

Risk Factors Associated with Long-Term Hospitalization COVID-19 Patients in Hadhramout, Yemen 2020

Shouqi Abdullah Al-Akabari¹, Maryam Hamed Baras^{2*}, Eidha Ali Bin-Hameed³ and Tahani Aidroos Al-Afifi⁴

¹*Department of Diagnostic Medicine, Ministry of Public Health and Population and Molecular Biology Diagnostic Unit, Ministry of Public Health and Population, Hadhramout Coast, Yemen*

²*Biology Department, Faculty of Science, Hadhramout University and Molecular Biology Diagnostic Unit, Ministry of Public Health and Population, Hadhramout Coast, Yemen*

³*Biology Department, Faculty of Science, Hadhramout University and Health Science Department, Faculty of Medicine and Health Sciences, University of Science and Technology, Hadhramout, Yemen*

⁴*National Center for Public Health Laboratories - Hadhramout Branch, Ministry of Public Health and Population and Molecular Biology Diagnostic Unit, Ministry of Public Health and Population, Hadhramout coast, Yemen*

***Corresponding Author:** Maryam Hamed Baras, Biology Department, Faculty of Science, Hadhramout University and Molecular Biology Diagnostic Unit, Ministry of Public Health and Population, Hadhramout Coast, Yemen.

Received: February 26, 2021; **Published:** March 23, 2021

Abstract

Objective: The different hospitalization durations of COVID-19 patients must be studied to understand the risk factors associated with long-term hospitalization. So, the clinical features may help to identify these potential risk factors.

Methodology: In this retrospective study, 60 patients who were symptomatic presentations of COVID-19 were included. We determined and evaluated the risk factors associated with long-term hospitalization COVID-19 patients during 7th April and 29th August 2020.

Results: In this retrospective study we enrolled 60 COVID-19 repeat cases visited corona isolation centers of Ibn sinna hospital and Dr. Rijad hospital. 30 (50%) were positive repeat cases and 30 (50%) were negative repeat cases. Age more than 60 years was significant independent risk factor for long-term hospitalization (P value = 0.008). However, the other studied risk factors like gender, fever, cough, sore throat, Pneumonia, shortness of breath, Rhinorrhea, Myalgia and comorbidities disease hadn't significant association. A multivariate regression analysis showed that COVID-19 patients which their ages more than 60 years are more likely to have long-term hospitalization by 1.458 than the other patients equal or less than 60 years.

Conclusion: In long-term hospitalization COVID-19 patients, age groups were the only significant independent risk factor with long-term hospitalization group in our study.

Recommendations: Older COVID-19 patients should have had as special care and monitoring because they are the most likely to have any progression in their cases leading to stay long duration in hospitals by 1.458 than younger patients.

Keywords: COVID-19; Infection; Long-Term Hospitalization; Risk Factors; SARS-CoV-2

Abbreviations

COVID-19: Coronavirus Disease 2019; COVS: Coronaviruses; SARS: Severe Acute Respiratory Syndrome; MERS: Middle East Respiratory Syndromes; 2019-nCoV: 2019-Novel Coronavirus; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; ICTV: International Committee on Taxonomy of Viruses; RT-PCR: Reverse Transcription- Polymerase Reaction Chains

Introduction

Over the past two decades, coronaviruses (COVS) have been associated with significant disease outbreaks in East Asia and the Middle East. The severe acute respiratory syndrome (SARS) and the Middle East respiratory syndromes (MERS) began to emerge in 2002 and 2012, respectively [1]. At present, a 2019-novel coronavirus (2019-nCoV), emerged in Wuhan, China, at the end of 2019 which has posed a global health threat with its ongoing pandemic in many countries and territories [2]. Later, this virus has been proposed to be designated/named as “severe acute respiratory syndrome coronavirus 2” (SARS-CoV-2) by the International Committee on Taxonomy of Viruses (ICTV) [3].

The coronavirus disease 2019 (COVID-19) carry similar DNA structure to SARS and MERS has spread throughout the world and creating massive panic to the human life; however, this novel virus is genetically distinct [4].

The most common symptoms associated with COVID- 19 were fever, cough, sneezing and shortness of breath. Complications may include pneumonia, throat pain and acute respiratory distress syndrome [5]. This is probably dependent on some demographic (advanced age, male sex) and clinical risk factors (hypertension, diabetes, cardiovascular disease, chronic respiratory disorders, cancer, obesity) [6].

Most patients can be discharged from hospitals after a series of treatments, but they were required to maintain home quarantine for 2 weeks and return to hospital regularly for follow-up testing [7].

Understanding which patients are most at risk for hospitalization is crucial for many reasons. It can assist emergency providers in making triage decisions and ambulatory clinicians in identifying patients who would most benefit from early treatment once available [8].

The diagnosis of COVID-19 depends on clinical presentation and essential investigations. The gold standard test remains the reverse transcription-polymerase chain reaction (RT-PCR) assay for the detection of viral ribonucleic acid (RNA) in oropharynx or nasopharynx [9].

Aim of the Study

This study aimed to provide data regarding the clinical features of patients diagnosed with COVID-19 and specifically to determine and evaluate the risk factors associated with long-term hospitalization COVID-19 patients in Hadhramout, Yemen.

Materials and Methods

Study design and participants

This prospective cohort study included patients who were symptomatic presentations of COVID-19 to evaluated the differences in demographic and clinical data of COVID-19 patients. We enrolled 60 patients with laboratory-confirmed COVID-19 admitted to corona isolation centers of Ibn sinna hospital and Dr. Rijad hospital, during 7th April to 29th August 2020.

Because it is unclear about the reason of the longer duration for COVID-19 patients. Thus, we divided the study’s participants into two groups: the first group was COVID-19 patients tested positive for COVID-19 after hospitalization duration for two weeks. And the control

group, was COVID-19 patients tested negative after the same previous hospitalization duration (two weeks). Fitness for discharge the negative tested COVID-19 patients was based on improved at least 2 consecutive negative reverse transcription polymerase chain reaction (RT-PCR) assay results with more than 24 hours apart.

Data collection

The epidemiological data, medical history, underlying comorbidities, symptoms and signs both at admission and during follow-up, real-time RT-PCR detection results, and survival data were obtained from patients’ medical records during the hospital stay.

Viral nucleic acid testing and analysis

Nasopharyngeal swab samples of patients were collected by staff of epidemiological surveillance of the public health and population office/Hadhramout coast and submitted to Molecular and Immunology Unit in Mukalla for RT-PCR test. A confirmed COVID-19 case was defined as a positive result on RT-PCR for the presence of SARS-CoV-2 in both nasal and pharyngeal swab specimens. The assay was performed using a SARS-CoV-2 nucleic acid detection kit in the Applied Biosystem instruments according to the manufacturer’s protocol Invitrogen (USA).

Statistical analysis

Data analyzed using the software of Statistical Package for Social Sciences (SPSS) version 25. The graphs presented using the software program (Excel for Windows Microsoft) version 10. Descriptive statistics (frequencies and percentages) for study variables were obtained. Categorical values were expressed as percentages, and the differences between the two groups were analyzed using χ^2 test. Candidate variables with a $P \leq 0.05$ in univariable analysis were included in the multivariable model and a stepwise forward selection was performed to explore the risk factors associated with long-term hospitalization. For all analyses, $p < 0.05$ was considered significant.

Results

Univariable analysis

The relationship between the risk factors and their associated with long-term hospitalization was investigated and evaluated. We arrived that age groups were the only independent significant risk factor for long-term hospitalization COVID-19 patients as given in table 1.

Risk factors	Total cases	Long-term group No. (%)	Short-term group No. (%)	OR	P-value
Gender					
Male	42	22 (36.7)	20 (33.3)	1.375	0.573
Female	18	8 (13.3)	10 (16.7)		
Age groups					
> 60	36	13 (21.7)	23 (38.3)	0.233	0.008*
≤ 60	24	17 (28.3)	7 (11.7)		
Fever					
Yes	53	25 (41.7)	28 (46.7)	0.357	0.288
No	7	5 (8.3)	2 (3.3)		
Cough					

Yes	50	26 (43.3)	24 (40)	1.625	0.488
No	10	4 (6.7)	6 (10)		
Sore throat					
Yes	31	14 (23.3)	17 (28.3)	0.669	0.438
No	29	16 (26.7)	13 (21.7)		
Pneumonia					
Yes	23	11 (18.3)	12 (20)	0.868	0.791
No	37	19 (31.7)	18 (30)		
Shortness of breath					
Yes	44	24 (40)	20 (33.3)	2.000	0.243
No	16	6 (10)	10 (16.7)		
Rhinorrhea					
Yes	18	11 (18.3)	7 (11.7)	1.902	0.260
No	42	19 (31.7)	23 (38.3)		
Myalgia					
Yes	37	20 (33.3)	17 (28.3)	1.529	0.426
No	23	10 (16.7)	13 (21.7)		
Diabetes					
Yes	13	9 (15)	4 (6.7)	2.786	0.117
No	47	21 (35)	26 (43.3)		
Coronary heart disease					
Yes	3	1 (1.7)	2 (3.3)	0.483	0.554
No	57	29 (48.3)	28 (46.7)		
Hypertension					
Yes	10	6 (10)	4 (6.7)	1.625	0.488
No	50	24 (40)	26 (43.3)		
Chronic respiratory disease					
Yes	5	2 (3.3)	3 (5)	0.643	0.640
No	55	28 (46.7)	27 (45)		

Table 1: The association between risk factors and longer hospitalized duration COVID-19 patients.

*: Significant statistics at p-value < 0.05, OR: Odds Ratio.

Multivariable logistic analysis:

According to multivariable logistic analysis, COVID-19 patients with ages more than 64 years were more likely to have long-term hospitalization by 1.458 than the other patients equal or less than 60 years in table 2.

Variable	OR	CI (95%)	P-value
Age			0.010*
Equal or more than 64	1.458	0.77 - 0.708	
Less than 64	0	Reference	

Table 2: Multivariable analysis of age with longer hospitalized duration COVID-19 patients.

*: Significant statistics at p-value < 0.05, OR: Odds Ratio; CI: Confidence Interval.

Discussion

In this report, we described and evaluated the clinical characteristics of 60 patients with laboratory-confirmed COVID-19 disease in Hadhramout, Yemen. The study results revealed that males and females were accounted 70% and 30% respectively that similarly with study of [10] and with disease progression in other studies [11,12], but it's contrast to another study where females had long-term hospitalization patients more than males intriguingly with rate of 55.8% [13]. In our study, there was no statistically significant association of gender and risk factors of long-term hospitalization. Similarly to some reports of other studies [14,15], with contrast to another study suggested that sex itself was the influencing factor of Viral RNA Shedding disease progression [10,11] respectively.

In our report, age was the only significant independent risk factor associated with long-term hospitalization. We found that COVID-19 patients > 60 years were the most likely in long-term hospitalization patients than short-term hospitalization patients with same findings reported in other studies [10,13,16-18] but contrast with another study [14].

In our study, cough was the most common symptom followed directly by fever in almost rate of 86.7% and 83.3% respectively, and this is little different with other study showed fever was the most common symptom at the onset of illness followed by cough [13]. The present study found that cough and fever weren't significant risk factors associated with long-term hospitalization. This is similar to some extent to the study results conducted in China which fever and cough weren't significant risk factors in progress the COVID-19 patients [19] and disagreed with other study where fever was significant risk factor but cough wasn't significant in progress the COVID-19 patients [15].

Sore throat and pneumonia were contained 46.7% and 36.7% respectively from positive patients which is less than positive patients who hadn't sore throat nor pneumonia. Liu., *et al.* (2020) identified several factors that led to the progression of COVID-19 pneumonia were including age, history of smoking, maximum body temperature at admission, respiratory failure [16]. Also, Cen., *et al.* (2020) revealed that sore throat doesn't consider as significant risk factor for progress the COVID-19 cases [19].

Almost of positive patients had shortness of breath in rate of 80% but there was no significant value with long-term hospitalization, with the same findings were revealed in other study [13]. On the hand, Mo., *et al.* (2020) find significant correlation between long-term hospitalization patients (more than 18 days) and the shortness of breath (p value 0.004) [20].

Herein rhinorrhea was the rare symptom from whole of the sixty samples in rate of 30%, similarly with study of [13]. However, it is contrast with myalgia which rate 61.7% from whole of the sixty samples. The same result had revealed by [12,15] for rhinorrhea and progression of COVID-19 patients unlike the myalgia in the same study.

Surprisingly, comorbidity in the recent study was not statistically significantly associated with long-term hospitalization. Our findings are generally consistent with other studies of [14,22]. However, knowing that Guan., *et al.* (2020) investigated that chronic underlying diseases (mainly hypertension, cardio-cerebrovascular diseases and diabetes) may increase the risk of 2019-nCoV infection [12]. Moreover,

other studies showed the improvement in the cases of patients was significantly associated with patients without coexisting chronic diseases (respiratory and cardiovascular disease) at ($p < 0.001$) [16,23]. Probably, because of the small sample size, there was no significant difference in any comorbidity [16].

On this basis, the age of (> 64) years was the main significant risk factor for long-term hospitalization COVID-19 patients.

Conclusion

We revealed that clinical symptoms can't be described as significant risk factors independently for long-term hospitalization except the age. So, older patients of age ≤ 60 years should avoid contact with infected COVID-19 persons and should have the suitable health care in the hospital.

Ethics Approval and Consent to Participate

This study was approved by the public health and population office/Hadhramout coast.

Funding

The study did not receive any fundings.

Conflict of Interest Statement

The authors declare that there is no conflict of interest.

Bibliography

1. Petrosillo N., *et al.* "COVID-19, SARS and MERS: are they closely related?". *Clinical Microbiology and Infection* 26 (2020): 729-734.
2. Unhale SS., *et al.* "A Review On Corona Virus (COVID-19)". *International Journal of Pharmaceutical and Life Sciences* 6.4 (2020): 109-115.
3. Dhama K., *et al.* "Coronavirus Disease 2019 – COVID-19". Preprint (2020).
4. Abdur Rahman., *et al.* "Risk Factors of the Severity of COVID-19: a Meta-Analysis. Preprint (2020).
5. Hafeez A., *et al.* "A Review of COVID-19 (Coronavirus Disease-2019) Diagnosis, Treatments and Prevention". *EJMO* 4.2 (2020): 116-125.
6. Lippi G., *et al.* "Current laboratory diagnostics of coronavirus disease 2019 (COVID-19)". *Acta Biomed* 91.2 (2020): 137-145.
7. Qiao X., *et al.* "Re-positive Cases of Nucleic Acid Tests in Discharged Patients With COVID-19: A Follow-Up Study". *Frontiers in Medicine* 7.349 (2020): 1-8.
8. Petrilli CM., *et al.* "Factors associated with hospitalization and critical illness among 4,103 patients with Covid-19 disease in New York City". *BMJ* 369 (2020): m1966.
9. Jameel T., *et al.* "Persistence of Reverse Transcription- Polymerase Chain Reaction (RT-PCR) Positivity in COVID-19 Recovered Patients: A Call for Revised Hospital Discharge Criteria". *Cureus* 12.7 (2020): e9048.

10. Xu K., *et al.* "Factors Associated With Prolonged Viral RNA Shedding in Patients with Coronavirus Disease 2019 (COVID-19)". *Clinical Infectious Diseases* 71 (2020a): 799-806.
11. Xu L., *et al.* "Risk factors for severe corona virus disease 2019 (COVID-19) patients: a systematic review and meta-analysis". *Med Rxiv* (2020b).
12. Guan W., *et al.* "Clinical Characteristics of Coronavirus Disease 2019 in China". *The new England Journal of Medicine* (2020): 1-13.
13. Zhao W., *et al.* "Clinical characteristics and durations of hospitalized patients with COVID-19 in Beijing: a retrospective cohort study". *medRxiv* (2020).
14. Wu Y., *et al.* "Risk Factors Associated With Long-Term Hospitalization in Patients With COVID-19: A Single-Centered, Retrospective Study". *Frontiers in Medicine* 7.315 (2020): 1-10.
15. Chang M., *et al.* "Risk factors for disease progression in COVID-19 patients". *BMC Infectious Diseases* 20.445 (2020): 2-6.
16. Liu W., *et al.* "Analysis of factors associated with disease outcomes in hospitalized patients with 2019 novel coronavirus disease". *Chinese Medical Journal* 133.9 (2020): 1032-1038.
17. Garg S., *et al.* "Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 - COVID-NET, 14 States, March 1–30, 2020". *Morbidity and Mortality Weekly Report* 69.15 (2020): 458-464.
18. Thai P., *et al.* "Factors associated with the duration of hospitalisation among COVID-19 patients in Vietnam: A survival analysis". *Epidemiology and Infection* 148 (2020): e114.
19. Cen Y., *et al.* "Risk factors for disease progression in patients with mild to moderate coronavirus disease 2019: a multi-centre observational study". *Clinical Microbiology and Infection* 26.2020 (2020): 1242-1247.
20. Mo P., *et al.* "Risk factors for delayed negative conversion of SARS-CoV-2 in patients with COVID-19 pneumonia: a retrospective cohort study". *Epidemiology and Infection* 148 (2020): e293.
21. Shen L., *et al.* "Clinical and laboratory-derived parameters of 119 hospitalized patients with coronavirus disease 2019 in Xiangyang, Hubei Province, China". *Journal of Infection* 81.2020 (2020): 147-178.
22. Kaeuffer C., *et al.* "Clinical characteristics and risk factors associated with severe COVID-19: prospective analysis of 1,045 hospitalised cases in North-Eastern France, March 2020". *Euro Surveill* (2020): 1-10.
23. Zhang J., *et al.* "Risk factors for disease severity, unimprovement, and mortality in COVID-19 patients in Wuhan, China". *Clinical Microbiology and Infection* 26 (2020): 767-772.

Volume 5 Issue 4 April 2021

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