



Future Healthcare Providers' Knowledge about Ebola Virus Disease: A Private University Students' Perspective

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Authors' contributions

This work was carried out in collaboration among all authors. Authors MZI and MSI designed the study, performed the initial statistical analyses and wrote the protocol. Authors SUDK and MSI wrote the first draft of the manuscript. Authors MZI and MSI managed refined analyses. Authors MZI, SUDK and MSI revised the manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2020/v32i2830875

Editor(s):

(1) Dr. Ana Cláudia Coelho, University of Trás-os-Montes and Alto Douro, Portugal.

Reviewers:

(1) Hassan Eslami, Birjand University of Medical Sciences, Iran.

(2) Regina Maria Pinto de Figueiredo, University of State of Amazonas, Brazil.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/62062>

Original Research Article

Received 19 July 2020
Accepted 21 October 2020
Published 11 November 2020

ABSTRACT

Objective: The objective of the study was to determine the knowledge of future healthcare providers regarding the Ebola virus disease (EVD) in a private university.

Methods: A cross-sectional study was conducted using a convenience sampling method. A self-developed and pre-validated tool was used to collect data from students studying in three health care faculties of a university in Malaysia. The Statistical Package for Social Science (SPSS) Version 24.0 was used to analyze the data.

Results: More female students 170 (62.3%) participated in the present study than the male students 103 (37.7%), out of a total of 273 studied students. The majority of the final year students had an adequate knowledge towards EVD than the pre-final year students.

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Conclusion: Overall appropriate and good knowledge was observed among the studied future healthcare providers. The present study concluded that pharmacy students had better knowledge regarding EVD than the rest of the studied students.

Keywords: Ebola virus disease; EVD; knowledge; future healthcare providers.

1. INTRODUCTION

Ebola Virus Disease (EVD) is a severe and transmittable viral hemorrhagic fever which can be transmitted to humans from an infected person or animal [1]. It has a public health hazard with a high mortality rate ranging from 25 to 90% [2]. In the year 2014–2015 Ebola virus disease epidemic in West Africa had the largest outbreak of Ebola in history, which resulted in 28 646 cases and about 11 000 deaths [3]. Ebola virus is categorized as the prototype virus pathogen that belonged to hemorrhagic fever, which can cause severe disease with a high fatality rate [4]. The different classes of Ebola virus can cause various clinical syndromes [1].

The transmission of Ebola virus disease from patients in the healthcare system had been surveyed as a typical pattern of inappropriate protective measures [5]. The early diagnosis of this disease is based on clinical assessment of patients [6]. Disease management is based on the separation of patients from others and strict protecting clothing and ventilators [7]. Current treatment plans have mainly belonged to symptomatic and supportive care for the patients [8]. There is no FDA approved antiviral that originate from treating the Ebola virus disease [9]. Thus, the health care providers should have the proper knowledge of the safety and precautions of this disease.

Health care providers are considered as the most trusted source of information on Ebola-related issues [10]. The health care providers and students of all healthcare programs should have proper knowledge of Ebola virus disease and the recommendations to treat this virus disease so that they can provide appropriate information to the general population [11]. The health care students, as future health care providers, have to be aware of epidemics that are occurring all over the world. They must gain

adequate knowledge to control any outbreaks in the upcoming future as well.

The present study was conducted to appraise the knowledge of future healthcare providers in medical, dental, and pharmacy students on Ebola virus disease in a private medical university in Malaysia.

2. METHODOLOGY

A cross-sectional observational study was conducted between healthcare students using a self-developed and validated research questionnaire. Data for the current study were collected by the Stratified convenience sampling method. A total of 273 students from medical, dental, and pharmacy faculties were targeted by the stratified convenience sampling method. The study protocol concerning the privacy of the data was strictly followed, and the data were used in research purposes only. All of the study participants were asked to understand and cautiously select the right answer based on their best understanding. The participants' response was recorded as correct answer and wrong answer. The obtained scores were interpreted as a percentage to ease the data presentation.

Data analyses and presentations were carried out using Statistical Package for Social Science (SPSS) version 24.0. Frequencies with percentages were calculated for the categorical variables. The Pearson Chi-Square/ Fisher's Exact Test was used to find out the p-value in variables. A p-value of < 0.05 was considered statistically significant.

3. RESULTS

A total of 273 future healthcare providers from three faculties participated in the current study. The demographic variables are presented in Table 1.

Table 1. Demographic information of the students (N=273)

Variables	N(%)
Year of study	
Pre-final	135(49.5)
Final	138(50.5)
Age	
20-25 years	267(97.8)
26-30 years	4(1.5)
31-35 years	2(0.7)
Race	
Malay	3(1.1)
Chinese	184(67.4)
Indian	85(31.1)
Others	1(0.4)
Education background	
A-level	0
STPM	14(5.1)
Diploma	18(6.6)
Foundation	228(83.5)
Others	13(4.8)
Residency	
Hosteller	200(73.3)
Non-Hosteller	73(26.7)

STPM = Malaysian Higher School Certificate

Knowledge Question 1: Ebola virus disease is caused by a negative strand RNA virus.

A statistically significant difference ($p=0.021$) was observed between response of question 1 and faculty variable. The proportion of correct answer was more in the dental students as compared with the pharmacy and medical students. A weak positive association ($\phi=0.041$) was observed between faculty variable and response of the students.

Knowledge Question 2: Normal incubation period of Ebola virus disease is 2-21 days.

A statistically significant difference ($p=0.005$) was observed between response of question 2 and faculty variable. The correct answers were more in the faculty of medicine students as compared with the pharmacy and dental students. A weak positive association ($\phi=0.073$) was observed between faculty variable and response of the students.

Knowledge Question 3: ELISA test is often used to diagnose Ebola virus disease.

A statistically significant difference ($p=0.008$) was observed between response of question 3 and faculty variable. The correct answers were more

in the faculty of pharmacy students as compared with the medicine and dental faculty students. A weak positive association ($\phi=0.068$) was observed between faculty variable and response of the students.

Knowledge Question 4: The best way to manage Ebola virus disease patients is to quarantined them.

A statistically significant difference ($p<0.001$) was observed between response of question 4 and faculty variable. The correct answers were more in the faculty of pharmacy students as compared with the medicine and dental faculty students. A moderate positive association ($\phi=0.432$) was observed between faculty variable and response of the students.

Knowledge Question 5: Hand hygiene is very essential in preventing Ebola virus disease.

A statistically significant difference ($p<0.001$) was observed between response of question 5 and faculty variable. The correct answers were more in the faculty of pharmacy students as compared with the medicine and dental faculty students. A moderate positive association ($\phi=0.652$) was observed between faculty variable and response of the students.

Table 2. Knowledge of students to question 1

Variable	Wrong answer N(%)	Correct answer N(%)	P value*	Effect Size# (ϕ value)
Faculty			0.021	0.041
Medicine	43(52.2)	41(48.8)		
Dentistry	35(38.9)	55(61.1)		
Pharmacy	43(43.4)	56(56.6)		
Year of study			0.040	0.029
Year 3	58(43.0)	77(57.0)		
Year 4	63(45.7)	75(54.3)		
Age			0.521	-
20-25 years	118(44.2)	149(55.8)		
26-35 years	2(50.0)	2(50.0)		
31-35 years	1(50.0)	1(50.0)		
Gender			0.711	-
Male	46(44.7)	57(55.3)		
Female	75(44.1)	95(55.9)		
Race			0.036	0.021
Malay	2(66.7)	1(33.3)		
Chinese	76(41.3)	108(58.7)		
Indian	43(50.6)	42(49.4)		
Others	-	1(100.0)		
Education Background			0.062	-
A-level	-	-		
STPM	5(35.7)	9(64.3)		
Diploma	8(44.4)	10(55.6)		
Foundation	99(43.4)	129(56.4)		
Others	9(69.2)	4(30.8)		
Residency			0.047	0.031
Hosteller	83(41.5)	117(58.5)		
Non-Hosteller	38(52.1)	35(47.9)		

*Pearson Chi-Square, **Fisher's Exact Test, #Phi Cramer's V

4. DISCUSSION

The current study is one of the pioneer studies in Malaysia that evaluates the knowledge of different future health care providers regarding Ebola virus disease. The results of the current study showed that a statistically significant difference ($p=0.021$) was observed between response of question regarding the cause of Ebola virus disease and faculty, year of education, race and residency variables. The proportion of correct answer was more in the dental students as compared with the pharmacy and medical students. A weak positive association ($\phi=0.041$) was observed between faculty variable and response of the students. The possible reason behind could be the better knowledge of dental students regarding the disease. May be the dental students would have more information regarding the Ebola virus disease. The results of current study was in line with the results of a study conducted by Diallo

Mbaye and colleagues where the medical students were not having the proper knowledge regarding the causative factors of Ebola virus disease [12].

The findings of the current study showed that a statistically significant difference ($p=0.005$) was observed between response of question regarding the normal incubation period of Ebola virus disease and faculty, age and residency variable. The correct answers were more in the faculty of medicine students as compared with the pharmacy and dental students. A weak positive association ($\phi=0.073$) was observed between faculty variable and response of the students. The reason behind could be that the adequate knowledge of faculty of medical students as compared with the other faculty's students according the normal incubation period of Ebola virus disease. The reason behind could be the better knowledge of medical students on the disease and this reason was supported with

the previous studies as well [13, 14]. The results of present study regarding the normal incubation period of Ebola virus disease are parallel with the study conducted in Pakistan according to which the medical students had a proper knowledge when the question was asked about the normal incubation period of Ebola virus disease [15].

The outcome of the current study showed that a statistically significant difference ($p=0.008$) was observed between response of question regarding the diagnose of Ebola virus disease with faculty and educational background variable. The correct answers were more in the faculty of pharmacy students as compared with the medicine and dental faculty students. A weak positive association ($\phi=0.068$) was observed between faculty variable and response of the students. The results of present study regarding diagnosing of Ebola virus disease is similar to other studies according to them pharmacy

students had more better knowledge about the disease [16-17].

The results of the current study presented that a statistically significant difference ($p<0.001$) was observed between response of question regarding the way to manage Ebola virus disease patients and faculty, year of education, gender and residency variable. The correct answers were more in the faculty of pharmacy students as compared with the medicine and dental faculty students. A moderate positive association ($\phi=0.432$) was observed between faculty variable and response of the students. Similarly, the results of the current study presented that a statistically significant difference ($p<0.001$) was observed between response of question regarding prevention of Ebola virus disease with the and faculty variable. The correct answers were more in the faculty of pharmacy students as compared with the medicine and dental faculty students. A moderate positive

Table 3. Knowledge of students to question 2

Variable	Wrong answer N(%)	Correct answer N(%)	P value*	Effect Size# (ϕ value)
Faculty			0.005	0.073
Medicine	47(56.0)	37(44.0)		
Dentistry	71(78.9)	19(21.1)		
Pharmacy	69(69.7)	30(30.3)		
Year of study			0.332	-
Year 3	94(69.6)	41(30.4)		
Year 4	93(67.4)	45(32.6)		
Age			0.042	0.022
20-25 years	183(68.5)	84(31.5)		
26-35 years	3(75.0)	1(25.0)		
31-35 years	1(50.0)	1(50.0)		
Gender			0.058	-
Male	67(65.0)	36(35.0)		
Female	120(70.6)	50(29.4)		
Race			0.063	-
Malay	3(100.0)	-		
Chinese	125(67.9)	59(32.1)		
Indian	58(68.2)	27(31.8)		
Others	1(100.0)	-		
Education Background			0.053	-
A-level	-	-		
STPM	9(64.3)	5(35.7)		
Diploma	13(72.2)	5(27.8)		
Foundation	155(68.0)	72(32.0)		
Others	10(76.9)	3(23.1)		
Residency			0.049	0.028
Hosteller	141(70.5)	59(29.5)		
Non-Hosteller	46(63.0)	27(37.0)		

*Pearson Chi-Square, **Fisher's Exact Test, #Phi Cramer's V

Table 4. Knowledge of students to question 3

Variable	Wrong answer N(%)	Correct answer N(%)	P value*	Effect Size# (ϕ value)
Faculty			0.008	0.068
Medicine	46(54.8)	38(45.2)		
Dentistry	41(45.6)	49(54.4)		
Pharmacy	43(43.4)	56(56.6)		
Year of study			0.761	-
Year 3	66(48.9)	69(51.1)		
Year 4	64(46.4)	74(53.6)		
Age			0.059	-
20-25 years	126(47.2)	141(52.8)		
26-35 years	4(100.0)	-		
31-35 years	-	2(100.0)		
Gender			0.876	-
Male	51(49.5)	52(50.5)		
Female	79(46.5)	91(53.4)		
Race			0.056	-
Malay	1(33.3)	2(66.7)		
Chinese	83(45.1)	101(54.9)		
Indian	45(52.9)	40(47.1)		
Others	1(100.0)	-		
Education Background			0.045	0.077
A-level	-	-		
STPM	-	-		
Diploma	6(42.9)	8(57.1)		
Foundation	10(55.6)	8(44.4)		
Others	108(47.4)	120(52.6)		
	6(46.2)	7(53.8)		
Residency			0.216	-
Hosteller	97(48.5)	103(51.5)		
Non-Hosteller	33(45.2)	40(54.8)		

*Pearson Chi-Square, **Fisher's Exact Test, #Phi Cramer's V

association ($\phi=0.652$) was observed between the faculty variable and response of the students. The results of present study regarding diagnose of Ebola virus disease is similar with the study

conducted in Pakistan according to which the female students had more better knowledge about the disease as compared with the males [18].

Table 5. Knowledge of students to question 4

Variable	Wrong answer N(%)	Correct answer N(%)	P value*	Effect Size# (ϕ value)
Faculty			<0.001	0.432
Medicine	39(46.4)	45(53.6)		
Dentistry	45(50.0)	45(50.0)		
Pharmacy	36(36.4)	63(63.6)		
Year of study			0.045	0.082
Year 3	64(47.4)	71(52.6)		
Year 4	56(40.6)	82(59.4)		
Age			0.056	-
20-25 years	119(44.6)	148(55.4)		
26-35 years	1(25.0)	3(75.0)		
31-35 years	-	2(100.0)		
Gender			0.004	0.092
Male	40(38.8)	63(61.2)		
Female	80(47.1)	90(52.9)		

Variable	Wrong answer N(%)	Correct answer N(%)	P value*	Effect Size [#] (ϕ value)
Race			0.068	-
Malay	2(66.7)	1(33.3)		
Chinese	82(44.6)	102(55.4)		
Indian	35(41.2)	50(58.8)		
Others	1(100.0)	-		
Education Background			0.055	-
A-level	-	-		
STPM	4(28.6)	10(71.4)		
Diploma	7(38.9)	11(61.1)		
Foundation	105(46.1)	123(53.9)		
Others	4(30.8)	9(69.2)		
Residency			0.006	0.088
Hosteller	93(46.5)	107(53.5)		
Non-Hosteller	27(37.0)	46(63.0)		

*Pearson Chi-Square, **Fisher's Exact Test, #Phi Cramer's V

Table 6. Knowledge of students to question 5

Variable	Wrong answer N(%)	Correct answer N(%)	P value*	Effect Size [#] (ϕ value)
Faculty			<0.001	0.652
Medicine	33(39.3)	51(60.7)		
Dentistry	35(38.9)	55(61.1)		
Pharmacy	12(12.1)	87(87.9)		
Year of study			0.008	0.099
Year 3	52(38.5)	83(61.5)		
Year 4	28(20.3)	110(79.7)		
Age			0.061	-
20-25 years	77(28.8)	190(71.2)		
26-35 years	2(50.0)	2(50.0)		
31-35 years	1(50.0)	1(50.0)		
Gender			0.722	-
Male	32(31.1)	71(68.9)		
Female	48(28.2)	122(71.8)		
Race			0.059	-
Malay	1(33.3)	2(66.7)		
Chinese	53(28.8)	131(71.2)		
Indian	25(29.4)	60(70.6)		
Others	1(100.0)	-		
Education Background			0.082	-
A-level	-	-		
STPM	6(42.9)	8(57.1)		
Diploma	3(16.7)	15(83.3)		
Foundation	65(28.5)	163(71.5)		
Others	6(46.2)	7(53.8)		
Residency			0.009	0.081
Hosteller	64(32.0)	136(68.0)		
Non-Hosteller	16(21.9)	57(78.1)		

*Pearson Chi-Square, #Phi Cramer's V

5. CONCLUSION

The present study reported mixed findings regarding the knowledge towards Ebola virus disease among future healthcare providers in a private medical university. The pharmacy faculty students had better knowledge Ebola virus disease. The final year students also showed better knowledge of Ebola virus disease.

ETHICAL APPROVAL AND CONSENT

As per concerned university standard, a written ethical approval has been collected and preserved by the author(s). The informed consent form was signed by those students who wanted to participate in the present study.

ACKNOWLEDGMENT

The authors would like to thank the Deanship of Scientific Research at Prince Sattam bin Abdulaziz University, Alkharj, Saudi Arabia, for the support in the publication of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/62062>