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A Study on the Perception of the Pharmacy Profession in Higher Secondary Students of Taiping, Malaysia

Dharshinie Johalingam[1], Abbas SA[1*], Vijay Kotra[1*], Allan Mathews[1], Nur Afrina Ikhsan[2], Helaluddin ABM[3], Ravi Varala[4*] and Sudhakar Madhavedi[5]

[1]Faculty of Pharmacy, Quest International University, 30250, Ipoh, Perak, Malaysia

[2]School of Computing, Quest International University, 30250, Ipoh, Perak, Malaysia

[3]Faculty of Pharmacy, International Islamic University Malaysia, 25200, Kuantan, Malaysia

[4]Scrips Pharma, Mallapur-500 076, Hyderabad, Telangana, India

[5]Department of Management, Kshatriya College of Engineering, Nizamabad-503 224, Telangana, India

ABSTRACT

The pharmacy profession is undoubtedly one of the healthcare professions with high responsibilities, particularly in ensuring the effective, safe, and reasonable use of medicines. The evolution of the pharmacist's role in the healthcare system has been significant over the past few years as pharmacists play a critical role in connecting healthcare providers and forming coherent relationships between patients as well as the healthcare team. To date, no studies have been done involving higher secondary school students and their awareness or perception of the pharmacy profession and its relevance in the healthcare system, especially in Malaysia. This study aims to determine the difference between higher secondary school students' perception of the pharmacy profession, which involves higher secondary school students from several secondary schools located in Taiping, Perak, Malaysia. Quantitative research was performed using a questionnaire survey to study perceptions towards the pharmacy profession in higher secondary school students. One-way ANOVA was performed to study the difference between higher secondary school students' perception of the pharmacy profession according to their current forms. The result of the analysis shows that there is no statistical difference between the perception of the pharmacy profession of each form, and this also shows that the higher secondary school students have similar levels of knowledge on the pharmacy profession. Further research may be required as this study was focused on one state, Perak; therefore, the data or results do not represent the perception of all higher secondary school students in Malaysia.

***Corresponding author**

Vijay Kotra, Faculty of Pharmacy, Quest International University, 30250, Ipoh, Perak, Malaysia. E-mail: vijay.kotra@qiu.edu.my

Ravi Varala, Scrips Pharma, Mallapur-500 076, Hyderabad, Telangana, India. Tel: +91 9618286529; E-mail: ravivarala@gmail.com

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Introduction

Pharmacy is a profession involved with the handling of all aspects of medicines. It includes the knowledge of the physical and chemical properties, the source of origin, the benefits and side effects, the dosage forms, compounding and manufacture, and the laws and ethics governing the manufacture, import, export, storage, sale, and usage of medications or drugs [1]. The pharmacy profession is undoubtedly one of the health professions that has a high responsibility when it comes to delivering effective, safe, and rational use of medicines. A pharmacist is well trained to counsel patients on the appropriate use of medicines or drugs, supplements, and herbal preparations for related diseases and conditions [2]. Besides, a pharmacist is also trained to provide information on the medications and advice on preventing disease and maintaining good health [3].

The stamped term "Seven Star Pharmacist" by World Health Organization in 1997 describes it as caregiver, decisionmaker, communicator, leader, manager, lifelong learner, and teacher [4]. The evolution of the pharmacist's role in the healthcare system has been quite prominent over the last few years as pharmacists play a crucial role that links the healthcare providers by forming a coherent relationship between the patient and the medical teams [5, 6]. The pharmacists develop an evidence-based plan to follow up with the health conditions of the patient in order to achieve optimal health outcomes [7]. In addition, it can be said that from just compounding and dispensing, the perspective of the pharmacy profession has emerged into a broader scope that includes hospital pharmacy, clinical pharmacy, industrial pharmacy, regulatory

pharmacy, community pharmacy, military pharmacy, and academia pharmacy [8].

As for the pharmacists in the hospital and clinical setting, they work closely with the doctors, where as a team, they discuss all aspects thoroughly and decide on the most cost-effective medicine for different disease conditions as well as considering the socioeconomic status of the patient [9]. The pharmacist's role here is to check the dose and type of medicine that the doctors have prescribed and screen through the prescription to avoid medication errors [10]. They also counsel patients on how to take the medications to improve patient compliance, ensure the therapeutic effect, and reduce the adverse effects of inappropriate drug use. Besides, pharmacists also perform therapeutic drug monitoring to assist the doctors in providing more effective treatment with lesser drug-induced adverse effects on the patients [11].

On the other hand, pharmacists in a community pharmacy not only dispense the medicines prescribed by doctors but also manage, procure, store, sell, counsel, and advise patients on using over-the-counter (OTC) drugs, food supplements, and herbal medications [12]. In some instances, if the medicine is expensive or not affordable to a patient, the pharmacists can recommend a cheaper but equally effective generic substitute that would give the same therapeutic effect required [13, 14]. Counselling on the use of specific medical devices as well as performing and counseling on the results of specific health screening tests such as blood glucose level, blood pressure, total cholesterol, and lipid profile tests are also being done by a community pharmacist. They are also involved in distributing health information and advising consumers on disease prevention and wellness promotion [15].

The pharmacists in the regulatory sector are involved in the Ministry of Health, Malaysia drug enforcement division. They enforce the law that controls the procurement, import, export, manufacture, distribution, and sale of drugs, medicine, and poisons [16]. The roles of a pharmacist here include the inspection of premises that manufacture drugs or medicine and herbal medicine to ensure that standards of Good Manufacturing Practice are to be adhered [17]. In addition, they are also responsible for the quality control, standardization, and registration of drugs, medicine, herbal medicine, cosmetics, and medical devices. Pharmacists in the industrial setting have many roles, such as they are either involved in drug research and development, quality control, manufacturing, registration, sales, marketing, and distribution of pharmaceutical products to hospitals, clinics, and community pharmacies [18].

Pharmacists who work in multinational drug companies could be involved in the company's management, sale of medicines, drug development and promotion, drug trials, drug registration, clinical drug trials, and post-marketing surveillance [19]. Now, pharmacists have become an excellent source of drug information and continuing drug education for medical and health professionals. Lastly, as for the pharmacists in academia, with additional Master's and Doctorate qualifications in appropriate pharmacy disciplines, the pharmacist can become a lecturer in the university in pharmacy, medical, dental, nursing, or biomedical science departments. A pharmacy graduate can also research and develop new drugs or new formulations of drugs in universities' research centers or drug companies [20].

Roles of Pharmacists

Pharmacists play an essential role in the betterment of society and the world from a broader perspective [4]. The role of a pharmacist has significantly evolved over the years. The evolution of the roles aimed to achieve a safe, effective, and rational use of drug therapy and optimize drug utilization in patient care [21]. As part of the roles of a pharmacist, patient counseling and the capability of the pharmacist to make drug or medication therapy recommendations to the physicians are included. A pharmacist also positively impacts patient care as they can identify and prevent any possible adverse effects of medications prior to drug administration to the patient. Besides, pharmacists will respond to the patient's symptoms either due to an illness or side effects of the drug [22]. Advising patients about their medications, which include the route of administration, frequency of the medication, and informing the patients regarding the possible side effects of the medicines, falls under the role of a pharmacist.

Various Scopes of Pharmacy

The work fields of the pharmacy profession have evolved from the roots of compounding and dispensing into a broader scope that includes the hospital, clinical, community, academia, industry, military, and regulatory sectors [23]. As in a hospital pharmacy, the job of a pharmacist includes dispensing drugs, preparing pharmaceuticals for hospital inpatients, providing the drug information, counseling and consultative services for patients, purchasing and managing drug inventories, and surgical and other hospital supplies [24]. Next, in a community pharmacy, the pharmacist ensures that the complex medications are being dispensed with caution and care and conducted with full responsibility. Besides, the pharmacist must screen the prescription for correct dosage, drug incompatibility, possible drug-drug interaction, and drug-food interaction before dispensing the drugs according to the prescriptions. Pharmacist in the industry, however, is involved in the production and development of new pharmaceuticals, which also includes the improvement and quality control of existing drugs [25].

On the other hand, a pharmacist in a military pharmacy is considered part of the army service. Pharmacists in this field ensure that the country has procured adequate pharmaceutical supplies to be utilized during times of emergency, such as during natural disasters or any other possible eventualities [26]. Besides, regulatory pharmacists ensure that the registrations submitted by distributors and importers are valid and that Good Manufacturing Practice comes under the National Pharmacy Regulatory Agency (NPRA). Lastly, pharmacists in academia are responsible for teaching, especially in tertiary institutions or organizations such as the pharmaceutical science schools [27].

Misconception about Pharmacists

It can be seen that people in developing countries have formed a misconception about the pharmacy profession or pharmacist. It is due to the reason that people tend to see the pharmacist either as a salesman, a drug dealer, or a money-minded businessman. They are unaware that a pharmacist's job is more than most people would have envisioned [21]. This profession is always taken for granted, and there are many challenges a pharmacist has to undergo. Despite this, the fact that a pharmacist has to portray a positive self-image, provide a positive view of the profession, and dilute all the unsure opinions of the future pharmacists about their professional identity is what matters. These misconceptions about pharmacists have eventually led to a shortage of pharmacists, which causes a high demand for pharmacists in all work fields of this profession [28].

Competency Standards for Pharmacists

Competencies are required for pharmacists in order to maintain their ability in professional practice. Competencies are usually helpful when it comes to controlling and maintaining the quality of professional skills, and in some instances, they can be used as part of criteria during an interview to hire a person for a job [29]. There are several competencies required for pharmaciest which includes the knowledge of pharmacy laws, rational use of drugs, conducting patient counselling, pharmaceutical manufacturing, quality assurance, preparation of pharmaceutical products, conducting community health programs and capable of providing updated information about the products to the patients and also the healthcare practitioners [30, 31].

Objective & Methodology

The evolution of the pharmacist's role in the healthcare system has been significant over the past few years as pharmacists play a critical role in connecting healthcare providers and forming coherent relationships between patients as well as the healthcare team. To date, no studies have been done involving higher secondary school students and their awareness or perception of the pharmacy profession and its relevance in the healthcare system, especially in Malaysia. This study aims to know the perception of higher secondary students on pharmacy profession in Malaysia and also to determine whether there is any the difference in students' perception of the pharmacy profession among the several secondary schools located in Taiping, Perak, Malaysia. Quantitative research was conducted using an online questionnaire survey to gain insights into the perceptions of the higher secondary school students towards the pharmacy profession. The questionnaire survey link was sent out via google forms to approximately 200 students from the targeted schools.

Study Population

As per the targeted population, the focus was on the higher secondary school students, consisting of students of age 15, 16, 17, 18, and 19 from five different secondary schools at Taiping. The schools chosen to conduct this research include SMK Convent Taiping, Treacher Methodist Girls' School, St. George Secondary School, SMK King Edward VII, and SMK Kampung Jambu. The Faculty of Pharmacy administration provided the permission or approval letters directed to the school principals to obtain permission to conduct the online survey using their respective school students.

Sampling Criteria

The sample inclusion criterion in this study is determined as follows:

- Participants should be from higher secondary school (Form 3, Form 4, Form 5, and Form 6 students)
- Students of all races such as Malay, Indian, Chinese, Sikh, etc
- Both genders, females and males students.

The exclusion criteria in this study:

- Students from lower secondary school (Form 1 and Form 2).

Sampling Method and Sample Size

A convenient random sampling method was chosen to conduct the questionnaire survey. In this study, the sample size was calculated using the formula as shown below:

Sample size = $(Z \text{ score})^2 \times \text{Std Dev} \times (1\text{-Std Dev}) / (\text{Confidence Interval})^2$

$= (1.28)^2 \times 0.5 \times (1 - 0.5) / (0.05)^2$

$= 1.6384 \times 0.5 \times 0.5 / 0.0025$

$= 163.84$

$n \sim 164$ respondents

Based on the calculated sample size, a minimum of 164 respondents were required to have a sample representing the higher secondary school students, meaning a minimum of 30 respondents from each school were needed. Therefore, the online questionnaire survey link was distributed to 200 students from the targeted schools.

Questionnaire Development

The questionnaire was prepared using online platforms such as Google forms to collect the required information. The questions were standardized as they were taken from validated and verified references from published research papers. However, minor modifications were made to the questions to suit the research study. The questions set were easily understandable as the respondents were school students. Besides, the number of questions that could expose the participants' or students' personal information were limited as there was a risk of personal information or data being leaked as the study was conducted online. A pilot study was conducted with 20 students, and the time to answer the survey was approximately 3 to 5 minutes.

The online questionnaire was divided into five parts. As for the first part, the informed consent for the questionnaire stated that the students who were participating in this research were completely voluntary and that they would not benefit directly from participating. They were also assured that all the information provided in this research would be treated confidentially. The second part of the questionnaire was related to the demographic information where questions such as the student's age, gender, nationality, ethnicity, current form, and the subjects that the students were currently studying were asked to confirm the streaming, whether the student was from Science or Arts stream. The third part of questions include the pharmacy profession, such as if they had heard about it before, if yes, how they knew about it. Besides, questions on the scopes of the pharmacy profession work fields that they have heard before and the approximate income range that a Fully Registered Pharmacist (FRP) makes a month were asked.

The fourth part of the questionnaire was scaled questions where the student's knowledge of the role of pharmacists was tested. The survey scale was used to assist the students in quantifying their thoughts or perception about the pharmacy profession. About seven questions were asked, and the options provided for these questions, where either one is to be chosen, consists of a scale of Strongly disagree, Disagree, Neutral, Agree, or Strongly Agree. Lastly, the final part includes the personal opinion of the students to determine their interest in this profession and why they would choose the pharmacy profession.

Data Collection

The sample size required for this research was 164 respondents based on the sample size calculation, and therefore, the online questionnaire link was distributed to approximately 200 students from all five targeted schools, where about 35 to 40 responses were expected to be received from each school. Fortunately, the number of responses obtained was more than expected, where 311 responses were received instead. More response is ascertained due to the currently available technologies, which help spread the information or survey link quickly enough to a more significant number of people, which explains the increased number of responses obtained.

Results & Analysis

The students' responses were collected, and the data were analyzed using the Statistical Package for the Social Sciences (SPSS),

version 26. Besides, descriptive analysis was used to calculate each form of students who responded to every question, especially the knowledge part of the questionnaire. In addition, one-way ANOVA was used to identify any significant difference among the different forms of higher secondary school students' perception of the pharmacy profession regarding the knowledge questions in the questionnaire.

Descriptive Analysis

As for the descriptive analysis, the boxplot shows that the data is approximately normally distributed. As for the outliers, there were no outliers observed on the boxplot graph. The smaller box lengths, which are the interquartile ranges, indicate that the data is less dispersed. Figure 16 shows the box plot obtained from the descriptive analysis that shows data is approximately normally distributed. Based on the histogram obtained, it can be said that the data follows an approximately normal distribution as the graph is approximately bell-shaped. Figure 17 shows the histogram obtained from the descriptive analysis, which shows that the data is approximately normally distributed.

Based on the demographic information obtained from the questionnaire survey responses, as for the age of higher secondary school students who have participated in the survey, 29.9% were students of age 15 years old, 31.5% were 16 years old, 35% were 17 years old students, 2.9% of 18 years old students and 0.6% were 19 years old students. Figure 1&2 shows the pie chart of the percentage (%) and the number of students who participated in the survey according to their age. Next, according to the gender of the respondents, about 86.8% of female respondents, whereas male respondents comprised 13.2% only. Figures 3 & 4 show the pie chart and bar chart of the percentage (%) of students who participated in the survey according to gender. As per the nationality, about 99.7% of the respondents were Malaysians, and 0.3% were non-Malaysians. Figure 5 shows the pie chart with the percentage (%) of students participated in the survey according to nationality. Based on ethnicity, 37.9% were Malay students, 29.9% were Indian students, 28% were Chinese students, and the rest were students of various ethnicities such as Sikh, Iban, Pakistani, Christian, and Eurasian. Figures 6 & 7 show the pie chart and bar chart of the percentage (%) of students who participated in the survey according to ethnicity. Next, according to their current forms, about 35.4% of students from Form 5, 31.5% were Form 4 students, 29.9% of Form 3 students, and 3.2% were Form 6 students. Figure 8 and 9 shows the pie chart and bar chart of the percentage (%) of students who participated in the survey according to the current forms.

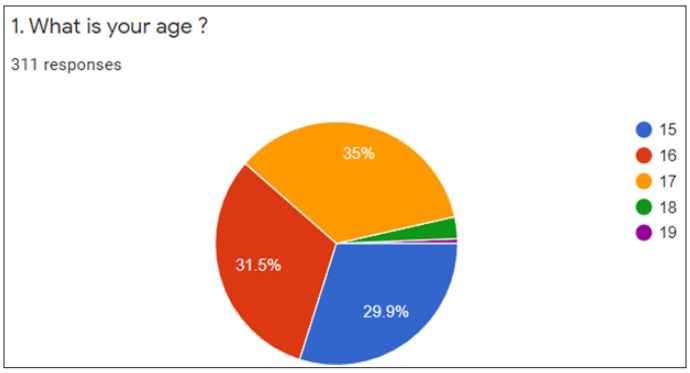

Figure 1: Pie chart that shows the percentage (%) of students participated in the survey according to their age.

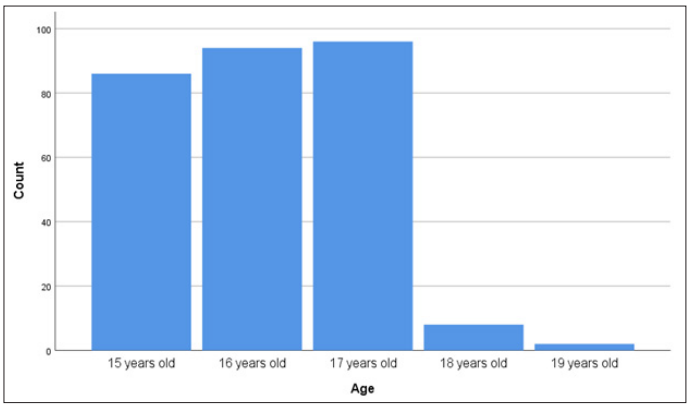

Figure 2: Bar graph that shows the number of students participated in the survey according to their age

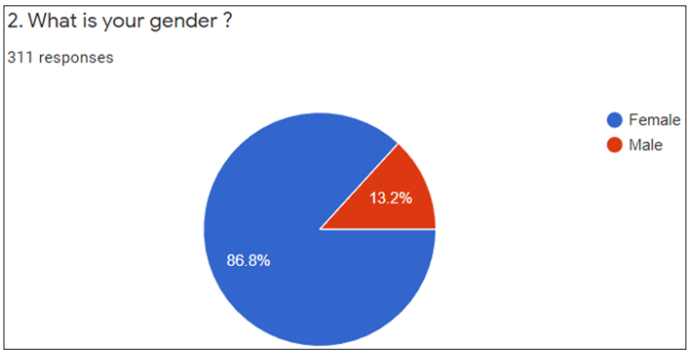

Figure 3: Pie chart that shows the percentage (%) of students participated in the survey according to gender

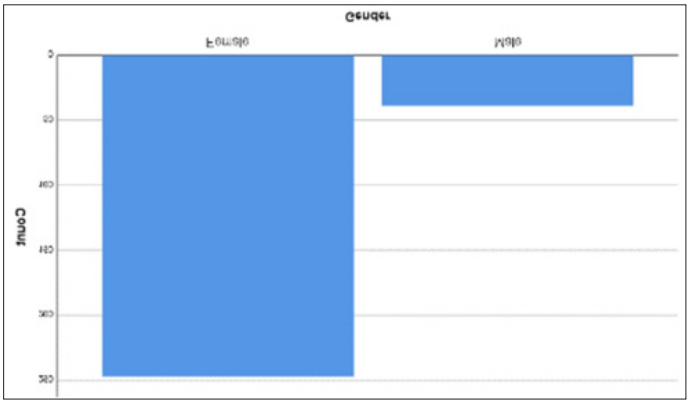

Figure 4: Bar graph that shows the number of students participated in the survey according to their gender.

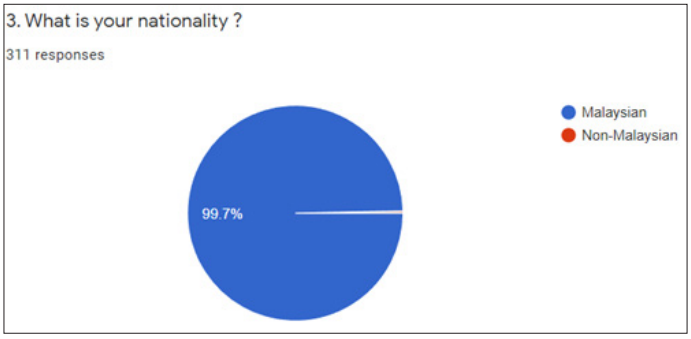

Figure 5: Pie chart that shows the percentage (%) of students participated in the survey according to nationality.

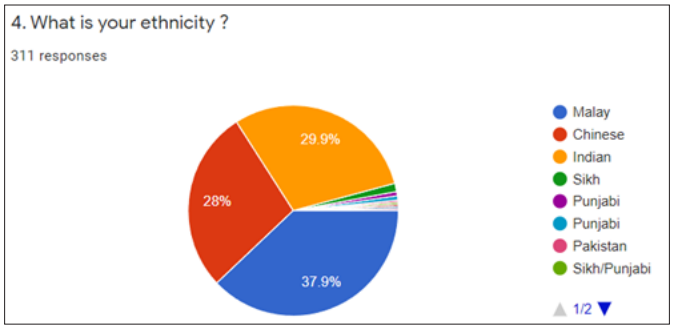

Figure 6: Pie chart that shows the percentage (%) of students participated in the survey according to the ethnicity

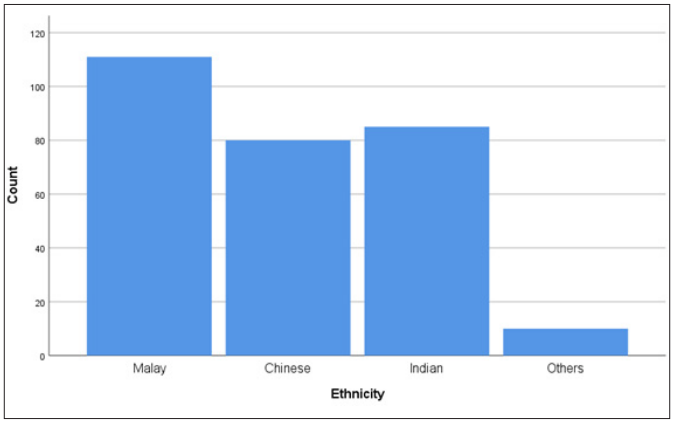

Figure 7: Bar graph that shows the percentage (%) of students participated in the survey according to the ethnicity.

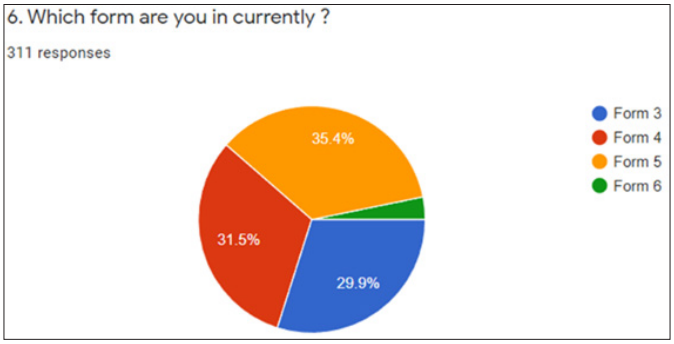

Figure 8: Pie chart that shows the percentage (%) of students participated in the survey according to the current forms

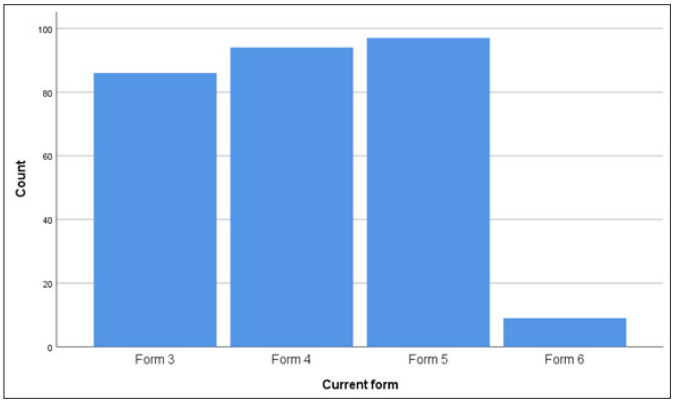

Figure 9: Bar graph that shows the percentage (%) of students participated in the survey according to the current forms

As for the third part of this questionnaire regarding the Pharmacy profession, when asked if they have heard of a pharmacist or pharmacy profession before, 80.4% of the respondents answered yes, 4.2% answered no, and around 15.4% of students answered maybe. Figure 10 shows the pie chart with the percentage (%) of students who have previously heard about the pharmacy profession. In addition, respondents who answered 'yes' to the previous question asked about how they knew about this profession, and the majority of the responses, 47.5%, were through family or relatives with a pharmacist. About 44.1% knew through school teachers during the teaching and learning program, and 33.3% knew due to personal interest in this profession. About 28.6% were exposed to this profession through Education fairs involving various colleges and universities offering the Pharmacy program. Mere 3% of students knew about the profession while visiting Universities that offer pharmacy programs. Lastly, a minority response reveals that they know about the pharmacy profession through social media and television programs. Figure 11 shows the chart with the percentage (%) of students who have heard about the pharmacy profession through various sources.

Besides, when asked about the scope of the pharmacy profession work field that the students have heard before, 93.6% of respondents have selected Pharmacists in Hospital or Clinical Pharmacy, 41.5% of students selected the Pharmacists in Community Pharmacy, 34.1% chose the Pharmacists in Military Pharmacy, 19.9% of students knew about the Pharmacists in Industrial Pharmacy, 13.8% knew about the Pharmacists in Academia, and 12.2% of the students heard of the Pharmacists in Regulatory Pharmacy.

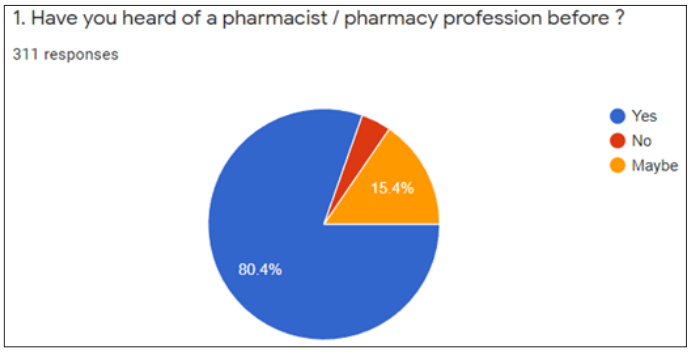

Figure 10: Pie chart that shows the percentage (%) of students who have heard about the pharmacy profession before

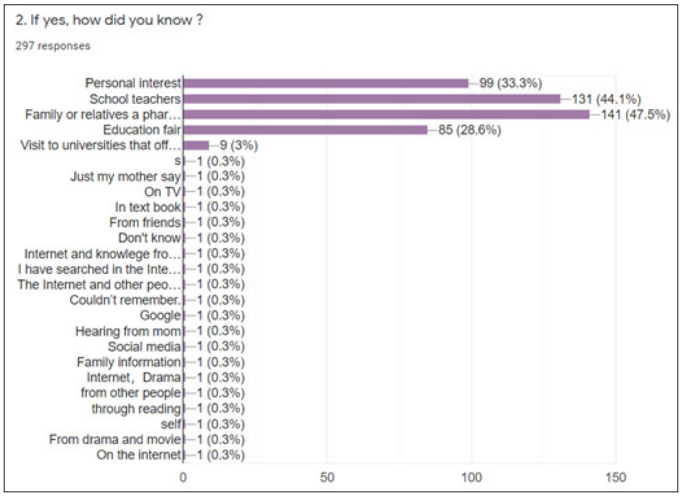

Figure 11: Chart that shows the percentage (%) of students who have heard about the pharmacy profession through various sources

Figure 12 shows a chart with the percentage (%) of students who have heard about the various work fields in the pharmacy profession. Next, a question regarding the income of a Fully Registered Pharmacist (FRP) makes a month, around 50.5% of students had selected the option with a salary range of RM 4,000 to RM 5,000, whereas 25.1% chose the option with a salary range of more than RM 6,000 and about 24.4% chose the salary range of RM 2,500 to RM 3,500. Figure 13 shows a pie chart with the percentage (%) of students who had a rough idea about the monthly income range of a Fully Registered Pharmacist (FRP).

Figure 12: Chart that shows the percentage (%) of students who have heard about the various work fields in the pharmacy profession.

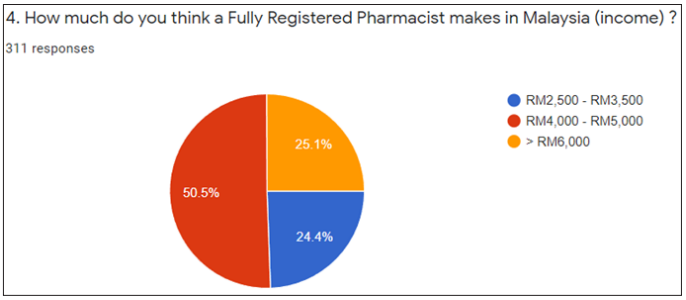

Figure 13: Pie chart that shows the percentage (%) of students who had a rough idea about the monthly income range of a Fully Registered Pharmacist (FRP)

The students were asked about their interest in being a pharmacist in the future; 21.9% chose a 'yes', 34.4% chose a 'no', and about 43.7% chose maybe. Figure 14 shows a pie chart with the percentage (%) of students' interest in being a pharmacist in the future. Besides, the students who chose 'yes', are asked for the reasons for their interest in pharmacist profession in the future; 31.6% of the students mentioned the reason was the desire to improve patients' health and wellbeing, 29.2% chose the option with good job opportunity, 24.4% mentioned the desire to work in healthcare sector, 6.7% of students stated the reason was to satisfy family desire, 3.3% stated that being a pharmacist comes as a professional status to them and various other personal reasons were stated by the students. Figure 15 shows a pie chart with a reason for the percentage (%) of students who indicated a yes to being a pharmacist in the future.

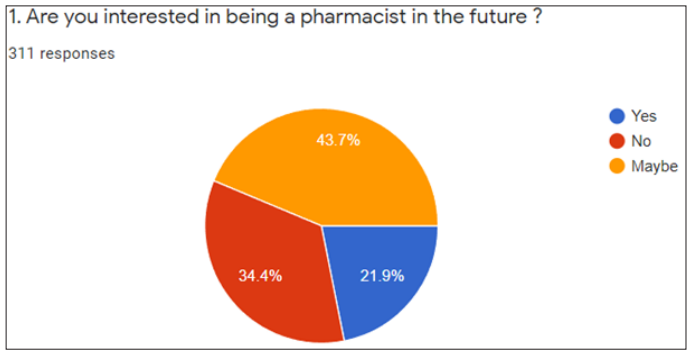

Figure 14: Pie chart that shows the percentage (%) of students' interest towards being a pharmacist in the future.

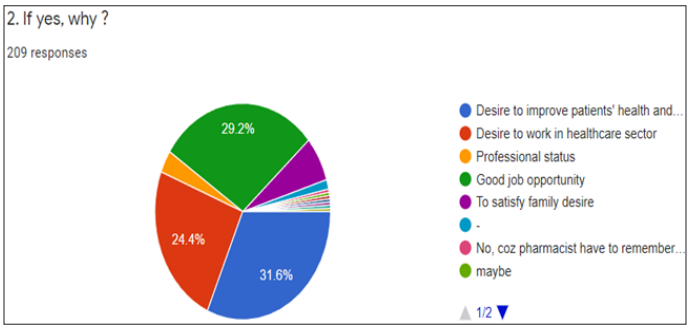

Figure 15: Pie chart that shows the percentage (%) of students who indicated a yes to being a pharmacist in the future with a reason.

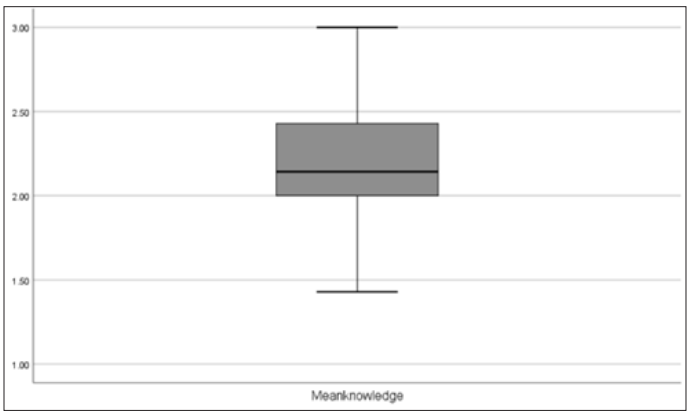

Figure 16: Box plot obtained from the descriptive analysis shows data is approximately normally distributed

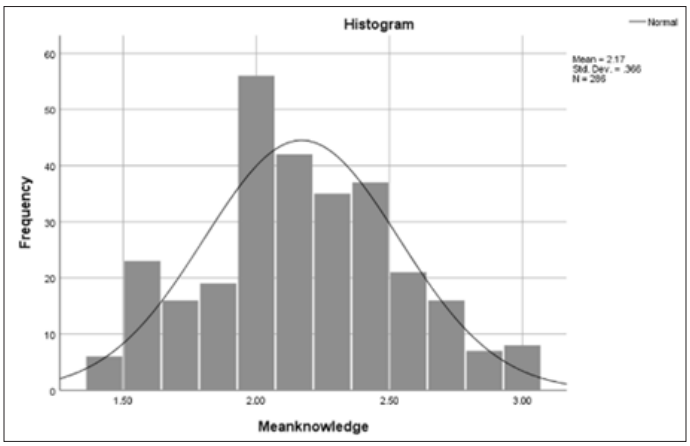

Figure 17: Histogram obtained from the descriptive analysis shows data is approximately normally distributed

One-Way Anova Results

The one-way analysis of variance (ANOVA) test was performed and from the homogeneity of variance test, Table 1 displays the results of Levene's statistic based on the mean, with a value of 1.482 and the corresponding p-value obtained was more significant than 0.05, which was 0.220. Next, based on the results of ANOVA from Table 2, the p-value obtained is also greater than 0.05, which was 0.487. Besides the post hoc test, the p values obtained from the post hoc test were more than 0.05 when compared individually with each form. This is said because when Form 3 was compared with Form 4, a significant value of 0.547 was obtained. The comparison of Form 3 with Form 5, the p-value of 0.905 was obtained, and Form 3 with Form 6, the p-value was 0.695. Next, when Form 4 students were compared to Form 5, the p-value was 0.907, and the comparison of Form 4 with Form 6 p-value of 0.952 was obtained. The comparison for Form 5 with Form 6 observed was 0.850. Table 3 shows Tukey's honestly significant difference (HSD) post hoc test with the comparison tables between each form of students.

Table 1: Test of Homogeneity of Variances

		Levene Statistic	Sig.
Meanknowledge	Based on Mean	1.482	0.220

Table 2: ANOVA test between the forms of the students

ANOVA

Meanknowledge

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.329	3	.110	.814	.487
Within Groups	37.925	282	.134		
Total	38.254	285			

Table 3: Tukey's honestly significant difference (HSD) post hoc test

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Meanknowledge

Tukey HSD

(I) Current form	(J) Current form	Mean Difference (I-J)	Std. Error	Sig.
Form 3	Form 4	-.07256	.05472	.547
	Form 5	-.03685	.05432	.905
	Form 6	-.14027	.12848	.695
Form 4	Form 3	.07256	.05472	.547
	Form 5	.03571	.05308	.907
	Form 6	-.06771	.12796	.952
Form 5	Form 3	.03685	.05432	.905
	Form 4	-.03571	.05308	.907
	Form 6	-.10342	.12779	.850
Form 6	Form 3	.14027	.12848	.695
	Form 4	.06771	.12796	.952
	Form 5	.10342	.12779	.850

Data Interpretation & Discussion

Demographic Data Interpretation

The demographic results from the questionnaire survey show that the 17 years old students had the highest number who had participated in the survey, whereas the least number of responses were from the 19 years old students. The 17-year-olds were more in numbers as they approached the end of their secondary education, meaning that they were preparing or gathering information for their tertiary education after their examinations. However, the 19-year-olds were the least in number as the survey was conducted during their final examinations. Therefore, most of them could not participate in the survey due to a lack of time and exam preparation. Next, as for the responses according to gender classification, it can be said that there were more female respondents compared the male respondents. Although the survey was sent equally to two girls' schools, two boys' schools and one co-ed school, the number of females respondents were more significant and based on a separate study, it was observed that there was a significant difference in response behaviour between females and males, which explains the results from this study performed. According to the students' nationality, the results show that the majority of respondents for this survey were local students, as Malaysians, because the targeted schools were all national schools with a majority of local students.

On the other hand, students who have participated in the survey, looking at the ethnicity, the highest number of respondents according to the ethnicity are the Malays. In contrast, the least number according to the data is Eurasian, with only one respondent; it is due to the race-based quota system in Malaysian schools where about 90% of the quota is reserved for the native people such as the Malays. Next, based on the data obtained, the number of responses from the Form 5 students shows the highest number compared to the other forms who have participated in the survey. Once again, this is also because the Form 5 students gathered information about their tertiary education right after their examinations as they approached the end of their secondary education.

As for the questions regarding the Pharmacy profession, students who responded yes, when asked if they have heard of a pharmacist or pharmacy profession before, indicated that they knew about the existence of the pharmacy profession or at least heard about the profession before, however, the students who answered no, indicates that they have no clue about the pharmacy profession or have not heard about this profession before. The students who responded that they have no clue about the profession show their lack of awareness of their existing and available career options. Students who have answered may be, indicates that they have a rough idea of what the pharmacy profession is all about. In addition, when asked about how they knew about this profession, the majority of the responses were through family or relatives with a pharmacist in various work fields available, and some were through school teachers who exposed their students to this profession during the teaching and learning session, some of them knew about it due to personal interest towards this profession and therefore did their research about the profession. There were also responses from the students, including their exposure to this profession through education fairs involving various colleges and universities offering the Pharmacy program, either a Diploma in Pharmacy or a bachelor's degree in pharmacy. Moreover, some included their university visits as part of their school's initiative to expose their students to the various career options, including universities that offer Pharmacy programs.

There are various work fields in the pharmacy profession which shows that a pharmacist would have a variety of options to choose from compared to many other professions that are restricted to a certain number of options. In the questionnaire, when the students

were asked about the scope of the pharmacy profession work field that they have heard before, the majority of the students were more familiar with the Hospital or Clinical Pharmacists compared to the other work fields such as Pharmacists in Community Pharmacy, Military Pharmacy, Industrial Pharmacy, Academia, and Regulatory Pharmacy. However, this could be due to their misperception that a pharmacist should only work at the healthcare sector such as hospital. In addition, this is also probably due to their lack of exposure and knowledge about the various scopes of the pharmacy profession. Next, students were also asked about the monthly income of a Fully Registered Pharmacist (FRP) and the majority of the students chose RM 4,000 to RM 5,000. This salary range appears to be reasonably true, as on average, a pharmacist's salary doubles their starting salary by the time they cross the experience mark of 10 years, which may be higher depending on the demand.

As for the personal opinion question about their interest in being a pharmacist in the future, some responded yes, indicating their interest toward the pharmacy profession, some selected no, indicating that they are not interested in the pharmacy profession and majority of the students chose maybe, which shows that they may or may not consider being a pharmacist or choosing the pharmacy profession in the future. Besides, as for the reason of interest to be a pharmacist in the future, most of the students stated that they desired to improve patients' health and wellbeing, some mentioned that the pharmacy profession is a good job opportunity, several students mentioned the desire to work in healthcare sector, a certain number of them stated the reason was to satisfy family desire, some mentioned that being a pharmacist comes as a professional status to them. Every student had at least one reason to be a pharmacist in the future, which could be a driving force or motivation for these students to achieve their goals in the future.

Descriptive Analysis Interpretation

According to the results obtained from the statistical analysis using the SPSS software, version 26, as for the descriptive analysis, the boxplot was used to demonstrate the distribution of the data. It can be said that the boxplot obtained from the analysis shows that the data is approximately normally distributed. This is said because the mean was about the same as the median, and the box plot looks almost symmetrical. Next, as for the outliers, there were no outliers observed at the boxplot graph, which means that there were no data points located outside the whiskers of the boxplot. The smaller box lengths, which are the interquartile ranges, indicates that the data is less dispersed. The box plots tend to be helpful as it provides a visual summary of the data, which enables the researchers to identify the mean values, the dispersion of the data set, as well as to identify for the signs of skewness. Next, based on the histogram obtained, it can be said that the data follows approximately normal distribution as the graph looks similar to a bell curve. This is because most of the data points tend to fall in the middle, however, there are few small and a few large values.

One-Way Anova Analysis Interpretation

Since the data obtained from the descriptive analysis shows approximately normal distribution, therefore, one way analysis of variance (ANOVA) test was performed. Firstly, from the data, the homogeneity of variance was tested to know if there were any equal of variance between the data. Levene's test was used to determine if the different forms of students have equal variances. From the Levene's test, a value of 1.482 and the corresponding p-value obtained was greater than 0.05, which was 0.220. As the p-value obtained was greater than 0.05, this indicates that the data has equal variance, which follows the assumptions of ANOVA. Thus, the null hypothesis has failed to be rejected as there was no sufficient evidence showing the variance in knowledge about the pharmacy profession between the different forms of students. Next, based on the ANOVA table, the p-value obtained was also greater than 0.05, which was 0.487, meaning that there is no difference between the forms of the students about the knowledge of the pharmacy profession. Besides, the post hoc test was also run to confirm if statistically significant differences occurred between forms of students. The Tukey's honestly significant difference (HSD) post hoc test was used as the data met the assumption of homogeneity of variances. The multiple comparisons table shows which form exactly are differed from each other. As for comparison of Form 3 with Form 5, a p-value of 0.905 was obtained, and for Form 3 with Form 6, the p-value was 0.695. Next, when Form 4 students were compared to Form 5, the p-value was 0.907 and as for the comparison of Form 4 with Form 6 p-value of 0.952 was obtained. The comparison for Form 5 with Form 6 observed was 0.850. From these results that were obtained during the comparison, it can be clearly seen that the p values obtained from the post hoc test were more than 0.05, and this indicates that there were no statistically significant differences between each form of students about the knowledge of the pharmacy profession when comparisons were made.

There are a few reasons why the results obtained showed no statistically significant differences between each form of students about the knowledge of the pharmacy profession. First and foremost, the higher secondary school students were not exposed to the pharmacy profession as much as they have been exposed to other common professions such as Medicine, Engineering, Teaching etc. Besides, some students envisioned the pharmacy profession as healthcare or medical-related profession without having the basic knowledge or understanding of what the pharmacy profession is all about. Next, the higher secondary school students also have different views about the pharmacy profession as some see the profession for social status, some take this profession for future financial benefits etc. This can also be related to the misconception about the profession due to the ongoing negative media portrayals of the pharmacy profession and the lack of progress in elevating awareness, which eventually influences the students and their thoughts about this profession. Misperceptions arising from a single experience, for example, when a student observes a pharmacist in a particular setting, such as the hospital setting, where the pharmacist has minimal patient contact and communication with patients, would have possibly left an impression that a career in pharmacy does not necessarily require them to interact with patients. However, students fail to realize the importance of a pharmacist being able to effectively communicate medical information to patients as well as other health professionals. In addition, the questionnaire survey, especially for the questions about the role of a pharmacist, the responses obtained from the students were almost similar for some of the questions and these responses indicate the lack of knowledge about the roles of a pharmacist. This is said because as for some questions, the students' responses did not seem that they knew or understood the roles and responsibilities of a pharmacist. Overall, the lack of awareness about the pharmacy profession, the roles of a pharmacist and the various work fields available in this profession can be seen from the responses and results obtained from the questionnaire survey.

Conclusion

Based on the questionnaire survey conducted, it can be concluded that there were no statistically significant differences between each form of students about the knowledge of the pharmacy

profession as the p-value obtained was greater than 0.05. Most of the higher secondary school students are oblivious of the broad scope of pharmacists' roles and responsibilities and the various pharmacy practice settings available in Malaysia as they had similar thoughts or perceptions about the pharmacy profession. Even though students from Form 5 and Form 6 will be pursuing their tertiary education soon after their final examinations, they still do not have much knowledge about the various work fields that are available in the pharmacy profession. This could be due to the lack of exposure and information about the scopes in pharmacy compared to other common professions. Therefore, there is a need to create awareness of the pharmacy profession as a well-recognized and respected profession for higher secondary school students. There are several ways of creating awareness among the higher secondary school students, such as by organizing healthcare-related seminars that expose the various professions involved in a patient's health care and management, where emphasis on the pharmacy profession should be made. Besides, the secondary schools should also collaborate with universities to have activities related to the pharmacy profession so that the students get a better idea of what the profession is all about. This is especially important to students such as the Form 5 and Form 6 who will be pursuing their tertiary education.

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