Evaluation of knowledge of Alzheimer disease among health university students in Riyadh, Saudi Arabia

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A B S T R A C T

Objective: To assess the knowledge of Alzheimer disease among healthcare students of King Saud University, Riyadh Saudi Arabia.

Methods: This cross-sectional survey was conducted via an online questionnaire using google form as the main platform to collect the data. We included Pharmacy, medical and dental students, who are studying at King Saud University, Riyadh Saudi Arabia during February to March 2019.

Results: A total of 671 healthcare students responded to the study, and a total of 529 participants completely filled the survey with a response rate 79%. Majority (70.1%) of the students studied about Alzheimer disease in their college life, only 16.6% were not and 13.2% of them not remember. Most of the respondents 373 (70%) answered correctly and said that Alzheimer disease is related to mental disorders, although majority of 73.5% knew that Alzheimer disease is a Neurodegenerative disease. There was significant difference in knowledge score of medical and dental students (p = 0.001), Pharmacy and dental students (p = 0.003) respectively.

Conclusion: Saudi healthcare students have variation in knowledge about Alzheimer disease. To increase levels of knowledge, it is necessary to provide adequate education Programme and training is needed in healthcare colleges. We suggest further studies with large sample sizes to identify the effectiveness of Alzheimer disease education programs healthcare schools are warranted.

1. Introduction

Alzheimer’s disease (AD) is progressive brain disorder that increasing rapidly irrespective of age groups worldwide (Nagle et al., 2013; Ridha et al., 2006; Williams 2013). It is primarily characterized by reduced or loss of power of memory and thinking skills, eventually the ability to carry out the simplest tasks. AD is the most common cause of dementia among individuals with multiple clinical presentations (Bature et al., 2017). It is evident that the prevalence of AD is relatively high in low-middle income countries (World Alzheimer’s Report, 2015).

According to previous reports dementia was the fifth leading cause of death globally, accounting for 2-4 million deaths annually (Nichols et al., 2019). According to recently published systematic analysis for the Global Burden of AD in 2016 revealed that 43-8 million individuals have dementia, among those More women than men had dementia (Nichols et al., 2019). The number of AD cases expected to increase to 131.5 million by 2050 with the majority are from low and middle income countries (Alzheimer’s Disease International, 2015). The prevalence of dementia in Saudi Arabia is estimated at 6.4%. Age, low level of education, hypertension, and cardiovascular disease were risk factors for cognitive impairment (Alkhunizan et al., 2018). However previous studies reported that most of the individuals and members families, view AD’s symptoms as normal aging, and hence, do not seek for any urgent medical treatments (Alkhunizan et al., 2018).

Managing the severity of AD is complex process as it leads to the change in psychiatric and behavioral disorders upon pharmacological treatment might overlap with the symptoms of cognitive decline. Therefore knowledge in managing disease is vital in all the community peoples. Healthcare professionals such as pharmacist are a member of the healthcare in managing patients with AD symptoms. Well trained to pharmacist are help full to identify adverse drug reactions (ADR), assisting the clinicians, to monitor
safety of medications, to find out the possibility of ADRs that may appear to be AD symptoms (Marasco et al., 2003).

Previous studies evaluated the knowledge among healthcare students from different countries and reported that the knowledge about dementia was found to be average among health care students but better among final year students in comparison to first year (2.5% of first year and 68.0% of final year students (Nagle et al., 2013; Sharma et al., 2018). There were number of published studies about estimation of knowledge of Alzheimer’s disease among general public (Algahtani et al., 2018; Alqahtani et al., 2017). However, there were limited or lack of data about the evaluation of knowledge of healthcare students in Saudi Arabia. Therefore the present study aimed to evaluate the knowledge of Alzheimer disease among healthcare students from king Saud University, Riyadh, Saudi Arabia.

2. Methods and materials

A cross-sectional study was conducted among a convenience sample of healthcare students from king Saud University Riyadh, Saudi Arabia to evaluate their knowledge about the AD. This study used a questionnaire, in English language, was modified from previously published study (Marasco et al., 2003).

To explore the students’ knowledge about Alzheimer’s disease, a new questionnaire was developed by a research team which composed of 3 members in total, who had wider experience in development and validation of the questionnaire on the basis of the covered items of previously used and published questionnaires (Marasco et al., 2003).

The questionnaire consisted two sections with a total of 22 items. The first part covers demographic such as age, gender and college of studying and consist of multiple-choice. The second part deal with knowledge related questionnaire like goal of disease treatment, neurotransmitter responsible for AD, enzyme catalysis for AD, about diagnosis of AD, signs of AD, and a total of 19 items with multiple choice and true false questionnaire. Once the research tool was prepared, it was sent to independent reviewers. The reviewers were a senior professor in clinical pharmacy, and assistant professor of pharmacy and a researcher in pharmacy practice, who have considerable experience in preparing and designing research questionnaire, opinion and suggestion about the suitability of the questionnaire was collected from review team and made changes according to feedback provided by the review team.

In order to check the validity of the questionnaire pilot study was conducted at college of pharmacy king Saud University under supervision of the investigator for the purpose of evaluating the response of the subject, measuring the validity of the questionnaire, testing the study tools; and choosing the best way for data collection and management. According to the results of the pilot study all the required changes in the study tools were made. The result of the pilot study was not included in the main study. The Cronbach alpha for knowledge questionnaire was found to be 0.733

2.1. Data analysis

Descriptive statistics included frequency percentage, and the means were calculated for each question. Statistical analysis was performed using SPSS version 25. Man-Whitney test and Kruskal-wallis test were applied to explore the association between socio-demographics data and questions at a significant level of 0.05.

3. Results

A total of 671 surveys were collected, among those 142 surveys were incompletely answered by the students, so we excluded those incomplete surveys form he study. A total of 529 students completely filled the survey with a response rate of 79%. More than half were male 291(55%), while 238(45%) were female. Almost two-thirds of them 337 (63.7%) were aged between 18 and 21 years, 141(26.7%) were 22–25 years old, majority of them were belong to pharmacy 223(42.2%), 218(41.2%) medical students, while only 88 (16.36%) were belongs to dental students. see Table 1.

4. Respondent’s responses towards knowledge of Alzheimer disease

All of the respondents 529(100%) revealed that they knew about Alzheimer disease, while 70.1% of the student agreed that they study about Alzheimer disease in their college life, only 16.6% were not studied and 13.2% of them not remember. Most of the respondents 373 (70%) answered correctly and said that Alzheimer disease is related to mental disorders, although majority of 73.5% knew that Alzheimer disease is a Neurodegenerative disease, 48.6% of them thought that Alzheimer genetic disorder, while 19.1% think it is a Autoimmune disease. The majority of them think that the goal of treating Alzheimer disease is to slowdown the progression of the disease (see Tables 2 and 3).

With regards to its correct definition most 63.5% of the responded defined it correctly, when ask about diagnosing Alzheimer 69% of them correctly answered that diagnosis will be done through Mental- status test, about 68% of the respondents correctly identified the Signs of Alzheimer’s as a Confusion with time or place. 26.8% of the respondents correctly drugs used in the treatment of Alzheimer. About 22.9% of the respondents answered correctly for identification of drug, which is effective in improving the Alzheimer patient’s symptoms “by its effect on increasing the levels of Acetylcholine (see Figs. 1 and 2).

5. Discussion

This is the first survey type of study which measures the knowledge of the Saudi healthcare students towards Alzheimer’s disease in a Saudi university, Riyadh Saudi Arabia. To the best of our knowledge, the knowledge of Alzheimer’s disease in Saudi Arabia has not been assessed previously. From the study results it is found that healthcare students have moderate level of knowledge towards Alzheimer disease. However large number of studies from different countries including United States of America (USA)

Table 1 details the demographics of the respondent (n = 529).

| Characteristic, N % |
|--------------------|
| Sex                |
| Male               | 291 | 55.0 |
| Female             | 238 | 45.0 |
| Age                |
| 18–21              | 337 | 63.7 |
| 22–25              | 141 | 26.7 |
| 25–30              | 42  | 7.9  |
| More than 30 years | 9   | 1.7  |
| College            |
| Pharmacy           | 223 | 42.2 |
| Medical            | 218 | 41.2 |
| Dental             | 88  | 16.6 |
revealed that Knowledge deficiencies were common in healthcare students (Nagle et al., 2013; Sharma et al., 2018; Scerri 2017). However similar study conducted in Asian countries reported, average knowledge about Alzheimer disease among healthcare students reported that final year students had a better knowledge in comparison to others (Nagle et al., 2013; Sharma et al., 2018). The present study reported that variations in the knowledge score among involved health specialties in our study medical students had a good knowledge comparing to other streams, similarly pharmacy students found to have good knowledge compared to dental students. This might be possible that medical and pharmacy students covering wide range of topics related to Alzheimer's and its pharmacology in academic curriculum.

Knowledge score was different according to speciality and seniority during their graduation as reported by Brian J. Nagle et al in 2013 who carried out study to measure medical students'

| Variables | N  | %  |
|-----------|----|----|
| Have you studied about Alzheimer disease (AD) in your college? |    |    |
| Yes       | 371| 70.1|
| No        | 88 | 16.6|
| I don't remember | 70 | 13.2|
| From your knowledge what do you think the cause of Alzheimer disease? |    |    |
| Genetic cause | 257| 48.6|
| Hypothyroidism | 58 | 11.0|
| Autoimmune disease | 101| 19.1|
| Not sure | 113| 21.4|
| The pathophysiology of Alzheimer disease is shown to be one of the following? |    |    |
| A misfolding of Alpha-synuclein protein | 83 | 15.7|
| A misfolding of Beta-amyloid protein | 263| 49.7|
| Accumulation of desmin in cardiac cells | 40 | 7.6|
| Not sure | 143| 27.0|
| The neurodegeneration of the neurons is mainly occurring in which of the following? |    |    |
| Dopaminergic neurons | 181| 34.2|
| Cholinergic neuron | 138| 26.1|
| Serotonergic neuron | 55 | 10.4|
| Not sure | 155| 29.3|
| By which of the following enzymes that catalyze protein cleavage is thought to be the bad cleavage enzyme? |    |    |
| Alpha-secretase | 97 | 18.3|
| Beta-secretase | 207| 39.1|
| Not sure | 225| 42.5|
| Enhancing the phosphorylation of tau protein is thought to be one of the treatments mechanisms |    |    |
| True | – | –|
| False | – | –|
| Not sure | 247| 46.7|
| If the misfolding and the accumulation of β-Amyloid protein become uncontrollable; the neuron cell will undergo |    |    |
| Necrosis | 156| 29.5|
| Apoptosis | 214| 40.5|
| Not sure | 159| 30.1|
| Alzheimer disease can be defined by one of the following statements |    |    |
| A loss of cognitive ability (mental process) such as memory, attention, solving problems, understanding language and making decisions. | 336| 63.5|
| A condition in which the heart beat is irregular | 33 | 6.2|
| A chronic autoimmune neuromuscular disease that causes weakness in the skeletal muscles, which are responsible for breathing and moving parts of the body, including the arms and legs | 18 | 3.4|
| A chronic progressive neurological disease chiefly of later life that is linked to decreased dopamine production in the substantia nigra and is marked especially by tremor of resting muscles, rigidity, slowness of movement, impaired balance, and a shuffling gait | 53 | 10.0|
| Not sure | 89 | 16.8|
| Increasing the level of one of the neurotransmitter will improve the symptoms of Alzheimer patients? |    |    |
| Dopamine | 140| 26.5|
| Acetylcholine | 183| 34.6|
| Serotonin | 47 | 8.9|
| Glutamate | 26 | 4.9|
| Not sure | 133| 25.1|
| Which of the following drugs is known to be effective in improving the Alzheimer patient's symptoms “by its effect on increasing the levels of Acetylcholine”? |    |    |
| Rotigotine | 78 | 14.7|
| Donepezil | 121| 22.9|
| Muscimol | 48 | 9.1|
| Bicuculline | 33 | 6.2|
| Not sure | 249| 47.1|
| One or all of the following drugs is thought to increase the level Acetylcholine? |    |    |
| Rivastigmine | 73 | 13.8|
| Galantamine | 51 | 9.6|
| All of the above | 142| 26.8|
| None of the above | 36 | 6.8|
| Not sure | 227| 42.9|
knowledge of Alzheimer disease. The author reported that only 2.5% of junior and 68.0% of senior students correctly scored on the knowledge scale (Nagle et al., 2013). Previous studies also reported that Knowledge deficiencies were common in final year medical students (Nagle et al., 2013; Alkhunizan et al., 2018; Sharma et al., 2018). This might be due to they were admitted or joined newly in the graduation courses for this they might be have lesser knowledge as comparing to other levels students. However in our study medicals students tend to have greater levels of knowledge. This finding is not uncommon as medical students were go through additional lectures and lengthy courses comparing to other stream. This might be same cause between the dental and pharmacy courses. Our study highlighted the importance and need of continuing education among health Care students in the aspects of major chronic diseases such as Alzheimer is needed. Further more training of health care students in the management of Alzheimer is essential, to overcome the burden of disease in health care system.

Dementia education has been proven of improving dementia knowledge particularly for health care providers (Wang et al., 2018; Smyth et al., 2013). An intervention study was published used numerous dementia education programs and resources to investigate their effectiveness on increase knowledge of dementia. These education programs involved an information video and a pamphlet for a one-hour lecture focus on the knowledge of dementia measure, physiology of dementia, common behaviors report in dementia and management of behaviors. The results of this study showed that improved knowledge of dementia after education programs (Smyth et al., 2013). Although this study was assessed the knowledge of health students of a single University. In KSA there were number of university under different regions in country which have their own curriculum. A national level study with large sample among of various universities students would give a better picture of the scenario.

### 6. Conclusion

Saudi healthcare students have variation in knowledge about AD. The knowledge score was lower in dental students comparing to medical and pharmacy. To increase the levels of knowledge, it is necessary to provide adequate additional lectures and other educational Programme are needed in healthcare colleges in Saudi Arabia. Also A better understanding of risk factors of AD which may self-harm to the patients or individuals is needed. We suggest further studies with large sample sizes to identify the effectiveness of AD education programs healthcare schools are warranted.
Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

Alzheimer’s disease International, 2015. World Alzheimer’s Report 2015 [Internet]. Alzheimer Disease International [Cited 2019 March 28].
Alzheimer’s disease International, 2015. “World Alzheimer Report 2015,” in The Global Impact of Dementia: An Analysis of Prevalence, Incidence, Cost and Trends. Available online at: https://www.alz.co.uk/research/world-report-2015 (accessed April 1, 2019).
Alkhunizan, M., Alkhunizan, A., Basudan, L., 2018. Prevalence of mild cognitive impairment and dementia in Saudi Arabia: a community-based study. Dement Geriatr. Cogn. Disord. Extra. 8, 98–103.
Alqahtani, H., Shirah, B., Alhazmi, A., Alshareef, A., Bajunaid, M., Samman, A., 2018. Perception and attitude of the general population towards Alzheimer’s disease in Jeddah, Saudi Arabia. Acta Neurol. Belg. 12, 1–8.
Alqahtani, A., Alqahtani, M., Zarbah, A., AlAhmari, T., Alhazzani, A., 2017. Public awareness, knowledge and attitude toward Alzheimer’s disease in Aseer region, Saudi Arabia-community based cross sectional study. Neurology 88 (P1), 696.
Bature, F., Guinn, B.A., Pang, D., Pappas, Y., 2017. Signs and symptoms preceding the diagnosis of Alzheimer’s disease: a systematic scoping review of literature from 1937 to 2016. BMJ Open 7 (8) e015746.
Maraico, R., Heely, J.A., Gardner, M., 2003. The pharmacist’s role in managing patients with Alzheimer’s disease. J. Am. Pharm. Assoc 43, S20–S21.
Nagle, B.J., Usita, P.M., Edland, S.D., 2013. United States medical students’ knowledge of Alzheimer disease. J. Educ. Eval. Health Prof. 10, 4.
Nichols, E., Szoeke, C.E., Vollset, S.E., Abbasi, N., Abd-Allah, F., Abdel, A., Aichou, M. T., Akinyemi, R.O., Alahdab, F., Asgedom, S.W., Awasith, A., 2019. Global, regional, and national burden of Alzheimer’s disease and other dementias, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurol. 18, 88–106.
Ridha, B.H., Barnes, J., Bartlett, J.W., et al., 2006. Tracking atrophy progression in familial Alzheimer’s disease: a serial MRI study. Lancet Neurol. 5, 828–834.
Sharma, R., Sharma, S.C., Pradhan, S.N., Chalise, P., Paudel, L., 2018. Knowledge of Alzheimer’s disease among medical students of a medical college. J. Nepal. Med. Assoc. 56, 666–669.
Scerri, C., 2017. Knowledge of Alzheimer’s disease and training needs in final year medical and pharmacy students. J. Aging Res. Clin. Pract. 6, 9–13.
Smyth, W., Fielding, E., Beattie, E., Gardner, A., Moyle, W., Franklin, S., Hines, S., MacAndrew, M., 2013. A survey-based study of knowledge of Alzheimer’s disease among health care staff. BMC Geriatrics 13, 2.
Wang, Y., Xiao, L.D., Luo, Y., Xiao, S.Y., Whitehead, C., Davies, O., 2018. Community health professionals’ dementia knowledge, attitudes and care approach: a cross-sectional survey in Changsha China. BMC Geriatrics 18, 122.
Williams, C.P., 2013. Mapping the brain’s decline. Nature 502, 84–85.