

The Prevalence of COVID-19 Symptoms in Syria: A Cross-Sectional Study

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Abstract

Introduction: The corona virus disease 2019 is a disease caused by the newly discovered human infecting SARS-Co V-2 virus. The COVID-19 virus is highly transmittable, by August 14, 2020, more than 20 million people were confirmed to have COVID-19 worldwide, with more than 750,000 death. Syria was declared to have one of most vulnerable health systems in the world, with poor surveillance systems, unstable conditions, no standardized method for reporting infections, lack of sufficient public awareness, and a continued deterioration of humanitarian and socio-economic conditions across Syria.

Objectives: to investigate the prevalence of COVID-19 symptoms among the Syrian population.

Methods: this is a cross sectional study in Damascus – Syria, data were collected during August, 2020 using an online questionnaire that contained 3 section (demographic variables, awareness of COVID-19, symptoms of COVID-19) and analyzed using SPSS v.22.

Results: 5212 people were included in the study, 59% females and 41% males, 9.6% had chronic medical conditions. 63.4% reported experiencing COVID-19 symptoms during the past 6 months, symptoms lasted 6.9 days on average, the most prevalent symptoms were as anosmia and dysgeusia (42.2%), headache (67.1%), fatigue (70%). Symptoms were significantly more prevalent in the past 14 days ($P=0.000$).

Conclusion: Within the limits of this study, high prevalence of covid-19 symptoms was noticed in the Syrian population. Significant correlation was made between the severity and duration of the symptoms. Measures to slow down spread of COVID-19 need to be taken immediately.

Background

(COVID-19), a human infecting virus belonging to the beta-coronavirus 2b lineage in the phylogenetic tree (1). It was newly detected and confirmed as the cause of COVID-19 in humans after it was reported in samples of bronchioalveolar lavage from three patients in China on January 24, 2020 (2).

As of January 30, 2020, the World Health Organization (WHO) declared COVID-10 to be a Public Health Emergency of International Concern (3). By August 14, 2020, more than 20 million people were confirmed to have COVID-19 worldwide, with more than 750,000 deaths making this disease a health challenge for humans (4).

Until the day, the pathophysiological mechanisms behind key events in COVID-19 progression from mild to severe disease remain unclear (5). However, researchers have identified human angiotensin converting enzyme 2 (ACE2) as an entry receptor for SARS-CoV-2 (6). ACE2 expression levels are the highest in the small intestine, testis, kidneys, heart, thyroid, and adipose tissue, and medium expression was found in the lungs, colon, liver, bladder, and adrenal gland.(7). Researchers have reported that many organs can be injured by the SARS-Co V-2 virus, including the respiratory system, cardiovascular system, renal system, gastrointestinal system, nervous system, cutaneous system, and coagulation cascade. The most

common clinical features of COVID-19 are fever (99%), fatigue (70%), dry cough (59%), anorexia (40%), myalgias (40%), dyspnea (31%), and sputum production (27%).(8)

The COVID-19 virus is highly transmittable (9) with an average reproductive number $R_0 = 3.2$ (10). As the COVID-19 pandemic is now hitting global health systems, Syria was declared to have one of most vulnerable systems in the world (11). A recent report stated that the maximum number of COVID-19 cases that could be adequately treated in Syria is currently 6,500, based on the number of available intensive care unit beds with ventilators across Syria, which is estimated to be only 325 (12).

The first confirmed case of COVID-19 in Syria was on March 23, 2020 (13). By the time of writing this report on August 14, 2020, the number of confirmed cases of COVID-19 cases was 1432, with 55 deaths (4), which is considered to be low. However, surveillance systems are poor, with unstable conditions and no standardized method for reporting infections, and lack of sufficient public awareness and a continued deterioration of humanitarian and socioeconomic conditions across Syria. This raised the concerns that real figures are much higher (11,12). In our study, we investigated the prevalence of COVID-19 symptoms among the Syrian population to estimate a proximate number of how spread Coronavirus is in our community and what measures should be made to reduce infection rates.

Methods And Materials

Study design: cross-sectional research to study the prevalence of COVID-19 symptoms and to assess the severity and duration of the symptoms.

Sampling and participants: The final sample was composed of (5212) participants, and inclusion criteria were defined as age ≥ 18 years old, residence in Damascus city, and consent to participate in this study. Data were collected using an open online Google form questionnaire that was distributed on social telemedicine groups administered by medical doctors. Data were collected between August 1st and 14th, 2020.

The questionnaire consisted of three parts. The first part contained questions about demographical variables (age, gender, residence, previously diagnosed systematic chronic diseases). The second part contained questions about COVID-19 (contact with symptomatic persons, adherence to protective measures, awareness of COVID-19 symptoms). The third part contained questions about symptoms of COVID-19. Symptom checklists were quoted from the latest available information related to COVID-19 symptoms from CDC (Centers for Disease Control and prevention) (14). Participants were asked to determine the severity of the symptoms using a 5-point Likert scale, indicating the time in which the symptoms appeared (during the past 14 days, during the past month, during the past two months, during the past 3-6 months) and the duration of the symptoms in days.

Statistical analysis: The data were analyzed using SPSS (Statistical Package for Social Sciences) V.22, using descriptive statistics (mean, SD, SE, Percentage), and inferential statistics (ANOVA test, independent samples T-test, Pearson's correlation).

Ethical approvals:

Ethical approval was obtained from the higher commission for medical research at Damascus University – Syria, reference number: 2785/m, and informed consent was obtained from each participant.

Results

The final sample consisted of 5212 Syrians from Damascus city, which is the capital of Syria, divided into 2136 males (41%) and 2076 females (59%). The age ranged between 18-85 years, and the average age was 35.2 years. The majority of the sample did not have any systematic chronic diseases (90.4%). Over half of the sample (55.1%) were uncertain whether they had direct contact with COVID-19 patients, while 27.3% were sure that they had direct contact with a patient. The results of the research variables are summarized in **Table N.1**.

Over half of the sample was committed to the protective measurement (52.9%), while another (41.8%) did not completely follow the measurement, and 5.4% did not take any protective measurement. Moreover, (92.9%) were aware of Covid-19 symptoms, and only 7.1% answered that they did not know the symptoms of the new disease. Only 3.9% of the sample underwent chest radiography to confirm the symptoms, and only 2.6% of the sample underwent PCR (**Table N.1**).

COVID-19 symptoms were noticed among 3301 (63.4%) of the total sample during the past 6 months, and the symptoms lasted between 1 and 90 days, with an average of 6.9 days (**Table 1**).

The prevalence and severity of the symptoms among the research sample are presented in **Table N.2**.

More people reported experiencing COVID-19 symptoms in the past 14 days of data collection (38.4%), compared with 11.6% in the month prior data collection, 7% in two months prior, and 6.4% 3-6 months prior. (27.5%) of the sample had no symptoms at all, while (16.9%) reported very moderate symptoms, and (8.7%) reported severe symptoms. **ANOVA** was used to investigate the significant difference between the time of occurrence and the severity of the symptoms, and significant differences were found between the two variables ($P=0.000$), indicating that more severe cases were noticed in August and July 2020 (**Table N.2**).

Based on the results of this study, loss of smell and taste senses were reported in 42.2% of the sample (20.3%), while 57.8% did not have this symptom. The highest percent of the symptoms was for fatigue (body aches). Approximately 70% reported this symptom, and 16.1% was severe among them; moreover, 67.1% had headache. Fever over 38° was noticed among only 29.2% of the sample, and the lowest symptom reported was dermal symptoms, which was lower than 14.5%. A detailed description of all symptoms is presented in **Table N.2**.

Bar chart N.1 demonstrates the number and severity of the symptoms during the 4 time intervals of the study (from past 14 days to past 3-6 months). The trend of the results illustrates that the number and severity of the symptoms increases with time, which indicates a high prevalence of COVID-19 symptoms in Syria. The polynomial trendline equation was calculated to predict the number of severe cases during the next month in Syria using the current data, and it is predicted that the number of severe cases in Syria will be approximately 18% during the next month.

Pearson's correlation test was used to test the relation between the severity of the symptoms and the duration (days) of the symptoms, and the results showed a positive significant difference between the two variables ($P=0.035$). Figure 2 shows the relation between the severity and duration of the symptoms.

Independent samples T-test was used to study the significant relationship between the severity of the symptoms and the persistence of systemic diseases, and the results showed a significant difference between the severity and the systemic diseases ($P= 0.015$). Patients with systematic diseases had more severe symptoms than healthy patients (Table N.2).

Discussion

The number of COVID-19 patients in Syria started to increase since early June after the reduction of infection control measurements applied by the government (15). The official numbers announced from the Syrian Ministry of Health are not reliable because of the lack of COVID-19 diagnosis equipment in the country - in our study, only 2.6% of participants underwent PCR tests to confirm COVID-19- and due to the sanctions currently applied, which made the health response to this pandemic very limited. Moreover, the Syrian health system, which has already been destroyed by years of war, is currently suffering from sanctions, which justify the concerns that the true numbers of cases are much higher (11,16). Therefore, it was of great importance to document the prevalence of COVID-19 symptoms among the Syrian population and to try to estimate the average number of patients despite the official numbers, which is very limited. This large-scale cross-sectional study included over 5000 Syrian citizens, which can provide better insight into the true percentage and prevalence of COVID-19 suspected cases in Syria.

The results of this study showed a high prevalence of COVID-19 symptoms among the Syrian population, which supports the hypothesis of a higher rate of spread of the disease in Syria. The most common symptoms were fatigue (body ache), headache, sore throat, fever and cough. On the other hand, dermal manifestations and diarrhea were less common in the Syrian population. This result agrees partially with the meta-analysis that summarized the results of 43 studies, and the most common symptoms were fever (83%), cough (60%) and fatigue (38%) (17). A high prevalence of smell and taste loss occurred in the Syrian population, which was similar to other cross-sectional studies (18,19).

The duration of carrying corona virus is on average 12 days (16). The results of our study showed less average duration of the symptoms; however, the duration might be longer because participants were asked to answer about the persistence of the symptoms, and the patients might be infected without any clinical symptoms (20). Moreover, patients with severe symptoms showed a longer duration of the

symptoms, and previous studies showed a correlation between the duration of the symptoms, age, and severity of the symptoms (21).

Ten percent of the sample had previously diagnosed chronic diseases, and systematic reviews demonstrated that one major determinant of COVID-19 severity is preexisting chronic condition, which confirms the results of this study (22,23).

It is of great importance to study and understand the process prevalence and response to COVID-19 in Syria because Syria has faced 10 long years of war, which laterally destroyed its health system, and currently under sanctions, which made it even harder for the under-poverty-line population to survive during this pandemic. With the lack of real and effective governmental measurements and decreased public awareness, we may be going straight ahead towards herd immunity, assuming an R_0 estimate of 3 for SARS-CoV-2, and the herd immunity threshold is estimated to be 67%-80% (24,25). Considering that 67% of our sample reported COVID-19 symptoms, we may be close to achieving herd immunity, but this cannot be confirmed without widespread screening PCR tests to confirm the disease. Additionally, with little understanding (until the date of writing this manuscript) of the host immune responses against SARS-Co V2, we cannot rely on the principle of herd immunity.

Several promising vaccines for SARS-Co V2 are currently being developed (26), but until proven safe and effective, several measures should be taken. One successful experience in this context is the Jordanian experience, where the government implemented several measurements, such as travel restrictions for non-Jordanians and mandatory quarantine of 14 days for Jordanians arriving from abroad, strict rules that banned all social events and public and religious gatherings that slowed down COVID-19 spreading (27). Another beneficial measurement is enforcing a law to wear face masks in public, especially in closed, minimally ventilated, and crowded places. 80% adoption of moderately face masks can reduce deaths caused by COVID-19 by approximately 40% (28)

Conclusion

Within the limits of this study, a high prevalence of Covid-19 symptoms was noticed in the Syrian population, and the most common symptoms were fatigue (body ache), headache, sore throat, loss of taste and smell. A significant correlation was made between the severity and duration of the symptoms.

Limitations

The results of this study can provide an overview of the current pandemic situation in Syria. However, because of the study design that was used, the results cannot be considered reliable for the true number of covid-19 cases. Nevertheless, this study can add more understanding to the process and development of the pandemic in Syria.

Declarations

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Competing interests

The authors declare no competing interests.

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Tables

Due to technical limitations, tables are only available as a download in the supplemental files section.

Figures

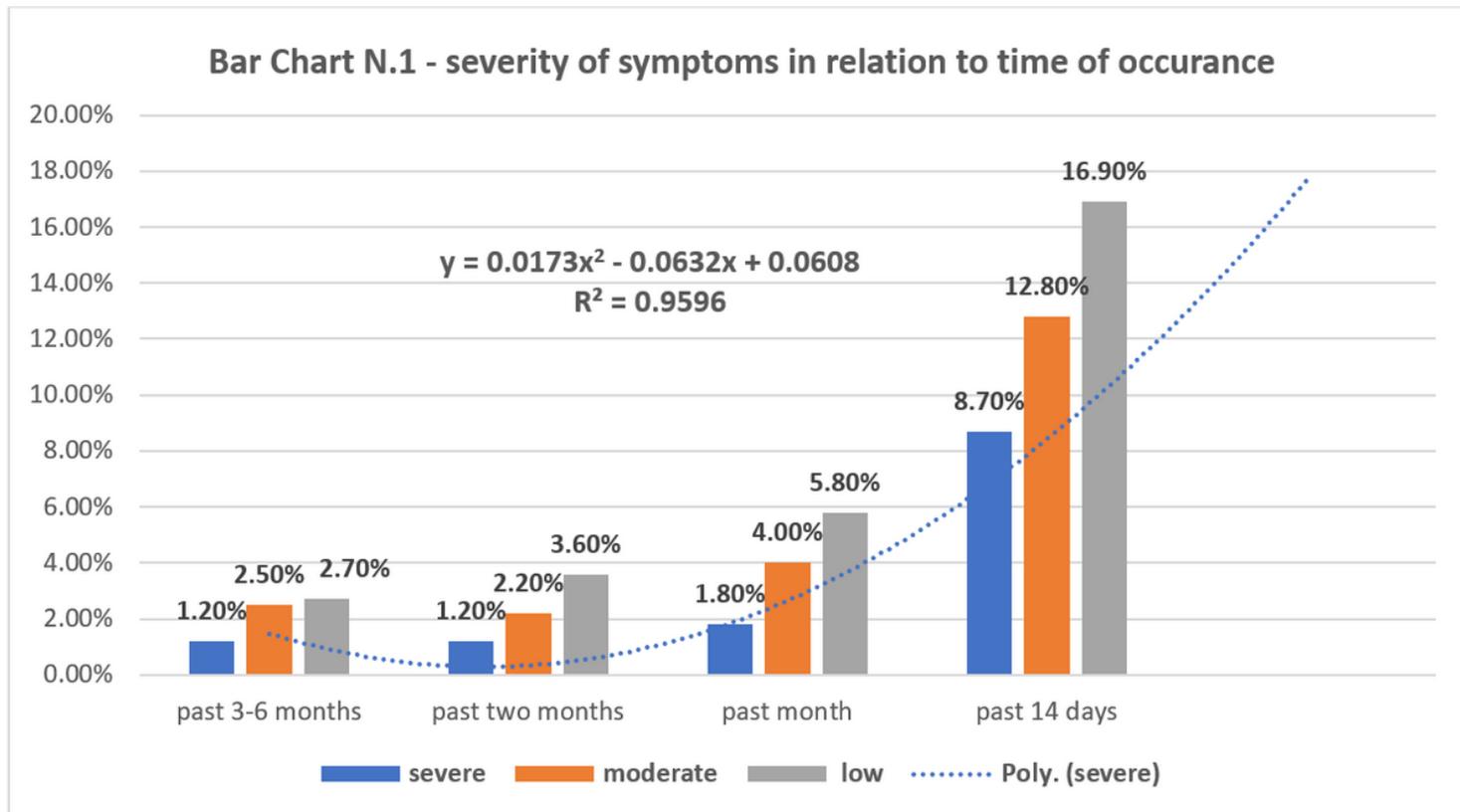


Figure 1

Severity of symptoms and time of occurrence.

Figure N.2 – the relation between severity and duration of COVID-19 symptoms

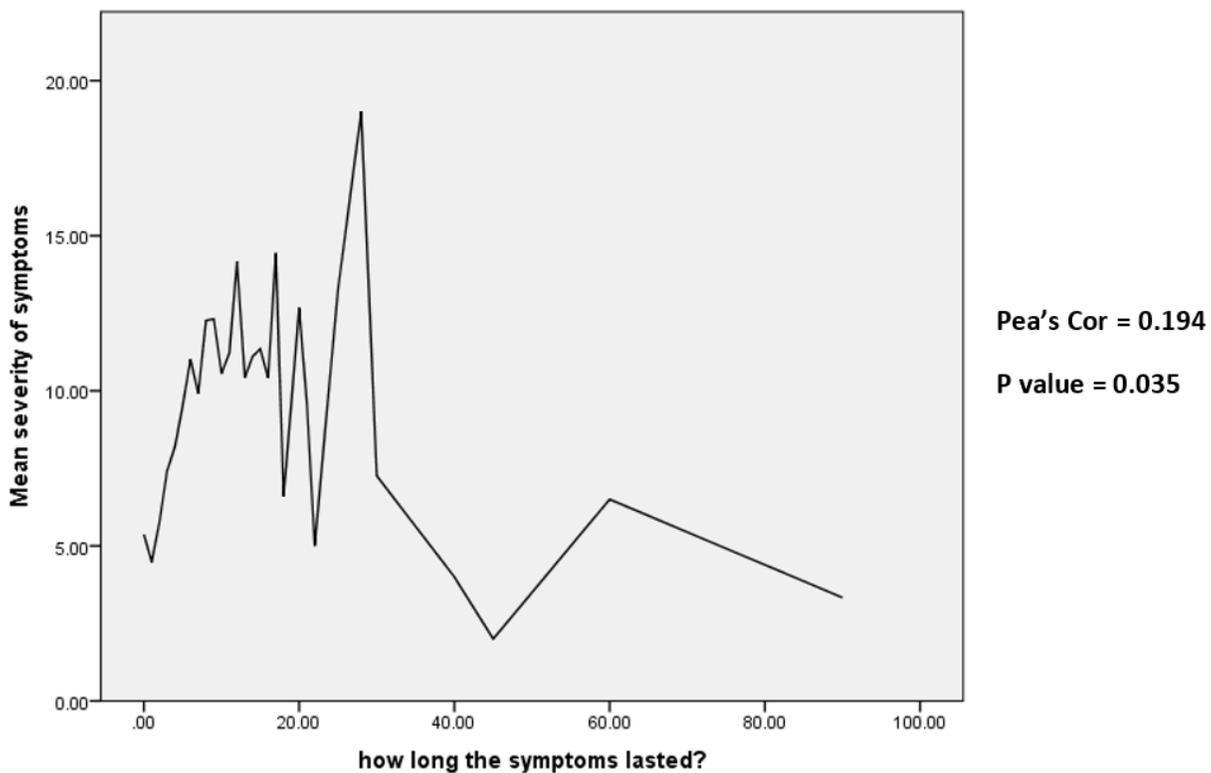


Figure 2

relation between severity and duration of COVID-19 symptoms.

Supplementary Files

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