

# Analisis Perilaku Pencegahan COVID-19 pada Pasien dengan Komorbiditas Diabetes Mellitus di Palembang

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## Analisis Perilaku Pencegahan COVID-19 pada Pasien dengan Komorbiditas Diabetes Mellitus di Palembang

### Analysis of COVID-19 Prevention Behaviour among Diabetes Mellitus Comorbidity Patients in Palembang

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#### ABSTRACT

**Background:** COVID-19 in Diabetes Mellitus (DM) patients are at higher risk for severe complications than people without DM. Preventive behaviour is the best way to avoid COVID-19 infection for DM patients due to its bad impact, such as severe symptoms requiring intensive care, leading to death. **Objective:** This study aims to analyse the COVID-19 preventive behaviour among DM comorbidity patients in Palembang. **Method:** The cross-sectional study was conducted from April 2021 to May 2021 using a questionnaire to diabetic patients at six community health centres in Palembang. The questionnaire has four sections: patient characteristics, knowledge, attitude, and COVID-19 prevention behaviour. A proportional random sampling technique was used to determine the number of samples according to the data on diabetic patients in each health centre. The total sample was 183 respondents from 1.266 total population diabetic patients in six community health centres. Respondents were diabetic patients aged  $\geq 18$  years old and willing to fill out the questionnaire. Univariate, bivariate, and multivariate statistical analyses were used to analyse the data. **Results:** More respondents have good knowledge (50.3%), negative attitude (57.3%), and poor COVID-19 preventive behaviour (53.0%). The findings revealed a statistical significance between knowledge ( $P$ -value = 0.0001), attitude ( $P$ -value = 0.0001), and educational status ( $P$ -value = 0.0001) with COVID-19 preventive behaviour. Furthermore, knowledge is the most determinant factor of COVID-19 preventive behaviour ( $PR= 7.597$ , 95% CI: 3.701 - 15.597). **Conclusion:** According to this study, diabetic patients with poor knowledge are at greater risk of having poor COVID-19 prevention behaviours. COVID-19 prevention programs, especially health education programs at the community health centre, need to be improved to ensure that diabetic patients adopt reasonable and appropriate COVID-19 prevention practices.

**Keywords:** Behaviour, COVID-19, Diabetes Mellitus, Prevention

#### ABSTRAK

**Latar Belakang:** Pasien diabetes mellitus (DM) yang menderita COVID-19 berisiko lebih tinggi mengalami komplikasi berat dibandingkan orang tanpa DM. Perilaku pencegahan merupakan cara terbaik untuk menghindari penularan COVID-19 bagi pasien DM karena dampaknya yang buruk, seperti gejala berat yang memerlukan perawatan intensif hingga dapat menyebabkan kematian. **Tujuan:** Penelitian ini menganalisis perilaku pencegahan COVID-19 pada pasien komorbiditas DM di Palembang. **Metode :** Studi cross sectional dilakukan pada April 2021 hingga Mei 2021 dengan menggunakan kuesioner yang diberikan kepada pasien DM di enam Puskesmas di Kota Palembang. Kuesioner memiliki empat bagian; karakteristik pasien, pengetahuan, sikap, dan perilaku pencegahan COVID-19. Penentuan jumlah sampel untuk setiap Puskesmas menggunakan teknik proportional random sampling sesuai dengan data pasien DM di masing-masing Puskesmas. Jumlah sampel sebanyak 183 responden dari total 1.266 populasi pasien DM di enam Puskesmas. Responden adalah pasien DM yang berusia  $\geq 18$  tahun dan bersedia mengisi kuesioner. **Hasil:** Lebih banyak responden memiliki pengetahuan baik (50,3%), sikap negatif (57,3%), dan perilaku pencegahan COVID-19 yang buruk (53,0%). Hasil penelitian secara statistik menunjukkan signifikansi antara pengetahuan ( $P$ -value = 0,0001), sikap ( $P$ -value = 0,0001), dan status



pendidikan ( $P$ -value = 0,0001) dengan perilaku pencegahan COVID-19. Selanjutnya, pengetahuan merupakan faktor yang paling dominan terhadap perilaku pencegahan COVID-19 ( $PR= 7.597$ , 95%  $CI: 3.706- 15.597$ ). **Kesimpulan:** Pasien DM dengan pengetahuan yang buruk berisiko lebih besar memiliki perilaku pencegahan COVID-19 yang buruk. Program pencegahan COVID-19 terutama program edukasi kesehatan di Puskesmas perlu ditingkatkan untuk dapat mendorong penerapan perilaku pencegahan COVID-19 yang baik dan tepat pada pasien DM.

**Kata kunci :** Perilaku, COVID-19, Diabetes Mellitus, Pencegahan

## INTRODUCTION

Coronavirus disease or COVID-19 is caused by a new type of Novel Corona Virus (2019-nCoV) and was first reported in Wuhan City, Hubei, China, in December 2019 quickly spread to other countries a worldwide pandemic (Li *et al.*, 2020). COVID-19 can be transmitted from human to human through droplets by direct or indirect contact through the mucous membranes of the eyes, mouth, and nose (Centers for Disease Control and Prevention, 2020). Symptoms including fever, cough, body feeling tired, myalgia, and shortness of breath which can cause severe symptoms and death (Li *et al.*, 2020; Ali and Alharbi, 2020). The COVID-19 pandemic has had a significant impact globally, especially in the health and socio-economic sectors of the country.

According to World Health Organization (WHO) data, COVID-19 cases worldwide have exceeded 100 million people. Indonesia is ranked 18th with the highest number of COVID-19 cases globally (World Health Organization, 2021). According to data from the Ministry of Health of the Republic of Indonesia or *Kementerian Kesehatan Republik Indonesia*, confirmed cases of COVID-19 in Indonesia have almost reached 2 million, with a cure rate of 90.1% and a fatal death rate or case fatality rate of 2.7% (Satuan Tugas COVID-19, 2021). Palembang is a city with the highest number of COVID-19 cases in South Sumatra Province (Dinas Kesehatan Provinsi Sumatera Selatan, 2021).

COVID-19 had a higher risk for the elderly and people who have a history of chronic (comorbid) disease with worse complications (Akalu, Ayelign and Molla, 2020). The three comorbid diseases and the highest causes of death in COVID-19 patients in Indonesia are hypertension, Diabetes Mellitus (DM), and

cardiovascular disease (Karyono and Wicaksana, 2020). The mechanism that caused poor prognosis in COVID-19 patients with diabetes comorbidity associated with elderly, uncontrolled blood sugar levels, and comorbid diseases or complications that accompany diabetes (Muniyappa and Gubbi, 2020; Pugliese *et al.*, 2020).

Data from various countries showed that the prevalence of COVID-19 patients with diabetes is lower than those without diabetes but has a more severe impact (Pugliese *et al.*, 2020). Based on data from the Indonesian COVID-19 Handling Task Force or *Satuan Tugas COVID-19 (Satgas COVID-19)*, COVID-19 patients with accompanying diabetes are in the second-highest rank compared to other comorbid diseases, with a 9.7% percentage of deaths (Satuan Tugas COVID-19, 2021). In South Sumatra Province, the number of COVID-19 patients with diabetes who died was the second-highest rank of other comorbidities (Dinas Kesehatan Provinsi Sumatera Selatan, 2021). The effort made by the Indonesian Ministry of Health is to issue steps for DM patients during the COVID-19 pandemic as an effort to prevent COVID-19 in comorbid DM patients (Kementerian Kesehatan Republik Indonesia, 2020).

Prevention efforts for diabetic patients are the best steps to avoid COVID-19 infection due to its bad impact on diabetic patients, such as severe symptoms that require intensive care to death (Kumar *et al.*, 2020). Diabetic patients at risk of being infected with COVID-19 with a worse effect must have good COVID-19 prevention behaviour. Based on research on patients with chronic diseases, most patients had good knowledge, positive attitudes, and good COVID-19 prevention (Huynh *et al.*, 2020). Research on patients with DM and hypertension found that poor

knowledge affects preventive behaviour, which can directly increase the risk of transmission of COVID-19 (Melesie Taye *et al.*, 2020). The patient's knowledge and attitude influence COVID-19 prevention behaviour in diabetic patients. Based on this background, this study was conducted to analyse the preventive behaviour of COVID-19 in comorbid DM patients in Palembang City.

## METHODS

The cross-sectional study was conducted from April 2021 to May 2021. The sampling technique in this study was carried out with purposive random sampling by dividing the area of Community health centres in the Seberang Ulu and Seberang Ilir areas of Palembang City. The results obtained were six community health centres, namely 1 Ulu, Karya Jaya, Talang Ratu, Pakjo, Sosial, and Basuki Rahmat. To determine the number of samples for each community health centre, a proportional random sampling technique was used according to data on diabetic patients in each health centre. Based on the results of the sample calculation, the total sample was 183 from 1.266 total diabetics patients in six community health centres. Respondents were diabetic patients aged  $\geq 18$  years old and willing to fill out the questionnaire.

This study used a questionnaire given to diabetic patients at the community health centres. The questionnaire has four sections, patient characteristics (age, gender, education, and occupation). Furthermore, fifteen knowledge questions about COVID-19 and its prevention efforts for diabetic patients, five favourable and five unfavourable attitude statements about COVID-19, and twelve COVID-19 prevention behaviours were made by diabetic patients. Before distributing the questionnaires, 30 non-participating diabetic patients were tested for validity and reliability. The results of the questionnaire validity and reliability test were; in the knowledge section, 15 valid and reliable questions with Cronbach's alpha 0.842 ( $> 0.60$ ); in the attitude section, ten valid and reliable statements with Cronbach alpha 0.796; and in the COVID-19 prevention behaviour section, 12 valid with Cronbach alpha 0.907. One variable was studied in univariate

analysis, while two variables were examined in bivariate analysis. Multiple variables were analysed in multivariate statistical analysis. The Health Research Ethics Commission of Sriwijaya University has approved this study (145/UN9.FKM/TU.KKE/2021).

## RESULTS AND DISCUSSION

Univariate analysis was used to examine each research variable: patient characteristics (age, gender, education, and occupation), knowledge, and attitudes. In the next step, a bivariate analysis was used to examine the association between patient characteristics (age, gender, education, occupation), knowledge, and attitudes towards COVID-19 prevention. A multivariate analysis was also carried out to determine the dominant factors influencing COVID-19 prevention in diabetic patients. The results of the studies are shown in Tables 1, 2, and 3.

**Table 1. Respondents Frequency Distribution Based on Dependent and Independent Variables**

Variable	n	%
<b>Age (years old)</b>		
18-59	95	51.9
$\geq 60$	88	48.1
<b>Gender</b>		
Male	74	40.4
female	109	59.6
<b>Educational status</b>		
Low (< high school)	108	59.0
High ( $\geq$ High School)	75	41.0
<b>Occupation</b>		
Working (employed)	116	63.4
Unemployed	67	36.6
<b>Knowledge</b>		
Poor	91	49.7
Good	92	50.3
<b>Attitude</b>		
Negative	106	57.9
Positive	77	42.1
<b>COVID-19 Preventive Behaviour</b>		
Poor	97	53.0
Good	86	47.0
<b>Total</b>	<b>183</b>	<b>100</b>

Table 1 shows the characteristics of the respondents (age, gender, education, and occupation). There are more respondents in the age group 18 - 59 years (51.9%), and most of them are female (59.6%). In addition, more respondents have higher education (59%), and most respondents are employed (63.4%).

In table 1, the results of the univariate analysis show that 50.3% of respondents have good knowledge. Respondents had more negative attitudes towards COVID-19 (57.9%). In addition, Table 1 also shows that 53% of respondents have poor COVID-19 prevention behaviour. The questionnaire lists preventive behaviours such as compliance and proper masks, handwashing with soap or hand sanitiser, and social withdrawal. In addition, preventative measures that diabetic patients must follow, such as regular medication or insulin injections, blood sugar monitoring, a healthy diet, and regular exercise.

Table 2 shows that 26 diabetic patients have poor knowledge of poor COVID-19 prevention behaviour, and 71 diabetic patients with good knowledge practice poor COVID-19 prevention behaviour. The chi-square test shows that knowledge is significantly associated with COVID-19 prevention behaviour in diabetic patients (P-value 0.0001). In addition, 37 diabetic patients have negative attitudes towards COVID-19 and poor COVID-19 prevention behaviours. The bivariate analysis results show a significant association between attitudes and COVID-19 prevention in diabetic patients (P-value 0.0001).

**Table 2.** Bivariate Analysis of Factors Associated with COVID-19 Preventive Behaviour in Diabetes Mellitus Patients

Variable	COVID-19 Preventive Behaviour				Total		P-value	PR (95% CI)
	Poor		Good		n	%		
	n	%	n	%	n	%		
<b>Knowledge</b>								
Poor	26	28.6	65	71.4	91	100	0.0001	3.129 (2.103-4.657)
Good	71	77.2	21	22.8	92	100		
<b>Attitude</b>								
Negative	37	34.9	69	65.1	106	100	0.0001	2.948 (1,895-4588)
Positive	60	77.9	17	22.1	77	100		
<b>Age (years Old)</b>								
≥ 60	44	50.0	44	50.0	88	100	0.443	0.884 (0.650-1.203)
18-59	53	55.8	42	44.2	95	100		
<b>Gender</b>								
Male	45	60.8	29	39.2	74	100	0.081	0.749 (0.536-1.048)
Female	52	47.7	57	52.3	109	100		
<b>Educational status</b>								
Low (< high school)	27	36.0	48	64.0	75	100	0.0001	0.550 (0.404-0.747)
High (≥ high school)	70	64.8	38	35.2	108	100		
<b>Occupation</b>								
Unemployed	36	53.7	31	46.3	67	100	0.881	1.025 (0.743-1.413)
Working (employed)	61	52.6	55	47.4	116	100		

**Table 3.** Multivariate analysis with Multiple Logistic Regression

Variable	P-value	Prevalence Ratio (PR)	95% CI
Knowledge	0.0001	7.597	3.701 - 15.597
Attitude	0.0001	5.803	2.754 - 12.229

The bivariate analysis results in Table 2 also show that 70 diabetic patients with high educational status have poor COVID-19 prevention behaviour. The data analysis results show a significant association between education and COVID-19 prevention in diabetic patients (P-value 0.0001). Meanwhile, the bivariate analysis results on age, gender, and occupation characteristics show no statistical significance with COVID-19 prevention behaviour in diabetic patients (P-value > 0.05).

The multivariate analysis results show the most dominant factor or variable related to COVID-19 prevention behaviour in Diabetes Mellitus (DM) patients. It is the knowledge variable with the highest adjusted prevalence ratio value, 7.597 (95% CI 3.701 - 15.597), which means DM patients with poor knowledge had a 7.597 times greater risk of having bad COVID-19 prevention behaviour compared to diabetic patients with good knowledge.

COVID-19 patients with accompanying diabetes are at higher risk for severe complications and death than

those without diabetes (Hussain, Bhowmik and do Vale Moreira, 2020; Abdi *et al.*, 2020). Preventive behaviour is the best effort to control and prevent COVID-19 because no treatment is considered adequate for COVID-19 and its adverse effects on diabetic patients. Research on COVID-19 prevention behaviour and knowledge, Attitude, Practice (KAP) in diabetic patients has not been widely carried out, especially in Indonesia.

This study found a higher prevalence in diabetic patients who had good knowledge of COVID-19 (50.3%). More respondents answered questions about COVID-19 and its prevention correctly, especially for patients with diabetes mellitus. However, for diabetic patients who had poor knowledge, it tended to be high as well (49.7%). This issue is similar to research conducted on patients with chronic diseases in Northwest Ethiopia and a survey of diabetes and hypertension patients in Ethiopia who had better knowledge outcomes. However, for those who had poor knowledge, it also did increase (Akalu, Ayelign and Molla, 2020; Melesie Taye *et al.*, 2020). In Huynh's (2020) study conducted on chronic disease patients in Vietnam, results for those with good knowledge were high (Huynh *et al.*, 2020). In addition, the study conducted on patients with type 1 DM in India also found that the results of most respondents with good knowledge were high (Pal *et al.*, 2020). Although COVID-19 is a new disease, research on the general public in Indonesia, South Korea, Malaysia, China, and Sudan also showed that most respondents had a good level of Knowledge about COVID-19 (Sulistiyawati *et al.*, 2021; Lee, Kang and You, 2021; Azlan *et al.*, 2020; Zhong *et al.*, 2020; Mohamed *et al.*, 2021).

Misinformation is negatively related to a lack of information and knowledge. When people get the wrong information, they tend to feel less in need of information about COVID-19 and its prevention (Kim *et al.*, 2020). Incorrect details on COVID-19 can lead to inappropriate COVID-19 prevention behaviour, so information delivery must be more proactive, especially in correcting misinformation in the community (Azlan *et al.*, 2020). The high percentage of poor knowledge can be attributed to misinformation and lack of access. Appropriate and easily accessible sources

of information are needed to increase knowledge about COVID-19.

A negative attitude has a higher prevalence (57.9%), as seen from the favourable and unfavourable attitude questionnaire results, which shows that diabetic patients have a negative attitude towards COVID-19 disease. This issue is similar to research conducted in Uganda, with most respondents having a negative attitude (79%) (Olum *et al.*, 2020). However, it is different from studies conducted on patients with chronic diseases, DM and hypertension patients, and patients with type 1 DM, which showed that most patients had a positive attitude towards COVID-19 so that they were more alert to the transmission of COVID-19 (Huynh *et al.*, 2020; Melesie Taye *et al.*, 2020; Pal *et al.*, 2020).

The negative attitude of diabetic patients towards COVID-19 can harm diabetic patients with higher risk who should be more aware of the transmission and prevention of COVID-19. In this study, the prevalence of poor COVID-19 prevention behaviour in diabetic patients was higher (53%). More diabetic patients do not perform excellent and appropriate preventive behaviour according to expert recommendations. This issue has similarities with research conducted in Sudan (Mohamed *et al.*, 2021).

In addition, a study conducted on chronic disease patients in Northwest Ethiopia and a study on diabetes and hypertension patients in Ambo, Ethiopia; also showed that most patients had poor preventive behaviour, such as not wearing a mask when going out, not avoiding crowds, and not keeping a social distance (Akalu, Ayelign and Molla, 2020; Melesie Taye *et al.*, 2020). Research on the knowledge, awareness, and behaviour of diabetic patients in Pakistan showed that diabetic patients did not perform optimal preventive behaviour and did not comply with COVID-19 prevention measures (Ajay *et al.*, 2020). During the COVID-19 pandemic, DM patients need to make behavioural changes to avoid COVID-19 transmission, but only 28% had their blood sugar checked regularly (Nachimuthu *et al.*, 2020). Most patients with chronic diseases had a low perception and willingness to carry out COVID-19 prevention behaviours (Dires, Gedamu and Getachew, 2021).

Meanwhile, in a study in the USA, most patients with chronic diseases such as DM and hypertension made changes in their behaviour and daily routines to prevent COVID-19 (Wolf *et al.*, 2020). Diabetic patients need to be extra in carrying out COVID-19 prevention practices compared to those who do not have diabetes (Yan *et al.*, 2020). COVID-19 prevention behaviour is the best step to avoid COVID-19 because no treatment is considered adequate for COVID-19 (Ali and Alharbi, 2020). Poor preventive behaviour can increase the risk of transmitting COVID-19.

Factors significantly associated with preventive behaviour are knowledge (P-value 0.0001), attitude (P-value 0.0001), and education (P-value 0.0001). Research in Northwest Ethiopia, Vietnam, South Korea, and China also showed that knowledge is significantly related to COVID-19 prevention practices (Akalu, Ayelign and Molla, 2020; Huynh *et al.*, 2020; Lee, Kang and You, 2021; Zhong *et al.*, 2020). Good knowledge is associated with good COVID-19 prevention behaviour (Melesie Taye *et al.*, 2020). Based on research in South Korea, knowledge related to COVID-19 prevention behaviour is carried out by wearing masks, maintaining hand hygiene, and avoiding crowds (Lee, Kang and You, 2021).

In a study of diabetic and non-diabetic patients, diabetic patients expressed concern about the risk of COVID-19 infection. They changed behaviour and lifestyle due to the COVID-19 pandemic (Yan *et al.*, 2020). Knowledge and attitudes are associated with COVID-19 prevention behaviour (Pal *et al.*, 2020; Zhong *et al.*, 2020; Reuben *et al.*, 2021). Good knowledge and a positive attitude are significantly associated with COVID-19 prevention behaviour compared to other factors (Andarge *et al.*, 2020). Meanwhile, according to a 2020 study in Sudan, knowledge and attitudes do not significantly affect COVID-19 prevention behaviour (Mohamed *et al.*, 2021). Knowledge and attitudes are part of the predisposing factors influencing behaviour change (Porter, 2016). Efforts to increase knowledge and encourage positive attitudes are needed for diabetic patients to make behavioural changes to prevent COVID-19.

The multivariate analysis of this study found that the most dominant factor influencing COVID-19 prevention behaviour is knowledge. Knowledge as a determinant also has similarities with research on chronic disease patients, which showed that respondents with good knowledge are 1.24 times more likely to have good COVID-19 prevention behaviour than respondents with poor knowledge (Huynh *et al.*, 2020). This case is different from the research conducted on patients with DM and hypertension in public health facilities which showed that respondents who do not have formal education have three times greater risk of carrying out bad COVID-19 prevention behaviours than those with formal education (Melesie Taye *et al.*, 2020).

This study found that poor knowledge has a greater risk of carrying out bad preventive behaviour. Therefore, efforts are needed to increase knowledge and avoid misinformation. Information regarding COVID-19 should focus more on correcting misinformation in the community that can lead to inappropriate preventive behaviour (Azlan *et al.*, 2020). Access and good sources of information are needed to increase public knowledge about COVID-19. A health education program is required to increase knowledge about COVID-19 prevention measures to help encourage good COVID-19 preventive behaviour practices for diabetic patients.

## CONCLUSION

Patients with diabetes exhibited suboptimal COVID-19 prevention behaviours. Knowledge, attitudes, and educational status significantly predict COVID-19 prevention behaviour. Knowledge is the most critical factor in preventing COVID-19 behaviour in diabetes mellitus patients. Preventing COVID-19 transmission is the best way to control it because no treatment is available, which affects diabetic patients the most. Knowledge about COVID-19 requires appropriate and easily accessible sources of information. COVID-19 preventive initiatives, particularly those focused on health education at community health centres, must be strengthened to ensure reasonable and suitable COVID-19

prevention practices are properly followed.

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