MEASURING COVID-19 KNOWLEDGE, ATTITUDE, AND BEHAVIOR OF UNIVERSITY STUDENTS IN UAE: THE MEDIATING ROLE OF COMMITMENT AND COMMUNICATION

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ABSTRACT

Human safety needs careful attention to minimize the risks of the COVID-19 pandemic, which signifies a crucial political, scientific, political, and public health concern across the globe. The purposes of this study were to assess the knowledge, attitude, communication, commitment, and behavioral practices of universities' students in UAE towards COVID-19, and the influences of the students' knowledge and attitude towards COVID-19 on their communication, commitment, and behavioral practices using Structural Equation Modelling (SEM). In this cross-sectional study, 995 university students in UAE completed an online-based questionnaire. In general, the respondents had good COVID-19 knowledge (71.4%), attitude (70%), behavioral practices (77.2%), and very good commitment (80.4 %)., while communication was moderate (67.6%), and it has been found a significant relationship between student's knowledge and attitude coupled with their behavioral patterns towards the epidemics and pandemic of COVID-19. There was a significant correlation between the knowledge and attitude of students with their behavior towards COVID-19. Significant relationships were found between the COVID-19 knowledge and attitude of the students with their commitment/communication and between communication and commitment of the students with their behavioral practices. The latter variable acted as partial mediators in the relationships between the students' knowledge and attitude with their behavioral practices. The results of this study approved that communication and commitment are important variables in COVID-19 management and preparedness to translate the COVID-19 knowledge and attitude into proactive behavioral practices.

Keywords: Knowledge, Attitude, Practices, Commitment, Communication, Risk management, COVID-19, Structural Equation Modelling.

INTRODUCTION

In 2019 a severe acute respiratory syndrome SARS-Cov-2 which is globally known as COVID-19 appeared in Wuhan, China. Since that date, it has infected more than 30 million and killed at least 962 thousand worldwide and in UAE; more than 94,190 confirmed cases and 419 deaths in total since late September 2020 (UAE National Emergency Crisis and Disaster Management Authority, 2020). According to Shang et al. (2020); WHO (2020) the

epidemics and pandemics of COVID-19 characterized by a cultivation period ranging from 1-14 days and it is an RNA enveloped virus that spread airborne. Mild and severe symptoms including fever, cough, tiredness, and loss of smell or taste were found in 70% of the cases (WHO, 2020).

Great governmental measures were put in place to contain the pandemic at both social and health levels to reduce the consequences of this pandemic to public health. Concurrently with all the efforts which were put in place, efforts to develop a vaccine started immediately to be available to all (clinical trials are taking place worldwide now) (WHO, 2020). These recognized efforts include either partial or total lockdown, adopting preventive measures, for instance, personal protective equipment (PPE), which includes using face masks and gloves while in public, maintaining a two meters social distancing, hand washing, and sanitizers available everywhere and place, no gatherings were allowed and the tracing of infected persons. Despite the measures which were put in place for public health other measures with more flexibility took place due to economic reasons to make sure that food and medical supplies are maintained to cover the demands and make sure no shortage exists. All these measures' supreme goal was to slow down the spread of the infection until a sustainable vaccine is available in the market for the public (UAE Ministry of health and prevention, 2020).

These measures which were put in place to facilitate the eradication of the transmission of pandemic outbreaks depend on the people's knowledge (either health worker or public), attitude, and practice (KAP) (Olaimat et al., 2020s; Upreti & Simkhada, 2009). It is considered crucial to all people at different levels to be aware of the consequences of COVID-19 and this acquired knowledge and awareness came from broadcast, social, or internet (Zhong et al., 2020a). According to Smith (2006), this acquired knowledge will shape the public attitude toward this infection and determines their behavior. The influence of COVID-19 pandemic knowledge on the reactions to this infection or other health issues was reported in many studies (Clements, 2020; Abdelhafiz et al., 2020; Chen et al., 2020). Keeping in mind that there are various components in demographic differences in the KAP regarding people's responses to COVID 19 disease control measures. This study aims to examine the predictors are as follows: i) Knowledge, attitude, communication, commitment, and behavior of university students in UAE to COVID-19, ii) Using structural equation modeling to study the relationships between COVID19 knowledge, attitude, communication, commitment, and behavior of students.

COVID-19 has created multiple challenges for the higher education community, and the responses to this challenge by educators are diverse across the world (Crawford et al., 2020). Considering the importance and impact of this newly emerged phenomenon this study is proposed to study its relevance with higher education students. Following research methodology is implemented to reach the respondents.

Since the COVID-19 outbreaks, most of the countries across the globe have adopted extreme levels of measures in response to the pandemic by restricting mobility from and to the regions, working from homes, suspending educational entities, masks, and physical distancing restrictions, and much more. A worldwide call has been executed to freeze overall mass congregations and several regions have significantly responded. Both the theoretical and empirical taxonomies from China have demonstrated that isolation, quarantine, and physical distancing of COVID-19-positive people can control the spread of pandemic outbreaks. Also, hygiene protocols have been globally endorsed.

In Oman, the first COVID-19 positive case was reported on 24th February 2020. In the first few weeks, the number of infected people numbers remained low resulted from the greater level of measures adopted by the Supreme Committee for COVID-19 to ratify a pseudo-complete lockdown across the region coupled with the closure of educational entities,

suspension of overall insignificant commercial hubs, and urging residents and inhabitants to remain restricted at home. To exhibit compliance with the Sultan Qaboos University (SQU) and government recommendations, the College of Nursing locked its doors, and learners were safely shifted to their homes.

To date, it has been found no preventive vaccine relative to the recent epidemics and pandemics of COVID-19 outbreaks and no treatment contemporarily available to treat it. Hence, it is of prime significance that students in Oman have wide-ranging knowledge regarding preventive measures such as coughing protocols, physical distancing, hand hygiene, avoiding jam-packed places, and wearing a mask when going outside. As significantly executing the above-mentioned protocols establishes the first defense line against the spread of pandemic outbreaks. To facilitate the eradication of COVID-19 from the entire UAE, it is inevitable to examine the university student's awareness regarding COVID-19 at this crucial phase. The student's commitment to preventive actions is undoubtedly exerted by their knowledge, attitude, and practices concerning the pandemics. The current empirical taxonomy assesses the KAP framework of university students across the UAE toward epidemics and pandemics of COVID-19 outbreaks.

It has been reported 29.5 million confirmed positive COVID-19 cases to date coupled with 932 thousand deaths across the globe. Concerning the UAE, as aforementioned, the first positive COVID-19 case was reported on 29th January 2020. It has been reported the total number of positive COVID-19 cases across the UAE was 82,000 coupled with 71,500 recoveries and 402 deaths till September 16, 2020. Incredible endeavors have been exerted by scholars across the globe to devise a vaccine or drug that can cure such pandemic outbreaks, however, unfortunately, there has been evident no accomplishment yet, and sick patients continue to experience only sympathetic treatment. The symptoms associated with the pandemic ranging from mild (for instance, breath shortness, fever, and cough, etc.) to intense (for instance, Kidney failure, pneumonia, and SARS, etc.). The war against the pandemic is continuing, and most of the regions across the globe executed preventive measures like complete/partial lockdown and strict pandemic control to restraint the infection and *"flatten the curve".* The lockdown has been enforced across the UAE from the 22nd of March with partial mobility sanctions for elderly people and children younger than 12 years during study times. Undoubtedly, compliance with the guidelines and people's knowledge significantly contributed to dealing with a pandemic of this magnitude.

The managing, minimizing and preventing ways to spread COVID-19 outbreaks have been discussed across the globe. Contemporary suggestions stress the significance of avoiding jam-packed places, maintaining physical distancing of at least 1m, avoiding touching the nose and mouth, washing/cleaning hands, and adopting respiratory cleanliness; those with other medical obstacles like cough have been asked to obtain a medical examination. Moreover, the CDC (Centres for Disease Control and Prevention) suggests covering the complete nose and mouth while sneezing and coughing coupled with the instant disinfection. A CDC is a governmental body in UAE whose focal objective is to secure public health by controlling and preventing disability, injury, or disease. The CDC engenders safe and healthy climate and behaviors across the country. It keeps track of health trends, tries to locate the predictors of health challenges and disease outbreaks, and swiftly responds to unique public health challenges. The CDC works with other health departments and organizations across the region and the world to help prevent and control the disease. The UAE government had also dispensed an array of policy guidelines aiming to prevent the COVID-19 outbreaks. For instance, The University of Sharjah (UOS) is situated in Sharjah, one of the seven Emirates. Undoubtedly, it is one of the largest university campuses across the UAE, with 14 colleges, more than 30 Faculties, and a total number of 15,000 enrolled students. It has been found largely Emirati and Arab students who are primarily residents

across the UAE and/or GCC. Such students constitute a very pivotal share of the youth population and could manipulate the health and well-being of their peers and pals. Also, the aforementioned population is most active socially, both on social networking sites and in the community, making them more susceptible to affected by a viral infection. While compiling this research, most of the population largely visiting public places like malls were middle-aged working personnel or young students resulted from the *"smart"* lockdown. Moreover, the students had all their university classes moved to online education mode from early March, which demonstrated a novel learning exposure for the learners. Also, insights regarding pandemic outbreaks were dispensed through digital modes, which include social networking sites and the university website as well. Because such students have persistent access to these insights, it is significant to analyze if they are exhibit attention and adopting the insights shared with them. Consequently, the evaluation of their KAP framework is critical. Hence, the focal objective of this empirical taxonomy was to analyze the mantra of KAP of university students during the era of epidemics and pandemics of COVID-19 across the UAE, as they are focal representatives of a particular share of community with more freedom and autonomy but inadequate life exposure which may affect their hazard and that of others of pandemic COVID-19.

MATERIAL AND METHODS

Sampling Plan

Nine hundred ninety-five university students studying in Dubai -UAE were chosen conveniently to contribute to this cross-sectional survey using an online, self-administered questionnaire. Research data were collected in the period between September 5 -26, the total numbers of COVID-19 cases on 26th September 2020 were 90618.

A survey link based on Google form was shared with respondents through email. The questionnaire involved a short brief about the epidemics and pandemics of the COVID-19 and the study objectives. A statement demonstrated that the contribution of this empirical taxonomy, and that the respondents may deny to involve or discontinue participation at any time without penalty was also mentioned. Further, an explanation that the survey is anonymous and confidential was given. Students signed a consent form accepting to contribute to this study.

Instrumentation

For this empirical study, an instrument was based on an online-driven survey questionnaire. The authorized English version of the survey instrument was borrowed from (Ref) to tap the research constructs such as behavior, communication, knowledge, attitude, and commitment towards COVID-19 pandemic among university students across the UAE by using a 5-point Likert scale ranging from 1 = strongly disagree and 5 = strongly agree. The questionnaire was translated into an Arabic version which was validated by a professional translator. The items of the questionnaire involved 33 questions evaluating each of students' knowledge, attitude, communication, behavioral practices, and students' commitment. Socio-demographic data of respondents were also comprised by the survey instrument.

The devised survey instrument was authenticated by research experts for further improvements and pretested on 30 students chosen randomly from three universities. The respondents' comments were positive as none received to be taken into account and the completion of the survey instrument has been accomplished within 13-18 minutes.

To analyze the variance adequacy associated with the items of the instrument, Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests have been executed. The test outcomes

were significant 0.952 (> 0.60) (*P*-value 0.000), demonstrating the occurrence of some sort of linkages among constructs, and non-appearance of identity matrix of correlation. Also, to extract and validate the authentic items relative to the behavioral practices, communication patterns, knowledge, attitude, and commitment towards the pandemic of COVID-19, a Confirmatory Factor Analysis (CFA) and Exploratory Factor Analysis (EFA) has been executed for the current study. The items loaded along with a factor > 0.4 have been selected following the guidelines asserted by Hair et al. (2010). The chosen items regarding knowledge, attitude, communication, commitment, and behavioural practices towards the pandemic of COVID-19 had loading in the range of 0.796 - 0.574, 0.827 - 0.743, 0.913 - 0.664, 0.895 – 0.461, and 0.843 - 0.607, respectively Table 1.

Table 1
FACTOR ANALYSIS AND RELIABILITY OF THE FINAL INSTRUMENT FOR COVID-19 KNOWLEDGE, ATTITUDE, COMMUNICATION, COMMITMENT AND BEHAVIOR

Construct	Items	Factor Loading for Items	% of Variance	% of Cumulative Variance	Cronbach's Alpha
Commitment	Co3	0.895	37.594	37.594	0.933
	Co2	0.887			
	Co5	0.85			
	Co4	0.846			
	Co7	0.807			
	Co8	0.802			
	Co6	784			
	Co9	0.771			
	Co11	633			
	Co10	0.62			
	Co1	0.51			
	Co12	0.461			
Communication	Cu8	0.913	10.223	47.817	0.886
	Cu1	0.87			
	Cu2	0.803			
	Cu3	0.737			
	Cu6	0.664			
Knowledge	K6	0.796	6.211	54.028	0.701
	K1	0.743			
	K4	0.837			
	K2	0.574			
Behavior	Be1	0.843	3.94	57.969	0.85
	Be4	0.764			
	Be3	0.728			
	Be8	0.724			
	Be10	0.687			
	Be9	0.607			
Attitude	A2	0.827	3.515	61.483	0.881
	A5	0.792			
	A3	0.786			
	A4	0.777			
	A6	0.761			
	A1	0.743			

Aiming to authenticate the item's reliability, the coefficients of Cronbach's alpha has been calculated and found (Table 1) about knowledge (0.701), behavior (0.850), commitment

(0.993), communication (0.886), and attitude (0.881) (> 0.70). To confirm that there is no possible occurrence of common method bias concerning the obtained data, hence, in this regard, Harman's one-factor test has been executed and the outcomes demonstrated that (Table 1) there is no obstacle of common method bias with the data obtained as the one factor explained 37.594% of the variance concerning the 33 observed constructs in comparison with the 61.483% of variance explained by the five factors. As for as the discriminant validity is concerned, it was calculated relative to the data obtained through Average Variance Extracted (AVE) was more than Shared Variance (SV) for corresponding variables. This demonstrated that the construct's items are associated with each other; a test for discriminant validity was executed endorsed by (Fornell & Larcker, 1981).

Model

The theoretical framework exhibit in Figure 1 has been proposed as an analytical framework for current research. The suggested summary of hypothesis related to the pandemic of COVID-19 is as follows:

H_1 *Knowledge of students positively influences the students' communication.*

H_2 *Attitude of students positively influences the students' commitment.*

H_3 *Attitude of students positively influences the students' communication.*

H_4 *Knowledge of students positively influences the students' commitment.*

H_5 *Commitment of students positively influences the students' behavioral practices.*

H_6 *Communication of students positively influences the students' behavioral practices.*

H_7 *There is a statistically significant relationship between the knowledge of students and their attitude.*

H_8 *Communication and commitment act as mediating variables in the relationships between knowledge and behavioral practices of students.*

H_9 *Communication and commitment act as a mediating variable in the relationships between attitude and behavioral practices of students.*

Statistical Analysis

The data obtained for this research has been evaluated and interpreted by adopting statistical analysis and descriptive statistics. An approach of SEM, Confirmatory Factor Analysis (CFA), and Exploratory Factor Analysis (EFA) have been executed through different statistical software including SPSS Amos (Version 23.0, IBM Corp., Armonk, NY) and IBM SPSS Statistics. For this study, an analytical approach of SEM was carried out to examine the proposed suppositions, recognize and demonstrate the causal correlations among the studied variables, elucidate both indirect and direct impacts between them, and tap the structural model fir. The significant value was established as P <0.05.

RESULTS

Descriptive Statistics

Table 2 shows that 29.1% of the participants were male while 70.8% were female. Most participants were between 20 to 40 years (73.8%) whereas 26.1% were under 20 years.

Additionally, the majority of participants reported being single (94.7%) and only 5.2% were married. The academic class year of the participants was distributed as the following: 21.1% the first year, 23.5% the second year, 27.2% the third year, and 28.1% a fourth year. Also, those who had training before or during COVID-19 (50.4%) while those who had not received the training were (49.6%).

Table 2
SOCIO-DEMOGRAPHIC CHARACTERISTICS OF STUDENTS (N = 995) STUDYING IN UNIVERSITIES IN UAE

Variable	Item	Frequency	Percentage
Gender	Male	290	29.1
	Female	705	70.8
Age	< 20 years	260	26.1
	20-40 years	735	73.8
Marital Status	Single	943	94.7
	Married	52	5.2
Academic class year	First year	210	21.1
	Second year	234	23.5
	Third year	271	27.2
	Forth year	280	28.1
Training/Awareness on Covid 19	Have training on Covid 19	502	504
	Have no training on Covid 19	493	49.6

In general, the students showed well in COVID-19 knowledge (71.4%), attitude (70%), behavior (77.2%), and very good in commitment (80.4 %), while in communication was moderate (67.6 %). Table 3 presents selected question statements involved in the structural model with a mean and percentage of correct responses of students. The percentage of students' correct responses among the items of knowledge, attitude, commitment, communication, and behavior about COVID-19 were 66.9-74.4%, 64.4-73%, 73.6-85%, 64-71.3%, and 72.4-81.2%, respectively.

Table 3
DESCRIPTIVE STATISTICS (QUESTION STATEMENTS, MEANS AND PERCENTAGE) OF CORRECT RESPONSES OF STUDENTS STUDYING IN UNIVERSITIES IN UAE

Item Code	Question statement	Mean	SD	% correct answers
Construct				
Co3	This establishment has a great deal of personal meaning for me	4.2422	0.85617	85
Co2	I do not feel a strong sense of belonging to this establishment.	4.18492	0.843947	84
Co5	Right now, staying with my job at this establishment is a matter of necessity as much as desire.	3.9246	0.89563	78.5
Co4	I really feel as if this establishment's problems are my own.	4.0040	0.76911	80.1
Co7	Even if it were to my advantage, I do not feel it would be right to leave	3.979	0.88862	79.6
Co8	I would feel guilty if I left this establishment now.	4.1477	0.84592	83
Co6	I do not feel any obligation to remain with my establishment.	3.9769	0.84781	79.4
Co9	This establishment deserves my loyalty.	3.9769	0.88837	79.4
Co10	I would not leave my establishment right now because of my sense of obligation to it.	3.9688	0.87672	79.3
Co11	I owe a great deal to this establishment	4.0774	0.79425	81.5
Co1	I would be very happy to spend the rest of my career in this establishment	3.6784	0.93935	73.6
Co12	One of the major reasons I continue to work for this establishment is that leaving would require considerable personal sacrifice	3.9910	0.85163	80
Behavior				

Be1	In order to prevent contracting and spreading COVID-19, I avoid going out of my home	4.0583	0.95187	81.2
Be4	In order to prevent contracting and spreading COVID-19, I avoid consuming outdoor food	4.0472	0.86095	81
Be3	In order to prevent contracting and spreading COVID-19 I avoid handshaking, hugging and kissing	3.8965	0.95172	78
Be8	I do not leave home except in an emergency	3.7739	1.08127	75.5
Be10	In order to prevent contracting and spreading COVID-19, I avoid shopping every day	3.6191	1.15265	72.4
Be9	I walk around with a mask and gloves	3.9437	0.94029	78.9
Attitude				
A1	I think that early detection of COVID-19 can improve treatment and outcome	3.5166	1.02409	70.3
A6	I think that COVID-19 can be treated at home	3.2181	1.05754	64.4
A4	I think that if there is an available vaccine for the disease, It should be used	3.6513	0.88013	73
A3	I think that the awareness considering COVID-19 disease in society is sufficient	3.4925	1.01334	69.9
A5	I think that COVID-19 disease can be transmitted through household pets to humans	3.6070	0.95647	72.1
A2	I think that Antibiotics will not prevent infection	3.4583	0.96050	69.2
Communication				
Cu8	The health authorities are always communicate the good hygiene practices and health guidelines, health instruction on daily basis	3.2000	1.20245	64
Cu1	The government gives daily COVID-19 report with full transparent	3.2251	1.06507	64.5
Cu2	The government provide adequate and timely information about current COVID-19 and new updated regulations	3.3869	1.09049	67.7
Cu3	The government gives health awareness by inviting the health experts and medical practitioners on TV Programs	3.5146	1.07867	70.3
Cu6	Citizens are encouraged to provide suggestions for improving the health situations	3.5658	1.06831	71.3
Knowledge				
K2	There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection	3.3437	1.00924	66.9
K4	Virus is not a stigma and I should not hide my infection	3.7226	0.88211	74.4
K1	The disease is more dangerous in people with weakened immune systems	3.5337	1.05179	71
K6		3.6633	0.97153	73.3

The results in Table 4 show the association between COVID 19 knowledge score and socio-demographic characteristics of students. The COVID-19 knowledge among the students was significantly associated ($P \leq 0.05$) with the academic class year, training on COVID-19, gender, and marital status. The students in the fourth academic class year had the highest score (78.8%) compared to those in the first year who had the lowest (61.72%). The students with training on COVID-19 had the highest score (81.82%), compared to those with no training (76.2). The single students had the highest score (82.46%) compared to married students had the lowest (75.99%). While; males showed lower scores (73.42%) compared to the females (82.46%). However, the variable age had no significant association with knowledge scores ($P > 0.05$).

Table 4 ASSOCIATION BETWEEN COVID-19 KNOWLEDGE SCORE AND SOCIO-DEMOGRAPHIC CHARACTERISTICS OF STUDENTS			
	Total Knowledge score Mean	**Total P-value Knowledge score (%)**	
Academic Class Year			
First year	3.0860[b]	61.72	0.008**
Second year	3.3008 [ab]	66.01	
Third year	3.5824[c]	71.64	
Forth year	3.9401[d]	78.80	
Age			
< 20 years	4.1344	82.68	0.185
20-29 years	4.0990	81.98	
Training on COVID-19			
Have no Training	3.8100	76.20	
Have Training	4.0912	81.82	0.000***
Gender			
Male	3.712	73.42	
Female	4.1230	82.46	0.000***
Marital Status			
Single	4.1230	82.46	0.009**
Married	3.7999	75.99	

Note: **Means with different letters in the same column are significantly different at <0.01
*** Means with different letters in the same column are significantly different at <0.001

Structural Model

Table 5 GOODNESS OF FIT INDICES FOR STRUCTURAL MODEL			
Fit indices	**Model value**	**Accepted value**	**Reference**
$\chi 2/df$	4.3	$\chi 2/df \leq 5$	Schumacker & Lomax (2004)
RMR	0.04	RMR ≤ 0.08	Browne & Cudeck (1993)
CFI	0.916	> 0.90	Byrne (2010)
TLI	0.908	> 0.90	Bentler (1990); Byrne (2010)
IFI	0.916	> 0.90	Bentler (1990); Byrne (2010)
RMSEA	0.058	< 0.10	Bentler (1990); Byrne (2010)

To test the proposed suppositions, a complete structural model of constructs related to this study was created, which includes behavioral practices, attitude, communication, commitment, and knowledge among the university students across the UAE about the pandemics of COVID-19 (see Figures 1-4) (Steiger, 1990; Ullman, 2001). The outcomes of the structural model demonstrated that obtained data have a good fit with the proposed framework, as evident that $\chi 2$ of the model was 2095 with 483 degrees of freedom (df) (χ^2/df = 4.3), Root Mean Square Residual (RMR) was 0.04, Comparative Fit Index (CFI) was 0.916, Tucker-Lewis Index (TLI) was 0.908, Incremental Fit Index (IFI) was 0.916, and Root Mean Square Error of Approximation (RMSEA) was 0.058 Table 5. Tests have been executed to measure whether there are empirically significant correlations between the attitude, communication, commitment and knowledge, and behavioral practices among the university students regarding COVID-19 pandemics. The outcomes of SEM analysis demonstrate that all propositions are supported (Table 6). Hence, the constructs of attitude and knowledge have a significant positive correlation with student's communication and commitment about the pandemics of COVID-19. Also, university student's attitude towards the COVID-19 pandemic has a greater level of repercussions on their communication patterns

as compared to the knowledge, whereas, the student's knowledge about COVID-19 has stronger implications on both the attitude and commitment of the students.

Table 6
HYPOTHESIS TEST RESULTS OF COVID 19 KNOWLEDGE, ATTITUDE, COMMITMENT, COMMUNICATION, AND BEHAVIOR

	Hypothesis	Standardized estimate	Standard error	Critical ratio	Result
H1	Knowledge to communication	0.197	0.040	4.908***	Supported
H2	Attitude to commitment	0.257	0.026	10.023***	Supported
H3	Attitude to communication	0.570	0.046	12.316***	Supported
H4	Knowledge to commitment	0.493	0.036	13.887***	Supported
H5	Commitment to behavior	0.539	0.064	8.421***	Supported
H6	Communication to Behavior	0.354	0.031	11.549***	Supported
H7	knowledge <--> attitude	0.54			Supported

Note: *** = $P < .001$

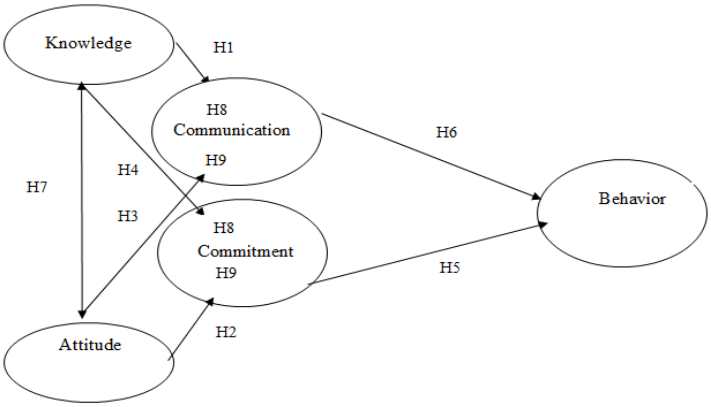

FIGURE 1
PROPOSED CONCEPTUAL MODEL

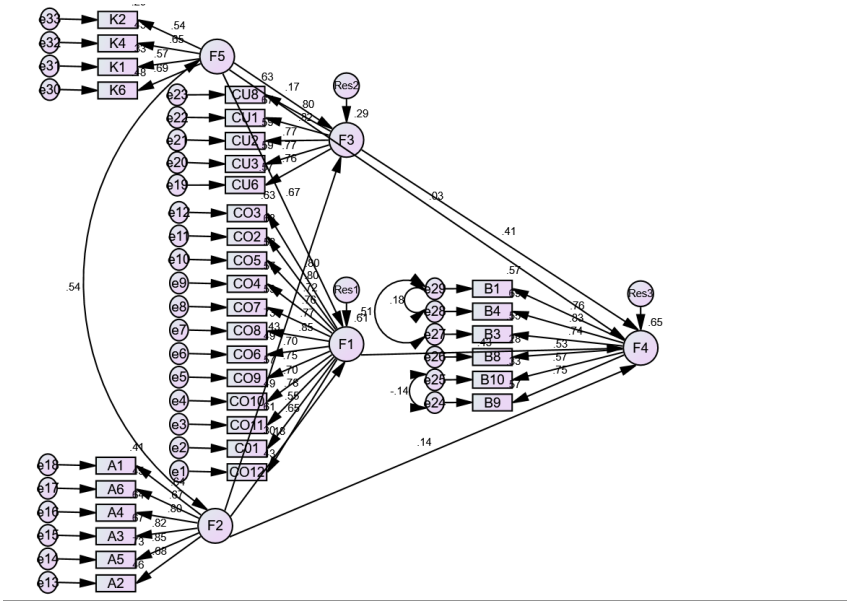

FIGURE 2
THE STRUCTURAL MODEL OF KNOWLEDGE (F5), ATTITUDE (F2), COMMUNICATION (F3), COMMITMENT (F1), AND BEHAVIORS (F4)

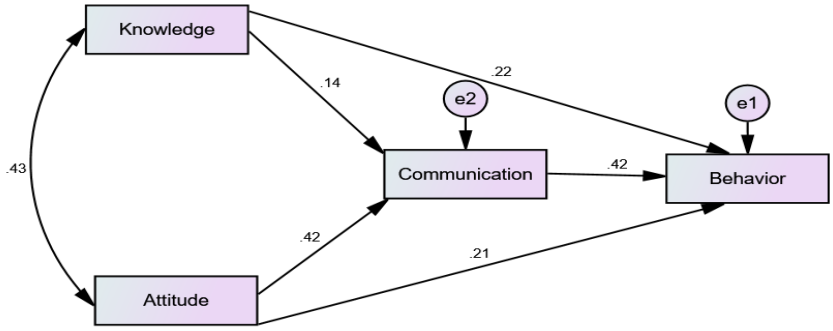

FIGURE 3
MEDIATION TEST RESULTS WITH COMMUNICATION AS THE MEDIATING VARIABLE

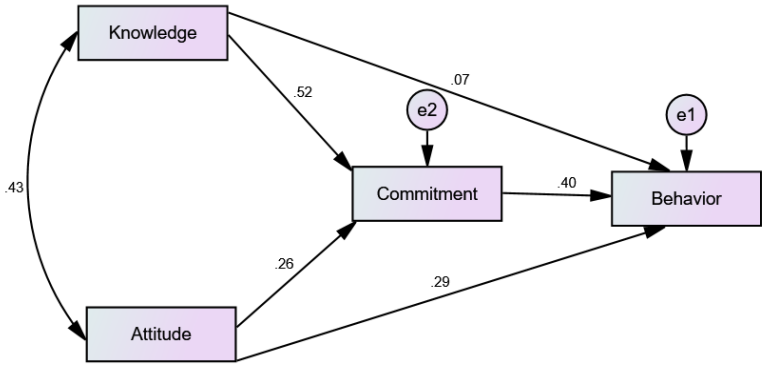

FIGURE 4
MEDIATION TEST RESULTS WITH COMMITMENT AS THE MEDIATING VARIABLE

Furthermore, the student's attitude towards pandemic exhibit a greater level of implications concerning their communication patterns than the knowledge, whereas, the student's knowledge about pandemics outbreaks has crucial repercussions on their commitment than attitude. Surprisingly, each of the study constructs has significantly related to student's behaviors. The results also indicate a direct association between the student's knowledge and attitude towards pandemic as a significant correlation was evident ($\beta = 0.54$, $P < 0.001$) (Table 6). Last, but not least, the results showed that both the commitment and communication constructs among the respondents act as a partial mediator relative to the relationship between behavior and knowledge about the COVID-19 pandemic and between behavior and attitude Table 7.

Table 7
MEDIATION TEST RESULTS (WITH COMMUNICATION /COMMITMENT AS THE MEDIATING VARIABLES)

Relationship	Mediator	Standardized direct effect	Standardized indirect effect	Mediation result
Knowledge to behavior	Communication	0.224**	0. 014**	Partial
Attitude to behavior	Communication	0.212**	0.018**	Partial
Knowledge to behaviour	Commitment	0.030*	0.207**	Partial
Attitude to behavior	Commitment	0.286**	0.104**	Partial

Note: ** = $P < .01$, * = $P < .05$

DISCUSSION

A piece of empirical evidence from Jorden amalgamated by Khasawneh & Humeidan (2020) analyzes the level of knowledge regarding potential transmission sources of COVID-19 among medical students. It has been reported nearly 42.5% of students perceived that animals are likely to be potential transmission sources. Remarkably, while the rest of the half students perceived that the pandemic could be transmitted through filthy food items (53.3%), only 38.6% of the respondents believe that the fecal-oral route is unlikely to be a transmission source. Mainly, respondents (41.8% and 48.0%, respectively) were segregated between perceiving that the COVID-19 pandemic is air-borne or not, while the majority of the students (91%) were believed that the pandemic is likely to be spread through inhalation of infested precipitations.

Also, the majority of the respondents appeared in agreeing with the assertion that pandemic is likely to be spread through direct physical contact resulted from exposure to filthy surfaces (97.4%), skin interactions (73.8%), shaking hands ((93.7&), or kissing (94.7%). Lastly, the majority of the respondents demonstrated that they did not aware of the disease is transmissible vertically through breast milk (62%), or via transfusion of blood (47.6%), or through birth/placenta canal (50.2%). Also, Khasawneh et al. (2020) also investigated the level of knowledge about potential risk elements about the viral infection of COVID-19 among medical students in Jorden.

It has been reported that 95% of the students perceived that persons with chronic disease are mainly vulnerable to a pandemic. On the other hand, they were segregated about risk in children as well as pregnant women, like 23.6 and 48.3% respectively medical students believed that children and pregnant women are at a bigger risk. Furthermore, nearly 76.4% of the respondents perceived that a sick patient can spread the virus for up to four persons at each interaction if preventive actions were not adopted, and that pandemic, unlike typical flu viruses or cold, is more likely to engender pneumonia in infected patients.

Whereas, a small percentage of respondents (19.3%) demonstrated that face masks are defensive against the pandemic transmission, while 60.6% of them perceived that only positive COVID-19 patients should use face masks to mitigate virus transmission. In contrast, the majority of the respondents (67.1%) asserted that a vast majority of sick patients (90%) would instinctively recover without any medical intervention needs, and 75% of the respondents perceived that an effective vaccine would break the transmission of COVID-19 pandemic. Last, but not least, 83.3% of the medical students in Jorden believe that if an individual got infected with a virus, he/she must avoid it accordingly. However, 76.9% of the respondents agreed that the infected person's family members or peers should be quarantined.

Also, Humeidan et al. (2020) also examined the preventive measures adopted by the medical students aiming to secure themselves from becoming contracted with the pandemic outbreaks. Firstly, restricted at home, exerting more emphasis on personal hygiene and regular hand sanitizing were the three focal preventive measures taken by the medical students to restraint themselves from becoming exposed to the virus.

Also, the majority of the respondents (more than 70%) have sidestepped mobility by using public transportation means, physical kissing, and attending jam-packed public events. Furthermore, an equal proportion of the respondents exhibit compliance with physical distancing protocols and guided people to adopt preventive guidelines seriously and execute them. Avoiding physical distancing and handshaking during meet-ups, avoiding eating at restaurants, and adopting disinfectants ranked in the third position after previously mentioned preventive actions where they were implemented by plenty of respondents (more than 65%). Although, Humeidan et al. (2020) has been found an empirically significant relationship between the level (year) of study of students and the utilization of disinfectants. It has been

found that 72.8% of the last three years medical students were more likely to adopt disinfectants in comparison to those students (66.1%) in the first three academic years of their study as a preventive action against getting infected.

Also, disinfecting cell phones, getting ample sleep, and personal health monitoring were perceived as less significant precautionary behaviors exerted by less than 50% of the medical students, however, the last three-year students (24%) were reported disinfecting their cell phones more than those in their first three academic years of study (18%). Interestingly, only 9.7% of the reported that using face masks is a focal preventive measure to mitigate the transmission of COVID-19 outbreaks. Also, it has been found a significant correlation between the respondent's perception regarding using face masks and their year of study. For instance, the student's percentage that demonstrated never wearing a face mask as a preventive action against pandemic outbreaks was higher among respondents about the first three academic years (64.3%) as compared to those students studied in the last three academic years (56.1%).

In this study, the university students had a score of knowledge of 71.4 % which is considered a good score which is lower than two studies conducted by Olaimat et al. (2020b) in Jordan. One explanation of these results can be explained that COVID-19 cases slowly increased in the world since the discovering of the first case that the majority of the population might be ignored getting more knowledge about it. According to Peng et al. (2020), the level of knowledge for China was about 82.3%, while the US resident's knowledge scored 80% (Clements, 2020). The public Chinese residents scored the highest score in knowledge which was 90% (Zhong et al., 2020a) which was way higher in comparison to the Iranian nurse's knowledge of 68.1% (Nemati et al., 2020).

From the data, we can see a significant relationship between the amount of knowledge for COVID-19- 19 and the academic class year. We can see that the students from the fourth year have the highest score of 78.8% while the students in first-year students scored only 61.72% which is the lowest score. One simple explanation can be due to that fourth class year students have much greater related information the taken courses and the curriculum which include some assignment or exercises on community issues. The same outcome was reported in a study conducted in March 2020 by (Olaimat et al., 2020b). In his study second-year, students showed a knowledge score of 66.01% compared to the third year which they scored 71.64%. A study conducted by Hasanet al. (2020) showed the scores of health-related students and none – health-related students, were 76%, 69.1% and this was close to the current result of none – health-related students (71.4).

Both Zhong et al. (2020a) and Peng et al (2020) have reported that female students have more knowledge about COVID-19 than the male students in which female students scored a 90.8% and males scored 87.5% which is similar to this study have reported that female students have more knowledge about COVID-19 than the male students as 82.46%, 73.42, respectively. This can be because those female students are more likely to engage in medical sciences than other majors, or more likely to read related health or hygiene subjects which leads to a higher score in their COVID-19 knowledge. Temsah et al. (2020) showed that no difference in knowledge scores between males and females. However, female HCWs scored higher in terms of adherence to hygienic practices, attitudes toward infection control measures, and perception of the adequacy of knowledge.

In this study being married or singles were taken under consideration and it was reported that single students scored 82.46% while married students scored only 75.99%, this can be explained that single students have adequate time to read or train on other subjects than the academic ones. On the other hand, a different result was reported by, Zhong et al. (2020a) which showed that single showed lower knowledge score than married, re-married, cohabiting, separated, divorced, or widowed Chinese residents.

When we start to talk about the attitude, students in this study showed a good positive attitude towards the COVID-19 crisis and scored a decent respectful score of 70%. The result of attitude (79.3%) was reported in a previous study conducted in Jordan by Olaimat and his team (Olaimat et al., 2020a). The score of attitudes in this study was close to students of Emirates and China who scored 76% and 73.8%, respectively (Jairoun et al., 2020; Peng et al., 2020). Good behavior was shown by students with a score of 77.2% which is higher than reported in Emirati students (45%) and lower than conducted in students of Jordan (84.3%) and China (87.9%) (Jairoun et al., 2020; Olaimat et al., 2020a; Peng et al., 2020). Compared to the previous studies the discrepancy in Knowledge, attitude, and practices can be related to the variations in the survey questions, the evaluation method used to the answers, and the demographic of the participants.

We can't put aside and ignore the fact that students are a major part of the community and they have the responsibility to stay healthy and to act as a part of the community to protect each other. The commitment to comply with the preventive measures of COVID-19 has a huge impact and influence on stopping the spread of the disease. We can with a confidential report that the students in this study showed a very good level of commitment with an average score of 80.4%, while Taha et al. (2020) at food handling commitment for food safety found a way higher percentage of 91.9%.

In the case of infectious disease and their spread, the risk communication will be implemented by the public health authorities and one reason for that is to reach the population on time as per Piltch and Abramson (2020), it is crucial to develop effective strategies for sufficient public health preparations in the cases of the infectious outbreak as what the world is experiencing these days (Kenis et al., 2019). All the forces worldwide should join their efforts in times of global crisis; COVID-19 is a clear example, to make sure that communications at-risk is implemented to engage everyone in the protection of individuals, families to help in stopping the spread of COVID-19.

This study showed a moderate communication of 67.6% between the health authorities and the governmental sector and the students in response to the COVID-19 crisis. Social media use in pandemic crisis is considered an important way to provide the public with information and to provide a successful risk communication model by establishing a community engagement, reaching everyone, increasing public health communication, and public control and encouragement (Abrams & Greenhawt, 2020). It was reported by a study from Zhong et al. (2020b) that's social media was an essential source of information but the health official authorities were the most trusted source (because rumors spread sometimes) for information regarding the COVID-19 patients in Wuhan, China. KAB has considered an important predicting factor for the variability of individual behavior practices as reported by Corrin and Smith (Corrin et al., 2017; Smith, 2006).

To the moment of writing this study, this is the first study in which structural equation modeling is used to investigate the impact and correlation of the knowledge, attitude of the students, communication, commitment, and behavioral practices towards the COVID-19 crisis in UAE. When dealing with an attitude which is a psychological factor that can be used to predict human behavioral practices since attitude is determined by feelings, beliefs, and behaviors and which behaviors should engage or avoid in response to a certain situation (Stangor et al., 2017).

According to Smith (2006), the risk knowledge involved is essential for individuals to follow and obey the control measures as part of risk prevention. This study showed with increasing the knowledge of the students the commitment level was more than the attitude, in contrast, the students' attitude for COVID-19 had a stronger influence on the communication than the knowledge. In Zhong et al. (2020b) studies in Wuhan, China it was reported that the

perception between the knowledge and the risk was negative among the patients of COVID-19.

The relationship between COVID-19 knowledge and behavioral practices of students or COVID-19 attitude and behavioral practices of students are mediated by commitment and communication was supported by the findings of this study. Zhang et al. (2020) reported the risk perception among individuals various due to different information sources, various communication behaviors, and the uncertainty of public health pandemics. While Taha et al. (2020) reported that commitment is a factor that partially influences the knowledge and behavior relationship, and between the attitude and behavior of food handling when considering food safety (Zhang et al., 2020; Taha et al., 2020). In other words, when we are going through a pandemic; communication is a keystone to reduce the gap between all the authorities and the population and will enhance the performing measures towards the risk they face (Frewer, 2004).

It was found by Piltch-Loeb & Abramson (2020) that during the Zika outbreak because different sources of information were available the American community was more effective in enhancing the intervention procedures. Due to the absence of effective communication strategies at the moment while facing COVID-19 no strong evidence of the population has formed a good knowledge and awareness. Because of the big knowledge gaps in-between the transmission and prevention which was among the COVID-19 patients of Wuhan, China from a study conducted by (Zhong et al., 2020b). This resulted in poor protective practices as both the experts and the official governmental channels were far from successfully explain the scientific prevention measures, the epidemiological characteristics of the disease, and the effective therapy activity (Zhang et al., 2020). Last, but not least, Asaad AM et al (2019) asserted that Health Care organizational personnel who had earlier experience with MERS are more likely to had impressive knowledge scores and exhibit a greater level of compliance behavior to hygiene and disinfected practices. The aforementioned outcomes could be elucidated by the notion that earlier educational campaigns by the caregiver institutions (hospitals) and handling earlier MERS-CoV cases could have optimized their level of knowledge and intents to exhibit compliance behaviors for pandemic control protocols.

CONCLUSION

The COVID-19 pandemic is a major public health, economic, political, and scientific concern worldwide. The students showed good knowledge (71.4%) and attitude (70%), and behavioral practices (77.2%). They showed moderate communication (67.6 %), and very commitment (80.4 %). The students' communication and commitment were positively influenced their behavioral practices. The attitude and knowledge of students were significantly correlated with their behavioral practices. Further, the COVID-19 knowledge and attitude of students positively influenced their commitment and communication which act as partial mediators in the relationships between each of COVID-19 knowledge and attitude of students with their behavioral practices. The studied variables influence the behavior toward COVID-19 protection and governmental health agencies could get benefits of the study model in strategic plans.

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Highlights

1. Students have good knowledge and attitude, behaviors, and moderate communication
2. Students' communication and commitment were positively influenced their behaviors.
3. Students' attitudes and knowledge were significantly correlated behaviors.
4. Knowledge and attitude positively influenced commitment and communication.
5. Commitment and communication are partial mediators between knowledge/attitude with behaviors.

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