Journal of Community Medicine & Public Health
Al-Wattar S, et al. J Community Med Public Health 8: 459
www.doi.org/10.29011/2577-2228.100459
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Research Article

# Knowledge, Attitude and Practice Assessment of Healthcare Workers Regarding COVID-19 in Kuwait

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**Citation:** Al-Wattar S, Al-Mulla M, Al-Maghrabi M, Al-Ghais D, Al-Oshari SHA (2024) Knowledge, Attitude and Practice Assessment of Healthcare Workers Regarding COVID-19 in Kuwait. J Community Med Public Health 8: 459. DOI: https://doi.org/10.29011/2577-2228.100459

**Received Date:** 25 July, 2024; **Accepted Date:** 06 August, 2024; **Published Date:** 09 August, 2024

## Abstract

**Background:** COVID-19 is a highly contagious disease caused by the novel coronavirus (SARS-CoV-2). It was first identified in Wuhan, China in December 2019 and has since become a global pandemic affecting millions worldwide, this study aimed to Investigate the Knowledge, Attitude, And Practice (KAP) Of Healthcare Workers in Kuwait Regarding COVID-19. **Methods & Materials:** A Multi-centric cross-sectional study was done on HCWs of Kuwait between July and October of 2020. Survey instrument was adapted from a validated questionnaire from previous study in China. **Results:** The final sample size consisted of 494 participants. Among the participants, 51.2% reported good knowledge, 61.7% reported positive attitude, and 53.6% reported appropriate practice. A Significant relationship between COVID-19 knowledge and older age and more years of work experience were observed (P=0.008), (P=0.051) respectively. There was a significant relationship between good practice and female gender (P=0.051). Study proved that increased course attendance frequency was related to higher KAP scores, and strong positive significant correlation between knowledge total score and practice total score in the studied group (P<0.001) was found. **Conclusion:** This study provided new evidence supporting health intervention program sunder public health emergencies, and future researchers are encouraged to investigate more outbreaks in relation to Healthcare Workers Knowledge, Attitude, and Practice.

**Keywords:** COVID 19; Health care worker; Knowledge; Attitude; Practice; Kuwait

## Introduction

COVID-19 is a highly contagious disease caused by the novel coronavirus (SARS-CoV-2). It was first identified in Wuhan, China in December 2019 and has since become a global pandemic affecting millions worldwide. Common symptoms include fever, fatigue and dry cough, although some people may be asymptomatic. The virus primarily spreads by respiratory droplets from an infected person. It can lead to severe respiratory illness and even death, especially in older adults and people with underlying health conditions [1]. COVID-19 reveals similarities with other coronaviruses that have led to outbreaks worldwide, such as severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) [1-3]. The COVID-19 pandemic is considered one of the largest atypical pneumonia outbreaks since the severe acute respiratory syndrome (SARS) outbreak in 2003 [4]. The World Health Organization (WHO) declared COVID-19 a public health emergency worldwide and considered it a pandemic on 11 March 2020 [1]. The number of infected patients has continued to escalate exponentially, despite the recent introduction of several vaccines [5]. Although there is not yet an antiviral curative treatment recommended for COVID-19 [1], vaccines have been developed and are being distributed worldwide. Following public health guidelines such as wearing masks, practising good hand hygiene and receiving vaccination are important steps to prevent the spread of the virus. The Centres for Disease Control and Prevention (CDC), along with published research and literature, have indicated that the rapid spread of the disease over different continents is due to easy transmission routes, for example, human-to-human transmission, which takes place through close contact (within 6 feet) with an infected person who has respiratory manifestations [6,7]. Other major routes are through touching surfaces where infected droplets exist and airborne and feco-oral transmission [6-8]. According to Asdaqetal [4], transmissibility of COVID-19, as indicated by its reproductive number, has been estimated at 4.08, suggesting that, on average, every case of COVID-19 will create up to four new cases, and the average incubation period is estimated to be 5.2 days (with significant variation among patients) [7,9].

Healthcare workers (HCWs) deal with screening, inspection, testing, nursing and pathogen detection of the COVID-19 virus. They are at high risk of contracting the virus due to the nature of their work. The WHO recommends that raising the awareness of HCWs, changing their attitudes and improving their practices and prevention protocols have a pivotal impact in fighting COVID-19 disease. Thus, this study investigates the knowledge, attitudes and practices of HCWs in Kuwait regarding COVID-19.

## Materials and Methods

### Study population

This multi-centric cross-sectional study was conducted on HCWs in Kuwait between July and October, 2020.Using the numbers of the latest count of the Kuwait Ministry of Health workforce, a sample size calculated using Rao soft showed that the study would require a minimum of 382 participants with an assumed response rate of 50%, with a 95% Confidence Interval (CI), Z value of 1.96, and margin of error of 5% [10]. The sample size that was obtained from the completed questionnaires was 524. However, when applying the inclusion and exclusion criteria, the final sample size was 494. The included participants were all HCWs such as physicians, nursing staff, pharmacists, lab technicians, radiographers and physiotherapists who directly interacted with COVID-19 patients across hospitals and different health centres in Kuwait. HCWs not in direct contact with or exposed to COVID-19patients, including social workers and clerks, were excluded, as well as participants under the age of 21.

### Data collection

### Knowledge, attitudes, practices questionnaire design

The knowledge, attitudes, practices (KAP) survey instrument was adapted from a validated questionnaire used to assess HCWs during theCOVID-19 pandemic in China [11]. Once the instrument was completed, it was further tested by sending it to researchers and professionals with medical backgrounds (physicians, pharmacists, and technicians) for their expert opinion on survey simplicity, relativity and importance. The questionnaire consisted of four sections with 29 questions and took 5-15 min to complete. It consisted of two parts. The first part recorded general demographic variables, including gender, age, job category (physician, nursing staff, pharmacist, radiographer, lab technician or paramedic), work experience (years), educational level, direct involvement with COVID-19, average working hours and average sleeping hours (Table 1). The second part comprised 20 items that assessed HCWs' KAP. To avoid comprehensive questions affecting the data quality, a short test consisting of nine items was included to evaluate epidemic infection knowledge. Responses were recorded on a Likert scale ranging from 1-5 (strongly agree to strongly disagree). The third section had five questions assessing HCWs' attitudes regarding fear of COVID-19 and fatigue resulting from the outbreak. Finally, a fourth section consisted of six questions evaluating HCWs practices during the COVID-19 pandemic.

### Distribution

Because of the country's lockdown and the COVID-19 restrictions in place at the time of data collection, an online data collection tool was constructed using Microsoft Google Forms (via docs.google.

com/forms). A link to the questionnaire was then distributed using WhatsApp groups, the members of which were approached to participate in the study.

### Data analysis

Analyses were conducted using SPSS. Patients' demographic data were expressed as numbers and percentages. The significance of the association between two groups for qualitative variables was determined using Pearson's chi-square ($\chi^2$) test. Fisher's exact test was used when the expected value of any of the cells was less than 5. A P-value was considered significant if <0.05.

## Results

### Demographic findings

The majority of participants were in the age range of 30-39 years (43.4%). A female predominance was noted at 69.1% compared with 30.2% male. In terms of working area, 55.2%of participants worked in districts with a high flow of patients and 44.8% worked in low patient flow districts. Of the participants, 54.5% were physicians, 30% were technicians and 15.5% were paramedics, and 59.5% had more than 10years' work experience. A bachelor's degree was held by 49.2% of participants, 52.2% of the studied group worked >8 h daily, and 61.7% of the studied group had an average of 5-6hours' sleep daily (Table 1). Regarding knowledge, 51.2% of the studied group had good knowledge of COVID-19 infection (Table 2 and Figure 1). More than two-thirds of participants had clear knowledge about the role of masks in prevention of transmission, 87% understood the modes of infection transmission, 31.8% believed that COVID-19 is an airborne droplet infection, and 71.7% had good knowledge of waste disposal. Concerning the attitudes of HCWs toward COVID-19, 61.7% of the studied group showed positive attitude (Table 2 and Figure 1), and 53.8% had conflict defeat the virus, 57.3% were fearful of being infected, and 45.8% had been quarantined from their families. Regarding practice, 53.6% demonstrated good practices toward COVID-19 (Table 2 and Figure 1), with 66.4% of participants aware of and using Personal Protective Equipment (PPE), and 65.4% practising the Five Moments for Hand Hygiene. Courses on good practice were attended by 62.7% of participants, the majority of which were conducted locally.

| Data | No. | % |
|---|---|---|
| **Age (years)** | | |
| **20–30** | 113 | 22.9 |
| **30–39** | 217 | 43.9 |
| **>40** | 164 | 33.2 |
| **Sex** | | |
| **Male** | 149 | 30.2 |
| **Female** | 345 | 69.8 |
| **Work distracts** | | |
| **High flow patients*** | 273 | 55.2 |
| **Low flow patients**** | 221 | 44.8 |
| **Job description** | | |
| **Medical[1]** | 269 | 54.5 |
| **Technician[2]** | 149 | 30 |
| **Paramedics[3]** | 76 | 15.5 |
| **Work year experience (years)** | | |
| **<5** | 125 | 25.3 |
| **5–9** | 75 | 15.2 |
| **>10** | 294 | 59.5 |
| **Education level** | | |
| **Diploma or equivalent** | 99 | 20 |
| **Bachelor** | 243 | 49.2 |

| | | |
|---|---|---|
| **Master** | 59 | 11.9 |
| **Ph.D.** | 85 | 17.2 |
| **Other** | 8 | 1.6 |
| **Average work hour** | | |
| **>8 h** | 258 | 52.2 |
| **<8h** | 236 | 47.8 |
| **Average sleep hour** | | |
| **>5** | 50 | 10.1 |
| **5–6** | 305 | 61.7 |
| **<7** | 139 | 28.1 |

*High flow patient districts = Hawally, Ahmadi and Farwaniya districts.
**Low flow patient districts = Capital, Mubark, Sabah, Jahra and others.
[1]Medical = physician, nurse or pharmacist.
[2]Technician = lab or radiology technician.
[3]Paramedic = health inspector, physiotherapist, nutritionist or others.

**Table 1:** Sociodemographic characteristics of the studied group (N=494).

| KAP | No | % |
|---|---|---|
| **Knowledge** | | |
| **Fair** | 241 | 48.8 |
| **Good** | 253 | 51.2 |
| **Attitude** | | |
| **Negative** | 189 | 38.3 |
| **Positive** | 305 | 61.7 |
| **Practices** | | |
| **Bad** | 229 | 46.4 |
| **Good** | 265 | 53.6 |

**Table 2:** Knowledge, attitudes and practices of healthcare workers regarding COVID-19.

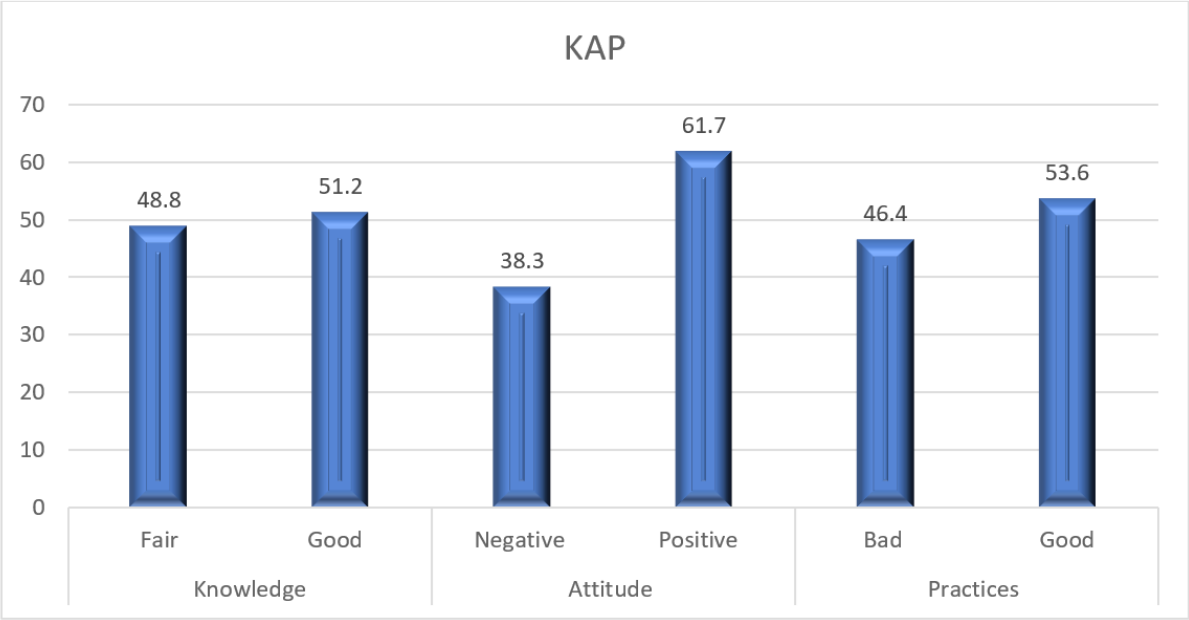


**Figure 1:** Knowledge, attitudes and practices of the studied group regarding COVID-19.

Relationships between KAP and the socio-demographic characteristics of the studied group are detailed in Table 3. Significant relationships between COVID-19 knowledge and age and work experience were observed, with 37.5% of the age group >40 years having good knowledge and 63.2% of participants with more than 10 years having a positive attitude. No significant relationships between knowledge and other sociodemographic characteristics were observed.

| | **Knowledge** | | | **Attitude** | | | **Practices** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Fair No=241** | **Good No=253** | **P-value** | **Negative No=189** | **Positive No=305** | **P-value** | **Poor No=229** | **Good No=265** | **P-value** |
| | **No (%)** | **No (%)** | | **No (%)** | **No (%)** | | **No (%)** | **No (%)** | |
| **Age (years)** | | | | | | | | | |
| **20–30** | 49 (20.3) | 64 (25.3) | **0.008** | 58 (30.7) | 55 (18) | **0.004** | 59 (25.8) | 54 (20.4) | 0.339 |
| **30–39** | 123 (51) | 94 (37.2) | | 77 (40.7) | 140 (45.9) | | 95 (41.5) | 122 (46) | |
| **>40** | 69 (28.6) | 95 (37.5) | | 54 (28.6) | 110 (36.1) | | 75 (32.8) | 164 (33.2) | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sex** | | | | | | | | | |
| **Male** | 75 (31.1) | 74 (29.2) | 0.651 | 63 (33.3) | 86 (28.2) | 0.227 | 79 (34.5) | 70 (26.4) | **0.051** |
| **Female** | 166 (68.9) | 179 (70.8) | | 126 (66.7) | 219 (71.8) | | 150 (65.5) | 195 (73.6) | |
| **Work distracts** | | | | | | | | | |
| **High flow patients** | 139 (57.6) | 134 (52.9) | 0.292 | 108 (57.1) | 165 (54.1) | 0.508 | 129 (56.3) | 144 (54.3) | 0.656 |
| **Low flow patients** | 102 (42.4) | 119 (47.1) | | 81 (42.9) | 140 (45.9) | | 100 (43.7) | 121 (54.7) | |
| **Job description** | | | | | | | | | |
| **Medical** | 127 (52.6) | 142 (56.1) | 0.457 | 105 (55.5) | 164 (53.7) | 0.245 | 136 (59.3) | 133 (50.1) | 0.530 |
| **Technician** | 79 (32.7) | 70 (27.6) | | 50 (26.4) | 99 (32.4) | | 67 (29.2) | 82 (30.9) | |
| **Paramedics** | 35 (14.5) | 41 (16.2) | | 34 (17.9) | 42 (13.7) | | 26 (11.3) | 50 (18.8) | |
| **Work year experience** | | | | | | | | | |
| **<5** | 61 (25.3) | 64 (25.3) | **0.051** | 60 (31.7) | 65 (21.3) | **0.029** | 64 (27.9) | 61 (23) | 0.303 |
| **5–9** | 46(19.1) | 29 (11.5) | | 24 (12.7) | 51 (16.7) | | 37 (16.2) | 38 (14.3) | |
| **>10** | 134 (55.6) | 160 (63.2) | | 105 (55.6) | 294 (59.5) | | 128 (55.9) | 166 (62.6) | |
| **Education level** | | | | | | | | | |
| **Diploma or equivalent** | 41 (17) | 58 (22.9) | 0.336 | 43 (22.8) | 56 (18.4) | 0.731 | 33 (14.4) | 66 (24.9) | 0.069 |
| **Bachelor** | 128 (53.1) | 115 (45.5) | | 92 (48.7) | 151 (49.5) | | 119 (52) | 124 (46.8) | |
| **Master** | 28 (11.6) | 31 (12.3) | | 21 (11.1) | 38 (12.5) | | 31 (13.5) | 28 (10.6) | |
| **PhD** | 39 (16.2) | 46 (18.2) | | 31 (16.4) | 54 (17.7) | | 42 (18.3) | 43 (16.2) | |
| **Other** | 5 (2.1) | 3 (1.2) | | 2 (1.1) | 6 (2) | | 4 (1.7) | 4 (1.5) | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Average work hour** | | | | | | | | | |
| **<8 h** | 125 (51.9) | 133 (52.6) | 0.876 | 100 (52.9) | 158 (51.8) | 0.811 | 118 (51.5) | 140 (52.8) | 0.773 |
| **>8h** | 116 (48.1) | 120 (47.4) | | 89 (47.1) | 147 (48.2) | | 111 (48.5) | 125 (47.2) | |
| **Average sleep hour** | | | | | | | | | |
| **>5** | 21 (8.7) | 29 (11.5) | 0.364 | 21 (11.1) | 29 (9.5) | 0.236 | 25 (10.9) | 25 (9.4) | 0.295 |
| **5-6** | 156 (64.7) | 149 (58.9) | | 123 (65.1) | 182 (59.7) | | 133 (58.1) | 172 (64.9) | |
| **<7** | 64 (26.6) | 75 (29.6) | | 45 (23.8) | 94 (30.8) | | 71 (31) | 68 (25.7) | |

*High flow patient districts = Hawally , Ahmadi and Farwaniya districts.

**Low flow patient districts = Capital, Mubarak, Sabah, Jahra and others.

[1]Medical =physician, nurse or pharmacist.

[2]Technician= lab or radiology technician.

[3]Paramedic = health inspector, physiotherapist, nutritionist or others.

P = P-value.

**Table 3:** Relationships between sociodemographic characteristics of the studied group and knowledge, attitudes and practices.

Significant relationships between attitude and age and between attitude and work experience were seen, with 45.9% of the age group 30-39 years having positive attitude and 59.5% of participants with >10 years working experience indicating positive attitudes. No other significant relationships between attitude and other sociodemographic characteristics were observed.

There was a significant relationship between practice and gender, with 73.6% of female HCWs indicating good practices in relation to COVID-19 infection. No other significant relationships between practice and other sociodemographic characteristics were observed.

We observed a significant relationship between attitude and practice total score and course attendance, with attitude and practice scores increasing with an increase in course attendance frequency (Table 4 and Figure 2). There was a strong positive significant correlation between knowledge total score and practice total score in the studied group (Table 5 and Figure 3).

| | Knowledge score Mean ±SD | P value | Attitude score Mean ±SD | P value | Practice score Mean ±SD | P value |
|---|---|---|---|---|---|---|
| **Rarely** | 29.40±3.3 | | 2.96±1.1 | | 17.40±3.19 | |
| **Occasionally** | 29.09±2.9 | | 2.56±1.2 | | 18.68±2.12 | |
| **Some time** | 29.52±3.6 | 0.234* | 2.83±1.1 | **0.003#** | 20.31±2.26 | **<0.001*** |
| **Most of time** | 29.90±3.6 | | 2.51±1.3 | | 21.92±1.78 | |
| **Always** | 30.68±3/4 | | 3.29±1.1 | | 23.10±2.39 | |

*ANOVA test; #Kruskal-Wallis test.

**Table 4:** Relationship between course attendance frequency and knowledge, attitudes, practice score.

| | Knowledge | | Attitude | |
|---|---|---|---|---|
| | r | P | r | P |
| **Attitude** | −0.064 | 0.154 | ---- | ----- |
| **Practices** | 0.23 | **<0.001** | −0.038 | 0.4 |

r = Pearson correlation; P = P-value.

**Table 5:** Correlation between knowledge total score, attitude total score and practices total score.

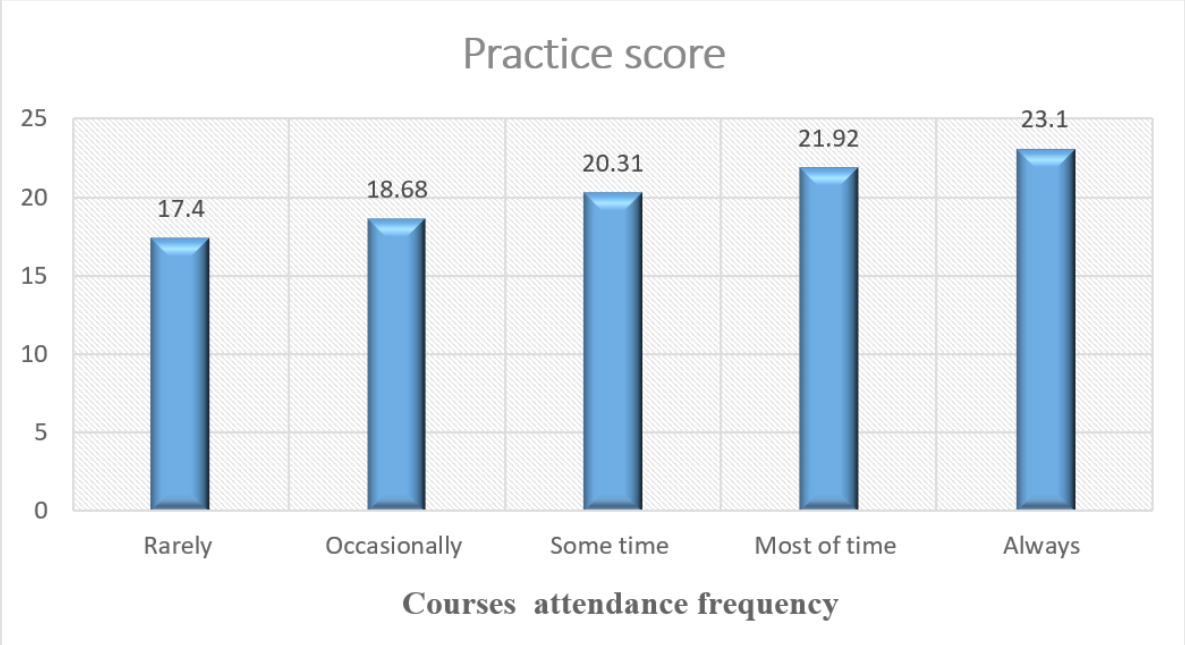


**Figure 2:** Relationship between course attendance frequency and practice total score.

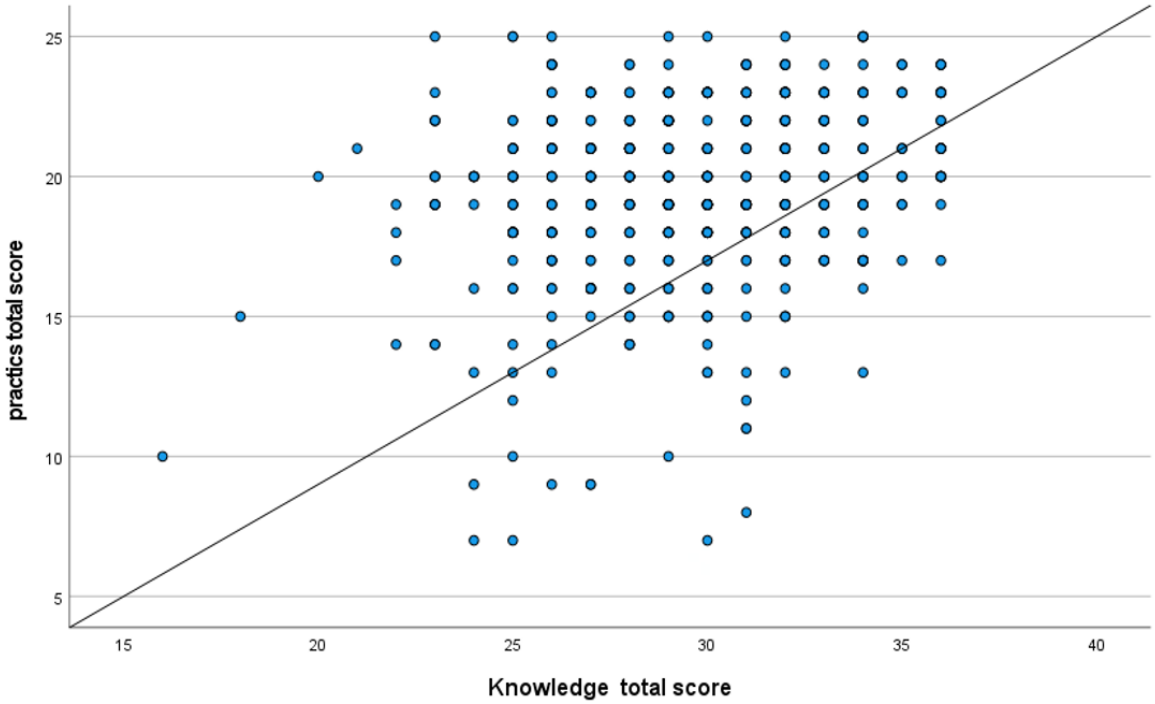


**Figure 3:** Correlation between knowledge total score and practice total score.

## Discussion

During the first phase of the COVID-19 pandemic, health authorities continuously updated information about the virus. It was important for HCWs to be informed of these updates to protect themselves and improve their capacity to contend with the pandemic. This study aimed to assess the KAP of HCWs regarding COVID-19 during the early and middle stages of the pandemic in Kuwait.

The present study showed that 51.2% of the studied group had good knowledge about COVID-19 infection. This finding was similar to the finding of [1], who found that 57.4% of HCWs in primary healthcare centres in Dubai had sufficient knowledge about COVID-19. This finding explained by our survey being conducted in the early and middle stage of a pandemic, when information about the virus, its mode of transmission and the infection isolation period was being updating constantly; thus, the facts kept changing as evidence changed. This finding about knowledge was in contrast to [2-4,7,21], whose studies demonstrated high knowledge level of participants; however, many of these studies were carried out after the pandemic peak, so the participants had time to gain sufficient knowledge. Knowledge is crucial to establish beliefs about prevention, forming a positive attitude and promoting good practice.

The present study revealed that 61.7% of the studied group had a positive attitude towardsCOVID-19, with 53.8% having had COVID-19 infection, 57.3% having a fear of infection, and 45.8% experiencing quarantine from their families. These findings were inconsistent with the findings of [1,4,7], During the early stages of the pandemic, there was much debate over information, meaning that the scoring for attitudes differed between the beginning and end of the pandemic.

The present study demonstrated that 53.6% of participants had good practices toward COVID-19, with66.4% of participants aware of and using PPE, and 65.4% of participants practising the Five Moments for Hand Hygiene. We also found that 62.7% of participants attended courses, the majority of which were held locally. These findings were consistent with the findings of [1], who reported that 72% of HCWs in primary healthcare centres in Dubai had good infection control practices related to COVID-19; however, our findings were inconsistent with [2,4] our study revealed that there was a significant relationship between knowledge and both age and years of working experience; these findings were consistent with [2]. This was expected, as the older the individual and the more work experience they have, the greater their knowledge. We did not find any significant relationship between knowledge and job description; this finding agreed with [18] but disagrees with [7,21]. Our study revealed a significant

relationship between attitude and both age and years of work experience; these findings were inconsistent with [4,18], who found no significant variation between demographic data and attitude scores. We observed a significant relationship between practice and gender, with 73.6% of female HCWs indicating good practices regarding COVID-19 infection; this finding agreed with [3]. We did not find any other significant relationships between practices and sociodemographic characteristics.

This study revealed a significant relationship between attitude total score, total practice score, and course attendance frequency, with the attitude and practice total scores of participants who always attended courses higher than the attitude and practice total scores of participants who rarely attended courses (attitudes 2.96±1.1, practices 3.29±1.1 for always attended; 23.10±2.39, 17.40±3.19, respectively, for rarely attended). This finding highlights the importance of continuous training and education, especially about the emerging and re-emerging of infectious diseases. Our study revealed a strong significant positive correlation between knowledge total score and practices total score ($r=0.230$; $P=<0.001$), suggesting that practices improve significantly with an increase in knowledge. This finding is consistent with [19] who found a significant positive linear correlation between knowledge score and practice score ($r=0.142$; $P=0.016$), and with [4], who reported that improved knowledge about COVID-19 is linked to appropriate practice ($r=0.095$; $P=0.010$). Our study revealed no significant correlation between total knowledge score and total attitude score, which is inconsistent with [4,18], who found a significant positive linear correlation between knowledge and practice scores.

## Limitations

The study was subjected to some limitations. Participant responses were through self-reported, web-based questionnaires, and errors from recall bias can occur when using this method. Interviewing the participants could have captured information on attitude and practice more accurately. Consequently, the results from these sections of the questionnaire do not necessarily reflect the actual attitudes and practices of the HCWs. This study began after Kuwait was placed under lockdown during the pandemic and continued after the restrictions were lifted. Public health measures in Kuwait have changed as more information about the pandemic has been published. Because of these factors, the results may not represent the current COVID-19 KAP of HCWs.

## Conclusion

We found that HCWs in Kuwait had good knowledge and positive attitudes regarding COVID-19, and they demonstrated good practices. We observed significant relationships between knowledge and both age and work experience, and between attitude and age and work experience. A significant relationship between practices regarding COVID-19 and gender was observed, as well as a significant relationship between attitude and practices. Increased course attendance frequency was related to higher KAP scores.

## Ethical Approval

Kuwait's Ministry of Health ethics committee approved the study. All eligible HCWs were informed about the study, and participation was optional. Participants were guaranteed anonymity and gave consent before participating.

## Recommendations

There is a clear need for regular training programmes for HCWs to increase their skills in dealing with disease outbreaks and to prepare them for future emerging or re-emerging infectious disease outbreaks.

## Acknowledgments

The authors would like to thank all health care workers who participated in this survey, Ministry of Health, Kuwait.

**Author Contributions:** All authors made a significant contribution to the work reported

**Funding:** No separate funds were required for the study.

**Conflicts of Interest:** The authors declared no conflict of interest.

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