

Knowledge and Awareness of Iraqi Population toward (COVID-19) Pandemic, A Cross-Sectional Study

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ABSTRACT

COVID-19 is incoming β -coronavirus emerged from Wu-han, a city in central east of China in end of 2019. SARS-CoV-2 is the agent that causes the COVID-19 pandemic which is a highly transmittable and pathogenic virus infection. This paper is performed to determine the knowledge and awareness of COVID-19 among Iraqi population via cross-sectional study was conducted in Iraq during the period from April 2020 to May 2021 via social media targeted all the Iraqi population starting from age 11 years. This study included 303 participants which involved 117 men and 186 women. The participants were divided into five groups depending on the age: group I includes 11-20 year, group II includes 21-30 year, group III includes 31-40 year, group VI includes 41-50 year and group V includes more than 50 year old. Data which was collected using questionnaire were statistically analysis. The present study shows 99.01% of participants were aware that avoiding overcrowded places, wearing face mask, washing hands with soap and using sterilizer would protect them from COVID-19 infection. 95.05% of participants agreed that coronavirus disease is an extremely pathogenic and transmissible viral infection. The current study show that 91.09% and 91.42% participants believed that the incubation period of COVID-19 ranging from 2-14 days and the quarantine period should extend to 21 days respectively. The people older than 50 years had limited information about this pandemic. This study shows a satisfactory level of COVID-19 knowledge among Iraqi population. However, it mirrors the need for educational programs targeting the age groups which are not using significantly the social media.



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1. Introduction

Introduction: Late December 2019 in Wu-han, China, a highly contagious and transmissible virus infection emerged after reported unexplained cases of pneumonia [1]. The outbreak began from the seafood market in this city and quickly spread nationwide and infected more than 50 people [2], a novel β -coronavirus that

was identified by the Chinese Center for Disease Control and Prevention (CCDC) was named officially as SARS-CoV-2 and the disease that causes was called COVID-19 [3]. SARS-CoV-2 belongs to epidemic coronaviruses which include severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) [4], [5]. SARS-CoV, which was widespread in 2002-2003, had higher morbidity and higher mortality rates. However, SARS-CoV-2 seems having more transmission mechanisms and immune surveillance evasion than SARS-CoV [6]. Analysis of genomic sequences showed that phylogenetically of SARS-CoV-2 is related to the bat viruses that responsible for SARS-like, therefore, there is a possibility that the bat is the primary reservoir of the virus and represents the third zoonotic coronavirus outbreak occur during twenty years of the 21st century which caused deeply global health concerns because of the rapid spread of the disease among people, which prompted the World Health Organization to declare that COVID-19 classified as a pandemic [7]. SARS-CoV-2 is an enveloped novel β -coronavirus with a single-stranded positive-sense RNA genome, four structural proteins encoded by surface glycoprotein spike S, envelope E, membrane M and nucleocapsid N genes. These surface glycoproteins have an important role in initiating infection through their binding to angiotensin-converting enzyme 2 (ACE2) receptors on the host cells [8]. Recently, ACE2 receptor was reported as the infective agent who is responsible for COVID-19 “providing a critical link between immunity, inflammation, ACE2, and cardiovascular disease” [9]. In addition, host cellular proteases play an important role in SARS-CoV-2 entry and infecting cells through proteolytic modified of S-proteins and ACE2. Since SARS-CoV-2 differs from SARS-CoV through many changes in amino acid residues, this allows for the enhancement of hydrophobic reactions and salt-bridging formations which in turn make SARS-CoV-2's binding affinity with ACE2 stronger than SARS-CoV and then much larger global impact [10], [11]. Inhibition of SARS-CoV /ACE2 interaction “by blocking the receptor-binding domain (RBD) of the viral S-protein” might be a potential treatment for SARS-CoV-2 [9], [12]. Although the primary infections occurred for patients who visited the seafood market, more investigations conducted and showed that the subsequent infection was picked up by people who had not visited this market [13].

Additionally, some patients transmitted COVID-19 virus to other healthy people without symptoms which results in spreading the disease [14]. While 80% of patients recovered from this novel virus with no need for special treatment, about 1 in 6 people who have COVID-19 becomes seriously ill leading to develop difficulty breathing, including pneumonia [14]. Countries of the world have conducted cross-sectional surveys which are presented online to the participants to quickly evaluate the awareness of public people, understanding of healthy behavior, detecting sources of information, misinformation of COVID-19 pandemic [15- 19]. Geldsetzer, in early of the pandemic, has found that the American and British public having sufficient awareness of disease transmission [20], However, insufficient of understanding the appropriate preventive measures and also a misinformation which have taken from social media leading to spread the COVID-19 pandemic [20]. Epidemic mitigation steps include measures that start at the global level and move to the patient level [21]. The present study aimed to assess the knowledge and awareness of SARS-CoV-2 among Iraqi population according to their awareness of how can handle with this novel virus. Furthermore, assessment their knowledge about signs and symptoms of the infected people, the mechanism pathways by which the virus transmission, treatment options that are available and the mechanisms of the isolation of the infected patients have done. However, little is known about this novel pandemic [13].

2. Methods

2.1 Participants

This study included 303 participants which involved 117 men and 186 women. It performed by using three criterions which are age, sex and education. The participants were divided into five groups depending on

the age: group I includes 11-20 year, group II includes 21-30 year, group III includes 31-40 year, group IIII includes 41-50 year and group IIIII includes more than 50 year old. Depending on participant sex, they are divided into two groups: male and female. As for education, they are divided into three groups: primary and secondary education, BSc and postgraduate.

2.2 Measures

The knowledge and awareness of SARS-CoV-2 among population was measured using version of self-administered questionnaire (Appendix 1). This questionnaire was design by the authors and was approved by two experts in the microbiological division of the Medicine and Education for Pure Science College / University of Diyala. The questionnaire was written in Arabic, the official language of Iraq, and then translated back into English for publishing purpose. The questionnaire included fourteen questions to collect data related to the knowledge of SARS-CoV-2. The questionnaire evaluated knowledge by using “Yes / No / Don’t know” patterns.

2.3 Procedure

The questionnaire-based survey was conducted at Iraq during the period from 1st of April (2020) to 1st of July (2020) via Google form which presented to participants through social media (Facebook and Whatsapp). Because of the full quarantine imposed by the Iraqi government, questionnaire could not be presented face to face. This study targeted all the Iraqi population starting from age 11 years. 303 questionnaires completed and returned back to authors.

2.4 Statistical analysis

The Statistical Analysis System- SAS [22] (2012) program was used. Chi-square test was used to significant compare between different variables according to the correct answer to the question only and P - value of < 0.05 was considered significance.

3. Results

All the three hundred and three participants who involved in this study responded correct answer to most questions which mirrors a satisfactory level of awareness of the novel SARS-CoV-2 among Iraqi population. Statistical analysis of awareness of participants to all the fourteen questions is shown in Table 1 bellow.

Table 1: The knowledge and awareness of SARS-CoV-2 among participants

NO	Questions	No (%) Yes	No (%) No	No (%) Don't know	Chi- square value	P- value
Q1	In 2019, December 29, a novel β -coronavirus was identified and quickly spread worldwide, the first four cases which have been reported related to the seafood wholesale market in Wuhan (Southern China).	262 (86.47)	41 (13.53)	0	(13.81**)	(0.0001)
Q2	Is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) the pathogen for COVID-19?	132 (43.56)	61 (20.13)	110 (36.30)	(8.63 **)	(0.0066)
Q3	Is the COVID-19 an extremely pathogenic and transmissible viral infection?	288 (95.05)	9 (2.97)	6 (1.98)	(14.51 **)	(0.0001)
Q4	Is the coronavirus disease 19 (COVID-19) transmitted from person to the person through either direct contact with an infected person or exposed to coughing, sneezing, respiratory droplets or aerosols?	297 (98.02)	3 (0.99)	3 (0.99)	(14.96 **)	(0.0001)
Q5	Is the incubation period of the coronavirus disease 19 of 2 to14 days, after which symptoms appear on the affected person?	276 (91.09)	11 (3.63)	16 (5.28)	(14.29 **)	(0.0001)

Q6	Can global travel increase the prevalence of Coronavirus-19 (COVID-19) disease worldwide?	294 (97.03)	6 (1.98)	3 (0.99)	(14.76 **)	(0.0001)
Q7	Is it possible that COVID-19 virus transmitted from infected people without symptoms (asymptomatic carriers) to other healthy people?	259 (85.48)	11 (3.63)	33 (10.89)	(13.57 **)	(0.0001)
Q8	Is the fever accompanied by other respiratory symptoms (such as coughing and shortness of breath) are the first signs of coronavirus disease 19?	250 (82.51)	32 (10.56)	21 (6.93)	(13.39 **)	(0.0001)
Q9	Is an extension of the adult quarantine period to 18 days or 21 days could be more effective in preventing virus-spreading and controlling the disease?	277 (91.42)	11 (3.63)	15 (4.95)	(14.40 **)	(0.0001)
Q10	Are the cells lining the throat, airways and lungs the first areas to be infected by the virus and turn them into "corona virus factories" that emit massive numbers of new viruses that continue to infect more cells?	238 (78.55)	17 (5.61)	48 (15.84)	(12.87 **)	(0.0006)
Q11	In the absence of effective treatments, do you think that the best way to handle with this novel virus is by controlling the sources of infection strategies that including early diagnoses, reporting, domestic isolation, and supportive treatments and maintenance of social distancing?	291 (96.04)	2 (0.66)	10 (3.30)	(11.56 **)	(0.0001)
Q12	Do you think that avoiding overcrowded places, always washing hands with soap and sterilizers, wearing medical face masks, sufficient rest, and maintaining good ventilation in the rooms of the house, have a big role in avoiding infection with the virus?	300 (99.01)	3 (0.99)	0	(15.06 **)	(0.0001)
Q13	Which population group is at greater risk of developing COVID-19.	Ageing 276 (91.09)	Adults 24(7.92)	Children 3(0.99)	(14.28 **)	(0.0001)
Q14	Is there an antiviral drug or a clinically approved vaccine available for use against infection with (COVID-19)?	24 (7.92)	214 (70.63)	65(21.45)	(11.49 **)	(0.0005)

** (P<0.01).

The participants were divided into five groups to precisely assess which age group has high level of the knowledge and awareness. Among five age groups, Age 21-30 year was the best age group to correctly answered reflecting increase in the knowledge in this group Table 2 and figure 1.

Table 2: Relationship of Age with the different questions

NO	Questions	Percentage (%)					Chi-square value
		11-20 year.	21-30 year.	31-40 year.	41-50 year.	≥ 50 year.	
Q1	In 2019, December 29, a novel β -coronavirus was identified and quickly spread worldwide. The first four cases which have been reported related to the seafood wholesale market in Wuhan (Southern China).	13.86	34.32	19.14	12.21	6.93	8.91 **
Q2	Is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) the pathogen for COVID-19?	4.95	16.17	10.89	7.59	3.96	5.02 *
Q3	Is the COVID-19 an extremely pathogenic and transmissible viral infection?	14.52	37.95	22.44	12.87	7.26	9.15 **
Q4	Is the coronavirus disease 19 (COVID-19) transmitted from person to the person through either direct contact with an infected person or exposed to coughing, sneezing, respiratory droplets or aerosols?	16.17	37.95	22.77	13.86	7.26	9.21 **
Q5	Is the incubation period of the coronavirus disease 19 of 2 to 14 days, after which symptoms appear on the affected person?	15.18	34.98	21.78	12.54	6.60	9.07 **
Q6	Can global travel increase the prevalence of Coronavirus-19 (COVID-19) disease worldwide?	16.50	36.96	22.44	13.86	7.26	9.61 **
Q7	Is it possible that COVID-19 virus transmitted from infected people without symptoms (asymptomatic carriers) to other healthy people?	12.21	31.68	22.11	12.54	6.93	8.69 **

Q8	Is the fever accompanied by other respiratory symptoms (such as coughing and shortness of breath) are the first signs of coronavirus disease 19?	13.86	33.00	18.48	11.22	5.94	8.72 **
Q9	Is an extension of the adult quarantine period to 18 days or 21 days could be more effective in preventing virus-spreading and controlling the disease?	14.85	35.31	21.78	12.87	6.60	8.91 **
Q10	Are the cells lining the throat, airways and lungs the first areas to be infected by the virus and turn them into “corona virus factories” that emit massive numbers of new viruses that continue to infect more cells?	12.87	29.37	18.81	12.87	4.62	8.55 **
Q11	In the absence of effective treatments, do you think that the best way to handle with this novel virus is by controlling the sources of infection strategies that including early diagnoses, reporting, domestic isolation, and supportive treatments and maintenance of social distancing?	16.17	35.97	23.10	13.86	6.93	9.31 **
Q12	Do you think that avoiding overcrowded places, always washing hands with soap and sterilizers, wearing medical face masks, sufficient rest, and maintaining good ventilation in the rooms of the house, have a big role in avoiding infection with the virus?	16.50	38.28	23.10	13.86	7.26	10.46 **
Q13 Aging	Which population group is at greater risk of developing COVID-19.	14.85	35.97	20.46	13.53	6.27	9.03 **
Q14	Is there an antiviral drug or a clinically approved vaccine available for use against infection with (COVID-19)?	1.98	3.30	0.99	1.65	0.00	0.886 NS

* (P<0.05), **(P<0.01).

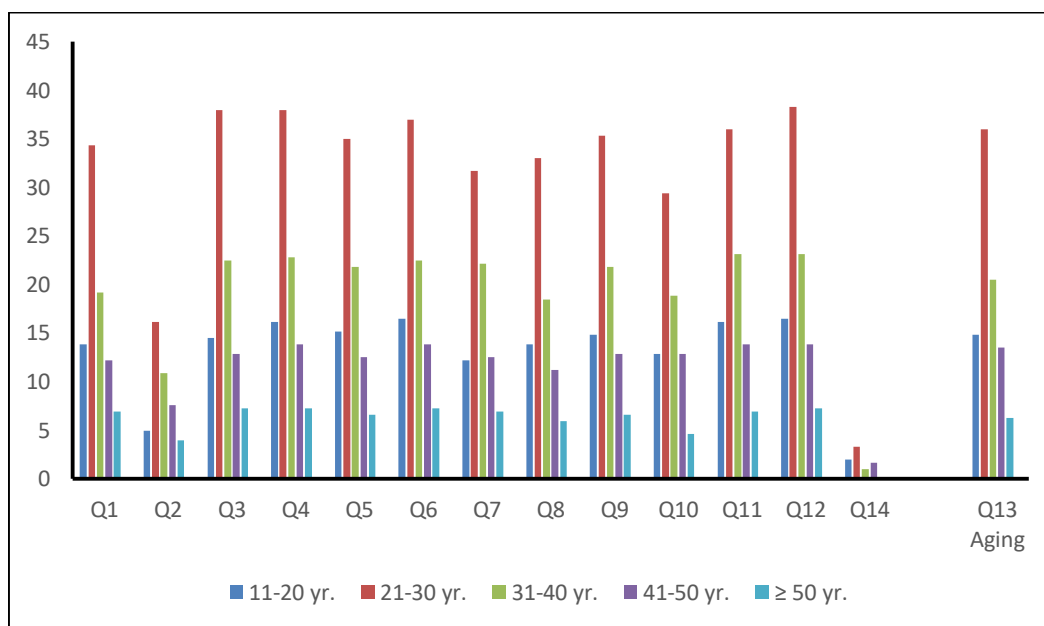


Figure 1: Levels of knowledge of COVID-19 according to different ages. This figure has illustrated that 21-30 year had high level of knowledge and people older than 50 year had the low level.

Basically, knowledge and awareness of females were higher than in males at all the questions. Furthermore, the differences reached statistical significance as shown in Table 3 and figure 2.

Table 3: Relationship of gender with the different questions

NO	Questions	Gender (%)		Chi-square value
		Male	Female	
Q1	In 2019, December 29, a novel β -coronavirus was identified and quickly spread worldwide. The first four cases which have been reported related to the seafood wholesale market in Wuhan (Southern China).	33.99	52.47	7.95 **
Q2	Is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) the	17.82	25.74	4.68 *

	pathogen for COVID-19?			
Q3	Is the COVID-19 an extremely pathogenic and transmissible viral infection?	36.96	58.09	8.74 **
Q4	Is the coronavirus disease 19 (COVID-19) transmitted from person to the person through either direct contact with an infected person or exposed to coughing, sneezing, respiratory droplets or aerosols?	36.96	61.06	8.59 **
Q5	Is the incubation period of the coronavirus disease 19 of 2 to 14 days, after which symptoms appear on the affected person?	36.30	54.79	7.66 **
Q6	Can global travel increase the prevalence of Coronavirus-19 (COVID-19) disease worldwide?	36.30	60.72	8.52 **
Q7	Is it possible that COVID-19 virus transmitted from infected people without symptoms (asymptomatic carriers) to other healthy people?	35.64	49.84	5.27 *
Q8	Is the fever accompanied by other respiratory symptoms (such as coughing and shortness of breath) are the first signs of coronavirus disease 19?	32.01	50.50	7.03 **
Q9	Is an extension of the adult quarantine period to 18 days or 21 days could be more effective in preventing virus-spreading and controlling the disease?	34.65	56.76	8.17 **
Q10	Are the cells lining the throat, airways and lungs the first areas to be infected by the virus and turn them into "corona virus factories" that emit massive numbers of new viruses that continue to infect more cells?	30.69	47.85	6.42 **
Q11	In the absence of effective treatments, do you think that the best way to handle with this novel virus is by controlling the sources of infection strategies that including early diagnoses, reporting, domestic isolation, and supportive treatments and maintenance of social distancing?	37.95	58.09	7.50 **
Q12	Do you think that avoiding overcrowded places, always washing hands with soap and sterilizers, wearing medical face masks, sufficient rest, and maintaining good ventilation in the rooms of the house, have a big role in avoiding infection with the virus?	37.95	61.06	8.92 **
Q13 Aging	Which population group is at greater risk of developing COVID-19.	32.01	59.08	8.71 **
Q14	Is there an antiviral drug or a clinically approved vaccine available for use against infection with (COVID-19)?	2.64	5.28	0.885 NS
* (P<0.05), ** (P<0.01).				

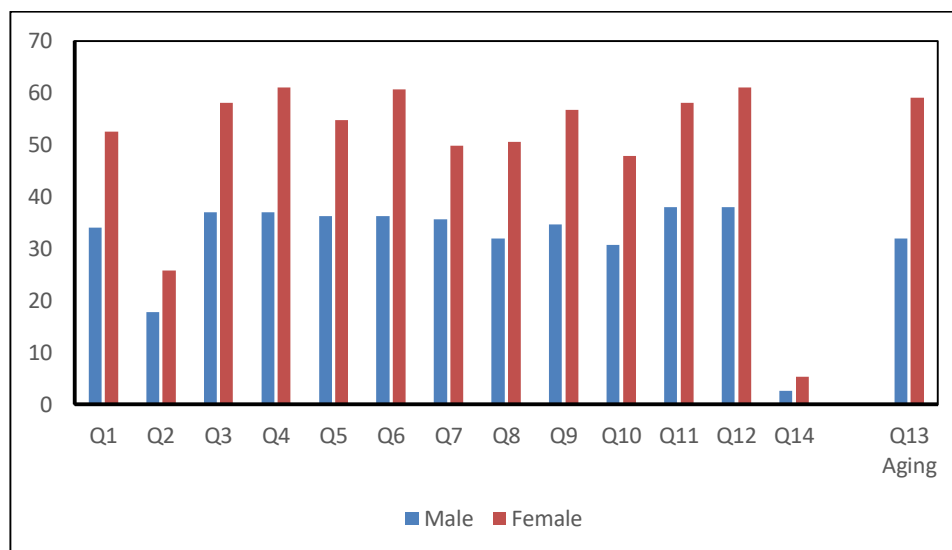


Figure 2: Level of COVID-19 knowledge according to sex, this figure shown that the female had high level of COVID-19 related information.

The questionnaire showed that a strong relationship between education and awareness among all the participants. BSc graduate participants have high level of awareness of this pandemic infection. Unexpected, knowledge was limited in post-graduate participants Table 4 and figure 3.

Table 4: Relationship of Education with the different questions

NO	Questions	Percentage (%)			Chi-square value
		Primary and Secondary	BSc.	Post graduate	
Q1	In 2019, December 29, a novel β -coronavirus was identified and quickly spread worldwide. The first four cases which have been reported related to the seafood wholesale market in Wuhan (Southern China).	11.55	59.74	15.18	10.35 **
Q2	Is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) the pathogen for COVID-19?	5.94	29.70	7.92	8.03 **
Q3	Is the COVID-19 an extremely pathogenic and transmissible viral infection?	12.87	66.01	16.17	11.48 **
Q4	Is the coronavirus disease 19 (COVID-19) transmitted from person to the person through either direct contact with an infected person or exposed to coughing, sneezing, respiratory droplets or aerosols?	12.54	68.64	16.83	11.94 **
Q5	Is the incubation period of the coronavirus disease 19 of 2 to 14 days, after which symptoms appear on the affected person?	12.21	62.71	16.17	10.89 **
Q6	Can global travel increase the prevalence of Coronavirus-19 (COVID-19) disease worldwide?	12.87	66.99	17.16	11.58 **
Q7	Is it possible that COVID-19 virus transmitted from infected people without symptoms (asymptomatic carriers) to other healthy people?	11.88	57.09	16.50	10.35 **
Q8	Is the fever accompanied by other respiratory symptoms (such as coughing and shortness of breath) are the first signs of coronavirus disease 19?	11.55	57.09	13.86	10.26 **
Q9	Is an extension of the adult quarantine period to 18 days or 21 days could be more effective in preventing virus-spreading and controlling the disease?	11.88	63.36	16.17	11.08 **
Q10	Are the cells lining the throat, airways and lungs the first areas to be infected by the virus and turn them into "corona virus factories" that emit massive numbers of new viruses that continue to infect more cells?	10.56	54.78	13.20	10.33 **
Q11	In the absence of effective treatments, do you think that the best way to handle with this novel virus is by controlling the sources of infection strategies that including early diagnoses, reporting, domestic isolation, and supportive treatments and maintenance of social distancing?	13.53	65.34	17.16	12.41 **
Q12	Do you think that avoiding overcrowded places, always washing hands with soap and sterilizers, wearing medical face masks, sufficient rest, and maintaining good ventilation in the rooms of the house, have a big role in avoiding infection with the virus?	13.53	67.99	17.49	12.73 **
Q13 Aging	Which population group is at greater risk of developing COVID-19.	12.54	63.37	15.18	10.64 **
Q14	Is there an antiviral drug or a clinically approved vaccine available for use against infection with (COVID-19)?	0.66	5.94	1.32	1.07 NS

**($P < 0.01$).

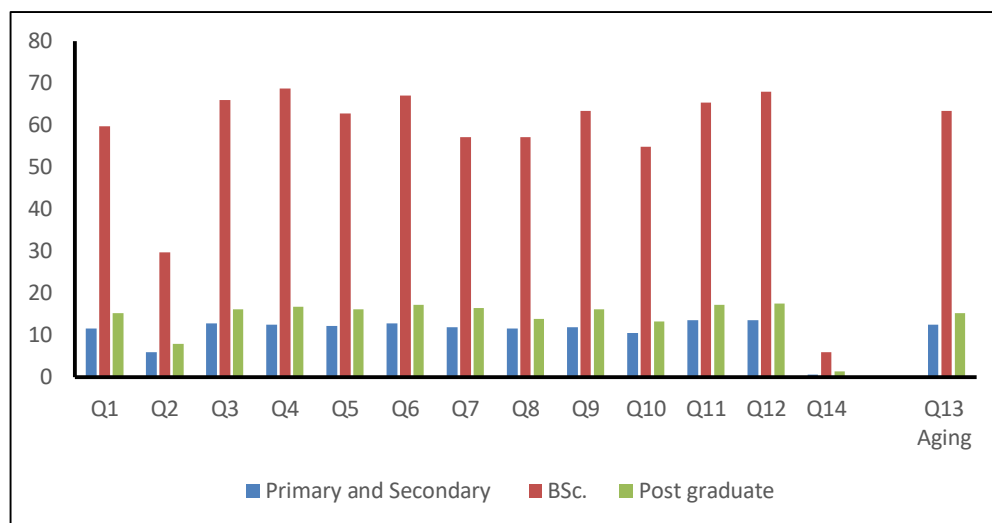


Figure 3: Level of COVID-19 knowledge according to education. This figure has shown that the level of knowledge of COVID-19 was high in BSc graduate participants. However, post graduate had the low level of coronavirus information.

4. Discussion

This study assessed the awareness and knowledge of Iraqi society towards COVID-19 and revealed high level of awareness of this pandemic infection among Iraqi population. This study performed by using three criterions which are age, sex and education to assess COVID-19 related knowledge among Iraqi population. The Original Bloom's Cut off Points used to evaluate the levels of knowledge. The scores 80-100%, 60-79% and $\leq 59\%$ were considered high, moderate and low level of knowledge respectively [23], [24]. This cross-sectional online survey on 303 participates revealed that the majority of them having a good knowledge of COVID-19 pandemic which reflects the positive role for the media to explain all information for this novel virus. This supports all efforts that the organizations such as the World Health Organization (WHO) [25], worldwide public health networks [26], and government public health agencies [27] had made. They have worked extremely to inform of public all emerging information by using internet, television and radio. Almost all the participated knew, with a rate of (99.01%), that avoiding overcrowded places, always cleaning hands with soap and sterilizers, wearing medical masks of face, sufficient rest, and maintaining good ventilation in the rooms of the house, have a big role in avoiding infection with the virus. Previous studies conducted in India and Jordan have found that the majority of partakers were conscious that cleaning hands, using hand sterilizer and wearing face mask could protect them from COVID-19 infection [28], [29]. However, one of the WHO recommendations is wearing face mask for population does not necessary except if they are in direct contact with people either infected with COVID-19 virus or having coughing and sneezing [30]. While, 132(43.56%) of participated had a low level of knowledge about the agent of the COVID-19 pandemic which is severe acute respiratory syndrome coronavirus (SARS-CoV-2). [28] reported that half of the participants had limited awareness of SARS-CoV-2, causes COVID-19 pandemic. COVID-19 is considered the novel respiratory virus transmitted by human to human and animal to human interaction [3], [31]. Our results showed that participants had high levels of knowledge of human to infected human interactions could be resource to spread this novel virus and global travel can increase this pandemic. The overall scores were (98.02%) and (97.03%) respectively with statistically significant (0.0001) for both.

Additionally, the awareness of participants to the possibility of COVID-19 virus transmission from infected people without symptoms (asymptomatic carriers) to other healthy people were high with score 85.48%,

291(96.04) of participants responded correctly to the question that deal with strategies that control this pandemic which includes early diagnoses, reporting, isolation, and supportive treatments. In a similar study performed in Jordan, found that 87.9% of Jordanian population agreed that the domestic isolation for coronavirus patients and their relatives is considered best strategies to control spread of this pandemic [29]. Knowledge related incubation period of COVID-19 and adult quarantine period were assessed. The study shown that 276(91.09) and 277(91.42) participants were aware of the incubation period of the coronavirus disease 19 of 2 to 14 days and the adult quarantine period should extend to 18 days or 21 days could be more effective in preventing virus-spreading respectively. [21] reported 89% participants were aware that the duration of quarantine for COVID-19 should be 14 days. Similarly, WHO recommended the duration of quarantine to prevent spread COVID-19 pandemic is 14 days [32]. Almost all the participants (288) knew that coronavirus disease is an extremely pathogenic and transmissible viral infection with score (95.05%), this consistent with the fact that the coronavirus has entry strategies to infect human cells which explain the wide spread of this virus [6]. Furthermore, 262(86.47%) of participants agreed that the source of this pandemic from Wuhan, China. 250(82.51%) participants were aware that shortness of breath and cough were the first signs of the disease. While, 238(78.55%) believed that airways and lungs are the first areas infects by the virus and turn them into “corona virus factories” that emit massive numbers of new viruses that continue to infect more cells. In a review article, [33] indicated that the COVID-19 disease emerged from the seafood market in Wuhan, China.

Moreover, it referred to isolation of this virus from airway epithelial cells of infected people [33]. The present study have shown that the participants had high level of knowledge of sequence of population group at greater risk of developing COVID-19 which were; Ageing 276(91.09); Adults 24(7.92) and Children 3(0.99). [34], reported that COVID-19 infection occurs in all the age groups but it occurs mild in children. Additionally, older people and persons who have high blood pressure, diabetes, heart disease, lung disease and cancer are at greater risk of COVID-19 developing [28]. Regarding the age groups, the best age group answered correctly to all the fourteenth questions was 21-30 yrs. This result reflects high level of knowledge to COVI-19 pandemic among this group. [35] indicated that the students are young people and have their own mobile devices with the internet available almost all the time [35] which may explain the high levels of COVID-19 related knowledge among students. In a study conducted on students at United Arab Emirates (UAE) shown that the participated students had moderate level of information related with this novel pandemic with score 72.4% [36]. It reported that the majority of participants (85.2%) depending on the internet and social media as a sours of information [36]. This study appeared that the COVID-19-related information was high in female than the male. Females had statistically high significant score on knowledge related transmissions mechanisms, symptoms, incubation period of COVID-19, adult quarantine period and population group which is at greater risk of developing COVID-19 with Chi-square value ranging from 7.03 to 8.92. This result consistent with study performed in China which reported that females having high level of information of “main clinical manifestation of COVID-19” than males [37]. Interestingly, a study reported that the majority of COVID-19 patients were male [38]. However, no statistically significant differences 0.885 have shown between female and male in question asking about approved antiviral drug or vaccine available. On the other hands, recently, many vaccines have been approved but none has scored 100% success [39].

Regarding of education with knowledge levels of COVID-19, BSc graduate participants have high level of awareness of this pandemic infection compare with primary and secondary and post graduate. Our result agreed with another study conducted in Chad which found that the level of knowledge of coronavirus depended on age participants and level of education. It reported that the age (> 40 years old) had a good knowledge and good practices depending on having access to news media [40]. Unexpected, knowledge

was limited in post-graduate participants.

5. Conclusion

The present study shows a satisfactory level of COVID-19 knowledge among Iraqi population and they are aware of transmission mechanisms, strategies could protect them from infection which includes wearing face masks, washing hands with soap and sterilizers and avoiding crowded places. Also, they knew the incubation period of COVID-19, symptoms of infection, quarantine period, population group which is at greater risk of developing COVID-19. However, the need to media still standing to increase this awareness and follow up applying the information.

6. Acknowledgment

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Appendix 1

Questionnaire

Socio-demographic characteristics

Age	
Sex	
Education	

Questions related to the knowledge and awareness

Q1	In 2019, December 29, a novel β -coronavirus was identified and quickly spread worldwide., the first four cases which have been reported related to the seafood wholesale market in Wuhan (Southern China).	Yes	No	I don't know
Q2	Is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) the pathogen for COVID-19?	Yes	No	I don't know
Q3	Is the COVID-19 an extremely pathogenic and transmissible viral infection?	Yes	No	I don't know
Q4	Is the coronavirus disease 19 (COVID-19) transmitted from person to the person through either direct contact with an infected person or exposed to coughing, sneezing, respiratory droplets or aerosols?	Yes	No	I don't know
Q5	Is the incubation period of the coronavirus disease 19 of 2 to 14 days, after which symptoms appear on the affected person?	Yes	No	I don't know
Q6	Can global travel increase the prevalence of Coronavirus-19 (COVID-19) disease worldwide?	Yes	No	I don't know
Q7	Is it possible that COVID-19 virus transmitted from infected people without symptoms (asymptomatic carriers) to other healthy people?	Yes	No	I don't know
Q8	Is the fever accompanied by other respiratory symptoms (such as coughing and shortness of breath) are the first signs of coronavirus disease 19?	Yes	No	I don't know
Q9	Is an extension of the adult quarantine period to 18 days or 21 days could be more	Yes	No	I don't

	effective in preventing virus-spreading and controlling the disease?			know
Q10	Are the cells lining the throat, airways and lungs the first areas to be infected by the virus and turn them into "corona virus factories" that emit massive numbers of new viruses that continue to infect more cells?	Yes	No	I don't know
Q11	In the absence of effective treatments, do you think that the best way to handle with this novel virus is by controlling the sources of infection strategies that including early diagnoses, reporting, domestic isolation, and supportive treatments and maintenance of social distancing?	Yes	No	I don't know
Q12	Do you think that avoiding overcrowded places, always washing hands with soap and sterilizers, wearing medical face masks, sufficient rest, and maintaining good ventilation in the rooms of the house, have a big role in avoiding infection with the virus?	Yes	No	I don't know
Q13	Which population group is at greater risk of developing COVID-19?	aging	Adults	Children
Q14	Is there an antiviral drug or a clinically approved vaccine available for use against infection with (COVID-19)?	Yes	No	I don't know