



Perception among Future Healthcare Providers about Treatment and Management of ALS

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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 SDK, EMS and MSI wrote the first draft of the manuscript. Authors MZI, EMS and MSI managed refined analyses. Authors SDK and MSI revised the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Objective: The objective of the study was to determine the perception of future healthcare providers regarding Amyotrophic Lateral Sclerosis (ALS) in a private medical 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: A total of 268 healthcare students from three faculties (medical, pharmacy and dental) participated in the current study. More female students 183 (68.3%) participated than the male students 85 (31.7%) in current study.

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Conclusion: Overall appropriate perception was observed among the studied future healthcare providers. The present study concluded that pharmacy students had more positive perception regarding ALS than the rest of the participants.

Keywords: Amyotrophic lateral sclerosis; ALS; perception; future healthcare providers.

1. INTRODUCTION

Amyotrophic lateral sclerosis (ALS) is a progressive neurodegenerative illness that distresses nerve cells situated in the brain and the spinal cord [1]. Initial indicators of ALS contain increasing muscle cramps, muscle weakness, and difficulty in walking or performing usual everyday activities [2]. Recognized risk factors for ALS contain age, sex, heredity, lead exposure, protein mishandling and smoking [3]. A significant problem in the diagnosis of ALS is the absenteeism of biomarkers, which results in delayed diagnosis from 9 to 12 months and lead to a false diagnosis in 10% of cases [4]. There are 4 different types (onsets) of ALS which are bulbar onset, pulmonary onset, upper limbs onset and lower limbs onset that usually determine the real severity of the ALS among its patients. These all four onset types often result in different clinical manifestations, disease severity and its overall management [1-4].

Complications especially aspiration are mainly result in major problems like difficulties in speaking, breathing, eating, dementia and getting food, saliva, or liquid into the lungs [5]. Some patients of ALS may have a tracheostomy in the later stages [6]. However, respiratory failure is the most common reason for death in ALS patients [7]. Furthermore, low levels of vitamin D and the eating problem can cause dehydration and malnutrition in patients of ALS [8]. On the other hand, the rate and severity of aspiration may also get higher in patients of ALS [9].

Although no proper management for ALS is available until now, yet managing glial cells deficiency which often lacks specific proteins and becomes sick, and maintenance of vitamin D, E and C could be considered as a supportive management of ALS. Additionally, Riluzole is considered as one of the FDA approved drugs that can decrease the progression of ALS in patients [10]. Riluzole mechanism is to reduce the levels of glutamate that is generally available at high levels in patients of ALS [11]. Since ALS is not a very well-known illness, and future health care providers may not be fully aware of it but they should have an appropriate and positive

perception of ALS. They must have practical information to control any outbreaks in the upcoming future. The present study was conducted to evaluate the perception of future healthcare providers in medical, dental, and pharmacy students on ALS in a private medical university in Malaysia.

2. METHODOLOGY

A cross-sectional study was conducted between future healthcare providers in a private medical university in Malaysia by a pre-validated research questionnaire. A stratified convenience sampling technique was used to calculate the sample size of the participants. The calculated sample size was 300 participants from medical, pharmacy, and dental faculties of a private medical university. All of the included participants of the current study were requested to read and understand the question statements before selecting the answer based on their best understanding. The gained scores were construed as a percentage response to ease the data presentation.

Statistical Package for Social Science (SPSS) version 24.0 was utilized for Data analyses and presentations. Frequencies with percentages were considered 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. Phi Cramer's value was used to find the effect size of the statistically significant variables. The results of effect size were as per the Crohn's classification for categorical data.

3. RESULTS

A total of 268 healthcare students from three faculties (medical, pharmacy and dental) participated in the current study. Demographic of the current study was different, including gender, race, faculty, age, year of education, residence and education background. The demographic variables are accessible in Table 1.

Perception Question 1: Transplanting healthy glial cells into patients could be a possible treatment of ALS.

Table 1. Demographic Information of Respondents

Variables	N	%
Gender		
Male	85	31.7
Female	183	68.3
Race		
Malay	2	0.7
Chinese	190	70.9
Indian	75	28.0
Others	1	0.4
Faculty		
Medical	83	31.0
Pharmacy	100	37.3
Dental	85	31.7
Age		
20-25	262	97.8
26-30	5	1.9
More than 30	1	0.4
Year of Education		
Year 3	95	35.4
Year 4	130	48.5
Year 5	43	16.0
Residence		
Hostellers	185	69.0
Non-hostellers	83	31.0
Education Background		
A Level	7	2.6
Diploma	5	1.9
Foundation	230	85.8
STPM*	26	9.7

STPM = Malaysian Higher School Certificate

A statistically significant difference ($p=0.049$) was observed between response of question 1 and age variable. The proportion of correct answer was more in the 20-25 years old as compared with the others. A weak positive association ($\phi=0.012$) was observed between faculty variable and the response of the students.

Perception Question 2: Riluzole is often recommended in the management of ALS.

A statistically significant difference was observed between the response of question 2 and faculty ($p=0.006$), year of education ($p=0.009$) and residence ($p=0.032$) variable. The proportion of correct answer was more in medical students as compared with the others. A weak positive association ($\phi=0.051$) was observed between faculty variable and response of the students.

Perception Question 3: Lower levels of vitamin D put older adults at a higher risk of acquiring ALS.

A statistically significant difference was observed between response of question 3 and faculty ($p=0.003$) and residence ($p=0.029$) variable. The proportion of correct answer was more in dental students as compared with the others. A weak positive association ($\phi=0.062$) was observed between faculty variable and response of the students.

Perception Question 4: Smoking is a risk factor for ALS.

A statistically significant difference was observed between response of question 4 and faculty ($p=0.002$) and residence ($p=0.018$) variable. The proportion of correct answer was more in dental students as compared with the others. A weak positive association ($\phi=0.029$) was observed between residence variable and response of the students.

Perception Question 5: Hearing therapy is of no use in treating ALS patients.

A statistically significant difference was observed between response of question 5 and faculty ($p < 0.001$) and year of education ($p = 0.018$) variable. The proportion of correct answer was more in dental students as compared with the others. A moderate positive association ($\phi = 0.571$) was observed between residence variable and response of the students.

Table 2. Perception of respondents to question 1

Variables	Wrong answer N (%)	Right answer N (%)	P value*	Effect size [#]
Gender			0.238	-
Male	64 (75.3)	21 (24.7)		
Female	138 (75.4)	45 (24.6)		
Race			0.059	-
Malay	-	2 (100.0)		
Chinese	150 (78.9)	40 (21.1)		
Indian	51 (68.0)	24 (32.0)		
Others	1 (100.0)	-		
Faculty			0.071	-
Medical	62 (74.7)	21 (25.3)		
Pharmacy	77 (77.0)	23 (23.0)		
Dental	63 (74.1)	22 (25.9)		
Age			0.049	0.012
20-25	198 (75.6)	64 (24.4)		
26-30	3 (60.0)	2 (40.0)		
More than 30	1 (100.0)	-		
Year of Education			0.484	-
Year 3	71 (74.7)	24 (25.3)		
Year 4	97 (74.6)	33 (25.4)		
Year 5	34 (79.1)	9 (20.9)		
Residence			0.612	-
Hostellers	140 (75.7)	45 (24.3)		
Non-hostellers	62 (74.7)	21 (25.3)		
Education Background			0.061	-
A Level	3 (42.9)	4 (57.1)		
Diploma	3 (60.0)	2 (40.0)		
Foundation	173 (75.2)	57 (24.8)		
STPM	23 (88.5)	3 (11.5)		

*Pearson Chi-Square; [#]Phi Cramer's V

Table 3. Perception of respondents to question 2

Variables	Wrong answer N (%)	Right answer N (%)	P value*	Effect size [#]
Gender			0.134	-
Male	63 (74.1)	22 (25.9)		
Female	141 (77.0)	42 (23.0)		
Race			0.062	-
Malay	2 (100.0)	0 (0.0)		
Chinese	146 (76.8)	44 (23.2)		
Indian	55 (73.3)	20 (26.7)		
Others	1 (100.0)	0 (0.0)		
Faculty			0.006	0.051
Medical	59 (71.1)	24 (28.9)		
Pharmacy	80 (80.0)	20 (20.0)		
Dental	65 (76.5)	20 (23.5)		
Age			0.079	-
20-25	200 (76.3)	62 (23.7)		
26-30	3 (60.0)	2 (40.0)		
More than 30	1 (100.0)	0 (0.0)		

Year of Education			0.009	0.047
Year 3	73 (76.8)	22 (23.2)		
Year 4	96 (73.8)	34 (26.2)		
Year 5	35 (81.4)	8 (18.6)		
Residence			0.032	0.028
Hostellers	147 (79.5)	38 (20.5)		
Non-hostellers	57 (68.7)	26 (31.3)		
Education Background			0.077	-
A Level	5 (71.4)	2 (28.6)		
Diploma	3 (60.0)	2 (40.0)		
Foundation	173 (75.2)	57 (24.8)		
STPM	23 (88.5)	3 (11.5)		

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

Table 4. Perception of respondents to question 3

Variables	Wrong answer N (%)	Right answer N (%)	P value*	#Effect size
Gender			0.256	-
Male	52 (61.2)	33 (38.8)		
Female	112 (61.2)	71 (38.8)		
Race			0.055	-
Malay	1 (50.0)	1 (50.0)		
Chinese	114 (60.0)	76 (40.0)		
Indian	48 (64.0)	27 (36.0)		
Others	1 (100.0)	-		
Faculty			0.003	0.062
Medical	55 (66.3)	28 (33.7)		
Pharmacy	60 (60.0)	40 (40.0)		
Dental	49 (57.6)	36 (42.4)		
Age			0.089	-
20-25	163 (62.2)	99 (37.8)		
26-30	1 (20.0)	4 (80.0)		
More than 30	-	1 (100.0)		
Year of education			0.219	-
Year 3	57 (60.0)	38 (40.0)		
Year 4	81 (62.3)	49 (37.7)		
Year 5	26 (60.5)	17 (39.5)		
Residence			0.029	0.014
Hostellers	119 (64.3)	66 (35.7)		
Non-hostellers	45 (54.2)	38 (45.8)		
Education background			0.096	-
A Level	3 (42.9)	4 (57.1)		
Diploma	5 (100.0)	-		
Foundation	139 (60.4)	91 (39.6)		
STPM	17 (65.4)	9 (34.6)		

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

4. DISCUSSION

The present study is the pioneer study conducted in Malaysian university that evaluates the perception of different health care students regarding ALS. The outcomes of the present study disclosed that a statistically significant difference was observed between response of

question regarding the possible treatment of ALS by transplanting healthy glial cells into patients. A statistically significant difference ($p=0.049$) was observed between response of question 1 and age variable. The proportion of correct answer was more in the 20-25 years old as compared with the others. A weak positive association ($\phi=0.012$) was observed between faculty variable

and response of the students. The reason behind could be the number of students in each category. The number of 20-25 years old students were more in the study as compared to the other age groups of students. The number of students is directly affecting the results of studies. The findings of current study are similar with the finding of a study conducted in Malaysia on root canal treatment in oral health, according to which the unmarried students had better knowledge as compared with the married students because of the difference in numbers in the cited study in Malaysia [12].

The findings of the current study showed that a statistically significant difference ($p=0.006$) was observed between response of question regarding the utilization of Riluzole as recommended in the management of ALS and faculty, year of education and residency variable. The correct answers were more in the faculty of

medicine students (28.4%) as compared with the pharmacy and dental students. A weak positive association ($\phi=0.051$) 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 regarding the utilization of Riluzole in ALS. The reason behind could be the better knowledge of medical students on the disease and this reason was in line with the previous studies too [13,14]. The results of the present study are in line with the study conducted by Beghi and colleagues [15].

The outcome of the current study showed that a statistically significant difference was observed between response of question regarding the lower levels of vitamin D as higher risk of acquiring ALS with faculty ($p=0.003$) and residence ($p=0.029$) variable. The proportion of

Table 5. Perception of respondents to question 4

Variables	Wrong answer N (%)	Right answer N (%)	P value*	#Effect size
Gender			0.452	-
Male	45 (52.9)	40 (47.1)		
Female	104 (56.8)	79 (43.2)		
Race			0.073	-
Malay	1 (50.0)	1 (50.0)		
Chinese	109 (57.4)	81 (42.6)		
Indian	38 (50.7)	37 (49.3)		
Others	1 (100.0)	-		
Faculty			0.002	0.069
Medical	45 (54.2)	38 (45.8)		
Pharmacy	64 (64.0)	36 (36.0)		
Dental	40 (47.1)	45 (52.9)		
Age			0.065	-
20-25	147 (56.1)	115 (43.9)		
26-30	2 (40.0)	3 (60.0)		
More than 30	-	1 (100.0)		
Year of Education			0.136	-
Year 3	55 (57.9)	40 (42.1)		
Year 4	69 (53.1)	61 (46.9)		
Year 5	25 (58.1)	18 (41.9)		
Residence			0.018	0.029
Hostellers	106 (57.3)	79 (42.7)		
Non-hostellers	43 (51.8)	40 (48.2)		
Education background			0.088	-
A Level	4 (57.1)	3 (42.9)		
Diploma	1 (20.0)	4 (80.0)		
Foundation	130 (56.5)	100 (43.5)		
STPM	14 (53.8)	12 (46.2)		

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

Table 6. Perception of respondents to question 5

Variables	Wrong answer N (%)	Right answer N (%)	P value*	*Effect size
Gender			0.139	-
Male	18 (21.2)	67 (78.8)		
Female	44 (24.0)	139 (76.0)		
Race			0.063	-
Malay	1 (50.0)	1 (50.0)		
Chinese	44 (23.2)	146 (76.8)		
Indian	17 (22.7)	58 (77.3)		
Others	0 (0.0)	1 (100.0)		
Faculty			<0.001	0.571
Medical	23 (27.7)	60 (72.3)		
Pharmacy	22 (22.0)	78 (78.0)		
Dental	17 (20.0)	68 (80.0)		
Age			0.057	-
20-25	60 (22.9)	202 (77.1)		
26-30	2 (40.0)	3 (60.0)		
More than 30	-	1 (100.0)		
Year of Education			0.016	0.027
Year 3	28 (29.5)	67 (70.5)		
Year 4	24 (18.5)	106 (81.5)		
Year 5	10 (23.3)	33 (76.7)		
Residence			0.518	-
Hostellers	44 (23.8)	141 (76.2)		
Non-hostellers	18 (21.7)	65 (78.3)		
Education			0.093	-
Background	4 (57.1)	3 (42.9)		
A Level	1 (20.0)	4 (80.0)		
Diploma	50 (21.7)	180 (78.3)		
Foundation	7 (26.9)	19 (73.1)		
STPM				

*Pearson Chi-Square; *Phi Cramer's V

correct answer was more in dental students as compared with the others. A weak positive association ($\phi=0.062$) was observed between faculty variable and response of the students. The results of present study regarding the lower levels of vitamin D as higher risk in ALS is similar with the study conducted in Malaysia according to which the pharmacy students had better knowledge about the disease [12].

The results of the current study presented that a statistically significant difference was observed between response of question 4 and faculty ($p=0.002$) and residence ($p=0.018$) variable. The proportion of correct answer was more in dental students as compared with the others. A weak positive association ($\phi=0.029$) was observed between residence variable and response of the students. Similarly, a statistically significant difference was observed between response of question 5 and faculty ($p<0.001$) and year of education ($p=0.018$) variable. The proportion of correct answer was more in dental students as

compared with the others. A moderate positive association ($\phi=0.571$) was observed between residence variable and response of the students. The results of present study regarding ALS are similar to the study conducted by Woelfel and colleagues according to which the female students had better knowledge about the disease as compared with the males [16].

5. CONCLUSION

The present study reported mixed findings regarding the perception of ALS among future healthcare providers in a private medical university. The medical faculty students had an appropriate perception about ALS whereas pharmacy students had better perception than the other students.

CONSENT AND ETHICAL APPROVAL

Before the enrolment of the participants, the informed consent form was signed from all the

respondents. The ethical approval of the study was taken from the university research and ethical committee. All the ethics, including the privacy of the data, was strictly followed as per the guidelines.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Saudagar R, Garge L. Amyotrophic Lateral Sclerosis: An Overview. *J. Drug Deliv. Ther.* 2019;9(3):613–616.
2. Gordon PH. Amyotrophic lateral sclerosis: Pathophysiology, diagnosis and management. *CNS Drugs.* 2011;25(1):1–15.
3. Corcia P, Gordon PH. Amyotrophic lateral sclerosis and the clinical potential of dexamipexole. *Ther. Clin. Risk Manag.* 2012;8:359–366.
4. Traynor BJ, Codd MB, Corr B et al. Amyotrophic lateral sclerosis mimic syndromes: A population-based study. *Arch. Neurol.* 2000;57(1):109–113.
5. Wijesekera LC, Leigh PN. Amyotrophic lateral sclerosis. *Orphanet J. Rare Dis.* 2009;4(1):3.
6. Albert SM, Whitaker A, Rabkin JG et al. Medical and supportive care among people with ALS in the months before death or tracheostomy. *J. Pain Symptom Manage.* 2009;38(4):546–553.
7. Pisa FE, Logroscino G, Giacomelli Battiston P, Barbone F. Hospitalizations due to respiratory failure in patients with Amyotrophic Lateral Sclerosis and their impact on survival: a population-based cohort study. *BMC Pulm. Med.* 2016;16(1):136.
8. Zarei S, Carr K, Reiley L et al. A comprehensive review of amyotrophic lateral sclerosis. *Surg. Neurol. Int.* 2015. DOI: 10.4103/2152-7806.169561.
9. Easterling C, Antinoja J, Cashin S, Barkhaus PE. Changes in tongue pressure, pulmonary function, and salivary flow in patients with amyotrophic lateral sclerosis. *Dysphagia.* 2013;28(2):217–225.
10. Khairoalsindi OA, Abuzinadah AR. Maximizing the Survival of Amyotrophic Lateral Sclerosis Patients: Current Perspectives. *Neurol. Res. Int.* 2018. DOI: 10.1155/2018/6534150.
11. Zarate CA, Manji HK. Riluzole in psychiatry: A systematic review of the literature. *Expert Opin. Drug Metab. Toxicol.* 2008;4(9):1223–1234.
12. Iqbal MZ, Al-Saikhani 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.
13. 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.
14. 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.
15. Beghi E, Balzarini C, Bogliun G et al. Reliability of the El Escorial Diagnostic Criteria for Amyotrophic Lateral Sclerosis. *Neuroepidemiology.* 2002;21(6):265–270.
16. Woelfel JA, Patel RA, Lee H et al. An overview and study of beneficiaries' knowledge, attitudes, and perceptions of the Medicare Part D benefit. *Consult. Pharm.* 2015;30(2):101–111.

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