Knowledge, attitude, and practice toward COVID-19 Outbreak: A Population-Based Survey on employees of the Ministry of Health

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ABSTRACT

INTRODUCTION: Employees of the Ministry of Health, health care workers and non-healthcare workers are on the front-lines in the exposure for any pandemic and aid in its prevention. Knowledge and awareness of the mode of disease transmission, basic hygiene principles and measures in health crises are vitally crucial for developing effective control measures.

OBJECTIVE: To measure the knowledge, attitude, and practice of the employees' of the Ministry of Health in Iraq toward COVID-19, and to compare the knowledge, attitude, and practice of healthcare workers to those of non-healthcare workers.

METHODS: A cross-sectional questionnaire-based study was conducted at the National Centre for Training and Human Development from 20 January to 20 February of 2021. Participants were permanent employees of the head-quarter's directorates of the Ministry of Health in Iraq.

RESULTS: We distributed 380 questionnaire forms, 15 were excluded from analysis because they had incomplete data. Analysis was done on 365 forms. Of all participants, 67 were healthcare workers (HCW), 298 were non-healthcare workers (non-HCW). Males were 162 (44.4%) and female were 203 (55.5%) were female. More than 70 % of the participants had correct knowledge about the causative agent of covid 19, its incubation period, and identifying its main clinical symptoms, 212 (58.1 %) knew the way of transmission, and only 167 (45%) of them recognize the risky age group. There were statistically y significant differences between knowledge of HCWs, and that of non-HCWs with regards to identifying causative agent and age risk group. More than two-thirds of the participants agreed that quarantine, closing airports, and providing educational programs will decrease the number of infected persons. Out of the 365 participants, 257 (69.6%) preferred to be isolated at home once they get infected. About two-thirds of the participants have stated that they were following the protective method against covid-19.

CONCLUSION: The employees working at the head-quarter of the Ministry of Health in Iraq generally have a good level of knowledge about covid -19, possess a positive attitude, and follow preventive measures in their daily activities. Job description as being medical or non-medical does not affect these results remarkably.

Key words: Covid-19, knowledge, attitude, practice, healthcare worker, Iraq.

INTRODUCTION

Covid-19, caused by severe acute respiratory syndrome, coronavirus 2 (SARS-CoV-2),[1] it is a global public health threat that becomes a pandemic crisis worldwide. SARS-CoV-2 belongs to a large family of viruses that can infect a wide range of organisms such as birds and mammals, including humans, according to the world health organisation (WHO).[2] The first case was reported in Wuhan city in China in December 2019.[3] By March 2021, about 116 million persons have been infected in 221 countries.[4]

In Iraq, the Iraqi Higher Committee for Health and National Safety (IHCHNS) declared a state of emergency [5,6] and several unprecedented measures, including lock down, have been adapted to control the COVID-19 transmission. [7] However, employees of the Ministry of Health's head quarter continued to work in those days, exposing them to the risk of infection. The risk was high due to overcrowding, the absence of isolation room facilities, envi-

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ronmental contamination, and the employees' inadequate knowledge about the disease and wrong attitude and practice.[8] Therefore understanding employees' knowledge, attitudes, and practices (KAPs) and possible risk factors helps predict the outcomes of planned behaviour.

The battle against COVID-19 is continuous in all countries. The spread of COVID-19 has imposed high threats on global health, life and work style, and social and economic development.[9, 10] Countries have issued many guidelines on different aspects of prevention and control of COVID-19 to overcome this threat.[11] These guidelines would not be effective unless the public's knowledge, attitudes, and practices, particularly Ministry of Health (MoH)'s employees, are improved. Lessons learned from the severe acute respiratory syndrome (SARS) epidemic pointed out that high KAP toward different epidemics decrease stress and panic and pave the way toward their prevention and control. [12, 13]

The employees in the MoH, both health care workers (HCWs) and non HCWs, are at risk of infection in the pandemic of COVID-19 and also they can help in controlling the outbreak. Therefore, all possible actions must be taken to control the spread of the infection to employees, first by identifying the risk factors for infection and then by taking appropriate measures to reduce these risks. Second by assessing the awareness and knowledge about the coronavirus, deeper insights into existing employees' perception and practices can be gained, thereby helping to identify attributes that influence the employees in adopting healthy practices and responsive behaviour.[14]

Knowledge is the awareness, or understanding of someone or something, such as facts , skills, or objects. By most accounts, knowledge can be acquired in many different ways and from many sources. It also can refer to a theoretical or practical understanding of a subject.[15, 16]

Attitude is a psychological construct, a mental and emotional entity that inheres in, or characterises a person, and they are acquired through experiences,[17] from a person's past and present. Attitude may be also defined as a feeling or disposition to favour or be against objects, persons, and situations.

Practice is a form of process that can be applied to a current problem. This allows for a mix and match approach for making recommendations that might encompass pieces of many good practices.[18]

Because of The importance of this topic, many studies have addressed, for e.g. China had been studied KAP regarding COVID-19 among HCWs in Hena.[19] It is well established that transmission of the disease among HCWs is associated with overcrowding, absence of isolation room facilities, and environmental contamination. However, this is likely compounded by the fact that some HCWs have inadequate awareness of infection prevention practices.[20] Understanding MoH employees' KAPs and possible risk factors help to predict the outcomes of planned behaviour.

This study aims to assess the Knowledge, Attitude, and practice of the employees s' Ministry of Health (MoH) toward COVID-19 during the pandemic rise and compare the level of KAP between health non-health professions.

METHODS

Study design & Setting: A cross-sectional study was conducted on a group of health and non-health employees working at the MoH headquarters' directorates. Data were collected from 20 January to 20 February of 2021.

Ethical consideration: The survey was conducted following the code of ethics in research of the Ministry of Health. The central ethical committee of the Ministry of Health has approved the proposal of this study. All participants were informed about the aim of the research, and their data were kept confidential and used only for this study.

Inclusion and exclusion criteria: the targeted population of this study were the permanent employees of the Ministry of Health headquarters' directorates. Employees were health and non-health; health employees included

doctors, nurses, pharmacists, dentists, and biologists working in administrative posts. Non-health employees included those with managerial and engineering backgrounds. We excluded employees who refused to participate or were not present at their offices for any reasons at the time of data collection.

Sample size: The sample size of this study was calculated based on the total number of the targeted population, which was 6000, according to the following equation:[21]

$n=Z^2p(1-p)(D)/E^2$, where:

n is the sample size.

Z is the standard normal variant at 5% type 1error and p less 0.05.

E is the sampling error, and here we used 5%

P is the expected proportion in population that based on pilot studies or previous studies

D is the design effect which equals two.

We added 5 % to the sample size to compensate for the expected non-respondent. Thus the sample size of this study was 367 participants.

Sampling: We included the Minister and deputy Ministers' offices, Directorate of Planning, Directorate of Public Health, Directorate of Technical Affairs, Directorate of Administrative, Financial and Legal, Directorate of Forensic Medicine, Directorate of Projects and Engineering Services, Directorate of Inspection, and The State Company for Marketing Medicines and Medical Appliances. We selected employees from each directorate by convenience sampling method. For each directorate, we conveniently selected 32 participants. Because of having a relatively larger number of employees, we selected 60 participants from the State Company for Marketing Medicines and Medical Appliances. We distributed 380 questionnaire forms, 15 of them were excluded because of incomplete data. Analysis of data has been done for 365 forms.

The questionnaire form: We used a self-reported questionnaire developed and translated by the authors based on the instructions of Iraqi MoH, guidelines issued by the WHO,[22] and several published articles related to measuring knowledge, attitude, and practice towards the COVID-19 pandemic.[23-25] Three experts in medical education, research methodology and respiratory medicine from the National Centre for Training and Human Development (NCTHD) had reviewed the questionnaire. A preliminary pilot study was carried out on 36 employees from one department of the MoH before the start of this study to ensure that the participants could understand the meaning of the statements clearly as intended by the authors and to measure the average time needed to fill in the questionnaire form. The results of this pilot have not been included in the final analysis of this study.

A trained team from the National Centre for Training and Human Development visited the directorates, explained for groups of participants the aim of the research and the details of the questionnaire and answered their queries and questions. Then the forms were distributed among the participants and asked them to fill them in. The questionnaire forms were recollected after 30 minutes according to the time estimated by the pilot study.

The questionnaire form has included four sections. *The first section* is devoted to the participant's sociodemographic features; age, gender, marital status, Job category, place of residency, health status, and whether or not the participants or his/ her family member had been infected with COVID-19 before. For women, we asked about pregnancy and feeding.

In *the second section* of the questionnaire, we assessed by five questions the participants' Knowledge of COVID-19; the causative agent, the ways of transmission, the clinical symptoms, the incubation period, and the high-risk infection groups.

The third section has six items related to participants' attitudes concerning COVID-19; we explore the participants' beliefs about covid 19 dangerousness, means of prevention of the infection, and whether quarantine of infected person, closing airports, and education programs prevent transmission of the infection in the community.

The fourth section included six items related to employees' practice of preventive measures to protect themselves from being infected; attending health institution if contracted the infection, the procedure to deal with a person recovering from covid-19, and how to get rid of the masks and gloves, how to cough or sneeze, when to wash hands, and what are the most protective equipment they use.

Statistical analysis: We used the statistical package for social sciences (SPSS) version 26 to enter the data. Results were summarised and presented in tables. Chi-square test was used to assess the association between variables, and binomial logistic regression was conducted to investigate the relationship between the employees of Ministry of Health and their KAP outcomes, P value of ≤ 0.05 considered significant.

RESULTS

We distributed 380 forms among the targeted population. Fifteen of them were excluded because the data were incomplete. The final analysis was done on the data of 365 participants. Sixty-seven employees were health care workers (HCW), and 298 employees were non-HCW; 162 (44.4%) were males, and 203 (55.5%) were females. Of the total, 157 (43%) participants had themselves or a member of their families covid-19 infections. **Table 1** Summarises some demographic features of the study's sample.

Table 2 shows the participants' answers for the five questions about the assessment of knowledge about covid-19 with a comparison between health and non-healthcare workers. The correct answers were reported in 283 (77.5 %) for the cause of the infection, 212 (58.1%) for the way of transmission, 260 (71.2 %) for the incubation period, and 262 (71.8) for identifying the main clinical symptoms. At the same time, only 167 (45 %) has correctly identified the high-risk group for the covid 19 infection. Comparing the correct answers between health care workers and non-healthcare work-

Table 1 | Demographic characteristics of the participants (n=365).

Demographic features		No	%
Gender	Male	162	44.4
	Female	203	55.6
Age	< 30y	78	21.4
	30-50y	254	69.6
	≤ 50y	33	9.0
Marital status	Single	109	29.9
	Married	256	70.1
Occupation	HCW	67	18.4
	Non-HCW	298	81.6
Do you have a chronic disease (CD)			
	HT	30	8.2
	DM	8	2.2
	Asthma	15	4.1
	More than one CD	8	2.2
	Others	17	4.7
	No CD	287	78.6
For women	Pregnant /lactating	4	1.1
	Did not	199	54.5
Residence	Al-KarKh	162	44.4
	Al-Russafa	203	55.6
Exposed to covid-19†	Yes	157	43.0
	No	136	37.3
	I don't know	72	19.7

HCW: Health care worker, **non-HCW**: Non-Health care worker, **CD**: chronic diseases. †: Participants had been infected himself or one of his family with covid-19

ers, we found that knowing the cause of the infection and identifying the high-risk group for the infection were statistically significant.

For attitude, 229/365 (62.7 %) agreed that covid-19 is a dangerous disease, 281/365 (77 %) agreed that distance and cleaning are enough to prevent infection, 254/365 (69.6 %) agreed that quarantine will decrease the number of infected persons, 307/365 (84.1 %) prefer to have treated at home once they get infected, 260/365 (71.2%) prefer to close the airport to control infection, and 298/365 (81.6 %) think that education will decrease the transmission of the infection. Apart from the effect of education on the transmission of the infection, no statistical significance was reported between HCWs and non HCWs; for more details, see **table 3**.

On assessing the practice for covid 19,

Table 2 | Questions of the knowledge about COVID-19 related to job description (n=365).

Knowledge		No	%	HCW	Non HCW	P-value
The cause of infection	Virus	283	77.5	62 (92.5%)	221 (74.2%)	0.005
	Bacteria	10	2.7	1 (1.5%)	9 (3%)	
	I am not sure	72	19.7	4 (6 %)	68 (22.8%)	
The way of transmission	Through touching and respiratory droplets	212	58.1	32 (47.8%)	180 (60.4%)	0.066
	Food and drinks	91	24.9	24 (35.8%)	67 (22.5%)	
	I am not sure	62	17.0	11 (16.4%)	51 (17.1%)	
Incubation period	14 days>	260	71.2	52 (77.6%)	208 (69.8%)	0.335
	≤14 days	39	10.7	7 (10.5%)	32 (10.7%)	
	I am not sure	66	18.1	8 (11.9%)	58 (19.5%)	
High risk group	≤ 60y	167	45.8	24 (35.8%)	143 (48%)	0.038
	<60y	192	52.6	40 (59.7%)	152 (51%)	
	I am not sure	6	1.6	3 (4.5%)	3 (1%)	
Main clinical symptoms	Fever, cough, fatigue, shortness of breath and diarrhoea	262	71.8	55 (82.1%)	207 (69.5%)	0.113
	Only respiratory symptoms	39	10.7	5 (7.5%)	34 (11.4%)	
	I am not sure	64	17.5	7 (10.4%)	57 (19.1%)	

257/365 (69.6%) agreed that they would self-isolate themselves once they have a fever, dry cough or feeling tired; 287 (77.8) behave positively with colleagues at work who recovered from covid infection but maintain protective measures; 263 (71.3 %) are disposed masks and gloves with other wastes directly; 322 (87.3 %) uses their elbow or tissue to cover their mouth and nose during coughing or sneezing; 251 (68 %) sterilise and wash hand all the daytime and on come back home; and 225 (61%) use medical masks, gloves, alcohol and sterilising gel. There is a statistical significance between HCWs and non-HCWs in behaviour with colleagues recovered from the infection and using protective measures. For more details, see **table 4**

Table 3 | Attitude of covid-19 among participants distributed in relation to the job description (n=365).

Attitude		No	%	HCW	Non HCW	P-value
Covid-19 is dangerous disease	Yes	229	62.7	45 (67.2%)	184 (61.7%)	0.491
	No	103	28.2	15 (22.4%)	88 (29.6%)	
	I am not sure	33	9.0	7 (10.4%)	26 (8.7%)	
Physical distance and cleaning are enough to prevent the infection	Yes	281	77.0	55 (82.1%)	226 (75.8%)	0.082
	No	68	18.6	7 (10.4%)	61 (20.5%)	
	I am not sure	16	4.4	5 (7.5%)	11 (3.7%)	
Quarantine decrease numbers of infected persons	Yes	254	69.6	50 (74.6%)	204 (68.5%)	0.234
	No	90	24.7	16 (23.9%)	74 (24.8%)	
	I am not sure	21	5.8	1 (1.5%)	20 (6.7%)	
On getting covid 19, you prefer having treatment at:	Hospital	46	12.6	11 (16.4%)	35 (11.7%)	0.462
	Home	307	84.1	53 (79.1%)	254 (85.3%)	
	I am not sure	12	3.3	3 (4.5%)	9 (3%)	
You prefer closing the airports	Yes	260	71.2	49 (73.1%)	211 (70.8%)	0.876
	No	68	18.6	11 (16.4%)	57 (19.1%)	
	I am not sure	37	10.1	7 (10.5%)	30 (10.1%)	
Education decrease the number of cases	Yes	298	81.6	61 (91%)	237 (79.5%)	0.039
	No	33	9.0	5 (7.5%)	28 (9.4%)	
	I am not sure	34	9.3	1 (1.5%)	33 (11.1%)	

Table 4 | Practice responses of the participants to COVID-19 and its relation to job description (n=365).

Practice		No	%	HCW	Non HCW	P-value
What to do if you have fever, dry cough or feeling tired.	Isolation at home	257	69.6	41 (61.2%)	216 (72.5%)	0.177
	Visit medical institution or provide clinic	98	26.6	24 (35.8%)	74 (24.8%)	
	I am not sure	10	2.7	2 (3%)	8 (2.7%)	
How to deal with person recovered from covid-19 in same room?	Welcoming him but keep a distance and avoid touching or shaking	287	77.8	61 (91%)	226 (75.8%)	0.017
	Avoiding him	65	17.6	4 (6%)	61 (20.5%)	
	I am not sure	13	3.5	2 (3%)	11 (3.7%)	
How to get rid of gloves and masks	Put them in a plastic bag then in a waste basket	92	24.9	23 (34.3%)	69 (23.1%)	0.066
	Put them directly in a waste basket	263	71.3	44 (65.7%)	219 (73.5%)	
	I don't know	10	2.7	0 (0.0%)	10 (3.4%)	
Behaviour during coughing or sneezing,	Cover mouth and nose with the elbow or a tissue	322	87.3	60 (89.6%)	262 (87.9%)	0.631
	Covering mouth and nose with hands	39	10.6	7(10.4%)	32 (10.7%)	
	I am not sure	4	1.1	0 (0.0%)	4 (1.4%)	
When to wash or sterilise your hands?	During the day	62	16.8	8 (12%)	54 (18.1%)	0.128
	On come back home	52	14.1	6 (9 %)	46 (15.4%)	
	Both	251	68.0	53 (79 %)	198 (66.5%)	
The most common protection methods used?	Medical mask and gloves	56	15.2	11 (16.5%)	45 (15.1%)	0.009
	Alcohol and sterilizing gel	84	22.8	6 (8.9%)	78 (26.2%)	
	Both	225	61.0	50 (74.6%)	175 (58.7%)	

Binary logistic regression analysis was used to predict the association between COVID-19 knowledge, Attitude and Practice among HCW and non HCW of MoH. The questions, K1 was observed the association (P=0.036, Odds ratio=0.567, 95% CI=0.333- 0.963), and K4 (P=0.041, Odds ratio=1.755, 95% CI= 1.023-3.011). See **table 5**

DISCUSSION

Preventive measures against covid-19 and receiving the vaccine are the two important tools to fight the pandemic of covid-19. In this study we measured not only the knowledge of a sample of employees working in Ministry of health but also their attitude and practice. The results of HCWs were compared to those of non-HCWs to see whether being of medical background affects the degree of knowledge, attitude, or practice or not. In this study 67 participants (18.4 %) were HCWs, and 298 participants (81.6 %) were non-HCWs.

Knowledge: The participants' overall knowledge was good; at least about 60 % of the participants correctly answered the knowledge questions. The exception was identifying high-risk groups where about 42 % knew that more than 65 years is a high risk for getting infected. This finding is consistent with that

Table 5 | Binary logistic regression, among the employees of MoH in Iraq 2021, KAP cross sectional study (n=365).

	B	P-value	Odds ratio	95% CI	
				Lower	Upper
The cause of infection	-0.568-	0.036	0.567	0.333	0.963
High risk group	0.563	0.041	1.755	1.023	3.011
Education decrease the number of cases	-0.591-	0.107	0.554	0.270	1.137
How to deal with person recovered from covid 19 in same room?	-0.644-	0.089	0.525	0.250	1.102
The most common protection methods used?	-0.376-	0.073	0.687	0.455	1.035
Constant	4.282	0.000	72.396		

of studies from Iraq [26] conducted on medical persons who were surveys through email, the United Arab Emirates on medical students,[27] and Huynh on HCWs.[28] In contrast, an Ethiopian study has found a poor knowledge about covid-19 among the general population.[29] This difference might be due to the difference in the targeted population; in the Ethiopian research, the general population has a low level of knowledge compared to HCWs and medical students, especially early in the outbreak.

In our study, knowledge about the mode of transmission does not differ among HCWs compared to non-HCWs. 32 (47.8%) and 180 (60.4 %) of non-HCW believed that respiratory droplets and close contact are the main routes of transmission; however, this difference was statistically non-significant (P=0.066). This might reflect the effectiveness of education campaigns to reach the non-HCWs. Similarly, two studies from Egypt and Iran have shown that a significant part of the participants reported that coronavirus spread via close contact.[30,31] On the other hand, a study from Bangladesh showed that 0.2% of young adults were not sure or unable to recognise transmission routes.[32] The reason for such discrepancy may reside in differences in the source of information.

Our findings showed that 52 (77.6%) of HCW and 208 (69.8 %) of non-HCW reported that the incubation period of covid-19 is less than 14 days (P=0.335). Knowledge about the incubation period was also excellent among the general population (86.2%) as measured in a Peruvian study conducted by Zegarra et al.[33]

In this study, 24 (35.8 %) of HCWs and 143 (48%) of non-HCWs have recognised that age ≥ 60 years is a high-risk group, p-value= 0.038. These results are relatively low compared to a study from UAE, [27] where 80 % of medical students identified that elderly and those with comorbidities are a high-risk group; half of them identified children younger than five years as a high-risk group. Also, 94.6 % of Jordanian students believed that the elderly are a high-risk group, and 40 % believed that children younger than five years are at high risk of developing

covid -19.[34]

The majority of our study's participants have recognised the clinical symptoms of covid-19; 55 (82.1%) for HCWs versus 207 (69.5 %) for non-HCWs, p-value 0.113. An Iranian study showed that 86% of the participants had sufficient knowledge regarding the disease symptoms.[31] The same was also reported by other studies.[35,36] Few of our sample were unaware of any symptoms related to covid-19; 5 (7.5 %) for HCWs versus 34 (11.4 %) for non-HCWs, similar to other studies elsewhere.[33, 37] On the contrary, a study from the United Arab Emirates has found that a significant proportion of HCWs had poor knowledge about the disease transmission and the symptom.[38]

The dissimilarity in the results of our study compared to others can be explained by the difference in the level of education and qualifications of the targeted population. The general population is expected to have lower knowledge compared to those of medical backgrounds. Also, it depends on the sources a person used to expand his knowledge because some participants may rely on non-authenticated resources like social media. It is worth mentioning that the HCWs participated in our study held a managerial post rather than a medical post making them more prone to get their knowledge from social media rather than from accredited medical resources. At the same time, the presence of non-HCWs in the same place with HCWs may improve their knowledge accordingly, explaining why the knowledge of non-HCWs is relatively similar to that of HCWs or sometimes even better.

Attitude: We found that HCWs and non-HCWs alike considered Covid-19 a dangerous disease, 45 (67.2%) of HCW versus 184 (61.7%) of Non-HCW, p =0.491. Approximately 71% of HCW in Saudi Arabia believed that COVID-19 is more dangerous than seasonal influenza.[39] Our result agrees with the findings of two studies conducted among Bangladeshi Internet Users[40] and HCW in China.[41] however, a study done in Chicago in the USA found that 24.6% of respondents were worried about being infected with COVID-19,[42] due to their poor understanding of the high infectiousness

of COVID-19.

Our results revealed that good knowledge was associated with a positive attitude among MoH's employees towards COVID-19. We found that 77% of the employees think that social distance and cleaning are enough to prevent the infection; 55 (82.1%) of HCW and 226 (75.8%) of Non-HCW P=0.082. This agrees with the results of another Iraqi study where over 90.0% of the population became interested in practising social distancing.[43] Also, social distancing proved to be one of the most effective methods of preventing disease transmission during the initial COVID-19 outbreak in Wuhan.[44]

Based on the results of our questionnaire, 254 (69.6%) of the participants believed in quarantine, locking down cities, restricting travel; 50 (74.62%) of HCW and 204 (68.5%) of Non-HCW, P= 0.234, also 260 (71.2%) of them believed that closing the airports will decrease the number of cases; 49 (73.13%) of HCW and 211 (70.8%) of non-HCW, P= 0.876. Many countries have used these measures that started initially in China on a massive scale.[44] on the contrary, a study in Iraq conducted on medical persons[26] showed that a high percentage of the participants thought the partial quarantine was ineffective and must be stopped. Also, HCWs participated in an Iranian study disagree with our results about quarantine and restricting travel.[28]

We found that 307 (84.1%) of the surveyed employees preferred to be treated at home if they get covid-19; 53 (79.1%) of HCW and 254 (85.3%) of non- HCW, P=0.462. The tendency to be treated at home in our sample may be explained by poor confidence with the available care provided at hospitals. This negative impression about health care has been based on misbeliefs and exaggerations led by some non-authorised social media. In addition to being afraid for more contagiousness at the emergency rooms and studies have reported that protective measures not being in place could increase the chances of infection while well-protected emergency and other departments in the hospital had lower chances of infection.[45]

Our results showed that 298 (81.6%) of the participants believed that health education programs about COVID-19 will improve their attitude and practice towards COVID-19 and decrease the number of infected cases; 61 (91%) of HCW and 237 (79.5%) of non-HCWs, P= 0.039. Many studies have shown that education has an influential determining factor of healthy behaviour.[46,47] and a study from Iran stated that increasing public awareness could be made by improving health education programs to raise the Knowledge about COVID-19.[48]

Practice: On having symptoms suggestive of covid-19, 257 (69.6 %) of our participants prefer isolating themselves at home than visiting medical institutions or private clinics; 41 (61.2%) of HCW and 216 (72.5%) of non-HCW, P= 0.177. In a study conducted in Iran, 28 98.2 % of the participants agreed that patients with covid-19 should be isolated; however, 97.9 % accept to be isolated in a health facility if they get infected.

On measuring the behaviour of the participants towards persons recovered from covid-19, 287 (77.8%) have stated that they will welcome recovered persons but with keeping distance and avoiding touching or shaking hands; 61 (91%) of HCWs and 226 (75.8%) of non-HCW, P=0.017. These results parallel that of research conducted in Nigeria on the general population, where 90.2% of them reported social distancing, 78.8% reported avoiding handshakes, and 74.4% reported avoiding face kissing as some practices to reduce the community spread of COVID-19.[49] Practising physical distancing and avoiding touching might be signs of good compliance to the instructions of the health authorities; in addition, a study from Egypt [50] has stated that distancing is a way to reduce embarrassment because some communities consider covid-19 as a stigma.

For the practice of how to get rid of gloves and masks after using them, 263 (71.3%) of the participants in our study; 44 (65.7%) HCW and 219 (73.5%) non-HCW with a p-value of 0.066, dispose of them directly in the waste-basket. Compared to only 92 (24.9 %), 23 (34.3%) HCW and 69 (23.1%) non-HCW, P=0.066, who

do it properly by putting them in plastic bags then disposing of them in the waste-basket. We could not find a similar question among other studies.

The majority of the participants in our study follow the advice about how to behave on coughing or sneezing, which might reflect their reasonable belief in hygiene as a preventive method; 322 (87.3 %) are using their elbows or tissues to cover their mouth and nose. This was true for HCWs and non-HCWs alike, 60 (89.6%) of HCW and 262 (87.9%) of non-HCW, P=0.631. Similarly, 95.8 % of Jordan's medical and non-medical university students use a tissue on coughing or sneezing and dispose of it in a waste bin.[51] our result is much higher than that of a Pakistani study that showed only 50.5 % of the general population cover their face when sneezing or coughing.[52]

On the line of hygienic methods, this study showed that 251 (68%) of the participants washed or sterilised their hands at work and on come back home; 53 (79%) of HCWs and 198 (66.5%) of non-HCW, P= 0.128. In Pakistan, research showed that 85.5% of 1004 participants wash their hands frequently, 59.8% of them wash their hands before eating, and 92.6% of them wash their hands after coming home.[53]On the contrary, a study done by Srichan et al. showed that 54.8% did not regularly use soap on washing hands.[54] Medical masks, gloves, alcohol and sterilising gel were the most common protective methods used by 225 (61 %) of the participants in our study; 50 (74.6%) of HCWs and 175 (58.7%) of non-HCW, P=0.009. Such a high protective behaviour toward COVID-19 could be attributed to the adequate level of knowledge among the employee, medical and non-medical, and the excellent belief that these measures are very effective in preventing COVID-19. This behaviour agrees with Saqlain's, who reported positive attitudes among most healthcare professionals towards wearing protective gear.[55] Our findings are still lower than that of a study from Chine where nearly all the participants (98.0%) wore masks when leaving their homes.[23] On the contrary, the result of a survey done among 4850 residents in Malaysia revealed the nearly 50 % of

the participants wore face masks.[52]

The findings from logistic regression analysis indicated that the MoH's employees had a good knowledge that COVID- 19 is a virus 0.567 times vs bacteria as a cause of infection (P= 0.036, 95% CI= 0.333 -0.963). For the High-risk group 1.755 times in those <60y (P=0.041, 95% CI=1.023-3.011). Other questions, the most common protection methods used, how you are dealing with person recovered from corona in the same room, and the education programs decrease the number of cases had no associations.

CONCLUSION

The employees working at the headquarter of the Ministry of Health in Iraq generally have a good level of knowledge about covid -19, possess a positive attitude, and follow preventive measures in their daily activities. Job description as being medical or non-medical does not affect these results remarkably.

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