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Research Article

Investigation of Symptom Cluster in Families of Patients with Covid-19 Diagnosis

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ABSTRACT

Aim: The symptoms of the COVID-19 not severe only in individuals with chronic diseases, also vary greatly in healthy individuals. In this study, it was aimed to show the presence of clustering of symptoms among patients diagnosed with SARS Cov-2 infection and their family members.

Method: Symptoms recorded 29 index cases and 51 family members from our COVID-19 patients who were followed up by our outpatient clinic. The first symptom and findings added over time were questioned by talking each of the participants.

Results: The mean age of the patients was 40.3 ± 11.9. In our sample 46.25% was men (n: 37), 53.75% was women (n: 43). 37.5% of the patients had a chronic disease. 65% of the patients (n: 52) were above the normal BMI and 2.5% (n: 2) were below normal. Among the symptoms, more frequent myalgia in female gender and relationship between sweating and BMI was statistically significant ($p < 0.05$). It was found that GIS symptoms accompanied the picture in all members of 7 index cases with GIS symptoms ($p=0.00$). Loss of taste and smell was observed in 76.9% of family members ($p < 0.05$).

Conclusions: In our study, a relationship was observed between female gender and myalgia, sweating and BMI factors. Another result of our study is the demonstration of symptom clustering among family members. As the disease affects organs and systems, it has been concluded that the determination of symptom clusters in families is a useful approach in the diagnostic process.

Strengths and limitations: In our study strengths; we will give important approach in the diagnostic process and so may provide more comprehensive assessment of illness. There may be some possible limitations. First, the number of patients can be said, secondly, geographic limitation. During the pandemic process, the obstacle to meeting primary care patients and contacted individuals face to face is another important limitation.

Keywords: COVİD-19, Symptoms, Family Symptom Cluster

INTRODUCTION

SARS Cov-2 infection was named epidemic by WHO (World Health Organization) as of December 2019, while it was declared as a pandemic on March 11, 2020. After the disease emerged, it spread rapidly in China with the pneumonia accompanied by symptoms of fever, dry cough, fatigue, muscle pain and shortness of breath [1]. In later studies, it was revealed that the disease had effects on many extrapulmonary systems while new symptoms were added as the knowledge increased. Mao et al noticed and observed neurological symptoms in their patients in January 2020. Neurological effects: headache, anosmia, dysgeusia, encephalitis, myelitis, and Guillain-Barré Syndrome findings and central and peripheral nervous system involvement have taken place in the symptom evaluation of the disease in subsequent studies [2]. Magro et al. Recommended the use of anticoagulants based on cutaneous and hematological findings in their patients in New York and it was observed that the effects on the circulatory system could be coagulopathy, pulmonary thrombosis, deep vein thrombosis, micro-thrombosis and diffuse intravascular coagulation (DIC) [3]. The effects of the disease on the immune system after the observation of high cytokine levels in plasma levels and

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abnormal immune response in patients in a study conducted in China in February 2020: cytokine storm with abnormal immune response, triggering the formation of a Kawasaki-like response after observed as an abnormal autoimmune response and SARS Cov-2 the disease called Pediatric Multisystem Inflammatory Syndrome, associated with , is also among its effects on the immune system [4,5]. The frequency and severity of the symptoms associated with the disease vary. Clinically, fever, fatigue, muscle pain, conjunctivitis, anosmia, dysgeusia, sore throat, nasal congestion, cough, shortness of breath, nausea, vomiting and diarrhea are the most common symptoms [6-8].

Following the detection of the causative virus, WHO announced some precautions and the Ministry of Health announced the recommendations it organized under the name of "14 Rules Fight Against Coronavirus" to the whole country through the media and health organizations. Among these rules, especially isolation has an important place in preventing contact with sick individuals. However, individuals who are in the same family and share the same house are exposed to viral load together in the process before and after the disease occurs, despite various precautionary measures. Studies indicate that domestic contact is one of the most important factors in contamination [6,7]. As a result of this exposure, more than one positive case can be seen in the same family members and it is observed that the presentation of the symptoms in the clinic can be similar. It is important to know the COVID-19 symptoms clusters in families and to evaluate the symptoms for 2 reasons. First, suspicious cases can be diagnosed by questioning symptom clusters. Ignoring the clustering of symptoms among family members can endanger public health. Second, knowledge of symptom clustering among family members provides more comprehensive symptom assessment. When common symptoms are questioned, other findings are likely to be overlooked. When symptom clustering among family members is questioned, the disease can be predicted and investigated. This ensures more efficient use of time and control of the epidemic.

In this study, it was aimed to show the presence of clustering of symptoms among patients diagnosed with SARS Cov-2 infection and their family members and their importance in diagnosis.

METHODS

In this study; 29 volunteers who were diagnosed with COVID-19 from oropharynx swabs by PCR test and 51 family members who had contact and test positive for each patient were interviewed and participants gave informed consent. Approval for the study was obtained from İnönü University Faculty of Medicine Clinical Research Ethics Committee and Ministry of Health General Directorate of Health Services. A total of 80 cases with positive PCR test results were included in the study. Families in whom all diagnosed cases could not be interviewed, and cases with no family cases were excluded from the study. The demographic data, accompanying diseases, body mass index, initial onset and added symptoms of the patients were questioned and recorded. IBM SPSS Statistics 25.0 program was used for analysis. Data were summarized as mean ± standard deviation and number (percentage). In statistical analysis, Pearson Chi-Square test, Yates Corrected Chi-Square test and Fisher's Exact Chi-Square test were used where appropriate. A $p < 0.05$ value was considered statistically significant.

RESULTS

The mean age of the patients was 40.3 ± 11.9. In our study 46.25% of the sample consisted of men (n: 37) and 53.75% women (n: 43). 37.5% of the patients had diabetes, hypertension, kidney disease and heart disease as a chronic disease. 65% of the patients (n: 52) had BMI above normal BMI (Body Mass Index), 32.5% (n: 26) were normal, 2.5% (n: 2) had a lower than normal BMI. The demographic data of the cases are summarized in Table 1. The most common symptoms are fever (50%), loss of taste and smell (45%), bone-joint pain (40%), weakness (35%), sore throat (35%), dry cough (32.5%) and myalgia (30%). Less common symptoms were burning in the hands and feet (5%), stomach pain (2.5%), and redness in the eyes (2.5%). When the initial symptoms of the disease are questioned: fever (22.5%), weakness (12.5%), myalgia (10%), bone-joint pain (10%), sore throat (10%), loss of taste and smell (7.5%), nausea. vomiting (5%), dry cough (5%), sweating (2.5%), postnasal drip (2.5%), burning in hands and feet (2.5%), headache (2.5%), red eye (2.5%), stomach pain (2.5%), blurred vision (2.5%). When the distribution of symptoms by gender was examined in our study, a statistically significant difference was found in the frequency of myalgia in female patients ($p < 0.05$). A positive correlation was observed between patients with sweating and high BMI ($p < 0.05$). There was no significant relationship between other symptoms and gender, age and BMI ($p > 0.05$). When we examine family members symptomatologic ally; GIS symptom was 100%, fatigue 80%, loss of taste and smell 76.9% ($p < 0.05$). Among the common symptoms, myalgia (50%) and joint pain (46.1%) were found to have lower rates in terms of showing familial characteristics (Tables 2 and 3).

Table 1: Descriptive Features.

Age	**Mean ± Standard Deviation (40 ± 12)**		
Variable	Category	N	%
Gender	Men	37	%46,3
	Women	43	%53,7
Chronic diseases	Any chronic diseases	50	62.5
	Chronic diseases	30	37.5
BMI	Underweight	2	2.5
	Normal	26	32.5
	Overweight	48	60
	Obese	4	5

Table 2: Common Symptoms in Index Cases.

Symptoms	Category	Clustering symptoms N	%	p value
Headache	No	24	82,8	0.29
	Yes	5	17,2	
Taste- smell loss	No	19	65,5	0.038*
	Yes	10	34,5	
Myalgia	No	23	79,3	0.16
	Yes	6	20,7	
Fever	No	16	55,2	0.007*
	Yes	13	44,8	
Bone-joint pain	No	23	79,3	0.16
	Yes	6	20,7	
Abdominal pain-diarrhea	No	22	75,9	0.15
	Yes	7	24,1	
Throat ache	No	21	72,4	0.08
	Yes	8	27,6	
Postnasal drip	No	27	93,1	1
	Yes	2	6,9	
Dry cough-dyspnoea	No	24	82,8	0.29
	Yes	5	17,2	
Weakness	No	21	72,4	0.08
	Yes	8	27,6	

Table 3: Frequency of Symptoms.

Symptoms	Incidence in index case N	Family Symptom Cluster N	%
Weakness	10	8	80
Myalgia	10	5	50
Bone-joint pain	13	6	46,1
Headache	7	5	71,4
Dry cough-dyspnoea	9	5	55
Taste- smell loss	13	10	76,9
Fever	17	13	76,4
Abdominal pain-diarrhea	7	7	100

DISCUSSION

In studies, although the male sex is higher and the average age is variable in SARS Cov-2 patients, it has been reported to be between 36-59 in meta-analysis studies. In our study, the frequency of female patients was higher and the mean age was similar to the literature [9].

When the literature is reviewed, the prevalence of all symptoms among family members has not been investigated before. Our study contributes to the literature in this respect.

According to our literature reviews, no relationship was reported between gender and BMI with symptoms of COVID-19. We can conclude that the significant association of female gender and myalgia and the high BMI and excessive sweating that we obtained from our study will be an important innovation in the literature.

Many studies show that high BMI is associated with an increase in the severity of SARS-CoV-2 infection [10,11]. In a meta-analysis study, a three-fold increase in the probability of severe SARS-CoV-2 infection was reported in patients with high BMI compared to patients without high BMI [10]. Similarly, in our study, the rate of patients with high BMI was found to be high.

In the literature, the most common symptom was reported as fever and cough in the second frequency [12,13]. In our study, the most common symptom was fever, followed by loss of taste and odor in the second rank. While fever takes the first place in most studies, the frequency of other symptoms varies. It has been reported in recent studies that the loss of taste and smell is one of the findings of COVID-19, even the first and the only finding, and different prevalence rates (39% -72%) [14,15]. In our study, loss of taste and smell was observed at the rate of 45% in the second frequency. The rate of loss taste-smell, which is later included in the symptoms, shows a significant difference in studies. The reason for this is that the loss of taste and smell was not reported in the first data from China and it was shown to be one of the common findings in the Italian series [16].

No symptom developed in all family members of the patients with positive PCR test results included in our study. It has been shown in the literature that pediatric cases and some family members are asymptomatic. [17]. In our series, there were no cases under the age

of 15. Since all pediatric cases in the family are asymptomatic, they are not included in the diagnostic process.

While the initial symptoms were determined as fever and headache in the studies performed, it has been shown that cough, sputum and sore throat accompany in the following days [10,18]. In our study, fever was the first symptom, while fatigue was the second most common symptom. The least frequent presentation was headache as the initial symptom. We think that this result, which seems different from the literature, may be due to the individuals keeping their headaches in the background or not being able to remember them in this retrospective study.

Another striking result we obtained in our study was the clustering of symptoms among family members. In the study of Jin et al. Conducted in China, it was found that individuals with GIS symptoms had a more severe course of the disease and a higher family clustering [15,7]. When the clustering symptoms among family members were examined, it was found in our study that GIS symptom was present in a patient and the family member accompanied GIS symptom (n:7, 100%). Similarly, the loss of taste-smell and fever were also statistically significant in terms of family clustering.

The cause of symptom cluster in families; genetic differences can be shown. It has been suggested that the abnormal immune response seen in cases with a diagnosis of SARS Cov-2 may result from genetic effects and there may be differences in the pathway of the immune response. It has been observed that genetic differences affect the course of the disease and the severity of symptoms in the course of viral infections [6,19]. It seems possible that the cause of the clustering of symptoms and the common clinical similarity in the course of the disease in family members of SARS Cov-2 patients can be explained by genetic factors.

CONCLUSION

It has been observed that the disease may affect different organs and systems in each individual, and these symptoms are similar in family members. Our study is important in that it reveals that the diagnosis of COVID-19 should be considered in diarrhea cases, except that GIS symptoms are the most common symptom among family members. In our study, in addition to GIS symptoms, the prevalence of symptoms such as loss of taste-smell and myalgia among family members was examined, and it was an important result that loss of taste-smell and fever were a finding that showed clustering of symptoms among family members.

The data we obtained in our study revealed that gender and myalgia, BMI and sweating factors have a significant relationship on the clinical presentation of the disease. A good anamnesis and physical examination are the most important factors in preventing the spread of the epidemic in all healthcare institutions including primary health care outpatient clinics in suspected COVID-19 cases and will increase the success rate in the control of the disease. We believe that questioning other findings added to the initial findings of the disease and symptom clustering among family members will be an important approach in the diagnostic process.

CONFLICTS OF INTERESTS

The authors report no conflicts of interests.

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