



UNIVERSITI PUTRA MALAYSIA

***EVALUATION OF KNOWLEDGE, ATTITUDE AND PRACTICE OF
SELF-MEDICATION AMONG PRE-CLINICAL MEDICAL STUDENTS
OF UNIVERSITI PUTRA MALAYSIA***

GROUP 36

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EVALUATION OF KNOWLEDGE, ATTITUDE AND PRACTICE OF SELF-MEDICATION
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ABSTRACT

Introduction: Self-medication is defined as the treatment of self-diagnosed disorders or symptoms by use of medicines. This study aimed to evaluate the knowledge, attitude and practice among pre-clinical medical students in Universiti Putra Malaysia (UPM). **Method:** This was a cross sectional study carried out among the pre-clinical students in Universiti Putra Malaysia from 1st June 2020 - 9th October 2020. There was a total of 165 respondents with 100% response rate through the online questionnaire that had been distributed. **Results:** Among 165 participants students, 57.6% practice self-medication. Respondents mainly obtain information from their previous prescription. They found it unnecessary to visit the doctor for minor illnesses and also recognized risk of adverse effect as the major reason against self-medication. The most common indication for self-medication was headache and the most used drug was found to be lozenges. No significant difference in knowledge, attitude and practice was found among any of the socio-demographic factors in our study. However, the difference in attitude score between those who practice self-medication and those who did not was found to be significant where it was found that those with a more positive attitude practiced self-medication less. **Conclusion:** It is found that the prevalence of self-medication among pre-clinical medical students of Universiti Putra Malaysia is quite high. The students' knowledge and attitude on self-medication is a good base to start promoting self-medication.

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CHAPTER 1: INTRODUCTION

1.1. Background

The World Health Organization (2000) defined self-medication as the treatment of self-diagnosed disorders or symptoms by use of medicines. It is a global phenomenon and is found to be prevalent in all ages. According to a study done by Shaghaghi et al. (2014), the prevalence of self-medication ranged between 8.5% and 98% with large differences across countries. Whereas in Malaysia specifically, it ranged between 62.7% and 80.9% based on studies done by Ali et al. (2012), Hassali et al. (2011) and Jawahir and Aziz (2017). These studies also reported that factors like gender, ethnicity, year of study, hometown and family background were commonly associated with the knowledge, attitude and practice of self-medication.

The practice of self-medication is widely accepted and is now considered an important component of healthcare. This is contributed to the fact that the public has easy access to medicine whenever needed. Consequently, this reduces the burden on the healthcare system of a country. Besides that, patients can be treated without having to wait long hours at healthcare institutions or paying high billing fees. These are some of the reason why people opt for self-medication. In addition to that, some consider their condition to be minor and does not require the attention of a healthcare professional. However, this comes with consequences like incorrect self-diagnosis, bacterial resistance, and drug interactions which could all delay treatment of the disease. Pharmacists and healthcare professionals have come to a consensus that these are the major concerns as some medication are accessible over the counter. Therefore, the responsible authorities should increase the efforts on raising awareness and educating the general public on the disadvantages of self-medication to not further burden our healthcare system.

On the other hand, medical students are more inclined to self-medicate as they have easy access to information and drugs to self-diagnose and treat themselves accordingly. As future healthcare professionals, it is important for them to know the benefits and dangers of self-medication. Besides that, they should be taught to always be responsible and follow the ethical guidelines regarding drugs in order to encourage their future patients to do so as well. The prevalence of self-medication among medical students ranged between 52.7% to 92% in studies performed in other countries across the world. In Malaysia, because not much study has been done, the extent of this phenomenon among local medical students remains under evaluated.

1.2. Problem Statement

According to the National Health and Morbidity Survey (2015) around 46% of those who experienced health problems self-medicated as opposed to only 40.6% who seek help from healthcare providers instead. This recent percentage for self-medication shows the ongoing increasing trend of this phenomenon from only 15.6% in 1996 to 38.4% in 2011. Among those, 59.5% in the age range of 15-19 practised self-medication the most followed by 51.6% of those aged between 20-24. This is in concordance with most studies done which showed a high prevalence of self-medication among university students. (Abdi et al., 2018; Kanwal et al., 2018; Maan et al., 2018)

With more knowledge and exposure to information on drugs in comparison to the general population, medical students are not excluded in being caught up with this alarming phenomenon. Many studies have been conducted to assess the knowledge, attitude and practice of self-medication among medical students around the world although it is worth mentioning that there is a lack of study specifically done on pre-clinical medical students. For example, a study conducted in Melaka Manipal Medical College stated that most students have moderate knowledge about self-medication

and showed good attitude towards self-medication (Maan et al., 2018). In another study conducted among first year medical students in a university in Bahrain, James et al. (2006) concluded that although knowledge of self-medication was poor, students had a positive attitude towards self-medication therefore, the practice of self-medication was common. Based on these studies, although the knowledge and attitude of self-medication is only average among the medical students, the prevalence of self-medication is still high. Therefore, this exposes them to the risks of self-medication with potentially harmful side effects that most medical students fail to acknowledge or even refuse to accept the harmful consequences of self-medication since it has become a norm. Some of the potential harms include incorrect self-diagnosis, adverse reactions, dangerous drug interactions, incorrect dosage, disease aggravation, masking of a severe disease and risk of dependence and abuse. This is especially alarming for pre-clinical students as their knowledge differ from clinical medical students who have more experience regarding drugs as they practise it for their medical postings.

Although many studies have been performed from all around the world regarding self-medication among medical students, there is a lack of studies conducted among pre-clinical medical students especially in Malaysia. Therefore, it is safe to say that there is a poor number of evidences that is available to suggest that pre-clinical medical students of Malaysia have good knowledge about self-medication and practicing it appropriately.

1.3. Significance of Study

This study will be able to provide information on the knowledge, attitude and practice of self-medication among pre-clinical medical students of Universiti Putra Malaysia. Besides that, through this study we can determine if the factors often

associated with self-medication among pre-clinical medical students is significantly associated among pre-clinical medical students of Universiti Putra Malaysia. With this information, the faculty and lecturers will be able to construct strategies to educate the students on the correct and safe way to self-medicate in order to prevent any harm in the future.

There is a paucity of information on self-medication among pre-clinical medical students in Malaysia in general therefore this study can contribute to future studies in properly evaluating the extent of this phenomenon among local medical students. This will enable the responsible authorities to formulate effective ways to educate on self-medication and instil responsibility in students for when they consider to self-medicate or provide advice on self-medication to others in the most rational calculus with the interest of one's health and preventing any unwanted harm from being done within their mindset.

1.4. Research questions

- I. What is the level of knowledge, attitude and practice of self-medication among pre-clinical medical students of Universiti Putra Malaysia (UPM)?
- II. What are the socio-demographic factors associated with level of knowledge, attitude and practice of self-medication among pre-clinical medical students of Universiti Putra Malaysia (UPM)?
- III. How does the level of knowledge and attitude towards self-medication affect the practise of self-medication among pre-clinical students of Universiti Putra Malaysia (UPM)?

1.5. Study Objectives

1.5.1 General Objectives

To investigate the knowledge, attitude and practice of self-medication and its associated socio-demographic factors among pre-clinical medical students of Universiti Putra Malaysia

1.5.2 Specific Objectives

- I. To determine the level of knowledge, attitude and practice of self-medication in pre-clinical medical students of Universiti Putra Malaysia
- II. To assess the difference between level of knowledge, attitude and practice of self-medication among socio-demographic characteristics of pre-clinical medical students of Universiti Putra Malaysia
- III. To ascertain how does the level of knowledge and attitude towards self-medication associate with the practice of self-medication among pre-clinical medical students of Universiti Putra Malaysia

1.6. Research Hypothesis

- I. There is a statistically significant difference of knowledge, attitude and practice of self-medication between the socio-demographic factors among pre-clinical medical students of Universiti Putra Malaysia
- II. There is association between knowledge and attitude on self-medication with the practice of self-medication among pre-clinical medical students of Universiti Malaysia

CHAPTER 2: LITERATURE REVIEW

2.1 Definition of self-medication

Self-medication can be defined as the use of drugs to treat self-diagnosed diseases or symptoms, or the occasional or persistent use of a prescription drug for chronic or recurring disease or symptoms (El-Ezz & Ez-Elarab, 2011). According to the World Health Organization (2000), medicinal products for self-medication are described as those which do not require a medical prescription, and which are developed, distributed and sold in order to be used by consumers on their own initiative and accountability when they find such usage is necessary. The practice of self-medication is popular worldwide in both established and developing countries nowadays, and they may be much more popular than the use of prescribed medication itself. Many studies about self-medication have been conducted by researchers worldwide. Maan et al. (2018) described self-medication as the choice and use of drugs by individuals to treat illnesses or symptoms that have been self-recognized. A study explained that self-medication, if done appropriately, can relieve acute medical problems, save time to see doctors and may be economical. It can benefit the patients, healthcare providers, the pharmaceutical industry, as well as the government (James et al., 2006). There may be some differences between medical students and the general public that practise self-medication as medical students have greater knowledge about medication compared to the general public. They have convenient access to knowledge for self-diagnosis and self-medication from various sources (Jagadeesh et al., 2015). According to a study done by Ramadan et al. (2018) the prevalence of self-medication in Europe may reach up to 68% as discussed globally in previous studies. In the study, they also mentioned that the self-medication prevalence among medical students is high ranging from 57.7% to 76%. Furthermore, self-medication is more popular among medical professionals such as physicians, nurses and pharmacists compared to the general public (Kanwal et al., 2018). The purpose of

this review is to discover the recommendations for this research from related articles that can provide brief explanations regarding self-medication among medical students.

2.2 Level of knowledge, attitude and practice of self-medication among medical students

2.2.1 Level of knowledge of self-medication

Knowledge plays a very important role when it comes to self-medication as it can bring more harm to a person with lack of knowledge when they are trying to practise it. Level of knowledge about self-medication varies among medical students around the world. A study conducted among medical students of all years in Melaka reported that of all 167 participants participated, 51 (30.6%) have good knowledge, 80 (48.6%) have moderate knowledge and 36 (21.6%) have poor knowledge regarding self-medication (Maan et al., 2018). It can be deduced that the knowledge level of self-medication in this university is moderate. James et al. (2006) stated that awareness of the 1st Year medical students in Arabian Gulf University about effective self-medication was low, but awareness of the benefits and risks of self-medication was adequate. In their study, they mentioned that the respondents recognized the advantages and disadvantages of self-medication. The most crucial advantage was saving time (45.5%) while the most serious disadvantage was the risk of adverse drug reactions (32.8%). In a similar study done among 2nd year medical students by Jagadeesh et al. (2015) approximately 60% had knowledge of over the counter (OTC) drugs and also considered OTC drugs to be Ayurveda drugs, 25% considered self-medication to be completely safe, while 61% considered self-medication to have benefits. According to them, the high percentage of students that had knowledge about OTC drugs might be because of having ample knowledge regarding pharmacology. In another study by Gyawali et al., (2015) conducted in Western Nepal among second and fourth semester student, it was reported that the mean knowledge score obtained was 74.54

(6.92) out of a total score of 100. It can be concluded that most research found that most of their respondents had average to above average knowledge in self-medication.

2.2.2 Level of attitude of self-medication

Based on a few studies that have been carried out by researchers, the attitude of medical students towards self-medication can be positive or negative. It depends on how the students react towards the self-medication. Findings from a study by Kanwal et al. (2018) conducted among medical students from several medical college in Pakistan stated that 285 (95%) of the total respondents had a positive attitude towards self-medication and agreed that self-medication is part of self-care. For those, 139 (46.3%) said they would not proceed with self-medication while 122 (40.7%) said they would start/proceed with self-medication. Meanwhile, Ramadan et al. (2018) reported in a study done in Alexandria Faculty of Medicine in Egypt, that most of the students (78.8%) confirmed that self-medication is acceptable and rationalized due to time savings (36.3%), rapid relief of symptoms (22.5%) and ease of use (17.5%). According to them, 84% of the medical students would proceed with self-medication for a week without recovery in their conditions and only 18% of the students experienced side effects due to self-medication. In another study, only 24 (24.7%) 2nd year medical students agreed that they always visited a qualified practitioner whenever they fell ill, while 65 (67%) said that they sometimes visited and 8 (8.2%) rarely visited (Thadani et al., 2013). However, a study done in a medical institute in India used a different approach by categorizing the level of attitude of medical students towards self-medication into few categories. Firstly, respondents were asked if they preferred self-medication in which 53% answered yes. Then, respondents were asked the reason why they preferred self-medication where 72% of them answered that

there was no need to consult a doctor for minor ailments. Lastly, respondents were asked if they would recommend self-medication to people with no medical background where only 20% answered yes. From this study, it can be concluded that although students were confident self-medicating themselves, they were against advising others in self-medicating (Jagadeesh et al., 2015). In another aspect, Gyawali et al. (2015) reported attitude in a continuous form where they found the average score was 67.18 (5.68). Overall, most of the study reported mostly positive attitude toward self-medication among medical students across the world.

2.2.3 Level of practice of self-medication

Practising self-medication can be very risky to those who are inexperienced and are not well educated about drugs. James et al. (2006) mentioned in a study performed among first year medical students in Bahrain, that 60 (44.0%) of 134 respondents practised self-medication. The remaining 74 (55.2%) respondents opted to visit a doctor by going to a private clinic (33.6%), primary health care facility (31.3%), doctor friend (28.4%), or local hospital (20.1%). This result showed that most of the students preferred a prescription from the doctor than practicing self-medication. Nevertheless, self-medication was popular and often inappropriate. Findings from another study in a medical college in Melaka resulted in a different number of self-medication practices. It was found that 128 out of 167 of their respondents (76.7%) practise self-medication (Maan et al., 2018). A research by Jagadeesh et al. (2015) stated that self-medication was practised by 62% of students, 86% of whom were appropriate, and 48% of students used knowledge from previous consultations. In a similar study done in Lucknow Medical College, India, the self-medication practice among the students is quite high where 79.4% of them occasionally practise it and 11.3% of them practicing it routinely. However, 9.3% of them

said that they never took self-medication (Thadani et al., 2013). Similar trends in data and conclusion were also made by Benameur et al. (2019), wherein it was reported that medical students (79.9%) were able to acknowledge that self-medication were not always the best practise in terms of safety in comparison to the non-medical students (48.6%) who participated in this study. Furthermore, researchers in this study concluded that more than satisfactory level of knowledge in the context of effectivity of drugs and its potential side effects were demonstrated by medical students in comparison to non-medical students who paled in their general knowledge in this context. Despite the level of knowledge they had, it was found that medical student still exhibited many inappropriate behaviours regarding self-medication.

2.3 Factors associated with self-medication among medical students

2.3.1 Gender

A study conducted among medical students from all year of study in India by Kasulkar and Gupta (2015) showed that females tend to self-medicate more than males. Out of the 488 respondents, 185 (52.8%) of the female participants and only 165 (47.2%) of male participants practised self-medication. Similar results were found by Maan et al. (2018) in a local study done in Melaka among pre-clinical and clinical medical students. In their study, even though gender was not significantly associated with knowledge and attitude of self-medication, it was significantly associated with the practice of self-medication. (Chi-square = 9.8 and $p = 0.002$). Female students were reported to be 3.2 times more likely to practice self-medication than male students. Likewise, Kanwal et al. (2018) reported the same findings and they claimed this may be due to higher number of female students in medical schools as mentioned in previous studies. Obermeyer et. al. (2004) argued self-medication is often associated with women because they are more concerned for their health compared to men

who prioritised affordability. Although gender was not reported to be a significant factor in self-medication in general, El-Ezz & Ez-Elarab (2011) reported that there was a statistical significant difference between male and females in regards of self-medicating with vitamins, analgesic and herbal products ($p = 0.00$, $p = 0.002$ and $p = 0.03$, respectively) in a study done among medical students from Ain Shams University, Egypt. Conversely, Girish et. al. (2013) found that self-medication was higher in males (66.66%) compared to female (64.3%) medical students though it was shown that females (77.8%) self-medicated more frequently in comparison to males (65.4%) in a study done among medical students of all years in North Kerala. On the other hand, a study performed by Ramadan et al. (2018) in Alexandria, Egypt showed that there was no significant association in the practice of self-medication between gender ($p = 0.086$). Studies conducted by Benameur et al., (2019) and Hu et al. (2018) supports this finding.

2.3.2 Ethnicity

In terms of ethnicity, the findings varied between studies and were found to be inconclusive. Muzaffar et al. (2016) reported in a study done at SeGi University Hospital among out-patients showed that Indian tend to practise self-medication. This is believed to be attributed to the belief that Indians tend to believe in alternative and herbal medication more compared to modern medicine. Whereas a study conducted in Penang conducted by Dawood et al. (2017) among the general public in Penang showed that Chinese and Indian participants were less likely to self-medicate compared to Malay participants ($p < 0.001$). Upon further evaluation, it was found that Indian respondents were 2.35 times more likely to consult a pharmacist when faced with a health problem (95% CI 1.29 – 4.30, $p = 0.005$). Besides that, between consulting a physician or pharmacist and self-medicating, self-medicating was found to be

the most prevalent choice among Chinese people ($p < 0.05$). Similarly, the National Health and Morbidity Survey (2015) reported that out 363 out of 550, 022 (46.8%) Chinese people practised self-medication. This was found to be the highest prevalence compared to Malay (43.3%) and Indian (41.7%) respondents. On the other hand, Maan et al. (2018) found that there was no significant association between the practice of self-medication and ethnicities in a study done exclusively among medical students of Melaka Manipal Medical College.

2.3.3 Hometown

In a study performed among the general public in Western India, Limaye et al. (2018) reported higher prevalence (51.5%) of self-medication in the urban population as opposed to the rural population with only 7.7%. Very few studies conducted among medical students reported whether hometown had a significant association with self-medication. However, Helal and Abou-Elwafa (2017) showed in their study that medical students from Mansoura University, Egypt, who resided in urban areas tend to self-medicate more compared to those that live in rural areas. They found that being from an urban area was an independent predictor for self-medication along with other factors. Hu et al. (2018) also found in their study conducted among medical students in China regarding antibiotics, that students living in an urban area tend to self-medicate more compared to those living in rural areas. The difference was found to be statistically significant. ($p = 0.012$). They concluded that this could be because of the easy access to medicine as more pharmacies are located in urban areas. This contrasts with the findings of the National Health and Morbidity Survey (2015) which showed that 1,452 out of 1,007,453 (47.6%) people in the rural area practised self-medication in comparison to those in the urban area with just 45.4%.

2.3.4 Year of study

In a study done by Ramadan et al. (2018), students in their sixth year of medical school showed highest prevalence (67.3%) of self-medication whereas those who have only completed two years of medical school showed the lowest (40.4%). Their study showed that there was a statistically significant association ($p = 0.048$) between level of study and the practice of self-medication. This is in concordance with findings in a study done by Kasulkar and Gupta (2015). The practice of self-medication varied amongst students of different year level and the trend was found to increase from first year to final year. The author claimed that this could be due to more knowledge of medicine in final year students which is parallel with the findings of past studies. This shows that acquiring medical knowledge and clinical skills throughout medical school resulted in senior students having an increased confidence in practicing self-medication. Although junior students are not exposed yet to drugs, ease of accessibility to information through the media could be the reason they still practise self-medication. However, Hu et al. (2018) also reported otherwise in their study. The difference between practice of self-medication among those in their Y1-Y3 and Y4-Y8 was found to be not statistically significant ($p=0.327$). Similarly, Benameur et al. (2019) came to the same conclusion. Fourth semester students had higher mean scores and both knowledge and attitude compared to second semester students. However, year of study was found to be not statistically significant in the practice of self-medication among these students.

2.3.5 Family background

In a study conducted among medical students of second and fourth semester in Western Nepal, Gyawali et al. (2015) reported that respondents with parents who are medical doctors practise self-medication more compared to those with

parents without a medical background. The difference was however found to be not significant. Nonetheless, through the free text comments respondents added that if their parents are medical doctors, their accessibility to medicine and samples increases which consequently raises the probability of self-medication. Some also added that doctor parents have an influence on their child regarding self-medication. Similarly, in a study done in universities all over China found that parents' education played a significant role in respondents' practice of self-medication. Hu et al. (2018) found that those with a mother with a medical background had higher rates of self-medication in general ($p < 0.01$). Whereas father's medical background was only found to be a significant factor in self-medication in general ($p = 0.042$) but not self-medication of antibiotics ($p = 0.081$). Thadani et al. (2013) discovered that 41.2% of students out of the 77 that practised self-medication had parents who were or are doctors. In addition to that, doctor parents were found to be the one of most prevalent source of information and drugs when self-medicating.

2.4 Types of self-medication commonly used among medical students

Jagadeesh et al. (2015) reported in their study that 68% of the 2nd year medical students preferred allopathy medicine and only 32% preferred ayurvedic medicine for self-medication. Most studies showed that medical students used over the counter (OTC) drugs the most when self-medicating. In a study conducted in Abbottabad, Pakistan, Kanwal et al. (2018) found that OTC drugs were used for self-medication in 98.3% of cases. Non-steroidal anti-inflammatory drugs (NSAIDs) were the most frequently used by 74.3% respondents. Similarly, Ramadan et al. (2018) reported that analgesic and anti-inflammatory drugs (77%) was commonly associated with self-medication followed by decongestants (33.4%), antimicrobials (33.1%) and antihistamines (33%). This is consistent with other studies conducted in Egypt (Kanwal et al., 2018) and Central India (Kasulkar & Gupta, 2015), where analgesics were also

the most commonly used drug group. Thadani et al. (2013) also reported that analgesics (62.9%) were the most used drug in self-medication among 2nd year students of Lucknow Medical College. Upon further questioning, 77.3% of these students preferred paracetamol over nimesulide (14.4%), diclofenac (6.2%) or ibuprofen (2.1%). This reflects in the indication for self-medication with headache (41.2%) being the highest. They also reported that multivitamins were only used by 11.3% of the respondents. On the other hand, though vitamin C was the least used by only 3% of the 1st year students in a study performed by James et al. (2006), it was reported by Maan et al. (2018) multivitamins were among the most commonly used commonly used drugs along with lozenges and analgesics among all medical students.

2.5 Reasons for self-medication among medical students

In reasons backing up the practise of self-medication by medical students, it is found that there are many factors involved. Thadani et al. (2013) found that a pivotal rationale that led to self-medication among 2nd year medical students was reducing the need to visit a doctor for every subsequent minor illness as well as self-medication being to provide an instant aid to their ailments. In another study done among 1st year students by James et al. (2006), it was stated a similar finding to the former research showing that time saving by avoiding a visit to general practitioners for minor illness and also ease of convenience in providing quick relief were the most important reasoning in administering self-medication. Other reasons such as ease of convenience, a platform to learn, and refraining from being in the crowds plays as a small factor to reasoning in the use of medication in both studies with only amounting to a cumulative percentage of below 17.2% in the study by James et al. (2006) and a cumulative percentage of 7% by Thadani et al. (2013). On a different perspective, a study by Benameur et al. (2019) regarding self-medication with antibiotics showed that besides the usual factors that push for self-medications such as mild illness and long waiting line to obtain medicine prescription from physicians, the unease in travelling a distance

to access healthcare professional advice was another reason people opt for self-medication. It is also worth mentioning that advice from family/friends (57.7%), ease of obtaining drugs (43.7%) and past experiences (36.6%) were other reasons that lead to self-medications among medical students. It is found alarming to know that despite strict regulations on giving antibiotics as prescription in pharmacies, many medical students still find them to be easily accessible in the setting of the study conducted in Saudi.

2.6 Indication for self-medication among medical students

There are various illnesses that are passed off as minor and self-medicate by medical students, Zafar et al. (2008) showed that the most common indication was headache (72.4%) followed by cough/flu/cold (65.5%) and closely entailed by fever (55.2%). Other illnesses such as diarrhoea, pain or aches in other parts of the body, allergy along with trouble sleeping showed some form of indication but was generally less common among the medical students. In a similar result on the indication for self-medication, Maan et al. (2018) stated that most prevalent indications to administer self-medication were cough, cold, sore throat (19.3%) with fever (19.1%) being second to these indications. Similarly, there were other less common indications which are headache (17.8%), diarrhoea (10.6%) and stomach-ache (9.5%) which as expected coincided with the former study stated as illness that deemed self-medicate able. It is also to be acknowledged there were other indications such as ocular symptoms, skin symptoms and ear symptoms but at a low prevalence rate. A recent study conducted by Benameur et al. (2019) also supports this trend whereby it was reported that the most common illness for which self-medication was used was sore throat (tonsillitis) followed by pyrexia and cough. There were statistically significant cases reported for sore throat ($p < 0.001$) along with pyrexia and cough ($p < 0.05$) in both cases of medical and non-medical students that participated in this study An important point not

to be missed is that menstrual symptoms are a part of indication for self-medication as demonstrated in both James et al. (2006) and Thadani et al. (2013).

2.7 Source of information/drugs for self-medication among medical students

Before the use of self-medication most medical students would have some fairly general or an abstract information regarding the type of self-administered medicine. The sources of which this information regarding the particular medicine of choices selected by the medical students varies. Abdi et al. (2018) reported that the most common resource on the information of drugs to medical students is through pharmacists and the internet. Similar study by Kanwal et al. (2018) showed that media 93 (31%) cases and second to its family members' advice 52 (17.3%) followed by old prescriptions 48 (16%) respondents proved to be the common source of information. On the other hand, a study conducted by Badiger et al. (2012) was able to shed some light on different primary sources for information regarding self-medication used in the aspect that textbook was chosen by 39% and seniors/classmates was chosen by 38% out of 200 respondents. Pharmacist (32.5%) as a source of information was still present although being the least popular form of source of information among medical students. Interestingly enough, this study also revealed that most medical students 117 (63.6%) who have self-medicated before, tend to suggest medication to family member/friends (51.8%) and juniors (48.2%). On the other hand, Benameur et al. (2019) showed the major source of information was reading material and this was proposed by the researches that it supports the issue that medical education and knowledge among medical students have its impact on the practise of self-medication. All in all, medical students derive sources for self-medication information from a range of sources.

2.8 Conceptual Framework

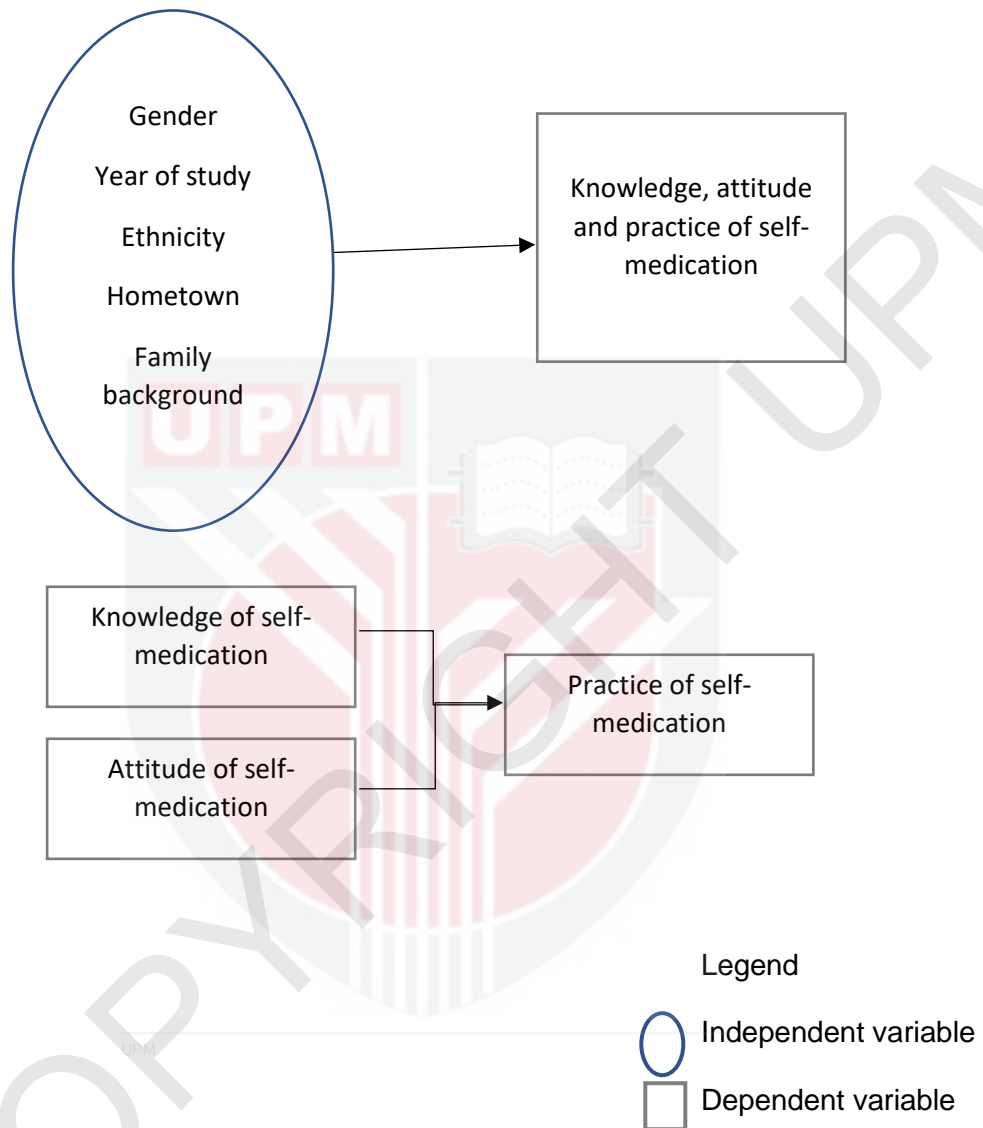


Figure 2.1: Conceptual framework of Evaluation of Knowledge, Attitude and Practice of Self Medication Among Pre-Clinical Medical Student in University Putra Malaysia

CHAPTER 3: METHODOLOGY

This study is divided into two phases, which are:

- a) Phase 1: Preparation and submission of proposal paper, development of questionnaire and proposal presentation
- b) Phase 2: Data collection and data analysis

3.1 Study Location

The study was conducted at the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor.

3.2 Study Duration

The study was conducted for approximately 4 months, which is from 1st June 2020 until 9th October 2020. The data collection period was from 17th August until 24th August.

3.3 Study Design

The form of study design that was used to obtain the necessary data was cross-sectional study. This cross-sectional study design was used to study a defined population of pre-clinical medical students in Universiti Putra Malaysia.

3.4 Sampling

3.4.1 Study population

The study population consists of pre-clinical medical students from Universiti Putra Malaysia.

3.4.2 Sampling population

Pre-clinical medical students from Universiti Putra Malaysia who fulfilled the inclusion and exclusion criteria

3.4.2.1 Inclusion criteria

1. Medical students who were enrolled as Year 1 and Year 2 students for Semester 2019/2020 at Universiti Putra Malaysia
2. Students who gave consent to participate in the study

3.4.2.2 Exclusion criteria

1. Students who were not reachable through Whatsapp
2. Those who did not consent to participate in the study

3.4.3 Sampling Frame

Pre-clinical medical students enrolled at Universiti Putra Malaysia

3.4.4 Sampling Unit

A selected pre-clinical medical student that fulfil all the inclusion and exclusion criteria.

3.4.5 Sample Size Estimation

The sample size for this research was calculated using the two-sample proportion formula. A few sample size calculations were made according to the objectives of this study and the largest number that was under the limit of our population size was chosen to be the sample size. Refer to Appendix 2 for the rest of the calculations.

$$n = \frac{[Z_{1-\alpha}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}]^2}{(P_1 - P_2)^2}$$

Where,

$Z_{1-\alpha}$ = level of significance (1.96)

P = mean of proportion of two sample

$Z_{1-\beta}$ = power of study (0.84)

n = sample size

Adjustment for non-response was done using this formula.

$$n_{final} = \frac{n \text{ calculated}}{1 - \text{nonresponse\%}}$$

The previous study stated a prevalence of females who practised self-medication was 84.6% which is the proportion in this formula as $P_1 = 0.85$. Whereas, the prevalence of males who practised self-medication was 63.5% which is the proportion in this formula as $P_2 = 0.64$. These values were inserted, and the sample size was calculated. The minimum number obtained is 148 but with a non-response rate of 10%, the sample size selected for this research including the non- response is 165 which is the final sample size.

3.4.6 Sampling Method

The sampling method that was used in our study is simple random sampling. The list name of students in Year 1 and Year 2 was compiled and each student was assigned a number from 1 – 226. 165 numbers were randomly selected, and these students were sent a link of our questionnaire in order to participate in our study.

3.5 Variables

3.5.1 Dependent Variables

The dependent variable in this study is the level of knowledge, attitude and practice of self-medication among preclinical medical students of Universiti Putra Malaysia.

3.5.2 Independent Variables

The independent variables in this study are socio-demographic factors commonly associated with self-medication such as:

1. Gender
2. Ethnicity
3. Year of study
4. Hometown
5. Family background (Medical personnel in the family)

3.6 Data Collection

3.6.1 Instruments of study

Self-administered questionnaire was distributed to the respondents and the data was collected based on it. The questionnaire is divided into 2 sections which are Section 1: Socio-demographic information and Section 2: Knowledge, Attitude and Practice of Self-Medication.

The development of questionnaire (Phase 1) is made based on previously validated questionnaire which was used in previous study with slight modification to suit our study. Phase 1 lasted 2 weeks from the original date of the research commence which is 1st June 2020. The Phase 2 of this study only proceed after receiving ethical approval from the Ethics Committee for Research Involving Human Subject (JKEUPM), and these questionnaires was distributed in online form due to the inability to distribute them physically during the COVID-19 pandemic.

3.6.1.1 Questionnaire

The instrument that was used during data collection is a questionnaire adapted from a pre-validated questionnaire used in a study conducted by Maan et al., (2018). The questionnaire is attached in Appendix 1. It comprises of a few sections based on the objectives of the study:

Section 1: Socio-demographic Information

Respondents are required to fill in their socio-demographic information which are age, gender, ethnicity, year of study, hometown and family background.

Section 2: Knowledge, Attitude and Practice of Self-Medication

This section tests the respondents' knowledge, attitude and practice of self-medication. Question 1 to 8 intends to assess the respondents' patterns in self-medication. Respondents are required to answer multiple choice questions for these items. Question 9 tests the respondents' attitude on self-medication. Respondents were required to answer a set 7 items based on a 5-point Likert scale ranging from not important to very important. There were a few items in this questionnaire which were negatively worded which were items a), d), e) and g). Respondents were scored according their answer for the Likert scale. A higher score reflects positive attitude towards self-medication. Whereas question 10 tests respondents' knowledge on self-medication. It consists of a set of 9 items where respondents are given the choice to answer between yes, no or I don't know. Similarly, a higher score reflects good knowledge in self-medication.

3.6.2 Data collection technique

The questionnaire was self-administered through Google Forms. The link to the Google Forms was distributed to selected Year 1 and Year 2 medical students of Universiti Putra Malaysia from 17th August 2020 until 24th August 2020 for

them to answer. To ensure a high response rate the chosen participants were followed up in regarding the completion of the questionnaire and if there were any amendments that we had to inform them of. This enable us to achieve the proposed sample size with high response rate.

3.7 Operational Definition

Terms	Definition
Age	Age of the respondents
Gender	Male or female
Ethnicity	Malay, Chinese, Indian or Others
Year of study	First Year student or Second Year student
Hometown	Urban or rural
Family background	Medical personnel in the family or none
Knowledge on self-medication	The total scores obtained based on 7 items. The score range is between 0 to 7 and a higher score reflects a higher knowledge in self-medication.
Attitude towards self-medication	The total score obtained based on 9 items. The score range is between 9 to 45 and a higher score reflects positive attitude in self-medication.
Practice towards self-medication	Yes or no

3.8 Validity and Reliability

The components and relevant questions used in the questionnaire were incorporated from a previously validated questionnaire from a recent study in similar areas of interest (Maan et al., 2018). The content was also reviewed by the supervisory committee to ensure relevance to the study.

3.9 Data Analysis

IBM SPSS Statistics version 25.0 (SPSS Inc., Chicago, IL, USA) was used as an instrument in recording data and statistical analysis. For categorical data, the variables are presented in a form of percentage and frequency whereas the continuous data is displayed in median form. After conducting a normality assessment, it was found that our data was not normally distributed. Thus, Mann-Whitney U test was used to test the difference between the dependent variables (knowledge and attitude of self-medication) and independent variables (gender, year of study, hometown and family background). Whereas for ethnicity, the Kruskal Wallis test was used. Chi Square test was used to test the association between practice of self-medication with all the socio-demographic characteristics. On the other hand, to test the difference between the dependent variables, Mann-Whitney U test was used.

3.10 Ethical Approval

This study was conducted in accordance with the merits and required criteria of conducting an ethical and safe study under the approval of the Ethics Committee for Research Involving Human Subject (JKEUPM). A detailed letter that includes the research proposal and the set of questionnaires was submitted and ensured to be approved before the commence of this research. The researchers vow to uphold the standard of conducting ethical research as per Ethics Committee for Research Involving Human Subject (JKEUPM) guidelines and ensure that all sensitive data obtained from this study which includes participants personal information was attended to with utmost form of confidentiality.

CHAPTER 4: RESULTS

4.1 Response Rate

Our calculated sample size was 165. During the period of online questionnaire distribution from 17/08/2020 to 25/08/2020, there were total of 165 respondents, thus achieving our sample size that is required. The response rate for this study is 100%.

4.2 Normality Assessment

The normality assessment is done for continuous variable in a study. The continuous variable in our study includes the level of knowledge of self-medication and the attitude towards self-medication. Table 4.1 shows the normality test done for the level of knowledge and attitude towards self-medication. Both variables were found to be not normally distributed.

Table 4.1: Normality assessment for continuous variables

Variable	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	dF	Sig.	Statistics	dF	Sig.
Knowledge	0.267	165	0.000	0.820	165	0.000
Attitude	0.101	165	0.000	0.982	165	0.028

4.3 Distribution of socio-demographic characteristics of respondents

Table 4.2 displays the distribution of the socio-demographic factors (gender, ethnicity, year of study, hometown and medical personnel in the family) among the pre-clinical medical students in UPM. As the data shows, majority of respondents are females (65.5%) and the minority are males (34.5%). In the ethnic group division, most of the respondents were Malay (58.8%), followed by Indian (21.8%), Chinese (15.8%) and lastly making up the minority of respondents were Others (3.6%). Most respondents were from urban areas (82.4%) while the remaining are from rural areas (17.6%). Second Year students (54.5%) make up the majority of the respondents and the

remaining were First Year students (45.5%). There were more respondents with no medical personnel in the family (72.3%) compared to those with medical personnel in the family (27.7%).

Table 4.2: Distribution of socio-demographic characteristics of respondents

Variables	Categories	Frequency (n)	Percentage (%)
Gender	Male	57	34.5
	Female	108	65.5
	Total	165	100.0
Ethnicity	Malay	97	58.8
	Chinese	26	15.8
	Indian	36	21.8
	Others	6	3.6
	Total	165	100.0
Hometown	Urban	136	82.4
	Rural	29	17.6
	Total	165	100.0
Year of study	First Year	75	45.5
	Second Year	90	54.5
	Total	165	100.0
Medical Personnel in the family	Yes	44	26.7
	No	121	73.3
	Total	165	100.0

4.4 Pattern of self-medication among respondents among pre-clinical medical students of Universiti Putra Malaysia

4.4.1 Practice of self-medication

Table 4.3: Practice of self-medication among pre-clinical medical students

Practise self-medication	Frequency	Percentage
Yes	95	57.6
No	70	42.4
Total	165	100.0

Table 4.3 shows the distribution of pre-clinical medical students of Universiti Putra Malaysia that practise and do not practise self-medication. It was found that more students (57.6%) practise self-medication and the remaining (42.2%) do not practise self-medication.

4.4.2 Source of information used for self-medication

Table 4.4: Source of information used for self-medication among pre-clinical medical students

Source of information	Frequency	Percent
*Multiple answers		
Lecture	25	13.2
Textbook	8	4.2
Previous prescription	76	40.0
Advertisement	12	6.3
Pharmacist	69	36.3
Total	190	100.0

Table 4.4 shows the source of information used for self-medication among pre-clinical medical students of Universiti Putra Malaysia. Previous prescription (40.0%) was the most used source of information used for self-medication among our respondents. This is followed by pharmacist (36.3%), lecture (13.2%), advertisement (6.3%) and lastly textbook (4.2%).

4.4.3 Reasons for self-medication

Table 4.5: Reasons for self-medication among pre-clinical medical students

Reason for self-medication *Multiple answers	Frequency	Percent
No need to visit doctor for minor illnesses	81	22.0
Quick relief	78	21.1
Time saving	70	19.0
Confident on your knowledge on medicine	17	4.6
Economical	23	6.2
Ease of convenience	63	17.1
Learning opportunity	14	3.8
Crowd avoidance	23	6.2
Total	369	100.0

Table 4.5 displays the reasons for self-medication among our respondents. The most common reason for self-medication among pre-clinical medical students is that there is no need to visit a doctor for minor illnesses (22.0%) followed by that it provides quick relief (21.1%), is time saving (19.0%) and provides ease of convenience (17.1%). Among the least common reasons to self-medicate include that it is economical (6.2%), to avoid crowds (6.2%), and is confident on their knowledge on medicine (4.6%). The least amount of people consider self-medication as a learning opportunity (3.8%).

4.4.4 Indication for self-medication

Table 4.6: Indication to self-medicate among pre-clinical medical students

Indication *Multiple answers	Frequency	Percentage
Headache	148	21.1
Fever	140	19.9
Cough, cold and sore throat	137	19.5
Stomach ache	76	10.8
Menstrual symptoms	64	9.1
Vomiting	35	5.0

Diarrhoea	55	7.8
Ocular symptom	12	1.7
Skin symptoms	35	5.0
Total	702	100.0

Table 4.6 shows the indication to self-medicate among pre-clinical medical students of Universiti Putra Malaysia. The most common indication is headache (21.1%) followed by fever (19.9%) and cough, cold and sore throat (19.5%). Stomach ache (10.8%), menstrual symptoms (9.1%) and diarrhoea (7.8%) were less common in comparison. Vomiting (5.0%), skin symptoms (5.0%) and ocular symptoms (1.7%) were the least common indications to self-medicate among our respondents.

4.4.5 Drugs used for self-medication

Table 4.7: Type of drugs used for self-medication among pre-clinical medical students

Drugs used	Frequency	Percent
*Multiple answers		
Analgesics	128	27.6
Antimicrobials	23	5.0
Multivitamins	110	23.8
Antispasmodics	6	1.3
Decongestants	60	13.0
Lozenges	136	29.4
Total	463	100.0

Table 4.7 shows the drugs used in self-medication among pre-clinical medical students of Universiti Putra Malaysia. The most used drugs in self-medication are lozenges (29.4%) followed by analgesics (27.6%), multivitamins (23.8%) and decongestants (13.0%). Antimicrobials (5.0%), and antispasmodics (1.3%) were the less commonly used drugs in self-medication among our respondents.

4.4.6 Reasons against self-medication

Table 4.8: Reasons against self-medication among pre-clinical medical students

Reason against self-medication *Multiple answers	Frequency	Percent
Lack of knowledge	123	16.7
Risk of adverse effects	149	20.2
Risk of using the wrong drugs	140	19.0
Risk of misdiagnosing	123	16.7
Risk of drug dependence	79	10.7
Risk of using drugs wrongly	123	16.7
Total	737	100.0

Table 4.8 displays the reasons against self-medication among pre-clinical medical students of Universiti Putra Malaysia. The most common reasons against self-medication include risk of adverse effects (20.2%) followed by risk of using the the wrong drugs (19.0%) and lack of knowledge, risk of misdiagnosing and risk of using drugs wrongly all at 16.7% each. The least common reason against self-medication was risk of drug dependence at only 10.7%.

4.4.7 Step taken before self-medicating

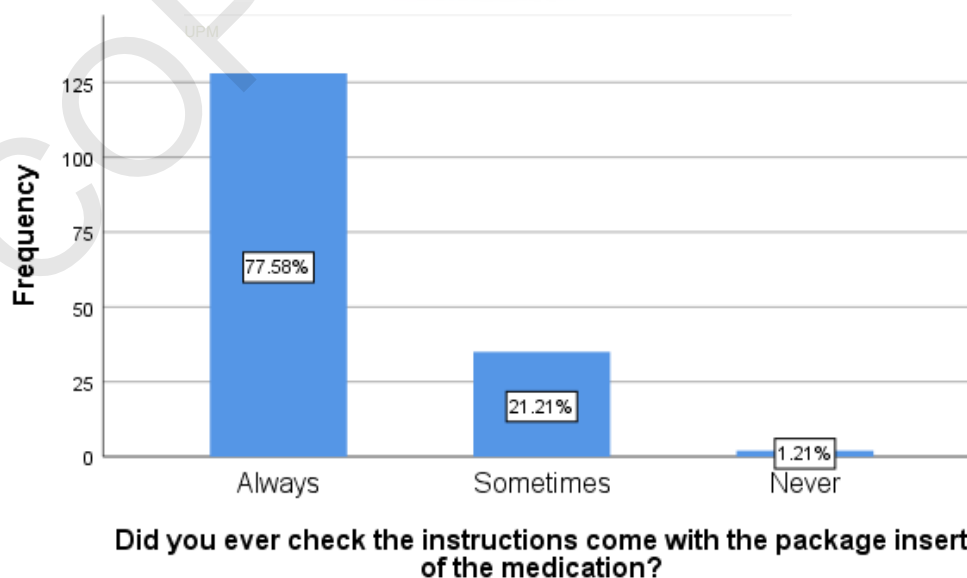
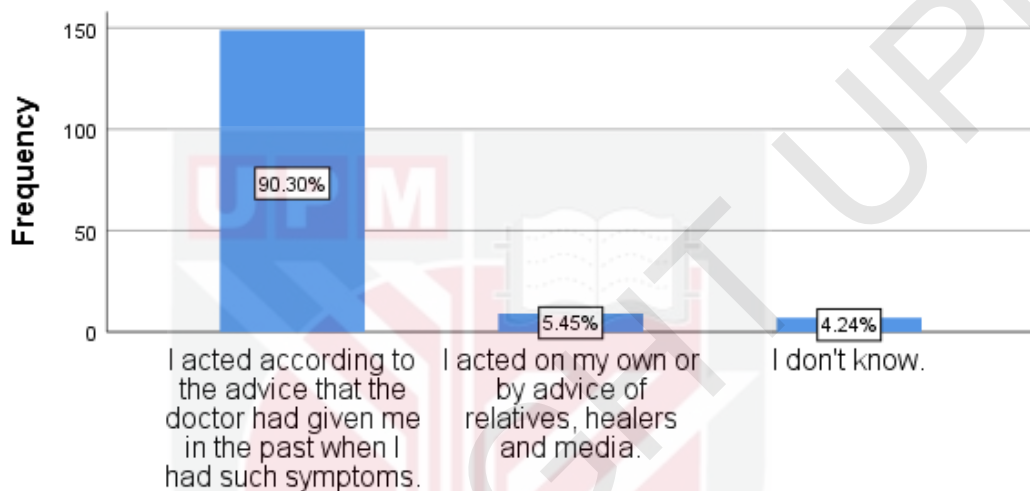


Figure 4.1: Step Taken Before Self-Medicating

Figure 4.1 shows the frequency and percentage of students who checked instructions that came with the package before self-medicating. It is found that 77.58% of the students always checked the instructions. Whereas 21.21% only checked it sometimes and the remaining 1.21% never checked the instructions before self-medicating.

4.4.8 Reaction to adverse effects after self-medicating



In the past year, how did you act in case of the following health problems: unplanned weight loss, urethra discharge, back pain, toothache, mild injuries, headache, rectal bleeding, muscle or joint pain, diarrhea, heartburn, cold or flu, anxiety, warts, vomiting, sore throat, sinusitis, fever, allergic rhinitis, nose bleeding, cough, obesity, earache, allergies, depression, general poor feeling, and nasal discharge.

Figure 4.2: Reaction To Adverse Effects After Self-Medicating

Figure 4.2 displays the frequency and percentage of students' reaction to adverse effects after self-medicating. It is found that 90.30% acted according to the advice given by the doctor when they had such symptoms. The rest of the students acted on their own or the advice of relatives, healers and media (5.45%) and some don't know (4.24%).

4.5 Level of knowledge, attitude and practice and its comparison according to socio-demographic characteristics

4.5.1 Knowledge

Table 4.9: Knowledge scores according to socio-demographic characteristics

Variables		Knowledge	p-value
		Median (IQR)	
Gender	Male	6.00 (1)	0.583
	Female	6.00 (1)	
Ethnicity	Malay	6.00 (3)	0.201
	Chinese	7.00 (2)	
	Indian	6.00 (1)	
	Others	7.00 (2)	
Education level	First Year	6.00 (2)	0.081
	Second Year	6.50 (1)	
Hometown	Urban	6.00 (1)	0.325
	Rural	7.00 (1)	
Medical personnel in the family	Yes	6.00 (2)	0.067
	No	6.00 (1)	

Table 4.9 shows the distribution of knowledge score among socio-demographic characteristics in median form along with the 25th and 75th percentile and its difference among the socio-demographic factors. After running the Mann-Whitney U test, it was found that none of the socio-demographic characteristic showed a significant difference in knowledge as the p-values were more than 0.05.

4.5.2 Attitude

Table 4.10: Attitude score according to socio-demographic characteristics

Variables		Attitude	p-value
		Median (IQR)	
Gender	Male	23.00 (3)	0.063
	Female	22.00 (4)	
Ethnicity	Malay	23.00 (3)	0.082
	Chinese	21.00 (3)	
	Indian	23.00 (4)	
	Others	21.00 (4)	
Education level	First Year	22.00 (3)	0.805
	Second Year	23.00 (3)	
Hometown	Urban	22.00 (3)	0.998
	Rural	22.00 (5)	
Medical personnel in the family	Yes	23.00 (3)	0.112
	No	22.00 (4)	

Table 4.10 shows the distribution of attitude score among socio-demographic characteristics in median form along with the 25th and 75th percentile and its difference among the socio-demographic factors. After running the Mann-Whitney U test, it was found that none of the socio-demographic characteristic showed a significant difference in attitude as the p-values were more than 0.05.

4.5.3 Practice

Table 4.11: Prevalence of self-medication among socio-demographic characteristics

Variables		Practice		Chi-square	p-value
		Yes n (%)	No n (%)		
Gender	Male	30 (52.6)	27 (47.4)	0.872	0.351
	Female	65 (60.2)	43 (39.8)		
Ethnicity	Malay	50 (51.5)	47 (48.5)	3.680	0.298
	Chinese	18 (69.2)	8 (30.8)		
	Indian	23 (63.9)	13 (36.1)		
	Others	4 (66.7)	2 (33.3)		
Education level	First Year	38 (50.7)	37 (49.3)	2.687	0.101
	Second Year	57 (63.3)	33 (36.7)		
Hometown	Urban	76 (55.9)	60 (44.1)	0.908	0.341
	Rural	19 (65.5)	10 (34.5)		
Medical personnel in the family	Yes	25 (56.8)	19 (43.2)	0.014	0.905
	No	70 (57.9)	51 (42.1)		

Table 4.11 shows the prevalence of self-medication among the socio-demographic characteristics and the difference between each characteristic. After running the Chi Square test, it was found that there was no significant difference in the practice of self-medication among the socio-demographic factors as the p-value were all more than 0.05.

4.6 Association between knowledge and attitude with the practice of self-medication

4.6.1 Association between knowledge and practice of self-medication

Table 4.12: Ranks table for knowledge about self-medication and practice of self-medication

	Practice of self-medication	Mean Rank
Knowledge about self-medication	Yes	87.51
	No	76.89

Table 4.13: Test statistics table for knowledge about self-medication and practice of self-medication

	Value
Mann-Whitney U	2897.00
p-value	0.142

Table 4.13 shows the association between knowledge of self-medication and the practice of self-medication. Table 4.12 shows that the mean rank score for knowledge in those who practise self-medication is 87.51 while in those who do not practise self-medication is 76.89. However, the result showed that the P-value is 0.142 which is not significant. Therefore, there is no significant association between the knowledge of self-medication with the practice of self-medication.

4.6.2 Association between attitude and practice of self-medication

Table 4.14: Ranks table for attitude about self-medication and practice of self-medication

	Practice of self-medication	Mean Rank
Attitude about self-medication	Yes	68.57
	No	102.59

Table 4.15: Test statistics table for attitude about self-medication and practice of self-medication

	Value
Mann-Whitney U	1954.00
p-value	$p < 0.001$

Table 4.15 shows the association between attitude towards self-medication and the practice of self-medication. Table 4.14 shows the mean rank score for attitude in those who practise self-medication is 68.57 while in those who do not practise self-medication is 102.59. There is a significant association between attitude towards self-medication and the practice of self-medication as the p-value is less than 0.001.

CHAPTER 5: DISCUSSION

5.1 Level of knowledge, attitude and practice of self-medication among pre-clinical medical students of Universiti Putra Malaysia

5.1.1 Level of knowledge

Our approach to assess the level of knowledge of self-medication among pre-clinical medical students is slightly different from other studies as we used continuous data compared to categorical data. In our study, the highest score was 9 and the lowest score was 0. Most of the students, 130 (78.8%) scored 6 over 9 which is more than the average score. So, it can be concluded that most of the respondents of our study have above average to above average knowledge regarding self-medication. Similarly, a study done among medical students in Melaka Manipal Medical College Maan et al. (2018) reported that majority of the students, 80 (48.6%) have moderate knowledge about self-medication. Another study done among first year medical students in university in Bahrain stated that the students have poor knowledge about appropriate self-medication James et al. (2006). In another study which displayed knowledge in continuous form, Gyawali et al. (2015) reported that the average score among their respondents was 74.54 (6.92) out of a total score of 100. Therefore, we can conclude that most medical students across many studies were found to have average to above average knowledge regarding self-medication.

5.1.2 Level of attitude

Similarly for the scoring of attitude, our approach differed slightly. We used continuous data therefore attitude is a quantitative variable instead of qualitative variable. The highest score for attitude in our study was 31 and the lowest score recorded was 16. The average score for attitude obtained by pre-clinical medical students of UPM was of 22.39 and it was found that only 81

(49%) of them scored higher than the average score and had a more positive attitude toward self-medication. In another study done by Maan et al. (2018) was based among medical students of all years in Melaka Manipal Medical College, it was found that 42.5% of their respondents had a good attitude and 37.7% of them had moderate attitude regarding self-medication. Overall, our students showed a more negative attitude compared to a previous study, this may be due to our students being less exposed to the benefits of self-medication. Similarly, Gyawali et al. (2015) which conducted a study among second and fourth semester medical students from Western Nepal found that the mean attitude score among their respondents was 67.18 (5.68) out of a total score of 100. Across most study, similarly to ours it was found that medical students had positive attitude towards self-medication which is probably why the prevalence of self-medication is relatively high in comparison to the general population.

5.1.3 Level of practice

In our study, it was found that the prevalence of self-medication was 57.6%. Similarly, in studies conducted among First Year students, James et al. (2006) reported a prevalence of self-medication to be 44.8% whereas in another study conducted by Jagadeesh et al., (2015) done among Second Years students reported it to be 66%. In a more recent study, Maan et al. (2018) found that self-medication was practised by 76.65% of their respondents which were made up of medical students from Melaka Manipal Medical College. A higher prevalence of self-medication was reported in a study conducted by Thadani et al. (2013) where 90.7% of 2nd year medical students practise self-medication. Self-medication is higher among medical students because it is thought to be due to easier access to information and to the drugs themselves, which leads to self-medication being a common phenomenon in medical schools.

5.1.3.1 Source of information for self-medication

Previous prescription (40.0%) was the most used source of information used for self-medication among our respondents. Similar results were reported in a study conducted by Jagadeesh et al. (2015) and Maan et al. (2018) where previous consultation was the most favoured source of information for self-medication among their respondents with 82.8% and 64.8% respectively. In a similar study done among 2nd year medical students in India, Sankdia et al. (2017) supported this and argued that it may be because students had visited the doctor for similar symptoms before and find it unnecessary to visit again for the same complaints. Textbooks (4.2%) was the least chosen source of information in our study; this is in contrast with the findings from Badiger et al. (2012) in their study done among medical students in South India and Benameur et al. (2019) in their study done among medical and non-medical students of King Faisal University, Saudi Arabia where textbooks were the most common source of information. This may be because our respondents trust their previous experience with a particular drug more compared to their textbook knowledge.

5.1.3.2 Reasons for self-medication

Our study showed that the most common reason for self-medication among pre-clinical medical students is that there is no need to visit a doctor for minor illnesses (22.0%). This finding was consistent with a study done by Thadani et al. (2013) among 2nd year medical students in India where the pivotal rationale that led to self-medication was reducing the need to visit a doctor for every subsequent minor illness as well as self-medication being to provide an instant aid to their ailments. In another study done by

James et al. (2006) among 1st year medical students in Bahrain, it was stated a similar finding to the former research showing that 72% students in their study preferred self-medication as they considered that a professional consultation was unnecessary for minor ailments every time they fall sick.

5.1.3.3 Indication for self-medication

The most common indication for self-medication in our study is headache (21.1%) followed by fever (19.9%) and cough, cold and sore throat (19.5%). Compared to a study done among all medical students in Melaka Manipal Medical College by Maan et al. (2018), the most prevalent indications to administer self-medication were cough, cold, sore throat (19.3%) with fever (19.1%) being second to these indications. A recent study which was conducted among students of King Faisal University, Saudi Arabia regarding use of antibiotics by Benameur et al. (2019) also supports this trend whereby it was reported that the most common illness for which self-medication was used was sore throat followed by pyrexia and cough. This may be because fever, cough and cold are the major cause as to why students miss lectures and have reduced attendance. On the other hand, headache is probably due to strain on eyes while studying and lack of sleep which is common among students.

5.1.3.4 Drugs used in self-medication

Studies also done among pre-clinical medical students by Jagadeesh et al. (2015), James et al. (2006) and Thadani et al. (2013) found that analgesics were the most commonly used drugs for self-medication. Similarly in our study, lozenges (29.4%), analgesics (27.6%) and multivitamins (23.8%)

were among the most commonly used drugs in self-medication in our study. These findings were similar in a study conducted among all medical students in Melaka done by Maan et al. (2018). This reflects the common indications for self-medication for our study which were headache, cough, cold and sore throat and also fever. Maan et al. (2018) also stated that this could also be due to these drugs availability over the counter and the majority of people have had experience with them before.

5.1.3.5 Reasons against self-medication

The most common reason against self-medication is the risk of adverse effects. This is consistent with findings from James et al. (2006), Sankdia et al. (2017) and Maan et al. (2018) in their studies which were done among medical students in their respective countries. This shows that regardless of year of study, medical students are aware of the adverse effects of self-medication as stated by Kasulkar & Gupta (2015).

5.1.3.6 Step taken before self-medicating

77.58% of pre-clinical students who participated in our study always checked the instructions that were packaged with the drugs taken. Similar findings were found by Kasulkar & Gupta (2015) where 79.1% of the students read packaged instructions and followed them. James et al. (2006) also reported the same findings. This shows that medical students are mostly careful when it comes to self-medication and makes sure to take precaution before administering drugs upon themselves.

5.1.3.7 Reaction to adverse effects after self-medicating

In our study, the majority of our respondents (90.3%) acted according to the advice given by the doctor when they experienced adverse effects after self-medicating. This is a common finding across most studies (Kasulkar & Gupta, 2013; Badiger et. al., 2012) where medical students stopped the medication and consulted a doctor if they are ever experiencing adverse effects to the drugs taken. It is safe to conclude that even though these students self-medicate without the consultation of a physician, they still trust professional healthcare workers for help if there are any side effects from the drugs they had taken.

5.2 Difference in level of knowledge, attitude and practice of self-medication among socio-demographic characteristics among pre-clinical medical students of Universiti Putra Malaysia

5.2.1 Difference in level of knowledge of self-medication among socio-demographic characteristics

In our study, we found that there was no significant difference in knowledge between gender. Similar findings were found in a study done by Maan et al. (2018) and Ramadan et al. (2018). This may be because the students receive the same knowledge from medical school and have relatively the same experience on self-medication regardless of gender.

For ethnicity, we found that Chinese had the highest mean score (6.35) among all the others. However, the result showed there was no significant difference between knowledge among different ethnicities as the p-value is 0.201. This finding was consistent with the study done among medical students from Melaka Manipal Medical College by Maan et al. (2018) where the association was also not significant.

There was also no significant difference in knowledge score between hometown as the p-value was 0.325. However, there was an uneven distribution of hometown which could be due to the undefined context of what constitutes as an urban or rural area. The students were left to deduce their hometown by their own metrics which could have distorted the results in our study.

As for year of study, second year had a higher mean score than first year students. However, the p-value showed no significant difference between knowledge with the year of study. Less study was done to compare the association between the knowledge about self-medication with the year of study. However, a study done by Gyawali et al. (2015) stated that fourth semester students had higher mean scores than second semester students which is similar to our study. This could be due to students gaining more knowledge as they learn more about other drugs and diseases in their curriculum.

We could not find any studies that investigated the association between the knowledge of self-medication with family background in Malaysia. But in our study, those without medical personnel showed a higher score for knowledge reflecting a better knowledge in self-medication than those without. As the number of respondents with medical personnel in the family was so low, we cannot draw a concrete conclusion if this trend could be applied to other studies. However, it was found that there was no significant difference among those with a family background in the medical field. This is in accordance with a study done in Western Nepal among medical students by Gyawali et. al. (2015) which stated that there was no significant difference between knowledge and parents' profession.

5.2.2 Difference in level of attitude of self-medication among socio-demographic characteristics

In our study, we found that all the socio-demographic factor had no difference in level of attitude of self-medication. For informative purposes the p value for following association are as such for attitude and gender is $p = 0.063$, attitude and ethnicity is $p = 0.082$, attitude and year of study is $p = 0.805$, while attitude and hometown is $p = 0.998$ and lastly between attitude and medical personnel is $p = 0.112$. Though it is worth mentioning different trends were found among other studies. Studies by Ramadan et al. (2018), Hu et al. (2018) and Benameur et al. (2019) which involved both pre-clinical and clinical medical students also showed that there is no association between gender and attitude. One assumption that we like to deduce is that attitude on self-medication is not affected by a person's gender, unlike in terms of practise of self-medication a different trend and explanation may be found. In terms of ethnicity, studies by Maan et al. (2018), Dawood et al. (2017) and Muzaffar et al. (2016) showed no association though it is to note that the former study was among medical students while the two later studies were done in general public in Malaysia. This may be despite cultural differences and respective form of traditional medicine that exist and associated with ethnicity, there isn't enough influence that directly affects the attitude level on self-medication among pre-clinical medical students. On another aspect, a study by Hu et al. (2018) done among medical students in China regarding the use of antibiotics reported a similar conclusion in aspect that no association was reported between socio-demographic factors and attitude on self-medication.

5.2.3 Difference in level of practice of self-medication among socio-demographic characteristics

In terms of gender, females (60.2%) practise self-medication more than males (52.6%). These findings are similar in studies performed by Kasulkar and Gupta (2015) and Maan et. al. (2018). Kanwal et al. (2018) reported the same findings and they stated that this may be due to a higher number of female students in medical schools instead of the probable assumption that female gender having higher need of use of analgesics to aid period cramps that occurs as a biological process, whereas their male counterpart don't face this problem and thus a reduced need to self-medicate. However, gender was found to not have a statistically significant difference in the practice of self-medication in our study which is contrary to the findings by Maan et. al. (2018) which reported a significant association. The difference in the findings may be because the former study was conducted among medical students of all years.

As for ethnicity, Chinese students (69.2%) were found to have the highest prevalence of self-medication. The National Health and Morbidity Survey (2015) which was done among the general population also reported that Chinese (46.8%) people practised self-medication the most among other races. However, this is in contrast with the findings of another study done exclusively among medical students by Maan et. al. (2018) where they found the Chinese students practise self-medication the least among other ethnicities in their study. Even so, the former study reported no significant difference between ethnicity and the practice of self-medication which is similar to the findings of our study.

In our study, it was found that those who are from rural areas (65.5%) practised self-medication more compared to those from urban areas (55.9%). This contradicts our assumption of urban areas having higher practise of self-

medication compared to rural areas due to the ease of availability of medicines in stores and pharmacies that are in relatively higher number in urban areas. The difference in findings could be due to our respondents being unclear on what is considered urban and rural as we did not specify what are the metric or parameters used to categorise whether their place of occupancy is considered as urban or rural area. A few studies (Helal & Abou-Elwafa;2017 Hu et al., 2018) reported urban areas showed a higher prevalence of self-medication and found that living in an urban area to be a predictor of self-medication. Hu et al. (2018) concluded that this could be because of the easy access to medicine as more pharmacies are located in urban areas. The difference in findings may be due to uneven distribution of respondents living in urban and rural area due to our questionnaire not stating what would be considered as urban or rural which left our respondents to deduct by themselves.

Similarly to other studies (Kalsukar & Gupta, 2016; Gyawali, 2015; Hu et al., 2018), our findings showed an increasing prevalence of self-medication where only 50.7% of First Year students practised self-medication in comparison to 63.3% of Second Year students practising it. This could be due to students gaining more knowledge by attending lectures and studying cases which resulted in having an increased confidence in practicing self-medication. Although the association between year of study was found to be not significant unlike the aforementioned studies, this might be due to the fact that our study was conducted among pre-clinical students which have similar amounts of knowledge in contrast to clinical students.

Lastly, those without medical personnel in the family (57.9%) practised self-medication slightly more than those with medical personnel in the family (56.8%). There was also no significant association reported between family background and the practice of self-medication in our study. This is in contrast

with studies conducted by Gyawali et. al. (2015), Hu et. al. (2018) and Thadani et. al. (2013) where those with parents with a medical background showed a higher prevalence of self-medication. This could be due to our respondents being unclear as to what a medical personnel is.

5.3 Association between level of knowledge and attitude of self-medication with the practice of self-medication among pre-clinical medical students of Universiti Putra Malaysia

5.3.1 Association between level of knowledge of self-medication with the practice of self-medication

There was no significant association found between level of knowledge and practice of self-medication among pre-clinical medical students in UPM. This was similar to a study done by Maan et. al. (2018) among medical students in medical school in Melaka.

5.3.2 Association between level of attitude of self-medication with the practice of self-medication

There was a significant association found between attitude towards self-medication and practice of self-medication among students in UPM with a $p < 0.001$. It is found that those with a more positive attitude on self-medication practise it less compared to those with a more negative attitude regarding self-medication. This may be due to our respondents deciding to practise self-medication based off their knowledge of self-medication compared to their attitude on it. Most study that we have reviewed did not seem to have any test done to elicit the association between attitude and practise of self-medication except one study by done by Maan et al. (2018). They reported similar association between attitude and the practice of self-medication, however it

was found that those with moderate attitude practise self-medication more than those with poor attitude on self-medication.



CHAPTER 6: CONCLUSION

6.1 Summary

From this research, it is seen that the prevalence of self-medication among pre-clinical medical students of Universiti Putra Malaysia is 57.6%. Our respondents were also found to have average to above average knowledge on self-medication and a positive attitude towards self-medication. It was found that there was no significant difference between knowledge, attitude and practice of self-medication with any of the socio-demographic factors.

No significant association was found between knowledge about self-medication with the practice of self-medication. However, it is found that there is a significant association between the attitude towards self-medication with the practice of self-medication where those with a more positive attitude regarding self-medication practise it less than those with a more negative attitude on self-medication.

6.2 Recommendations

We would like to suggest the Ministry of Education of Malaysia to include self-medication in the curriculum as it is important for the students to know how to properly self-medicate and this will reduce the burden on the healthcare system. Also, to emphasise the methods on how to correctly diagnose and choose the right drugs for common minor illnesses in order to ensure appropriate practice of self-medication. This is because self-medication is important for reducing the heavy workload on our healthcare system. We also believe that a more conclusive study should be done by including participants of pre-clinical study from different universities in Malaysia. This could help get a better outlook on the extent of self-medication among medical students.

6.3 Limitations

In this study, one of the limitations is due to Covid-19 pandemic, we could not gather all participants in one hall and distribute the questionnaire to them. So, we used an online questionnaire for this research as it was more practical. Next, as the questionnaire was self-administered about information on self-medication in the preceding 2 years, this led to an underestimation of the reported rates and there was recall bias. A further limitation is that only those who were internet-savvy and in the circle of contacts of respondents' contacts participated in this study.



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Work Plan

Activity \ Month	Apr	May	Jun	Aug	Sep	Oct
Proposal Preparation						
Submission of proposal						
Proposal presentation						
Preparation of ethical approval to organization						
Data collection and analysis						
Presentation of analysed data						
Report writing						
Poster competition						
Final presentation						
Submission of logbook						

APPENDIX 1

EVALUATION OF KNOWLEDGE, ATTITUDE AND PRACTICE OF SELF-MEDICATION
AMONG PRE-CLINICAL MEDICAL STUDENTS OF UNIVERSITI PUTRA MALAYSIA

SECTION 1: SOCIO-DEMOGRAPHIC INFORMATION

1. Age: _____ years
2. Sex
 - a) Male
 - b) Female
3. Ethnicity
 - a. Malay
 - c. Chinese
 - e. Indian
 - f. Other
4. Education level
 - a. First Year
 - b. Second Year
5. Hometown
 - b. Rural
 - d. Urban
6. Any medical personnel in the family
 - a. Yes
 - i. Father
 - ii. Mother
 - iii. Siblings
 - iv. Others
 - b. No

SECTION 2: KNOWLEDGE, ATTITUDE AND PRACTICE OF SELF-MEDICATION

1. Have you ever self-medicated in the past 2 years?
 - a) Yes
 - b) No (If No, please directly go to question 5)

2. If yes, then which of the following was the source of information of the drugs used for self-medication?
 - a) Lecture
 - b) Textbook
 - c) Advertisement
 - d) Previous prescription
 - e) Pharmacist

3. According to you which of the following were the reasons in favour of self-medication?
(Tick (✓) in the relevant boxes; Can be more than 1 box)

No need to visit the doctor for minor illness	
Quick relief	
Time saving	
Confidence on your knowledge about medicines	
Economical	
Ease and convenience	
Learning opportunity	
Crowd avoidance	

4. According to you what were the indications for self-medication?

(Tick (✓) in the relevant boxes; Can be more than 1 box)

Headache	
Fever	
Cough, cold, sore throat	
Stomach ache	
Menstrual symptoms	
Vomiting	
Diarrhoea	
Ocular symptoms	
Skin Symptoms	

5. According to you which of the following drugs were used for self-medication?

(Tick (✓) in the relevant boxes; Can be more than 1 box)

Analgesics	
Antimicrobials	
Multivitamins	
Antispasmodics	
Decongestants	
Lozenges	

6. According to you which of the following were the reasons for not taking self-medication?

(Tick (✓) in the relevant boxes; Can be more than 1 box)

Lack of knowledge about medicines	
Risk of adverse effects	
Risk of using wrong drugs	
Risk of misdiagnosing	
Risk of drug dependence	
Risk of using drugs wrongly	

7. Did you ever check the instructions come with the package insert of the medication?

- a) Yes, Always
- b) Yes, Sometimes
- c) Never

8. In the past year, how did you act in case of the following health problems: unplanned weight loss, urethra discharge, back pain, toothache, mild injuries, headache, rectal bleeding, muscle or joint pain, diarrhea, heartburn, cold or flu, anxiety, warts, vomiting, sore throat, sinusitis, fever, allergic rhinitis, nose bleeding, cough, obesity, earache, allergies, depression, general poor feeling, and nasal discharge.

- a) I acted according to the advice that the doctor had given me in the past when I had such symptoms,
- b) I acted on my own or by advice of relatives, healers and media
- c) I don't know.

9. Please mark ✓, on a scale from 1 to 7, how important the following reasons for self-medication are to you. (1 means that the reason is not important and 7 means that the reason is very important)

Reasons	1 <i>Not Important</i>	2	3 <i>Neutral</i>	4	5 <i>Very Important</i>
a) I don't want to burden my physician because my problems are not important					
b) My physician told me that I can manage such symptoms on my own					
c) I want to play an active role regarding my health					
d) My relatives, friends, media told me that I can manage such symptoms on my own					
e) I don't want to go to my physician due to long waiting time					
f) The prescribed treatment from my physician was not successful					
g) I don't trust my physician					

10. Please mark ✓ at yes, no or I don't know for the following statements based on your knowledge on self-medication.

Statement	Yes	No	I don't know
i. Any drug, including herbal one, has side effects			
ii. Simultaneous use of drugs, including herbal ones, can be potentially dangerous			
iii. Increasing drug dose can be dangerous			
iv. Lowering drug dose can be dangerous			
v. In case of side effects physicians' help must be sought			
vi. Using drugs with unknown substances in patients with liver and kidney diseases is very dangerous			
vii. No drug can be used during pregnancy			
viii. Mild medical problems do not need drug treatment			
ix. Self-treatment can mask the symptoms and signs of diseases, so the physicians can overlook them easily			

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APPENDIX 2

SAMPLE SIZE CALCULATION

Objective:

1. To determine the level of knowledge, attitude and practice of self-medication in Year 1 and Year 2 medical students of Universiti Putra Malaysia

$$n = \frac{Np(1-p)z_{1-\frac{\alpha}{2}}^2}{d^2(N-1) + p(1-p)z_{1-\frac{\alpha}{2}}^2} \qquad n_{final} = \frac{n \text{ calculated}}{1 - \text{nonresponse\%}}$$

Where,

Population size, N = 226

Alpha, $\alpha = 0.05$

Error, d = 0.05

n = sample size

Prevalence	Sample size
i. Knowledge P = 30.6% (Good knowledge) Confidence level = 95%	n = 134 n _{final} = 149
ii. Attitude P = 42.5% (Good attitude) Confidence level = 95%	n = 142 n _{final} = 158
iii. Practice P = 76.7% (Prevalence of self-medication) Confidence level = 95%	n = 125 n _{final} = 139

2. To assess the factors associated with the level of knowledge, attitude and practice of self-medication among medical students

$$n = \frac{[Z_{1-\alpha}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}]^2}{(P_1 - P_2)^2}$$

n_{final}

$$= \frac{n_{calculated}}{1 - nonresponse\%}$$

Where,

$Z_{1-\alpha}$ = level of significance (1.96)

$Z_{1-\beta}$ = power of study (0.84)

P = mean of proportion of two sample

n = sample size

Gender and Practice of Self-Medication	Sample size
P_1 (Females who practice self-medication) = 84.6%	n = 148
P_2 (Males who practice self-medication) = 63.5%	n_{final} = 165

Ethnicity and Practice of Self-Medication	Sample size
i. Malay and non-Malay P_1 (Malays who practice SM) = 18% P_2 (Non Malays who practice SM) = 82%	n = 10 n_{final} = 11
ii. Indian and non-Indian P_1 (Indians who practice SM) = 44.5% P_2 (Non-Indians who practice SM) = 55.5%	n = 375 n_{final} = 416
iii. Chinese and non-Chinese P_1 (Chinese who practice SM) = 27.3% P_2 (Non-Chinese who practice SM) = 72.7%	n = 20 n_{final} = 22
iv. Others and Malay, Indian, Chinese P_1 (Others who practice SM) = 10.2% P_2 (Malays, Indians, Chinese who practice SM) = 89.8%	n = 6 n_{final} = 7

3. To ascertain how does the level of knowledge and attitude towards self-medication affect the practise of self-medication among medical students

$$n = \frac{[Z_{1-\alpha}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}]^2}{(P_1 - P_2)^2} \quad n_{final} = \frac{n_{calculated}}{1 - nonresponse\%}$$

Where,

$Z_{1-\alpha}$ = level of significance (1.96)

$Z_{1-\beta}$ = power of study (0.84)

P = mean of proportion of two sample

n = sample size

Association between knowledge and practise of self-medication	Sample size
i. Good and Poor P_1 (Good knowledge and practice SM) = 31.3% P_2 (Poor knowledge and practice SM) = 21.1%	n = 320 n_{final} = 355
ii. Moderate and Poor P_1 (Moderate knowledge and practice SM) = 47.7% P_2 (Poor knowledge and practice SM) = 21.1%	n = 57 n_{final} = 63

Association between attitude and practise of self-medication	Sample size
i. Good and Poor P_1 (Good attitude and practice SM) = 41.4% P_2 (Poor attitude and practice SM) = 21.1%	n = 66 n_{final} = 73
ii. Moderate and Poor P_1 (Moderate attitude and practice SM) = 40.6% P_2 (Poor attitude and practice SM) = 21.1%	n = 45 n_{final} = 50

Reference book: Wayne W., D. (1995). *Biostatistics: A Foundation of Analysis in the Health Sciences (6th ed.)*. John Wiley & Sons, Inc., 180.