

## Prevalence of COVID-19 among high school teachers in Erbil city

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### Abstract

**Background and objective:** An outbreak of pneumonia of unknown origin was reported in Wuhan, Hubei Province, China, in December 2019. Cases of epidemic pneumonia have been linked to the Huanan Seafood Market; thus, it has been dubbed the severe acute respiratory syndrome coronavirus (SARS-CoV-2). The global spread of thousands of deaths from the coronavirus disease (COVID-19) has led the WHO to declare a pandemic on March 12, 2020. This study aimed to find out the prevalence of COVID-19 disease and vaccination coverage among public preparatory school teachers in Erbil.

**Methods:** A cross-sectional study was conducted among the target group of 772 teachers in 76 public preparatory schools. The study population was 3157 teachers, 1263 male and 1894 female, in Erbil city, from September 1, 2021, to March 30, 2022. A questionnaire was used to collect data through face-to-face interviews using a simple random sampling method.

**Results:** The study sample ages ranged from 26 to 62 years; the mean age,  $\pm$ standard deviation, was  $40.53 \pm 9.75$ . The prevalence rate of COVID-19 was 63.1%. Of the study samples, 58.5% received information about COVID-19 disease from social media and 23.8% from satellite channels. 68.9% of the study samples received the COVID-19 vaccine, and the majority preferred the Pfizer vaccine.

**Conclusion:** The majority of the study samples were infected with COVID-19 disease; many of the study samples received the COVID-19 vaccine; misconceptions need further correction; an increase in updating information regarding mode of transmission; an explanation of COVID-19 disease preventive measures; raising awareness of COVID-19 vaccination; more interesting health campaigns; and using mass media and community programs to change health behavior and reduce future health consequences of COVID-19 disease.

**Keywords:** COVID-19; Infection; Vaccine; Teachers; Attitudes; Knowledge; Erbil.

### Introduction

A new acute respiratory infection, called COVID-19, swept through the workers of the Wuhan Fish Market and spread in the Chinese city of Hubei in early December 2019 and then to all cities in China.<sup>1</sup>

Great effort are being made to contain it and prevent its spread.<sup>2</sup> The climatic conditions, such as temperature and population movement, contributed to an increase in the rate of the disease rapidly spreading to European countries, then

America, and other regions.<sup>3</sup> Daily life was affected, the global economy collapsed, millions were infected, and thousands died. It was characterized by high body temperature, coughing fits, loss of sense of smell or taste, shortness of breath, and low oxygen in the body.<sup>4</sup> A strict quarantine on the population led to the disruption of all activities, including the education sector.<sup>5</sup> The infected with COVID-19 disease needed special medical care, especially among the elderly or those with chronic

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diseases.<sup>6</sup> COVID-19 led to a psychological burden, fears, and depression, which increased the rumor<sup>7</sup> and increased the burden on health institutions and medical service providers.<sup>8</sup> An increase in mortality, as WHO recorded, between the age groups 25–59 and the morbidity in Iraq was 2.97%.<sup>9</sup> The droplets were one of the modes of COVID-19 virus transmission through touching surfaces or using infected tools and were the easiest way to spread infection, so it required the closure of schools on April 6, 2020, all over the world.<sup>10</sup>

Rapid and early diagnosis is an important procedure in planning the necessary medical measures and interventions to limit COVID-19 virus spreading, save the infected, and reduce morbidity<sup>11</sup> by sputum samples or chest radiography.<sup>12</sup> identified behaviors to reduce the spread of COVID-19, such as hand washing, social distancing, mask-wearing, and staying at home.<sup>13</sup> Evidence indicates that the spread occurs as a result of shaking hands and kissing.<sup>14</sup> Several substances were produced to stimulate the immune system to produce antibodies that contribute to destroying the surface protein of the virus<sup>15</sup> by getting two doses of a special vaccine.<sup>16</sup> The importance of this study is that it gives knowledge about public preparatory school teachers' beliefs and perceptions of COVID-19 and predicts the behavior through health circumstances changing by their levels of awareness that roughly mirror the general knowledge about COVID-19 regarding their current perception of the environment and every idea affecting directly on the teacher's behavior as a result of the COVID-19 impact on the educational sector. closure, rapid spread among society members, and because of the school environment, crowding, and lack of control over social distancing, teachers dread and fear increased, so the COVID-19 disease is considered an important event that must be studied and investigated to learn about teachers' perceptions of this disease and its vaccine.

This study aimed to investigate the prevalence of COVID-19 disease and vaccination coverage among public preparatory school teachers in Erbil.

## Methods

A cross-sectional study was conducted in Erbil, the capital of Kurdistan Region/Iraq. A total of 772 public preparatory school teachers, 1263 male and 1894 female, from September 1, 2021, to March 30, 2022, participated in the study. The participants were chosen by using a simple random sampling method, using the CDC EPI-Info application to determine sample size, and to increase the effectiveness of the study design, a cluster sample was used with a confidence interval of 95%. A total of 76 public preparatory schools were visited, and a minimum of 10–15 teachers were chosen from each school. Reliability and validity were measured by the supervisor, health experts, and study samples. A pilot study was conducted among 20 teachers of public preparatory schools, with a survey conducted to measure agreement on the type of questions. The survey was repeated with the same group after questionnaire modification after a week, and then the results of acceptance were compared before reaching the final form of the questionnaire. A face-to-face interview questionnaire was used to address all relevant teachers' demographic information, knowledge, attitudes, and practices toward COVID-19 disease and its vaccine. The questionnaire consisted of three sections. The first section consists of 14 questions about demographic information to determine COVID-19 disease prevalence. The second section has 15 questions to evaluate self-reported COVID-19 disease information. Third section: 15 questions to find out the self-reported COVID-19 vaccine coverage rate and type of COVID-19 vaccine preferred. Each question was given a specific score based on how much information was provided with yes, no, and do not know.

The Statistical Package for Social Science (SPSS, Chicago, IL, version 26) was used for data entry and analysis. By utilizing two approaches, descriptive and analytic, the Chi-square test was used to find a significant association between categorical variables; a *P*-value of  $\leq 0.05$  was regarded as statistically significant.

The study protocol was approved by the Scientific Committee of the Department of Community Medicine, the ethical committee at the College of Medicine, and finally by the council of the College of Medicine and the presidency of Hawler Medical University. After receiving verbal informed consent, participants were voluntarily recruited after being told of the purpose and objectives and receiving this consent. The teachers were assured of the anonymity of the study. After completing the questionnaire, they were acknowledged and given proper instructions about a healthy lifestyle. The official permission for carrying out this study was obtained from the General Directorate of Education in Erbil Governorate and the Education Directorate of Erbil Center.

## Results

The participants in the current study, 772 public preparatory school teachers, ranged in age from 26 to 62 years; the mean age and standard deviation were 40.53 and 9.75, respectively. Male participants constituted 53.4% of the group, while female participants constituted 46.6%.

The age groups 30-39 years had the highest percentage (34.2%), 40-49 years had the second-highest percentage (27.8%), and 60 years and older had the lowest percentage (2.7%). In contrast to 59.2% of female participants, 63.1% of male participants had COVID-19 disease. However, Table 1 shows that there was no statistically significant ( $P = 0.262$ ) association between gender and COVID-19 disease.

Regarding the sources of knowledge about COVID-19, 58.5% of the study sample's sources of knowledge come from social media, while 23.8% come from satellite channels. Only 11.8% of the study sample sources of information on COVID-19 disease come from healthcare professionals, as indicated in Table 2.

**Table 1** Association between gender and COVID-19 disease.

Gender	COVID-19 disease		Total No. (%)	P-value
	Yes No. (%)	No No. (%)		
Male	260 (63.1)	152 (36.9)	412 (100)	0.262
Female	213 (59.2)	147 (40.8)	360 (100)	
Total	473 (61.3)	299 (38.7)	772 (100)	

**Table 2** Source of information toward COVID-19 disease.

Source of information	No.	%
Social-media	347	58.5
Satellite channels	141	23.8
Newspaper or magazine	2	0.3
Radio broadcasting	10	1.7
Health care workers	70	11.8
Friends	17	2.9
Family	6	1.0
Total	593	100.0

Only 31.1% of the study sample did not receive the COVID-19 vaccine, compared to 68.9% who did. As demonstrated in Table 3, despite the fact that 68.1% of participants were female and 69.7% were male, there was no statistically significant connection between getting the COVID-19 vaccine and gender.

There was no statistically significant association between the kind of COVID-19 vaccination preference and gender ( $P = 0.107$ ), as indicated in Table 4, between 11.6% of male participants who selected the AstraZeneca vaccine and 68%

of female participants who preferred the Pfizer vaccine.

Only 11.9% of male participants accepted the COVID-19 vaccine because it was simple and cost-free, compared to 62.9% of male participants who accepted the COVID-19 vaccine as a preventive measure against COVID-19 infection, and 25.4% of female participants accepted the COVID-19 vaccine because they believed vaccination was the best way to eradicate the COVID-19 virus generally. This association was statistically significant ( $P = 0.025$ ), see Table 5.

**Table 3** Association between COVID-19 vaccine receiving and gender.

Gender	COVID-19 vaccine receiving			P-value
	Yes No. (%)	No No. (%)	Total No. (%)	
Male	287 (69.7)	125 (30.3)	412 (100)	0.631
Female	254 (68.1)	115 (31.9)	360 (100)	
Total	532 (68.9)	240 (31.1)	772 (100)	

**Table 4** Association between type of COVID-19 vaccine preferring and gender.

Gender	Type of COVID-19 vaccine preferring			Total No. (%)	P-value
	AstraZeneca No. (%)	Pfizer No. (%)	Sinopharm No. (%)		
Male	38 (11.6)	207 (62.9)	84 (25.5)	329 (100)	0.107
Female	19 (6.7)	193 (68.0)	72 (25.4)	284 (100)	
Total	57 (9.3)	400 (65.3)	156 (25.4)	613 (100)	

**Table 5** Association between reasons to the acceptance of COVID-19 vaccine and gender.

Gender	Reasons to the acceptance of COVID-19 vaccine					Total No. (%)	P-value
	Prevention of infection No. (%)	Easy and free No. (%)	Got enough information No. (%)	Vaccines best solutions No. (%)	Influenced by personalities No. (%)		
Male	207 (62.9)	39 (11.9)	26 (7.9)	50 (15.2)	7 (2.1)	329 (100)	0.025
Female	155 (54.6)	33 (11.6)	16 (5.6)	72 (25.4)	8 (2.8)	284 (100)	
Total	362 (59.1)	72 (11.7)	42 (6.9)	122 (19.9)	15 (2.4)	613 (100)	

Table 6 shows that 66.7% of participants who received the vaccine were infected with COVID-19 before receiving the vaccine, while 49.2% of participants who did not receive the vaccine were infected with COVID-19, and there was a statistically significant ( $P \leq 0.001$ ) association between COVID-19 and the COVID-19 vaccine.

### Discussion

The COVID-19 pandemic continues to rise, with many new cases emerging daily around the world.<sup>17</sup> The COVID-19 virus is a source of fear and anxiety in society, as well as physiological unrest. Physiological.<sup>18</sup> The COVID-19 pandemic has revolutionized studies to learn about society's perceptions of this pandemic and think about planning health awareness programs to adopt a healthy lifestyle, and the high rate of infections due to COVID-19 has accelerated this need. The current study is the first in the city of Erbil among public preparatory school teachers.

In the results of our study, the male participants were infected with COVID-19 disease more than females, due to the high percentage of the male's activity and effectiveness in carrying out the tasks without females, and this finding was disagreed with by Tomáš et al. They observed that 49.5 percent of males and 50.5 percent of females had COVID-19,<sup>19</sup> and this finding in our study was due to the high male's outdoor activity, effectiveness, and the many chances of getting infected with COVID-19, and our study has shown

there was no association between gender and COVID-19 disease, and these findings agreed with the findings reported by Takahashi et al.<sup>20</sup>

A study by Al-Qerem and Akour et al. shows that (49.1%) and (56.3%) of participants were infected with COVID-19 disease, respectively,<sup>21,22</sup> and these findings were less than our study results, which show a significant difference in proportions with previous studies, and that this is due to mis commitment to the strict application of health procedures or daily health reports reporting, hygiene, facemasks, social distancing, and minimal interaction between classes in Iraqi schools.

Regarding getting information about COVID-19 disease Wang et al. reported that 6.65% of participants got information from social media and satellite channels,<sup>23</sup> which was highly less than our study finding, because of the high interest from our participants in searching for COVID-19 information in social media and watching satellite channels to monitor the health situation and the latest developments of the COVID-19 pandemic, and because of the behavior and decisions of policymakers in Iraqi educational institutions that led to increased levels of anxiety among teachers during the COVID-19 pandemic.

Racey et al. show that (89.7%) of the study sample of public-school teachers received the COVID-19 vaccine,<sup>24</sup> which high than our study, due to a lack of knowledge in our study samples of reliable sources of information about the COVID-19 vaccine,

**Table 6** Association between COVID-19 disease and COVID-19 vaccine.

COVID-19 Vaccine	COVID-19 Disease			P-value
	Diseased No. (%)	Not diseased No. (%)	Total No. (%)	
Received	355 (66.7)	177 (33.3)	532 (100)	< 0.001
Not received	118 (49.2)	122 (50.8)	240 (100)	
Total	473 (61.3)	299 (38.7)	772 (100)	

such as public health institutions and health care providers, in addition to the weakness in the work of school boards and teachers' unions with professional organizations in delivering public health messages and circulating them to teachers, which was no association between COVID-19 vaccine receiving and gender, and our finding disagreed with Racey et al. and Vigezzi et al. which was due to Where these differences in convictions are due to the level of awareness of the risks of Covid-19 disease between individuals and countries, in addition to the gender of acceptance of the vaccine and the idea of its future effect on the genes that will appear on newborns.<sup>24, 25</sup>

Regarding the type of vaccine, a study by Dubik shows that (20%) of the participants preferred AstraZeneca vaccines and (84%) received the COVID-19 vaccine to prevent infection and feel safe from the vaccine, which is higher than<sup>26</sup> our study results because AstraZeneca vaccines are the first vaccine that the Iraqi government used and is specially used to vaccinate health workers, with limited amounts. Otherwise, a study by Galingana et al. showed that 57.5 percent received the Pfizer vaccine, which<sup>27</sup> was a lower percentage than our study findings because of the sufficient information about the Pfizer vaccine and vaccinated many representatives of the community with this vaccine.

The availability of the vaccine in the Iraqi health institutions was one of the main developments for accepting the COVID-19 vaccine, in addition to the country's travel requirements and the quality of the vaccine accepted in the health system. They found no association between type of COVID-19 vaccine preference and gender, which disagreed with Omar and Hani.<sup>28</sup>

In the results of our study, there was an association between reasons for the acceptance of the COVID-19 vaccine and gender, resulting from the conviction of each gender and the number of sources of information. Researching results of the usefulness of the COVID-19 vaccine

agreed with Harapan et al.<sup>29</sup> A study by Machida et al. shows that 49.2% of participants who did not receive the vaccine were infected with COVID-19 disease, which was a lower percentage than our finding. There was an association between COVID-19 disease and the COVID-19 vaccine, and it was agreed by Machida et al. that this relationship exists because most participants received the COVID-19 vaccine after COVID-19 disease.

### Conclusion

A significant number of study participants tested positive for COVID-19, while a smaller proportion received the COVID-19 vaccine, falling short of meeting the recommended immunization coverage set by the World Health Organization. The study also revealed numerous misunderstandings about the COVID-19 disease and vaccine, as well as a lack of knowledge regarding the transmission of COVID-19 and preventive measures to avoid infection. Suggesting the appropriate utilization of institutions, mass media, health campaigns, and community initiatives can stimulate public discourse regarding the health concerns of preparatory school teachers, leading to a modification in health behaviors and a decrease in potential health repercussions caused by the COVID-19 disease.

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### Competing interests

The authors declare that they have no competing interests.

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