



Assessment of respiratory symptoms of post COVID patients

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Abstract

A descriptive study was done to assess the respiratory symptoms among post COVID patients attending OPDs of the selected hospital, Pathanamthitta. The objectives of the study were to assess the respiratory symptoms of post COVID patients and to find out the association between the respiratory symptoms of post COVID patients with the selected baseline variables. Descriptive research design was used for the present study. Health promotion model by Nola. J. Pender was used as the conceptual framework for the study. The main study was done among 110 patients. The samples were selected using non probability purposive sampling technique. Baseline data assessment proforma and rating scale were used as the tools for data collection. Descriptive and inferential statistics were used for data analysis. The study revealed that 53.7% of the patients showed moderate post COVID respiratory symptoms, 24.5% were showed less post COVID respiratory symptoms and 21.8% were showed severe post COVID symptoms. Significant association was found between occupation and respiratory symptoms, income and respiratory symptoms and living area and respiratory symptoms. The study concluded that majority of the samples had showed moderate post COVID respiratory symptoms. In this three category commonly assessed respiratory symptoms were generalized weakness, coughing (dry cough), breathing difficulty and tiredness while working.

Key words: Outpatient departments (OPDs); post COVID; respiratory symptoms.

INTRODUCTION

Background of the problem

The COVID-19 pandemic is currently a serious global public health concern. The disease is caused by a novel coronavirus which was first discovered in Wuhan, China in 2019 but it later spread throughout the world. The clinical presentation of COVID-19 ranges from asymptomatic, mild symptomatic to fulminant and fatal cases. Severe cases of infection can lead to serious complications including, pneumonia, acute respiratory distress syndrome (ARDS), sepsis, multiple organ failure, blood clotting, myocarditis, acute myocardial infarction, acute kidney injury, and other viral and bacterial infections.¹

The COVID-19 pandemic has held the world in its grip for the past two years, and with the appearance of new variants demonstrating increasing immune-evasion and the end of this pandemic seems currently not in sight. Apart from the ongoing pandemic of acute COVID-19, data is mounting regarding the subsequent pandemic of persisting signs and symptoms post-acute COVID-19 infection.²

Since the discovery of the novel coronavirus, SARS-CoV-2, scientists have debated its origin. It has been speculated that SARS-CoV-2 is the product of laboratory manipulations. However, genetic data does not support this hypothesis and shows that SARS-CoV-2 did not derive from a previously known virus backbone.³

SARS-CoV-2 is an RNA virus, and mutations arise naturally as the virus replicates. Many thousands of mutations have already arisen, but only a very small minority are likely to be important and to change the virus in an appreciable way that there are currently around 4000 mutations in the spike protein. Thousands of mutations have already arisen, and the vast majority have no effect on the virus but can be useful as a barcode to monitor outbreaks.⁴

Genomes analysis and comparison with previously known coronavirus genomes indicate that SARS-CoV-2 presents unique features that distinguish it from other coronaviruses: optimal affinity for angiotensin converting enzyme 2 (ACE2) receptor and a polybasic cleavage site at the S1/S2 spike junction that determines infectivity and host range.⁵SARS-CoV-2 is highly similar to bat SARS-like coronaviruses and bat might be the reservoir host. It is 96% identical to SARS-CoV-2 with some differences in the spike receptor binding domain (RBD) that could explain the differences in ACE2 affinity between SARS-CoV-2 and SARS-like coronaviruses.⁶

All viruses, including SARS-CoV-2, the virus that causes COVID-19, change over time. Most changes have little to no impact on the virus' properties. However, some changes may affect the virus's properties, such as how easily it spreads, the associated disease severity, or the performance of vaccines, therapeutic medicines, diagnostic tools, or other public health and social measures. WHO, in collaboration with partners, expert networks, national authorities, institutions and researchers have been monitoring and assessing the evolution of SARS-CoV-2 since January 2020.⁶

It is believed to be spread through the exposure of mucosae (mouth and nose) or conjunctiva (eyes) to infective respiratory droplets. Symptoms of the disease can manifest as fever, cough, encephalitis, myalgia, fatigue, muscle weakness, arthralgia, anosmia, and impairment in other important bodily functions.¹ When one contracts the disease, the virus binds with angiotensin converting enzyme 2 (ACE2) in the alveolar cells and damages the alveolar cells. Damage to the alveolar cells results in impaired oxygen and carbon dioxide exchange in the lungs which will in turn impair many vital functions in the body, primarily effect on the lower respiratory tract. As a result of the clinical course of COVID-19 infection with rapidly developing acute respiratory distress syndrome (ARDS) requires intubation and mechanical ventilation (MV). Consequently, the disease can result in morbidity, disability, and mortality for the COVID-19 victims.⁷

Viral respiratory infections result when a coronavirus infects the cells of the respiratory mucosa; this can occur when virus particles are inhaled or directly contact a mucosal surface of the nose or eyes.¹ Infected individuals shed virus in to the environment by coughing or sneezing

or even during quiet breathing. Virus shed during coughing and sneezing is often present in large droplets that fall out of the air within a short distance. If the virus falls on a surface, it can be transmitted when someone touches the infected surface and then touches their nose, eyes, or mouth. Virus is also spread by the airborne route in the form of small ($<5 \mu\text{m}$) droplet nuclei that can remain suspended for long periods of time and can be inhaled into the lower respiratory tract. The relative contribution of different particle sizes and of direct contact versus airborne transmission as a means of spread differs among the respiratory viruses.⁸

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. Unfortunately, coronaviruses do not only affect the respiratory tract but also have an effect on other systems including the central nervous system, cardiovascular system, musculoskeletal system, and gastrointestinal system.⁹

Long COVID, or post-COVID syndrome, is not one condition, and is defined by the National Institute for Health and Care Excellence (NICE) as “signs and symptoms that develop during or after an infection consistent with COVID-19 which continue for more than 12 weeks and are not explained by an alternative diagnosis.”¹⁰

Those who recovered from COVID-19, a few develop persistent or new symptoms lasting weeks or months this is called long COVID, Long Haulers or Post COVID syndrome. The term long COVID was first used by Perego in social media to denote persistence of symptoms weeks or months after initial SARS-CoV-2 infection and the term ‘long haulers’ was used by Watson and by Yong. Those infected with corona virus commonly develop symptoms 4–5 days after exposure. Long COVID is a term used to describe presence of various symptoms, even weeks or months after acquiring SARS-CoV-2 infection irrespective of the viral status.¹¹

Acute COVID symptoms include fever, throat pain, cough, muscle or body aches, loss of taste or smell and diarrhea. A study from England, Wales and Scotland identified three clusters of symptoms during acute illness, respiratory symptom cluster with cough, sputum, shortness of breath, and fever, musculoskeletal symptom cluster: with myalgia, joint pain, headache, and fatigue, enteric symptom cluster with abdominal pain, vomiting, and diarrhea. Persistence of various symptoms in people who recovered from COVID-19 (collectively called Long COVID) is a major health issue worldwide. Proper clinical evaluation will help to identify the etiology, and to customize treatment. As the disease is new, it is too early to know the true long-term outlook.¹²

There are several challenges in the diagnosis of long COVID. The time taken for the clinical recovery varies depending upon the severity of illness; while associated complications make it difficult to define the cut-off time for the diagnosis. A significant proportion of SARS-CoV-2 infected individuals are asymptomatic, and many individuals would not have undergone any test to confirm SARS-CoV-2 infection.¹¹ If these individuals develop multiple symptoms subsequently, making a diagnosis of long COVID without a preceding evidence of SARS-CoV-2 infection is challenging. The testing policy varies in different countries and it is a common practice during a pandemic to diagnose clinically based on symptoms without any confirmatory tests. Therefore, persistence of symptoms in those who had never checked for COVID is a challenge. Similarly, residual symptoms in those checked negative for COVID (false negative as testing may be done too early or too late in the disease course) may also add to diagnostic dilemma.¹³

The high number of people affected by COVID-19 infection worldwide, based on the limited scientific knowledge and evidence available at the moment, it can be expected that psychiatrists and physiotherapists will be increasingly involved in the care of these patients, to improve pulmonary function, physical and psychological efficiency, and to restore a good patient quality of life. Timely preparation and thoughtful planning can help to limit any impact that arises from this unprecedented situation.¹⁴

The highly infectious and pathogenic coronavirus (CoV-2) predominantly affects the respiratory system. At present we are facing the third wave of corona virus and individuals presenting with post-COVID symptoms. Many studies reveals that post COVID patients continues to experience respiratory problems. So this study focus on determining post-COVID symptoms and providing awareness about the same. This will ultimately improve their quality of life and minimize the symptoms among post COVID patients.

Need and significance of the study

As of August 2022, 58.7 Cr people have been infected and 64.3 lakh million people have died from COVID 19 worldwide. In India, close to 4.42 Cr people have been infected and 5.27 lakhs deaths due to COVID 19 have been reported. In Kerala 67.3L people infected and 70,588 thousand people deaths due to COVID-19.¹⁵

The lung is the most common and important organ affected in COVID-19 can result in breathlessness, cough, hypoxia, and chestpain. The most important open question to be answered is as follows: “Once recovered from COVID-19 what happens to patients, and how has the virus impacted their body. To answer this question the study aims to investigate and characterize the manifestations of respiratory symptoms after recovery of COVID-19.

Post-COVID-19 syndrome is defined by persistent clinical signs and symptoms that appear while or after suffering COVID-19, persist for more than 12 weeks and cannot be explained by an alternative diagnosis. The long-term respiratory complications of severe acute respiratory syndrome (SARS) CoV2 infection remain to be seen and further studied. It is a long way to go before we begin to understand the extent and severity of the sequela caused by the coronavirus although recent data suggest that patients of COVID 19 pneumonia have respiratory symptoms even after weeks or months following their initial illness.¹⁶

Respiratory Post-Covid-19 difficulties, Long COVID symptoms can persist long after recovery. These symptoms should be medically addressed to ensure restoration of complete health. Following is a list of post-Covid-19 symptoms in respiratory experienced by survivors are Shortness of breath, Dizziness, the reappearance of fever. Breathing problem, Fatigue, Chest pain.¹ Apart from these, the survivors of the second wave of COVID-19 infection experience lung issues and fungal infection. The painful respiratory disease might progress to respiratory failure. So, once you have recovered from COVID-19, you will need to get essential rest, chest inspection and oxygen monitoring.¹⁷

Collective data initially from China and later from Northern Italy confirmed that the most severe disease occurred in elderly People with long COVID experience a confusing array of persistent and fluctuating symptoms including cough, breathlessness, fever, sore throat, chest pain, palpitations, cognitive deficits, myalgia, neurological symptoms, skin rashes, diarrhea and some also have persistent or intermittent low oxygen saturations¹. Documented post-acute sequelae include myo-or pericarditis, heart, and thrombo-embolic complications including myocardial infarction, stroke and venous thrombosis. Men with other poor prognostic factors such as a history of smoking and presence of comorbidities. This demographic is very similar to patients who develop interstitial pulmonary fibrosis.¹⁸

In Kerala patients coming with post-COVID complications, two to three weeks after their discharge. Pulmonologists and infectious disease experts in government medical colleges in the state said that several patients, those with even mild or moderate COVID symptoms, are now returning to the hospitals, complaining of either serious conditions such as residual intravascular clotting in the lung or post-COVID lung fibrosis. Many have also complained of minor problems such as anosmia that persists for more than six to eight weeks after discharge from the hospital, chronic fatigue and lack of energy for a variable period of time.¹⁸

The definitions of 'post-acute' symptoms beyond 3–4 weeks and 'chronic' symptoms beyond 12 weeks COVID-19 are yet to be formally confirmed. A positive test for COVID-19 is not a prerequisite for diagnosis of post-acute or chronic disease, since many people were never tested. The extent and severity of the long term respiratory complications of COVID-19 infection remain to be seen, but emerging data indicate that many patients experience persistent respiratory symptoms months after their initial illness. The patient needs aftercare recovering from COVID-19 and identifies potential respiratory problems.¹⁹

An observational cohort study conducted in Michigan, United States, among post COVID syndrome evaluated 1,250 patients from 38 hospitals discharged alive at 60 days by utilizing medical record abstraction and telephone surveys. During the study periods 6.7% patients died, while 15.1% of patients required re-admission. Of 488 patients who completed the telephone survey in this study, 32.6% of patients reported persistent symptoms, including 18.9% with new or worsened symptoms. Dyspnea while walking up the stairs (22.9%) was most commonly reported, while other symptoms included cough (15.4%) and persistent loss of taste and/or smell (13.1%).²⁰

A cross sectional study was conducted in Thrissur, Kerala, among Persistence of symptoms after acute COVID-19 infection. A total of 335 patients who were admitted and discharged with SARS-CoV-2 infection. They were contacted through a telephonic interview 28 days from symptom onset through a semi-structured interview schedule. Out of the 335 patients, the persistence of symptoms of COVID-19 infection after 28days of symptom onset of 221 (66%) Persistence of two or more COVID-19 symptoms after 28 days of onset seen in 120 (35.8%). The most common persistent symptoms among the patients were fatigue in 109 (32.5%) of people followed by dyspnea in 77 (23%), cough in 45 (13.4%) and myalgia in 37 (11%) patients Highest persistence was seen in Category C patients where symptoms were persisting in 75%. Persistence was also higher in those with diabetes mellitus, those who received oxygen support and those who were in Intensive Care Unit (ICU) or ventilator and the association was statistically significant (p-value<0.05).²¹

The respiratory follow-up is of pivotal importance to evaluate lung function, alveolar–arterial gas exchange, and exercise tolerance in recovered non-infective COVID-19 patients. Along with medical and supportive therapy, a multidisciplinary pulmonary rehabilitation program is essential to improve the quality of life and reduce symptoms in post-COVID-19 patient. Once we identifies post COVID respiratory problems, will move the accurate treatment regimen in future. The long-term health consequences of SARS-CoV-2 remain largely unclear.²²

So the investigator felt the need of conducting this study to assess the post COVID respiratory symptoms

Statement of the problem

A study to assess the respiratory symptoms among post COVID patients attending OPDs of the selected hospital at Pathanamthitta district, with a view to prepare an information booklet.

Objectives

1. Assess the respiratory symptoms of post COVID patients.
2. Find out the association between the respiratory symptoms of post COVID patients with the selected base line variables.

Operational definitions

Post COVID Patients

Post COVID patients refers to persons who are having respiratory symptoms, after 3 weeks of confirmed SARS-CoV-2 or COVID-19 positive.

Respiratory Symptoms

Respiratory symptoms refers to the symptoms developed among post COVID patients such as breathing difficulty, dyspnea, fatigue, chest pain, cough, voice problems.

Information booklet

The information booklet is the booklet given to the patient regarding some measures to improve the quality of respiratory system such as incentive spirometer, nebulization, steam inhalation, hydration therapy, coughing and deep breathing exercise. **Research approach**

Research approach means the description of the plan to investigate the phenomenon under study.²³

Quantitative research approach was adopted in the present study.

Research design

Research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection.²³

Descriptive study design was selected for the present study.

Setting of the study

The present study was conducted in MGM Muthoot hospital Kozhencherry in Pathanamthitta district. This is the 1st NABH Accredited hospital in Central Travancore and one of the handfuls of NABH Nursing Excellence certified hospitals in the region. Since its inception in 1988, MGM Muthoot Hospitals, Kozhencherry is committed to providing high quality specialized healthcare services to the community. With over 15 specialties and 9 super specialty medical services and a team of renowned specialists with decades of experience. The criteria for selection of the study setting were availability of subjects and feasibility of conducting the study.

Population

The entire set of individuals or subjects having some common characteristics for the research study is population.²³

In this study, population encompasses the age group of 18 years and above post COVID patients at selected hospital, Pathanamthitta district.

Sample and sampling technique

Sample refers to a selected proportion of the defined population.²⁷ In this study, the sample consisted of 110 post COVID patients.

Sampling technique is a process of selecting representative units from an entire population of the study.²³ Purposive sampling technique was used for the selection of subjects in this study.

Inclusion criteria:

- Age group more than 18 years
- Both men and women

Exclusion criteria:

- Not willing to participate the study
- Patients with CCF, Cancer and Critically ill
- Patient with previous history of respiratory problem

Tool /Instruments

The data were collected using the following tool which was prepared by the researcher

Tool 1 categorized in to section A and section B

Section A : Baseline proforma

Technique : Self structured questionnaire

Section B : Rating scale on respiratory symptoms of post COVID patients

Technique : Self structured questionnaire

Development /Selection of the Tool

An instrument is a device used to collect data. After an extensive review of literature, discussion with the guide and various experts in the field of Medical Surgical Nursing for the development of the tool as there was no standardized tool available. The researcher inclined tool according to the objectives of the study. The following steps were carried out in preparing the tool. Review of literature: For the development of the tool to all appearance used website and journals. Personal discussion with guide, statistician, subject experts, pulmonologist and experts from respiratory medicine. Then the prepared items were subjected to content validation, pretesting and estimation of reliability.

Description of the tool

Tool 1

Section A : Baseline proforma

Baseline proforma consisted of baseline variables such as age, gender, education, occupation, income, living area, comorbidities, date of COVID test, and type of test.

Section B : Rating scale on respiratory symptoms of post COVID patients

The rating scale consisted of 20 questions related to post COVID respiratory symptoms and used as a 4 score rating scale, ie never, very little, sometimes, always and the score is 1,2,3 4 respectively. So the total score is 80, then it categorized into three groups according to the score ie, mild symptoms, moderate symptoms and severe symptoms.

Content validity

Content validity concerns the degree to which an instrument has an appropriate sample of items for the construct being measured.²³

Content validity of the tool was established by obtaining suggestions from the experts. The prepared tool along with the problem statement, objectives, assumptions and operational definitions were submitted to 9 experts. The experts were from the field of Medical surgical nursing, Respiratory medicine, Child health nursing, Community nursing and the Statistician. The tool was modified according to the suggestions received from the experts. The final tool consisted of baseline proforma includes 9 items and rating scale includes 20 items. A criterion rating for validation of the tool was developed with options like relevant, not relevant and remarks from the experts. After all corrections tool was found to be valid and suitable for the study.

Reliability of the tool

Reliability is the degree of consistency and accuracy with which an instrument measures the attribute for which it is designed to measure. There are several ways to measure the reliability for the research tools, which depends on several factors, such as the nature of instrument as well as aspects of reliability the researcher wants to measure.²³

Split half method was used to estimate reliability of the tool. The scores of the items was calculated into two equal halves with odd and even numbers of the questions and correlation were found using Spearman's correlation coefficient formula, and the 'r' value is 0.83 This indicates that the tool was reliable and feasible.

Pilot study

A pilot study is referred to a small scale preliminary study conducted in order to evaluate feasibility, time, cost, adverse events, and effect size (statistical variability) in an attempt to predict an appropriate sample size and improve upon the study design prior to performance of a full-scale research project.²³

Pilot study was conducted at Muthoot hospital, Kozhencherry, Pathanamthitta district in the month of January 2022. Eleven subjects were the samples and explained about the purpose of the study and obtained consent from the subjects. The collected data were analyzed using descriptive and inferential statistics. The study was practicable and feasible.

Data collection process

Data collection was started after obtaining formal written permission from the nursing superintendent, MGM Muthoot hospital, Kozhencherry, Pathanamthitta district. The study was conducted among 110 post COVID patients who met the inclusion criteria. The data collection period was from 17.01.2022 to 05.02.2022. Initially good rapport was established with the participants, the purpose of the study was explained and informed consent was taken. The patients were given the questionnaire such as baseline proforma and rating scale to assess the baseline data and respiratory symptoms of post COVID patients in Malayalam language. It took 30 minutes to complete the questionnaire.

Plan for data analysis

The data was analyzed by descriptive and inferential statistics using SPSS (statistical package for social science), version 16. Sample characteristics were presented using frequency and percentage, illustrated by tables and graphs. The demographic data and respiratory symptoms were also presented by frequency and percentage. Association of respiratory symptoms with baseline was computed by chi-square test. The relationship between baseline data and respiratory symptoms were analyzed using Spearman's correlation coefficient.

ANALYSIS AND INTERPRETATION

Analysis has been defined as categorizing, ordering, manipulating and summarizing the data to obtain answers to research questions.²³In this study the data were analyzed based on the objectives of the study using descriptive and inferential statistics.

Data collected from 110 post COVID patients were analyzed, organized and presented under the following sections based on the objectives of the study.

Section I : Distribution of post COVID patients according to baseline variables.

Section II : Assessment of respiratory symptoms of post COVID patients according to rating scale.

Section III : Association between baseline variables and respiratory symptoms.

Section I: Distribution of post COVID patients according to baseline variables.

This section deals with distribution of post COVID patients based on demographic data such as age, gender, educational status, occupation, total income per month, living area, comorbidities, date of COVID test and type of test.

(N=110)

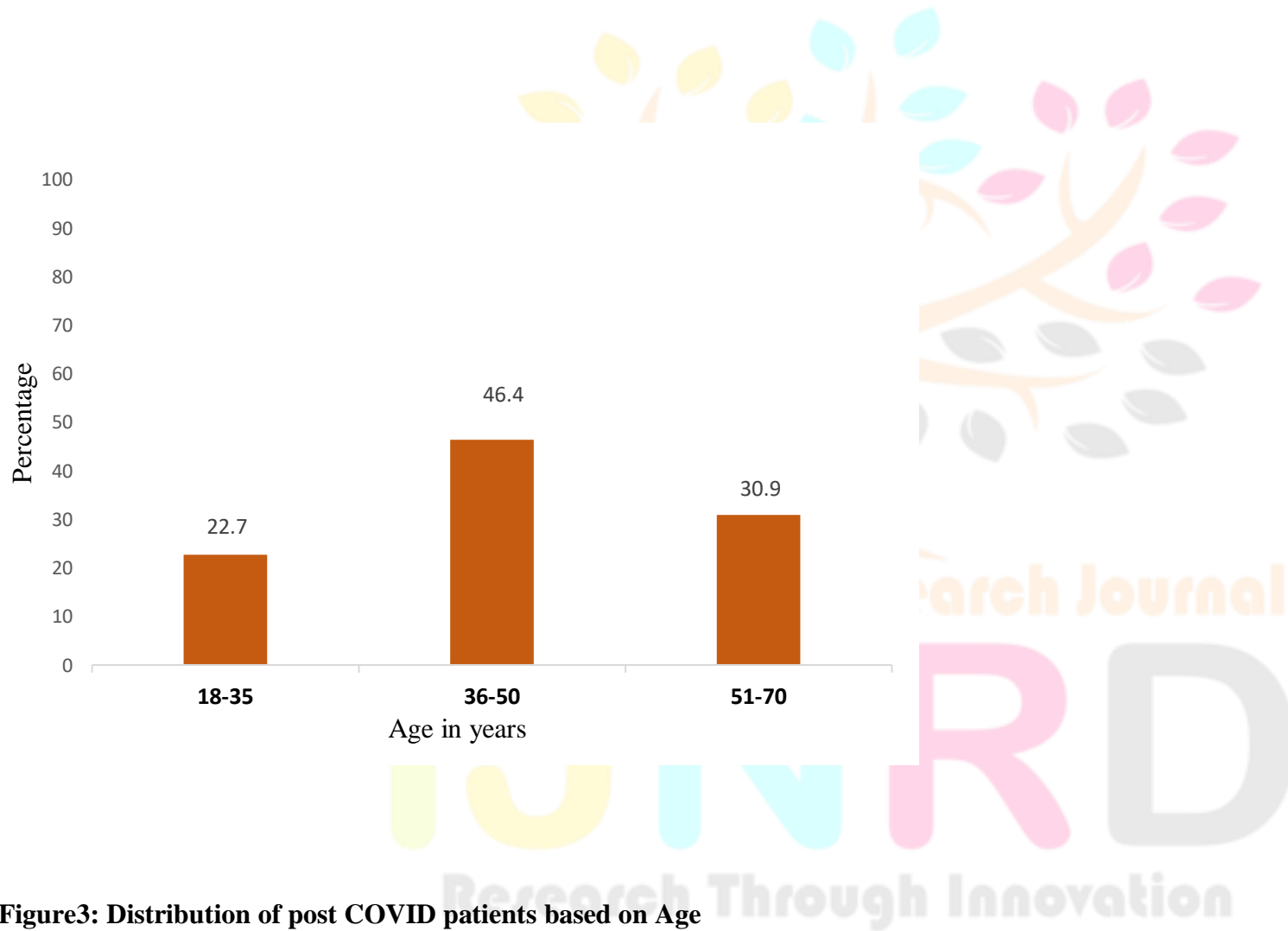


Figure3: Distribution of post COVID patients based on Age

Figure 3 reveals that 22.7% of post COVID patients were between the age group of 18-35 years, 46.4% were between 36-50 years of age and 30.9% were between 51-70 years of age.

(N=110)

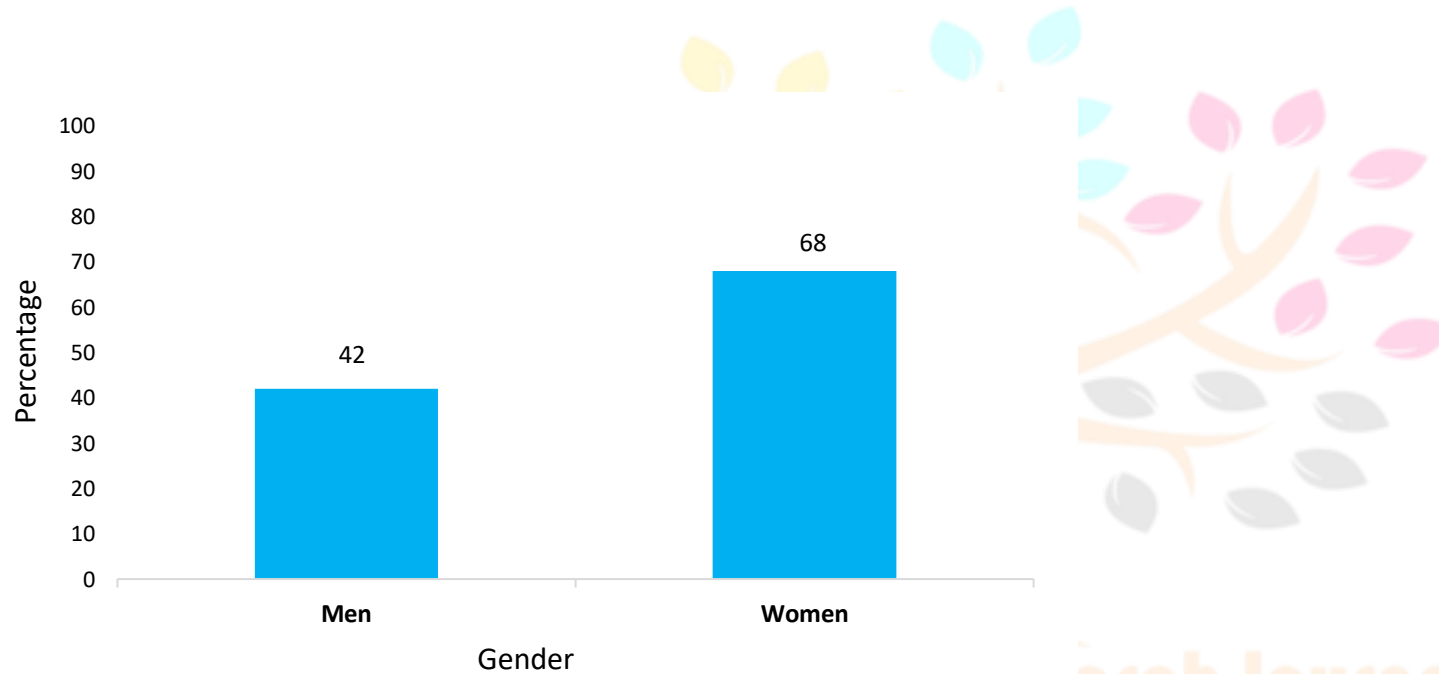


Figure4: Distribution of post COVID patients based on Gender

Figure 4 shows that majority (68%) of post COVID patients were females and 42% were males

(N=110)

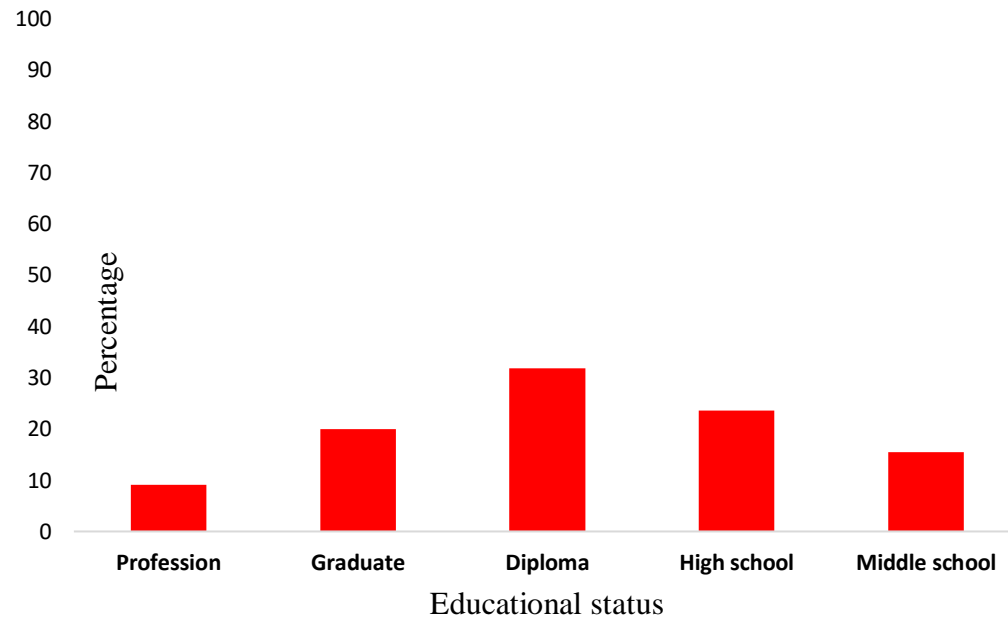


Figure5: Distribution of post COVID patients based on educational status

Figure 5 shows the majority of post COVID patients were diploma 31.8%, high school were 23.6%, graduate were 20%, middle school were 15.5%, and profession were 9.1%.

Table 1: Distribution of post COVID patients based on occupation (N=100)

Sl No	Occupation	Frequency	Percentage
1	Legislators, Senior Officials & Managers	1	0.9
2	Professional	19	17.3
3	Technicians and Associate Professionals	10	9.1

4	Clerks	7	6.4
5	Skilled Workers and Shop & Market Sales Workers	16	14.5
6	Skilled Agricultural & Fishery Workers	12	10.9
7	Craft & Related Trade Workers	7	6.4
8	Plant & Machine Operators and Assemblers	1	0.9
9	Elementary Occupation	27	24.5
10	Unemployed	10	9.1
Total		110	100.0

It is evident from the table one 0.9% of post COVID patients were Legislators, Senior Officials & Managers, professional were 17.3%, technicians were 9.1%, clerks were 6.4%, skilled workers, shop and market sales workers were 14.5%, skilled agricultural & fishery workers were 10.9%, craft & related trade workers were 6.4%, plant & machine operators and assemblers were 0.9%, elementary occupation were 24.4%, and unemployed were 9.1%.



Table 2: Distribution of post COVID patients based on income (N=110)

SI No.	Income in year	Frequency	Percentage [%]
1	1 to 6174	26	23.6
2	6175 to 18,496	41	37.3
3	18,497 to 30,830	38	34.5
4	30,831 to 46,128	5	4.5
	Total	110	100.0



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Table 2 shows that 37.3% post COVID patients were having monthly income in between Rs.6175 to 18,496, 34.5% of having income in between Rs.18,497 to 30,830, 23.6% of having below Rs.6174 and 4.5% of having income in between Rs.30,831 to 46,128.

Table 3: Distribution of post COVID patients based on living area**(N=110)**

Sl No	Living area	Frequency	Percentage[%]
1.	Rural	73	66.4
2.	Semi urban	37	33.6
	Total	110	100.0

Table 3 shows that the vast majority (66.4%) of post COVID patients were living in rural area and 33.6 % living in urban area.

Table 4: Distribution of post COVID patients based on comorbidities**(N=110)**

Sl No.	Comorbidities	Frequency	Percentage [%]
1.	No	63	57.3
2.	Yes	47	42.7
	Total	110	100.0

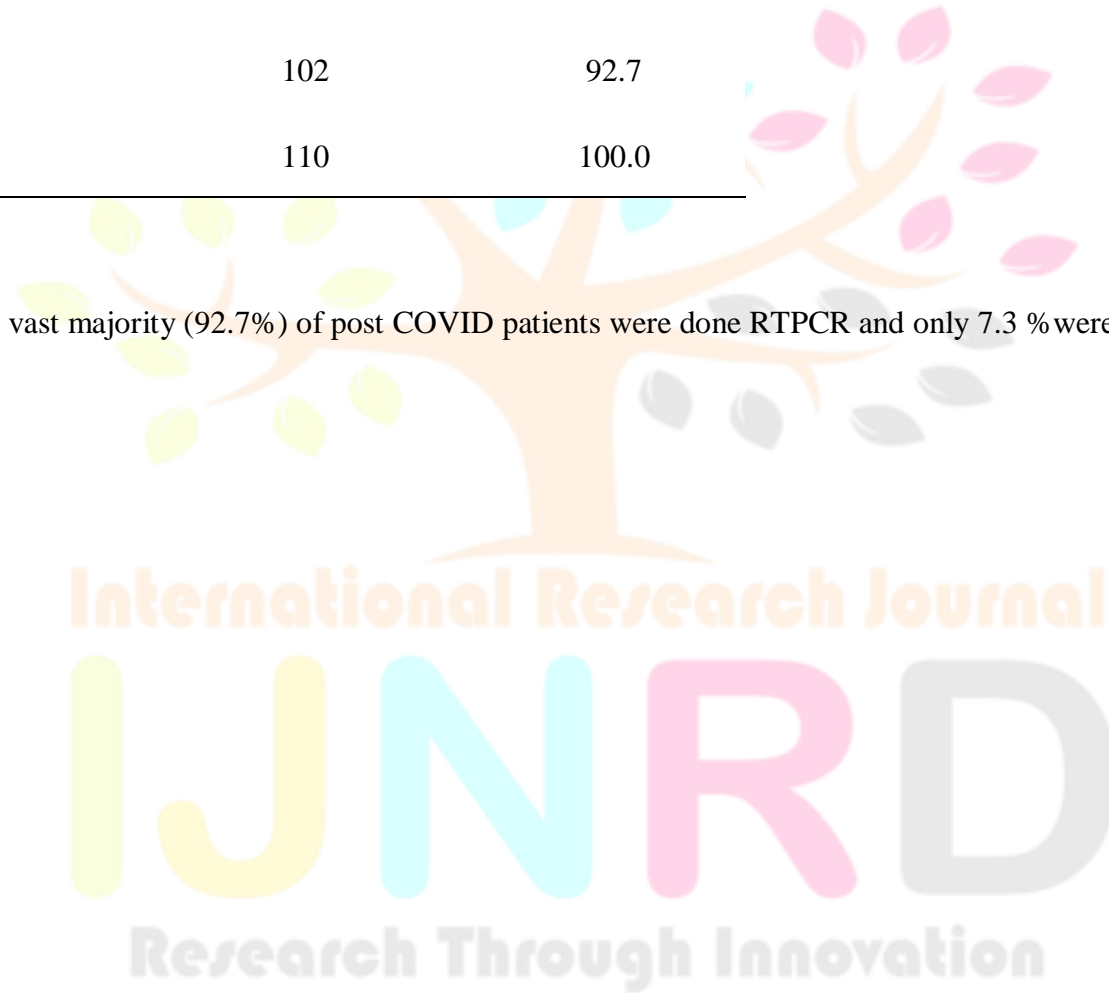
Table 4 shows that 42.7% post COVID patients with comorbidities and 57.3% patients without comorbidities.



Table 5: Distribution of post COVID patients based on Type of test**(N=110)**

Sl.No	Type of test	Frequency	Percentage [%]
1.	Antigen	8	7.3
2.	RTPCR	102	92.7
	Total	110	100.0

Table 5 shows that the vast majority (92.7%) of post COVID patients were done RTPCR and only 7.3 % were done antigen.



Section II: Assessment of respiratory symptoms of post COVID patients according to rating scale. (N=110)

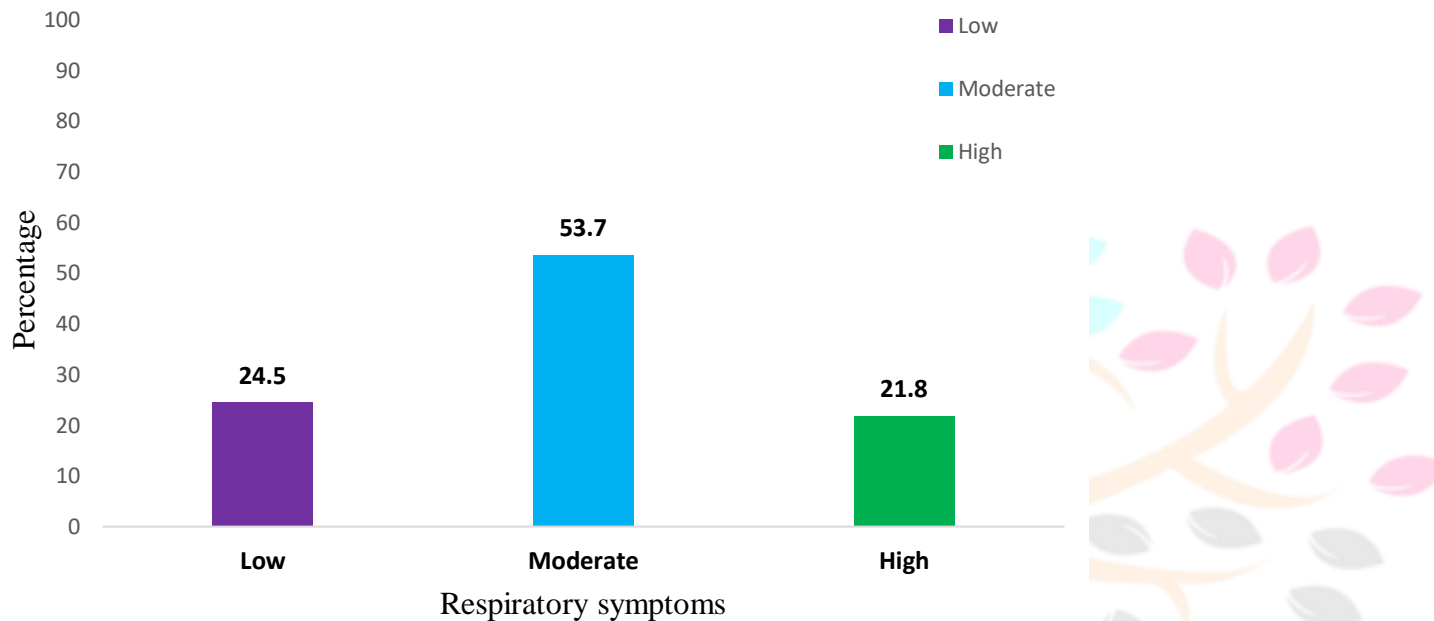
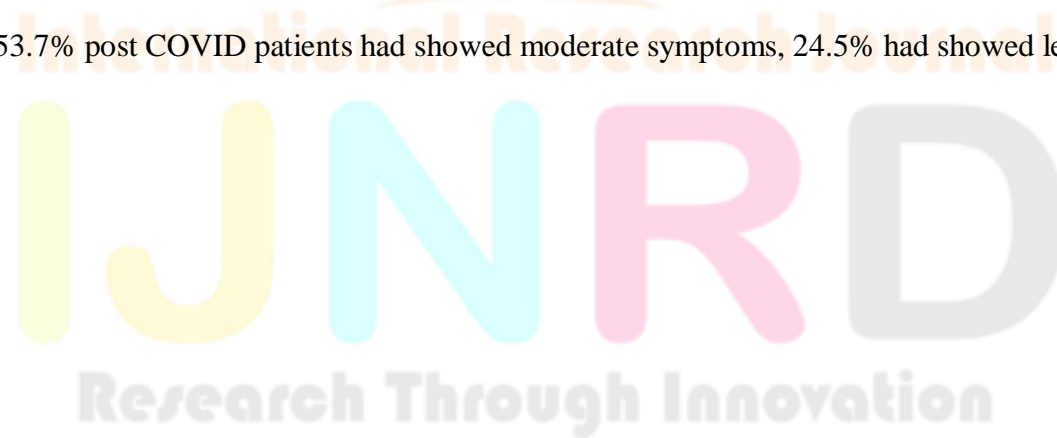


Figure 6 reveals that the majority 53.7% post COVID patients had showed moderate symptoms, 24.5% had showed less symptoms and 21.8% had showed severe (high) symptoms



Section III: Association between baseline variables and respiratory symptoms**Table 6: Association between age and respiratory symptoms**

Sl No	Age	Respiratory symptoms			χ^2
		Low	Moderate	High	
1.	18 to 35	9	12	4	.429
2.	36 to 50	13	26	12	
3.	51 to 70	5	21	8	
	Total	27	59	24	



As shown in table 6 that there was statistically no association between age and respiratory symptoms



Table 7: Association between gender and respiratory symptoms

SI No	Gender	Respiratory symptoms			χ^2
		Low	Moderate	High	
1.	Female	14	37	17	.371
2.	Male	13	22	7	
	Total	27	59	24	

As shown in table 7 that there was statistically no association between gender and respiratory symptoms.

Table 8: Association between education and respiratory symptoms

SI No	Education	Respiratory symptoms			χ^2
		Low	Moderate	High	
1.	Profession	3	5	2	
2.	Graduate	3	15	4	
3.	Intermediate/diploma	12	16	7	.246
4.	High School	8	14	4	
5.	Middle School	1	9	7	
	Total	59	59	24	



As shown in table 8 that there was statistically no association between education and respiratory symptoms.

Table 9: Association between occupation and respiratory symptom

Sl No	Occupation	Respiratory symptoms			χ^2
		Moderate	Low	High	
1	Legislators, Senior Officials & Managers	1	0	0	
2	Professional	12	5	2	
3	Technicians and Associate Professionals	6	2	2	
4	Clerks	3	1	3	
5	Skilled Workers and Shop & Market Sales Workers	4	9	3	.046
6	Skilled Agricultural & Fishery Workers	7	4	1	
7	Craft & Related Trade Workers	3	2	2	
8	Plant & Machine Operators and Assemblers	1	0	0	
9	Elementary Occupation	17	4	6	
10	Unemployed	5	0	5	

Total

59

27

24

As shown in table 9 that there was statistically association between occupation and respiratory symptoms.

Table 10: Association between income and respiratory symptoms

Sl No	Monthly Income	Respiratory symptoms			χ^2
		Moderate	Low	High	
1.	1 to 6174	16	2	8	.066
2.	6175 to 18,496	21	11	9	
3.	18,497 to 30,830	17	14	7	
4.	30,831 to 46,128	5	0	0	
	Total	59	27	24	

As shown in table10 that there was statistically association between income and respiratory symptoms.

Table 11: Association between living area and respiratory symptoms

SI No	Living area	Respiratory symptoms			χ^2
		Moderate	Low	High	
1.	Rural	35	18	20	.040
2.	Semi urban	24	9	4	
	Total	59	27	24	

As shown in table 11 that there was statistically association between living area and respiratory symptoms.

Table 12: Association between comorbidities and respiratory symptoms

SI No	Comorbidities	Respiratory symptoms			χ^2
		Moderate	Low	High	
1.	No	27	22	14	.471
2.	Yes	32	5	10	
	Total	59	27	24	

As shown in table12 that there was statistically no association between comorbidities and respiratory symptoms

RESULTS

Objectives

1. Assess the respiratory symptoms of post COVID patients.
2. Find out the association between the respiratory symptoms of post COVID patients with the selected base line variables.

Results

Results of the present study are discussed under the following headings.

Section I : Distribution of post COVID patients according to baseline variables.

Section 2 : Assessment of respiratory symptoms of post COVID patients according to rating scale.

Section 3 : Association between baseline variables and respiratory symptoms.

Section I: Distribution of post COVID patients according to baseline variables.

- ❖ Based on age 22.7% of post COVID patients were between the age group of 18-35 years, 46.4% were between 36-50 years of age and 30.9% were between 51-70 years of age.
- ❖ Among gender majority (68%) were females and (42%) were males.
- ❖ In the present study a majority of subjects were diplomats (31.8%), high school were 23.6%, graduate were 20%.

- ❖ Most of the subjects were elementary workers 24.5% professionals were 17.3%, shop and market sales workers were 14.5%, skilled agricultural & fishery workers were 10.9%.
- ❖ The study reveals majority (37.3%) of subjects were having monthly income of between Rs.6175 to 18,496 , (34.5%) were having the income of between Rs.18,497 to 30,830.
- ❖ A majority of (66.4%) subjects were living in rural area and 33.6% were living in urban area.
- ❖ The present study 42.7% post COVID patients with comorbidities and 57.3% patients without comorbidities.
- ❖ A vast majority (92.7%) of post COVID patients were done RTPCR and only 7.3 % were done antigen.

Section 2: Assessment of respiratory symptoms of post COVID patients according to rating scale.

The present study 53.7% post COVID patients had showed moderate symptoms, 24.5% had showed less symptoms and rest of them were (21.8%) showed severe (high) symptoms. In this three category commonly assessed respiratory symptoms were generalized weakness, coughing (dry cough), breathing difficulty and tiredness while working. Patient complaints about other post COVID symptoms were headache, pain and swelling in the joints, anorexia, itching the skin, depression etc.

Section 3: Association between baseline variables and respiratory symptoms.

Chi –square test were used to find out the association between baseline variables and respiratory symptoms.

In the present study, there was statistically significant association between occupation and respiratory symptoms ($p < 0.05$).

There was statistically significant association between living area and respiratory symptoms ($p < 0.05$). In the present study majority of patients living in rural area.

There was statistically significant association between comorbidities and respiratory symptoms ($p < 0.05$). The most common comorbidities showed in this study were diabetes mellitus and hypertension.

There was no statistically significant association between respiratory symptoms and other baseline variables such as age, gender, education and income.

DISCUSSION, SUMMARY AND CONCLUSION

This chapter gives a brief account of major findings of present study and discussion in relation to similar studies conducted by other researchers. It further includes summary, conclusion, nursing implication, limitation of the study and recommendation.

Discussion

Section I : Discussion about baseline variables.

Section2 : Discussion about respiratory symptoms of post COVID patients according to rating scale

Section 3 : Discussion about association between baseline variables and respiratory symptoms.

Section I: Discussion about baseline variables

Age

Majority of post COVID patients (46%) were belonged to 36-50 years of age, 30.9% were belonged to age group of 51-70 years and 22.7% were belonged to 18 – 35 years. This finding is consistent with most of the studies 36-50 years in which the results shows that high percentage of subjects were below 2 years of study.

Gender

In majority of post COVID patients 68% were females and 42% were males.

Education

Majority of respondents were diplomats (31.8%), high school education were 23.6%, graduate were 20%, middle school were 15.5% and professions were 9.1%.

Occupation

In the present study for occupation used Kuppuswamy's socio economic scale, 10 category according to the scale, they were such as Legislators, Senior Officials & Managers, professionals , technicians, clerks, skilled workers, shop and market sales workers, skilled agricultural & fishery workers, craft & related trade workers, plant & machine operators and assemblers ,elementary occupation, and unemployed. Most of the respondents were elementary workers 24.5%, professionals were 17.3%, shop and market sales workers were 14.5%, skilled agricultural & fishery workers were 10.9%.

Income

Based on the Kuppuswamy's socio economic scale out of 110 samples majority (37.3%) have the monthly income between 6175 to 18496, 34.5% have the monthly income between 18497 to 30830, 23.6% have the monthly income between 1 to 6174, and the balance 4.5% have the monthly income between 30,831 to 46,128.

Living area

The present study revealed that majority of 66.4% respondents were resided in rural area and 33.6% respondents were resided in semi urban area.

Comorbidities

The study revealed that 57.3% patients without comorbidities and 42.7% patients with comorbidities. The most showed comorbidities were thyroid problems, diabetes mellitus and hypertension.

Section 2: Discussion about respiratory symptoms of post COVID patients according to rating scale

The present study assessed the respiratory symptoms of post COVID patients out of 110 patients 53.7% post COVID patients had showed moderate symptoms, 24.5% had showed less symptoms and rest of them were (21.8%) showed severe (high) symptoms. In this three category commonly assessed respiratory symptoms were generalized weakness, coughing (dry cough), breathing difficulty and tiredness while working. Patient complaints about other post COVID symptoms were headache, pain and swelling in the joints, anorexia, itching of the skin, depression etc.

Section 3: Discussion about association between baseline variables and respiratory symptoms.

The present study used Chi-square test to find out the association between baseline variables and respiratory symptoms. The findings was supported statistically significant association between occupation and respiratory symptoms ($p < 0.05$), living area and respiratory symptoms ($p < 0.05$), comorbidities and respiratory symptoms ($p < 0.05$). The most common comorbidities showed in this study were diabetes mellitus and hypertension.

There was no statistically significant association between respiratory symptoms and other baseline variables such as age, gender, education and income.

Summary

The present study assessed the respiratory symptoms of post COVID patients in a selected hospital Pathanamthitta district. Descriptive design using quantitative approach was used for the study. The study was conducted among 110 post COVID patients by using purposive sampling technique. Data was collected by using structured questionnaire for assessing the baseline variables of post COVID patients and the respiratory symptoms was assessed using rating scale. For describing the data, frequency and percentage were used to describe the baseline variables and chi-square test and Spearman's correlation were used to determine the association between respiratory symptoms and baseline variables.

In the present study the findings revealed that the respiratory symptoms is associated with selected baseline variables such as occupation, living area and comorbidities. There is no significant association found between other baseline variables and respiratory symptoms.

Conclusion

The present study was intended to assess the respiratory symptoms of post COVID patients in the selected hospital Pathanamthitta district. The study revealed that moderate respiratory symptoms of post COVID patients. From this study found significant association between respiratory symptoms and three baseline variables. The study was able to categorize the symptoms like mild, moderate and severe. This result highlighted the importance of giving proper health education regarding the follow up care of post COVID patients.

Nursing Implications

The findings of the study have implications in the field of nursing practice, nursing education, nursing administration and nursing research.

The nurse as a professional health care practitioner can make a significant contribution in providing interventions that help to understand the importance of follow up care of post COVID patients, because of this purpose government started the post COVID clinics.

Nursing Practice

1. Clinical nurses should have awareness regarding post COVID symptoms.
2. Nurses need to consider various factors affecting the post COVID symptoms.
3. Nurses can conduct awareness programmes about precautions of COVID-19.
4. Nurses should inspire patients and their families about the importance of post COVID patients especially with comorbidities.
5. Nurses can support the patients and help in achieving a healthy environment.

Nursing education

1. As nurse educators, there are ample opportunities to educate regarding post COVID symptoms.
2. Nurse educators can educate students and the society for the importance of using mask and hand washing technique.

Nursing research

1. Nurse researcher can develop insight to society to prevent post COVID symptoms.
2. Nurse researcher can do further studies based on post COVID complications.
3. Evidence based practice will potentiate nurses to equip themselves better on updating knowledge.
4. The findings of the study can be presented in any conference and make the data available for other nurse researchers.
5. Nurse researchers can replicate the study with large samples to get better results.

6. The study can be published in journals for further utilization by other researchers.
7. The tool used in the study can be utilized for future studies.

Nursing administration

1. Nurse administrator in collaboration with community professional can organize conferences to enhance the awareness of post COVID symptoms.
2. Mental health camps can be arranged for identifying the problems of mobile phone use among students.
3. Nurse administrator can take initiative to conduct various training programs for staff nurses and other health care workers to the prevention and precautions of COVID-19 and post COVID symptoms.

Limitations of the study

4. The sample size was small comprising only 110 samples.
5. The study was limited to only selected hospital in a district.
6. The study was limited to only respiratory symptoms.

Recommendations

1. A similar study can be carried out with different methods and tools.
2. Emerging researchers should expand and extend the present study for a large sample in different settings to generalize the study findings.
3. Researchers can conduct interventional studies and assess the post COVID symptoms in each systems.

This chapter has dealt with discussion, summary and conclusion.

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