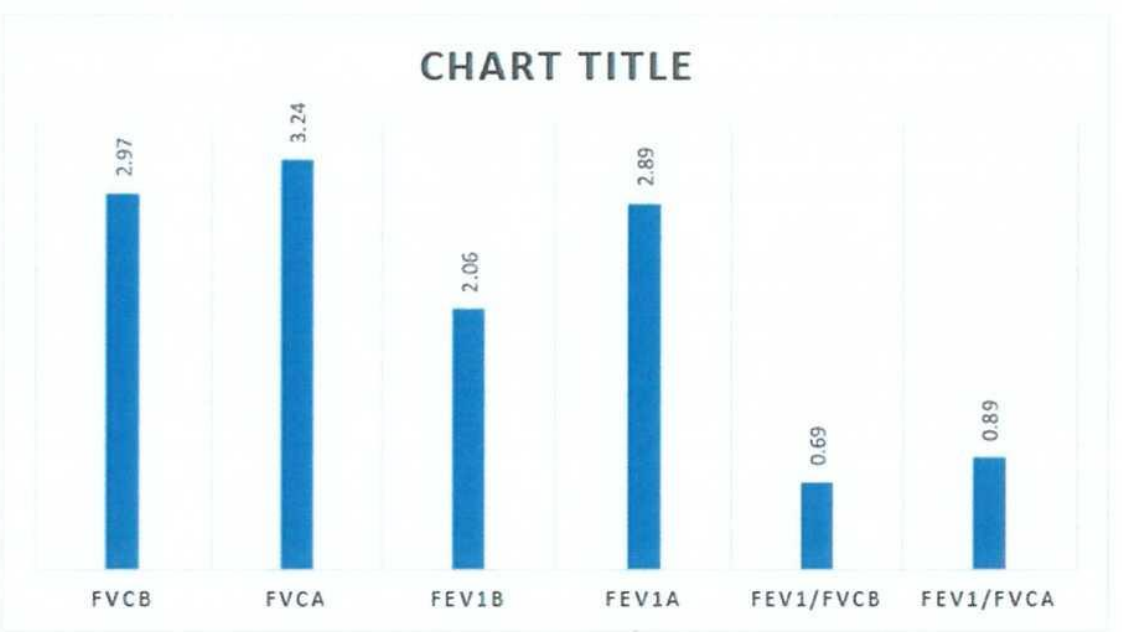

Chart 47. Comparison of mean respiratory capacity indices before and after respiratory exercises in patients

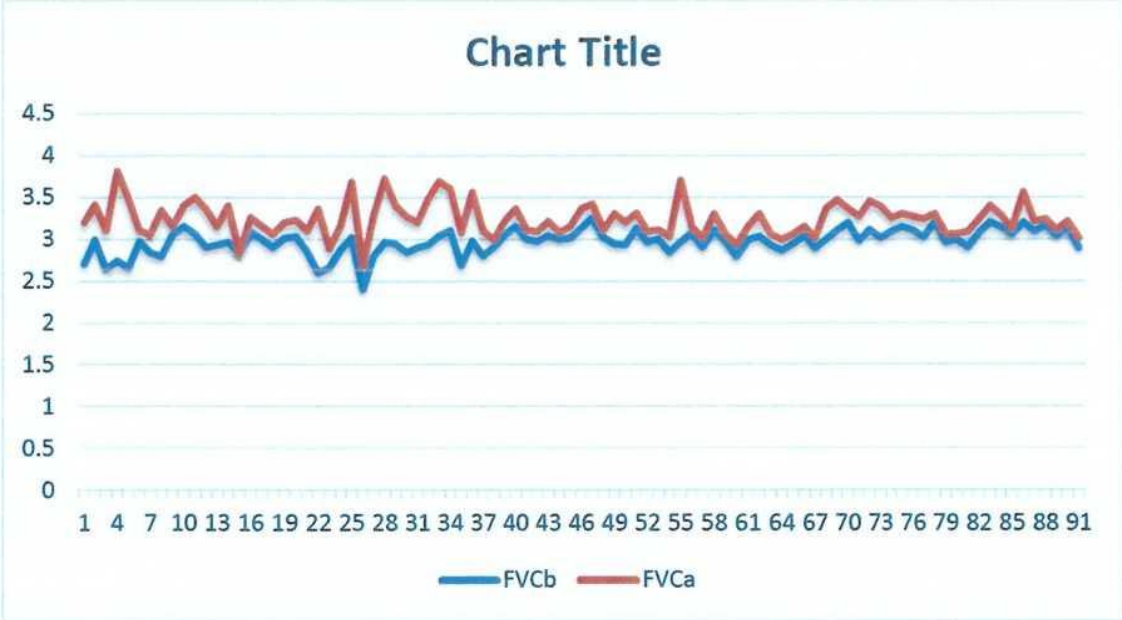

Chart 48. Linear diagram of changes in FVC index before and after breathing exercises in 91 patients perfonning respiratory physiotherapy Exercises

This pattern clearly shows that respiratory physiotherapy exercises have increased vital respiratory capacity in patients performing these exercises.

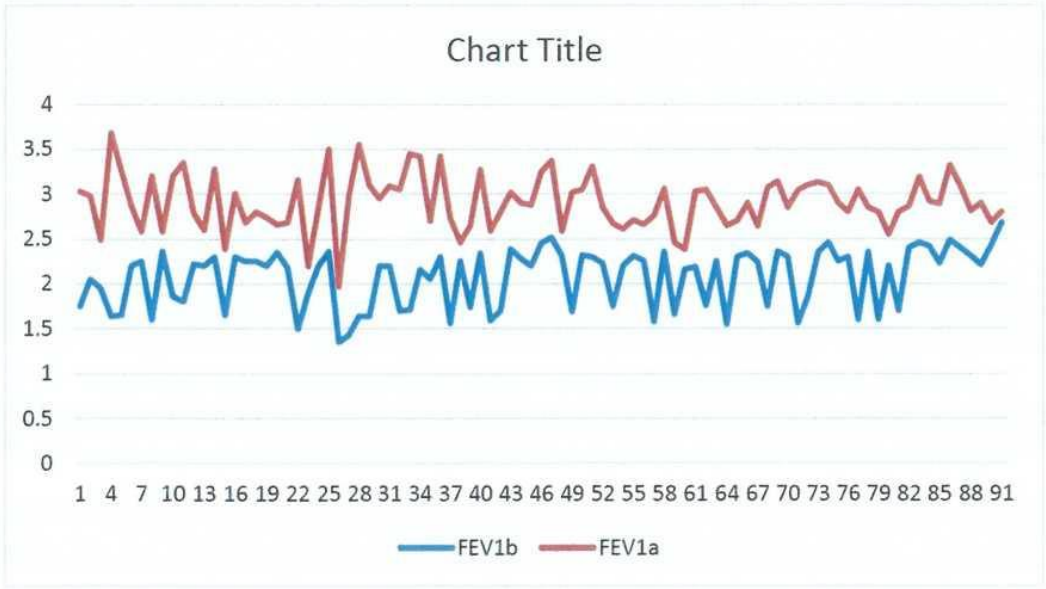

Chart 49. Linear chart of changes in FVC index before and after respiratory exercises in 91 patients performing respiratory physiotherapy Exercises

This pattern clearly shows that respiratory physiotherapy exercises have increased the volume of hypertensive exhalation in the first second in patients perfonning these exercises. This shows the effectiveness of trained physiotherapy exercises to improve the respiratory capacity of patients with respiratory disorders.

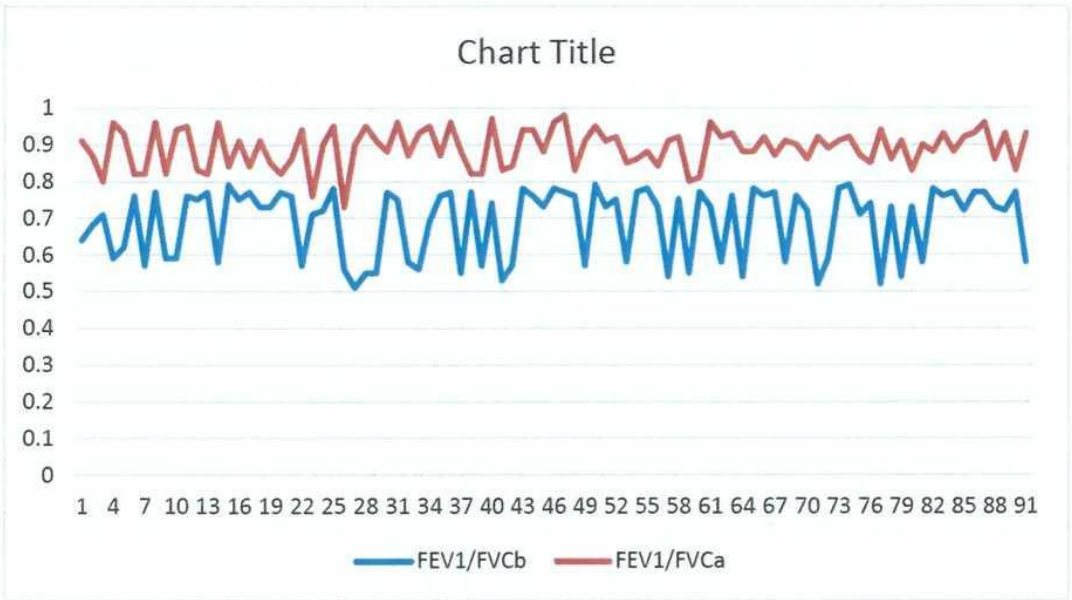

Chart 50. Linear diagram of changes in FVC index before and after breathing exercises in 91 patients perfonning respiratory physiotherapy exercises

This pattern clearly shows that respiratory physiotherapy exercises increase the FEV1 / FVC ratio after respiratory physiotherapy exercises. This shows the effectiveness of trained physiotherapy exercises to improve the respiratory capacity of patients with respiratory disorders. Examining the difference between before and after breathing exercises, FVC index was found to be significant (p-value = <0.000). This indicates a significant and significant increase in hypertensive vital capacity after breathing exercises and shows the effectiveness of respiratory physiotherapy exercises in increasing patients' respiratory capacity. Examination of the difference between before and after respiratory FEV1 index showed that this is a difference (p-value = <0.000). This indicates a significant increase in the volume of hypertensive exhalation in the first second after breathing exercises and shows the effectiveness of respiratory physiotherapy exercises in increasing the respiratory capacity of patients.

Examination of the difference between before and after respiratory FEV1 / FVC index revealed that this is a difference (p-value = <0.000). This indicates a significant increase in the ratio of high-pressure expiratory volume in the first second to the vital capacity of high-pressure after breathing exercises and shows the effectiveness of respiratory physiotherapy exercises in increasing the respiratory capacity of patients.

This pattern clearly shows that respiratory physiotherapy exercises increase the FEV1 / FVC ratio after respiratory physiotherapy exercises. This shows the effectiveness of trained physiotherapy exercises to improve the respiratory capacity of patients with respiratory disorders.

Table 12: Evaluation of FVC, FEV1 and FEV1 / FVC indices before and after breathing exercises

	Before Skewness	After Skewness	Before kurtosis	After kurtosis
FVC	- 1.01	0.66	1.83	1.26
FEV1	-0.56	-0.16	- 1.19	0.33
FEV1/FVC	-0.65	-0.65	- 1.32	2.48

Examining the difference between before and after breathing exercises, FVC, FEV1 and FEV1 / FVC indices showed that this difference is significant (Table 11).

Table 13: Significance of mean FVC, FEV1 and FEV1 / FVC indices before and after respiratory physiotherapy exercises

	Before Mean (SD)	After Mean (SD)	P
FVC	2.97	3.24	< 0.000"
FEV1	2.06	2.89	< 0.000"
FEV1/FVC	0.69	0.89	< 0.000"

This indicates a significant and significant increase in hypertensive vital capacity after breathing exercises and shows the effectiveness of respiratory physiotherapy exercises in increasing patients' respiratory capacity. (P< 0.05)

5. DISCUSSION

In this study, most of the participating patients were in the young age group (20-30). In a 2020 study of 151 patients by Jun Tian et al., The average age of participants in their study was 50.10 years (46). In a study conducted by Klinger V.T. da Costa et al. In 2020, the average age of participants in their study.

Reported 36/90 (47). In a study conducted by Erdal Sakalli et al. In 2020 on 172 patients with Covid-19, the mean age of patients was 37.80 (48). Another study conducted in 2020 by Joseph V. Pergolizzi Jr. and colleagues to examine the epidemiology of Covid-19 disease found that the mean age of patients was 49 years (49). Some of these studies are consistent with our study and some are not consistent with our study. This factor may be due to the different research community or different sampling methods of the studies and also due to the nature of Covid-19 disease which is constantly changing, and with Considering that there is no significant relationship between age and respiratory disorders and also the improvement of this respiratory disorder in patients with Covid-19, so age is not a risk factor or an influential factor for the improvement of respiratory disorders and its consideration cannot have much effect. Respiratory disorders, unless they affect the underlying disease and the ability of individuals to perfonn various exercises and respiratory physiotherapy exercises. Therefore, the decision on how to perform respiratory physiotherapy exercises should be made by physiotherapists. In terms of gender distribution, participants in this study participated in equal proportions. In the study, Erdal Sakalli et al. Stated that 51.20% of patients were female (48). In a study by Serge Daniel Le Bon et ah, Conducted in 2020 on 77 patients with covid-19, they reported that 68.10% of the participants in the study were female (50). In a study conducted by Mr. Valentina Parma and colleagues in 2020 on 4039 patients with Covid-19 in 2020, they mentioned that 2913 patients (72.12%) were female (51). Another study conducted in 2020 by Tu H et al. To study the epidemiology of covid-19 disease found that.

41.90% of patients were female (52). The existence of gender bias in various studies and the lack of a significant relationship between gender and respiratory disorders, as well as the lack of relationship between the effect of exercise and physiotherapy exercises in improving patients' respiratory disorders with their gender

indicate that gender has no effect on these factors. It should not be considered in the examination of patients. In this study, slightly more than half of the patients with Covid-19 had respiratory disorders in both mild and severe forms, which indicates the high importance of respiratory disorders in patients with Covid-19. A retrospective study by Franck Grillet et al. In 2020 on 2003 patients with Covid-19 in the United States reported that 280 (13.98%) patients were hospitalized. Respiratory disorders were one of the most important symptoms in patients with Covid-19 and the prevalence of respiratory disorders in all patients was reported to be 15.00% (17). A 2020 study by Maximilian Ackermann et al. On the autopsy of patients who died of Covid-19 disease found that progressive respiratory failure was the leading cause of death in all patients. Gear is Covid-19 (18). A study conducted by Chih-Cheng Lai et al. In 2020 to study the Covid-19 epidemic and its challenges found that lung involvement is one of the most important disorders in patients with Covid-19 (13). . Another study conducted in 2020 by Yuefei Jin and colleagues to investigate the epidemiology-pathogenicity of covid-19 disease found that respiratory disorders were one of the most important complications of covid-19 disease and diseases such as The sentence is Sars (53). Another study by Ramadhan Tosepu et al., Conducted in 2020 on the relationship between climate and the Covid-19 pandemic, stated that acute respiratory disorders are one of the most important symptoms and complications in patients with covid. 19 is (54). Another study by Carlo Contini et al. In 2020 found that respiratory disorders are one of the most important complications of Covid-19 disease in these patients (55).

All these studies were consistent with our study and show the high importance of respiratory disorders in patients with covid-19. In this study, it was found that there is no significant relationship between exercising with irregular walking and anaerobic bodybuilding and improvement of the eighth week of follow-up of respiratory disorders and also improvement of the 16th week of follow-up of respiratory disorders in patients with Covid- 19. In a 2020 study by Carol Gois Leandro and colleagues to determine the role of exercise in Covid-19 patients, they found that having Covid-19 weakens the immune system and that exercise Exercise can improve the condition of patients with respiratory disorders such as Covid-19 by boosting the immune system by affecting T, B (B) and neutrophils, but strenuous exercise can predispose humans to respiratory infections. It can increase the risk of Covid-19 disease. They also mentioned that

hypothalamic, pituitary-adrenal hormones, glucocorticoid receptors and intracellular NF-kB signaling honnones are involved in chronic inflammatory diseases of the respiratory tract, which increase as a result of regular exercise in the body and improve the condition of patients. (21). A study by David Jimenez-Pavon and colleagues on the role of exercise in improving the physical and mental well-being of Covid-19 patients in 2020 found that the Covid-19 epidemic and quarantine were sudden and widespread. People who include non-patients and those with Covid-19, although one of the most important components of preventing individuals in the community from getting Covid-19, but it changed the lifestyle of people and because exercise has a proven effect in treating many diseases. Such as diabetes, hypertension, respiratory diseases, etc., it has been stated that physical exercise is a suitable solution to deal with the mental and physical consequences in patients with Covid-19. He recommended at least 150 to 300 minutes per week of aerobic exercise and 2 sessions of resistance training per week in patients with Covid-19, and also stated that under quarantine conditions, exercise time can be increased to 200. Increased 400 minutes per week. He mentioned exercise strengthens the immune system and improves the condition of patients with Covid-19 (19). A 2020 study of the effects of exercise and physiotherapy by Kai Liu (et al.) Found that specific rehabilitation and exercise training related to the respiratory muscles, including the intercostal muscles, the eager muscles, the abdominal wall muscles, and so on. It can play a very important role in improving the respiratory disorders of patients with Covid-19 and accelerating their recovery (15). This suggests that although exercise can improve the condition of patients with Covid-19, doing these exercises alone has no effect on improving respiratory disorders in patients with Covid-19. In this study, it was found that specialized respiratory physiotherapy exercises taught by physiotherapists to patients with Covid-19 have increased respiratory capacity and reduced respiratory secretions in these patients, which ultimately significantly improved respiratory disorders in these patients. Is. A 2020 study by JH Hull and colleagues on patients with Covid-19 found that six weeks of respiratory rehabilitation in patients with Covid-19, especially in the elderly, could improve respiratory function. Improve life and reduce anxiety (20). In a study conducted by Mei He et al. hi 2020 to evaluate the effectiveness and safety of pulmonary rehabilitation methods, a study was perfonned on 96 patients with chronic obstructive pulmonary disease with acute

involvement, stating that rehabilitation and respiratory physiotherapy in patients Respiratory disorders have improved in these patients and it was mentioned that these interventions were safe for the patients and did not cause any clinical hann to them (22). In a 2020 study by Qiu HB et al. Hypoxia), irritative and dry cough, irritation of the throat, sputum, risk of pulmonary fibrosis and in more severe cases, decreased level of consciousness. Respiratory physiotherapy can improve the respiratory status of patients, stress on the respiratory system and other reduce related organs and reduce the risk of further damage to the tissues of the respiratory system and the problems and discomforts of patients with the disease, and patients and staff in the treatment department in faster discharge of patients and physical and mental relaxation of staff and maintaining financial resources of patients and centers. Therapeutic help. Accordingly, all patients with coronavirus need physiotherapy intervention. They also mentioned that the type of respiratory physiotherapy for patients is designed based on the level and severity of their respiratory involvement (based on the assessment of patients' respiratory health status) and includes training and strengthening the respiratory muscles of the chest and ribs, various breathing exercises to increase Lung function such as deep and slow breathing training, diaphragmatic breathing, chest volume- enhancing exercises, cough training, lung-clearing exercises, improvement of respiratory patterns, posture and elimination of possible airway secretions, and elimination of factors Is a causal and interfering disease (24). In another study conducted by Peter Thomas et al. In 2020 to examine the impact of physiotherapy and physiotherapists in improving disorders including respiratory disorders in patients with Covid-19 and to determine the flowchart of physiotherapy interventions, physiotherapists and respiratory physiotherapists included Exercises that clear the airways and respiratory secretions, increase lung capacity, etc. play an important role in improving the disorders of these patients. They also stated that physiotherapists have an integral role in the management of patients with Covid-19 (23). Another study by Lazzeri et al. In 2020 stated that the respiratory system is one of the most important organs involved in Covid-19 disease, so the role of physiotherapists, especially in respiratory physiotherapy, along with other health professionals, plays an important role. Treatment and care of this group of patients and overcoming the respiratory symptoms of patients with Covid-19 are important (56). A 2020 study by Cieloszczyk et

al. Found that breathing physiotherapy exercises played a significant role in improving respiratory disorders in patients with Covid-19 in hospitals, clinics, and even homes. He stated that one of the important factors in the effectiveness and effectiveness of physiotherapy in patients is the time of its onset, so patients should be examined and followed by a physiotherapist to be prescribed respiratory physiotherapy exercises based on the patient's clinical condition (57). Zhao et al. Also stated that respiratory physiotherapy is very important in patients with Covid-19 and that the main purpose of respiratory physiotherapy is to reduce the symptoms of shortness of breath, improve lung capacity, reduce disability, improve quality of life and reduce anxiety and depression levels. (58). In this study, most patients reported that their respiratory disorders improved after performing respiratory physiotherapy exercises, and that performing respiratory physiotherapy exercises resulted in FVC, FEV1, and FEV1 / FVC scores in 91 patients with respiratory disorders who performed these exercises. They had done a significant increase compared to before these breathing exercises. In a 2016 study by Oliveira et al., Which aimed to evaluate the effect of respiratory physiotherapy exercises on patients with lower respiratory tract infections, they stated that 33.00% of the patients in the case group had performed respiratory exercises. They mentioned that these exercises were necessary for their recovery. They also mentioned that the values of FVC and FEV1 indices increased significantly in the case group of patients who perfonned these breathing exercises compared to the patients in the control group who did not perfonn these exercises. He had stated that breathing exercises were necessary to improve the condition of patients with lower respiratory tract infections in order for them to return to life (59). In a study by Izadi Onji Fatemeh Sadat et al. Respiratory physiotherapy exercises (studied in our study) can lead to significant changes in respiratory pattern variables. He concluded that training in respiratory physiotherapy exercises should be considered as a key factor in the rehabilitation of patients with chronic pulmonary disorders (60). Another study by Walaa Nasreldin Othman et al., Conducted in 2017, found that deep breathing breathing exercises (a type of breathing physiotherapy exercise) had a significant effect on improving lung condition and increasing lung capacity. . He stated that in the study intervention group who performed respiratory training, the values of FVC and FEV1 indices were significantly higher than the control group who did not perfonn respiratory training

(61).Respiratory disorders are one of the most common and important disorders in patients with Covid-19 that remain for a long time (more than 16 weeks) in a significant proportion of these patients, which causes disability and discomfort in these patients. Considering that respiratory physiotherapy exercises have an effective role in improving the respiratory disorders of these patients and considering the inseparable role of physiotherapists in the management of patients with Covid-19, we recommend that patients with Covid-19 be visited by physiotherapists and if there are any disorders. Respiratory in these patients Respiratory physiotherapy exercises should be taught to these patients by physiotherapists and patients, especially patients with severe respiratory disorders should be followed up by a physiotherapist until the end of recovery.

6. CONCLUSION

Respiratory disorders are one of the most common and important complications and symptoms in patients with covid-19, which causes inability to perform personal affairs in a significant part of almost one-third of patients with covid-19, so take specialized measures to improve it and rehabilitate. Patients are very important. Because respiratory disorders, especially severe respiratory disorders in a significant proportion of patients for a long time, often remain 8 to 16 weeks, so follow-up respiratory disorders for at least 16 weeks in patients with severe respiratory disorders and at least 8 weeks in patients It is essential to covid-19 with mild respiratory disorders. Since exercising unplanned and arbitrarily, regardless of the individual's underlying conditions and diseases, has not had a significant effect on the course of recovery of respiratory disorders in patients with covid-19, and also due to the fact that specific physiotherapy breathing exercises, with Increasing respiratory capacity and reducing respiratory secretions improves respiratory disorders in these patients, and also because according to the current trend, patients with covid-19, regardless of whether they have respiratory disorders or not, go to a physiotherapist to schedule exercise and physiotherapy. They are not referred for improvement and their symptoms, including respiratory disorders, and are only recommended to exercise, while the results of the study showed that regular exercise such as unplanned walking and anaerobic bodybuilding exercises have a significant effect on improving respiratory disorders in patients. Does not have covid-19, while it has been proven that respiratory physiotherapy exercises with increasing patients' respiratory capacity and reducing respiratory secretions have a significant effect on reducing respiratory secretions and improving respiratory disorders in these patients. Therefore, it is recommended that patients with Covid-19 who have respiratory disorders, especially patients with severe respiratory disorders with inability to perfonn personal tasks, as well as patients with Covid-19 who also have chronic obstructive pulmonary deases (COPD) be referred to physiotherapists. They should be trained in respiratory physiotherapy exercises and it is also recommended that these patients be followed up by pulmonologists until they recover from respiratory disorders and rehabilitation.

6.1. Innovation of this study

1. The effect of respiratory physiotherapy exercises in reducing respiratory secretions, increasing respiratory capacity and improving respiratory disorders in patients with Covid- 19.

6.2. Study Limitations

Among the limitations of this study are the following:

1. Non-random sampling

2. Lack of comparison group

3. Low sample size

4. All patients with Covid-19 participants in this study who had respiratory disorders did not receive the respiratory physiotherapy exercises studied.

5. Uncertainty of the reference population of the samples, which made it impossible to generalize the results to a specific community outside the patients participating in this study.

6.3. Offers

We suggest a double-blind randomized clinical trial study with sampling from several centers that have a specific reference community. And we suggest that in these studies, patients with different degrees of respiratory disorders be included in the study.

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8. APPENDIX

Anket. 1: Basic Information and Exercise Impact Assessment:

Name and surname	Symptom start date:	File Completion Date:
Age:	Gender: Female ☐ Male ☐	Job:

Do you have a history of close contact with Covid-19 patients ?: Yes ☐ No ☐
Status of Covid-19: No ☐ positive X-ray ☐ positive CT test ☐ Type of test: .....
Hospitalization: Yes ☐ No ☐ Which ward: .....
Symptoms: fever ☐ body pain ☐ weakness and fatigue ☐ headache ☐ dizziness ☐ Sore throat ☐ Dry cough ☐ Sputum cough ☐ Mild shortness of breath ☐ Severe shortness of breath ☐ Odor Disorder ☐ Abdominal pain ☐ Diarrhea Vomiting ☐ * Other: .....
Exercise history: Yes ☐ No ☐ Type of sport: Exercise duration:
Exercise history at the time of Covid-19: Yes ☐ No ☐ Type of sport: Exercise duration:
How long have you had respiratory problems (dry cough, whooping cough, mild shortness of breath, severe shortness of breath) after getting Covid-19? From the onset of infection ☐ three days later to ☐ one week later ☐ It was accompanied by other symptoms ☐ after the decline of symptoms ☐ * Other: .....
Do you have a taste problem ?: Yes ☐ No ☐ If positive, was it gradual or sudden ?: Gradually sudden

Background: Diabetes ☐ mellitus Heart disease ☐ Respiratory disease ☐ Kidney disease ☐ Liver disease ☐ Nerve disease ☐ A history of trauma to the head ☐ schizophrenia ☐ depression ☐ * Other: .....
History of use: Cigarettes ☐ alcohol ☐ narcotics ☐
History of allergies: Seasonal allergies ☐ food ☐edicine ☐ * Other: .....
Medication: Oral corticosteroids ☐ Corticosteroid injection ☐ Corticosteroid ☐ supplement ☐ Zinc Captopril ☐ ☐ Losartan ☐ Valzartan ☐ Enalapril * Other: .....
When did you start Corton ?: How to use:
If there was a change in the type of respiratory disorder, what was it like?: Complete recovery ☐ Partial recovery☐ No change ☐ Exacerbation of quality ☐ change disorder ☐
How long after your Covid-19 has your respiratory disorder improved?: 2 weeks ☐ 4 weeks ☐ 6 weeks ☐3 months ☐6 months ☐ * Other: .....

Anket. 2: Evaluate the effect of respiratory physiotherapy exercises

What form of respiratory disorder did you develop after developing Covid-19? Light ☐ medium ☐ Intense ☐
How do you evaluate your respiratory pattern before catching Covid-19 (according to what was taught in the correct breathing pattern training)? I had normal chest breathing ☐ I had normal abdominal breathing ☐ Sometimes I had chest breathing and sometimes I had abdominal breathing ☐

I do not know (I cannot determine) ☐
According to what you have been taught about the correct breathing pattern, how did you breathe before you contracted Covid-19? Hardly (it took a lot of energy from me) ☐ Easily (it didn't take much energy from me) ☐ Sometimes easy and sometimes hard ☐ I do not know (I cannot explain) ☐
Which part of your upper respiratory tract did you breathe the most (inhale and exhale) before catching Covid-19? Inhale through the nose and exhale through the mouth ☐ Inhale and open the tail from the nose ☐ Inhale through the mouth and exhale through the nose ☐ Inhale and exhale through the mouth ☐ It was variable, I cannot say exactly ☐
Did you correct your breathing pattern after developing a respiratory disorder caused by Covid-19 in accordance with the trained breathing exercise? Yes, I completely corrected (I always complied) ☐ Yes, I corrected most of the time (most of the time I complied) ☐ Sometimes I complied and sometimes I did not ☐ I did not correct my breathing pattern ☐
Did you hold your breath while breathing between inhaling and exhaling before catching Covid-19? Yes ☐ No ☐ If your answer is yes, a few seconds: .....
What percentage of the breathing exercises taught by the physiotherapist did you do? I did 9 to 11 exercises ☐ I did 6 to 8 exercises ☐ I did less than 5 exercises ☐
Have you had a history of breathing physiotherapy exercises before getting Covid-19? Yes ☐ No ☐ If your answer to this question is yes, please state why you did the breathing physiotherapy exercises and mention how many years ago you did these exercises: Cause: ..... Year: .. ..

According to the breathing physiotherapy exercises given, what percentage of the total number of times did the physiotherapist recommend for each exercise? 100 percent ☐ 75% ☐ 50 percent ☐ Less than 50 observations ☐
Has your respiratory disorder improved after doing the trained breathing physiotherapy exercises? Completely improved ☐ Relatively improved ☐ Slightly improved ☐ Did not improve ☐
Did your respiratory discharge decrease after the trained respiratory physiotherapy exercises? It completely decreased ☐ Decreased relatively ☐ Slightly decreased ☐ Did not decrease ☐
How effective do you think the trained respiratory physiotherapy exercises have been in improving the respiratory disorders caused by Covidd-19 disease? It was very effective ☐ It was relatively effective ☐ It was a little effective ☐ It had no effect at all ☐
How did the patient's respiratory capacity change after the trained breathing exercises? Fully increased ☐ Increased relatively ☐ Increased slightly ☐ Did not change ☐

Table of variables:

Row	Title Variable	Type of Variable	Quantitative Scientific	Qualitative	scientific –	How to Measure	Scale

								practical definitio n	Scale	
		Inde pend ent	Depe ndent	Contin uously	Disc rete	Nom inal	Ra nk a			
1	age	*		*				This refers to the patient's chronolo gical age until the time of the study and based on the patient's identity informat ion.	questionnai re	Qualitativ e
2	Gender	*				*		Gender is a spectru m of characte ristics and distincti	questionnai re	Qualitativ e

								ons between masculinity and femininity and includes both genders, male and female.		
3	Having a respiratory disorder		*			*			questionnaire	Qualitative
4	Having a taste disorder	*				*			questionnaire	Qualitative
5	Job	*				*			questionnaire	Qualitative
6	Fever	*				*			questionnaire	Qualitative
7	Cough		*			*			questionnaire	Qualitative
8	Dry cough		*			*			questionnaire	Qualitative
9	Sore throat	*				*			questionnaire	Qualitative
10	Vertigo	*				*			questionnaire	Qualitative
11	Myalgia	*				*			questionnaire	Qualitative
12	History of	*				*				

	sports and physiotherapy									
13	History of previous illness	*				*			questionnaire	Qualitative
14	Exercise and physiotherapy	*				*			questionnaire	Qualitative
15	taking medication	*				*			questionnaire	Qualitative

Definition of variables

Age:

Practical definition: The meaning of age in this checklist is the age of the identity card and was determined based on the patient's self-declaration. Age was collected raw.

Gender:

Practical Definition: Gender meant a range of characteristics and distinctions between masculinity and femininity that included both males and females.

History:

Practical definition: The date in the whole of this checklist was the solar date, which included the day, month and year, for example, 10/01/2019.

Job:

Practical definition: In this checklist, the purpose of the job in this study was the type of profession through which a person earns money and was collected in coded form and includes: 0-unemployed, 1- housewife, 2- worker (all models include Municipal worker, construction worker, electrician, plumber, gas plumber, builder, peddler, etc.), 3- Employee (including all Cannen models), 4- Health center personnel, 5- Doctor and nurse, 6- Teacher 7- University professor, 8- Military force, 9-

Businessman and shopkeeper, 10- Free retiree, 11- Military retiree, 12- Social security retiree.

Sports activity history:

Practical Definition: The history of exercise and physiotherapy in this study refers to any exercise and physiotherapy activity that a person has done regularly before developing Covid-19.

Sports activities:

Practical definition: Exercise activity in this study is any exercise and physiotherapy activity that a person after getting Covid-19 on the instructions of a doctor, physiotherapist or other specialists or on a regular self-prescription to reduce respiratory disorders caused by Covid-19 and Or underlying diseases or due to the improvement of physical and mental condition of the body and has done.

History of Respiratory Physiotherapy Exercises:

Practical definition: Respiratory physiotherapy exercises in this study means any history of performing one or a number of respiratory physiotherapy exercises used in this study. Respiratory physiotherapy exercises:

Scientific definition: Respiratory physiotherapy is a therapeutic intervention that includes modifying the respiratory pattern, strengthening the muscles of the respiratory system, draining the secretions into the lungs and airways, as well as stimulating the cough reflex and teaching breathing techniques and breathing exercises (30).

Practical definition: Respiratory physiotherapy exercises in this study are 11 sets of respiratory physiotherapy exercises recommended by the Iranian Physiotherapy Association to improve respiratory disorders in patients with Covid-19 who are respiratory disorders and recommended by a physician or physiotherapist consulting center The mentioned health was taught to the patients studied in this study.

Spirometry:

Scientific and practical definition: Spirometry is a tool used to test the critical capacity of slow exhalation, forced vitality and hypertension, to detennine the volume of exhaust air in the first second of forced exhalation, and to determine the fraction of vital output capacity in the first second of exhalation, hi this study, it was used to determine the respiratory capacity of patients after 4 weeks of receiving respiratory physiotherapy exercises by patients in the study (31).

School of Medicine

Research Ethics Certificate

Approval ID:	IR.IUMS.FMD.REC.1399.323	**Approval Date:**	2020-08-15
Evaluated by:	School of Medicine		
Status:	Approved		
Approval Statement:	The project was found to be in accordance to the ethical principles and the national norms and standards for conducting Medical Research in Iran. **Notice:** 1. Although the proposal has been approved by the research ethics committee, meeting the professional and legal requirements is the sole responsibility of the PI and other project collaborators. 2. This certificate is reliant on the proposal/documents received by this committee on 2020-08-15. The committee must be notified by the PI as soon as the proposal/documents are modified.		
Thesis Title:	Parosmia prevalance and improvement its symptoms in (covid-19) infected patients referred to the international health center in Tehran in 1399		
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