Knowledge, Attitude, and Practice toward Coronavirus (Covid-19) among Laboratory & Nursing Students of Hadhramout University, in Mukalla City, Yemen

Muna Omar Alkatheri

Medical Sciences Department of Nursing College, Hadhramout University, Mukalla, Yemen
Email: monaalkathiri23@gmail.com

Abstract

Background: As future healthcare providers, nursing students must have high-quality knowledge and be able to respond to rapid changes in any situation, such as the pandemic Covid-19. The condition of these students reflects the readiness of nursing students to face the increasing cases in the country. Since December 2019, coronavirus (Covid-19), a novel infectious disease that emerged, has spread worldwide, and the World Health Organization (WHO) has declared that the infection is a "pandemic" and no country or region can be considered safe. The World Health Organization declared the novel coronavirus a global health emergency (pandemic) on January 30, 2020. The novel coronavirus is a highly contagious disease, and the current outbreak has affected a large portion of the population around the world. Public health and social interventions play a critical role in reducing the number of infections and deaths until the vaccine is available to all. **Objective:** To determine the knowledge, attitude, and practice toward Coronavirus (Covid-19) among Laboratory & Nursing students of Hadhramout University, in Mukalla City, Yemen. **Methods:** This was a descriptive cross-sectional. Stratified random sampling is used in sample selection to ensure that laboratory and nursing students total of 130 (70, 60) were included in the study. The sample was randomly selected from one hundred students, 50 laboratory students, and 50 nursing students studying at Hadhramout College. Time of study from October to December 2021. **Results:** The statistical analysis of data collected in this study showed that the awareness of coronavirus knowledge was high, as indicated by the percentage of correct answers. 78% of the nursing students obtained the highest percentage of knowledge about coronavirus, while more than 75% of the laboratory students, relied on social media as their main

source of Covid-19 information. The College of Nursing students got the highest percentage of resource information about the Coronavirus 44%. Also we reported negative attitudes in general among nursing students and laboratory students at Hadhramout University, with 31% and 35% of nursing students and laboratory students respectively. On the other hands, we noted that (39%) of nursing students received a greater percentage of practice about Coronavirus than (37%) of laboratory students. So, they had a negative practice in general. **Conclusion:** The present study shows that knowledge about coronavirus is high, but attitudes and practices toward coronavirus (Covid-19) among laboratory and nursing students at Hadhramout University in Mukalla, Yemen, are generally negative.

Keywords

1. Introduction

This Coronavirus is a disease that affects the respiratory system. It spreads in the same way as other cold viruses. It can be spread either by coughing and sneezing from infected persons, by touching the contaminated hands or face of an infected person, or by touch. The symptoms of most coronaviruses are similar to those of other respiratory infections, including a runny nose, cough, sore throat, and sometimes fever [1] [2].

The term "coronavirus" is commonly used for a group of viruses that are usually found in animals and cause severe health problems when transmitted to humans. The transmission of viruses from animals to humans is referred to as "animal viral origin," and coronavirus is one of them [3] [4] [5]. One type of novel coronaviruses was reported in Saudi Arabia in September 2012, and the case involved a man who was hospitalized with pneumonia and acute kidney injury in June 2012 [6].

The recent outbreak of respiratory illness caused by a novel coronavirus (designated "Covid-19") has attracted worldwide attention and has been classified as a serious public health threat by the US Centers for Disease Control and Prevention (CDC). The first case was discovered in the city of Wuhan in China's Hubei province, and since then the disease has spread rapidly [7] [8].

On February 28, 2020, the World Health Organization (WHO) declared the Covid-19 outbreak a Public Health Emergency of International Concern (PHEIC). 62 countries reported 85,176 confirmed cases (including 79,250 in mainland China) and 2,919 deaths to date [9] [10]. Before the outbreak of the coronavirus in December 2019, there was no knowledge about this virus and this emerging disease [8]. The risks depend on where they are and where the person has recently traveled. The risk of infection increases in areas where multiple people have been diagnosed with Covid-19 disease. Currently, 95% of Covid-19 cases

are concentrated in China, and Hubei province is where most of these cases occur [11]. For people in most other parts of the world, the risk of Covid-19 is still low, but it is important that they are aware and prepared for the situation in their area. WHO is working with health authorities in China and around the world to monitor and respond to outbreaks of Covid-19 [12].

Elderly people and those with pre-existing conditions (such as hypertension, heart disease, and diabetes) appear to be more affected than others. Currently, there are no antiviral drugs or vaccines for Covid-19 infections, and infected patients are treated with supportive measures to relieve symptoms [13] [14]. Severely ill individuals should be hospitalized. Most patients recover from supportive care [5] [15] [16].

Some potential vaccines and drugs specifically needed to treat this disease are under investigation. They are being tested in clinical trials. WHO is coordinating efforts to develop vaccines and drugs to prevent and treat Covid-19 disease [3] [17].

The first confirmed case associated with the Covid-19 pandemic in Yemen was announced on April 10, 2020, with an incident in Hadhramaut [18] [19] [20].

Organizations described the news as a "devastating blow" and a "nightmare scenario" given the already dire humanitarian situation in the country [21].

Given the dire humanitarian situation due to Yemen's civil war, exacerbated by famine and cholera outbreaks, the country is considered highly vulnerable to disease outbreaks [22] [23].

Yemen's health care system has been "nearly decimated" by the war and lack of medical personnel [24] [25]. As future healthcare providers, Laboratory & Nursing students must have high-quality knowledge and be able to respond to rapid changes in any situation, such as the pandemic Covid-19. The condition of these students reflects the readiness of nursing, and laboratory students to face the increasing cases in the country.

The aim of our study is to determine the knowledge, attitude, and practice toward Coronavirus (Covid-19) among Laboratory & Nursing students of Hadhramout University, in Mukalla City, Yemen.

2. Material and Methods

2.1. Study Design

This was a descriptive cross-sectional study to determine the knowledge, attitude, and practice related to Coronavirus (Covid-19) among laboratory and nursing students of Hadhramout University, Mukalla City, and Hadhramout Governorate, Yemen (October-December) 2021.

2.2. Sample Size and Methods

Stratified random sampling is the method used to select the sample to ensure that laboratory and nursing students at the final–level in the college are included

in the study, which totals 130 students (70 laboratory students, and 60 nursing students). A hundred students of sample size were randomly selected among laboratory students (50) and nursing students (50) at Hadhramout College during October-December 2021.

Thus, we estimated a sample size of approximately 50% for an assumed knowledge, attitude, and practice (KAP) of laboratory and nursing students, a confidence level of 95%, and a margin of error of 5%.

2.3. Data Collections and Analysis

Data will be collected from final-level students in two different specialized departments' laboratory students and nursing students in 2021 who were randomly selected. A letter was sent to the directors of the colleges informing them of the survey and explaining the purpose and methodology. A self-administered questionnaire was designed that included the following questions: The personal data (ages, sex level of education, level, etc…)

➢ The Knowledge toward Corona Virus among Laboratory & Nursing students of Hadhramout University.

➢ The main information source toward Corona Virus among Laboratory & Nursing students of Hadhramout University.

➢ The attitude toward Corona virus (Covid-19) among Laboratory & Nursing students of Hadhramout University, in Mukalla City, Yemen.

➢ The practice of treatment and prevention of Covid-19 among Laboratory, and Nursing students of Hadhramout University, in Mukalla City, Yemen.

A Covid-19 knowledge questionnaire was developed by the authors, regarding clinical symptoms, transmission routes, prevention, and control of Covid-19. These questions were responded to on a true/false basis with an additional "I don't know" option. The true answer was assigned with 1 point and false/I don't know answers were assigned with 0 point. Higher scores represented a better knowledge of Covid-19. Similar options were assigned for the questions related to attitude while only two options namely "Yes" and "No" were assigned for the questions related to practice towards Covid-19. Cronbach's alpha coefficient of the knowledge statements was 0.71.

Data are coded and analyzed using the Statistical Package for Social Sciences (SPSS version 19) to ensure the accuracy of data, such as frequencies and percentages were calculated and presented in tables and charts using computer office programs (Word and Excel Office 2010).

2.4. Ethical Consideration

Approval for the project will be obtained from the nursing college leadership, and we have written a letter to the laboratory and nursing college leadership to facilitate our work and data collection. Participants will be informed about the research, including the objectives and how confidentiality will be assured. Those who agree to participate will be enrolled in the study, and the information will

be kept confidential and used only for the research objective and to benefit the community.

3. Results

A hundred respondents were approached for participation. All of them provided complete information. The demographic characteristics of the respondents were presented.

In our study, the majority percentage of the Gender were laboratories male students (46%) and female nursing students (60%), Aged were nursing between (20 - 25) years (100%). On the other hand, the level of college education was fourth (final-year) of nursing students and laboratory students. The higher percentage of the place of life was Hadhramout Coast (72%) of nursing students, number of hours of practical application in the hospital during the past week was between 3 - 12 hours/day (80%) of nursing students applied in the hospital departments. Laboratory students had been on the front line to confront Corona as a volunteered (52%) but (74%) of nursing students said no to being on the front line to confront Corona. The demographic detail shown in this study has some limitations. This study focuses only on nurses and nursing assistants while other healthcare providers are excluded. Secondly, the study was conducted in one public hospital (CPLR) with 187 beds, while the city of Bujumbura has five public hospitals. As shown in Table 1.

Table 1. Socio-demographic characteristics of participant (n = 100).

Characteristics Personal Information	Items	Laboratory Students		Nursing Students	
		Freq.	%	Freq.	%
Gender	Male	23	46%	20	40%
	Female	27	54%	30	60%
Age	20 - 25 years	44	88%	50	100%
	26 - 31 years	5	10%	0	0%
	32 - 37 years	1	2%	0	0%
Education level	Level	4		4	
Place of life	Hadhramout Coast	33	66%	36	72%
	Hadhramout Valley	17	34%	8	16%
	Other provinces	0	0%	1	2%
	Expatriate	0	0%	5	10%
The number of hours of practical application in the hospital during the past week	1 - 2 hours/day	13	26%	6	12%
	3 - 12 hours/day	35	70%	40	80%
	More than 12 hours/day	2	4%	4	8%
Have you volunteered or been involved in the front line to confront corona?	Yes	26	52%	13	26%
	No	24	48%	37	74%

By collecting information and analyzing data about the knowledge of nursing and laboratory students who were in their final years of college, note that nursing obtains the highest percentage of knowledge about coronavirus by 78% than the laboratory students (75%). According to the score of the correct answers, we had nine questions about the type of microorganism causing Covid-19 disease, and the way of transmission of coronavirus to be infected which they had both (100%) correct answers, the incubation period for Covid-19 (98%) were nursing students, who is more likely to be infected with Covid-19 were (96%) of laboratory students, the patient is considered suspected of infection one of the confirmed clinical symptoms of Covid-19 virus appears (92%) of nursing students, the way to avoid infection with Covid-19 (100%) of laboratory students, the main cause of death when infected with the Covid-19 (36%) of nursing students, Treatment of cases of Covid-19 viruses were both (72%), and if a center DR. Riyadh AL-Jariri the isolation center in Ibn, Sina had, a treatment protocol for an infected patient (44%) of nursing who had given correct answers. Our results show in Table 2.

The main information source among nursing and laboratory students of Hadhramaut University regarding the coronavirus, we note that nursing students get the highest percentage of resource information about coronavirus is social media (44%), on the other hand, (34%) of the laboratory students' information from news on TV which shows in Figure 1.

Table 2. Knowledge about corona virus among Laboratory & Nursing colleges students of Hadhramout University, in Mukalla City, Yemen (n = 100).

| Characteristics	Correct Answers	Laboratory Students		Nursing Students	
		Freq.	%	Freq.	%
The microorganism causes corona disease	Viral	50	100%	50	100%
What are the main ways of transmission of corona virus infection?	By breathing and direct contact	50	100%	50	100%
What is the incubation period for Covid-19?	From 1 to 14 days	45	90%	49	98%
Who is more likely to be infected with Covid-19?	People in general	48	96%	41	82%
The patient is considered suspected of infection if one of the confirmed clinical symptoms of Covid-19 virus appears.	Fever and dry cough	38	76%	46	92%
Detailed way to avoid infection with Covid-19 virus	Use of masks and social distancing	50	100%	48	96%
The biggest cause of death when infected with the Covid-19 virus?	Kidney failure and chronic diseases for the elderly	15	30%	18	36%
Treatment of cases of Covid-19 virus through	Symptom treatment	36	72%	36	72%
Do we have a center in DR. Riyadh AL–Jariri or the isolation center in Ibn, Sina, a treatment protocol for patient?	Yes	5	10%	12	44%
Total Percentage		337	75%	350	78%
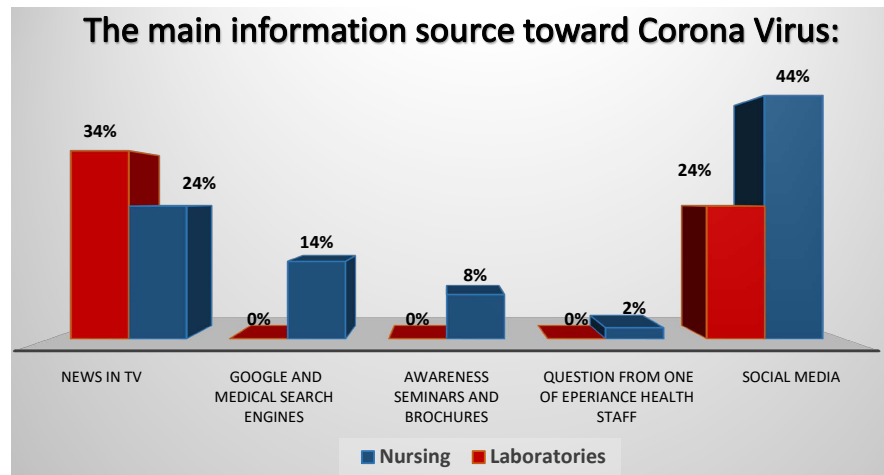
Figure 1. The main information source toward corona virus among Laboratory & Nursing colleges students of Hadhramout University (n = 100).

By analyzing the data about the attitudes and opinions of the laboratory final-level students, and final-level nursing students regarding coronavirus, we note that laboratory students receive the highest percentage (35%) of attitudes and opinions about coronavirus than the nursing students (31%). They had a negative attitude according to the score of the correct answers to the World Health Organization's ten questions about general attitudes toward coronavirus such as feeling if they were afraid from Covid-19, we found about (50%) of the nursing students and (36%) laboratory students not be afraid by using the method of prevention which was correct answers, also (84%) of the laboratory students said that smoking affect Covid-19 patients, (36%) of the laboratory students that exposing them self to the sun or temperatures above 25 degrees Celsius prevent or treat Covid-19 disease not effective, (64%) laboratory students should not think that patients or suspected of being infected with the Covid-19 conceal their infection with the virus, (42%) of the laboratory students opinion that eating healthy food such as garlic, honey and nigella not help in raising immunity and prevention from Covid-19, (84%) of the laboratory students and (28%) of the nursing students opinion that it is necessary to take the vaccine against Coronavirus and the emerging corona during the corona pandemic, (38%) of the nursing students opinion about masks should not be worn while exercising, (70%) of the laboratory students they did not think that thermal scanners are effective in detecting people infected with the Coronavirus, (64%) of the nursing students opinion that washing hands in public places is more effective than wearing rubber gloves in preventing infection, Finally, (16%) of the nursing students attitude that Covid-19 disease diabetes patients need to raise the dose of sugar drugs that shows in Table 3.

Our results from collecting and analyzing practices data among laboratory students and nursing students toward coronavirus, (72%) of laboratory students stay at home for observation and self-quarantine when they had a dry cough and a fever, (62%) more than half of the nursing students always washing their hands

Table 3. Attitude toward corona virus (Covid-19) among Laboratory & Nursing colleges students of Hadhramout University, in Mukalla City, Yemen (n = 100).

Item	Laboratory Students		Nursing Students	
	Freq.	%	Freq.	%
How afraid are you of the Covid-19 virus?				
❖ Yes, I feel scared	11	22%	11	**22%**
❖ I do not care	21	42%	14	28%
❖ Do not be afraid by using the method of prevention	18	36%	25	50%
Does smoking affect Covid-19 patients?				
❖ Yes	42	84%	41	82%
❖ No	0	0%	0	0%
❖ do not	8	16%	9	18%
Exposing yourself to the sun or temperatures above 25 degrees Celsius prevents or treats Covid-19 disease.				
❖ Yes	18	36%	14	28%
❖ No	18	36%	16	32%
❖ I do not	14	28%	20	40%
To what extent do you think that patients or suspected of being infected with the Covid-19 should conceal their infection with the virus?				
❖ Yes	4	8%	10	20%
❖ No	32	64%	18	36%
❖ I do not	14	28%	22	44%
Does eating healthy food such as garlic, honey and nigella help in raising immunity and prevention?				
❖ Yes	21	42%	34	68%
❖ No	21	42%	7	14%
❖ I do not	8	16%	9	18%
During the Corona pandemic, how much do you think is necessary to take the vaccine against Corona virus and the emerging corona?				
❖ Yes	42	84%	14	28%
❖ No	2	4%	14	28%
❖ I do not	6	12%	22	44%
Masks can be worn while exercising.				
❖ Yes	21	42%	26	52%
❖ No	16	32%	19	38%
❖ I do not	13	26%	5	10%
8-Do you think that thermal scanners are effective in detecting people infected with the Coronavirus?				
❖ Yes, it works for all cases	9	18%	9	18%
❖ I do not	35	70%	26	52%
❖ There are no cases to discover	6	12%	15	30%
Do you think that wearing rubber gloves in public places is more effective than washing hands in preventing infection?				
❖ Yes	22	44%	13	26%
❖ No	25	50%	32	64%
❖ I do not	3	6%	5	10%

Continued

Will having Covid-19 disease diabetes need to raise the dose of sugar drugs?				
❖ Yes	2	4%	8	16%
❖ No	5	5%	16	32%
❖ I do not	43	86%	26	52%
Total Percentage	**176**	**35%**	**154**	**31%**

after contact with any patient or your surrounding, and if they had close contact with confirmed cases, (82%) laboratories more than (74%) of nursing students notify official authorities and use safety and prevent tools. (20%) of nursing students and (8%) of laboratory students have written down or stored any helping number in their phone to call in case they suspect you have Covid-19 or someone else as shown in Table 4.

Only (16%) of laboratory students and (8%) of nursing students apply preventive measures for students while studying in the college and hospital, such as masks, sterilizers, and social distancing. On the other hand, (18%) of nursing students, and (2%) of laboratory students will be got vaccinated Covid-19 virus which reached Yemen through hospitals from the World Health Organization. Finally, less than half of laboratory students and nursing students (34%, 28%) respectively, have one of the means of prevention such as a mask, sterilizer, or soap, and show it to us. At the beginning of the Covid-19 pandemic, (12%) of nursing students were committed to attending training courses on how to deal with Covid-19 cases according to the protocol via the Zoom application, from our results, (80%) of laboratory students, and (64%) of nursing students, that war and poor health services are the main reason at Covid-19 pandemic doctors, medical staff, and internship students was reluctant to perform their duties and training in a hospital in Yemen.

According to the score of the correct answers, we note that (39%) of nursing students receive a greater percentage of practice about Coronavirus than (37%) of laboratory students. So, they had a negative practice in general.

4. Discussion

The recent coronavirus disease (Covid-19) pandemic is associated with increasing morbidity and mortality and has impacted the lives of the global population. Human behavior and knowledge assessment during the crisis are critical in the overall efforts to contain the outbreak [26]. A hundred final-level laboratory students and nursing students were approached for participation. The demographic characteristics of the respondents were presented.

The demographic characteristics of the respondents were presented in our study. The majority percentage of males belonged to the laboratory students (46%), while females belonged to the nursing students (60%). Aged were (100%) nursing students between (20 - 25) years, On the other hand, the level of college education was fourth (fin-level) nursing and laboratory students. The higher

Table 4. Practices toward corona virus (Covid-19) among Laboratory & Nursing colleges students of Hadhramout University, in Mukalla City, Yemen (n = 100).

Characteristics	Correct Answers	Laboratory Students		Nursing Students	
		Freq.	%	Freq.	%
What would you do if you had a dry cough and a fever?	Stay home for observation and self-quarantine	36	72%	32	64%
In the event that you need volunteers in the fight against Covid-19 You are ready to help on the front line.	Yes, I will	12	24%	21	42%
How often do you wash your hands after contact with any patient or your surrounding?	Always	22	44%	31	62%
What would you do if you had close contact with confirmed cases?	Notify official authorities and use safety and prevention tools	41	82%	37	74%
At the beginning of the Covid-19 pandemic What is your commitment to attending training courses on how to deal with Covid-19 cases according to the protocol?	Share via the Zoom application	5	10%	6	12%
Do you apply preventive measures during your stay in your college and hospital such as masks sterilizers and social distancing?	Yes	8	16%	4	8%
In the event that vaccine against the Covid-19 virus reaches Yemen through hospitals from the World Health Organization?	I will get vaccinated-	1	2%	9	18%
Have you written down or stored any helping number in your phone to call in case you suspect you have Covid-19 or someone else?	Yes	4	8%	10	20%
At the beginning of the outbreak of the Covid-19 pandemic Doctors Medical staff and internship students were reluctant to perform their duties and train them in a hospital in Yemen because?	War and poor health services	40	80%	32	64%
Do you now have any of the means of prevention such as mask sterilizer or soap? (Make sure it is present)	Yes	16	34%	14	28%
Total percentage		185	37%	196	39%

percentage of the place of life was Hadhramout Coast (72%) of nursing students, number of hours of practical application in the hospital during the past week was between 3 - 12 hours/day (80%) of Nursing students applied in the hospital departments. Laboratory students had been on the front line to confront Corona as a volunteered (52%) but 74% of nursing students said no to being on the front line to confront Corona.

In our study, the high prevalence of the knowledge of coronavirus among nursing students and laboratory students who were in their final years of college, nearly percentage between nursing students and laboratory students (78%, 75%) according to the score of the correct answers about some basic information as the type of microorganism causing Covid-19 disease, the way of transmission,

the incubation period, who is more likely to be infected, one of the confirmed clinical symptoms, and the way to avoid infection with Covid-19. The main cause of death when infected with Covid-19, the treatment of cases of Covid-19, and our treatment protocol for an infected patient at DR. Riyadh AL–Jariri Isolation Center in Ibn, Sina aligns with the high prevalence of coronavirus awareness knowledge found in a study conducted in Uganda by Ronald Olum, *et al.* [27].

Social media was the most common source of updated knowledge about coronavirus information among (44%) of final-level nursing students, on the other hand, (34%) of the laboratory students' information from news on TV. These results agree with the study by Ashraf I., Khasawneh, *et al.* (2020) in Jordan reported that the source of updated knowledge about Covid-19 information was social media [28].

From our study we reported different opinion percentages and attitudes toward coronavirus among laboratory and nursing students of Hadhramout University, in Mukalla City, Yemen, we noted they had negative attitudes according to the score of the correct answers to the World Health Organization's ten questions about the most common attitudes toward coronavirus. Laboratory students and nursing students receive less than half of the student's attitudes and opinions about coronavirus (35%, 31%) respectively.

Some confused concepts in the community and their attitudes about coronavirus need to the necessity of corrected, such as accept to take the vaccine against coronavirus, Exposing to the sun or temperatures above 25 degrees Celsius to prevent or treat Covid-19 disease, and to what extent you think that patients suspected of being infected with the virus should conceal their infection, and diabetes disease and their dose of sugar, our results disagree with the study by Ronald Olum, *et al.* in Uganda reported that 74% of all participants had positive attitudes 74% of all participants had positive attitudes [27].

In our study, we reported the weak practices in general toward coronavirus (Covid-19) among final-level of laboratory & Nursing students of Hadhramout University, in Mukalla City, Yemen. According to some practice, we asked them about it (if they have written down or stored any helping number in their phone to call in case they suspect you have Covid-19 or someone else, also if they attending training courses on how to deal with Covid-19 cases according to the protocol via the Zoom application, and if they apply preventive measures while studying in the college and hospital, such as masks, sterilizers, and social distancing). We found low scores of laboratory students and nursing students who had weak practices.

Also, regarding vaccination Covid-19 virus reached Yemen through hospitals from the World Health Organization only (12%) of nursing students, and (8%) of laboratory students accept it. The results of our study disagree with their results which were good practices for the study done in, Uganda (Ronald Olum, *et al.* 2020) [27].

5. Limitation of the Study

This study has some limitations. This study was conducted at the Medical and Health Sciences College and College of Nursing at Hadhramout University. It focuses only on two specialized departments, 130 final-level students of nursing students, and laboratory students with the lowest practice and experience with coronavirus patients. So we measure their knowledge, attitudes, and practice about coronavirus. More mistaken information may lead to more fear, anxiety, and a high area to spread it.

Organizations called it a "devastating blow" and a "nightmare scenario to the already dire humanitarian situation by the war, it is seen to be extremely vulnerable to the outbreak [21] [22] [23].

6. Conclusion

The present study shows that knowledge about coronavirus is high, but attitudes and practices toward coronavirus (Covid-19) among laboratory and nursing students at Hadhramout University in Mukalla, Yemen, are generally negative.

Acknowledgements

The author would like to express gratitude to the participants in this study for their cooperation and patience during the data collection.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

[1] World Health Organization (WHO): Coronavirus Disease (Covid-2019) Advice for the Public.
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

[2] Rothe, C., Schunk, M., Sothmann, P., Bretzel, G., Froeschl, G., Wallrauch, C., *et al.* (2020) Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *New England Journal of Medicine*, **382**, 970-971.

[3] Omrani, A.S. and Shalhoub, S. (2015) Middle East Respiratory Syndrome Coronavirus (MERS-CoV): What Lessons Can We Learn. *Journal of Hospital Infection*, **91**, 188-196.

[4] Wang, J. and Wang, Z. (2020) Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis of China's Prevention and Control Strategy for the Covid-19 Epidemic. *International Journal of Environmental Research and Public Health*, **17**, 2235. https://doi.org/10.3390/ijerph17072235

[5] World Health Organization (2020, August 7) Public Health Surveillance for Covid-19: Interim Guidance. Geneva.
https://www.who.int/publications/i/item/who-2019-nCoV-surveillanceguidance-2020.7

[6] Abdel-Moneim, A.S. (2014) Middle East Respiratory Syndrome Corona Virus (MERS-

CoV): Evidence and Speculations. *Archives of Virology*, **159**, 1575-1584.
https://doi.org/10.1007/s00705-014-1995-5

[7]   Center of Disease Control (CDC) (2020, February 1) About 2019 Novel Corona Virus (2019-nCoV).
https://www.cdc.gov/coronavirus/2019-ncov/about/index.html

[8]   Mohammed, A. (2020) Preliminary Epidemiological Analysis of Suspected Cases of Corona Virus Infection in Libya, 2020 since December 2019 Corona Virus Disease.

[9]   World Health Organization WHO Report (2020, January 29) Novel Coronavirus (2019-nCoV) Situation Report 9.
https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200129-sitrep-9-ncov.pdf

[10] Shereen, M.A., Khan, S., Kazmi, A., Bashir, N. and Siddique, R. (2020) Covid-19 Infection: Origin, Transmission, and Characteristics of Human Coronaviruses. *Journal of Advanced Research*, **24**, 91-98.

[11] Zhang, N., Li, C., Hu, Y., Li, K., Liang, J., Wang, L., Du, L. and Jiang, S. (2020) Current Development of Covid-19 Diagnostics, Vaccines and Therapeutics. *Microbes and Infection*, **22**, 231-235.

[12] World Health Organization (WHO): Rolling Updates on Coronavirus Disease (COVID-19).
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen

[13] Coronavirus Disease 2019 (Covid-2019) Treatment Guidelines National Institutes of Health.
https://www.mayoclinic.org/diseases-conditions/coronavirusdiagnosis-treatment/DRC-20479976

[14] Emergency Use Authorization. U.S. Food & Drug Administration.
https://www.fda.gov/emergency-preparedness-and-response/mcm-legal-regulatory-and-policy-framework/emergency-use-authorization-archived-information#covid19

[15] Murthy, S., Gomersall, C. and Fowler, R. (2020) Care for Critically Ill Patients With COVID-19. *JAMA*, **323**, 1499-1500. https://doi.org/10.1001/jama.2020.3633

[16] Yu, P., Zhu, J., Zhang, Z., Han, Y. and Huang, L. (2020) A Familial Cluster of Infection Associated with the 2019 Novel Coronavirus Person-to-Person Transmission during the Incubation Period. *The Journal of Infectious Diseases*, **221**, 1757-1761.
https://doi.org/10.1093/infdis/jiaa077

[17] World Health Organization (WHO): Covid-2019 Vaccines.
https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines

[18] World Health Organization (WHO): Ministry of Health in Aden Confirms the First Case of COVID-19 in Yemen.
https://www.emro.who.int/yemen/news/ministry-of-health-in-aden-confirms-the-first-case-of-covid-19-in-yemen.html

[19] McIntosh, K., Hirsch, M.S. and Bloom, A. (2020) Coronavirus Disease 2019 (Covid-19).

[20] Dhabaan, G., Chahin, A., Buhaish, A. and Shorman, M. (2020) COVID-19 Pandemic in Yemen: A Questionnaire-Based Survey, What Do We Know? *The Journal of Infection in Developing Countries*, **14**, 1374-1379. https://doi.org/10.3855/jidc.13966

[21] Yemen "Faces Nightmare" as Virus Case Confirmed. BBC News, 10 April 2020.

[22] Shaker, N. (2020, March 25) WHO Warns Yemen of Pending "Explosion" of Covid-19 Cases. Al-Monitor.

[23] Covid-19: Impact on Yemen. ACAPS. 23 March 2020.

[24] Almutawakel, R. (2020) Yemen: First Bombs, Soon a Coronavirus Epidemic.
      https://www.aljazeera.com

[25] Santarpia, J.L., Rivera, D.N., Herrera, V., Morwitzer, M.J., Creager, H., Santarpia,
      G.W., *et al.* (2020) Santarpia Transmission Potential of SARS-CoV-2 in Viral Shed-
      ding Observed at the University of Nebraska Medical Center.

[26] Pandit, S.B. and Pandit, R.B. (2021) Knowledge, Attitude and Practices of Nursing Stu-
      dents towards Covid-19: A Cross-Sectional Study. *International Journal of Health
      Sciences and Research*, **11**, 261-264.

[27] Olum, R., Kajjimu, J., Kanyike, A.M. and Chekwech, G. (2020) Perspective of Med-
      ical Students on the Covid-19 Pandemic: Survey of Nine Medical Schools in Ugan-
      da. *JMIR Public Health and Surveillance*, **6**, e19847. https://doi.org/10.2196/19847

[28] Khasawneh, A.I., Humeidan, A.A., Alsulaiman, J.W., *et al.* (2020) Medical Students
      and Covid-19: Knowledge, Attitudes, and Precautionary Measures. A Descriptive
      Study from Jordan. *Frontiers in Public Health*, **8**, Article No. 253.
      https://doi.org/10.3389/fpubh.2020.00253