

Knowledge and Perception of the Risk of Respiration Disorders in COVID-19 Pandemic in COPD Patient: A Mixed-Method Study

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) have a higher risk for COVID-19-related complications. Knowledge and perception will greatly influence the behavior of a COPD patient in dealing with a problem, such as the risk of COVID-19 infection. The purpose of the study was to determine knowledge and perceptions about the risk of respiration disorders during the COVID-19 pandemic in COPD patients. This research was a mixed methods research with an explanatory sequential research design. The location was conducted in Rungkut District in Surabaya City, East Java, from May-October 2022. Sampling by purposive sampling method, and analyzed descriptively. The research sample was 116 people. On the knowledge, the most correct answers were the COVID-19 virus was contagious (112 of 116). On the perception, the answer with the most positive level is a question regarding the use of masks. Some respondents had a low knowledge category (54 of 116), and the most positive perception category (57 of 116). The respondents' knowledge of the COVID-19 virus showed COVID-19 virus was a contagious disease and was transmitted through air. But many respondents didn't know about the type of COVID-19 virus. Therefore, it was necessary to develop a strategy to increase knowledge about COVID-19 and related COPD treatment.

Key words: COPD, COVID-19, Knowledge, Perception.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a global health problem that has an increasing health burden. Conventional treatment now aims to relieve symptoms, prevent repeated exacerbations, maintain optimal lung function, and improve quality of life.^{1,2} According to World Health Statistics, COPD is the third leading cause of death worldwide. Based on data from Basic Health Research (RISKESDAS), COPD has a prevalence of 3.7% per one million population in Indonesia.³ COPD has become a ticking time bomb in Indonesia, because many people are at risk of COPD but are not aware of it yet.^{4,5} Individuals who have chronic lung diseases such as severe asthma and COPD are at higher risk, so they should be protected to reduce the risk of SARS-CoV-2 infection. The prevalence of COPD among individuals hospitalized with COVID-19 may be lower than that of the general population, in contrast to the prevalence of other chronic comorbidities such as hypertension and diabetes, raising speculation of a possible protective phenotype. In contrast, COPD has been shown to be associated with a greater risk of COVID-19-related death, and severe asthma may also be associated with an increased risk.^{6,7}

Patients with COPD have a higher prevalence of coronary ischemia and other factors that put them at higher risk for COVID-19-related complications. Several observational and case-control studies have confirmed a higher prevalence of cardiovascular disease in COPD patients than in the general population, possibly due to shared risk factors or associated pathogenic mechanisms. Despite major differences in studies evaluating the association between COPD and cardiovascular disease, COPD

patients undoubtedly have a higher prevalence of coronary ischemia and other risk factors that may worsen the prognosis of COVID-19. COPD was associated with a higher risk for poor disease outcome (combined endpoints included admission to an intensive care unit, invasive ventilation, or death), as reflected by a hazard ratio (HR) of 2,681 (95% CI 1,424–5,0480), after adjusting for with age and smoking. Compared with non-COPD individuals, COPD patients with COVID-19 exhibit a much poorer disease prognosis, as evaluated by hospitalization and mortality. Patients with COPD and COVID-19 had more comorbidities than non-COPD patients. Pneumonia was the most common diagnosis among COPD patients hospitalized for COVID-19 (59%); 19% of patients showed pulmonary infiltrates suggestive of pneumonia and heart failure. COPD patients with COVID-19 show higher rates of hospitalization and death, mainly related to pneumonia.^{8,9}

Knowledge and perception will greatly influence the behavior of a COPD patient in dealing with a problem, such as the risk of COVID-19 infection. Previous studies have shown that nearly half of the chronic disease patients in Nepal had poor knowledge and practice whereas more than two-thirds had a negative attitude towards COVID-19 disease. The older age of the patient was significantly associated with poor knowledge and poor practice. These study findings could be helpful for the government and non-government stakeholders while planning COVID-19 awareness campaigns for the targeted patient groups. Poor understanding and social stigma related to the virus and viral transmission increase the spread of infection in communities and escalate COVID-19-associated morbidity and mortality.¹⁰

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The relationship between knowledge and perception related to decreased lung function in respiratory disease is very low due to several factors such as education level and living environment.¹¹⁻¹⁴ The BE-COPD group showed poorer socioeconomic status. No significant differences were found to be associated with SARS-CoV-2 infection regarding housing conditions, poor knowledge, attitude, and risk perception toward COVID-19. Living in urban areas and perceiving risk in COVID-19 were significantly associated with increased adherence to sanitary measures and concerns of contagion. Around 40% of all patients showed poor risk perception and adherence to sanitary measures towards COVID-19.¹⁵

Perception is the experience of an object, event or relationship obtained from inferring known information and interpreting it, giving meaning to the stimulus. In other studies, it is also stated that the perception is that there is no need to visit/get advice on services from prescriptions for minor illnesses, self-medication is more economical, and does not have to queue long at the clinic. Perception is proven to significantly influence someone in self-medication in the selection of self-medication. The relationship between knowledge and perception is that perceptions are influenced by knowledge. Therefore, a person's source of information can influence knowledge which will influence him in making decisions.¹⁶⁻¹⁹ Previous systematic reviews on this and similar topics did not include hospitalization as an outcome, which is particularly important as healthcare resources become stretched during the pandemic. The maintenance of essential health services is a key strategic priority of the WHO COVID-19 response.²⁰ This study aimed to explore knowledge and perception of the risk of respiration disorders in the COVID-19 pandemic in COPD patients. This research was mixed methods research with quantitative and qualitative approaches, with a phenomenological approach.

MATERIALS AND METHODS

Research design

This research was mixed methods research with quantitative and qualitative approaches complementing the description of the study results regarding the phenomenon under study and strengthening the research analysis. This research design used a sequential explanatory model or combines quantitative and qualitative research methods sequentially. The location was conducted in Rungkut District in Surabaya City, East Java, from May-October 2022.

Quantitative phase: This quantitative study used a survey research method that aimed to determine the role of knowledge and knowledge and perception of the risk of respiration disorders in the COVID-19 pandemic in COPD patients. The data collection method in this study was using a questionnaire in the form of a scale obtained from previous research (Table 1). Each knowledge number was worth 1 point if the answer was correct, the maximum value was 16 (16 numbers). To assess the level of perception of the respondents, 7 questions were included to encompass individual perception of perception of the risk of respiration disorders in the COVID-19 pandemic in COPD patients. The question of perception was given a score of 0 for disagreement responses (very agree and agree) and a score of 1 for agreement responses (disagree and very disagree). The scores were summed to a total score ranging from 0 to 7.²¹

Qualitative phase: This qualitative research was conducted using the interpretative phenomenological analysis (IPA) research method which aimed to determine the knowledge and knowledge and perception of the risk of respiration disorders during the COVID-19 pandemic in COPD patients. The interview method used in this research was the in-depth interview method. The data analysis technique in this research was thematic analysis such as factor analysis.

Population and sample

In this study, the research target population that will be used were stable COPD patients who live in Rungkut sub-district, Surabaya City, East Java. The research sample was adult COPD patients (17-60 years), willing to participate in research, not hospitalized >1 month, and not working in the health sector.

Data collection and analysis method

Distribution of Informed Consent and interview in in-depth interview method, using structured interview guides and semi-structured interview guides. Validation of the questionnaire was done by equating the meaning and assessment of each statement on the questionnaire. The questionnaire was translated into the Indonesian language. Language validation was done by submitting the translation results to three expert judgments in community pharmacists. The suitability score was then validated using the Content Validity Ratio (CVR), which was declared valid if CVR was >0.29. Interviews were made with the framework of thinking as in Table 1. The construct validity test used factor analysis with the Exploratory Factor Analysis (EFA) system to find factor loads in the relationship between dimensions (factors) and items. The reliability test was conducted to determine the instrument, if Cronbach alpha value >0.7 then it was reliable. The overall interpretation of the analysis was the analysis of the interpretation of the quantitative and qualitative results, namely by combining the results from the quantitative phase and the qualitative phase of the research into the overall results of the study, so that a unified conclusion was obtained.

RESULTS AND DISCUSSION

Research implementation

A total of 116 stable COPD patients were the study sample from 124 COPD patients were encountered. A total of 7 people was not willing to be interviewed because of their busy schedules and 1 person had just been treated at the hospital, so it does not include stable COPD >1 month.

Characteristics of respondents

There were 116 respondents. Most of the respondents were male (107 of 116). While the average age of the respondents was 47 years and the lowest age was 32 years and the lowest age was 60 years. The biggest category is in the early elderly (57 of 116). A history of diseases other than COPD are cardiovascular disease (57 of 116), respiratory disease (27 of 116), and diabetes mellitus (24 of 116). As many as 69 respondents had been infected with the COVID-19 virus, and most needed treatment at the hospital because of quite severe symptoms of shortness of breath. The largest number of jobs are private employees (43 of 116), including working in offices, maintaining shops, and online drivers (Table 2).

Most of the respondents with male gender (Table 2). Data from most of the early studies indicated that men had a greater risk of developing COPD and dying from COPD than women, but data from developing countries show that the prevalence of COPD in men and women is similar, which may reflect changes in tobacco smoking patterns. Data from most of the early studies indicated that men had a greater risk of developing COPD and dying from COPD than women, but data from developing countries show that the prevalence of COPD in men and women is similar, which may reflect changes in tobacco smoking patterns.³¹⁻³³

Most of the respondents' ages were in the range of 45-55 years of 49.14% (Table 2). Human lungs develop until 10-12 years of age and mature until they reach a maximum age at around 20 years for girls and around 25 years for boys. Then lung function begins to decline with age as a

Table 1: Interview guidelines for knowledge and perception of the risk of respiration disorders in the COVID-19 pandemic in COPD patient.

No	Questionnaire of Knowledge	Domain	Answer key description
1	Is the COVID-19 virus contagious?	Understanding of the COVID-19 virus	Coronavirus disease 2019 (COVID-19), the highly contagious infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). ^{22,23}
2	How does the COVID-19 virus spread?		Airborne transmission with aerosol-generating procedures has also been implicated in the spread of COVID-19. Resources for contact tracing and testing must be enhanced to limit the spread of this virus. Patients must be educated and encouraged to adhere to social distancing guidelines, travel guidelines, and the use of facemasks. ^{22,23}
3	How long is the incubation period for COVID-19?		The average incubation time for COVID-19 was 12.5 days when the mean age of patients was 60 years, increasing 1 day for every 10 years. ^{23,24}
4	Is there any similarity between COVID-19, SARS-CoV and MERS-CoV?		Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), MERS-CoV (Middle East Respiratory Syndrome Coronavirus), and the recent SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2 otherwise known as COVID-19) are the seven types of Betacoronoviruse genus well-known for their respiratory illness caused in humans and are capable of co-evolving, which enhances their pathogenicity and the property of long-term adaptation to human host. SARS-CoV, MERS-CoV, and SARS-CoV-2 are the potential members of the Betacoronoviridae family that are very well known for their pandemic outbreak of lethal respiratory infections in human whereas the other types are associated with mild respiratory illness. ^{23,25}
5	Who is at risk of contracting COVID-19?	COPD link with COVID-19	The potential exposure and risk of contracting COVID-19, linked with new cases and quarantine procedures being systematically introduced, are understandably higher in such places as hospitals, medical centres and diagnostic units. ^{23,26}
6	Is a person with chronic pulmonary function impairment more at risk of contracting COVID-19?		People with Asthma or severe COPD are not at higher risk for contracting COVID-19 but they are more susceptible to severe complications if they do contract COVID-19 as COVID-19 most commonly affects the respiratory system. ²⁷
7	Does a person with chronic pulmonary function impairment show more severe symptoms if infected with COVID-19?		
8	Should patients still go to the doctor for scheduled visits even with the COVID-19 pandemic?		COPD treatment is always initiated and monitored by a health care provider or at the health facility. ²⁷
9	Does medications for COPD increase the risk of getting sick of COVID-19?		COPD medications do not increase the risk of getting Covid-19 or developing severe COVID-19 disease. ²⁷
No	Questionnaire of Perception	Domain	Question Purpose
10	COVID-19 is not a dangerous disease and similar to the usual influenza	Understanding of the COVID-19 virus	Influenza (flu) and COVID-19 are both contagious respiratory illnesses, but they are caused by different viruses. COVID-19 is caused by infection with a coronavirus (SARS-CoV-2) first identified in 2019. Flu is caused by infection with a flu virus. ^{28,21}
11	Coronavirus is not contagious during a conversation		
12	Only those with symptoms who can transmit coronavirus		
13	Coronavirus may survive outside the human body for a couple of hours		
14	Healthy people do not need to wear mask	COPD link with COVID-19	How to reduce the risk of being exposed to the Covid-19 virus, by staying home except for essential activities, physical distancing in public, and wearing a face mask in public. ^{30,21}
15	We should not afraid to interact with COVID-19 patients as long as we keep our distance and wear mask		
16	The deaths of people who suffer from chronic disease(s) are not related to coronavirus infection.		

consequence of structural and physiological changes in the lung. Aging is defined as a progressive decline in homeostasis after the reproductive phase is complete, resulting in an increased risk of disease or death. Thus, aging is one of the main drivers of the development and increasing burden of non-communicable diseases, namely chronic diseases. Older COPD patients (geriatrics) experience a greater decline in functional status so that age is an independent risk factor for reducing functional capacity in COPD patients.^{34,35}

Instrument validity test

The validity test was the level of reliability and validity of the instrument or measuring instrument used. Content Validity Ratio (CVR) was the

accuracy of a measuring instrument in terms of the content of the measuring instrument through rational analysis by expert judgment. The results of the data validity test showed that items 1-16 were valid so that the questionnaire can be used as a measuring tool (Table 3).

Construct Validity (CV) was used using factor analysis with the Exploratory Factor Analysis (EFA) system. to look for the Loading Factor was the relationship between dimensions (factors) and items. The condition of the loading factor was >0.5. The results of factor analysis showed the following values:

Sample Sufficiency Test was tested using Kaiser-Meyer-Olkin (KMO) and Measure of Sampling Adequacy (MSA), provided that the KMO

Table 2: Frequency distribution based on characteristics of respondents.

Characteristics of Respondents		Frequency (n: 116)	Percentage (%)
Gender	Male	107	92.24
	Female	9	7.76
Age (years)	17-25 (Late adolescence)	0	0
	26-35 (Early adulthood)	11	9.48
	36-45 (Late adulthood)	37	31.89
	46-55 (Early elderly)	57	49.14
	56-60 (Late elderly)	11	9.48
	Respiratory disease	27	23.28
History of other diseases	Cardiovascular disease	57	49.14
	Endocrine disease	24	20.69
	Autoimmune disease	6	5.17
History of being infected with COVID-19	Other	2	1.72
	Ever	47	40.52
Occupation	Never	69	59.48
	Self-employed	12	10.34
	Private sector employee	43	37.07
	Civil servant	7	6.03
	Retired	51	43.97
	Other	3	2.586

value was >0.5. The results showed KMO and MSA values for the correlation between variables in the KMO and Bartlett's Test box showed a value of 0.661 which was >0.5. Meanwhile, the significance result from Bartlett's Test of Sphericity was 0.000. Based on the results above, it can be concluded that this instrument had met the valid requirements, so the data was eligible for further Factor Analysis.

Item Independence Test was used to test each item in the questionnaire, provided that the antiimage correlation value was >0.4. The results showed the correlation between the independent variables of each item was classified as high, namely all items had an antiimage correlation data value >0.4 so that based on the results of item validity testing, it can be concluded that all items were valid and all independent variables can be analyzed further.

Exploratory Factor Analysis was carried out to find the Loading Factor was the relationship between dimensions (factors) and items. The provisions of the loading factor that was >0.5. The following was the loading factor from item No. 1-9 (knowledge) and 10-16 (perception).

The discrimination index (DI) was the distinguishing power of the item, namely the ability of the item to distinguish a sample that had high and low score group. There were many ways to calculate the discrimination index. The technique used in this study was to use product moment Pearson correlation between items and the total. Good items were items that had item correlation – a total of >0.3. The results of the discrimination index test showed that from a total of 30 samples, all items had good discrimination with average significance of 0.000 and the total item correlation value showed >0.3.

Instrument reliability test

The reliability test was conducted to determine whether the instrument, in this case the questionnaire, could be used more than once, so as to produce data that was consistent with the condition that Cronbach's alpha was >0.7. From the item reliability test with Cronbach's alpha, the results of the reliability test get a value of 0.866 so that it can be said that the items in the questionnaire were reliable or reliable used in data collection tools.

Quantitative phase

Profil answers from knowledge and perception of the risk of the risk of respiration disorders in the COVID-19 pandemic in COPD patients

was shown in Table 4. On the knowledge question, the most correct answers were number 1 which asked whether the COVID-19 virus was contagious (112 of 116). While the most wrong answers were asking whether there is any similarity between COVID-19, SARS-CoV, and MERS-CoV (21 of 116) and whether medications for COPD increase the risk of getting sick of COVID-19 (38 of 116) (Table 4). On the perception item, the answer with the most positive level is a question no. 15 (We should not be afraid to interact with COVID-19 patients as long as we keep our distance and wear masks). While the answer with the most positive levels is question no. 13 (Coronavirus may survive outside the human body for a couple of hours) (Table 4).

Some respondents had a low knowledge category (54 of 116), and the most positive perception category (57 of 116). Respondents with high and very high levels of knowledge were 48 of 116 (Table 5).

Qualitative phase

The results of this study were obtained by using in-depth interviews with informants as a form of searching for data and direct documentation in the field which were then analyzed by researchers. The results of the interview findings can be seen in Table 6.

The respondent's knowledge of the COVID-19 virus showed that the respondent knows that the COVID-19 virus was a contagious disease and was transmitted through the air (can be through coughing and sneezing).^{22,36,23} However, during the incubation period of the virus, many respondents answered variously and thought that if someone is in contact with someone who is positive for COVID-19, they should take a test after 3-4 days (Table 6). The average incubation time for COVID-19 was 12.5 days when the mean age of patients was 60 years, increasing by 1 day every 10 years.^{23,24} However, many respondents do not know about the type of COVID-19 virus, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), MERS-CoV (Middle East Respiratory Syndrome Coronavirus), and the recent SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2 otherwise known as COVID-19) are the seven types of *Betacoronaviruse* genus well-known for their respiratory illness caused in humans and are capable of co-evolving, which enhances their pathogenicity and the property of long term adaptation to human host. SARS-CoV, MERS-CoV, and SARS-CoV-2 are the potential members of the *Betacoronaviridae* family that are very well known for their pandemic outbreak of lethal respiratory infections in humans whereas the other types are associated with mild respiratory illness.^{23,25}

Table 3: Results of the CVR (Content Validity Ratio) questionnaire.

Item	Question Knowledge	Content Validity Ratio CVR					Construct Validity (CV)				Discrimination Index (DI)			
		Ne	N/2	N-1	CVR	Description	Loading Factor	Description	Dimension (Factor)	Dimension	Pearson Correlation	Sig (N=30)	Description	
1	Is the COVID-19 virus contagious?	3	1.5	2	0.75	valid	0.632	valid	1		0.544	0.000	Good discrimination	
2	How does the COVID-19 virus spread?	3	1.5	2	0.75	valid	0.567	valid	1					
3	How long is the incubation period for COVID-19?	3	1.5	2	0.75	valid	0.721	valid	1	Understanding of the COVID-19 virus				
4	Is there any similarity between COVID-19, SARS-CoV and MERS-CoV?	3	1.5	2	0.75	valid	0.675	valid	1					
5	Who is at risk of contracting COVID-19?	3	1.5	2	0.75	valid	0.574	valid	1					
6	Is a person with chronic pulmonary function impairment more at risk of contracting COVID-19?	3	1.5	2	0.75	valid	0.628	valid	2					
7	Does a person with chronic pulmonary function impairment show more severe symptoms if infected with COVID-19?	3	1.5	2	0.75	valid	0.726	valid	2	COPD link with COVID-19				
8	Should patients still go to the doctor for scheduled visits even with the COVID-19 pandemic?	3	1.5	2	0.75	valid	0.688	valid	2					
9	Does medications for COPD increase the risk of getting sick of COVID-19?	3	1.5	2	0.75	valid	0.622	valid	2					
Item	Question of Perception	Content Validity Ratio CVR					Construct Validity (CV)				Discrimination Index (DI)			
		Ne	N/2	N-1	CVR	Description	Loading Factor	Description	Dimension (Factor)	Dimension	Pearson Correlation	Sig (N=30)	Description	
10	COVID-19 is not a dangerous disease and similar to the usual influenza	3	1.5	2	0.75	valid	0.672	valid	1		0.604	0.000	Good discrimination	
11	Coronavirus is not contagious during a conversation	3	1.5	2	0.75	valid	0.521	valid	1	Understanding of the COVID-19 virus				
12	Only those with symptoms who can transmit coronavirus	3	1.5	2	0.75	valid	0.691	valid	1					
13	Coronavirus may survive outside the human body for a couple of hours	3	1.5	2	0.75	valid	0.593	valid	1					

14	Healthy people do not need to wear mask	3	1.5	2	0.75	valid	0.658	valid	2	COPD link with COVID-19
15	We should not afraid to interact with COVID-19 patients as long as we keep our distance and wear mask	3	1.5	2	0.75	valid	0.509	valid	2	
16	The deaths of people who suffer from chronic disease(s) are not related to coronavirus infection.	3	1.5	2	0.75	valid	0.601	valid	2	

CVR = Content Validity Ratio= (Ne-N/2)/(N-1);

Ne: 1-3 (Number of expert judgments who gave an assessment) (Agree/Strongly Agree);

N: 3 (Sum of all expert judgments)

Table 4: Profile answers from knowledge and perception of the risk of the risk of respiration disorders in COVID-19 pandemic in COPD patient.

No	Questionnaire of Knowledge	Answer Category	Frequency (n=116)	Percentage (%)
1	Is the COVID-19 virus contagious?	Right	112	96.55
		Wrong	4	3.45
2	How does the COVID-19 virus spread?	Right	87	75.00
		Wrong	29	25.00
3	How long is the incubation period for COVID-19?	Right	73	62.93
		Wrong	43	37.07
4	Is there any similarity between COVID-19, SARS-CoV and MERS-CoV?	Right	21	18.10
		Wrong	95	81.89
5	Who is at risk of contracting COVID-19?	Right	69	59.48
		Wrong	47	40.52
6	Is a person with chronic pulmonary function impairment more at risk of contracting COVID-19?	Right	55	47.41
		Wrong	61	52.59
7	Does a person with chronic pulmonary function impairment show more severe symptoms if infected with COVID-19?	Right	47	40.52
		Wrong	69	59.48
8	Should patients still go to the doctor for scheduled visits even with the COVID-19 pandemic?	Right	44	37.93
		Wrong	72	62.07
9	Does medications for COPD increase the risk of getting sick of COVID-19?	Right	38	32.76
		Wrong	78	67.24
No	Questionnaire of Perception	Answer Category	Frequency (n=116)	Percentage (%)
10	COVID-19 is not a dangerous disease and similar to the usual influenza.	Very agree	55	47.41
		Agree	47	40.52
		Disagree	14	12.07
		Very disagree	0	0.00
11	Coronavirus is not contagious during a conversation.	Very agree	21	18.10
		Agree	81	69.83
		Disagree	10	8.62
		Very disagree	4	3.45
12	Only those with symptoms who can transmit coronavirus.	Very agree	41	35.34
		Agree	52	44.83
		Disagree	10	8.62
		Very disagree	13	11.21
13	Coronavirus may survive outside the human body for a couple of hours.	Very agree	2	1.72
		Agree	10	8.62
		Disagree	31	26.72
		Very disagree	73	62.93
14	Healthy people do not need to wear mask.	Very agree	40	34.48
		Agree	66	56.89
		Disagree	10	8.62
		Very disagree	0	0.00
15	We should not afraid to interact with COVID-19 patients as long as we keep our distance and wear mask	Very agree	58	50.00
		Agree	20	17.24
		Disagree	21	18.10
		Very disagree	17	14.66
16	The deaths of people who suffer from chronic disease(s) are not related to coronavirus infection.	Very agree	27	23.28
		Agree	44	37.93
		Disagree	26	22.41
		Very disagree	19	16.38

Table 5: Category of knowledge and perception of the risk of the risk of respiration disorders in COVID-19 pandemic in COPD patient.

Category of Knowledge	Interval	Frequency (n: 116)	Percentage (%)
Very low	<4	14	12.07
Low	4-7	54	46.55
High	8-11	22	18.97
Very high	≥12	26	22.41
Category of Perception	Interval	Frequency (n: 116)	Percentage (%)
Negative	<2	28	24.14
Neutral	2-4	31	26.72
Positive	≥5	57	49.14

Table 6: Respondents' opinions regarding the risk of respiration disorders in the COVID-19 pandemic in COPD patients.

Domain	Answer finding	Excerpts of Interview Results
Understanding of the COVID-19 virus	The COVID-19 virus was highly contagious	"I think it's very contagious because the news has talked a lot about COVID, right?" "It's very contagious, yes, because many people have been affected by corona and died." "It's very contagious, because there are many schools and companies that work from home, right?"
	The COVID-19 virus was spread through coughing and sneezing.	"infected if someone else has corona and then coughs" "through sneezing and the virus is carried in the air"
	The COVID-19 virus was spread through the air, it can even be infected when talking close together.	"The virus can be infected when chatting close together, so you have to keep your distance, because you can get the saliva"
	The incubation period is between 3-4 days.	"As far as I know, when I come in contact with someone who has Corona, I was asked to take a test 34 days after that"
	Caused by different diseases.	"different possible causes of the disease"
	Don't know	"oh I don't know what it is" "I have never heard of" "same seems yes"
COPD link with COVID-19	A person with a chronic illness and the elderly.	"Parents, yes, because there are many diseases and the immune system has gone down, right?" "Patients with diabetes and heart disease" "old age people, because the incidence of death and severe generally occurs in old age people" "It's more risky, yes, because the virus is attacked in the lungs, the place is the same in the breath"
	COPD patients were more at risk of experiencing COVID-19 infection	"more at risk with impaired lung function because the symptoms of shortness of breath are more severe"
	COPD patients were not more at risk of experiencing COVID-19 infection.	"same y seems" "Maybe it's the same because it's a virus so it can attack anyone"
	COPD patients need to see a doctor if symptoms appear or are positive for infection.	"You need to see a doctor if shortness of breath appears, because the danger can cause death" "if symptoms appear when positive for corona"
	There was no effect of treatment on the risk of being infected with COVID-19	"It's the same, I've had COVID, and pulmonary medicines are still being used as usual"

A strong immune system can help increase the body's resistance, thereby reducing risk in the midst of the COVID-19 pandemic.^{37,38} Chronic lung diseases such as COPD and asthma are particularly at risk of developing serious conditions if infected with COVID-19.³⁹⁻⁴² Chronic lung diseases (COPD, asthma, pulmonary fibrosis, and lung cancer) are at high risk of developing serious conditions if infected with COVID-19. Patients with severe and/or uncontrolled asthma/COPD are at increased risk for more severe infections.^{37,38}

The COPD treatment associated with COVID-19 is inhaled corticosteroids (ICS). ICS are the mainstay of therapy for airway disease and provide beneficial effects including protection against exacerbations. In addition, ICS can reduce the risk of viral acquisition or alternatively suppress viral inflammation and prevent symptom manifestation. However, there is also a theory that ICS has an adverse effect of suppressing the innate immune response against rhinovirus and influenza infection, leading to increased viral replication, although an opposite (protective) effect of ICS has been reported *in vitro* for seasonal coronavirus 229E11 and SARS-CoV2.⁶ The COPD treatment guidelines (Global Initiative for Chronic Obstructive Lung Disease

or GOLD) recommend that patients with COPD should follow basic infection control measures and wear a mask whenever possible. In most cases, a loose-fitting face covering, or even a face shield is tolerable and effective, but wearing a surgical mask does not appear to affect ventilation even in patients with severe airflow limitation.^{43,44} The use of inhaled corticosteroids (ICS) in the treatment of COPD during the COVID-19 pandemic is still controversial. ICS had an overall protective effect against exacerbations in COPD patients with a history of exacerbations; however, its use is also associated with an increased risk of pneumonia. A more recent study suggests the use of ICS in COPD does not protect against coronavirus infection, and raises the possibility that it increases the risk of developing COVID-19, but the results are likely to be confounded by indications for ICS. The GOLD report concludes that there are no conclusive data to support changes to maintenance COPD pharmacological treatment including ICS, either to reduce the risk of developing COVID-19 or otherwise because of concerns that pharmacological treatment may increase the risk of developing COVID-19.⁴⁴

Some respondents had a low knowledge category (54 of 116), and the most positive perception category (57 of 116). Respondents with high and very high levels of knowledge were 48 of 116 (Table 5). There has been no previous research regarding knowledge and perceptions of the risk of respiration disorders in the COVID-19 pandemic in COPD patients. A similar earlier study, by Mortiel-Lopez *et al.* (2021), who examined prevalence, attitude, knowledge, and risk perception towards COVID-19 in COPD patients associated with biomass exposure. No significant differences were found to be associated with SARS-CoV-2 infection regarding housing conditions, poor knowledge, attitude, and risk perception toward COVID-19. Living in urban areas and perceiving risk in COVID-19 were significantly associated with increased adherence to sanitary measures and concern for contagion. Around 40% of all patients showed poor risk perception and adherence to sanitary measures towards COVID-19. Another previous study assesses knowledge, attitude, and practice toward COVID-19 among patients with chronic disease. The prevalence of poor knowledge and poor practice was high. Leaflets prepared in local languages should be administered and health professionals should provide detailed information about COVID-19 to their patients.⁴⁵⁻⁴⁷

CONCLUSION

Some respondents had a low knowledge category (54 of 116), and the most positive perception category (57 of 116). Respondents with high and very high levels of knowledge were 48 of 116. The respondent's knowledge of the COVID-19 virus showed that the respondent knows that the COVID-19 virus was a contagious disease and was transmitted through the air (can be through coughing and sneezing). However, during the incubation period of the virus, many respondents answered variously and thought that if someone is in contact with someone who is positive for COVID-19, they should take a test after 3-4 days. But many respondents do not know about the type of COVID-19 virus.

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CONFLICTS OF INTEREST

No conflicts of interest.

FUNDING DISCLOSURE

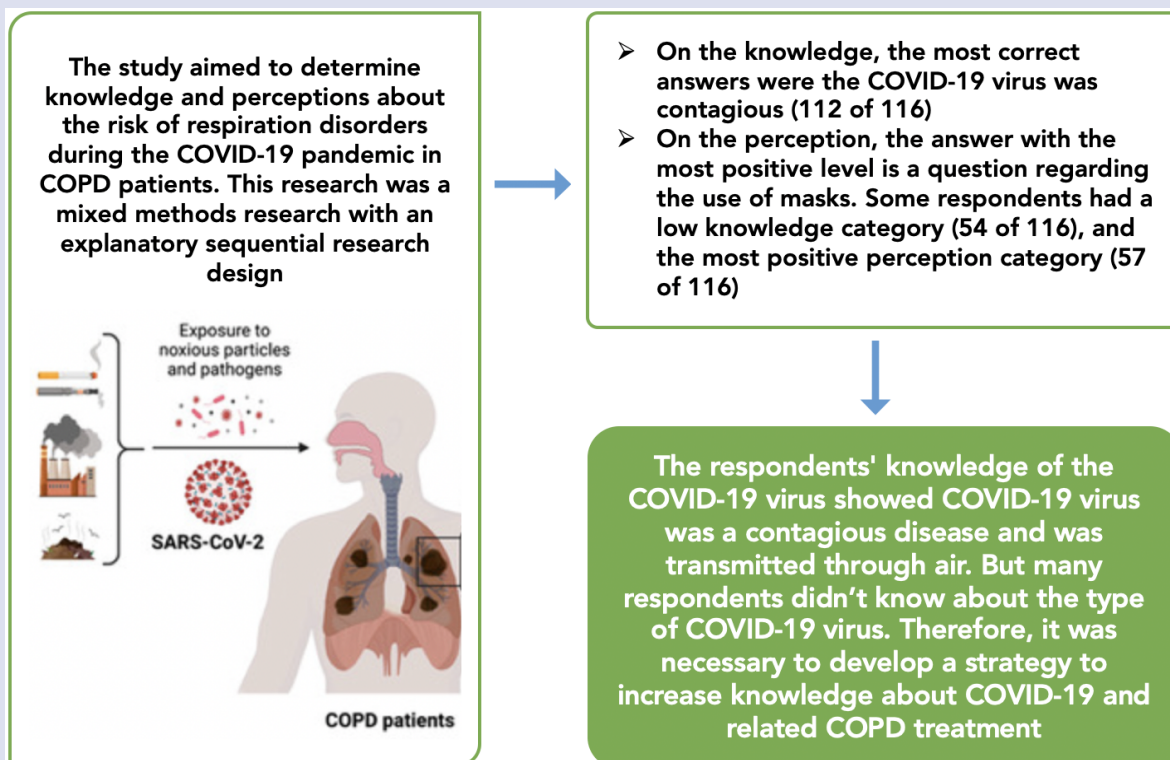
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GRAPHICAL ABSTRACT



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