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# House officers' knowledge, attitude and practice of Covid-19 infection at Thamar University Al-Wahdah Teaching Hospital, Yemen

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## Abstract

**Background:** House officers' (HOs) adherence to fight COVID-19 is essential, especially after declaration of World Health Organization that COVID-19 as a pandemic.
**Aim**: The aim of this study was to evaluate the knowledge, attitudes and practices (KAP) towards COVID-19 among HOs at Thamar University Al-Wahdah Teaching Hospital (TUWTH), Yemen.
**Methods**: A descriptive cross-sectional survey, using a structured questionnaire, was carried out on 90 HOs. The survey was designed to evaluate the KAP towards COVID-19.
**Results**: The findings indicated that about more than two third of the participants had good level of knowledge and positive attitudes regarding COVID-19 pandemic (68.9%, and 67.8%, respectively). Similarly, about two third (63.3%) had good practices towards COVID-19.
**Conclusion**: Most of HOs had good knowledge , a positive attitudes and good practices toward COVID-19. However, this was less than we hope for their essential role in this pandemic. The results highlight the importance of consistent messaging from HOs to the faculty medicine staffs as we recommend continuous educational programs for house officers to be one of the first lines for COVID-19 fighting or any newly pandemic disease.

**Keywords:** House officers, Covid-19 infection, Dhamar, Yemen.

## 1. Introduction

Hose Officers (HOs) are prepared at a high level of knowledge, practice and behavior to manage any recent epidemic disease during undergraduate studies because they have already received many training courses related to the transmission of epidemic diseases, and infection quality control. Therefore, they are able to control infections and handle any epidemic diseases. The coronavirus disease 2019 (COVID 19) is a coronavirus-caused severe acute respiratory syndrome that was first reported in Wuhan, China [1,2]. In January 2020, the World Health Organization (WHO) proclaimed a public health emergency, and in March of the same year, a pandemic [3,4]. The main viral transmission methods are respiratory droplets and close contact, as stated by the WHO [5].

The knowledge, attitudes, and behaviors of HOs and healthcare professionals regarding COVID-19 have a

significant influence in the spread and management of the disease. Yemen is one country that health-care workers don't have enough personal protective equipment, overcrowding and absence of isolation room facilities. The college of medicine's six-year program for medical students and an additional year of required house officer duty, during which time they complete their training in various departments and specializations at Thamar University Al-Wahdah Teaching Hospital (TUWTH). Due to the fact that they are constantly in contact with patients, house officers at Thamar University Faculty of Medicine (TUFM), in Yemen in particular are at a higher risk of infection than others during their rotation practice. As a result, they were playing a crucial role in diagnosis, treatment, prevention of disease, and public education during this pandemic. There are several studies in different countries among HOs have been performed to assess the level of awareness, perception, and attitude of Hos toward this pandemic and practice modifications along with other related factors. suggest that adequate house officers' knowledge, attitudes, and practices toward COVID-19 would enhance their ability to avoid the risk of self-infection, decrease mortality, and provide adequate medical care service during this pandemic [ 6-9]. This study aimed to assess the knowledge, practice, and attitude toward (COVID-19) infection among house officers at TUWTH, Yemen.

## 2. Methods

This descriptive cross-sectional survey was conducted on house officers during their training at Thamar University Al-Wahdah Teaching Hospital (TUWTH), Dhamar governorate, Yemen. TUWTH is the teaching Hospital of Thamar University Faculty of Medicine (TUFM). All the house officers for the academic year 2020-2021 were determined as a population of the study. Ninety (n=90) house officers agreed to participate in the study. The data were collected by using a structured questionnaire that was adapted from different studies following WHO's recommendations, and existing study on individuals' knowledge, attitudes and practices toward COVID-19 [6,9].

The questionnaire included three main parts to investigate the participants' knowledge attitudes and practices toward COVID-19. Part one (14 questions) was designed to assess the participants' knowledge included; information sources about COVID-19, the epidemiology, clinical pictures, diagnosis, treatment, and prevention of COVID-19. Part two (Eight questions) was designed to investigate the participants' attitudes toward COVID-19 pandemic in Yemen and the world. Surveyed HOs were asked whether they are you happy to be a physician or not. They were also asked whether has think the physician takes his considerable respect from the community and the government (yes or no); if they have any anxiety symptoms for getting infection by COVID-19; any sleep disorders symptoms related to COVID-19; and incidence of covid-19 infection in Yemen is high (yes or no). Part three (17 questions) was designed to investigate the clinical practice of the study participants including, the preventive measures, reading of local or international guidelines about COVID-19 infection, protective considerations during training course at the hospital, receiving of COVID-19 vaccine or, receiving of training on COVID-19.

**Ethical Considerations**

The approval on the study protocol was obtained from Thamar University Medical Ethics Committee (TUMEC). Before commencing the study, the survey's objectives were explained for all the participants. The participants were informed that their participation is voluntary and that the data is subjected to strict confidential as well as the freedom to withdraw at any time of the study period.

**Statistical analysis**

Data entry, checking and analysis were done using Statistical Package for Social Science (SPSS) software (version, 14). The descriptive statistics were curried out to represent, the nominal variables by the frequency distribution and percentages; and the continuous variables by the mean and standard deviation (SD). The appropriate answer on Knowledge (14 items), attitudes (8 items), and practices (17 items) regarding COVID-19 was given one point, whereas the non-appropriate answer was recorded as zero. The level of the knowledge (Good and insufficient), attitudes (Favorable and Unfavorable), and practices (Good and pad) scores regarding COVID-19 were categorized into two levels, using, the overall median as a cut-off value in KAP. Regarding to sources of participants' information about COVID-19, Any answer included: "Scientific sources" or " Your collage" or both of them ± the another chooses, i.e., Social media, TV, "Other", was given one point whereas, the unreliable sources such as the single or combined answer with "social media", TV, "Other" was recorded as zero.

## 3. Results

Table 1 shows the knowledge about COVID-19 infection among house officers in TUFM, Yemen. The highest knowledge levels of participants were noted to be 98.9 % about the geographical origin of COVID-19 is Wuhan, China and, 97.8% that the confirmed testing of infection is PCR. Similarly, Ninety four percent (94.4%) of the participants knew that COVID-19 is classified as a pandemic by WHO; the incubation period is 2-14 days; and the treatment depends only on symptomatic and supportive treatment. While, the travelling was reported by 91.1% as a major risk factor for disease spreading. On the other hand, the majorly (86.7%) of the participants completely knew, the most important precautions for prevention of COVID-19 infections and the required precautions that must be done for health care workers

who contact with COVID-19 patients (81.1%). Also, as shown in Table 1, about three quarters correctly indicated to the animal as a potential natural host of COVID-19; and SARS-COV2 as an adapted scientific name by WHO for the agent infection (76.6% , and 72.2%, respectively) whereas, 57.8% of the participants had no knowledge about that the oral anticoagulant drug should be given to all COVID-19 cases and, 40% of them also had no knowledge about that the radiological imaging is a corner stone for diagnosis of COVID-19.

Regarding the most important symptoms for suspicion of COVID-19. About the half (48.9%) of participants correctly indicated the fever > 38 ℃. Twenty one percent (21.1%) of the participants unacceptably indicated the dry cough; the fever > 38 ℃ and one of anther three choices (12.2%); and the fever > 38 ℃ and dry cough as well as generalized fatigue or, gastroenterology manifestation(12.2%). In addition, about, 4.4% indicated all choices and 3.3% a generalized fatigue.

The overall median knowledge score was 11.0 out of a maximum possible score of 14.0 (25th percentile 10.0, 75th percentile 12.0). Accordingly, nearly more than two third of the participants (68.9%) had good level of knowledge regarding COVID-19, and 31.1 % had no sufficient knowledge. In total, only one (1.1%) participant answered seven of the items correctly and two (2.2%) participants answered all 14 items correctly.

**Table 1: House officers' knowledge on COVID-19 infection (n= 90)**

| Item | n | % | Item | n | % |
|---|---|---|---|---|---|
| **Epidemiologic, clinical and diagnostic features** | | | **The most important symptoms for suspicion of COVID-19 infection** | | |
| COVID-19 classified by WHO as pandemic | | | **Fever > 38 č* | 44 | 48.9 |
| **Yes* | 85 | 94.4 | *Generalized fatigue* (GF) | 3 | 3.3 |
| *No* | 5 | 5.6 | *Dry cough* (DC) | 19 | 21.1 |
| The geographical origin of COVID-19 from Wuhan China. | | | *Gastroenterology manifestation* (GM) | 0 | 00.0 |
| **Yes* | 89 | 98.9 | Fever > 38 č; GF | 2 | 2.2 |
| *No* | 1 | 1.1 | Fever > 38 č; DC | 7 | 7.8 |
| The official name used by the WHO for the virus is SARS-COV2 | | | Fever > 38 č; GM | 1 | 1.1 |
| **Yes* | 65 | 72.2 | Fever > 38 č; GF; DC | 7 | 7.8 |
| *No* | 25 | 27.8 | Fever > 38 č; DC; GM | 3 | 3.3 |
| The potential natural host of COVID-19 is thought to be from animal | | | Fever > 38 č; GF, DC; GM | 4 | 4.4 |
| **Yes* | 68 | 75.6 | **What's the most important precautions for prevention of COVID-19 infections?** | | |
| *No* | 22 | 24.4 | *Stay at home only* | 7 | 7.8 |
| The incubation period is 2-14 days. | | | *Social distance only* | 1 | 1.1 |
| **Yes* | 85 | 94.4 | *Repeated hand washing only* | 0 | 0.0 |
| *No* | 5 | 5.6 | *Avoid mass gatherings only* | 0 | 0.0 |
| The diagnosis of COVID-19 confirmed by PCR. | | | *Wearing personal protective equipment only* | 1 | 1.1 |
| **Yes* | 88 | 97.8 | **All must be considered* | 78 | 86.7 |
| *No* | 2 | 2.2 | Wearing personal protective equipment only and one of the first three options | 3 | 3.3 |
| Travelling is a major risk factor for disease spreading | | | **Precautions must be done for health care workers who contact with patients** | | |
| **Yes* | 82 | 91.1 | *Use full personal protective equipment* | 16 | 17.8 |
| *No* | 8 | 8.9 | *Isolation for two weeks* | 1 | 1.1 |
| Radiological imaging is a corner stone for diagnosis of COVID-19. | | | **Both measures* | 73 | 81.1 |
| **Yes* | 54 | 60.0 | **Source of information** | | |
| *No* | 36 | 40.0 | *Reliable source** | 71 | 78.9 |
| Treatment depends only on symptomatic & supportive treatment | | | Unreliable *source* | 19 | 21.1 |
| **Yes* | 85 | 94.4 | | | |
| *No* | 5 | 5.6 | **Total knowledge score, mean ±SD** | 11.2± 1.5 | |
| Oral anticoagulant treatment must be considered for treatment of all cases. | | | **Overall level of the participants' knowledge, Median (IQR)** | 11(2) | |
| **Yes* | 38 | 42.2 | Good | 62 | 68.9 |
| *No* | 52 | 57.8 | Pad | 28 | 31.1 |

* The accepted answer. The italic statements indicate to the available answer choices. IQR: Interquartile Range; ** Any answer included: "Scientific sources" or " Your collage" or both of them ± the another chooses, i.e., Social media, TV, "Other",

As shown in table 2, a majority of the house officers had positive attitudes in their responses of some evaluation items that included, Having the ability to share with the health care provider the responsibility to fight covid-19 pandemic (83.3%); Feeling happy that they would become physicians (80.0%); Believing that the world can to get rid of covid-19 pandemic (77.8%); and the belief that the physicians have took their considerable respect from the community and the government (63.3%). Although, most (68.9%) of the participants positively confirmed, that they didn't develop any sleep disorders symptoms related to COVID-19 and, that they had no any anxiety symptoms for getting infection (60.0%). However, rats who negatively answered with " Yes" on the latter two items, were 21.1%, and 40.0%, respectively. The overall median attitudes score was 5.0 out of a maximum possible score of 8.0 (25th percentile 4.0, 75th percentile 6.0). Accordingly, nearly more than two third of the participants (67.8%) had favorable attitudes towards practices and circumstances of COVID-19 pandemic , and 32.2% had unfavorable attitudes. In total, only one (1.1%) participant answered none of the items positively and only four (4.4%) participants answered seven of the items positively.

Table 3 shows the practices related to COVID-19 infection among house officers. A majority (92.2%) of them confirmed reading a local or international guidelines about COVID-19; informing the precautions that must be followed to the patients attended health care(88.9%); accepting visits to COVID-19 patient who have been cured (78.9%); take the required precautions during the training course at the hospital(70.0%). While, who confirmed receiving of a training on COVID-19 and a vaccine against it were only 40%, and 14.4%, respectively.

On the other hand, when participants were asked about their practices "if they suspected to be infected with COVID-19". The highest (87.8%) correct response reported was "Cover mouth and nose while coughing" followed by "self-isolation and asking for sick leave" (84.4%); and wearing the face mask all the time to protect others (84.4%). The overall median practices score was 12.0 out of a maximum possible score of 17.0 (25th percentile 10.0, 75th percentile 13.0). Accordingly, two third of the participants (63.3%) had good practices towards COVID-19. In total, only one (1.1%) participant answered four items correctly and only two (2.2%) participants answered of the 16 items correctly (Table 3) .

**Table 2: Attitude of the participants toward COVID-19 infection (n=90)**

| Item-Yes | no(%) |
|---|---|
| Are you happy to be a physician?* | 72(80.0) |
| Did you think that the physician takes his considerable respect from the community and the government?* | 57(63.3) |
| Did you suspect that you are able to share the health care provider the responsibility to fight covid-19 pandemic?* | 75(83.3) |
| Do you think this outbreak has impacted on your learning curve? | 76(84.4) |
| Do you think that the world is able to get rid of covid-19 pandemic?* | 70(77.8) |
| Do you have any anxiety symptoms for getting infection by COVID-19? | 36(40.0) |
| Did you develop any sleep disorders symptoms related to COVID-19? | 28(21.1) |
| Incidence of covid-19 infection in Yemen is high | 55(61.1) |
| **Total knowledge score, mean ±SD** | 4.9± 1.3 |
| **Overall level of the participants' attitudes, Median (IQR)** | 5(2) |
| Favorable | 61(67.8) |
| Unfavorable | 29(32.2) |

Data are given as The number (n) and percentage (%) unless otherwise noted; *Favorable attitude. IQR: Interquartile Range

**Table 3: Practices related to COVID-19 infection among house officers (n=** 90**)**

| Item-Yes | n(%) |
|---|---|
| Did you read about COVID-19 infection local or international guidelines? | 83(92.2) |
| Did you consider precautions during training course at the hospital? | 63(70.0) |
| Did you mention the precautions that must be followed to the patients attended health care? | 80(88.9) |
| Did you accept the visiting of COVID-19 patient who had been cured? | 71(78.9) |
| Have you received COVID-19 vaccination? | 13(14.4) |
| Have you received training on COVID-19? | 36(40) |
| **If I suspect myself with COVID-19, I will do the followings.** | |
| Cover mouth and nose while coughing. | 79(87.8) |
| Seek medical attention immediately even if the symptoms are mild. | 51(56.7) |
| Isolate myself and ask for sick leave | 76(84.4) |
| Take antibiotics* | 51(56.7) |
| Take some herbal medicine.* | 41(45.6) |
| I wear a face mask all the time to protect others | 76(84.4) |
| Frequent cleaning of household surfaces and workplaces. | 67(74.4) |
| Stop any kind of gatherings activities or social events. | 61(67.8) |
| I take certain medications such as antipyretic and cough medicines | 71(78.9) |
| Requests a test | 51(56.7) |
| Nothing, just wait* | 1(1.1) |
| **Total knowledge score, mean± SD** | 11.72±2.45 |
| **Overall level of the participants' practices, Median (IQR)** | **12 (3)** |
| Good | 57(63.3) |
| Poor | 33(36.7) |

Data are given as The number (n) and percentage (%) unless otherwise noted; .* unaccepted answers; IQR: Interquartile Range

A total of 90 of House Officer were enrolled in this study. Most (73.3%) of the participants reported that the main source of their information about COVID-19 was the scientific web sites, application, etc., followed by the social media, college, Television (55.6%, 28.9%, 26.7%, respectively) (Figure 1).

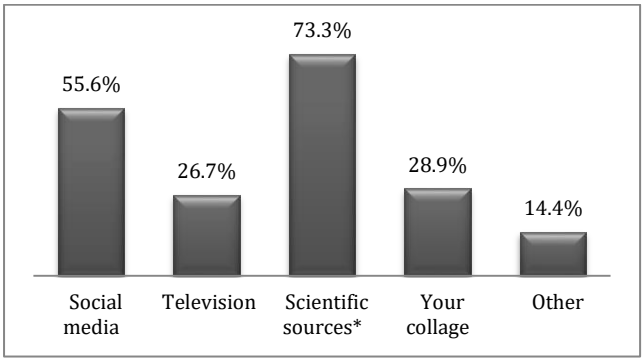


**Figure 1: Source of information about COVID-19**
*Web site, applications

# 4. Discussion

This is a cross-sectional survey conducted on house officers (HOs) at TUWTH, Thamar university, Yemen during the academic year 2021-2022 to assess the knowledge, attitude and practice toward COVID-19. Novel Coronavirus 2019 has become the primary global concern and the physicians and HOs are the frontlines for virus fighting. At the best of our knowledge this is the first study in Yemen investigate the KAP toward COVID-19 infection among Yemeni HOs. The study Generally revealed that most of the house officers (HOs) participated have good knowledge level regarding COVID-19 (68.9%). This was lower than findings of other studies conducted in Ethiopia, India and China (88.2%, 82.9%, and 89%, respectively) among healthcare workers (HCWs) [10,11,12]; and two separated studies conducted in Egypt, where was reported a good knowledge level among physicians and, an acceptable knowledge level among undergraduate medical students (98.8%, 74.3%, respectively) [13,14]. On the other hand, findings of the present study, is higher if compared to the findings of other studies reported also adequate knowledge among HOs in Egypt and good knowledge among medical interns in Saudi Arabia (46.1%, 38%, respectively) [15,16].

The vast majority of HOs correctly know that, COVID-19 originated in Wuhan, China; PCR analysis

confirms the infection; COVID-19 is classified by WHO as a pandemic; the presumed incubation period (2-14 days) of the disease is (2-14 days); supporting of patient and reducing of symptoms is the alone treatment of disease; the major risk factor concerned for disease spreading is the travelling. Although, findings of the present study was consistent with several studies also reported a vast majority of knowledge regarding incubation period of the disease among medical students in Nigeria [17,18]; and among healthcare professionals in Pakistan [19]. However, a lower level of knowledge have been also reported in other study among healthcare workers [20]. The majority of HOs fully aware of the precautions required to prevent an COVID-19 infection ( staying at home, social distance, repeated hand washing, avoiding mass gatherings, and wearing personal protective equipment i.e. wearing face mask). This was in agreement with findings (at least three of the preventive measures listed above) of similar studies conducted among Iranian medical students [18]; Indian medical & allied health science students [21]; and Pakistani healthcare professionals [19]. In contrast, findings of the current study and aforementioned studies were clearly higher compared to an Ahmed and his colleagues findings (46.1%) among Egyptian HOs [9].

Generally , nearly more than two third of the HOs showed a positive attitude towards COVID-19 pandemic. Consistent with other studies, a similar levels of positive attitudes were observed among undergraduate medical students in both Egypt (64.2%,)[14] and, Indonesia (64.9%)[22] whereas, a lower level was observed among medical HOs in Egypt (51.2%) [15]. A majority of the HOs had positive attitudes in their responses of some evaluation items included, Having the ability to share with the health care providers the responsibility to fight covid-19 pandemic Feeling happy that they would become physicians and Believing that the world can to get rid of covid-19 pandemic. This was consistent with results of a similar study showed that majority (63.7%, 69.6%, and 84.3%, respectively) of Egyptian HOs had also positive attitudes levels towards COVID-19 [9] in their responses of the same items mentioned above in the present study. In contrast, it is conflicting to an Ugandan study done by Olum et al. among HCWs . Where reported a low rate (44%) of agreement to confidently participation in the management of patients with COVID-19. The researchers indicated to the needing to provide the adequate information to the HCWs about COVID-19 case management [23].

Although, most of the participants positively confirmed, that they didn't develop any sleep disorders symptoms related to COVID-19 and, that they had no any anxiety symptoms for getting infection. However, rates (21.1%, and 40.0%, respectively) who negatively answered with " Yes" on the latter two items, were considered low compared to what Ahmed and his colleagues reported (44.1%, and 68.6%, respectively )among Egyptian HOs [9]. Similarly, a Chinese study done by Zhang., et al. among HCWs, indicated also to that majority of the participants were afraid of becoming infected with COVID-19 at work [12]. A majority of the participants in the current study think this outbreak has impacted their training course in the hospital. This was in agreement with findings of several studies [9,15,24]. In the other hand, about two third of the HOs think the physicians had took their considerable respect from the community and the government. This was higher compared to that was reported by Ahmed., et al. (31.4%.) [9].

Generally, nearly two third of HOs showed a good practice level. Several other studies conducted on various medical and heath categories reported a relatively higher level of the good practices towards COVID-19 among undergraduate medical students (76.8%) [14], Physicians (77.5%) [13], HOs 82.5% [15] in Egypt ; and among HCWs in China (89.7%) [12]. The present study showed that a majority of the surveyed HOs had good practices towards COVID-19 in their responses of some evaluation items including: reading a local or international guidelines of COVID-19 diagnosis and Management; adherence to the precautions during the training course at hospital; willingness to visit the COVID-19 patient who have been cured; informing the precautions that must be followed to the patients attended health care. This was consistent with those reported in Ahmed., et al' s study [9]. With the exception of responding rates on the last two items mentioned above that were (15.2%, and 14.7%, respectively) lower compared to our findings. Infection prevention and control (IPC) training of health workers is associated with decreased risk of occupational acquisition of COVID-19.WHO continues to recommend that the highest priority population for vaccination include health workers, older adults and individuals with underlying medical conditions [25] while, only less than half of the participants in this study had received a training course on COVID-19 and less than fifteen percent had received a COVID-19 vaccine. When participants were asked about their practices if they suspected to be infected with COVID-19. The required preventive practices to protect other people from the infection were correctly reported by more than eighty percent including: "Cover mouth and nose while coughing", and " self-isolation and asking for sick leave"; and wearing the face mask all the time. Other preventive practices to the same purpose were also reported by most of the participants included, frequent cleaning of household surfaces and workplaces; and stop any kind of gatherings activities or social events. These are very vital practices to prevent transfer of COVID-19 from patients to patients and to the HCWs [23] and, to community and family members as well.

Generally, findings of the current study and aforementioned studies showed variation of the participants' knowledge, attitude, and practices towards COVID-19. Such variation can be attributed to the

differences in a time of the study, received training [26], study design & tool and sample size. Although, most of HOs had good knowledge and a positive attitude toward COVID-19. However, this was less than we hope for their essential role in this pandemic. In this study, about three-quarters of the participants reported that the main source of their information about COVID-19 was the scientific web sites, application, etc., whereas more than half of them obtained on their information from the social media. This was lower than findings of other studies reported also the social media as a main source of information on COVID 19 in Uganda and Pakistan (74.0 % , and 87.68%, respectively) among Health Care Workers/ professionals [19,23]; and Nigeria, and Jordan (81.0% and 83.4%, respectively) among Medical Students [17,27]. Generally, findings analysis of multiple correct answers of participants' source of information revealed that about eighty percent obtained on their information from a reliable sources included "Scientific sources" or " their collage" or both of them regardless if other unreliable sources ( i.e., social media", Television) were used as well.

# 5. Conclusion

The majority of participant's source of information was Scientific sources followed by social media. Our finding show that house officers display good basic knowledge of COVID-19, a positive attitude and adherence to good practices regarding the pandemic. Although they are on the frontline to fight against CVID-19, Low percentage of house officers received training on COVID-19 and small number of them received vaccination against this virus. We recommend continuous educational activity, training, and follow-up updates for COVID-19 diagnoses and management by policymakers and house officers to be one of the first lines for COVID-19 fighting. Also, we recommend providing access to and encouraging house officers' vaccination against COVID-19.

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**Declaration**

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**Competing interests**

The authors declare that they have no competing interests.

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