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The Effective Symptoms Of COVID-19 Infection In Hadhramout Yemen, Comparative Study

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Abstract: COVID-19 is evolving rapidly worldwide. Many researches has been established to study the disease from different aspects to understand it well and control its prevalence. So, this study aimed to detect the major symptoms and the kind of the infection in the body to have a clear vision of the infection of the virus based also on other future investigations. Our results suggested that the mean age of the positive COVID-19 patients was 55.16 years old and it was significantly associated with COVID-19 infection (P value = 0.001). Also, infected COVID-19 males patients were higher than females 74.9% with statistically significant value (P value= 0.018). However, all studied risk factors in this study haven't been significantly associated with the infection, but fever, cough and shortness of breath were the most common symptoms in COVID-19 patients with high rates of 92.45, 88.6% and 80.6% respectively. In brief, Gender males and older age were the significant risk factors associated with infection of COVID-19. These results provide references for clinical judgment and early intervention, and may be beneficial to our overall understanding of COVID-19.

Keywords: COVID-19, Risk Factors, Effective Symptoms, PCR, Hadhramout, Yemen.

1. Introduction

The outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)–induced pneumonia is becoming a public health emergency [1]. The clinical spectrum of COVID-19 ranges from the absence of symptoms to life-threatening severe acute respiratory distress syndrome (ARDS) and death, making the detection and isolation of COVID-19 cases complex and facilitating the spread of the virus [2].

On admission, 20-51% of patients reported as having at least one comorbidity, with diabetes (10-20%), hypertension (10-15%) and other cardiovascular and cerebrovascular diseases (7-40%) being most common. Previous studies have demonstrated that the presence of any comorbidity has been associated with a 3.4-fold increased risk of developing acute respiratory distress syndrome in patients with H7N9 infection [3]. As reported in the meta-analysis study of [4] where 13 studies were included, showed that hypertension is more prevalent than obesity and diabetes in patients with Covid-19 disease. The prevalence of co-morbid metabolic risk factors must be adopted for better management and priority settings of public health vaccination and other required interventions.

Viral infection, in particular that related to influenza virus represents a significant medical problem as most of the individuals may expose to more than one medical ailment annually. The synergistic effects of COVID-19 on immune system (lymphocytopenia, thrombocytopenia and leukopenia) and the impaired immune response of patients with DM are essential contributors to predict the final outcome [5].

Angiotensin converting enzyme (ACE2) its natural receptor at the surface of cells of a vast array of organs and tissues, especially alveolar type 2 cells in the lung, but also lymphocytes and cells of the heart, kidney and gastrointestinal system. The large and widespread diffusion of ACE2 at cell surface clearly explains the frequent lung involvement with interstitial pneumonia, occasionally evolving into acute respiratory distress syndrome (ARDS) [6].

On a wider level, there is continuing need for numerical data on COVID-19 infection distribution, its determinant and potential risk factors associated with it in order to identify priorities for the health services in the community. Therefore, the current study was aimed to characterize the systematic clinical features and evaluate the potential associated risk factors with the prevalence of COVID-19 infection in Hadhramout Governorate, Yemen.

2. Materials and Methods

2.1 Study setting and design

Molecular diagnostic unit (PCR) located at Mukalla city, Hadhramout is a place where the first case in Yemen was diagnosed the COVID-19 by polymerase chain reaction (PCR). In this retrospective comparative study, we employed all suspected COVID-19 cases in the period from June to October, 2020 in Mukalla, Hadhramout to identify risk factors for infection of COVID-19.

Risk factors and clinical profile of patients were studied by using a standardized questionnaire which included gender, age groups, fever, cough, sore throat, pneumonia, shortness of breath, Rhinorrhea, myalgia, diabetes, Coronary heart disease, hypertension, Chronic respiratory disease, Liver disease, kidney disease, onset day of illness.

2.2 Virologic investigations

Suspected COVID-19 cases were confirmed by testing respiratory specimens (nasopharyngeal swab) with a real-time reverse transcription–polymerase chain reaction assay (RT-PCR). SARS-CoV-2 nucleic acid detection kit was performed in the Applied Biosystem instruments according to the manufacturer's protocol Invitrogen (USA).

2.3 Statistical analysis

Continuous variables were expressed as (mean ± median) and were compared by t-test. Categorical variables were expressed as (frequencies and percentages) and the differences between the two groups were analyzed using χ^2 test. Univariable logistic regression analyses were applied to explore significant differences. All statistical analyses were performed using the software of Statistical Package for Social Sciences (SPSS) version 25. The significance level of the hypothesis tests was set at 0.05 (2-sided).

3. Results and Discussion

3.1 Results

Pearson chi square test was used to study the significant association between the risk factors and the infection of COVID-19. The study revealed that males 74.9% were the significant risk factor for the infection (P value= 0.018). In contrast, the other risk factors haven't significant association, as given in **Table 1**.

Table 1: The Association Between The Risk Factors With Participants

Risk factor	Total cases	Tested positive No. (%)	Tested negative No. (%)	OR	*P-value*
Gender					
Male	233	158 (74.9)	75 (62.5)	1.789	0.018*
Female	98	53 (25.1)	45 (37.5)		
Fever					
Yes	304	195 (92.4)	109 (90.8)	1.230	0.613
No	27	16 (7.6)	11 (9.2)		
Cough					
Yes	290	187 (88.6)	103 (85.8)	1.418	0.310
No	38	22 (10.4)	17 (14.2)		
Sore throat					
Yes	92	59 (28)	33 (27.5)	1.023	0.928
No	239	152 (72)	87 (72.5)		
Pneumonia					
Yes	202	136 (64.5)	66 (55)	1.484	0.090
No	126	75 (35.5)	54 (45)		
Shortness of breath					
Yes	257	170 (80.6)	87 (72.5)	1.573	0.090
No	73	41 (19.4)	33 (27.5)		
Rhinorrhea					
Yes	56	31 (14.7)	25 (20.8)	0.654	0.152
No	275	180 (85.3)	95 (79.2)		
Myalgia					
Yes	168	97 (46)	71 (59.2)	0.587	0.021*
No	163	114 (54)	49 (40.8)		
Diabetes					
Yes	98	65 (30.8)	33 (27.5)	1.174	0.527
No	232	146 (69.2)	87 (72.5)		
Coronary heart disease					
Yes	42	25 (11.8)	17 (14.2)	0.814	0.542
No	288	186 (88.2)	103 (85.8)		
Hypertension					
Yes	76	49 (23.2)	27 (22.5)	1.042	0.881

No	254	162 (76.8)	93 (77)		
Chronic respiratory disease					
Yes	27	16 (7.6)	11 (9.2)	0.813	0.613
No	303	195 (92.4)	109 (90.8)		
Liver disease					
Yes	5	3(1.4)	2(1.7)	0.851	0.861
No	325	208(98.6)	118(98.3)		
Kidney disease					
Yes	9	5(2.4)	4(3.3)	0.704	0.604
No	321	206(97.6)	116(96.7)		

*Significant statistics at p-value <0.05, OR: odds ratio

Using t-test, the study revealed that older age 55.16 years has significant association with the infection of COVID-19 (P value 0.001), but the onset day of illness (The appearance of disease symptoms in the suspected cases) hasn't had a significant effect, as shown in **Table 2**.

Table 2: The Association Between The Continues Risk Factors In Participants

Factor	Tested positive	Tested negative	*P-value*
Age (mean ± median)	55.16±55	46.48±50	0.001*
Onset days from illness (mean ± median)	7.73±6	7.58±5	0.596

*Significant statistics at p-value <0.05

3.2 Discussions

During this pandemic, a lot of studies in different countries have been established to investigate the main risk factors for trying to understand this disease. To the best of our knowledge, this is the first study in Yemen to study the main risk factors associated with diagnosis of the suspected COVID-19 cases. We hope that our results will demonstrate rapid strategies for predicting the outcome of the COVID-19 suspected cases.

As the statistical analysis arrived in our study, gender males were the significant risk factor for confirmed COVID-19 cases. This provides studies results revealed that males were the most likely to have COVID-19 [7;8], which it may turned to the fact that increased severity of disease in males compared with females is likely due to a combination of behavioral risk factors, prevalence of co-morbidities, genetic and hormonal factors and underlying biological sex differences [9].

The median age in our study for confirmed cases was 55 years which is compatible with other study where the median age of confirmed cases was 57 years [10]. Significant association with COVID-19 in our study and other studies [10;11;12]. Unlike our results, age and gender weren't significant risk factors [13], we turned this reason for the differences of the study sample, where the age in the study of the participating samples were (4-17) years.

In our study, the common symptoms were fever (92.4%), cough (88.6%), sore throat (28%), pneumonia (64.5%), shortness of breath (80.6%) and rhinorrhea (14.7%). Huang et al., (2020) arrived to, fever 40 (98%), cough 31 (76%), and myalgia or fatigue 18 (44%). From the above rates, cough and shortness of breath had the highest rates than the other clinical symptoms as showed in other study discussed the main primary symptoms effects of the respiratory system of humans caused by COVID-19 were fever, cough, and shortness of breath that manifests as pneumonia [15], and they suggested that the development of a post-infectious cough in those patients back to some autoimmune process. Fever presents the most common symptoms rate, this is because febrile temperatures are so closely linked to the inflammatory response which causes of the infection [16].

Different studies have discussed these symptoms. A study of (Liu et al., 2020) revealed that fever, dizzy, myalgia, and chill caused higher infected risks to their contacts, while cases with rhinorrhea, expectoration, and chest tightness caused lower infected risks [17]. However, we revealed that these risk factors -cough, sore throat, pneumonia, shortness of breath and rhinorrhea- are insignificant effects on confirmed cases, but this doesn't mean that these risk factors have never effect on having Covid-19 disease, but means that haven't independent effect. In contrast to our study, cough and rhinitis were the only independent significant clinical symptoms related to positive COVID-19 patients than negative tested patients [13].

Unexpected results, where the most of positive COVID-19 tested patients didn't suffer from myalgia compared with negative COVID-19 tested significantly. So, on this base we could say that myalgia couldn't be considered for the primary diagnosis. This confirmed the pooled analysis of the current scientific literature suggesting that the presence of myalgias shall not be considered a prognostic factor for severe COVID-19 disease. It is hence unlikely that adding the efficiency of stratification models for COVID-19 may be substantially improved by adding the presence of myalgia [18].

For the comorbidity also we arrived that these risk factors (diabetes, coronary heart disease, hypertension, chronic respiratory disease, liver disease and kidney disease) have no independent significant effect on confirmed cases. So, every comorbidity patient has no higher probability to have COVID-19 disease or long-term hospitalization. Same results had been arrived by [12;13]where comorbidity (hypertension, diabetes mellitus, renal failure, chronic lung disease and cardiac disease) were not significant risk factors, but it's contrast, where COVID-19 patients had an increase of prevalence one or more comorbidities, particularly diabetes, obesity, and hypertension, they were independently associated with laboratory-confirmed COVID-19 [19].

4. Conclusion

Older suspected men patients were more likely to have COVID-19 infection than the other younger suspected COVID-19 patients. Fever, cough and shortness of breath are the most common symptoms in the positive tested COVID-19 patients.

Acknowledgement

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