University Students' Perception of Japanese Encephalitis

Muhammad Shahid Iqbal[1*], Salah-Ud-Din Khan[2] and Muhammad Zahid Iqbal[3]

[1]*Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam bin Abdulaziz University, Al-Kharj, 11942, Saudi Arabia.*
[2]*Department of Biochemistry, College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia.*
[3]*Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, AIMST University, 08100, Bedong, Kedah Darul Aman, Malaysia.*

Authors' contributions

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

Original Research Article

ABSTRACT

Objective: The objective of the study was to evaluate the perception of Japanese Encephalitis (JE) among future healthcare providers in a university in Malaysia.
Methods: A cross-sectional and observational study was conducted among the students of three different healthcare provider faculties in a university in Malaysia with the help of pre-validated research tool. The Statistical Package for Social Science (SPSS) Version 24.0 was used to enter and analyze the data.
Results: Overall, 252 respondents from three different health care faculties participated in the current study. The dental faculty students had better perception as compared to the other two faculties. The female students had a better perception of JE as compared to the students who were living in hostels.

_____

Corresponding author: E-mail: drmmsiqbal@gmail.com;

Conclusion: Overall appropriate perception was observed in the three health care provider faculty students. The present study concluded that dental and pharmacy students had a better perception of JE than medical students.

Keywords: Japanese encephalitis; perception; future healthcare providers.

1. INTRODUCTION

Although a rare and unusual infection, Japanese Encephalitis (JE) is considered among the most critical viral infections worldwide [1]. Pandemics of Encephalitis were depicted in Japan since 1870 and onwards [2]. JE virus is transferred among animals via Culex mosquitoes and is evident in eastern and southern Asia and the Pacific border [3]. Nevertheless, associated neurotropic flaviviruses which share many virological, are discovered throughout the world [4]. Humans become infected with JE virus unexpectedly when residing or travelling near the enzootic cycle of the virus [5]. Even though most cases reported in rural regions, JE virus is also discovered on the boundary of cities [6].

JE is mostly present and reported in children and young adults. The prevalence is lower between children of <3 years old than in older children, possibly showing interactive factors [7]. In past, when outbreaks first happen in new places, like in Sri Lanka, India, and Nepal, grownups are also infected [8]. The reasons for the spread of JE are not entirely known till yet but expected reasons could be increasing mosquito breeding, and animal husbandry which could further spread the virus to host animals [9].

Patients with JE usually present after a few days of non-specific fevered illness, which may consist of rhinitis and diarrhoea which followed by headache, vomiting, and a decreased level of consciousness, often after that convulsion [10]. In certain patients, some older children and adults, unusual behaviour may be the only available feature, resulting in an early diagnosis of mental illness due to JE [11].

Few past studies have confirmed that the prevalence of JE in Malaysia [3,12]. Therefore, all the health care students must have a proper and positive perception of JE. Thus, the present study was conducted to evaluate the perception of the medical, dental and pharmacy students towards JE in a university in Malaysia.

2. METHODOLOGY

A cross-sectional study was conducted in a university to assess medical, dental, and pharmacy students' perceptions on JE. A self-prepared pre-validated research tool was used for the data collection.

Stratified convenience sampling technique was adopted to recruit the study participants. For evaluation of students' perception of JE, open-ended statements were asked from all the study participants. All the perception question statements consisted of one right answer, along with two or more wrong answers. All the respondents were asked to understand the questions and wisely select the best answer based on their personal perception of each requested statement. The achieved results were taken and presented as a percentage of right and wrong answers.

Statistical presentation and data evaluations were done with Statistical Package for Social Science (SPSS) version 24.0. The data type was categorical, and therefore, it was analyzed by Chi-square and Fisher exact test to find the p-value. A value of $p < 0.05$ was considered statistically significant for the current study. The Effect size was measured using Partial Eta Squared (η^2). According to Cohen's classification of effect size, if $0.01 \leq \eta2 \leq 0.06$ = small, if $0.06 \leq \eta2 \leq 0.14$ = medium, $\eta2 \geq 0.14$ = large.

3. RESULTS

Overall, 252 respondents from three medical, pharmacy and dental faculties participated in the current research. From these 252 participants, 75 students were females and 177 were males. The demographic characteristics of the respondents were as follow, in Fig. 1.

The individual replies against each asked perception question statements are presented in followings tables.
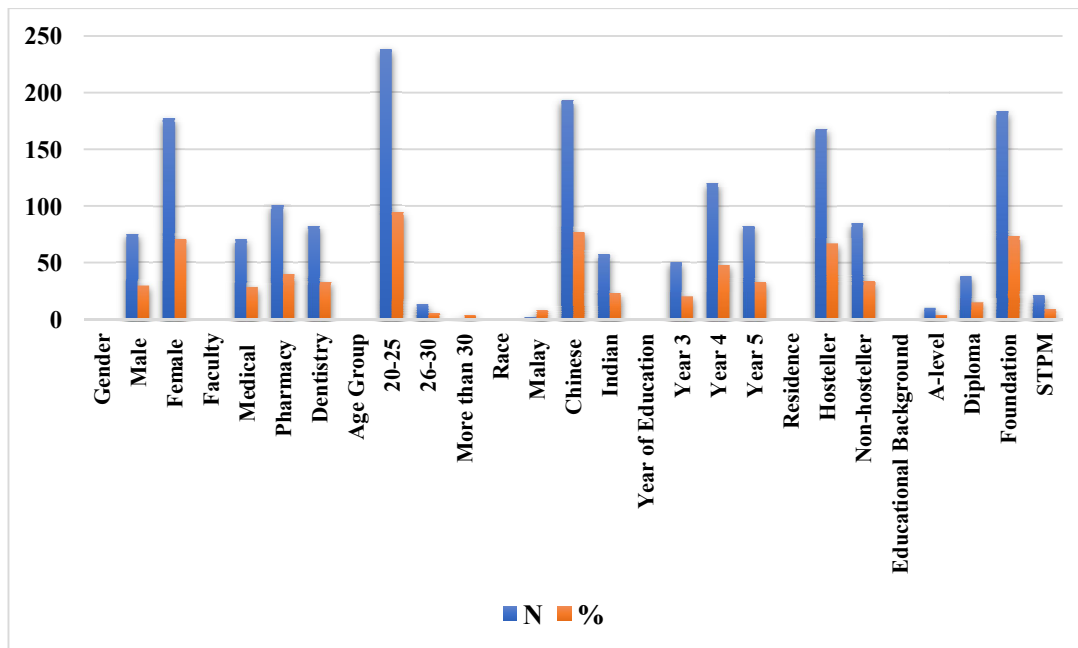
Fig. 1. Demographic information of respondents

Perception question 1: In my perception, a vaccine is available to prevent JE.

A statistically significant difference and weak positive association were observed between the response of perception question 1 with faculty (p=0.006, φ=0.012) and residence variables (p=0.002, φ=0.018). A statistically significant strong positive association was observed with year of education variable (p<0.001, φ=0.162). The wrong answers were more from the fifth year of education, as shown in the Table 1.

Perception question 2: JE vaccination often results in adverse effects like hematoma.

A statistically significant difference and large positive association were observed between the response of question 2 with faculty variable (p<=0.001, φ=0.0.167). A statistically significant weak positive association was seen with year of education variable (p=0.007, φ=0.009). The right answers were more from Dentistry students as shown in Table 2.

Perception question 3: In my view, intellectual disability is among the worst complications of JE.

A statistically significant and weak positive association were observed between the response of question 3 with gender (p<=0.046, φ=0.0.007), faculty (p<=0.003, φ=0.0.015), year

of education (p<=0.034, φ=0.0.002) and residence variable (p<=0.049, φ=0.0.005). The wrong answers were more from the females as shown in Table 3.

Perception question 4: I believe, JE is a life-threatening disease.

A statistically significant and weak positive association were observed between the response of question 4 with gender (p<=0.004, φ=0.0.0197), faculty (p<=0.034, φ=0.0.008), year of education (p<=0.039, φ=0.0.003) and residence variable (p<=0.008, φ=0.0.014). The wrong answers were more from the fifth year of education as shown in Table 4.

Perception question 5: In my opinion, frequent travelers are at highest risk of getting JE.

A statistically significant and weak positive association were observed between the response of question 5 with year of education (p<=0.036, φ=0.0.007) and residence variable (p=0.006, φ=0.0.014). A statistically significant moderate positive association was seen with the gender variable (p=0.002, φ=0.122). A statistically significant large positive association was seen with the educational background variable (p<0.001, φ=0.143). The right answers were more from Diploma candidates as shown in Table 5.

Table 1. Perception of question 1 N(%)

Variables	Wrong Answer	Right Answer	p value	Effect size
Gender			0.139	-
Male	23(30.7)	52(69.3)		
Female	60(33.9)	117(66.1)		
Faculty			0.006	0.012
Medicine	30(42.9)	40(57.1)		
Pharmacy	22(22)	78(78)		
Dentistry	31(37.8)	51(62.2)		
Age Group			0.852	-
20-25	80(33.6)	158(66.4)		
26-30	3(23.1)	10(76.9)		
More than 30	0(0)	1(100)		
Race			0.078	-
Malay	1(50)	1(50)		
Chinese	66(34.2)	127(65.8)		
Indian	16(28.1)	41(71.9)		
Year of Education			<0.001	0.162
Year 3	14(28)	36(72)		
Year 4	35(29.2)	85(70.8)		
Year 5	34(41.5)	48(58.5)		
Residence			0.002	0.018
Hosteller	61(36.3)	107(63.7)		
Non-hosteller	22(26.2)	62(73.8)		
Educational Background			0.065	-
A-level	3(30)	7(70)		
Diploma	16(42.1)	22(57.9)		
Foundation	57(31.1)	126(68.9)		
STPM	7(33.3)	14(66.7)		

Table 2. Perception of question 2 N(%)

Variables	Wrong Answer	Right Answer	p value	Effect size
Gender			0.433	-
Male	54(72)	21(28)		
Female	124(70.1)	53(29.9)		
Faculty			<0.001	0.167
Medicine	59(82.9)	12(17.1)		
Pharmacy	70(70)	30(30)		
Dentistry	50(61)	32(39)		
Age Group			0.552	-
20-25	167(70.2)	71(29.8)		
26-30	10(76.9)	3(23.1)		
More than 30	1(100)	0(0)		
Race			0.056	-
Malay	1(50)	1(50)		
Chinese	135(69.9)	58(30.1)		
Indian	42(73.7)	15(26.3)		
Year of Education			0.007	0.009
Year 3	33(66)	17(34)		
Year 4	88(73.3)	32(26.7)		
Year 5	57(69.5)	25(30.5)		
Residence			0.435	-
Hosteller	117(69.6)	51(30.4)		
Non-hosteller	61(72.6)	23(27.4)		
Educational Background			0.077	-
A-level	8(80)	2(20)		
Diploma	27(71.1)	11(28.9)		
Foundation	129(70.5)	54(29.5)		
STPM	14(66.7)	7(33.3)		

Table 3. Perception of question 3 N(%)

Variables	Wrong Answer	Right Answer	p value	Effect size
Gender			0.046	0.007
Male	39(52)	36(48)		
Female	100(56.5)	77(43.5)		
Faculty			0.003	0.015
Medicine	39(55.7)	31(44.3)		
Pharmacy	59(59)	41(41)		
Dentistry	41(50)	41(50)		
Age Group			0.774	-
20-25	131(55)	107(45)		
26-30	7(53.8)	6(46.2)		
More than 30	1(100)	0(0)		
Race			0.096	-
Malay	1(50)	1(50)		
Chinese	92(47.7)	101(52.3)		
Indian	46(80.7)	11(19.3)		
Year of Education			0.034	0.002
Year 3	31(62)	19(38)		
Year 4	61(50.8)	59(49.2)		
Year 5	47(57.3)	35(42.7)		
Residence			0.049	0.005
Hosteller	95(56.5)	73(43.5)		
Non-hosteller	44(52.4)	40(47.6)		
Educational Background			0.085	-
A-level	5(50)	5(50)		
Diploma	23(60.5)	15(39.5)		
Foundation	100(54.6)	84(45.4)		
STPM	11(52.4)	10(47.6)		

Table 4. Perception of question 4 N(%)

Variables	Wrong Answer	Right Answer	p value	Effect size
Gender			0.004	0.019
Male	35(46.7)	40(53.3)		
Female	70(39.5)	107(60.5)		
Faculty			0.034	0.008
Medicine	38(54.3)	32(45.7)		
Pharmacy	37(37)	63(63)		
Dentistry	30(36.6)	52(63.4)		
Age Group			0.559	-
20-25	98(41.2)	140(58.8)		
26-30	6(46.2)	7(53.8)		
More than 30	1(100)	0(0)		
Race			0.871	-
Malay	2(100)	0(0)		
Chinese	77(39.9)	116(60.1)		
Indian	26(45.6)	31(54.4)		
Year of Education			0.039	0.003
Year 3	19(38)	31(62)		
Year 4	44(36.7)	76(63.3)		
Year 5	42(51.2)	40(48.8)		
Residence			0.008	0.014
Hosteller	73(43.5)	95(56.5)		
Non-hosteller	32(38.1)	52(61.9)		
Educational Background			0.955	-
A-level	5(50)	5(50)		
Diploma	13(34.2)	25(65.8)		
Foundation	79(43.2)	104(56.8)		
STPM	8(38.1)	13(61.9)		

Table 5. Perception of question 5 N(%)

Variables	Wrong Answer	Right Answer	p value	Effect size
Gender			0.002	0.122
Male	38(50.7)	37(49.3)		
Female	60(33.9)	117(66.1)		
Faculty			0.451	-
Medicine	27(38.6)	43(61.4)		
Pharmacy	39(39)	61(61)		
Dentistry	32(39)	50(61)		
Age Group			0.122	-
20-25	92(38.7)	146(61.3)		
26-30	5(38.5)	8(61.5)		
More than 30	1(100)	0(0)		
Race			0.068	-
Malay	1(50)	1(50)		
Chinese	79(40.9)	114(59.1)		
Indian	18(31.6)	39(68.4)		
Year of Education			0.036	0.007
Year 3	17(34)	33(66)		
Year 4	55(45.8)	65(54.2)		
Year 5	26(31.7)	56(68.3)		
Residence			0.006	0.014
Hosteller	58(34.5)	110(65.5)		
Non-hosteller	40(47.6)	44(52.4)		
Educational Background			<0.001	0.143
A-level	4(40)	6(60)		
Diploma	9(23.7)	29(76.3)		
Foundation	74(40.4)	109(59.6)		
STPM	11(52.4)	10(47.6)		

4. DISCUSSION

The current study was novel in evaluating perception of healthcare students about JE in a Malaysian university. According to the present study findings, a statistically significant difference and weak positive association were observed between the response of perception question about vaccines' availability to prevent JE with faculty (p=0.006, φ=0.012) and residence variables (p=0.002, φ=0.018). A statistically significant strong positive association was observed with the year of education variable p<0.001, φ=0.162). The wrong answers were more from the fifth year of education, students. These study findings are in line with a study conducted in India In which the question was asked about the availability of vaccination for JE [13].

A statistically significant difference and large positive association were observed between the response to the question regarding adverse impacts of JE vaccination like hematoma with faculty variable (p<=0.001, φ=0.0.167). Furthermore, a statistically significant weak positive association was seen with the year of education variable (p=0.007, φ=0.009). The right answers were more from dentistry students. The

reason behind this could be the inappropriate knowledge of medical students regarding the adverse effects of vaccination for JE. The results of the current study were well supported by a study conducted in Malaysia by Iqbal and colleagues. The dental students had better knowledge of root canal treatment than the medical students [14].

The current study finding shows that a statistically significant and weak positive association were observed between the response of question statement regarding opinion on intellectual disability is among the worst complications of JE with gender (p<=0.046, φ=0.0.007), faculty (p<=0.003, φ=0.0.015), year of education (p<=0.034, φ=0.0.002) and residence variable (p<=0.049, φ=0.0.005). The wrong answers were more from females. The better perception of females than the males is in line with a study conducted in Taiwan, according to which the female respondents had a better perception than males on JE [15].

A statistically significant and weak positive association was observed between the perception statement's response as the belief of students on JE as a life-threatening disease with gender (p<=0.004, φ=0.0.0197), faculty

(p<=0.034, ϕ=0.0.008), year of education (p<=0.039, ϕ=0.0.003) and residence variable (p<=0.008, ϕ=0.0.014). The wrong answers were more from the fifth year of students. These findings of senior students having inappropriate perception contrast with a study conducted in Malaysia, according to which the senior students head better understanding and positive perception [16].

The current study disclosed that a statistically significant and weak positive association was present between the response to question regarding the frequent travelers are at highest risk of getting JE with the year of education (p<=0.036, ϕ=0.0.007) and residence variable (p=0.006, ϕ=0.0.014). A statistically significant moderate positive association was seen with the gender variable (p=0.002, ϕ=0.122). A statistically significant large positive association was seen with the educational background variable (p<0.001, ϕ=0.143). The right answers were more from Diploma candidates. The current study findings regarding the background of student studies affecting the perception are in line with a study conducted in Malaysia. The study background is directly affecting student knowledge and perception [17]. The reason that medical students had a lower level of perception about JE than the pharmacy and dentistry students could be due to their less knowledge and awareness about JE epidemiology, progression, severity, and its management.

It is of paramount importance for healthcare students to have in-depth and comprehensive medical education which will enable them to better diagnose, understand drug-disease mechanisms and overall management and better patients care [18-21]. Unconventional healthcare simulations, better drug-disease information, and evidence-based practices are vital for healthcare students in order to treat numerous contagious diseases. This in return, could improve patients' health-related quality of life especially among chronic disease patients [22-25].

5. CONCLUSION

The present study concluded that dental and pharmacy students had a more appropriate perception as compared to the medical students regarding JE. The female students had positive and more appropriate perception as compared with the males regarding JE.

CONSENT AND ETHICAL APPROVAL

The informed consent form was signed by all the participants to participate in the study. The ethical approval of the current study was taken from the research and ethical committee of the university. The data in the form of information was taken from the respondents, and research ethics were followed strictly.

ACKNOWLEDGEMENT

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Solomon T, Dung NM, Kneen R, et al. Japanese Encephalitis. J. Neurol. Neurosurg. Psychiatry 2000;68(4):405–415.
2. Solomon T, Ni H, Beasley DWC, et al. Origin and evolution of Japanese Encephalitis virus in Southeast Asia. J. Virol. 2003;77(5):3091–3098.
3. MacKenzie JS, Williams DT. The zoonotic *Flaviviruses* of southern, south-eastern and eastern Asia, and australasia: The potential for emergent viruses. Zoonoses Public Health, John Wiley & Sons, Ltd. 2009;56(6–7): 338–356.
4. Artsob H, Gubler DJ, Enria DA, et al. West Nile Virus in the new world: Trends in the spread and proliferation of West Nile Virus in the Western Hemisphere. Zoonoses Public Health. 2009;56(6–7): 357–369.
5. Mackenzie JS, Gubler DJ, Petersen LR. Emerging *Flaviviruses*: The spread and resurgence of Japanese encephalitis, West Nile and dengue viruses. Nat. Med. 2004; 10(12):98–109.
6. Reed KD, Meece JK, Henkel JS, Shukla SK. Birds, migration and emerging zoonoses: West nile virus, lyme disease, influenza A and enteropathogens. Clin. Med. Res. 2003;1(1):5–12.
7. Misra UK, Kalita J. Overview: Japanese Encephalitis. Prog. Neurobiol. 2010;91(2): 108–120.

8. Solomon T, Mallewa M. Dengue and other emerging flaviviruses. J. Infect. 2001;42(2): 104–115.

9. Kumar K, Arshad SS, Selvarajah GT, et al. Japanese Encephalitis in Malaysia: An overview and timeline. Acta Trop. 2018; 185:219–229.

10. Yun SI, Lee YM. Early events in Japanese Encephalitis virus infection: Viral entry. Pathogens 2018;7(3):68.

11. Hegde NR, Gore MM. Japanese encephalitis vaccines: Immunogenicity, protective efficacy, effectiveness, and impact on the burden of disease. Hum. Vaccines Immunother. 2017;13(6):1320–1337.

12. Looi LM, Chua KB. Lessons from the Nipah virus outbreak in Malaysia. Malays. J. Pathol. 2007;29(2):63–67.

13. Dasgupta A, Dey A, Paul B, et al. Perception of prevention of Japanese Encephalitis with emphasis on its vaccination programme: A community based study in a slum of Kolkata. Int. J. Public Heal. Res. 2017;7(2):845–851.

14. Iqbal MZ, Al-Saikhan FI, Rajan S, Iqbal MS. Knowledge of root canal treatment and its association with patients' demographics – A cross-sectional insight. J. Pharm. Res. Int. 2020;32(6):1–8.

15. Hsu LC, Chen YJ, Hsu FK, et al. The incidence of Japanese Encephalitis in Taiwan—A population-based study. PLoS Negl. Trop. Dis. 2014;8(7):3030.

16. Iqbal MS, Iqbal MZ, Rajan S, Ahmed NJ. Evaluation of drug-related knowledge and clinical skills among future healthcare professionals. J. Pharm. Res. Int. 2020; 32(8):44–50.

17. Iqbal MZ, Rajan S, Iqbal MS. Determinants of Oral health-related quality of life among patients on root canal treatment. J. Pharm. Res. Int. 2020;32(5):76–82.

18. Musarrat Rauf Burki, Sadia Shakeel, Saira Hayat, Amer Hayat Khan, Muhammad Shahid Iqbal, Jiyauddin Khan. Evaluation of knowledge, attitude and practices of university students towards rational use of medicines. Medical Science. 2020;24(106): 4425-4437.

19. Sadia Shakeel, Faiza Hayat, Saifullah Mehsud, Amer Hayat Khan, Muhammad Shahid Iqbal, Jiyauddin Khan. Students' knowledge and attitude towards rational use of antibiotics. Medical Science. 2020; 24(106):4499-4509.

20. Ahmed A Albassam, Muhammad Zahid Iqbal, Fahad I Al-Saikhan, Salah-Ud-Din Khan, Muhammad Shahid Iqbal. Attitude of future healthcare professionals towards Ebola virus disease. Medical Science. 2020;24(106):3901-3910.

21. Muhammad Zahid Iqbal, Salah-Ud-Din Khan, Muhammad Shahid Iqbal. Oral healthcare attitude among students of a medical university. Medical Science. 2020; 24(106):3891-3900.

22. Ahmed A Albassam, Muhammad Zahid Iqbal, Fahad I Al-Saikhan, Salah-Ud-Din Khan, Muhammad Shahid Iqbal. Knowledge of mental health challenges among healthcare students – Findings from a medical university. Medical Science. 2020;24(106):3881-3890.

23. Muhammad Zahid Iqbal, Ahmed A. Albassam, Ziyad S. Almalki, Salah-Ud-Din Khan, Muhammad Shahid Iqbal. Healthcare students' perception about mental illnesses– A cross-sectional study. Medical Science. 2020;24(106):3835-3844.

24. Muhammad Shahid Iqbal, Muhammad Zahid Iqbal, Salah-Ud-Din Khan, Eldowaik Mohamed Salah Saad, Yaman Walid Kassab. Evaluation of health-related quality of life among healthcare professionals– A cross-sectional study findings. Medical Science. 2020;24(106): 4471-4476.

25. Muhammad Shahid Iqbal. Predictors of health-related quality of life among healthcare professionals. Medical Science. 2020;24(106):4445-4452.