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Israa Saad Al-Atiyah
B.D.S., M.Sc., Ph.D.
Candidate, Preventive
Dentistry, Iraq

Mohammed Abdul-Hassan Hussein
B.D.S, Diploma, Preventive
Dentistry, Iraq

Enas Mizhir Saaed
B.D.S, Diploma, Preventive
Dentistry, Iraq

A study of the course of COVID-19 infection in Iraqi societies, it's most widespread symptoms and the best methods used for recovery

Israa Saad Al-Atiyah, Mohammed Abdul-Hassan Hussein and Enas Mizhir Saaed

Abstract
Introduction: The new pandemic outbreak of COVID-19 caused by the coronavirus 2 (SARS-CoV-2), ranging from mild to severe Respiratory Syndrome, has posed a serious health threat, and pushed the global death toll to over 1,701,627 till December 2020. However, in Iraq, the increasing number of COVID-19 incidence is faced by increasing in the cases of recovery.
Objectives: To assess the initial and most severe symptoms, the infection routes, the time period needed to get recovery, and the ways of treatment used to get to the full clinical recovery (symptoms disappearance).
Method: A cross-sectional study which included 639 participants in Iraq. The data collection that started from July to November 2020, was done by an electronic version of a special formed questionnaire, in Arabic language, which was introduced to different Iraqi population through Google-forms. The forma was distributed in the internet media especially through Facebook and other social Medias. Data were analyzed by frequencies, Mean and percentages.
Result: The study showed that the most recovered group (57.9%) were aged between 18-29 years, and the most possible causes of the infection (51.5%) was happened after getting -in close contact- with other positively infected patients. Considering the testing technique or the way that was used to confirm the SARS-CoV-2 infection, more than (40%) assumed that staying in -close contact- with symptomatic COVID-19 patient was the way that their positive infection was assured. The collected data about Illness Presentation (early symptoms) showed that (70.4%) had raised body temperature (fever), Followed by (66.7%) who showed severe headache, the 3rd most revealed symptom was Pain and body aches which was presented in (63.7%) of the participants. Moreover, the most severe symptoms were Pain and body aches and/or weakness (57.6%) of the participants. Regarding the SpO_2 (Oxygen saturation in blood), the study revealed that (65.7%) had High SpO_2 level (95% or more). Dealing with the Time period needed from the onset of the symptoms till the clinical recovery Most of the patients (48.7%) took about 7-14 days till the end of the symptoms. Most of the participants (83.9%) had no systemic diseases or health problem. Dealing with medications that were used during the infection, most of the participants used Azithromycin (72.2%), and (54%) of them used paracetamol, and more than (50%) used different Vitamin supplements (as Vit. C, D, Zinc and Omega-3). Considering the quarantine (isolation) for patients during the infection period, the study data revealed that (92.6%) of the participants were quarantined at home.
Conclusion: Most of the recovered patients had mild and moderate symptoms, high oxygen level, with illness period between 7-14 days. Most of the participants needed simple and available medications and supplements to have full clinical recovery.

Keywords: COVID-19, SARS-CoV-2, clinical recovery, symptoms, Google-form questionnaire, Iraq

Introduction
The Coronavirus disease 2019, which is also called as (COVID-19), is the newly emerging, highly contagious disease, which quickly posed massive threats on global health and economy. It has exploded when cases were first reported in Wuhan, China, December, 2019 [1].

As of March 2020 more than 100 countries worldwide reported cases of COVID-19 leading to its announcement as a pandemic by the World Health Organization (WHO) on the 11th of March 2020, and in less than a year As of the 5th of December, 2020 more than 66 million cases of COVID-19 were reported around the world, caused by severe acute respiratory

Corresponding Author:
Israa Saad Al-Atiyah
B.D.S., M.Sc., Ph.D.
Candidate, Preventive
Dentistry, Iraq

syndrome coronavirus 2 (SARS-CoV-2) infection, which also including more than 1.5 million deaths [2].

SARS-CoV-2-infected patients produce a large quantity of the virus in their upper respiratory tract during the prodromal period, and because of the mild clinical symptoms in a good proportion of patients, they can remain mobile and carry out day to day activities, leading to further spread of the infection [3]. This along with the presence of asymptomatic carriers of COVID-19, who can also shed the virus, led to the it's spreading through the globe in a timely manner [4].

In Iraq, the first confirmed cases of COVID-19 were reported in late February 2020, this led the Iraqi government to quickly enforce a number of legislations on the 17th of March including curfews in Baghdad and provinces along with banning flights [5].

The virus quickly exhausted the health care systems in many countries along with curfews, flight bans and other legislations leading to unprecedented rates of unemployment reaching 14.8% in the United States in April 2020 (from 4.4% in March) [6] in Iraq, the number of new cases increased gradually over the next few months, hitting one thousand new cases a day on June, and up to 5 thousands a day on September, over the next few months, a decreasing trend was noticed in cases, around January 2021, possibly marking the end of the 'first wave' of the infection. These numbers quickly rose through February and March reaching an all-time high in April 2021.

As COVID-19 is primarily a pulmonary disease, emerging data suggest that it may also leads to cardiac [7, 8], dermatologic [9], hematological [10], hepatic [11], neurological [12, 13], renal [14, 15] and other complications. Thromboembolic events also occur in patients with COVID-19, with the highest risk in critically ill patients [16]. The long-term sequelae of COVID-19 survivors are currently unknown.

Health-care staff suffered the most from COVID-19, with those working in hospital wards and nurses being at the highest risk of acquiring the disease and subsequently exposing patients and others, for that reason, it seemed only reasonable to emphasize on the medical staff. A meta-analysis reviewed a total of 97 studies which showed an estimated prevalence of SARS-CoV-2 infection in health-care workers of 11% using reverse transcription-polymerase chain reaction [17].

The best investigation for the diagnosis of COVID-19 remains real-time PCR by detecting nucleic acid in nasal and throat swab samples [18], however, this method is only useful for diagnosis while Computed tomography (CT) can be used for both diagnosis and evaluation of severity which usually reveals multiple patchy ground glass opacities bilaterally, multifocal lung lesions, with peripheral distribution [19].

Since COVID-19 infection still has no approved cure, and with the vaccine becoming available only very recently in Iraq, the only ways of combating the illness at the beginning was by (symptomatic treatment) using a number of general antiviral and antibiotics, with different supplements and vitamins to restore the body defense mechanism.

As a pandemic disease, with a very high spreading capability, the commonest symptoms and the most used medications, drugs and treatment methods used for COVID-19 infection must be known, in order to diagnose the infection as soon as it happens, and to use the most effective treatment methods.

Objectives
To study the course of COVID-19 in the Iraqi societies, and it's most widespread symptoms, and the best ways used for recovery from it, among the Iraqi society.

Methods
Setting and study design
A cross-sectional study, (observational study).
Data collection was done from conducted on 1st of July till the 30th of November 2020, by an electronic version of pre-formed questionnaire, designed and published through Google-form.

Inclusion and Exclusion criteria
Iraqi Population (living in any city inside Iraq), from different age groups who had a previous infection with COVID-19 and had a full clinical recovery (free of symptoms).

Ethical consideration
A brief explanation about the study and its benefits was included in the questionnaire format, with keeping the privacy for each participant's information.

Sampling technique
The sample was collected primarily from friends, relatives, and work colleagues. Although, the most answers were collected from Facebook medical groups (most from females' medical staff) randomly. However, a few numbers were collected from other social media.

Questionnaire Format
The questionnaire format was primarily constructed in Arabic language, and it was presented as 14 questions, 11 were presented as multiple choice questions (answers are required), and the other 3 were open-ended questions (optional).
Two parts were included in the format: the 1st part deals with Sociodemographic questions (age and gender), and other part discuss different signs, symptoms, durations, and the possible causes of the disease, and the treatment methods that were used.

Data collection
All the data were presented and collected via the internet, using an electronic version of the questionnaire through Google-forms site, on.
https://docs.google.com/forms/d/e/1FAIpQLSfC5PZwis8yui j2QhTb0RKZGK7R6DOoQq8Z09VTWFDVuUssPQ/viewf orm?vc=0&c=0&w=1&flr=0

The researchers had sent the questionnaire via internet media (Facebook, Viber, WhatsApp, and emails) and the participants were asked to resend it to their family, friends or work colleagues, who were recovered from COVID-19 infection.

Statistical analysis Outcomes and procedures
The answers were downloaded from the electronic-form of the Questionnaire (Google-form) to the computer as an excel file and imported Spss-23 to be analyzed. Comparisons were made between the results. Averages, Frequencies and percentages had been calculated.

Results

In this study, a total of 639 subjects participated. The results showed that the age group of most of the participants (57.9%) was between 18-29 years, followed by (23.6%) of the participants between (30-39) years old, then about (7.2%) were between (50-59) years old, while others age groups were only less than 10% from all the participants. From the collected data, about 75% (479) of the participants were females, and only 25% (160) were males. As shown in Table 1.

All the answers frequencies (for the multiple choice questions only), are illustrated in Table 2.

Table 1: The Distribution of participants according to their age and gender

		Frequency	**Percentage**
Age	less 18	19	
	18- 29	370	
	30- 39	151	
	40- 49	28	
	50-59	46	
	More than 60	25	
Gender	Male	160	25%
	Female	479	75%
Total		639	100%

Table 2: The Distribution of the participants' answers relating to the multiple answers question (questionnaire format)

S. No.	The Questions	Possible Answers	Frequency
1.	What is your Age?	Less than 18 years	19
		18-29 years	370
		30-39 years	151
		40-49 years	28
		50-59 years	46
		More than 60 years	25
2.	What is Your Gender (Male, Female)?	Female	479
		Male	160
3.	How did you "confirm" your infection?	CT scan	89
		Rapid Test	43
		Rt. PCR	247
		Contacting a Positive Case (Through Symptoms)	257
4.	What are the symptoms that you had in the beginning of your infection? (More than One Answer could be chosen)	Raise In Body Temperature (fever)	449
		Dry Cough	290
		Headaches	427
		Throat pain	319
		Diarrhea	220
		Nausea and Vomiting	116
		Short breaths	195
		Absence of smell and taste	341
		Bone pain	406
		Skin rash or change in fingers colors	38
		Loss of apatite	252
		Others	53
		Asymptomatic	15
5.	What are the most severe symptoms during the course of the infection? (More than One Answer could be chosen)	Shortness of breath	131
		Body pain and movement restriction	368
		Chest pain	140
		Others	191
6.	How much time needed till acquiring full clinical recovery?	One week	170
		7-14 days	311
		More than 14 days	158
7.	Do you have any other systemic diseases or health problems?	Yes	103
		No	536
8.	In your opinion, what is the possible cause for your infection with COVID-19?	In Contact with positive case	329
		Working in health institutions	205
		Presenting in crowded places	24
		Don't know	81
9.	After getting clinical recovery, How can you describe the severity of your infection with corona virus?	Asymptomatic	18
		Mild	262
		Moderate	304
		Severe	55
10.	During your infection, What was your SpO$_2$ level?	High (>95%)	420
		Between 94%-80%	141
		Less than 80%	14
		Don't know	64
11.	During your infection, Have you been Quarantined?	Yes (at home)	592
		Yes (in the hospital)	30
		No	17

Relating to the possible causes of the infection, more than half of the participants 329 (51.5%) were positive about their infection after getting - in close contact - with other positive patients. While 205 (32.1%) said that they were working in different health sectors, and 81 (12.7%) of the participants were not sure about the possible cause or source of their infection with COVID-19, Meanwhile, only 24 (3.8%) assumed that the infection cause was relating to their attendance to crowded places.

Considering the testing technique that was used to confirm the SARS-CoV-2 infection, the biggest part of the participants 257 (40.3%) assumed that staying in -close contact- with symptomatic COVID-19 patient was the way that their positive infection was assured (which means that the participant was sure about his/her infection without any additional viral or serological tests). This was followed by 247 (38.7%) of participants who confirmed their infection after getting positive detection of SARS-CoV-2 RNA by reverse transcription polymerase chain reaction (RT-PCR), either from nasopharynx or throat samples. Results showed that 89 (14%) from the participants choose CT scan as the test they used for SARS-CoV-2 confirmation. However, the least proportion, which counts 43 (6.7%), relied on The Rapid test for SARS-CoV-2 confirmation.

The collected data about Illness Presentation (early symptoms) was showed that most of the patients, 449 (70.4%), had raised body temperature (fever), Followed by 427 (66.8%) who showed severe headache, the 3rd most revealed symptom was Pain and body aches which was presented in 406 (63.5%) of the participants. Loss of taste and/ or smell was presented in 341 (53.4%) of the participants. Sore or burning throat sensation was found in 319 (49.9%) of them. Dry cough, loss of appetite, diarrhea, difficulty in breathing (or shortness in breath) and other symptoms and their frequencies are all illustrated in Table 3.

Table 3: Illness Presentation (Early symptoms)

Early Symptoms of COVID-19	No. of patients	Percentage
Raised body temperature (fever)	449	70.3%
Severe headache	427	66.8%
Pains and body aches	406	63.5%
Loss of taste and/or smell	341	53.4%
Throat burning and/or pain	319	49.9%
Dry cough	290	45.4%
Loss of apatite	252	39.4%
Diarrhea	220	34.4%
Difficulty in breathing or shortness of breath	195	30.5%
Nausea and vomiting	116	18.2%
Skin rash, or discoloration of fingers or toes	38	5.9%
Asymptomatic	15	2.3%
Other symptoms	53	8.3%

Emaciation and fatigue was presented in many patients, and it may continue after full recovery from the disease. Also, Hypotension was presented in some patients prior to the onset of the disease symptoms, and it may continue for few days.

As (loss of smell and taste) was found as one of the most common symptoms, many patients assured that it may took long time (Up to 3 months after the recovery) until smell and taste return to its normal state and function.

Regarding the next question, which deals with the most severe symptom during the disease course, pain and body aches and/or weakness was found to be the most presented symptom, and 368 (57.6%) of the participants were having these symptoms. Meanwhile, 140 (21.9%) of the participants had chest pressure and pain, and only 131 (20.5%) of patients were presented with Difficulty of breathing and/or shortness of breath. However, 191 (29.9%) of the patients was presented with other severe symptoms, which will be illustrated later in the results.

Relating to the SpO_2 level (Oxygen saturation in blood), the study revealed that a largest portion of the participants 420 (65.7%) had High SpO_2 level (95% or more), in addition, 141 (22.1%) of the participants showed SpO_2 level between 80-94%, and only 14 (2.2%) of the patients showed less than 80% SpO_2 level.

However, only 64 (10%) of the participants didn't know the exact oxygen saturation in their blood during the infection period.

Dealing with the Time period needed from the onset of the symptoms till the clinical recovery (symptoms disappearance), Most of the patients, 311(48.7%), took about 7-14 days till the end of the symptoms, and 170 (26.6%) of the participants took only about 1 week. However, only 158 (24.7%) of them needed more than 14 days till the clinical recovery from the disease.

Most of the participants, 536 (83.9%), had no systemic diseases, health problem and/or not taking any chronic medications. However, only 103 (16.1%) of the participants had different systemic diseases and/or health problems, the most presented diseases is illustrated in the Table 4.

Table 4: The most presented Health conditions and diseases

Systemic Diseases and other health problems	No. of patients (Frequencies)	Percentage
Hypertension	32	5.00%
Diabetes	21	3.29%
Asthma	19	2.97%
Hypothyroidism	6	0.94%
pregnancy	4	0.63%

Dealing with the most important question that was given to the participants, which reveals all the medications and drugs that were used during the infection period, only 83.41% of the participants (533 out of 639 subjects) answered this question (as it was an optional question).

The answers were collected, assorted and illustrated in table 5, from the most to the less taken drugs and medications till clinical recovery.

Table 4: The distribution of medications and supplements used by the study sample

Type of Medication	No. of Participants (Frequencies)	Percentage
Azithromycin	385	72.20%
Paracetamol	288	54.03%
Vitamins and Other supplements	Zinc (272)	51.03%
	Vit. C (266)	49.90%
	Vit. D (256)	48.03%
	Omega3 (17)	3.19%
Aspirin	37	6.94%
Other antibiotics (Amoxicillin)	15	2.81%

Considering the quarantine (isolation) for patients during the infection period, the study data revealed that 592 (92.6%) of the participants were quarantined at home, and 30 (4.7%) were isolated and quarantined inside the hospital for the entire infection period, while only 17 (2.7%) of the patients were not isolated during the illness stages.

Discussion

The new pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has presented serious challenges to the healthcare systems in almost every country around the world [20].

In our study, the results showed that the age group of most of the participants (57.9%) was between 18-29 years, followed by (23.6%) of the participants between (30-39) years old. Also, the collected data showed that 75% of the participants were females, and only 25% were males. The reason behind these percentage is that the most of the responses were collected from the female doctors, dentists and pharmacists and their relatives and families and relatives through Facebook groups, as the electronic questionnaire was published Online between medical groups more than general groups, and also the most active members were the young females working in the medical field.

Relating to the possible causes of the infection, more than half of the participants (51.5%) were positive about their infection after getting - in close contact- with other positive patients. While about (32%) said that they were working in different health sectors, this is because of the nature of their work field, as most of the participants are working in health care institutions, and they work in close contact with ill patients. And (12.7%) of the participants were not sure about the possible cause or source of their infection with COVID-19, Meanwhile, only 3.8% assumed that the infection cause was relating to their attendance to crowded places. These results agreed with (McMichael TM *et al.*, 2020) [21] and (Heinzerling A *et al.*, 2020) [22] which found that long-term care facilities and hospitals are settings in which persons at higher risk for severe COVID-19 illness are in close contact with staff members, many of whom work at multiple facilities. Also, findings agreed with (Rocklöv J and Sjödin H, 2020) [23], which found that high-density settings also might contribute to the spread of COVID-19.

Considering the testing technique that was used to confirm the SARS-CoV-2 infection, more than 40% of the Participants assumed that staying in -close contact- with symptomatic COVID-19 patient was the way that their positive infection was assured (which means that the participant was sure about his/her infection without any additional viral or serological tests).

This was followed by 38.7% of participants who confirmed their infection after getting positive detection of SARS-CoV-2 RNA by reverse transcription polymerase chain reaction (RT-PCR), either from nasopharynx or throat samples. These findings agreed with (Zitek T. 2020) [24] which found that the most commonly used test for detecting SARS-CoV-2 is a nasopharyngeal swab that uses a reverse transcriptase-polymerase chain reaction (RT-PCR) to identify viral RNA. Data from *in vitro* analyses suggest that the RT-PCR test is highly specific for SARS-CoV-2, but in clinical settings the sensitivity of the nasopharyngeal RT-PCR swab tests for diagnosing COVID-19 is questionable.

Almost (14%) from the participants choose (CT scan) as the test they used for SARS-CoV-2 confirmation. The results of a study by Fang Y *et al*. in 2020 [25] showed that the sensitivity of chest CT was greater than that of RT-PCR (98% vs. 71%, respectively, and it supports the use of chest CT for screening for COVD-19 for patients with clinical and epidemiologic features compatible with COVID-19 infection particularly when RT-PCR testing is negative.

The collected data about Illness Presentation was showed that most of the patients (70.4%) had raised body temperature (fever), Followed by (66.7%) who showed severe headache, with Pain and body aches which was presented in (63.7%) of the participants. Loss of taste and/or smell was presented in (53.4%) of the participants. Sore or burning throat sensation was found (49.9%). Moreover, dry cough, loss of appetite, diarrhea, difficulty in breathing (or shortness in breath) and other symptoms were also presented with lower percentages.

The results of our study agreed with many studies in many symptoms with different percentages, such as the results that reported in a study by Stokes EK, 2020 In the United States [26], which revealed that more than 370,000 confirmed COVID-19 cases with symptoms, 70% of patients experienced fever, cough, or shortness of breath, while 36% of them had muscle aches, and 34% reported headaches. Other reported symptoms have included, but are not limited to, diarrhea, dizziness, rhinorrhea, anosmia, dysgeusia, sore throat, abdominal pain, anorexia, and vomiting.

Another study by Guan W.J. in China [27], symptomatic subjects showed early-phase fever in 45%, and constitutional symptoms, such as muscle or bone aches,

chills, headache, sore throat, and nasal congestion, were observed.

Regarding the neurological manifestations, such as the loss of smell and taste, and headache, a study by Ahmad I and Rathore F.A., 2020 [28] and another one by Mao L, *et al*. 2020 [29] agreed with our research findings.

Comparing to our results, a study by Calıca Utku *et al*., 2020 [30], showed similar symptoms but with different percentages, where the most common symptoms in the COVID-19 positive group were: cough (56.6%), weakness (56.6%), taste disorder (35.7%), myalgia (34.3%) and fever (33.6%), and diarrhea were significantly higher in COVID-19 positive patients.

In 2020, Wu Z and McGoogan JM [31]. Define severe clinical manifestations of Covid-19 in adults such as dyspnea, respiratory rate of 30 or more breaths per minute and blood oxygen saturation of 93% or less. However, in our study, the most severe symptoms during the disease course are pain and body aches and/or weakness, which was found to be the most presented symptom. Followed by (21.9%) of the participants had chest pressure and pain, and (20.5%) with Difficulty of breathing and/or shortness of breath.

Relating to the SpO_2 level, the study revealed that a largest portion had High SpO_2 level (95% or more), with 22.1% of the participants showed SpO_2 level between 80-94%, and only 14 (2.2%) of them showed less than 80% SpO_2 level.

This can be related to the degree if illness. According to the National institutes of Health, 2019 [32], moderate illness is defined as evidence of lower respiratory disease during clinical assessment or imaging, with $SpO_2 \geq 94\%$ on room air at sea level. While Patients with COVID-19 are considered to have severe illness if they have SpO_2 30 breaths/min.

Dealing with the Time period needed from the onset of the symptoms till the clinical recovery (symptoms disappearance), Most of the patients (48.7%) took about 7-14 days till the end of the symptoms, and (26.6%) of the participants took only about 1 week, and (24.7%) of them needed more than 14 days till the clinical recovery from the disease. These results could be due to different in patient age, health status, treatment and medication they use, and severity of infection. A study by Chang *et al*. in 2020 [33] concluded that the Mean of Days from onset of symptoms to resolution of symptoms was 8 (6.25-11.5).

Dealing with the medications and drugs that were used during the infection period, More than 80% answered the question. Different medications and supplements were used during the illness period, such as Azithromycin, Paracetamol, Vitamins (Vit. C and D) and other supplements (Zinc and Omega 3), Aspirin and Other antibiotics such as (Amoxicillin).

Different Antiviral drugs were approved by the FDA such as Chloroquine, Hydroxychloroquine, Lopinavir/Ritonavir, Remdesivir. The role of antiviral medications that specifically target SARS-CoV-2 is not clear.

The role of vitamin D supplementation in the prevention or treatment of COVID-19 is not known. The rationale for using vitamin D is based largely on immunomodulatory effects that could potentially protect against COVID-19 infection or decrease the severity of illness. Ongoing observational studies are evaluating the role of vitamin D in preventing and treating COVID-19.

Vitamin C has beneficial immuno-modulating properties in patients with viral infections. However, there are insufficient data for the COVID-19 Treatment Guidelines Panel (the Panel) to recommend either for or against the use of vitamin C for the treatment of COVID-19 in critically ill or non-critically ill patients. No specific treatment for COVID-19 has been developed or approved yet [32].

Considering the quarantine during illness period, more than 90% of the study samples were home-quarantined. According to the CDC treatment guidelines, it is recommended to stay in quarantine for 14 days [32].

Conclusion
1. Most of the participants were females, aged between 18 and 39 years, and free of any health problems or systemic diseases.
2. The most used test to confirm positive COVID-19 infection was the reverse transcription polymerase chain reaction (RT-PCR), however, the biggest part of the participants assumed that staying in -close contact- with symptomatic COVID-19 patient was the way that their positive infection was assured.
3. Illness Presentation (early symptoms) showed that most of the patients had raised body temperature, severe headache, and body aches.
4. About half of the participants took about 7-14 days to get full clinical recovery.
5. Most of the participants had High SpO_2 level (95% or more).
6. Most of the recovered patients had mild and moderate illness.
7. Most of the participants used simple and available medications (Azithromycin, Aspirin and paracetamol) and supplements (Zinc, Vit. C and D, and Omega 3) during the infection period.
8. Almost all of the participants had their quarantine at home during the illness period.

Recommendation
Further studies are needed to investigate the routes of infection in the Iraqi society, and increase the degree of awareness of COVID-19 among the population.

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