

Knowledge and Attitudes Towards Elderly People and Their Care Among Medical Students of Melaka-Manipal Medical College, a Cross Sectional Study

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Abstract

Geriatric care has an important role in the population due to the increase in the number of older people. This geriatric care correlates with knowledge and attitudes among medical students. We investigated factors affecting medical students' knowledge and attitudes towards geriatric care and association between sociodemographic factors and the perception of the medical students towards the elderly and their care is done. Purposive sampling was used to recruit 125 undergraduate medical students in Melaka Manipal Medical College for this cross sectional study using Facts on Aging Quiz 1 (FAQ1) and University of California at Los Angeles (UCLA) Geriatric Attitudes Scale as too. Among 125 undergraduate medical students, the mean knowledge percentage was 58%, thus giving a standard deviation of 10%. While the mean for attitudes score was 51.69 out of 70, thus giving standard deviation of 6.47. Majority of the medical students had a moderate knowledge and positive attitudes towards geriatric care. Students who had experience in taking care of the elderly and exposure to the geriatric medicine had significantly higher attitude scores ($P < 0.05$). The majority of medical students involved in this study had positive attitudes towards the elderly, however, they lack related knowledge about the elderly and aging.

Keywords

Knowledge, Attitudes, Elderly People, Medical Students, Malaysia

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1. Introduction

The world's population is ageing: elderly age group is increasing in number in every part of the world, with inference to for many sectors of society, including the health care sector. [1] A study done by the United Nations in the year 2017, estimated the world's geriatric population aged more than 60 years, being 962 million in number, which is twice as the geriatric population in the year 1980 when the global elderly population was 382 million in number. [1] Moreover, the global geriatric population is estimated to be doubled by 2050, predicted to reach over 2.1 billion. [1] With

the growing population of elderly persons, their implications on the health care sector will only be widened. Nonetheless, various studies done over the years have proven that there is a scarcity of geriatricians to provide care for the growing population of elderly generation. [2]

As apparent by the present situation of scarcity of geriatricians, studies that have been done in different parts of the world have concluded that, most medical students do not show much interest in pursuing geriatric medicine, even though they have a positive attitude towards elderly persons. [2] Negative attitude and prejudice towards the elderly may frequently produce displeasing medical care and with the

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increasing older population it is important to raise awareness of having a positive attitude towards the elderly among every health care provider. [3] In addition, many previous literatures also show that many of the medical students have unsatisfactory knowledge about aging with mixed attitudes towards the older generation and their care. [4]

The diagnosis and treatment of elderly needs specific knowledge and well developed skill sets that are acquired throughout medical education from the medical colleges and post graduate training. [5] In order to improve the geriatric care, it is important to understand the factors that affect the attitude of health care workers towards the elderly and their knowledge on aging. In this study, medical students' attitude and knowledge are surveyed in hope of improving the future care of the growing elderly population.

Various studies have been done to investigate different factors that contribute to medical students' attitudes and knowledge towards geriatric care. The majority of studies investigating relationships between race and attitudes, and age and attitudes reported that there was no significant relationship between these variables. Where a relationship between attitudes and age was reported, studies often did not recognize the likelihood of multi-collinear associations between age and other variables (e.g. years in medical school) and may therefore have violated statistical test assumptions. [6] Plus, age and gender seem to affect the development of attitudes towards the elderly. [7]

Education seems to have either a positive or a negative influence to the attitudes of health care givers. [7] On the whole, variables related to stage of education or career, previous education in, and clinical experience of geriatric medicine did not appear to be related to the attitudes of medical students and doctors toward older patients. There is a report stating that doctors' attitude scores were significantly associated with the attitude scores of teaching faculty members at their residency (training) programmes. [6] Well-established knowledge on gerontological medicine, as well as experience on geriatric care seems to influence positively medical student's attitudes towards the elderly. [7] Educational interventions designed to change attitudes and increase knowledge about the elderly have been investigated in many studies, and their effects measured. These studies provided evidence that such interventions may improve medical students' attitudes, but positive effects were not consistently found, and effect sizes were small. [8] One systematic review that has been done found that medical students exposed to education on aging have positive attitudes towards older patients. Furthermore, one survey done unanimously on medical students showed that they perceived ageism as an important area of change to foster more effective communication when treating older patients.

[9] However, other research finding suggests that geriatrics-related educational interventions can improve student attitudes toward elderly persons and increase students' willingness to cure for geriatric patients in their future practices. [10]

In addition, clinical experience of medical students with the elderly seems very important in shaping student's attitudes towards treating them. Another important aspect is continuing education in order to alleviate social misconception about aging. [7] Various studies have shown that training in geriatrics has a positive effect on the attitude of staff. In fact, mere exposure to certain groups of older people is beneficial. There is a more positive attitude toward the care of the elderly among students in a geriatric ward than among those in a general ward. Older students with their grandparents as their role models also have better attitudes toward older people. Improved training and exposure to older people may raise the status of geriatrics. Improved status may have a positive impact on attitude, which encourages more people to enter the field, and in turn give a lot of benefit to the elderly. [11] Thus, it appears likely that the quality of exposure or relationships with the elderly may be related to attitude scores among medical students. [6]

Even though there has been a continuous increase in geriatric population, it has been reported that only a few percentage of medical students are interested in geriatric medicine. Medical students usually do not find taking care of the elderly as an attractive career choice. An interest in the geriatric population was positively correlated with a willingness to enter the gerontology field, suggesting that students with an interest in the geriatric population are 4.5- fold more likely to choose a career in gerontology than students without an interest towards older people. [12] It was also found that better attitudes were associated with a greater interest in geriatric medicine as a career. One study found that only 20% of first-year medical students considered pursuing a career in geriatrics, and this eventually decreased to 16% in the second year of their studies. They also concluded that a lot of students decided their postgraduate specialty as early in their third year of medical school. [13] One of the main reasons is because there is no geriatric content within pre-graduate medical course at medical universities. [14] Expert opinion can be found in the literature addressing the issue of lack of interest in geriatrics. The main reasons that are highlighted are (lack of) exposure to the course, finances and status, and also the nature of the work. Talking about exposure, both an insufficient exposure to geriatrics and the lack of positive role models are said to contribute to the students' lack of interest in pursuing a career in gerontology. Furthermore, it is a well-known fact that there are less faculty members to teach, the lack of visibility of research programmes

compared with other specialties, and insufficiency of trained leaders in geriatrics are also said to contribute to this problem. [15]

A lot of studies have concluded that, compared to the average population, medical students display an increased negative attitude towards the elderly. For this reason, it is important that some features are taught during the medical population in school related to the diagnosis and treatment of the elderly. [16] The growth of the geriatric population in Malaysia has been continuously increasing since the 1970s and by the year 2040, the geriatric population is expected to triple from 2.0 million to 6.0 million. [17] In one study that was conducted among healthcare students in Malaysia, it was found that a lot of them have a good knowledge about aging. [18] Malaysia has seen a rapid increase in the number of medical colleges during the first decade of this millennium. However, out of 34 registered medical courses, only a few universities include geriatric medicine in their undergraduate curriculum. Other universities replace geriatrics modules with nursing home visits which may further tarnish the image of geriatric medicine. [19] Thus, geriatric medicine needs to be firmly embedded in both undergraduate and postgraduate curricula so that current and future generations of health care professionals develop better skills to care and treat the older patient. [20] Curricular deficiencies are likely to have a bad impact on students' knowledge of and attitudes towards geriatric medicine and their ability to effectively engage with older adults. [21] As far as we know, only a few studies have been conducted on medical students' attitudes towards the elderly in Malaysia. We thus sought to study this potentially important aspect of patient care among our future doctors.

The significant increase in the size of the geriatric population, which is also known as the population aged 65 years and above has been on the most remarkable demographic trends all over the world. The growth of the geriatric population in Malaysia has been steadily increasing since the 1970s and the size is expected to triple from 2.0 million today to 6.0 million by the year 2040. [22] Several studies have been conducted regarding the attitudes of medical students towards the geriatric population. From reviewing these studies, the results are rather inconsistent. In a study done on beginning medical school students from five different medical schools in California, it is shown that these students have already formed some negative attitudes towards the elderly. A 70-year-old patient has been rated as more ineffectual, dependent, and personally intolerable when compared to a 35-year-old patient. [23] Another study among first year medical students and fourth year medical students in September 2005 showed that these students have a positive attitude towards the geriatric population.

Besides that, it is concluded that the fourth year medical

students have a more positive perception towards the elderly compared to the first year medical students. [23] Similarly, it has also been discovered that osteopathic medical students are more focused towards providing primary-care, showing decreased interest towards geriatric care. [24] With the increasing trend of the size of the geriatric population, it is imperative that this population is provided with high quality geriatric care. It has been suggested by recent forecasts that there will be a large demand in predominantly primary care physicians, to provide quality care to the elderly. [25] In order to ensure proper geriatric care is provided to the elderly, geriatric medicine should be an aspect in undergraduate medical education. [26] A few studies about the attitudes of medical students towards the geriatric population have been conducted in Asia, therefore we thought that it is important to study the perceptions of medical students in Melaka Manipal Medical College towards the elderly.

1.1. Research Question

Are the students of Melaka Manipal Medical College knowledgeable about elderly people and their care and what are their attitudes towards the elderly and their care?

1.2. Research Objectives

To study the knowledge of medical students of Melaka-Manipal Medical College about the elderly and their care.

To study the attitudes of medical students of Melaka-Manipal Medical College towards the elderly and their care.

To establish an association between gender, age, ethnicity, year of study, type of family and the perceptions of the medical students towards the elderly and their care.

To find out whether frequent exposure and past relationships with the elderly produces a positive attitude towards the elderly.

1.3. Research Hypothesis

There is an association between gender, age, ethnicity, year of study, type of family, frequency of exposure to the elderly, and past relationships with the elderly and the attitudes towards them and their care.

2. Methodology

2.1. Study Design, Time, Setting, Population

A cross-sectional study was conducted from January to February 2020 in our college,

Melaka-Manipal Medical College, Malaysia. Our college has two campuses; one based in Muar, Johor and the other is

based in Malacca. The Muar campus offers Bachelor of Medicine and Bachelor of Surgery (MBBS) Semester 6 and 7, while the Malacca campus offers Bachelor of Dental Surgery (BDS), Foundation in Science (FIS) and MBBS Semester 8, 9 and 10. This study aims to determine the knowledge and attitudes of medical students towards the geriatric population and their care, and therefore a study population of 600 medical students from MMMC was selected.

2.2. Sample Size

The sample size was calculated using a sample size calculator from the application Epi Info called StatCalc. The minimum sample size needed was calculated as shown below:

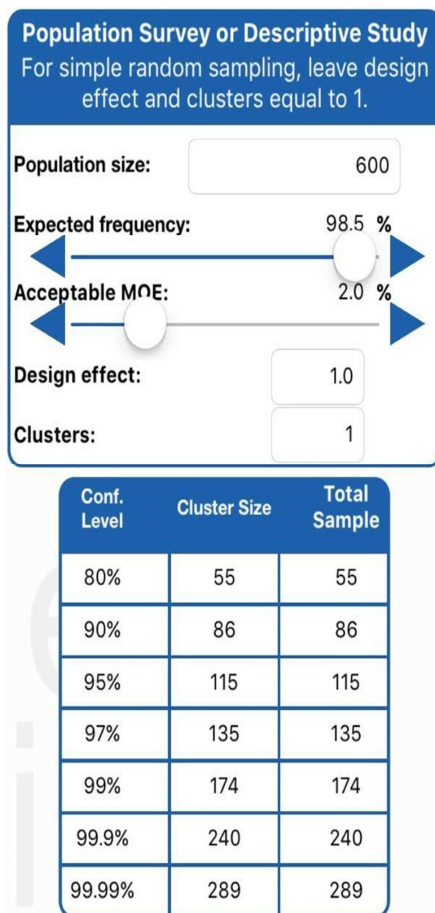


Figure 1. Calculation of minimum sample size.

Application used: Epi Info - StatCalc

Population size: 600

Expected frequency: 98.5% (Percentage of positive attitude among medical students in China) [12]

Acceptable Margin of Error: 2.0%

Minimum sample size with 95% confidence level: 115

$$n_{sample\ size} = \frac{n_{calculated}}{1 - nonresponse\ rate(\%)}$$

$$n_{sample\ size} = \frac{115}{1 - 0.1} = 128$$

The minimum sample size calculated using the application was 115. However, after calculating the non-response rate of 10%, the final sample size obtained for the study was 128.

2.3. Sampling

The inclusion criteria for this cross-sectional study were Year 3 medical students of MMMC who were willing to give consent to participate in the study and also students present at the time of distribution of questionnaires. The exclusion criteria included BDS students, students who were absent at the time of distribution of questionnaires, incomplete answering of the questionnaires and those participants who did not give informed consent.

The sampling method used in this study was purposive sampling which is a non-probability sampling method. The questionnaires were distributed early in the morning before the commencement of classes.

2.4. Data Collection

The participants of the study were given a questionnaire that was distributed with proper instructions and were to be answered independently. The questionnaire consisted of four parts that were designed to assess students' personal contact and relationship with elderly and their attitude and knowledge towards the elderly population.

The first part of the questionnaire gathered demographic data of each individual such as gender, age, ethnicity, nationality, religion, year of study, type of family (nuclear or extended) and the monthly family income.

The second part of the questionnaire assessed personal contact with elderly which was taken from the previous study. [25] This part included the following aspects. (a) Living with grandparents, (b) the frequency of visiting grandparents for those who do not stay with them, (c) their relationship with elderly, (d) previous experience of taking care of ill elderly patients or family members and (e) their relationship with the elderly at home.

The survey also measured the association between the students' attitude and their previous exposure to volunteering activities. Furthermore, the exposure to geriatric medicine in their curriculum and the tendency to take up geriatric medicine in the future were also assessed.

The attitude towards the elderly were assessed by using the University of California at Los Angeles (UCLA) Geriatric Attitudes Scale. [4] It consisted of 14 questions that were designed to assess the general impression on elderly persons, personal economic concerns on geriatric groups, and

measured the individuals' attitude towards the elderly and their care, more globally. Five of these 14 statements were positive sentiments and 9 were negative sentiments. Each statement was given five options, and one to be chosen, from strongly disagree, somewhat disagree, neutral, agree, to strongly agree. Points from 5 to 1 were given accordingly. The negative statements were given reverse scoring. Total score was calculated and the higher score indicated a better attitude towards elderly.

The factual knowledge on aging among the medical students was assessed by using the Facts on Ageing Quiz 1 (FAQ1). [12] It consisted of 36 true or false statements modified to coordinate with the knowledge of medical students. The correct answer was scored 1 mark while the wrong answer

was scored 0 mark. The percentage correct score was used as the measurement of knowledge on elderly and ageing. Higher scores complemented with better understanding about ageing and elderly persons.

2.5. Data Processing and Data Analysis

The data was then processed using Microsoft Excel and analysed using Epi Info V7.2.2.6. The frequency and percentage for qualitative data such as gender, ethnicity, nationality, religion were calculated. The mean, standard deviation, minimum and maximum values of quantitative data such as age, the knowledge score and attitudes score were derived. Odds ratio was used to measure the association between the variables. The level of significance was set as 0.05.

Table 1. Independent variable, dependent variable and statistical testing used in the study.

Independent variable	Dependent variable	Statistical Testing
Religion	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Ethnicity	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Gender	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Type of family	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Living with the elderly	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Frequency of exposure to the elderly	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Past relationships with the elderly	Knowledge and attitudes towards the geriatric population and care	Chi-square test
Experience in taking care of an ill elderly patient	Knowledge and attitudes towards the geriatric population and their care	Chi-square test
Involvement in volunteer activity	Knowledge and attitudes towards the geriatric population and their care	Chi-square test
Exposure to geriatric medicine	Knowledge and attitudes towards the geriatric population and their care	Chi-square test
Interest in taking up geriatric medicine	Knowledge and attitudes towards geriatric population and their care	Chi-square test
Knowledge percentage	Attitude score	Linear regression

2.6. Ethical Consideration

This research was approved by the Research Ethics Committee, Faculty of Medicine,

Melaka-Manipal Medical College, Malaysia. This study complied with the principles of informed consent and respect for privacy, thus participants involved in this study will not be traceable. The nature, objectives, methods, and confidentiality of the study were explained to students. The survey was conducted only after the students were told that participation in the study was completely voluntary and after they gave their written consent. This study complied with the principle of harmlessness; the scale used has good reliability and validity, fewer items, clear description, comprehensibility, and easy selection; thus, we considered that completing the survey would not cause any psychological and physiological damage.

3. Result

Table 2. Sociodemographic characteristics of undergraduate students (n=125).

Variables	n(%)
Gender	
Male	44 (35.2)

Variables	n(%)
Female	81 (64.8)
Age	
21-22	81 (64.8)
23-24	43 (34.4)
>25	1 (0.8)
Ethnicity	
Chinese	39 (31.2)
Indian	43 (34.4)
Malay	26 (20.8)
Others	17 (13.6)
Nationality	
Malaysian	121 (96.8)
International	4 (3.2)
Religion	
Buddhist	32 (25.6)
Christian	21 (16.8)
Hindu	35 (28.0)
Islam	31 (24.8)
Sikh	6 (4.8)
Type of family	
Nuclear	104 (83.8)
Extended	20 (16.1)
Household income	
<RM5000	36 (28.8)
RM5000-RM10000	37 (29.6)
RM10000-RM15000	19 (15.2)
>RM15000	33 (26.4)
Lives with grandparents	
Yes	27 (21.6)
No	98 (78.4)
For those who do not live with their grandparents; frequency of visiting grandparents	

Variables	n(%)
Once a week	26 (26.8)
Once a month	24 (24.7)
Twice a year or more	47 (48.5)
Relationship with elderly at home	
Good	116 (92.8)
Poor	9 (7.2)
Experience in taking care of an ill elderly person	
Yes	84 (67.2)
No	41 (32.8)
Previous participation in volunteer activities	
Yes	100 (80.0)
No	25 (20.0)
Exposure to geriatric medicine	
Yes	32 (25.6)
No	93 (74.4)
Interested in taking up geriatric medicine in the future	
Yes	33 (26.4)
No	92 (73.6)

The above table shows the sociodemographic data of students under the study and a few aspects of their personal contact with elderly persons. A total of 125 students participated in the study in which 64.8% was female and were between the ages of 21-22. 96.8% of the study sample consisted of Malaysian students while the remaining were international students. 78.4% of the individuals under the study did not live with their grandparents while 92.8% of all students stated to have a good relationship with elderly at home. 67.2% of the students stated that they had prior experience in taking care of elderly. It was found out that, only 26.4% of all students were willing to take up geriatric care in the future while 73.6% did not show any interest in taking up geriatric medicine in the future.

Table 3. Knowledge of students towards the geriatric population and their care.

No	Statement	Correct response, n (%)
1.	The majority of old people (past 65) have Alzheimer’s disease.	79 (63.29%)
2.	As people grow older, their intelligence declines significantly.	86 (68.80%)
3.	It is very difficult for older adults to learn new things.	50 (40.00%)
4.	Personality changes with age.	20 (16.00%)
5.	As adults grow older, reaction time increases.	84 (67.20%)
6.	Clinical depression occurs more frequently in older than younger people.	64 (51.20%)
7.	Older adults are at risk for HIV/AIDS	26 (20.80%)
8.	Alcoholism and alcohol abuse are significantly greater problems in the adult population over age 65 than that under 65.	107 (85.60%)
9.	Older adults have more trouble sleeping than younger adults do.	91 (72.80%)
10.	Older adults have the highest suicide rate at any age group.	106 (84.80%)
11.	Older people perspire less, so they are more likely to suffer from hyperthermia.	54 (43.20%)
12.	Most old people lose interest in and capacity for sexual relations.	27 (21.60%)
13.	Bladder capacity decreases with age, which leads to frequent urination.	107 (85.60%)
14.	Kidney function is not affected by age.	108 (86.40%)
15.	Increases problems with constipation represent a normal change as people get older.	37 (29.60%)
16.	As people live longer, they face fewer acute conditions and more chronic health conditions.	83 (66.40%)
17.	Retirement is often detrimental to health- i.e people frequently seem to become ill or die soon after retirement	83 (66.40%)
18.	Most older people are living in nursing homes.	86 (68.80%)
19.	The modern family no longer takes care of its elderly.	75 (60.00%)
20.	Living below or near the poverty level is no longer a significant problem for most older Malaysian.	85 (68.00%)
21.	Most older drivers are quite capable of safely operating a motor vehicle.	77 (61.60%)
22.	Most old people are set in their ways and unable to change.	27 (21.60%)
23.	The majority of old people are bored.	64 (51.20%)
24.	In general, most old people are pretty much alike.	67 (53.60%)
25.	Older adults (65+) have higher rates of criminal victimisation than adults under 65 do.	79 (63.20%)
26.	Older adults (65+) are more fearful of crime than are persons under 65.	43 (34.40%)
27.	Older people do not adapt as well as younger age groups when they relocate to a new environment.	19 (15.20%)
28.	Participation in volunteering through organisations (e.g churches and club) tends to decline among older adults.	77 (61.60%)
29.	Older people are much happier if they are allowed to disengage from society.	89 (71.20%)
30.	Geriatrics is a specialty in Malaysian Medicine.	99 (79.20%)
31.	Abuse of older adults is not a significant problem in Malaysia.	93 (74.40%)
32.	Grandparents today take less responsibility for rearing grandchildren than ever before.	85 (68.00%)
33.	Older people take longer to recover from physical and psychological stress.	115 (92.00%)
34.	Most older adults consider their health to be good or excellent.	70 (56.00%)
35.	Older females exhibit better health care practices than older males.	79 (63.20%)
36.	Research has shown that old age truly begins at 65.	48 (38.40%)

Table 3 shows the knowledge medical students possess about the geriatric population and their care, along with responses of true and false to the provided statements. Out of the 36 statements about the elderly that were posed to the students, 28 out of the 36 statements were answered accurately by the majority of the participants. 8 out of the 36 statements were answered correctly by less than 35% of the participants. This

evidently shows that the majority of the medical students are fairly knowledgeable about the geriatric population and their care. The highest correctly answered question is statement 33 in which 92.0% of the students have answered this statement correctly. However the question with the lowest percentage of true response is in question 27, whereby only 15.2% of the participants have answered this statement correctly.

Table 4. Attitudes of medical students towards the geriatric population and their care.

Item	Strongly Disagree n(%)	Somewhat Disagree n(%)	Somewhat Neutral n(%)	Agree n(%)	Strongly Agree n(%)
1. As people grow older, they become less organised and more confused.	4 (3.20%)	23 (18.40%)	59 (47.20%)	38 (30.40%)	1 (0.80%)
2. Elderly patients tend to be more appreciative of health care compared to younger patients.	1 (0.80%)	11 (8.80%)	30 (24.00%)	61 (48.80%)	22 (17.60%)
3. I tend to pay more attention and have more sympathy towards my elderly patients than my younger patients.	1 (0.80%)	11 (8.80%)	45 (36.00%)	48 (38.40%)	20 (16.00%)
4. If I had the choice, I would rather see younger patients than elderly ones.	27 (21.60%)	35 (28.00%)	47 (37.60%)	16 (12.80%)	0
5. In general, old people act too slowly for modern society.	13 (10.40%)	36 (28.80%)	62 (49.60%)	14 (11.20%)	0
6. It is interesting listening to old people's accounts of past experiences.	0	5 (4.00%)	16 (12.80%)	46 (36.80%)	58 (46.40%)
7. It is society's responsibility to provide care for its elderly people.	0	5 (4.00%)	19 (15.20%)	49 (39.20%)	52 (41.60%)
8. Medical care for old people uses up too much human and material resources.	33 (26.40%)	45 (36.00%)	35 (28.00%)	10 (8.00%)	2 (1.60%)
9. Most old people are pleasant to be with.	1 (0.80%)	4 (3.20%)	47 (37.60%)	48 (38.40%)	25 (20.00%)
10. Old people don't contribute their fair share towards paying for health care.	33 (26.40%)	40 (32.00%)	43 (34.40%)	9 (7.20%)	0
11. Old people in general do not contribute much to society.	45 (36.00%)	47 (37.60%)	27 (21.60%)	5 (4.00%)	1 (0.80%)
12. Taking a history from elderly patients is frequently an ordeal.	13 (10.40%)	22 (17.60%)	68 (54.40%)	21 (16.80%)	1 (0.80%)
13. The government should reallocate money from aged care to research on AIDS, cancer, or paediatric diseases.	30 (24.00%)	30 (24.00%)	38 (30.40%)	19 (15.20%)	8 (6.40%)
14. Treatment of chronically ill old patients is hopeless.	49 (39.20%)	51 (40.80%)	17 (13.60%)	6 (4.80%)	2 (1.60%)

Table 4 shows the distribution of students' opinions regarding geriatric, with responses rated on a scale of 1-5, with 1=agree and 5=disagree for all 14 items. Most students showed positive attitudes towards older people and geriatric patient care and a number of students chose to be neutral.

Half of the students chose to be neutral for the first item which states whether older people become more disorganized and confused as they age.

Item 3, 4 and 14 shows that students have favourable opinions regarding the treatment of the geriatric population. For example, 68 out of 125 students agreed when they were asked whether they tend to be more attentive towards older patients compared to younger patients. Plus, half of the students showed disagreement for the third item which states whether they rather choose to see younger patients than older patients. A larger number of students (100 out of 125 students) also believed that treatment of chronically ill old patients is not hopeless.

Regarding health care of geriatric population, most of the students showed favourable attitudes. For example, more than half of students chose to disagree with item number 8, 10 and 13 which state that older people didn't contribute fairly in paying their healthcare and the resources for geriatric healthcare should be transferred to other departments.

For the social aspect of this scale, most of the students showed a positive attitude while some chose to stay neutral. 80% of students agreed that listening to older people's past experience is interesting. 58% of students agreed that older people are pleasant to be with and 37% chose to stay neutral for this statement. Furthermore, more than half of students disagreed that older people didn't contribute much to society. However, for item number 5 which states that older people are too slow for modern society, half of the students chose to be neutral while only a few disagreed.

Table 5. The mean, standard deviation, minimum and maximum values for knowledge percentage and attitude score.

Dependent Variables	Mean (SD)	Minimum-Maximum Value
Knowledge Percentage (0-100)	58 (10.0)	33.0 - 78.0
Attitude Score (14-70)	51.69 (6.47)	33.00-69.00

Table 5 shows the mean for knowledge percentage is 58.0, thus giving a standard deviation of 10.0. The minimum-maximum value is noted to be 33.0-78.0. For attitude score,

the mean is 51.69, thus giving a standard deviation of 6.47. Its minimum-maximum value is 33.0-69.0.

Table 6. Association between the independent variables and knowledge about aging.

Independent variables	Knowledge percentage mean (SD)	P value
Gender		
Male	58.71 (10.6)	0.349

Independent variables	Knowledge percentage mean (SD)	P value
female	56.92 (9.9)	
Ethnicity		
Malay	55.66 (9.5)	
Chinese	57.34 (10.8)	0.692
Indian	58.60 (10.60)	
Other	55.33 (8.6)	
Nationality		
Malaysian	57.5 (10.1)	0.769
International	59.02 (11.6)	
Religion		
Islam	54.93 (9.3)	
Buddhist	58.59 (10.1)	
Christian	57.14 (11.7)	0.397
Hindu	58.33 (10.3)	
Others	62.50 (5.8)	
Type of family		
Extended	55.83 (11.2)	0.418
Nuclear	57.85 (9.9)	
Household income		
<RM5000	55.25 (9.8)	
RM5000-RM10000	61.28 (9.6)	0.079
RM10000-RM15000	56.14 (10.2)	
>RM15000	57.21 (10.3)	
Lives with grandparents		
Yes	56.89 (11.5)	0.703
No	57.74 (9.8)	
For those who do not live with their grandparents; frequency of visiting grandparents.		
Once a week	58.79 (11.3)	
Once a month	55.21 (8.0)	0.259
Twice a year or more	58.52 (9.8)	
Relationship with elderly at home		
Good	57.52 (10.3)	0.886
Poor	58.02 (8.9)	
Experience in taking care of an ill elderly person		
Yes	58.56 (9.1)	0.111
No	55.49 (11.8)	
Previous participation in volunteer activities		
Yes	57.27 (10.5)	0.542
No	58.67 (8.1)	
Exposure to geriatric medicine		
Yes	55.46 (11.1)	0.178
No	58.27 (9.7)	
Interest in taking up geriatric medicine in the future		
Yes	57.57 (9.0)	0.989
No	57.54 (10.5)	

Based on the results obtained in Table 6, there was no significant association found between the independent variables and the knowledge of aging. It was discovered that males have higher knowledge about aging when compared to the female population as the male medical students have a mean score of 58.71 (10.6) compared to the females who have a mean score of 56.92 (9.9). Among the ethnicity groups, it was found that the Indians have the highest mean score of 58.60 (10.6), followed by the Chinese with a mean score of 57.34 (10.8), the Malays with a mean score of 55.66 (9.5), and lastly other ethnic groups with a mean score of 55.33 (8.6). With respect to the nationality of the participants, It was found that the international medical students have higher knowledge compared to the Malaysian students as they have a mean score of 59.02 (11.6) compared to the Malaysians who have a mean score of 57.50 (10.1). Besides

that, it was found that the others religion have the highest mean score that is 62.5 (5.8), followed by the Hindus with a mean score of 58.33 (10.3), the Buddhists who have a mean score of 58.59 (10.1), the Christians, 57.14 (11.7) and lastly the Muslim students with a mean score of 54.93 (9.5). This study also discovered that participants who have a nuclear family are more knowledgeable about the elderly. It was found that students hailing from a nuclear family have a mean score of 57.85 (9.9) compared to those who have an extended family 55.83 (11.2). In terms of household income, it was found that the students who have a household income of RM5000-RM10000 are the most knowledgeable with a mean score of 61.25 (9.6), followed by participants with a household income of >RM15000 with a mean score of 57.21 (10.3), students with a household income of RM10000-RM15000 have a mean score of 56.14 (10.2) and lastly

students with a household income of less than RM5000 have a mean score of 55.25 (9.8). Moreover, it was found by this study that students who do not live with their grandparents have a higher mean score which is 57.74 (9.8) when compared to the participants who live with their grandparents, 56.89 (11.5). This shows that those who do not live with their grandparents are more knowledgeable about the geriatric population compared to those who do. It was found out that the students who visited their grandparents as often as once a week and the students who visited them less frequently as twice a year as well had an average percentage knowledge score of 58%. The students who stated to have a poor relationship with elderly at home scored a mean of 58.02%(8.9) while the students who stated to have a better relationship with the elderly at home scored a mean of 57.52% (10.3) Furthermore, the students who had prior experience in taking care of elderly, had a mean knowledge score of 58.56% (9.1) while the participants who did not have any prior experience in taking care of the elderly had a, mean knowledge score of 55.49% (11.8) However, the students who stated to have prior exposure to volunteer activities, achieved a mean score of 57.27% (10.5) whilst the students who did not have any prior exposure to volunteer activities scored a mean of 58.67% (8.1) Moreover, the students who were not exposed to geriatric medicine in their curriculum had a mean score of 58.27 (9.7) while the students who were exposed to geriatric medicine, had a mean percentage score of 55.46 (11.1) Lastly, the students who were willing to pursue geriatric medicine in the future and the students who were not interested in geriatric medicine as a career choice showed a mean knowledge score of 57.57% (9.0) and 57.54% (10.5) as well.

Table 7. Association between sociodemographic characteristics and attitude towards geriatric care.

Independent variables	Attitude Score Mean (SD)	P Value
Religion		
Islam	50.58 (7.17)	0.058
Christian	51.14 (5.65)	
Buddhist	50.31 (4.89)	
Hindu	53.31 (7.29)	
Sikh	57.17 (3.97)	
Ethnicity		
Malay	50.46 (5.87)	0.087
Chinese	50.15 (5.75)	
Indian	53.09 (7.26)	
Others	53.53 (6.04)	
Gender		
Male	50.34 (5.87)	0.086
Female	52.42 (6.69)	
Nationality		
Malaysian	51.65 (6.52)	0.740
International	52.75 (4.92)	
Type of Family		
Nuclear	51.80 (6.21)	0.316
Extended	50.25 (6.77)	
Household Income (per month)		

Independent variables	Attitude Score Mean (SD)	P Value
<RM5000	50.83 (6.40)	0.141
RM5000-RM10000	53.79 (6.41)	
RM10000-RM15000	50.00 (4.90)	
>RM15000	51.51 (7.03)	
Living with the elderly		
Yes	50.59 (7.50)	0.322
No	51.99 (6.16)	
Frequency of exposure to the elderly		
Once a month	52.42 (6.53)	0.597
Once a week	52.88 (5.70)	
Twice a year or more	51.43 (6.25)	
Past relationships with the elderly		
Good	51.85 (6.53)	0.306
Poor	49.56 (5.53)	
Experience in taking care of an ill elderly patient		
Yes	52.87 (6.30)	0.003
No	49.27 (6.20)	
Involvement in volunteer activity		
Yes	51.83 (6.56)	0.6253
No	51.12 (6.19)	
Exposure to geriatric medicine		
Yes	49.69 (7.12)	0.042
No	52.38 (6.12)	
Interest in taking up geriatric medicine		
Yes	52.30 (7.48)	0.526
No	51.47 (6.09)	

Based on the study results in table 7, there were two significant findings which are experience in taking care of an ill elderly patient and exposure to geriatric medicine. Our study shows that the medical students of Melaka-Manipal Medical College who practice Sikhism had the highest mean for attitude score of 57.17 (3.97), followed by those who practice Hinduism 53.31 (7.29), Christian 51.14 (5.65), Islam 50.58 (7.17) and Buddhism 50.31 (4.89). Among medical students who came from different ethnicities, the others group had the highest mean attitude score of 53.53 (6.04), followed by Indian 53.09 (7.26), Malay 50.46 (5.87) and Chinese 50.15 (5.75). Female medical students who had a mean of 52.42 (6.69) shows that they have better attitude towards geriatric care compared to male medical students who have a mean of 50.34 (5.87). Besides that, International medical students 52.75 (4.92) had a greater mean attitude score than Malaysian medical students 51.65 (6.52). Medical students who came from nuclear families have a mean attitude score of 51.80 (6.21) which was higher than those who came from extended families with a mean attitude score of 50.25 (6.77). Medical students who had household income (per month) RM5000-RM10000 shows the highest mean attitude score of 53.79 (6.41), followed by >RM15000 with mean attitude score of 51.51 (7.03), <RM5000 with mean attitude score of 50.83 (6.40) and RM10000-RM15000 with mean of 50.00 (4.90). Our study also shows that those who did not live with the elderly had a better mean attitude score of 51.99 (6.16) compared to those who lived with the elderly that had a mean attitude score of 50.59 (7.50). The medical

students who were exposed to elderly once a week had mean attitude score of 52.88 (5.70) which is the highest, followed by those who were exposed once a month with mean attitude score of 52.42 (6.53) and twice a year or more with mean attitude score of 51.43 (6.25). Besides that, medical students who have had good past relationships with the elderly 51.85 (6.53) had a higher mean attitude score than the medical students who had poor past relationships with the elderly 49.56 (5.53). Medical students who had experience in taking care of an ill elderly patient had a mean attitude score of 52.87 (6.30) which is greater than those who did not have experience in taking care of an ill elderly patient, 49.27 (6.20). In addition to that, the mean attitude score for those involved in volunteer activities and those who never participate in any volunteer activities were quite the same, 51.83 (6.56) and 51.12 (6.19) respectively. However, students who had never been exposed to geriatric medicine had a better attitude score 52.38 (6.12) compared to students who were exposed to geriatric medicine 59.69 (7.12). Lastly, students who were interested in taking geriatric medicine as a career had better attitude score 52.30 (7.48) compared to those who were not interested 51.47 (6.09).

4. Discussion

A cross-sectional study was done among undergraduate medical students to study the knowledge of medical students of Melaka-Manipal Medical College about the elderly and their care, to study the attitudes of medical students of Melaka-Manipal Medical College towards the elderly and their care, to establish an association between gender, age, ethnicity, year of study, type of family and the perceptions of the medical students towards the elderly and their care, and to find out whether frequent exposure and past relationships with the elderly produces a positive attitude towards the elderly.

The knowledge of the undergraduate medical students was assessed using the FAQ scale. It was found that the mean percentage of knowledge score is 58.0%. The students answered most of the statements correctly, however, the respondents were unaware of certain facts about the geriatric population. The students were unaware that personality does not change with age, older adults are at risk for HIV/AIDS. Besides that, they were also unaware about the fact that most old people do not lose interest in and capacity for sexual relations and that increasing problems with constipation do not represent a normal change when ageing. The respondents believe that most elderly people are unable to change, more fearful of crime than younger people and they do not adapt as well as young age groups when they relocate to a new environment which are all false statements. They also believe

that old age truly begins at 65 which is also a false statement. Only a small percentage of the respondents have answered these statements correctly. In a cross-sectional study done in California among medical students, it was discovered that the respondents were correct on about 37% of the statements presented to them. [4] The medical students were unaware that only 5% of elderly people above the age of 65 stayed in an old folks' home. [4] On the contrary, 92% were right about the fact that physical strength decreases with age. [4] In another study conducted in Malaysia among healthcare related students, it was found that the median knowledge score was 9. It was found that 74% of the participants had good knowledge of ageing while 26%, which was the minority, had poor knowledge on ageing. [18] In another student conducted among third year medical students in Florida, it was observed that most frequent misapprehensions on the FAQI scale involved the beliefs that older persons have more injuries in the home, there are higher rates of criminal victimisation among the elderly and there is poverty among the geriatric population. [27]

The attitude towards the elderly was assessed by using the University of California at Los Angeles (UCLA) Geriatric Attitudes Scale which consisted of 14 statements. The students' mean score for attitude was 51.69 out of 70 marks with minimum score being 33 and the highest score being 69. Most of the students agreed on the fact that elderly persons tend to be appreciative of their health and that it is the society's responsibility to provide care for the elderly. The study also showed that the majority of the students concurred that it is pleasant to be with most old persons and that it is interesting listening to their past experiences. Furthermore, many students stated that they tend to pay more attention and have more sympathy towards their older patients than their younger patients. A significant number of students disagreed on choosing to treat younger patients over the elderly if they had the chance and that elderly medical care consumes too much human and material resources. Most of the students further disagreed on the fact that older adults do not contribute much to society or pay for their health care. Majority of the students do not believe that it is hopeless to treat chronically ill elderly patients. The students further disagreed on transferring government fundings from geriatric care to other branches of health care. A few students stated that it's often difficult to take clinical history from elderly patients when a majority remained neutral. A previously done cross sectional study among undergraduate medical students in the University of Aberdeen, United Kingdom showed that most of the students had relatively better positive attitudes towards the elderly. [23] Their mean UCLA attitudes score was 3.69. [23] Another cross sectional study done among the medical students of the University of Michigan about

medical students' knowledge, attitudes, and experience to an interest in Geriatric Medicine which showed that students had moderately positive attitudes towards the elderly with significantly higher scores in females than in males. There was no significant association between attitude and previous care of elderly and ethnicity. [4] A cross sectional study that was done among the internal medicine residents in University of Hawaii, further showed positive attitude towards elderly with a mean score on the attitudes scale of 3.77. [5] A previously done cohort study among the first year medical students at the National University of Singapore school of medicine gave a mean UCLA score of 3.58 suggesting a general positive attitude. [28]

In the present study, it was observed that there was no significant association between gender, ethnicity, nationality, religion, type of family, and household income with the knowledge the respondents possess about the geriatric population and their care. It was also found that living with grandparents, frequency of visiting of grandparents, relationship with the elderly at home, experience in taking care of an ill elderly person, previous participation in volunteer activities, exposure in geriatric medicine and the interest in taking up geriatric medicine in the future does not have any significant association with the knowledge about elderly people and their care. In a study done in New York among first year medical students, it was noted that contact and feelings towards grandparents, the support provided to the elderly by their families, exposure to geriatric medicine and the degree of assistance provided by the respondents towards their respective grandparents have no significant association with their factual knowledge about the aged. [26] On the other hand, a study done in California showed that knowledge is not associated with interest in geriatric medicine. It was also discovered in the same study that there is no significant relationship between the knowledge levels of these students and their preferred patient age. [4] In a cross-sectional study conducted among medical students and dental students in Illinois and Iowa, it was found that exposure to geriatric medicine yields more knowledgeable respondents. The knowledge scores were compared between dental students and medical students, and these medical students have previous exposure to geriatric medicine. Thus there is a significant association between exposure to geriatric medicine with the knowledge that the students possess about the elderly. [27]

The present study has found out that the students who had previous experience in taking care of the elderly patients had a higher mean attitude score with respect to those who did not have previous experience in taking care of ill elderly persons, along with a P value of 0.003 suggesting that the association between the past experience of taking care of ill

elderly persons is significantly associated with more positive attitude towards the elderly. Furthermore, female students had a relatively better attitude than male students even though the association between the two variables were not significant. It was further found out that students who visited their grandparents more often (once a week) and the students who had better relationships with the elderly at home had a better attitude towards the elderly persons than the students who visited their grandparents twice a year and the students who had a poor relationship with their elders at home respectively. However, the association between the mentioned variables was not significant. Lastly, the students who showed an interest in taking up geriatric medicine in the future had a relatively better attitude towards the elderly than the students who did not show an interest in taking up geriatric medicine in the future. There was no significant association between age, religion, ethnicity, nationality, type of family, household income and past volunteer activities with a better attitude towards elderly. A previously done cross sectional study among undergraduate medical students in the University of Aberdeen, United Kingdom showed that students who were more willing to take up geriatric medicine had a more positive attitude towards the elderly than those who were not willing to choose geriatric medicine as a speciality. [23] Another cross sectional study done among the first year medical students at the state university of New York, USA had similar results showing that there was no significant association between age, ethnicity, past volunteer activities, the closeness with their own grandparents and the kind of care their parents provided the students' grandparents were not significantly associated with their attitude towards the elderly. However it was found out that the students' factual knowledge was significantly associated with a more positive attitude. [26] A previously done cohort study among the first year medical students at the National University of Singapore School of Medicine further showed that about 33.2% of the students who had a better attitude towards elderly, were more willing to choose geriatric medicine than the students who had a relatively poor attitude. This study further stated that there was no significant association between the gender, age, ethnicity and the attitude towards elderly. [28] Moreover, another cross-sectional study done in California among medical students of the university of Michigan showed that there was no significant association between age, gender, ethnicity, and prior care of elderly with their attitude towards the elderly. However this study further stated that the students who had a more positive attitude towards older persons were more interested in taking up geriatric medicine in the future compared to those who had relatively poor attitudes towards the elderly. [4]

There were a few limitations of this cross-sectional study. As the university examinations were held during the period of study, the academic year of semester 7, 9 and 10 could not be approached. Since the cross-sectional study was done in a short duration of time, the changes in knowledge and attitude towards elderly among the medical students over the time period of the academic years ahead could not be observed and examined. In addition, as this cross-sectional study was done in only one institution; Melaka-Manipal Medical College Muar Campus, Johor, Malaysia, the knowledge and attitude towards geriatric population and their care of medical students in other institutions may not have the same results.

From our study, we recommend that geriatric medicine should be properly started and explained to the medical students early in their academic years. Interesting activities, videos, workshops and real-life cases should be implemented in geriatric medicine. We recommend the future studies to explore the knowledge and attitude among final year medical and shadow housemanship students. Qualitative interviews could be done to get better opinions and perceptions towards geriatric care.

5. Conclusion

The majority of medical students involved in this study had positive attitudes towards the elderly, however, they lacked related knowledge about the elderly and aging. Few independent predictors (either demographic profiles or previous exposure) of students' attitudes could be identified that would help in the selection of students who had more favourable attitudes toward the elderly. There is also increasing evidence on the relationship between knowledge and attitudes toward the elderly which suggests that by acquiring better insights into all aspects of ageing through their education, the students will develop better attitudes and interest in working with the elderly. Thus, in order to generate future physicians with better attitudes and knowledge, we must rely on curricular efforts during medical school. Therefore, it is important to implement the geriatric medicine component in the Malaysian undergraduate curriculum in view of the increasing numbers of older people in the future.

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References

- [1] Un.org. (2017). [online] Available at: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Highlights.pdf [Accessed 1 Feb. 2020].
- [2] Schigelone, A. and Ingersoll-Dayton, B. (2004). SOME OF MY BEST FRIENDS ARE OLD: A QUALITATIVE EXPLORATION OF MEDICAL STUDENTS' INTEREST IN GERIATRICS. *Educational Gerontology*, 30 (8), pp. 643-661.
- [3] Wang CC, e. (2009). Taiwanese medical and nursing student interest levels in and attitudes towards geriatrics. - PubMed - NCBI. [online] Ncbi.nlm.nih.gov. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/19347077>
- [4] Fitzgerald, J., Wray, L., Halter, J., Williams, B. and Supiano, M. (2020). Relating Medical Students' Knowledge, Attitudes, and Experience to an Interest in Geriatric Medicine.
- [5] Kishimoto, M., Nagoshi, M., Williams, S., Masaki, K. and Blanchette, P. (2020). Knowledge and Attitudes About Geriatrics of Medical Students, Internal Medicine Residents, and Geriatric Medicine Fellows.
- [6] Samra, Rajvinder, Tom, Gordon, Lee, A., Conroy, ... Cox. (2017, May 2). Factors related to medical students' and doctors' attitudes towards older patients: a systematic review. Retrieved February 2, 2020, from <https://academic.oup.com/ageing/article/46/6/911/3787763>
- [7] Lambrinou, E., Sourtzi, P., Kalokerinou, A., & Lemonidou, C. (2009, August). Attitudes and knowledge of the Greek nursing students towards older people. Retrieved February 2, 2020, from <https://www.ncbi.nlm.nih.gov/pubmed/19243864>
- [8] Goeldlin, A. O., Siegenthaler, A., Moser, A., Stoeckli, Y. D., Stuck, A. E., & Schoenenberger, A. W. (2014). Effects of geriatric clinical skills training on the attitudes of medical students. *BMC Medical Education*, 14 (1). doi: 10.1186/1472-6920-14-233.
- [9] Anthea, Hussain, Labib, D'Cruz, Lilly, J., Tai, ... Sebastian. (2016, January 24). Why should medical students study Social Gerontology? Retrieved February 2, 2020, from <https://academic.oup.com/ageing/article/45/2/190/2195364>
- [10] Goldenhar, L. M., & Kues, J. R. (2006, March). Effectiveness of a geriatric medical student scholars program: a qualitative assessment. Retrieved February 2, 2020, from <https://www.ncbi.nlm.nih.gov/pubmed/16551324>
- [11] Sheikh, R. B. & Mathew, Elsheba & Rafique, A. M. & Suraweera, R. S. C. & Khan, H. & Sreedharan, Jayadevan. (2013). Attitude of medical students toward old people in Ajman, United Arab Emirates. *Asian Journal of Gerontology and Geriatrics*. 8. 85-89.
- [12] (5AD). Survey of Attitude towards and Understanding of the Elderly amongst Chinese Undergraduate Medical Students, 8, 615–622. doi: 10.5372/1905-7415.0805.335.
- [13] Haque, A. F., Soong, D. G., & Wong, C. L. (2014). Assessing the Impact of a Geriatric Clinical Skills Day on Medical Students' Attitudes Toward Geriatrics. *Canadian Geriatrics Journal*, 17 (1). doi: 10.5770/cgj.17.74.

- [14] Considerations for the Development of an Undergraduate Curriculum in Geriatric Medicine. (12AD). Considerations for the Development of an Undergraduate Curriculum in Geriatric Medicine, 385–391. doi: 10.1159/000346511.
- [15] Meiboom, A. A., Vries, H. D., Hertogh, C. M., & Scheele, F. (2015). Why medical students do not choose a career in geriatrics: a systematic review. *BMC Medical Education*, 15 (1). doi: 10.1186/s12909-015-0384-4.
- [16] Wiese, C. H., Fragemann, K., Keil, P. C., Bundscherer, A. C., Lindenberg, N., Lassen, C. L., ... Trabold, B. (2014). Geriatrics in medical students' curricula: questionnaire-based analysis. *BMC Research Notes*, 7 (1). doi: 10.1186/1756-0500-7-472.
- [17] Wan Ibrahim, W. M. S. (2017, August 3). Populations and Demographics: Ageing. Retrieved February 1, 2020, from https://www.dosm.gov.my/v1/uploads/files/6_Newsletter/Ageing.pdf
- [18] Factors Associated with Knowledge of Ageing among Healthcare related students in Universiti Putra Malaysia (2015). *International Journal of Public Health and Clinical Sciences (IJPHCS) Open Access e-Journal e-ISSN: 2289-7577*, 2 (4), 75–87.
- [19] Tan, M., Kamaruzzaman, S., & Poi, P. (2018). An Analysis of Geriatric Medicine in Malaysia-Riding the Wave of Political Change. *Geriatrics*, 3 (4), 80. doi: 10.3390/geriatrics3040080.
- [20] Forsyth, Duncan & Chia, Yook Chin. (2009). How should Malaysia respond to its ageing society?. *The Medical journal of Malaysia*. 64. 46-50.
- [21] Annear, M. J., Lea, E., Lo, A., Tierney, L., & Robinson, A. (2016). Encountering aged care: a mixed methods investigation of medical students' clinical placement experiences. *BMC Geriatrics*, 16 (1). doi: 10.1186/s12877-016-0211-8.
- [22] Reuben, D. B., Fullerton, J. T., Tschann, J. M., & Croughan-Minihane, M. (1995). Attitudes of Beginning Medical Students Toward Older Persons: A Five-Campus Study. *Journal of the American Geriatrics Society*, 43 (12), 1430–1436. doi: 10.1111/j.1532-5415.1995.tb06626.x.
- [23] Hughes, N. J., Soiza, R. L., Chua, M., Hoyle, G. E., Macdonald, A., Primrose, W. R., & Seymour, D. G. (2008). Medical Student Attitudes Toward Older People and Willingness to Consider a Career in Geriatric Medicine. *Journal of the American Geriatrics Society*, 56 (2), 334–338. doi: 10.1111/j.1532-5415.2007.01552.x.
- [24] Reuben, D. B., Zwanziger, J., Bradley, T. B., Fink, A., Hirsch, S. H., Williams, A. P., ... Beck, J. C. (1993). How Many Physicians Will Be Needed to Provide Medical Care for Older Persons? Physician Manpower Needs for the Twenty-First Century. *Journal of the American Geriatrics Society*, 41 (4), 444–453. doi: 10.1111/j.1532-5415.1993.tb06955.x.
- [25] Gale, J., & Livesley, B. (1974). Attitudes Towards Geriatrics: A Report Of The Kings Survey. *Age and Ageing*, 3 (1), 49–53. doi: 10.1093/ageing/3.1.49.
- [26] Perrotta, P., Perkins, D., Schimpfhauser, F., & Calkins, E. (1981). Medical student attitudes toward geriatric medicine and patients. *Academic Medicine*, 56 (6), 478–83. doi: 10.1097/00001888-198106000-00003.
- [27] Duerson, M. C., Thomas, J. W., Chang, J., & Stevens, C. B. (1992). Medical Students Knowledge and Misconceptions About Aging: Responses to Palmores Facts on Aging Quizzes. *The Gerontologist*, 32 (2), 171–174. doi: 10.1093/geront/32.2.171.
- [28] Attitudes of First-year Medical Students in Singapore Towards Older People and Willingness to Consider a Career in Geriatric Medicine Melvin Pw Chua, MBChB, Mrcp (Uk), Chay Hoon Tan, MBBS, M. Med (Psy), PhD, Reshma Merchant, MBChB, Mrcp (Uk), Roy L Soiza, MBChB, Mrcp (Uk). (n.d.).