

# Epidemiological Characteristics of COVID-19 Patients in Kütahya Province in Turkey

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## ABSTRACT

**Aim:** It is aimed to evaluate the epidemiological features of COVID-19 patients and risk factors affecting hospitalization.

**Methods:** This cross-sectional study included 883 adult patients whose Polymerase Chain Reaction tests were positive for SARS-CoV-2 in Kütahya province until July 2020. The patients were questioned in terms of their socio-demographic characteristics, drugs, comorbidities, and symptoms. They were divided into two groups according to their hospitalization status and outpatient treatment status.

**Results:** There were 473 female and 410 male participants in the study. 532 of 883 adult patients were hospitalized. The most common symptoms were fatigue (47.9%), myalgia (44.7%), and loss of smell and taste (32.4%). Hospitalization was associated with advanced age, low income, presence of additional disease, several symptoms, smoking, comorbidities including diabetes mellitus, chronic kidney diseases, cardiovascular and respiratory system. In multivariant analyses, advanced age, low income, fever, dyspnea and chronic lung diseases were associated with increased odds of hospital admission.

**Conclusion:** In our study, it was found that independent risk factors for hospitalization were advanced age, low income, fever, shortness of breath, and chronic lung diseases. We think that determining risk factors for hospitalization may be a guide for clinicians in predicting patient prognosis.

**Keywords:** COVID-19, epidemiology, hospitalization, symptoms, comorbidity

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Preliminary results related to this article are presented in Authorea.

## Introduction

After the first case occurred in December 2019, in the Hubei province of China, coronavirus disease (COVID-19) continued to spread all over the world with over 17.6 million confirmed cases (1). The first case was detected on March 20, 2020, in Kütahya Province, Turkey. After this date, the cases increased throughout the province.

Due to the government's interventions and control measures (closure of schools, determination of a treatment strategy, age group-specific curfews, reduction of the number of active workers in business life, *etc.*) and changes in personal behavior (wearing masks and obeying social distance rules), the number of confirmed and suspicious cases in our country has begun to decrease.

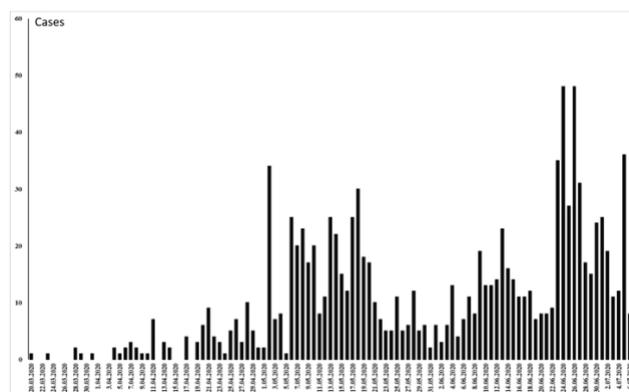
Although the first cases in China were found to have contact history with local seafood and wild animal markets in Wuhan, it was found that the virus was transmitted from person to person by droplets or direct contact (2). Typical symptoms in symptomatic patients are fever, cough, dyspnea, weakness, sore throat, and myalgia. It was observed that patients initially had symptoms of upper respiratory tract disease but tended to proceed rapidly to pneumonia (3).

It has been stated that the prognosis is worse in patients with comorbidity (4). This situation carries great importance in the frequency of comorbidity, prognostic importance in age groups, case detection, and establishment of hospital admission protocols. There is a limited number of studies on COVID-19 epidemiology in our country. In this study, disease epidemiology, clinical features, and other risk factors affecting hospitalization were evaluated.

## Methods

This cross-sectional study was approved by the Ministry of Health and the Clinical Research Ethics Committee of Kütahya University of Health Sciences (2020/10-03). It was planned to include all Polymerase Chain Reaction (PCR)- positive SARS-CoV-2 cases in Kütahya from 20 March 2020 to 6 July 2020. A total of 1099 cases were followed up between 20 March

2020 and 6 July 2020. In Figure 1, the graph of the date-case number is shown.



**Figure 1.** The number of cases by time

Between these dates, 1099 cases were followed up in Kütahya province. Ninety-six patients with missing data, 120 patients under 18 years of age, patients under treatment, and patients with symptoms at the time of the study were excluded from the study were excluded. A total of 1003 cases were included in the analysis. 120 of 1003 patients were under 18 years old. Therefore, the study was conducted with 883 patients.

Patients' information was extracted from the local health database. Moreover, face-to-face interviews with all patients were used to ensure the validity of the data. The patients were questioned in terms of their socio-demographic characteristics, drugs, comorbidities, and symptoms. They were divided into two groups according to their hospitalization status and outpatient treatment status.

In statistical analysis with SPSS 22.0, categorical variables were given as numbers and percentages. For descriptive statistics mean  $\pm$  standard deviation (SD) and median (min-max value) were used depending on the normal distribution state of the variables. Normal distribution was evaluated with Kolmogorov-Smirnov/ Shapiro-Wilk tests. Chi-Square tests were used for the comparison of categorical variables between groups. Student T-test or Mann-Whitney U test was used for comparison of data sets. Binary logistic regression analysis is used to determine the independent risk factors for hospitalization in patients with COVID-19. Clinically relevant variables and/or variables with  $p < 0.05$  as determined in univariate analyses were entered into binary logistic regression

analysis after excluding multicollinear variables.  $p < 0.05$  was accepted to be statistically significant.

### Results

The study was carried out with 883 patients. The

sociodemographic features of the adult patients examined are shown in Table 1. 532 of 883 adult patients were hospitalized. Other patients (n=351) were treated on an outpatient basis.

**Table 1.** Sociodemographic and clinical features of patients

Characteristics	All patients (N=883)	Outpatient (N=351)	Hospitalized (N=532)	p value
Age, Med (min-max)	46 (18-96)	38 (18-87)	52 (18-96)	<0.001
Sex, N (%)				0.579
Female	473 (53.6)	184 (52.4)	289 (54.3)	
Male	410 (46.4)	167 (47.6)	243 (45.7)	
Marital status, N (%)				<0.001
Married	714 (80.9)	262 (74.6)	452 (85.0)	
Single	169 (19.1)	89 (25.4)	80 (15.0)	
Education time (year), Med (min-max)	5 (0-22)	8 (0-22)	5 (0-22)	<0.001
Monthly income, N (%)				<0.001
≤ 2500 TL	518 (58.7)	164 (46.7)	354 (66.5)	
> 2500 TL	365 (41.3)	187 (53.3)	178 (33.5)	
Smoking (+), N (%)	330 (37.4)	147 (41.9)	183 (34.4)	0.025
Comorbidity (+), N (%)	343 (39.1)	90 (26.3)	252 (73.7)	<0.001
Hypertension	156 (17.8)	29 (8.3)	127 (24.1)	<0.001
Diabetes mellitus	126 (14.4)	32 (9.2)	94 (17.8)	<0.001
Chronic lung diseases	66 (7.5)	10 (2.9)	56 (10.6)	<0.001
Cardiovascular diseases	59 (6.7)	11 (3.2)	48 (9.1)	0.001
Neurological diseases	41 (4.7)	22 (6.3)	19 (3.6)	0.062
Psychiatric diseases	27 (3.1)	9 (2.6)	18 (3.4)	0.489
Nephrological diseases	13 (1.5)	1 (0.3)	12 (2.3)	0.017
Others *	63 (7.1)	20 (5.7)	43 (8.1)	0.178
Pharmacological therapy (+), N (%)				
Oral antidiabetic	86 (10.4)	23 (6.8)	63 (13)	0.005
Anticoagulant	69 (8.4)	11 (3.3)	57 (12.0)	<0.001
Alpha-beta blocker	59 (7.2)	11 (3.3)	48 (10)	<0.001
ACEI	56 (6.8)	5 (1.5)	51 (10.6)	<0.001
Diuretic	56 (6.3)	9 (2.7)	47 (9.8)	<0.001
Inhaler	44 (5.3)	6 (1.8)	38 (7.8)	<0.001
ARB	44 (5.0)	12 (3.6)	32 (6.6)	0.053
CCB	35 (4.3)	4 (1.2)	31 (6.4)	<0.001
Anti-lipidemic	28 (3.4)	3 (0.9)	25 (5.1)	0.001
Others **	103 (12.5)	47 (13.9)	56 (11.5)	0.301
Symptoms, N (%)				
Fatigue	423 (47.9)	161 (45.9)	262 (49.2)	0.325
Myalgia	395 (44.7)	162 (46.2)	233 (43.8)	0.491
Loss of smell and taste	286 (32.4)	102 (29.1)	184 (34.6)	0.086
Cough	256 (29.0)	70 (19.9)	186 (35)	<0.001
Fever	253 (28.7)	83 (23.6)	170 (32)	0.008
Headache	153 (17.3)	56 (16)	97 (18.2)	0.381
Diarrhea	127 (14.4)	54 (15.4)	73 (13.7)	0.491
Anorexia	127 (14.4)	35 (10)	92 (17.3)	0.002
Dyspnea	120 (13.6)	21 (6)	99 (18.6)	<0.001
Sore throat	107 (12.1)	56 (16)	51 (9.6)	0.005
Nausea and vomiting	69 (7.8)	21 (6)	48 (9)	0.100
Runny nose	48 (5.4)	15 (4.3)	33 (6.2)	0.216
Nazal stuffiness	39 (4.4)	16 (4.6)	23 (4.3)	0.868
Sputum	39 (4.4)	11 (3.1)	28 (5.3)	0.132
Dizziness	22 (2.5)	4 (1.1)	18 (3.4)	0.036

\* Dyslipidemia, rheumatological, thyroid, gastrointestinal diseases and malignancy; \*\*Proton pump inhibitor, thyroid, insulin, dialysis, immunosuppressant, cardiac and neurological therapy

Hospitalized patients were older, more frequently married, and less educated ( $p<0.05$ ) and had significantly more comorbidities than outpatients ( $p<0.05$ ). Among symptoms, fever, cough, anorexia, dyspnea, throat ache, and dizziness were higher in hospitalized patients ( $p<0.05$ ) (Table 1).

In multivariate analyses, advanced age, low income, fever, dyspnea, and chronic lung diseases were independent determinants of hospitalization. However, patients with sore throats were less likely to be hospitalized (Table 2).

**Table 2.** The determinants of hospitalization in patients

	B	OR	CI %95	P
<b>Socio-demographic</b>				
Age	0.029	1.03	1.01-1.04	<0.001
Gender (male)	0.037	1.04	0.76-1.41	0.815
Marital status (married)	0.328	1.38	0.93-2.07	0.108
Monthly income (low income)	0.590	1.80	1.32-2.45	<0.001
Smoking	-0.095	0.90	0.66-1.24	0.550
<b>Symptoms</b>				
Fever	0.458	1.58	1.11-2.23	0.010
Dyspnea	0.981	2.66	1.55-4.58	<0.001
Sore throat	-0.567	0.56	0.36-0.90	0.016
<b>Comorbidities</b>				
Hypertension	0.364	1.44	0.86-2.40	0.165
Diabetes mellitus	-0.085	0.91	0.55-1.50	0.736
Chronic lung diseases	0.833	2.30	1.08-4.87	0.030
Nephrological diseases	1.463	4.31	0.53-34.9	0.170

## Discussion

COVID-19 virus is more contagious in the early phase, and therefore diagnosing people with specific symptoms is essential for the management of the disease (5). In this study, the most common symptoms were fatigue (47.9%), myalgia (44.7%), loss of smell and taste (32.4%). A systematic review and meta-analysis of 148 studies from 9 countries reported that the most prevalent symptoms were fever (78%), cough (57%), and fatigue (31%) (6).

In multivariate analysis, older age, low income, presence of fever or dyspnea and chronic lung disease is a risk factor for hospitalization in our study. Several studies have reported similar results (7-9). In most studies, factors affecting disease severity rather than

hospitalization were evaluated (10,11). However, hospitalization of patients indicates the high severity of the disease. Hospitalization rates were high in our study. In the early phase of the pandemic, patients with COVID-19 were hospitalized more often, as the course of the disease is not known exactly, and practices of local health committees recommended that patients be hospitalized for isolation.

Studies have shown that age is the most important predictor of death or severe stage in patients (12-16). Older age affects the immune system, which prevents virus reproduction (17).

We determined that specific symptoms such as fever and dyspnea were more common in patients who were hospitalized than those who were not hospitalized. Under the literature, we found that the presence of high fever and dyspnea symptoms increased hospital admissions. (18-22).

Wiemers et al. (23) showed that socioeconomic status is associated with COVID-19 adverse events. Clouston et al. (24) reported that higher socioeconomic status was associated with the earlier incidence of index cases. Sese et al. (25) stated that low socioeconomic status may contribute to the excess mortality observed in hospitalized patients. Therefore, particular attention should be paid to patients with low socioeconomic status to fight against health disparities in the context of the COVID-19 epidemic.

The presence of underlying chronic lung disease has been identified as an increased risk factor for COVID-19 infection (26,27). In the present study, it was found that people with comorbid diseases had more severe diseases.

The results of this study may contribute to the training of clinicians during this disease. This study can be a guide in the development of preventive interventions for hospitalization and the evaluation of risk factors within the scope of clinical applications.

Interestingly, we found that the hospitalization rate was less in patients with sore throat in our study. Sore throat is a common symptom of COVID-19. A sore throat could lead to an early diagnosis of COVID-19. Sore throat is often associated with the upper respiratory tract rather than the lower respiratory tract.

## Conclusion

Older age, low income, presence of fever, dyspnea, or chronic lung disease are determinants in hospitalization in patients with COVID-19. During

COVID-19 disease, it is important to determine the risk factors in the transition to the severe disease stage to ensure more appropriate and efficient management of the disease.

## References

1. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet* 2020;395:507-13. doi: 10.1016/S0140-6736(20)30211-7.
2. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020;382(13):1199-207. doi: 10.1056/NEJMoa2001316.
3. Zhong NS, Zheng BJ, Li YM, Poon, Xie ZH, Chan KH, et al. Epidemiology and cause of severe acute respiratory syndrome (SARS) in Guangdong, People's Republic of China, in February 2003. *Lancet* 2003;362(9393):1353-8. doi: 10.1016/s0140-6736(03)14630-2.
4. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395:497–506. doi: 10.1016/S0140-6736(20)30183-5.
5. Wölfel R, Corman VM, Guggemos W, Seilmaier M, Zange S, Müller MA, et al. Virological assessment of hospitalized patients with COVID-2019. *Nature* 2020;581(7809):465-9. doi: 10.1038/s41586-020-2196-x.
6. Grant MC, Geoghegan L, Arbyn M, Mohammed Z, McGuinness L, Clarke EL, et al. The prevalence of symptoms in 24,410 adults infected by the novel coronavirus (SARS-CoV-2; COVID-19): A systematic review and meta-analysis of 148 studies from 9 countries. *PLoS One* 2020;15(6):e0234765. doi: 10.1371/journal.pone.0234765.
7. Thai PQ, Toan DTT, Son DT, Van HTH, Minh LN, Hung LX, et al. Factors associated with the duration of hospitalisation among COVID-19 patients in Vietnam: A survival analysis. *Epidemiol Infect* 2020;148:e114. doi:10.1017/S0950268820001259.
8. Telle KE, Grøslund M, Helgeland J, Håberg SE. Factors associated with hospitalization, invasive mechanical ventilation treatment and death among all confirmed COVID-19 cases in Norway: Prospective cohort study. *Scand J Public Health* 2021;49(1):41-7. doi: 10.1177/1403494820985172.
9. Soares RCM, Mattos LR, Raposo LM. Risk factors for hospitalization and mortality due to COVID-19 in Espírito Santo State, Brazil. *Am J Trop Med Hyg* 2020;103(3):1184-90. doi: 10.4269/ajtmh.20-0483..
10. Chidambaram V, Tun NL, Haque WZ, Majella MG, Sivakumar RK, Kumar A, et al. Factors associated with disease severity and mortality among patients with COVID-19: A systematic review and meta-analysis. *PLoS One* 2020;15(11):e0241541. doi: 10.1371/journal.pone.0241541.
11. Hobbs ALV, Turner N, Omer I, Walker MK, Beaulieu RM, Sheikh M, et al. Risk factors for mortality and progression to severe COVID-19 disease in the Southeast United States (US): A report from the SEUS Study Group. *Infect Control Hosp Epidemiol* 2021;11:1-33. doi: 10.1017/ice.2020.1435.
12. Yang J, Zheng Y, Gou X, Pu K, Chen Z, Guo Q, et al. Prevalence of comorbidities and its effects in patients infected with SARS-CoV-2: A systematic review and meta-analysis. *Int J Infect Dis* 2020;94:91-5. doi: 10.1016/j.ijid.2020.03.017.
13. Emami A, Javanmardi F, Pirbonyeh N, Akbari A. Prevalence of underlying diseases in hospitalized patients with COVID-19: A systematic review and meta-analysis. *Arch Acad Emerg Med* 2020;24;8(1):e35. PMID: 32232218.

14. Lin Z, Long F, Yang Y, Chen X, Xu L, Yang M. Serum ferritin as an independent risk factor for severity in COVID-19 patients. *J Infect* 2020;81(4):647-79. doi: 10.1016/j.jinf.2020.06.053.
15. Guan WJ, Liang WH, Zhao Y, Liang HR, Chen ZS, Li YM. Comorbidity and its impact on 1590 patients with COVID-19 in China: A nationwide analysis. *Eur Respir J* 2020;55:2000547. doi: 10.1183/13993003.00547-2020.
16. Li X, Xu S, Yu M, Wang K, Tao Y, Zhou Y, et al. Risk factors for severity and mortality in adult COVID-19 inpatients in Wuhan. *J. Allergy Clin Immunol* 2020;146:110-8. doi: 10.1016/j.jaci.2020.04.006.
17. Bektas A, Schurman SH, Sen R, Ferrucci L. Human T cell immunosenescence and inflammation in aging. *J Leukoc Biol* 2017;102:977-88. doi: 10.1189/jlb.3RI0716-335R.
18. Suh HJ, Kim DH, Heo EU, Lee HW, Park SW. Clinical characteristics of COVID-19: Clinical dynamics of mild severe acute respiratory syndrome Coronavirus 2 infection detected by early active surveillance. *J Korean Med Sci* 2020;35:e297. doi: 10.3346/jkms.2020.35.e297.
19. Rod JE, Oscar OT, Javier CR. A brief-review of the risk factors for COVID-19 severity. *Rev Saude Publica* 2020;54:60. doi: 10.11606/s1518-8787.2020054002481.
20. He X, Cheng X, Feng X, Wan H, Chen S, Xiong M. Clinical symptom differences between mild and severe COVID-19 patients in China: A meta-analysis. *Front Public Health* 2021;8:561264. doi:10.3389/fpubh.2020.561264.
21. Cao M, Zhang D, Wang Y, Lu Y, Zhu X, Li Y, et al. Clinical features of patients infected with the 2019 Novel Coronavirus (COVID-19) in Shanghai, China. medRxiv 2020.03.04.20030395. doi: 10.1101/2020.03.04.20030395. Preprint.
22. Kim SR, Nam SH, Kim YR. Risk factors on the progression to clinical outcomes of COVID-19 patients in South Korea: Using national data. *Int J Environ Res Public Health* 2020;17(23):8847. doi:10.3390/ijerph17238847.
23. Wiemers EE, Abrahams S, AlFakhri M, Hotz VJ, Schoeni RF, Seltzer JA. Disparities in vulnerability to severe complications from COVID-19 in the United States. *Res Soc Stratif Mobil* 2020;69:100553. doi: 10.1016/j.rssm.2020.100553.
24. Clouston SAP, Natale G, Link BG. Socioeconomic inequalities in the spread of coronavirus-19 in the United States: A examination of the emergence of social inequalities. *Soc Sci Med* 2021;268:113554. doi:10.1016/j.socscimed.2020.113554.
25. Sesé L, Nguyen Y, Giroux Leprieur E, Annesi-Maesano I, Cavalin C, Goupil de Bouillé J, et al. Impact of socioeconomic status in patients hospitalised for COVID-19 in the Greater Paris area. *Eur Respir J* 2020;56(6):2002364. doi: 10.1183/13993003.02364-2020.
26. Çakır Edis E. Chronic pulmonary diseases and COVID-19. *Turk Thorac J* 2020;21(5):345-9. doi:10.5152/TurkThoracJ.2020.20091.
27. Sanchez-Ramirez DC, Mackey D. Underlying respiratory diseases, specifically COPD, and smoking are associated with severe COVID-19 outcomes: A systematic review and meta-analysis. *Respir Med* 2020;171:106096. doi:10.1016/j.rmed.2020.106096.