Treatment-Seeking Behavior of Patients With COVID-19 and Its Related Factors in Central Sulawesi, Indonesia

Made Agus Nurjana, MEpid1, A. Mukramin Amran, SpRad, Dr2, Wijoyo Halim, SpS, Dr2, Lutfiah Sahabuddin, MKM2, Nita Damayanti, MKe3, Hayani Anastasia, MPH1, Octaviani, MEpid1, and Ni Nyoman Veridiana, MKe3

Introduction
COVID-19 has become a global health problem since the World Health Organization mentioned a pneumonia cluster with unclear etiology in Wuhan City, Hubei Province, China, on December 31, 2019. In Central Sulawesi Province, Indonesia, the disease has spread throughout the districts/cities. As of April 12, 2022, 60,680 positive cases were confirmed with 1716 deaths (CFR = 2.83%). The highest cases were found in Palu City with 13,121 cases and 239 deaths (1.79%).1 People with a history of contact with COVID-19 patients are recommended to be quarantined for 14 days. Staying at home is the best option for preventing COVID-19 transmission.2 The management of such patients should focus on preventing virus transmission and monitoring clinical conditions to be treated immediately in the hospital if needed.3 Contacting a health care provider to treat symptoms of cough, fever, and difficulty breathing in some cases is rare.

Treatment-seeking behavior is influenced by the availability of health services, perceptions of susceptibility and severity of disease, and social and demographic characteristics of individuals.4 This study was conducted to determine the treatment-seeking behavior of people with confirmed COVID-19 in Palu City and its related factors.

Methods
Observational research with a retrospective case series design was conducted to determine the behavior of treatment-seeking behavior in 268 polymerase chain reaction–confirmed cases of COVID-19 between March 2020 and May 2021 in Palu City using Pearson χ² and logistic regression with SPSS version18. The ethical approval of this study was obtained from the Health Research Ethics Committee of the Faculty of Medicine, Alkhairaat University, No 389/SR. KEPK/UA-FK/VI/2021.

Results
About 57.8% of patients were looking for health workers, 62.7% self-treatment, 58.8% were taking traditional medicine, and 69% were taking a combination of treatments (Table 1). Multivariate logistic regression shows that only those with a history of diabetes and symptoms of shortness of breath were identified as independent factors associated with seeking treatment from health facilities. Patients with a history of diabetes and shortness of breath have a greater chance of seeking treatment from health facilities with odds ratio (OR) of 8.14 (P = .015) and 2.54 (P = .016), respectively. Cases with symptoms of fatigue have a greater chance (adjusted OR = 2.3, P = .014) of seeking traditional treatment. Patients with a history of diabetes have a greater chance (adjusted OR = 4.41, P = .018) of seeking self-treatment. Cases with fatigue symptoms are three times more likely to seek several types of treatments (adjusted OR = 3.27, P = .003). There is no association between demographic factors, hypertension, cardiovascular disease, asthma, chronic obstructive pulmonary disease (COPD), obesity, tuberculosis, fever, diarrhea, headache, chest pain, and loss of smell with the treatment-seeking behavior, either professional or traditional, independent or combination (P > .05) (Table 2).

Discussion
More than half of the COVID-19 cases seek treatment at health facilities, self-treatment, traditional medicine, or a combination of the three treatments. Self-treatment in patients experiencing COVID-19-like symptoms by purchasing medicines at pharmacies/stalls is common but may increase the risk of developing more severe symptoms, especially in comorbidities such as diabetes, chronic

1National Research and Innovation Agency, Research Centre for Public Health and Nutrition, Indonesia
2Faculty of Medicine, Alkhairaat University, Palu, Indonesia
3National Institute of Health Research and Development Unit Donggala, Ministry of Health, Donggala, Indonesia

Corresponding Author:
Made Agus Nurjana, National Research and Innovation Agency, Research Centre for Public Health and Nutrition, Jl Batu Bata Indah No. 45, Palu 94231, Central Sulawesi, Indonesia.
Email: agusmd81@gmail.com
heart disease, hypertension, and chronic liver diseases. Elderly, diabetics, hypertensive, and obese patients are at increased risk of severe illness and death from COVID-19 infection. 

| Table 1. Treatment-Seeking Behaviors of COVID-19 Cases According to Characteristics and Symptoms. |
|---------------------------------------------------------------|
| **Health facilities (public health center or hospitals)** | **P** | **Traditional treatment** | **P** | **Self-medicine treatment** | **P** | **Combination treatment** | **P** |
|---------------------------------------------------------------|
| **Total participant (N = 268)** | 155 (57.8) | | 168 (62.7) | | 185 (69) | |
| **Gender** | | | | | | | |
| Male | 62 (54.9) | 66 (58.4) | 66 (58.4) | 73 (64.6) |
| Female | 93 (60.0) | 91 (58.7) | 102 (65.8) | 112 (72.3) |
| **Age** | | | | | | | |
| <60 | 139 (57.0) | 145 (59.4) | 156 (63.9) | 170 (69.7) |
| ≥60 | 16 (66.7) | 12 (50.0) | 12 (50.0) | 15 (62.5) |
| **Occupation** | | | | | | | |
| Unemployed | 18 (54.5) | 17 (51.5) | 20 (60.6) | 16 (48.5) |
| Employed | 137 (58.3) | 140 (59.6) | 148 (63.0) | 169 (71.9) |
| **Medical history** | | | | | | | |
| Diabetes | | | | | | | |
| No | 137 (55.2) | 147 (59.3) | 161 (64.9) | 172 (69.4) |
| Yes | 18 (90.0) | 10 (50.0) | 7 (35.0) | 13 (65.0) |
| Hypertension | | | | | | | |
| No | 136 (58.1) | 135 (57.7) | 147 (62.8) | 160 (68.4) |
| Yes | 19 (55.9) | 22 (64.7) | 21 (61.8) | 25 (73.5) |
| Cardiovascular disease | | | | | | | |
| No | 144 (56.3) | 151 (59.0) | 164 (64.1) | 177 (69.1) |
| Yes | 11 (91.7) | 6 (50.0) | 4 (33.3) | 8 (66.7) |
| Asthma | | | | | | | |
| No | 151 (57.9) | 153 (58.6) | 163 (62.5) | 181 (69.3) |
| Yes | 4 (57.1) | 4 (57.1) | 5 (71.4) | 4 (57.1) |
| COPD | | | | | | | |
| No | 153 (57.5) | 155 (58.3) | 167 (62.8) | 183 (68.8) |
| Yes | 2 (100) | 2 (100) | 1 (50.0) | 2 (100) |
| Obesity | | | | | | | |
| No | 102 (55.1) | 104 (56.2) | 120 (64.9) | 124 (67.0) |
| Yes | 53 (63.9) | 53 (63.9) | 48 (78.8) | 61 (73.5) |
| Fever | | | | | | | |
| No | 50 (54.9) | 57 (62.6) | 50 (54.9) | 62 (68.1) |
| Yes | 105 (59.3) | 100 (56.5) | 118 (66.7) | 123 (69.5) |
| Dry cough | | | | | | | |
| No | 85 (57.4) | 92 (62.2) | 82 (55.4) | 101 (68.2) |
| Yes | 70 (58.3) | 65 (54.2) | 86 (71.7) | 84 (70.0) |
| Fatigue | | | | | | | |
| No | 102 (57.0) | 96 (53.6) | 103 (57.5) | 109 (60.9) |
| Yes | 53 (59.6) | 61 (68.5) | 65 (73.0) | 76 (85.4) |
| Diarrhea | | | | | | | |
| No | 134 (57.3) | 134 (57.3) | 149 (63.7) | 159 (67.9) |
| Yes | 21 (61.8) | 23 (67.6) | 19 (55.9) | 26 (76.5) |
| Headache | | | | | | | |
| No | 102 (58.0) | 100 (56.8) | 100 (56.8) | 111 (63.1) |
| Yes | 53 (57.6) | 57 (62.0) | 68 (73.9) | 74 (80.4) |
| Shortness of breath | | | | | | | |
| No | 110 (52.9) | 125 (60.1) | 134 (64.4) | 140 (67.3) |
| Yes | 45 (75.0) | 32 (53.3) | 34 (56.7) | 45 (75.0) |
| Chest pain | | | | | | | |
| No | 146 (58.2) | 147 (58.6) | 155 (61.8) | 171 (68.1) |
| Yes | 9 (52.9) | 10 (58.8) | 13 (76.5) | 14 (82.4) |
| Loss of smell and taste | | | | | | | |
| No | 80 (61.1) | 74 (56.5) | 77 (58.8) | 88 (67.2) |
| Yes | 75 (54.7) | 83 (60.6) | 91 (66.4) | 97 (70.8) |

Abbreviation: COPD, chronic obstructive pulmonary disease.

*Statistical significance based on the χ² or Fisher exact test.

Diabetes and shortness of breath are associated with seeking treatment from health workers in the public health center and/or hospitals. Diabetes is one of the most common comorbid diseases found in COVID-19 patients. This behavior is
due to the patient’s awareness of the importance and risk of respiratory involvement and taking the necessary precautions. A study in Iran showed similar results that symptoms of shortness of breath and a history of respiratory illness are related to the search for professional treatment.8

Fatigue is the only symptom associated with seeking traditional treatment and a combination of treatments. Traditional Chinese medicine is one of the oldest medical practices globally, covering a wide variety of ways, ranging from herbs, and acupuncture, to Tai Chi. Traditional Chinese medicine is one of the oldest medical traditions and a combination of treatments. Moreover, only diabetes, symptoms of shortness of breath, dry cough, and fatigue are associated with the treatment-seeking behavior. However, we did not find any predictors of treatment-seeking behavior in elderly patients, hypertension, obesity, and asthma, although there was a risk of severe illness and death from COVID-19 infection.6 Thus, the sensitivity of patients with congenital diseases and older age to seek professional treatment is crucial.

**Conclusion**

Most COVID-19 cases seek treatment at health facilities, self-treatment, traditional medicine, or a combination of the three treatments. Moreover, only diabetes, symptoms of shortness of breath, dry cough, and fatigue are associated with the treatment-seeking behavior. However, we did not find any predictors of treatment-seeking behavior in elderly patients, hypertension, obesity, and asthma, although there was a risk of severe illness and death from COVID-19. Thus, behavioral change interventions in cases with a history of comorbidity and severe symptoms such as shortness of breath are essential to improve behavior in search of appropriate treatment.

**Author Contributions**

All authors are the main contributors. M.A.N., A.M.A., W.H., L.S., N.D., H.A., O., and N.N.V. are responsible for drafting the original article, analyzing data, designing the study, methodology, investigation, and writing a review. All authors read and approved the final manuscript.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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**Table 2. Multivariate Logistic Regression of Treatment-Seeking Behavior for COVID-19 Confirmed Cases in Palu Municipality.**

| Health facilities (public health centers or hospitals) | Traditional treatment | Self-medicine treatment | Combination treatment |
|---------------------------------------------------------|-----------------------|------------------------|----------------------|
| OR | 95% CI | P | OR | 95% CI | P | OR | 95% CI | P | OR | 95% CI | P |
| Gender (Ref: Male) | | | | | | | | | | | |
| Female | 1.54 | [0.89, 2.64] | .120 | 1.00 | [0.59, 1.72] | .988 | 0.94 | [0.54, 1.63] | .814 | 1.39 | [0.78, 2.49] | .258 |
| Age years (Ref: < 60) | | | | | | | | | | | |
| ≥60 | 0.69 | [0.21, 2.27] | .546 | 0.615 | [0.22, 1.73] | .358 | 0.99 | [0.34, 2.90] | .987 | 0.64 | [0.22, 1.89] | .423 |
| Occupation (Ref: Employed) | | | | | | | | | | | |
| Unemployed | 0.91 | [0.41, 2.02] | .818 | 1.33 | [0.60, 2.96] | .478 | 0.72 | [0.32, 1.63] | .424 | 2.58 | [1.13, 5.91] | .025* |
| Diabetes mellitus | 8.14 | [1.49, 44.34] | .015* | 0.91 | [0.27, 3.11] | .881 | 4.41 | [1.29, 15.11] | .018* | 0.94 | [0.26, 3.38] | .925 |
| Hypertension | 0.49 | [0.19, 1.23] | .128 | 1.47 | [0.59, 3.68] | .409 | 0.71 | [0.27, 1.88] | .487 | 1.02 | [0.37, 2.78] | .977 |
| Cardiovascular disease | 7.39 | [0.69, 79.14] | .098 | 0.42 | [0.09, 1.97] | .271 | 2.15 | [0.47, 9.86] | .326 | 0.56 | [0.12, 2.68] | .464 |
| Asthma | 1.11 | [0.21, 5.81] | .900 | 1.04 | [0.22, 5.04] | .958 | 0.77 | [0.12, 5.03] | .787 | 0.38 | [0.07, 1.98] | .252 |
| COPD | 1.00 | [0.07, 27.70] | .843 | — | — | — | — | — | — | — | — | — |
| Obesity | 1.66 | [0.90, 3.06] | .102 | 1.36 | [0.75, 2.47] | .316 | 1.27 | [0.69, 2.33] | .464 | 1.47 | [0.76, 2.85] | .248 |
| Fever | 1.02 | [0.56, 1.88] | .948 | 0.71 | [0.39, 1.30] | .264 | 0.61 | [0.33, 1.14] | .119 | 0.80 | [0.42, 1.52] | .494 |
| Dry cough | 0.83 | [0.47, 1.48] | .523 | 0.60 | [0.34, 1.05] | .076 | 0.45 | [0.25, 0.83] | .010* | 0.75 | [0.40, 1.38] | .354 |
| Fatigue | 0.93 | [0.47, 1.82] | .862 | 2.30 | [1.18, 4.47] | .014* | 0.4 | [0.23, 0.95] | .034* | 3.28 | [1.51, 7.10] | .003* |
| Diarrhea | 0.93 | [0.39, 2.18] | .874 | 1.54 | [0.66, 3.61] | .314 | 1.64 | [0.69, 3.86] | .260 | 7.00 | [0.46, 3.12] | .713 |
| Headache | 1.27 | [0.63, 2.56] | .510 | 1.04 | [0.52, 2.08] | .919 | 0.92 | [0.44, 1.92] | .826 | 1.64 | [0.76, 3.52] | .204 |
| Shortness of breath | 2.54 | [1.19, 5.43] | .016* | 0.69 | [0.35, 1.39] | .307 | 2.09 | [0.99, 4.38] | .052 | 1.03 | [0.47, 2.24] | .949 |
| Chest pain | 0.54 | [0.17, 1.78] | .314 | 1.17 | [0.38, 3.59] | .783 | 0.61 | [0.15, 2.42] | .477 | 2.02 | [0.48, 8.60] | .341 |
| Loss of smell and taste | 0.76 | [0.44, 1.34] | .348 | 1.16 | [0.67, 2.02] | .588 | 1.05 | [0.59, 1.87] | .869 | 0.89 | [0.49, 1.62] | .696 |

Abbreviations: CI, confidence interval; COPD, chronic obstructive pulmonary disease; OR, odds ratio.

*Adjusted for all variables that were significant in univariate analyses.
Funding
The author(s) disclosed receipt of the following financial support for
the research, authorship, and/or publication of this article: This
work was supported by the Faculty of Medicine, Alkhairaat
University, Palu City, Indonesia.

ORCID iDs
Made Agus Nurjana  https://orcid.org/0000-0002-9190-566X
Hayani Anastasia  https://orcid.org/0000-0003-0134-1619

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