Original Research Article

Perception of Undergraduates and Postgraduates pertaining online Learning during the COVID-19 Pandemic: a Cross-sectional Study amongst Sudanese Health Professional Students

Abstract

Background: The novel coronavirus (COVID-19) pandemic has impacted all aspects of life including educational services due to partial and complete lockdown. In Sudan, education is based on the traditional method of learning (face-to-face lectures) in a classroom. However, the sudden outbreak of COVID-19 made some educational institutes especially Universities and colleges resort to online learning. This study aimed to assess the Perception of Health professional students included under and postgraduates concerning the possible application of online learning during the COVID-19 pandemic in Sudan 2020.

Methods: A Cross-Sectional study was conducted amongst Sudanese Health professional Students, included Undergraduates and postgraduates. A convenient sample collection method was used via a self-administrated online structured questionnaire of nineteen questions, which were validated by a medical education expert. The perception was assessed and data were analyzed using a statistical package for social science (SPSS).

Results: A total of 133 Health Professional students responded to the web questionnaire.97 (73%) were undergraduates and 36(27%) were postgraduates. Among undergraduates, 58(59.8%) were expressing positive perception, while 39(40.2%) had a negative perception. Whereas 24 (66.7%) of Postgraduates had positive perceptions and 12(33.3%) of them expressed a negative perception about online learning.

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Conclusions:

Postgraduate health professionals are more familiar and stating a higher level of perception compared to the undergraduates, furthermore, several students already were exposed to hybrid online learning during the current COVID-19 Pandemic.

Several obstacles to the implementation of online learning in Sudan were noticed by the participating students in this study, which must be appropriately managed for the successful implantation of this mode of learning.

Keywords: Health Professional Students, COVID-19,Online Learning, Perception.

Background

As the pandemic of COVID-19 spread worldwide, the need to continue medical education becomes of paramount importance, especially when taking into account the recurrent nature of the disease (1, 2). This has led to the use of already available technologies of online learning with wider applications and more efficient and practical ways (3, 4). This was also the case in previous pandemics and catastrophic where the need for continuing life and education was part of the survival mechanisms of communities stroked by these calamities. (5-8)

COVID-19 has dramatically affected the quality of life and education in Sudan, Schools and universities were on several on and off periods both undergraduates and postgraduate students (9-11)

The classical educational system in Sudan is based on direct face-to-face contact in a classroom. In the meanwhile, online learning has a poor history in Sudan in terms of efficiency and user experience with most of the time being individual and small-scale projects. (17, 18)

Henceforth an alternative method of education was suggested, and even started in some colleges and private schools with different success rates (12, 13), furthermore there are different methods for online Medical learning which including Social Collaboration Platforms é live video communication, Massive

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Open Online Course (MOOC) Platforms and External repositories of universities (Academic Repositories), Social Collaboration Platforms é lives video communication (14-16).

Moreover, there are several technical and social challenges facing online medical teaching in Sudan like poor electronic infrastructure and civil wars. Even though, a considerable part of the literature showing a positive perception of students regarding online learning, despite network, and interaction challenges (27). To overcome them, several changes are needed to be done both in individual and at the national level. (19)

Up to date, there is no previous study focused on the perception of Sudanese HPS (Health Professional Students) about online learning during COVID-19 Pandemic, (28) which considered a basis to assess demands, answer questions, resolve problems, launch baselines, dissect trends, and select objectives to apply the online learning appropriately, and choose the most suitable method, of learning to get maximum benefit to those students. To the best of our knowledge, this is the first study that aims to assess the Perception of under and postgraduates Sudanese HPS during the COVID-19 pandemic, against this measure specifically in the case of medical education, which is a challenging task even in normal circumstances.

Methods

Study design and sampling technique

A Cross-sectional study was conducted amongst Undergraduate and Postgraduate Sudanese Health Professional Students during the COVID-19 pandemic 2020. Data was collected depending on the convenience sampling technique through an online survey.

Study tools

A medical education expert validated the content of the self-administered online structured questionnaire; a pilot test was done on five students to determine the validity, relevance, and clarity of the questionnaire.

Moreover, it carried out a week prior study by posting the questionnaire on WhatsApp group the joint only Sudanese HPS, pre-prepared and contain an introductory letter to inform the student about the study and voluntary participation. Amongst participants, no one faced any issue regarding the feasibility of the questionnaire; they filled the questionnaire smoothly and submitted it successfully. The questionnaire consisted of nineteen questions, most of which were closed-ended. The questionnaire includes inquiries into students' demographics{age, gender, college, graduation status (under or postgraduate), the level of studying in college regarding undergraduates.}, The rest of the questions were about their experiences with online learning, appropriate methods for online medical learning, variables that affect online delivery, the major obstacles, the impact of financial, social, and economic status on applied online learning, and the effectiveness of online learning on practical skills. The questions involved in the questionnaire are available in table (1). Exploiting this self-administered online structured questionnaire.

Data collection

To launch the survey, informed consent was taken from each student before enrollment and it apprised the students that participation is voluntary and they have the choice to withdraw from the study at any point without any subsequent outcomes. Moreover, an introductory letter was posted with the survey's web link on social media (Facebook, WhatsApp, Twitter, and Telegram) which was stating the study's aims and solicited the student's participation, and posted in Sudanese groups. The Google form survey was available from July to November 2020.

Data management

The perception was assessed using 12 questions with different points for each response giving a score range from 0 to 23, Cronbach's Alpha level was 0.546. Kolmogorov-Smirnova test was used to test the normality of the data. Since the Sig. <0.05 the data was found to be not normally distributed.

Since perception score was not normally distributed median was used to divide the data into the median and above which represent positive perception and below the median, which represents negative perception.

Data analysis

Data were analyzed using a statistical package for social science (SPSS version 23). Descriptive statistics were used to analyze the responses to the perception scales. In the students' perception questionnaire, two items were recorded, where 1 = agree and 0 = disagree. Categorical variables were described as frequencies and percentages and continuous data is presented as median values depending on normality. Then chi-square and Fisher's Exact Test was applied to test the significant association between the median score of students' perception and {age, gender, college, graduation status (under or postgraduate), the level of studying in college regarding undergraduates}, which defined as a p-value of <0.05, was considered as statistically significant.

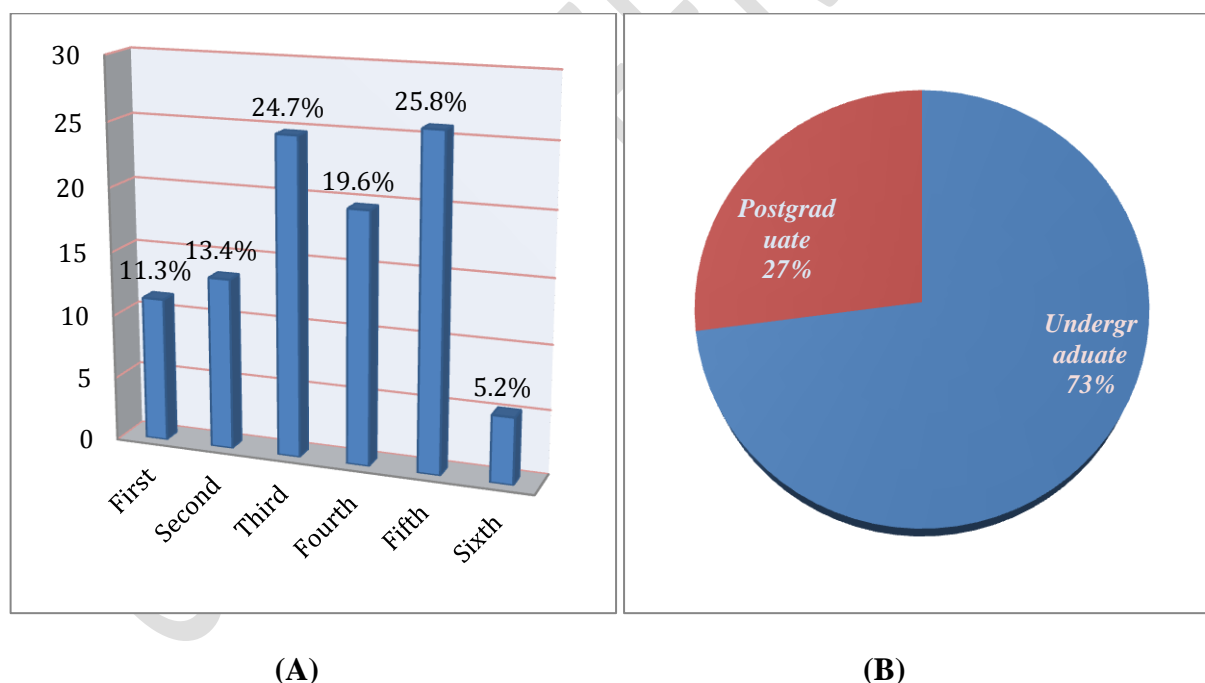

(A)   (B)

Figure (1) A: Distribution of Undergraduates According to their academic year.

B: Distribution of students according their graduation status.

Results

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A total of 133 Health Professional Student were responded to the online questionnaire, out of the (73%) were undergraduate and (27%) were postgraduate (Figure1). Among undergraduates, (59.8%) were expressing positive perception, while (40.2%) are stating a negative perception. Although (66.7%) of Postgraduates have a positive perception, whilst (33.3%) of them boast a negative perception about online learning, undergraduates contemplating social media, principally Facebook as a source of Perception, nonetheless postgraduates from educational websites and both have experience with a hybrid of synchronous and asynchronous online learning, whilst undergraduates learn via social media and postgraduates through MOOCs as shown in table(1). (50%) of undergraduates were being joined beforehand to Hybrid, (14.8%) to synchronous, and (13.8%) to Asynchronous. In contrast (70.4%) of postgraduates being enrolled before to hybrid, (14.8%) to Synchronous and (14.8%) to asynchronous online learning.

Furthermore, (46.6%)of undergraduates are learning via social media, (17.2%)via Collaboration platform é live video communication, (29.3%)thru MOOC Platforms, (6.9%)by way of External repositories, whereas (25.9%)of postgraduates learn through social media, (22.2%) thru Collaboration platform é live video communication, (51.9%) via MOOCs and (0%) by External repositories. (45%) of undergraduates and (36%) of postgraduates declaring to having financial and social ability to participate in online learning, although (54.6%) of undergraduates and (63.9 %) of postgraduates have not such ability. (39.2%) of undergraduates and (52.8 %)of postgraduates are thinking that the electronic simulation can be to some extent a replacement for the practical training in the laboratory and hospital, in opposites to (60.8%) of undergraduates and (47.2 %)of postgraduates. (15.5%) of undergraduates and (13.9%) of postgraduates are believing that there is a better alternative for online learning although (84.5 %) of undergraduates and (86.1) of postgraduates are never Perspective that. (36.1%) of undergraduates and (75%) of postgraduate are supposed that online learning should be continued even after the pandemic is over, unlike (63.9%)of undergraduates and (25%) of postgraduate, (46.4%)of

undergraduates, and (58.3%) of postgraduate credence that the Health professionals can safely practice in the hospital-based on this sort of learning whilst (53.6%) of undergraduates and(41.7%) of postgraduate are don't deliberate that. (37.1%) of undergraduates and (47.2%) of postgraduate think there should be a fee for online learning, also (62.9%) of undergraduates and (52.8%) of postgraduate think there should not be a fee for online learning.

(74.2%) of undergraduates and (83.3%) of postgraduate believe that already available free online international material could be used in this type of learning in Sudan, while (25.8%) of undergraduates and (16.7%) of postgraduates disagree that free online international material in this type of learning is available in Sudan.

The results revealed that there is an insignificant association between perception and group (under or postgraduate), (P.value:0.469). Furthermore, undergraduate students show a significant association between perception and age (P.value:0.06), and an insignificant association with gender, college, and undergraduate level (P.value:0.168&0.478) in order. While postgraduate students indicate a significant association between perception and gender (P.value:0.043) and an insignificant association with age and college (P.value:0.205).

Apropos, undergraduate students, there is a significant association of age with social media as a source of perception about online learning (P.value:0.014), Collaboration Platforms é live video communication as an appropriate method for online learning (P.value:0.004), and student characteristics as a variable that affects the effectiveness of online learning (P.value:0.047).
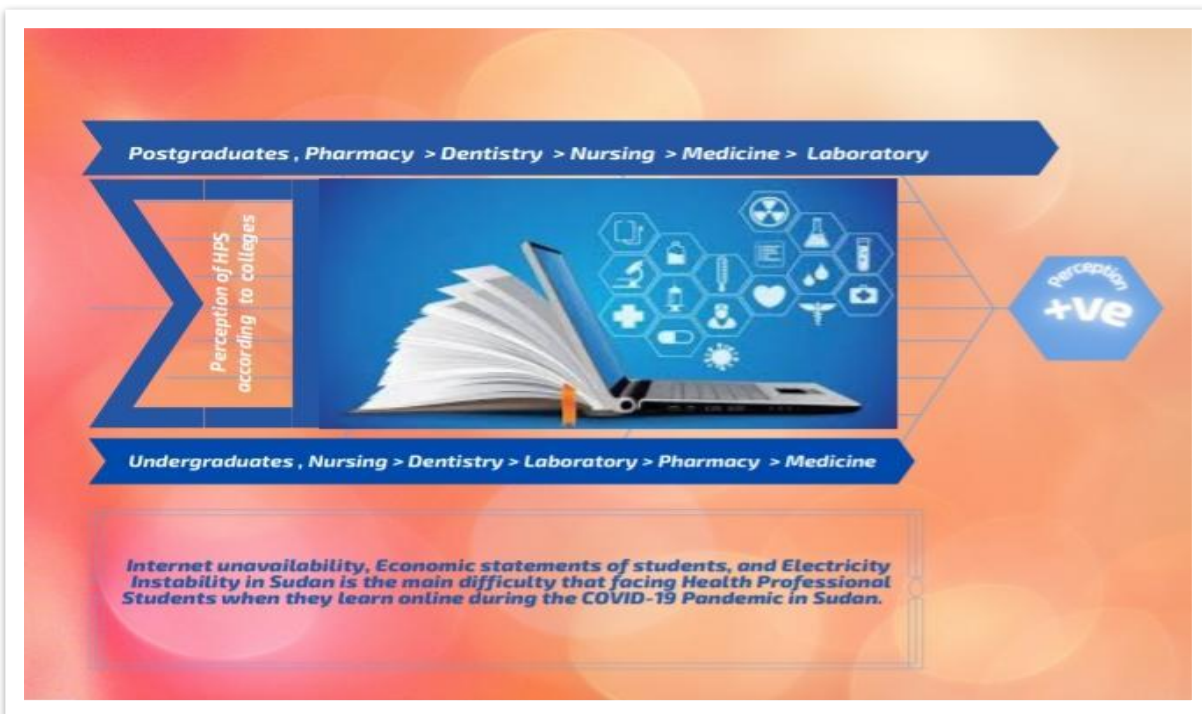
Figure (2): *In comparison to Undergraduates, Postgraduate HPS have a higher positive perception about Online Learning; also, the perception level of HPS is fluctuated according to college.*

Discussion

Student perception about online learning is mandatory to assess, before applying in Sudan, for the reasons that such type of learning is new and unusual for Sudanese HPS. Therefore, they will be unfamiliar with it, although many factors are affecting, obstacles, and other challenges that face the implementation of online learning, as demonstrated in the table (1), at the same time, there is no other option to continue student learning safely during the contemporary pandemic.

Potentially, student perception will be a basis to discover HPS comprehension and understanding about online learning concerning their conditions and current circumstances.

This study indicates that postgraduates have a higher positive perception compared to Undergraduates about online Learning as illustrated in figure (1). Also, represent that more than three-quarters of HPS are familiar with online learning and heard about it before, undergraduates mainly from social media particularly Facebook while postgraduates from educational websites and have previous experience with

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a hybrid of synchronous and asynchronous. This is Similar to the Study done by Al gahtani *et al,* which shows that there is a Growing positive perception of E-learning, but the Level of acceptance Remains Low. The current study, besides consistent with Elshami et als' study that reported a student satisfaction with online may improve by the enactment of Hybrid learning. Moreover, Stated that tow-third of Students that they familiar with and heard about E-learning, but more than two-thirds reported that they did not attend any E-learning Courses. (20)

According to Present findings, half of the undergraduates and almost three quadrants of postgraduates are intersection hybrid online learning, this in parallel with Elshamis'

study which advocates a Hybrid of synchronous and asynchronous online approaches that advantages in increasing student engagement, notably when incorporating different applications with the learning management systems used to engage students in online learning. (20)

In another study, Abbasi *et al*, state that two-thirds of the student have a negative perception towards E-learning, and Ayob *et als'* study that finds more than three-quarters of students have Negative perceptions toward E-learning. Both studies are consistent but they are Contradictory to the current study and previous study that was performed by Binshehab *et al* and Indicated, that both under and postgraduate students' perception of online Learning is positive. (21, 22)

In addition, the present study finds that there is a significant association between perception and Age of undergraduates.

This is consistent with the study of Teo *et al.* and Ngamporudna *et al. which* implies that younger students have a greater level of E-learning acceptance. (23, 24)

Moreover, the present study discloses a significant association between perception and gender of postgraduates, and an insignificant association between the perception and age as well as with College. Perception's variation with gender which, is also evident in the study of Al gahtani *et al., that* attain Female Students express a greater perception about cheating and Fraud during E-learning despite the

male students attending more E-learning courses. Additionally, there is a variation in the level of perception concerning the college type. As the most eminent perception is, perceive in the college of sciences and Health, that Support present verdicts, which assert the postgraduates of Medical laboratory colleges, have the leading perception amidst other HP postgraduates of colleges, whereas the undergraduates of Medicine are, prove utmost perception amongst undergraduates of other HP colleges as illustrated in figure (1).

Furthermore, Females manifest a lower level of perception than males according to a study done by Ibrahim *et al.* This is supporting by Toe et al study, which reports that females own a lower level of perception. On another hand, the Present study conveys a significant association between the age of the undergraduate students and social media as a source of the perception about online Learning. Even more, there is an association between the collaboration platforms with live video communication as an appropriate method for online Learning and Student Characteristics as a variable that affects the effectiveness of online learning. This could explain why another study noticed that most of the students believe that cellular phones could be handled effectively as teaching methods as cell phones facilitate the use of these platforms. (26) The extant result revealed that two-third prefer as well as considering the possibility of practicing online learning currently. More than three-quadrant of students agreed that the major obstacle against online learning is Network mainly then student readiness interaction a, collaboration, in order, this consented with- Martines I G, *et al* concern that students choose mobile for their learning because student-teacher interaction through mobile is Easier Compared to other Devices(27). Present findings also support Suvyawanshi DM, *et al*, as one-third of students preferred Traditional Classroom Teaching, and the main barrier against online learning is the unavailability of speed internet and as well as teacher-student interaction. May justify by India is developing countries like Sudan.

In the end, there was a difference in the level of perception between the under and postgraduate Sudanese health professional students, as postgraduate students boast an advanced positive perception towards online learning compared to undergraduates.

Conclusions

Undergraduate and Postgraduate Health professional Students have a positive perception, although prefer online learning. Whereas postgraduates present a higher perception comparing to undergraduates, each of them considered the possibility and have a previous experience with Hybrid online learning during the current COVID-19 Pandemic, although the obstacles and factors that affect the online learning implementation must be deemed for improving online learning during the lockdown. However, the perception of most students is affected by age and gender, with social media as a source of undergraduates' perception and educational websites regarding postgraduates and Collaboration Platforms é live video communication as an appropriate method for online learning.

The variables and obstacles that affect the effectiveness of online delivery for Health professional students should be taken into the consideration. Likewise, there is a need for improvement in the methods employed in online learning amongst health professional students in Sudan.

Abbreviations

HPS: Health Professional Students.

MOOCs: Massive open online Course.

Study Limitations

The questionnaire was posted only in Sudanese groups and data was collected using the convenience sampling technique, this may impact the generalization of the prevailing result; however, it shines a light on the perception of under and postgraduate Health Professional students about online learning in Sudan during the COVID-19 pandemic.

Availability of data and materials

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Data and supplement materials are available under request from the corresponding author.

Ethics approval and consent to participate

Informed consent was taken from each student before partaking in the study. The data was only probed for purpose of the research and no identification questions were interrogated, to ensure the privacy of the participants.

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Annexes

Table (1): Distribution, Association amid perception and demographics of undergraduate and postgraduate Sudanese Health

Question	Answer	Undergraduates	Postgraduates	P.value
Demographics		*Frequency (%)*	*Frequency (%)*	
1/What is your Age?	Less than 20	19(19.6)	0(0)	0.000
	20 to 30	74(76.3)	19(52.8)	
	More than 30	4(4.1)	17(47.2)	
	Total	97(100)	36(100)	
2/What is your Gender?	Male	36(37.1)	11(30.6)	0.482
	Female	61(62.9)	25(69.4)	
	Total	97(100)	36(100)	
3/ Belong any College do you Study?	Medicine	49(50.5)	10(27.8)	0.009
	Pharmacy	17(17.5)	4(11.1)	
	Laboratory	13(13.4)	15(41.7)	
	Nursing	4(4.1)	0(0)	
	Dentistry	8(8.2)	4(11.1)	
	Other Medical related college	6(6.2)	3(8.3)	
	Total	97(100)	36(100)	
4/Are you an undergraduate or post graduate student?	See figure(2)			
Perception				

	Negative Perception	39(40.2)	12(33.3)	0.469
	Positive Perception	58(59.8)	24(66.7)	
	Total	97(100)	36(100)	
Q5/A. Have you heard about online learning before?	Yes	92(94.8)	36(100)	0.201
	No	5(5.2)	0(0)	
	Total	97(100)	36(100)	
5/B.If yes, where did you hear about it the first time?	At university	22(23.9)	5(13.9)	0.134
	From colleagues	11(12)	5(13.9)	
	Social media	34(37)	9(25)	
	Educational websites	25(27.2)	17(47.2)	
	Total	92(100)	36(100)	
Q6/A. What are your thoughts about online learning, is it possible to be applied at present time in Sudan?	Yes	58(59.8)	21(58.3)	0.879
	No	39(40.2)	15(41.7)	
	Total	97(100)	36(100)	
Q7/A. On your opinion, which of the following is an appropriate method for online Medical				

Learning in Sudan?				
Social Media	Yes	41(42.3)	16(44.4)	0.822
	No	56(57.7)	20(55.6)	
	Total	97(100)	36(100)	
Collaboration Platforms é live video communication	Yes	37(38.1)	16(44.4)	0.51
	No	60(61.9)	20(55.6)	
	Total	97(100)	36(100)	
Massive Open Online Course (MOOC) Platforms	Yes	39(40.2)	16(44.4)	0.659
	No	58(59.8)	20(55.6)	
	Total	97(100)	36(100)	
External repositories of university	Yes	14(14.4)	2(5.6)	0.134
	No	83(85.6)	34(94.4)	
	Total	97(100)	36(100)	
Q8/Do you clam that most of the students have the finical and social ability to participate on Online learning?	Yes	44(45.)	13(36.1)	0.338
	No	53(54.6)	23(63.9)	
	Total	97(100)	36(100)	
Q9/Do you think an electronic simulation could to some extent provide a replacement for practical training in the lab and the hospital?	Yes	38(39.2)	19(52.8)	0.159
	No	59(60.8)	17(47.2)	
	Total	97(100)	36(100)	

Q10/From your perspective, is there a better alternative for online Medical learning?				
	Yes	15(15.5)	5(13.9)	0.821
	No	82(84.5)	31(86.1)	
	Total	97(100)	36(100)	
Q11/What is/are the most essential variable/s that can affect the effectiveness of online delivery?				
Technology	Yes	88(90.7)	35(97.2)	0.19
	No	9(9.3)	1(2.8)	
	Total	97(100)	36(100)	
Instructor characteristics	Yes	77(79.4)	33(91.7)	0.075
	No	20(20.6)	3(8.3)	
	Total	97(100)	36(100)	
Student characteristics	Yes	77(79.4)	32(88.9)	0.155
	No	20(20.6)	4(11.1)	
	Total	97(100)	36(100)	
Q12/Out of the following, which one will be the major obstacle for online Medical learning?				
Network	Yes	78(80.4)	32(88.9)	0.188
	No	19(19.6)	4(11.1)	
	Total	97(100)	36(100)	
Collaboration	Yes	18(18.6)	5(13.9)	0.363
	No	79(81.4)	31(86.1)	
	Total	97(100)	36(100)	

Interaction	Yes	21(21.6)	11(30.6)	0.286
	No	76(78.4)	25(69.4)	
	Total	97(100)	36(100)	
Students Readiness	Yes	22(22.7)	4(11.1)	0.103
	No	75(77.3)	32(88.9)	
	Total	97(100)	36(100)	
Q13/ Do you suppose that online Medical learning should be continued even after the pandemic is over?	Yes	35(36.1)	27(75)	0.000
	No	62(63.9)	9(25)	
	Total	97(100)	36(100)	
Q14/In your Opinion, Health professionals could safely practice in the hospital based on this sort of learning?				
	Yes	45(46.4)	21(58.3)	0.221
	No	52(53.6)	15(41.7)	
	Total	97(100)	36(100)	
Q15/Are you thinking there should be a fee for online learning?				
	Yes	36(37.1)	17(47.2)	0.29
	No	61(62.9)	19(52.8)	
	Total	97(100)	36(100)	
Q16/Do you believe that already available free				

online international material could be used in this type of learning in Sudan?				
	Yes	72(74.2)	30(83.3)	0.27
	No	25(25.8)	6(16.7)	
	Total	97(100)	36(100)	
17/Do you consider online learning is a fair method despite the different economic status of the learner?				
	Yes	43(44.3)	17(47.2)	0.766
	No	54(55.7)	19(52.8)	
	Total	97(100)	36(100)	
Q18/A.Have you participated in international or local Online Medical learning before?				
	Yes	58(59.8)	27(75)	0.105
	No	39(40.2)	9(25)	
	Total	97(100)	36(100)	
Q19/ How about return to classical real life learning, would it be a better choice during COVID-19 pandemic?				
	Yes	42(43.3)	15(41.7)	0.866
	No	55(56.7)	21(58.3)	
	Total	97(100)	36(100)	