UNIVERSITI PUTRA MALAYSIA

ASSOCIATION BETWEEN SOCIO DEMOGRAPHIC FACTORS WITH KNOWLEDGE AND ATTITUDE LEVEL TOWARDS ANTIBIOTIC USAGE AMONG UPM MEDICAL STUDENTS IN 2013

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ABSTRACT

Background: Medical students' knowledge and attitude towards antibiotic usage play an important role in the field of medicine as they are the future doctors. This study aimed to determine the current knowledge and attitude level of UPM medical students on the usage of antibiotics, which could serve as a baseline data and provide further insight planning for our university's curriculum programmes in relation to antibiotics.

Objective: To determine the knowledge level and attitude level among medical students of UPM on antibiotic usage and its association with their socio-demographic characteristic.

Method: A cross sectional study with stratified sampling method using questionnaires involving pre-clinical year students and clinical year students was conducted. The data was analyzed using SPSS version 21.0.

Results: Nearly 54.23% of the respondents have good knowledge level, including on antibiotic resistance (69.15%), and side effects of antibiotic (70.65%), while only 52.24% students have good attitude level towards antibiotic usage. Age(p=0.001) and medical educational level(p=0.006) were statistically associated with antibiotic knowledge. Meanwhile, race (p=0.042), age (0.030) and medical educational level (0.001) were statistically associated with attitude level. Besides, clinical year students have good knowledge and attitude level on antibiotic usage compare to pre-clinical year students. Lastly, there was a weak correlation between knowledge score and attitude score (p=0.001 , r=0.358) towards antibiotic usage.

Conclusion: There are differences in knowledge and attitude level regarding antibiotic based on socio-demographic factors among medical students of UPM. There is association between knowledge score and attitude score regarding antibiotic among medical students of UPM.

Keywords: *Antibiotic Usage, Knowledge, Attitude, Antibiotic resistance, Medical Students*

"KAITAN ANTARA FAKTOR SOSIO-DEMOGRAFI DENGAN TAHAP PENGETAHUAN DAN SIKAP TERHADAP PENGGUNAAN ANTIBIOTIK DALAM KALANGAN PELAJAR PERUBATAN UPM TAHUN 2013" 25 MAC - 5 SEPTEMBER

ABSTRAK

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Pengenalan: Pengetahuan dan sikap pelajar perubatan terhadap penggunaan antibiotik memainkan peranan yang penting dalam bidang perubatan memandangkan mereka adalah bakal doktor pada masa hadapan. Kajian ini bertujuan untuk menentukan tahap pengetahuan dan sikap pelajar perubatan UPM terhadap penggunaan antibiotik pada masa sekarang, di mana ia boleh dijadikan sebagai ukuran dan menyediakan perancangan yang selanjutnya untuk program kurikulum universiti berkaitan dengan antibiotik.

Objektif: Untuk menentukan tahap pengetahuan dan sikap pelajar perubatan UPM terhadap penggunaan antibiotik dan kaitannya dengan ciri-ciri sosio-demografi.

Kaedah: Kajian keratan rentas dijalankan dengan menggunakan borang soal selidik melibatkan pelajar pra-klinikal dan pelajar klinikal. Data dianalisis menggunakan SPSS 21.0.

Keputusan: Hampir 54.23% daripada responden mempunyai pengetahuan dan sikap(52.24%) yang baik terhadap penggunaan antibiotik. Mereka juga menpunyai tahap pengatahuan yang baik terhadap rintangan antibiotik(69.15%) dan juga kesan sampingan antibiotik(70.65%). Tahap pengetahuan antibiotik mempunyai kaitan statistik antara umur($p=0.001$) dan tahap pendidikan($p=0.006$). Sementara itu, kaum($p=0.042$), umur(0.030) dan tahap pendidikan($p=0.001$) menunjukkan kaitan statistik dengan tahap sikap. Di samping itu, pelajar klinikal mempunyai tahap pengetahuan dan sikap yang baik terhadap penggunaan antibiotik berbanding pelajar pra-klinikal. Akhir sekali, skor pengetahuan dan skor sikap terhadap penggunaan antibiotik menunjukkan hubung kait yang lemah($p=0.001$, $r=0.358$).

Kesimpulan: Terdapat perbezaan antara tahap pengetahuan dan sikap terhadap antibiotik berdasarkan faktor sosio-demografi dalam kalangan pelajar perubatan UPM. Terdapat kaitan antara skor pengetahuan dan skor sikap terhadap antibiotik dalam kalangan pelajar perubatan UPM.

Kata kunci: *Penggunaan Antibiotik, Pengetahuan, Sikap, Rintangan Antibiotik, Pelajar Perubatan.*

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LIST OF ABBREVIATION

ABR	Antibiotic resistance
MRSA	Methicillin Resistance *Streptococcus Aureus* Antibiotic
MDR-TB	Multidrug-resistance tuberculosis
XDR-TB	Extensively drug-resistance tuberculosis
WHO	World Health Organisation
DDD	Defined daily dose
URTI's	Upper respiratory tract infection
ECG	Electrocardiogram

CHAPTER 1: INTRODUCTION

1.1 Introduction

Antimicrobial drugs which act on microorganisms include drugs such as antibiotics, antiviral, antifungal and antimalarial. Antibiotics are a class of drugs used to treat bacterial infection where they destroy bacteria (bactericidal) or prevent bacteria from multiplying (bacteriostatic) (Kumar et al., 2011). Antibiotics decrease morbidity and mortality associated with serious and life-threatening infections diseases but the escalation in antibiotic resistance poses significant threats (Collignon et al., 2009). Antibiotic resistance is an inevitable consequence of antibiotic use. Furthermore, the decline in the development of novel antibiotic to curb antibiotic resistance has created challenges to health policy makers, health care workers and population all around the world. Therefore, antibiotic resistance was the focus of World Health Day 2011 (Brundtland, 2000).

Beside antibiotic resistance, antibiotics have side effects and contraindications that are harmful to the people. Thus, the awareness on antibiotic usage plays vital role in proper use of antibiotic to overcome the above problems. Factors of behaviour of medical students towards antibiotic can be analyzed by knowledge (K) and attitudes (A) (Celia et al., 2010). In addition, medical students are important target groups as they are the future prescribers of antibiotic agent (Celia et al., 2010). The prescribing behavior of medical practitioner is important in the consumption of antibiotic and is a potential tool for control and containment of antibiotic resistance (Celia et al., 2010).

In Malaysia, an observational based study conducted in 2011 among health science students of Masterskilll University College of Health Sciences (MUCH) showed overall knowledge towards antibiotics is only 43% which is less than average

(Kumar et al., 2011). Results of the study showed a very poor knowledge regarding side effects of antibiotics. However, their general knowledge and understanding on classes of antibiotics was just average and as a consequence of inadequate knowledge on medication, this may obviously lead to overuse or patient noncompliance with a drug regimen. This indicates the need of enhanced educational strategies in order to enable health science students to improve their knowledge and attitude towards antibiotic (Kumar et al., 2011)

A cross-sectional study done in 2009 showed that although medical practitioners at the University Hospital of West Indies were aware of the problem of antibiotic resistance and the implications, their attitude did not reflect measures to reduce it (Tennamt et al., 2010). Thus, continuous educational programmes and institution-specific antibiotic prescribing guidelines were emphasized (Tennant et al., 2010). Therefore, changing medical students' attitudes and improving their knowledge regarding antibiotics usage will be an important early strategy to preserve antibiotic effectiveness in the era of resistance.

The aim of this study is to determine the knowledge and attitude towards antibiotic usage among UPM medical students. Thus, this study sought to explore the current level knowledge and attitudes of medical students of University Putra Malaysia who are future doctors to be on antibiotic use, which could serve as baseline data and provide further insight in planning and developing strategies specifically for our university to review on curriculum programmes associated with antibiotics.

1.2 Problem Statement

The World Health Organization has highlighted antibiotic resistance as a major threat of public health in 21st century (WHO, 2007). According to the Malaysian Statistics on Medicine 2005, antibiotics were the most commonly prescribed anti-infective agents by both public and private health-care sectors (Ministry Of Health, 2005). Thus, Ministry of Health had launched a National Campaign on the Containment of Antimicrobial Resistance in 2012 to educate public and medical practitioners especially on the importance of having awareness on this issue. In addition, Health Ministry is emphasizing on the urge to curb this problem as antibiotic resistance is on the increase. In Malaysia, *Streptococcus pneumonia* showed increasing resistance to macrolide antibiotics from 21.9% in 2003 to 30.9% in 2010 while *Acinetobacter baumanii* resistance to the antibiotic Carbapenem increased from 35% in 2005 to approximately 57.4% in 2011 (Ministry Of Health, 2012).

A study done in city of Karachi,Pakistan among medical and non-medical students showed that prevalence of self-medication is high in the educated youth, despite majority being aware of its side effects. This indicates a need to educate the young generation specifically medical students to ensure safe practices (Syed et al., 2008).

Even though the problem of irrational drug usage appears to be, its scope has not been adequately researched in UPM. Therefore this study aims to determine the level of knowledge and attitude toward antibiotics in among medical students in Universiti Putra Malaysia. This study also looks at the association between all the factors of socio-demographic with the knowledge and attitude score.

1.3 Objectives

1.3.1 General Objective:

To determine the association between socio-demographic factors with knowledge and attitude level towards antibiotic usage among medical students of UPM.

1.3.2 Specific Objectives:

a) To describe the socio-demographic characteristics of respondents.

b) To determine the knowledge level on antibiotics usage among medical students of UPM.

c) To determine the attitude level on antibiotics usage among medical students of UPM.

d) To determine the knowledge level on antibiotic resistance and side effect of antibiotic among medical students of UPM.

e) To determine the association of knowledge and attitude level among UPM medical students based on socio-demographic factors.

f) To compare the knowledge level regarding antibiotics usage between pre-clinical and clinical year medical students of UPM.

g) To compare the attitude level regarding antibiotics usage between preclinical and clinical year medical students of UPM.

h) To determine the correlation between knowledge score and attitude score regarding antibiotics usage among medical students of UPM.

1.4 Research Hypothesis

1.4.1 Null hypothesis:

a) There are no differences in knowledge level regarding antibiotics based on socio-demographic factors among medical students of UPM.

b) There are no differences in attitude level regarding antibiotic based on socio-demographic factors among medical students of UPM.

c) There is no association between knowledge score and attitude score regarding antibiotics usage among medical students of UPM.

1.4.2 Alternative hypothesis:

a) There are differences in knowledge level regarding antibiotics based on socio-demographic factors among medical students of UPM.

b) There are differences in attitude level regarding antibiotic based on socio-demographic factors among medical students of UPM.

c) There is association between knowledge score and attitude score regarding antibiotics among medical students of UPM.

CHAPTER 2: LITERATURE REVIEW

Antibiotic serves a very useful therapeutic purpose in eradicating bacterial infection. Several studies have been done regarding knowledge and attitude on antibiotics among health care students. In 2013 the medical students and medical doctors from DR Congo were assessed on general knowledge regarding antibiotics, classification, mechanism of action, type of organism which primarily active, spectrum of activity, side effects, and contraindications (Thriemer et al., 2013). Lack of knowledge and attitude on antibiotic consumption has been found to be associated with antibiotic misuse which provoke the emergence of antibiotic resistance (Sarahroodi et al., 2010) & (Sawair et al., 2009).

Antibiotic resistance is a result of the irrational and inappropriate use of antibiotics which develops when a microorganism mutates or acquires a resistance gene. It involves complex process and may develop natural selection that is exacerbated by the abuse, overuse and misuse of antibiotics in the treatment of human illness and in animal husbandry, aquaculture and agriculture (Brundtland, 2000).

The major mechanisms of antibiotic drug resistance due to chromosomal mutations are reduced permeability or uptake, enhanced efflux, enzymatic inactivation, alteration or over-expression of the drug target and loss of enzymes involved in drug activation. A case study suggested *E.coli* isolates had acquired an additional resistance beyond lactamases by down regulating its cell wall porins causing cephamycin resistance (Tenover, 2006). The efflux pumps combined with limited permeability of *P.aeruginosa* causes resistance towards lactams, fluoroquinolones, tetracycline, chloramphenicol, macrolides, TMP, and aminoglycosides (Schweizer, 2003), (Poole & Srikumar, 2001).

The globalization of antibiotic resistance is a reality (Williams, 2001). Globally, around 440 000 new cases of multidrug-resistant tuberculosis (MDR-TB) occurs annually, giving rise to at least 150 000 deaths (WHO, 2012). In addition, extensively drug-resistant tuberculosis (XDR-TB) has been reported in 64 countries from 1994-2010, there were approximately 500,000 cases of multidrug-resistant (MDR) tuberculosis in 2007 including 289,000 new cases in which 131,000 were in India, 112,000 in China, 43,000 in Russia, 16,000 in South Africa, and 15,000 in Bangladesh (WHO, 2012). About 55 countries had reported cases of extensively drug resistant (XDR) tuberculosis by the end of 2008 (Donald & Helden, 2009).

The most frequently occurring hospital-acquired infections in Asia reported in 2004 are caused by highly resistant bacteria such as Methicillin-Resistant *Staphylococcus aureus* (MRSA). A study was conducted by collecting total of 685 clinical *Streptococcus pneumoniae* isolated from patients from 11 Asian countries from January 2000 to June 2001. Isolates from Vietnam showed the highest prevalence of penicillin resistance (71.4%), followed by those from Korea (54.8%), Hong Kong (43.2%), and Taiwan (38.6%). Data from the multinational surveillance study clearly showed distinctive increases in the prevalence rates and the levels of antibiotic resistance among *S. pneumoniae* isolates in many Asian countries which are among the highest in the world (Song et al., 2004).

National hospitalization and resistance data from United States were used to estimate the annual number of hospitalizations and deaths caused by *S. aureus* and MRSA from 1999 to 2005. The percentage of *S. Aureus* assosiated hospitalizations increased from 294,570 to 477,927 which is 62% and the MRSA assosiated hospitalizations was more than doubled, from 127,036 to 278,203. These data shows

that MRSA should be considered as a national priority for disease control (Klein et al.,2007).

According to the Malaysian Statistics on Medicine 2005, antibiotics were the most frequently prescribed anti-infective drug by both public and private healthcare sectors with 9.55 defined daily dose (DDD)/1,000 population/day (Alpuche & Mazzotti , 2010). Penicillin group of drug is the most commonly prescribed antibiotic with the percentage of 47.0% (Alpuche & Mazzotti, 2010). Malaysia has lower antibiotic usage compared to Greece (31.4), France (29.0), the United States (24.9), Europe (19.0), and British Columbia (17.9), and is comparable to countries with lower antibiotics consumption such as Austria (12.5), Latvia (11.7) and Netherlands (9.8) (Williams, 2001), (WHO, 2012) & (Shipton, 1993). A study was conducted in Malaysia (2006) in order to determine the trend of antibiotic usage in six general hospitals showed that about two thirds were prescribed for therapeutic purposes and the most frequently treated illness were lower respiratory tract infections (The Alexander Fleming Papers, 2006). However, there was a lack of compliance with antibiotics guidelines issued by the Ministry of Health (The Alexander Fleming Papers, 2006). It was found that almost half of the antibiotics prescribed in the public health care setting were for infections of upper respiratory tract (URTIs) (Teng et al., 2004).

Irrational prescribing of antibiotic by healthcare professionals is a main contributory factor to antibiotic resistance. This may be due to inadequate knowledge about mechanism of action, classification and side effects of antibiotic. Furthermore, improper laboratory diagnosis in identification of bacteria and also antibiotic

susceptibility test give rise to this problem. Others can be due to doctors pressurized by patients to prescribe antibiotic incentive schemes from pharmaceutical pharmacy, to prescribe newer and more expensive antibiotic, buying over the counter, incomplete course of treatment, prolong used, broad spectrum of antibiotic and inappropriate use in viral infection and fungus. Thus the knowledge and attitude of future medical professionals need to be assessed (Shankar et al., 2012).

The quantity and quality of antibiotic prescription differs greatly between countries. Thus, each country or region has different antibiotic policies. Rational use of antibiotic or antibiotic stewardship, targeted therapy and de-escalation, local epidemiology regarding causative agents on specific infections, antibiotic susceptibility patterns and resistance, surveillance on multidrug resistance organism (eg; MRSA), antibiotics, infection control measures in hospital, vaccination and local antibiotic guideline would assist in appropriate antibiotic prescription. Continuous education and surveillance among healthcare professional are therefore essential. Prescribers of antibiotic have major responsibility, they have to provide optimal therapy to the patients and on the other hand they have to preserve the efficacy of the antibiotic and minimize the development of the resistance. Prudent antibiotic prescription and usage would therefore reduce the economic burden in the country (Pulcini & Gyssens, 2013).

2.1 Antibiotics

2.1.1 Definition of antibiotic

Antibiotic therapy is not only based on the characteristic of a patient and a drug, but also depends on the types of the microorganisms causing the infection and the colonizing flora (Pulcini & Gyssens, 2013).

The term "antibiotic" was first introduced by Selman Waksman in 1942 as any chemical substance produced by various species of microorganisms (bacteria, fungi, actinomyces). Antibiotic is a compound that kills or slows down the growth of bacteria. It is used to destroy microbes (bactericidal) or inhibit their growth (bacteriostatic), (Iyalomhe et al., 2011).

2.1.2 Classifications

Antibiotics can be divided into broad and narrow spectrum. Example of broad spectrum antibiotics are tetracyclines, chloramphenicol, steptomycin, fluoroquinolones, third and fourth generation of cephalosporins, ampicillin. Examples for narrow spectrum are penicillin, cloxacillin, erythromycin, vancomycin, aminoglycosidees, metronidazole (Brooks, 2004).

In 1928, Alexander Fleming have invented penicillin from Penicillium mold (Shipton, 1993). The penicillins are the oldest class of antibiotics, and have a similar chemical structure with cephalosporins. The two groups are classified as the beta-lactam, and are generally bactericidal (kills the bacteria). It works by inhibiting the formation of peptidoglycan cross-links in bacterial cell wall. The side effects are hypersensitivity; anaphylactic shocks, urticaria, joint swelling, and variety of skin

rashes, fever, nephritis, etc. High dosage causes central nervous system concentration symptoms, while in a low doses it causes encephalopathy among renal disease patients (Brooks, 2004).

Cephalosporins are another groups of beta-lactam. It acts on bacteria by inhibiting cell wall synthesis and resulting in bacterial death. In general, Cephalosporins tend to be resistant to the beta-lactamases produced by *staphylococci* and common gram-negative bacteria that hydrolyze and inactivate penicillin. Cephalosphorin are excreted mainly by kidney which may induce renal insufficiency (Brooks, 2004). The side effects of cephalosporins are hypersensitivity reactions such as anaphylaxis, fever, rashes, nephritis, granulocytopenia and haemolytic anaemia. A study revealed that hypersensitivity is less common than penicillin and nephrotoxicity is not a problem with modern cephalosporin eventhough it produce slight reduction in renal function if ceftazidime is used at high doses (Brooks, 2004) & (Norrby, 1987).

Tetracyclines inhibit protein synthesis, widely distributed in tissue but less penetrates into cerebrospinal fluid. It inhibits growth of susceptible gram positive and gram negative bacteria. Besides, it is also drug of choice in infections caused by *Ricketssiae, Chlamydiae* and *Mycoplasma pneumoniae.* Prescription long term low dose tetracycline is used in the treatment of acne to suppress skin bacteria (Brooks, 2004). Tetracycline causes gastrointestinal upset (nausea, vomiting, diarrhea), skin rashes, new yeast infection and fever when administration is prolonged and high dosage. Prolonged intake of this drug is contraindicated in pregnant women which causes permanent tooth discoloration (Drugs & Medications-Tetracycline Oral, 2013).

Chloramphenicol is a broad spectrum antibiotic, bacteriostatic antibiotic and inhibits protein synthesis. The growth of microorganisms will resume if the drug is withdrawn early. It treats infection caused by Salmonellae, Meningococci and *H. influenzae* but it is no longer a drug of choice in any infection (Brooks, 2004). If the dosage is more than 3 g/d, it will cause disturbances in red cell maturation, elevation of serum ion and anemia. Additionally, this drugs will also induce collapse in premature and newborn infants (Brooks, 2004).

Fluoroquinolone inhibits nucleic acid synthesis (Liu, 2010) & (Brooks, 2004). This antibiotic reacts toward Enterobacteriaceae and bacteria that is resistant toward third generation of cephalosporin, *Haemophilus* species, *Neisseriae gonorrhea* and *Chlamydiae trachomatis*. It is effective in treating respiratory tract infection, urinary tract infection, and sexually transmitted disease (Brooks, 2004). The most frequent adverse effects are nausea, insomnia, headache, and dizziness, ECG abnormalities (QT interval prolongation), disrupted glucose metabolism, phototoxicity, tendon and joint disorders, hypersensitivity and skin disorders, and hepatic toxicity a (Brooks, 2004) & (Liu, 2010).

2.2 Knowledge and Attitude of Medical Students Regarding Antibiotics

Several studies have been carried out regarding the topic of our research. In 2012, a cross sectional study was done in Jordan to assess the level of knowledge, attitude and behaviour related to antibiotic use among medical and non-medical university students. Medical students scored quite well on general knowledge on antibiotic which is about seventy percent (70.4%) of medical students knew that antibiotics were used to treat bacterial infections. In the same study, about seventy-nine percent (79%) of them aware that death is possible if antibiotic is given to patient with allergy (Ghadeer et al,.2012).

In another study conducted in 2004 that involved final year medical students, not all respondents could give right answer regarding generic name or approved name for six antibodies listed by their proprietary name. Both Ciproxin and Ciprofloxacin were first given as an example. Sixty percent of the medical students knew the generic name for both Augmentin and Fucidin, 40% for Flagyl, 10% for Zinacef but no one knew Targocoid or Magnapen (Wright & Jain, 2004). The same study showed that about 94% of final year medical students know very well that *Staphylococcus aureus* was one of the bacteria which increasing evidence of antibiotic resistance, 48% for *Mycobacterium tuberculosis,* 23% for *Streptococcus pneumoniae,* 135 for *enterococci*, 10% for *Enterobacteriaceae* and 4% for *Campylobacter* (Wright & Jain, 2004).

Beside that, a research carried out in Makerere University Kampala Uganda to compare the knowledge and attitudes on antibiotic drugs among students of health sciences and the non health sciences courses. Study showed an expected result which

is health science students were more knowledgeable about antibiotic than non-health sciences students. But surprisingly there was no statistically significant difference between both groups when answering the role of antibiotics in treatment of colds. This indicates that students of health sciences still lacking of knowledge especially when it comes to prescribe patients with common colds (Jacqueline et al., 2011).

Another study was done in Hong Kong to analyze the correlation between the level of experience with knowledge and attitude. The studies revealed that senior students were more knowledgeable than the junior students because the senior students have received clinical training and have more medical base training than the juniors (Miaoyin, 2012).

On the other hand, a cross sectional study on Medical Students' attitude towards antibiotics misuse in Hong Kong suggested that attitude and knowledge toward antibiotics usage and resistance are important factors that is associated with inappropriate antibiotics prescription behavior (Miaoyin, 2012). A negative attitude and lack of agreement with protocols or guidelines on antibiotics affects prescribing (Pulcini & Gyssens, 2013). This self-medication of antibiotics may contribute and sometimes contribute to increase in morbidity among the population (Aswapokee et al,. 1990).

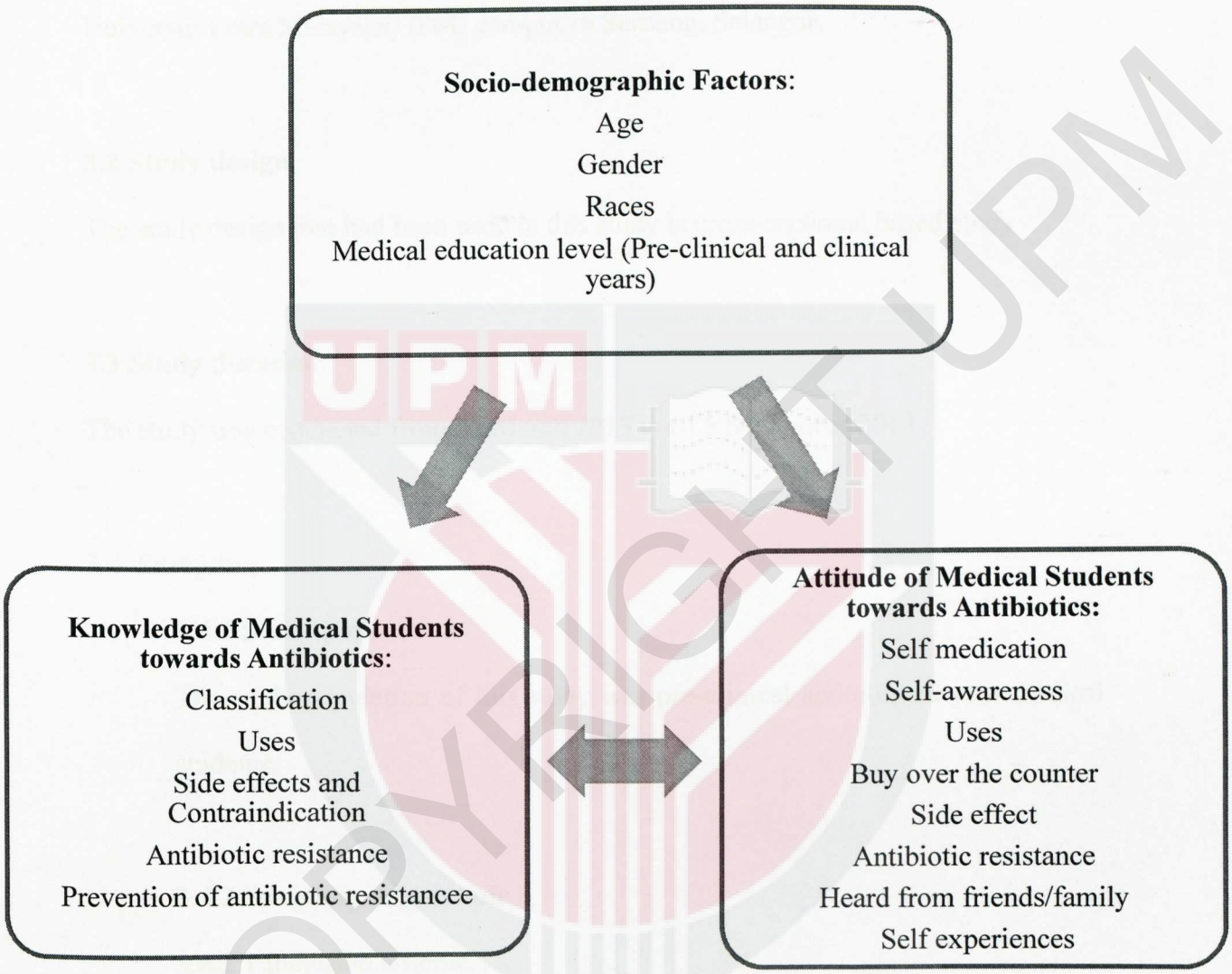
In addition, a study on antibiotic self-medication was done in 2011 among medical undergraduate students in Northern Nigeria. Study reported that 38.8% of medical students had practiced self-medication and the difference level of medical education plays no statistically significance difference. The study also revealed that male students practices self-medication more commonly on antibiotic, but this difference was not statistically significant ($p>0.05$).

The disease that was wrongly prescribed with antibiotics is fever and other similar symptoms which could be due to viral conditions (Fadare & Tamuno, 2011).

Other than that, another study was done to compare the attitude of medical doctors and medical students. Medical students answered three questions frequently incorrect which are on the most advised antibiotics for patient with urinary tract infection, awareness on cross-resistance of MRSA and about the safety of antibiotic in pregnancy (Thriemer, et al., 2013). Besides, not all medical students completed the course of antibiotic therapy (Sarahroodi et al., 2010). The uncompleted course of antibiotic therapy will lead or contribute to antibiotic resistance (Thriemer et al., 2013).

A research done in Putrajaya to analyze the correlation between knowledge score and attitude score revealed that knowledge of appropriate antibiotic use correlates positively with attitude (Lim & Teh, 2012). Another study conducted in Korea showed the same result. The researcher found that there is strong association between adequate knowledge on antibiotic and good attitude toward antibiotic. People with adequate knowledge were 1.5 times more likely to demonstrate appropriate attitude (Kim, 2011). However, a different result was proven in Turkey which was conducted among academic staff in 2002 and among university students in 2005. The study indicated that the knowledge score does not always correlate positively with behaviour (Buke et al., 2003) & (Buke et al., 2005).

2.3 Conceptual Framework



CHAPTER 3: METHODOLOGY

3.1 Study location

This study had been carried out in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia(UPM) campus in Serdang, Selangor.

3.2 Study design

The study design that had been used in this study is cross-sectional based study

3.3 Study duration

The study was conducted from 25 March 2013 until 5 September 2013.

3.4 Sampling

3.4.1 Study population

The study population of this study was pre-clinical and clinical year medical students.

3.4.2 Sampling population

3.4.2.1 Inclusion criteria

All pre-clinical and clinical year medical students in Faculty of Medicine and Health Sciences, UPM.

3.4.2.2 Exclusion criteria

Medical students who were not listed as respondents.

3.4.3 Sampling frame

A list of respondents who fulfilled the inclusion criteria.

3.4.4 Sampling unit

It includes medical students in UPM who full filled the inclusion criteria.

3.4.5 Sampling method

Stratified sampling was being used in our study. There were 502 medical students and thus these students were our study population. For this study, we had stratified our population into two groups consisting pre-clinical and clinical. The number of students from each group is 268 and 234 students respectively. Our sample size was 251 people. Then, we had calculated the percentage of each group that should be included in our study.

Percentage of Pre-clinical students : $\frac{268}{502} \times 100\ \% = 53.4\%$

Percentage of Clinical students : $\frac{234}{502} \times 100\ \% = 46.6\%$

From that calculation, it tells us that from our sample of 251 students, 53.4% of the sample should be pre-clinical students and 46.6% should be clinical year students.

53.4% out of 251 people is 134 students.

46.6% out of 251 people is 117 students.

Therefore, in this study, we approached 134 pre-clinical students and 117 clinical students. Upon approaching our respondents systemic sampling was used in which every second name listed in the name list was selected to be the respondent.

3.4.6 Sample size

Group comparison was used between pre-clinical students and clinical year students. The value of $P1$ or prevalence of clinical year students is 54.3%, while the value of $P2$ or pre- clinical year students is 35.1% (James H et al., 2008).

The formula is:

$$n = \{z_{1-\alpha/2}\sqrt{2\bar{P}(1-\bar{P})} + z_{1-B}\sqrt{P_1(1-P_1)+P_2(1-P_2)}\}^2/(P_1-P_2)^2$$

$\bar{P} = (P_1+P_2)/2$

P_1 = estimated proportion (larger)

P_2 = estimated proportion (smaller)

$z_{1-\alpha/2}$ = 95% level of confidence = 1.96

z_{1-B} = power = 80% = 0.84

$n = \{1.96\sqrt{2(0.447)(1-0.447)} + 0.842(\sqrt{0.543)(1-0.543)} + 0.351(1-0.351)\}^2/(0.543-0.351)^2$

$= \{1.96(0.7031)+0.842(0.6898)\}^2/0.03686$

$= \{1.3781+0.5808)^2/0.03686$

$= 3.8372/0.0368$

$= 104$

n = 104 subjects per group x 2 groups = 209 subjects.

20% drop out = 20/100×209 subjects

= 42

After considering a 20% drop out of incomplete data and non-response factor, the estimated sample size is 251

3.5 Instruments and data collection

3.5.1 Instruments/questionnaire

The data was collected by using questionnaires. The set of questionnaires were distributed to the respective respondents at their lecture hall before the lecture starts and during their self study period. The set of questionnaire consists of 3 broad sections which are Section A, B and C.

Section A

This section includes socio-demographic factors including age, gender, race, and medical educational level (pre-clinical or clinical year student).

Section B

Section B comprised 51 questions regarding role of antibiotic, antibiotic classification, antibiotic side effects, contraindication of antibiotic and antibiotic resistance. Respondents were required to tick either "yes" or "no". One mark was given for each correct answer while no mark was given for incorrect answer. For the scoring system, median score which is 78.4% was used as the cut-off point. Those who scored higher than 78.4%were classified as having good knowledge level while those who scored below than 78.4% were classified as having poor knowledge level. Regarding the scoring system for knowledge of antibiotic resistance, a median score of 84.2% was used as the cut-off point. For the side effects, a median score of 80% was used as the cut-off point.

Section C

Section C comprised questions regarding antibiotic usage, origin of antibiotic, reasons for not completing the full course of antibiotic, reason for kept left over antibiotic and prevention of antibiotic resistance. Respondents were

required to choose "strongly agree", "agree", "disagree" and "strongly disagree". In order to make data analysis easier, "strongly agree" and "agree" were grouped as "agree" while "strongly disagree" and "disagree" were grouped as "disagree". One mark was given for each correct answer while no mark was given for incorrect answer. For the scoring system, median score which is 73.6% was used as the cut-off point. Those who scored higher than 73.6% were classified as having good attitude level while those who scored below than 73.6% were classified as having poor attitude level.

3.5.2 Data collection technique

Data was collected through questionnaires which were fully standardized in English. The data collected from the respondents was primary data. Before answering the questionnaires, all the respondents were given a short briefing and around 15 minutes were given to complete the questions. After the questionnaires had been completed, the investigators immediately checked for the missing or inaccurate data and asked the participant to fill up or correct them.

3.5.3 Pre-test

A pre-test was done among 20 biomedical students in Faculty of Medicine and Health Sciences who do not involve in this study. This pre-test study aims to discover problems that might appear throughout the distribution and answering of the questionnaire. Subsequently, revision and modification of the questionnaire had been made based on the pilot study. This test helped to validate the questions so that it can be easily understood by respondents upon answering the questionnaire.

3.5.4 Quality control

The questionnaire were an adaptation of questions from related journals (Ghadeer et al ., 2012) & (Oh et al., 2010). The supervisor and committee were consulted during the construction of the questionnaire. The questionnaire was designed in one language only; English, as all the respondents are medical students who fully understand and used to it, as well as for the convenience of the respondents who are multiracial.

3.5.4.1 Consent from respondents

An informed consent was obtained from each respondent before answering the questionnaire. The respondents were also informed about the purposes of the study and all the information as well as privacy of the subjects are being kept confidential.

3.6 Variables

3.6.1 Dependent variable

The dependent variable is the score of knowledge and attitude of medical students including pre-clinical and clinical year students towards antibiotic usage in the Faculty of Medicine and Health Sciences, UPM.

3.6.2 Independent variables

The independent variables are age group, gender, race, and medical educational level (pre-clinical or clinical year student)

3.7 Data analysis

Descriptive statistics were used to evaluate the differences in knowledge and attitude towards antibiotic usage among UPM medical students. Data was analyzed by using Statistical Package for Social Science Program (SPPS) version 20. In order to check for data distribution normality, Kolmogorov Smirnov test was used. Chi-square test was used to compare different proportion and association between level of knowledge and attitude among students with different medical educational level (pre-clinical and clinical year students) and other variables. Spearman correlation was used to analyze correlation between knowledge and attitude score. All tests were estimated to be two sided and the statistical significance was considered to be at $P< 0.05$ as the cut-off point.

3.8 Definition of terms

Knowledge level: The level of information, understanding and skills through education and experience on antibiotic usage between pre-clinical and clinical year students whether can be ranged as good or poor based on the results of the questionnaires.

Attitude level: The level of perception and personality of medical students on antibiotic usage whether can be classified as good or poor based on the questionnaires.

Antibiotic: A chemical substance, usually produced by a microorganism or semi-synthetically, having the capacity to kill or inhibit growth of other microorganism used in treating bacterial infections only, which can lead to antibiotic resistance if under or overuse (Dorland's Pocket Medical Dictionary, 2011).

Antibiotic stewardship: Optimizing the indication, selection, dosing, route of administration and duration of antibiotic therapy to maximize clinical cure or prevention of infection while limiting the collateral damage of antibiotic use, including toxicity, selection of pathogenic organisms and emergence of resistance (Pulcini & Gyssens, 2013).

Antibiotic Resistance: The ability of bacteria and other microorganisms to resist the effects of an antibiotic to which they were once sensitive. Antibiotic resistance is a major concern of under or overuse of antibiotic, along with irrational and inappropriate prescription among doctors that spread all over world. Also known as drug resistance.

CHAPTER 4: RESULTS

4.1 Response Rate

After sampling, 251 questionnaires were distributed in Faculty of Medicine and Health Sciences (FMHS), Universiti Putra Malaysia (UPM). However, only 201 completed questionnaires were collected at the end of the data collection period. The response rate was 80.00%. The remaining 50 respondents (20.00%) failed to complete the questionnaire given within the stipulated period due to their heavy workload. Therefore, the following analysis report is based on the 201 responded respondents

4.2 Socio-demographic characteristics of respondents

Table 1 shows the distribution of respondents according to Age, Gender, Race, Medical educational level. (n=201). It shows that the majority of the respondents in our study were females (64.68 %), Malays (58.2 %) and Pre- clinical students (54.7 %).

Table 1: The distribution of respondents based on socio-demographic characteristic.

Socio-demographic characters		Distribution of respondents	
		Frequency(n)	Percentage(%)
Gender	a. Female	130	64.68
	b. Male	71	35.32
Age	a.<21	49	24.4
	b. ≥21	152	75.6
Races	a. Malay	117	58.2
	b. Non-malay	84	41.8
Medical educational level	a. Pre-clinical years	110	54.7
	b. Clinical years	91	45.3

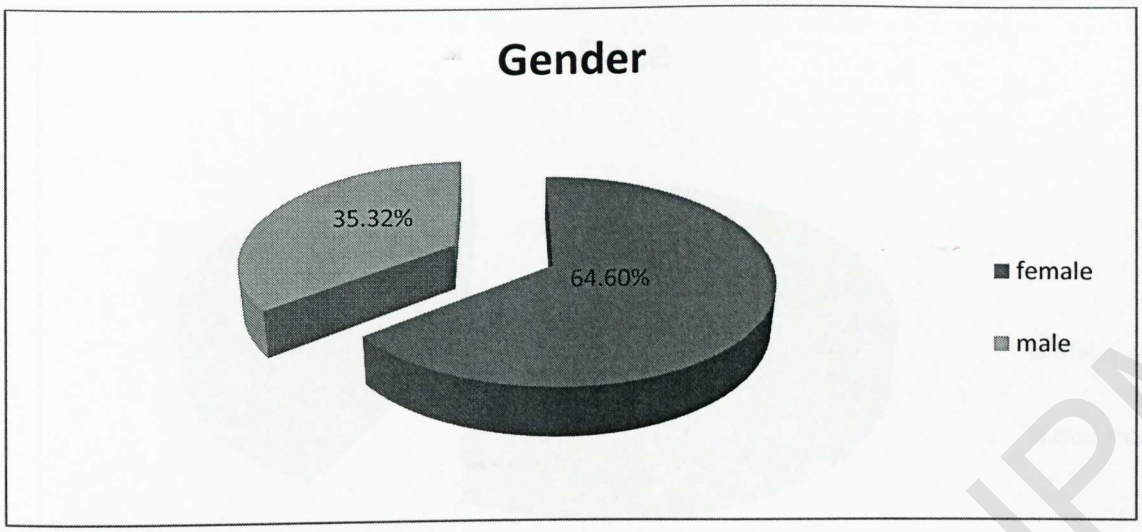


Figure 1: The distribution of respondents according to gender

From the figure above, it was evident that the majority of respondents that participated in our study were female with a percentage of 64.68% and frequency of 130.

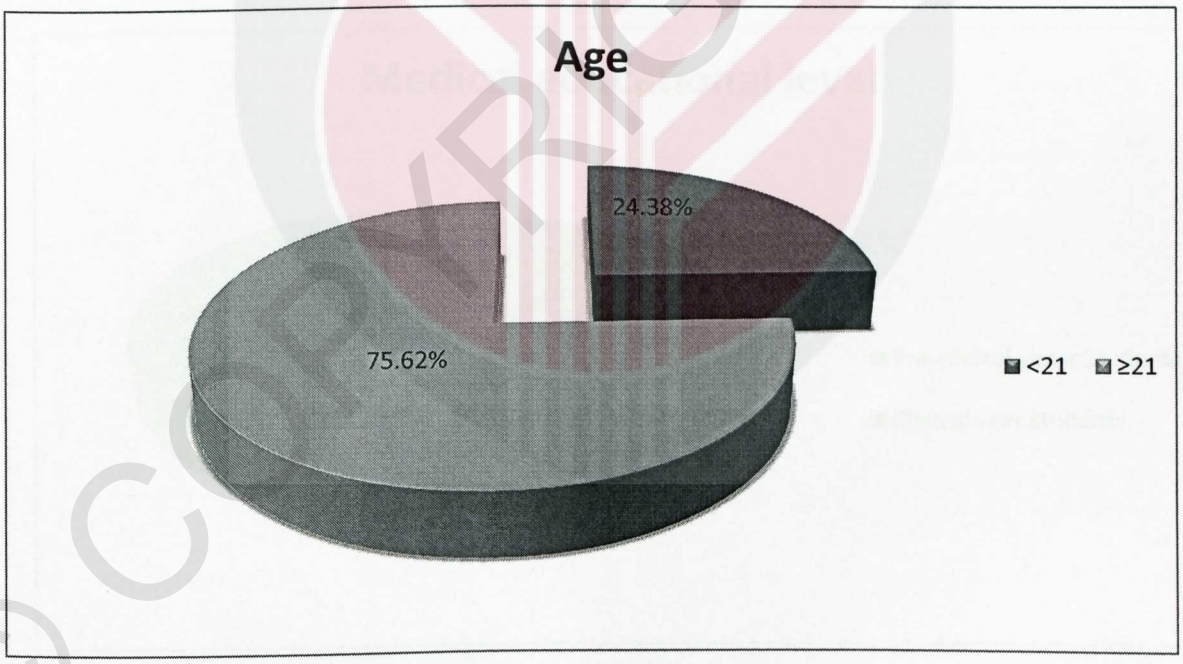


Figure 1: The distribution of respondents according to age

Based on figure above, it was evident that the majority of respondents that participated in our study were ≥21 with a percentage of 75.62% and frequency of 152.

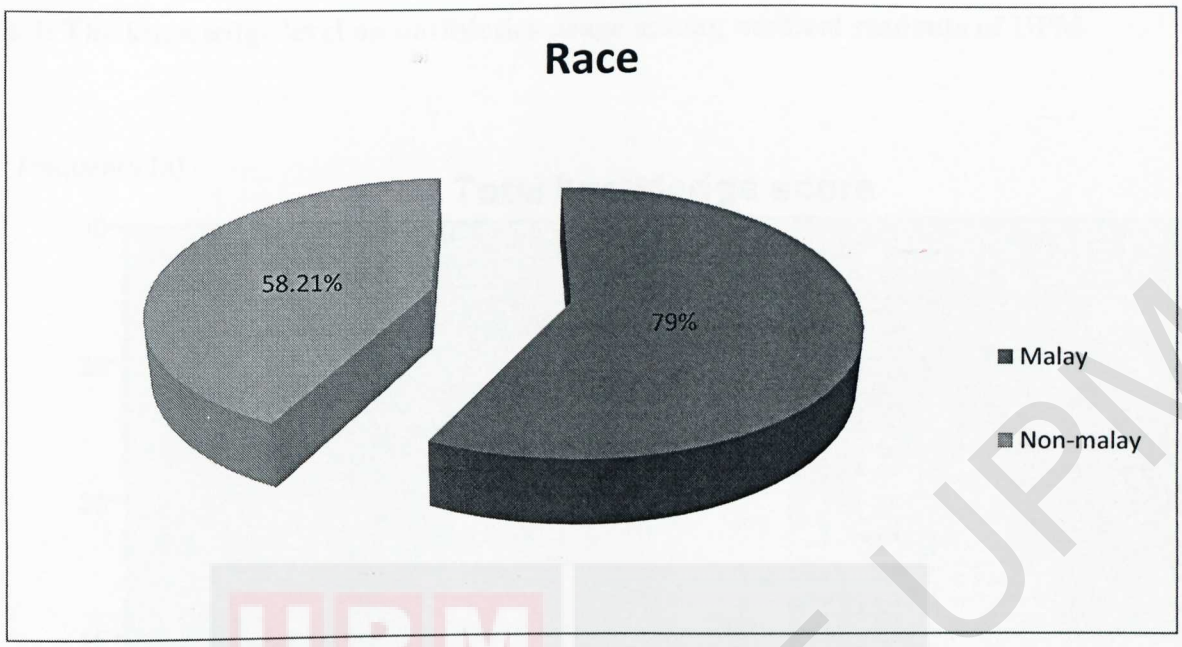


Figure 3: The distribution of respondents according to race

From figure above, it was evident that the majority of respondents that participated in our study were Malays with a percentage of 58.21% and a frequency of 170.

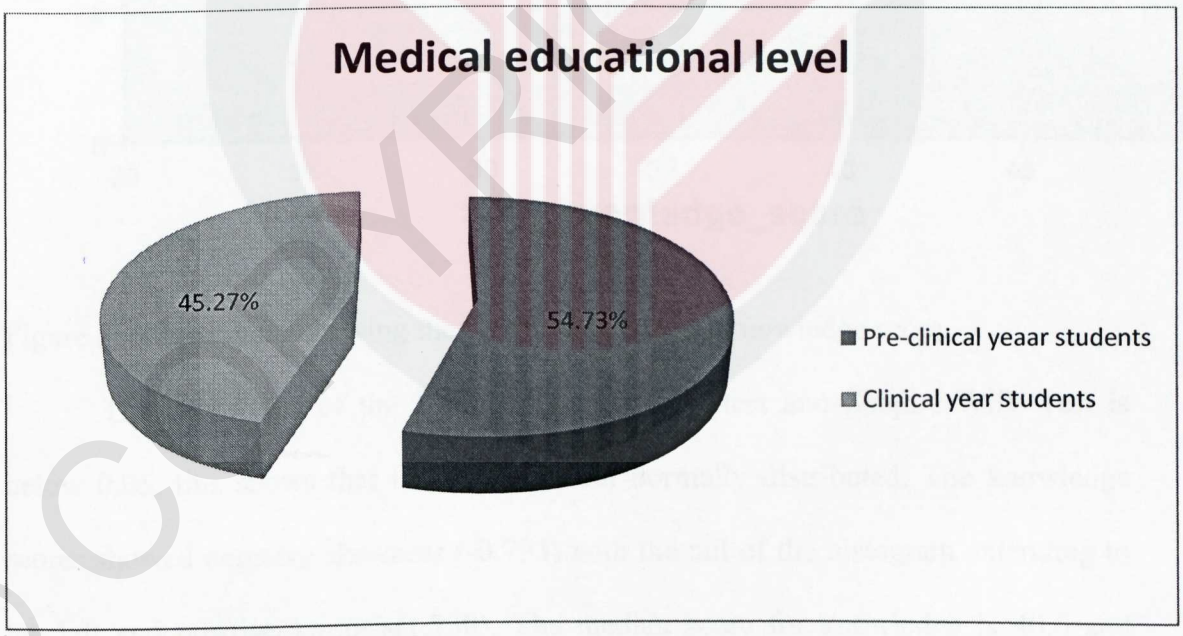


Figure 4: The distribution of respondents according to medical educational level

Based on figure above, it was evident that the majority of respondents that participated in our study were pre-clinical years with a percentage of 54.73% and a frequency of 110.

4.3: The knowledge level on antibiotics usage among medical students of UPM

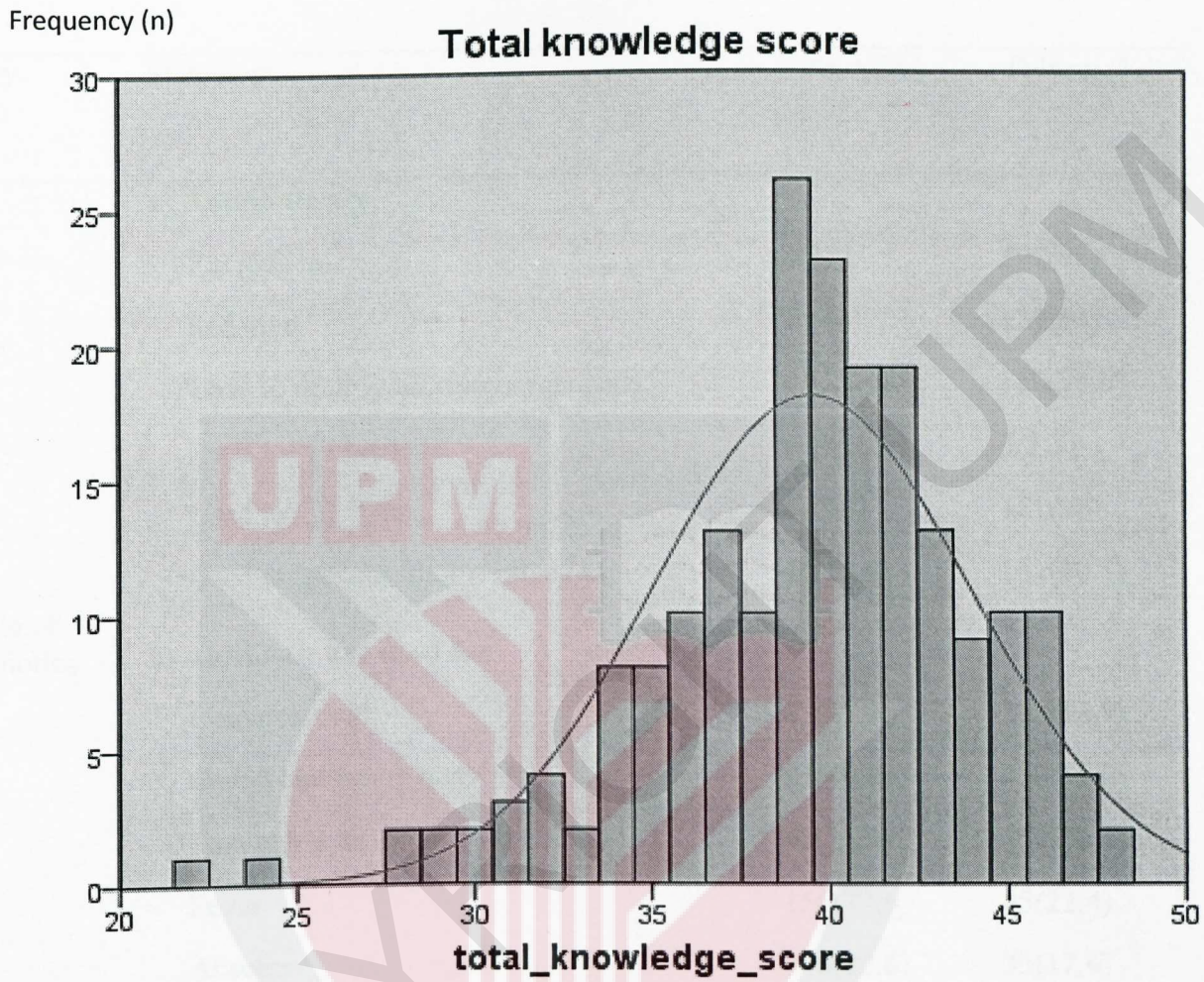


Figure 5: A histogram showing the distribution of total knowledge score.

The Sig, value of the Kolmogorov Smirnov test and Shapiro-Wilk Test is below 0.05, this shows that the data was not normally distributed. The knowledge scores showed negative skewness (-0.793) with the tail of the histogram extending to the left and positive kurtosis(1.230). The median score for knowledge is 40.0 and interquartile range is 5.

Table 2: The distribution of answers among UPM medical students on their knowledge towards antibiotic usage.

Category	Statement	True n (%)	False n (%)
Role of antibiotics	**1) Antibiotic are**		
	Pain killers	4(2)	197(98)
	Sedative	12(6)	189(94)
	Used to destroy all microorganisms	43(21.4)	158(78.6)
	Used to kill bacteria	198(98.5)	3(1.5)
	Used to kill virus	20(10)	181(90)
	Used to prevent fungus infection	40(19.9)	161(80.1)
	2) Antibiotic are used for		
	Common cold	83(41.3)	118(58.7)
	Cough and runny nose	82(40.8)	119(59.2)
	Stomach ache	42(23.9)	153(76.1)
	Fever	156(77.6)	45(22.4)
	Abscess	166(82.6)	35(17.4)
	Clean, small superficial skin injury by sharp knife	69(34.3)	132(65.7)
Classification of antibiotics	**3) Antibiotics can be classified according to their**		
	Cell wall	188(93.5)	13(6.5)
	DNA and RNA	152(75.6)	49(24.4)
	Protein	168(83.6)	33(16.4)
	Replication	105(52.2)	96(47.8)
	Ribosome	107(53.2)	94(46.8)
Side effects of antibiotics	**4) Regarding antibiotic side effects**		
	Commonly cause mild stomach upset	116(57.7)	85(42.3)

	None of them cause side effect	15(7.5)	186(92.5)
	Most of them are addictive	12(6)	189(94)
	Penicillin causes allergic reaction	157(78.1)	44(21.9)
	Gentamicin causes renal toxicity	147(73.1)	54(26.9)
	5) Antibiotics		
	Should be stopped when the patients does not have fever	40(19.9)	161(80.1)
	Are effective after 2 days	53(26.4)	148(73.6)
	May be continued when the patients are still feeling unwell	144(71.6)	57(28.4)
	May be changed when the patients are still feeling unwell	144(71.6)	57(28.4)
Contraindication of antibiotics	Should be stopped during pregnancy	144(71.6)	57(28.4)
	Should not be given to child less than 1 year old	99(49.3)	102(50.7)
	6) Antibiotics are contraindicated when taken along with		
	Alcohol	161(80.1)	40(19.9)
	Sweets	15(7.5)	186(92.5)
	Coca cola	93(46.3)	108(53.7)
	Contraceptive pills	109(54.2)	92(45.8)
	7) Antibiotic resistance		
	Leads to the ineffectiveness of antibiotic	198(98.5)	3(1.5)
	Eliminates bacterial infection	16(8)	185(92)
	Occurs due to usage of aspirin	50(24.9)	151(75.1)
Antibiotic resistance	Causes harm to the patients	142(70.6)	59(29.4)

8) The antibiotic resistance is due to		
Prolonged usage of broad sprectrum antibiotic	187 (93)	14 (7)
Buying over the counter	131 (65.2)	70 (34.8)
Not completing the full course of antibiotic	179 (89.1)	22 (10.9)
Using the same antibiotic of different brands	79 (39.9)	122 (60.7)
Using antibiotic without physician prescription	163 (81.1)	38 (18.9)
9) What is the impact of antibiotic resistance		
Causes longer lasting illness	181 (90)	20 (10)
Increases mortality	173 (86.1)	28 (13.9)
Increases cost of care	178 (88.6)	23 (11.4)
Causes extended hospital stay of patients	189 (94)	12 (6)
Requires expensive antibiotic to treat infection	171 (85.1)	30 (14.9)
10) How to prevent the emergence of antibiotic resistance nowadays		
Through antibiotic stewardship	155 (77.1)	46 (22.9)
Complete the antibiotic course based on doctors' prescription	194 (96.5)	7 (3.5)
prevent buying over the counter prescription	163 (81.1)	38 (18.9)
Using a broad spectrum antibiotic	51 (25.4)	150 (74.6)
Using antibiotic with appropriate dosage and duration	197 (98)	4 (2)

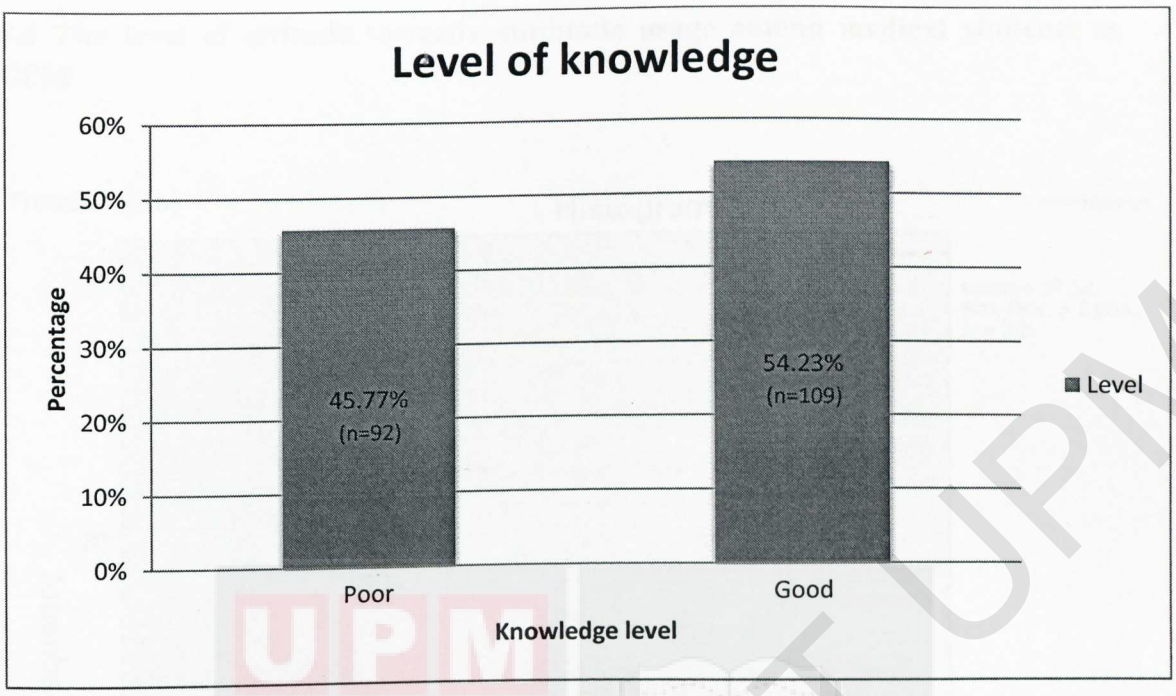


Figure 6: Bar chart showing the level of knowledge regarding antibiotic usage among UPM Medical Students.

From the figure above, 54.23% of medical students with a frequency of 109 have good level of knowledge towards antibiotic usage while only 45.77% of medical students have poor knowledge level on antibiotic usage.

4.4 The level of attitude towards antibiotic usage among medical students in UPM

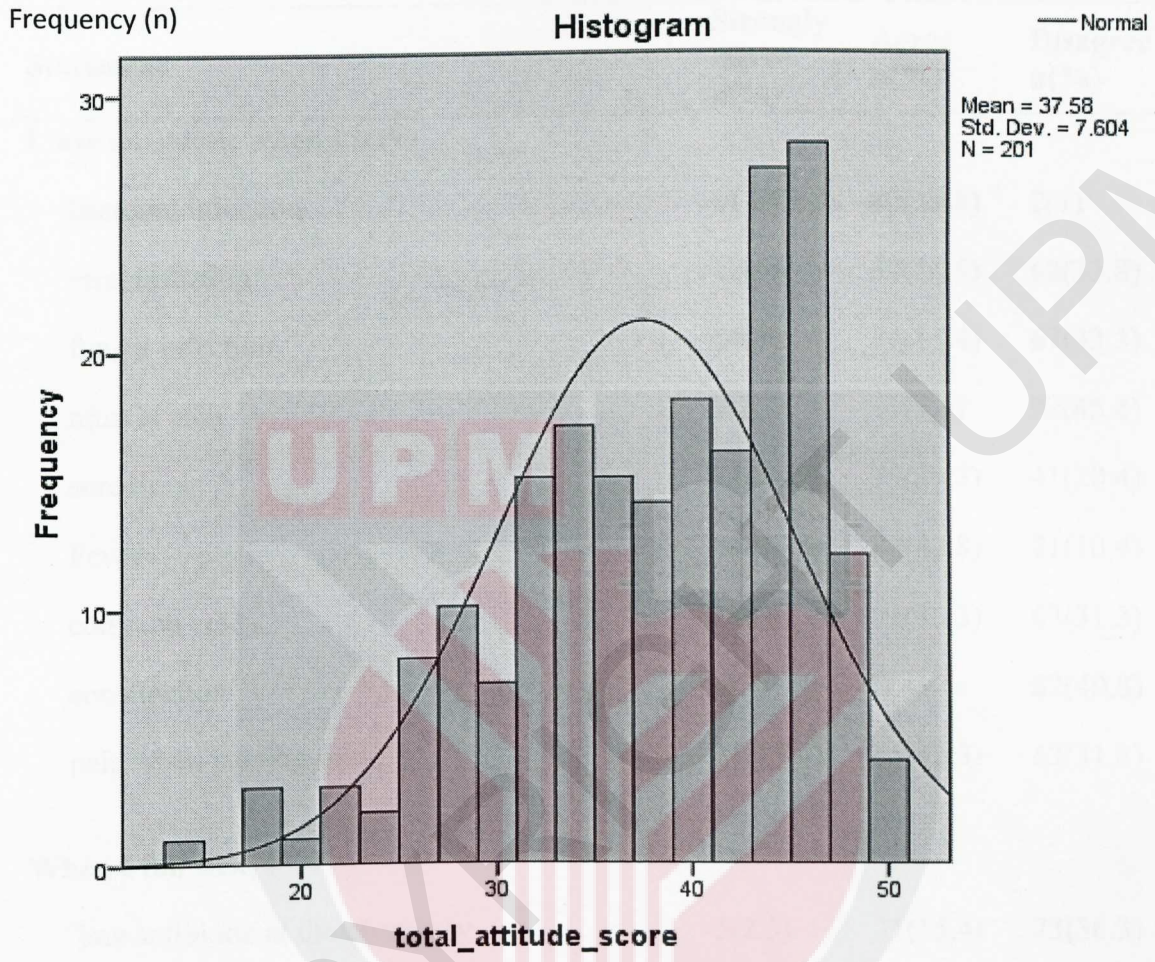


Figure 7: Histogram showing the distribution of total attitude score.

The Sig, value of the Kolmogorov Smirnov test and Shapiro-Wilk Test is below 0.05, this show that the data was not normally distributed. The attitude scores showed negative skewness (-0.658) with the tail of the histogram extending to the left and negative kurtosis(-0.238). The median score for attitude is 39.0 and interquartile range is 12.

Table 3: The distribution of answers of UPM medical students on their attitude towards antibiotic usage.

No	Statement	Strongly Agree n(%)	Agree n(%)	Disagree n(%)	Strongl Disagr n(%)
C1	**I use antibiotic when I have**				
	bacterial infection	111(55.2)	80(39.8)	2(1)	8(4)
	viral infection	12(6)	30(14.9)	68(33.8)	91(45.3
	fungal infection	14(7)	31(15.4)	67(33.3)	89(44.3
	muscle pain	3(1.5)	11(5.5)	92(45.8)	95(47.3
	sore throat	34(16.9)	79(39.3)	41(20.4)	47(23.4
	Fever	69(34.3)	88(43.8)	21(10.4)	23(11.4
	common colds	18(9)	71(35.3)	63(31.3)	49(24.4
	constipation	4(2)	8(4)	82(40.8)	107(53.
	pain when passing urine	31(15.4)	65(32.3)	63(31.3)	42(20.9
C2	**When I fall sick, I**				
	buy antibiotic at the pharmacy	5(2.5)	31(15.4)	73(36.3)	92(45.8
	buy antibiotic over the clinic counter	12(6)	44(21.9)	64(31.8)	81(40.3
	take antibiotic upon doctor's prescription	111(55.2)	74(36.8)	11(5.5)	5(2.5)
	take the left-over antibiotics	9(4.5)	32(15.9)	70(34.8)	90(44.8
	take the other family member's antibiotic	5(2.5)	26(12.9)	77(38.3)	93(46.3
	use the same antibiotic everytime I have infection	7(3.5)	41(20.4)	79(39.3)	74(36.8
C3	**I will stop taking antibiotic**				
	when I feel better	27(13.4)	44(21.9)	71(35.3)	59(29.4
	when I start having side effects without doctor's consultation	39(19.4)	79(39.3)	53(26.4)	30(14.9

	when I loss antibiotic	16(8)	73(36.3)	75(37.3)	37(18.4
	based on doctor's advice	94(46.8)	84(41.8)	11(5.5)	12(6)
	when I don't feel better	12(6)	38(18.9)	99(49.3)	52(25.9
C4	**I do not complete the course of antibiotic because**				
	the antibiotic are finished	40(19.9)	88(43.8)	48(23.9)	25(12.4
	I feel better	29(14.4)	69(34.3)	61(30.3)	42(20.9
	I forget about it	26(12.9)	71(35.3)	63(31.3)	41(20.4
	of the side effects of the antibiotic that made me feel unwell	31(15.4)	70(34.8)	63(31.3)	37(18.4
	I loss the antibiotic	26(12.9)	57(28.4)	82(40.8)	36(17.9
C5	**If I do not feel better after taking an antibiotic**				
	I stop taking it and consult another doctor	35(17.4)	58(28.9)	71(35.3)	37(18.4
	I stop taking it and consult the same doctor	67(33.3)	85(42.3)	34(16.9)	15(7.5)
	I buy another antibiotic based on friend's suggestion	6(3)	12(6)	90(44.8)	93(46.3
	I buy another antibiotic based on my knowledge experience	5(2.5)	36(17.9)	89(44.3)	71(35.3
	I persuade the doctor to give my favourite antibiotic	5(2.5)	14(7)	97(48.3)	85(42.3
	I use it for recommended period	46(22.9)	102(50.7)	30(14.9)	23(11.4
C6	**I will not take antibiotic**				
	if the taste is better	7(3.5)	20(10)	89(44.3)	85(42.3
	if the size is too big	14(7)	25(12.4)	78(38.8)	84(41.8
	is the prize is expensive	13(6.5)	38(18.9)	73(36.3)	77(38.3
C7	**When I have flu or colds**				

	I take antibiotic	24(11.9)	38(18.9)	73(36.3)	77(38.3
	I expect the doctor to prescribe an antibiotic	27(13.4)	66(32.8)	74(36.8)	34(16.9
	I do not expect the doctor to prescribe an antibiotic	19(9.5)	73(36.3)	86(42.8)	23(11.4
	I persuade the doctor to prescribe me an antibiotic	13(6.5)	20(10)	104(51.7)	64(31.8
	I use left-over antibiotics	18(9)	16(8)	83(41.3)	84(41.8
C8	**I keep left-over antibiotic because**				
	I may need it again	20(10)	62(30.8)	56(27.9)	63(31.3
	I did not complete the course	22(10.9)	74(36.8)	57(28.4)	48(23.9
	I am lazy to see the doctor	13(6.5)	41(20.4)	75(37.3)	72(35.8
	It is expensive	10(5)	33(16.4)	86(42.8)	72(35.8
C9	**I use the left-over antibiotic**				
	for the same infection	22(10.9)	63(31.3)	56(27.9)	60(29.9
	for another type of infection	5(2.5)	29(14.4)	86(42.8)	81(40.3
C10	**To prevent antibiotic resistance, I should**				
	learn not to use antibiotic unnecessarily	112(55.7)	76(37.8)	11(5.5)	2(1)
	should use expensive antibiotic to treat infection	3(1.5)	15(7.5)	110(54.7)	73(36.3
	avoid buying antibiotic over the counter	68(33.8)	71(35.3)	35(17.4)	27(13.4
	avoid using multiple antibiotic when treating the same infections	66(32.8)	79(39.3)	35(17.4)	21(10.4
	use antibiotic for common cold condition	14(7)	47(23.4)	79(39.3)	61(30.3
C11	**I should take antibiotic**				
	before meal	15(7.5)	27(13.4)	87(43.3)	72(35.8
	with meal	3(1.5)	21(10.4)	99(49.3)	78(38.8
	after meal	91(45.3)	85(42.3)	19(9.5)	6(3)

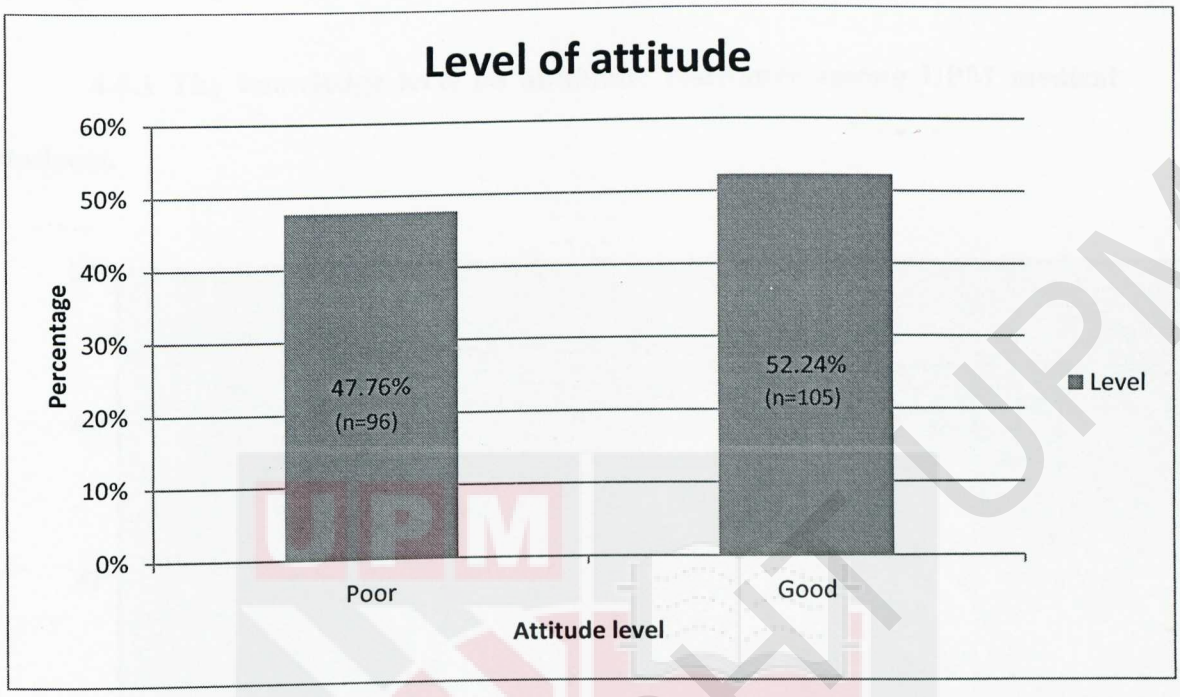


Figure 8: Bar chart showing the level of attitude regarding antibiotic usage among UPM Medical Students.

From the bar chart above, 52.24% of respondents with a frequency of 105 have good attitude level towards antibiotic usage, while only 47.76% of respondents have poor attitude level on antibiotic usage.

4.5: The knowledge level on antibiotic resistance and side effects of antibiotic among medical students of UPM

4.5.1 The knowledge level on antibiotic resistance among UPM medical students.

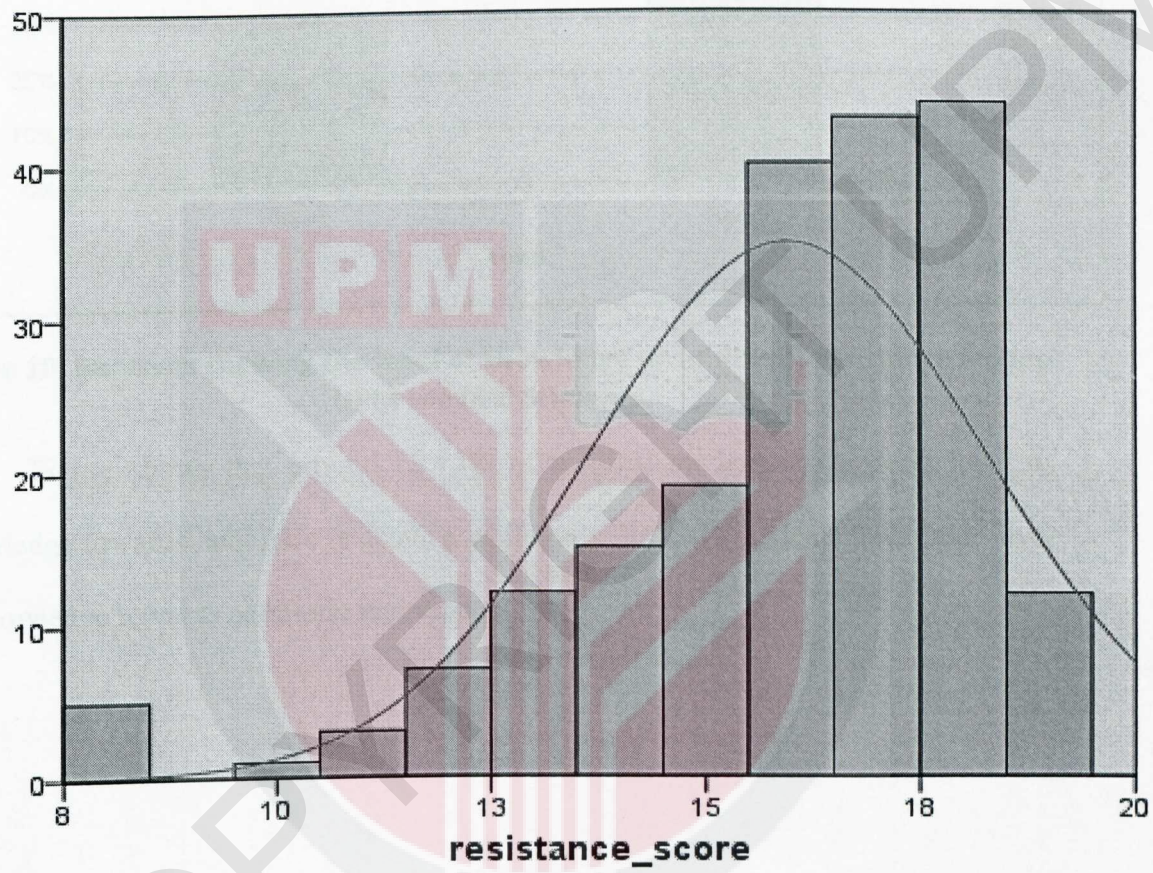


Figure 9: Histogram showing the distribution of antibiotic score among medical students of UPM.

The Kolmogorov Smirnov and Shapiro-Wilk test was below 0.05, this shows that the data significantly deviate from a normal distribution.The knowledge score on antibiotic resistance showed negative skewness (-1.344) with the tail of the histogram extending to the left and positive kurtosis (2.110). Therefore, the knowledge score on antibiotic resistance was not normally distributed. The median score for knowledge on antibiotic resistance was 16.00 and the interquatile range was 3.

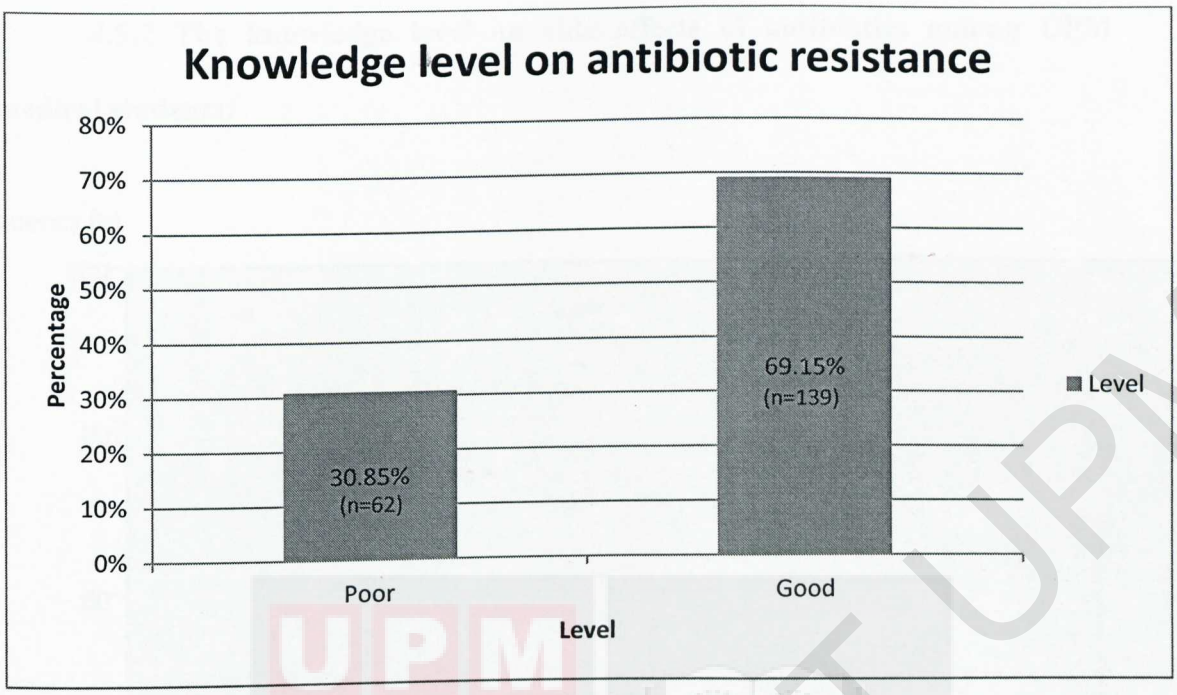


Figure 10: Bar chart showing the level of knowledge on antibiotic resistance among UPM Medical Students.

Figure shows that around 69.15% of medical students have good level of knowledge towards antibiotic resistance while only 30.85 % students have poor level of knowledge towards antibiotic resistance.

4.5.2 The knowledge level on side effects of antibiotics among UPM medical students.

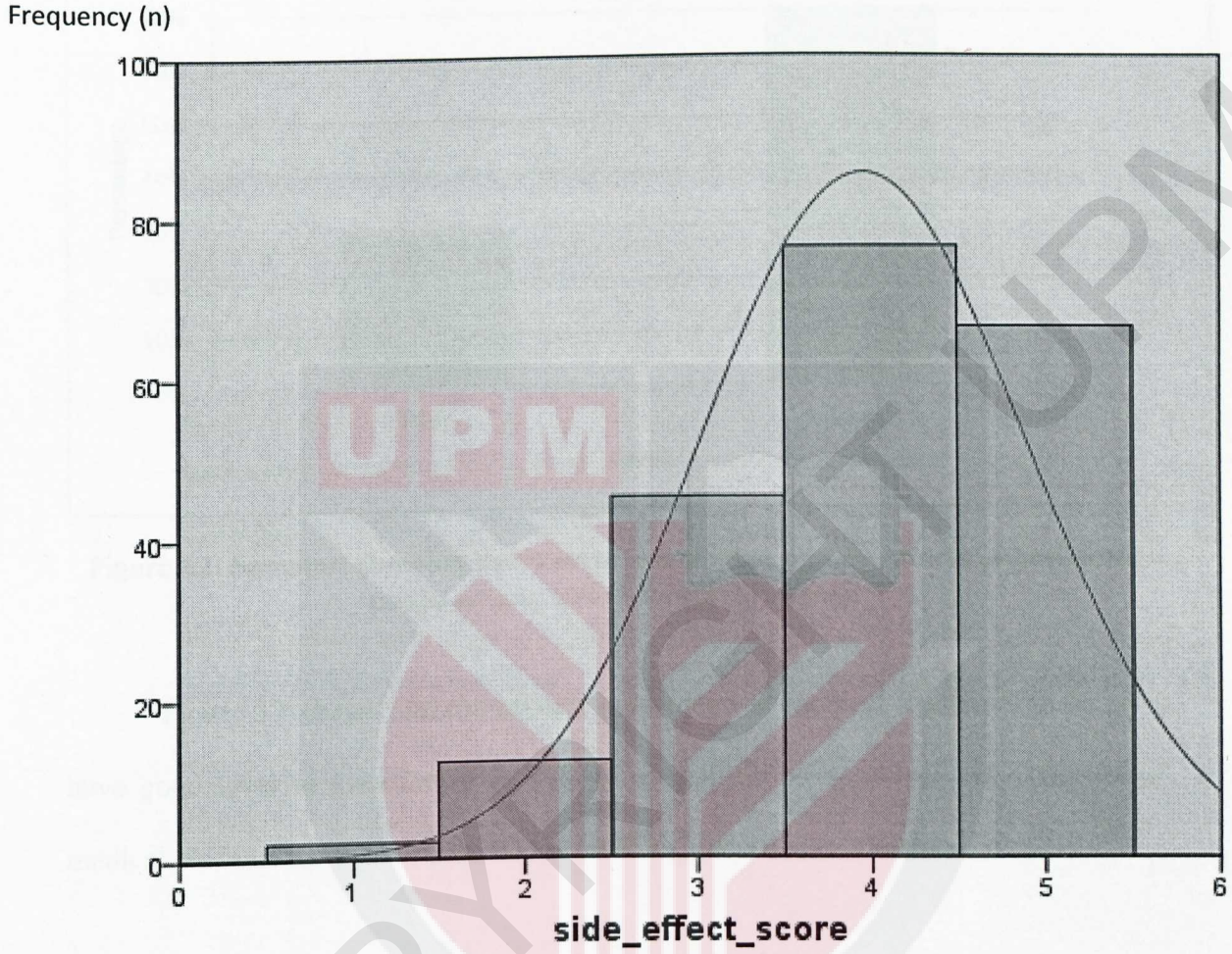


Figure 11: Histogram showing the distribution of side effects of antibiotic among medical students of UPM.

The Kolmogorov Smirnov and Shapiro-Wilk test was below 0.05, this showed that the data was significantly deviate from a normal distribution. The knowledge score on side effects of antibiotic showed negative skewness (-0.641) with the tail of the histogram extending to the left and negative kurtosis (-0.111). Therefore, the knowledge score on side effects of antibiotic was not normally distributed. The median score for knowledge on side effects of antibiotic was 4.00 and the interquatile range was 2.

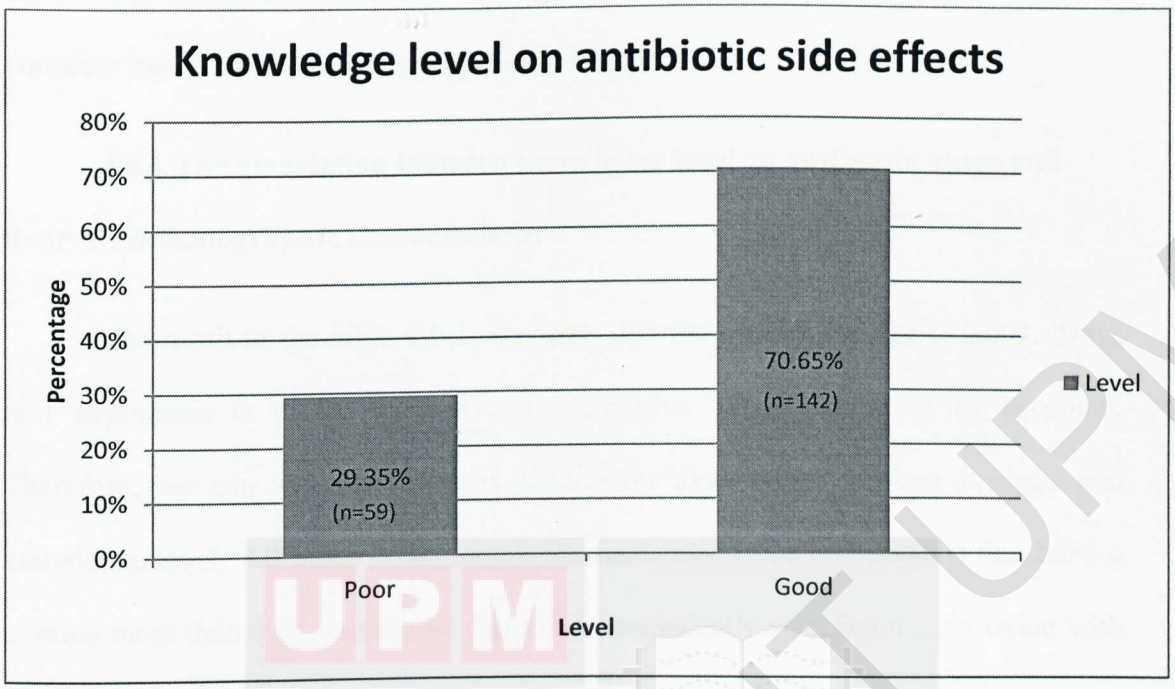


Figure 12: Bar chart showing the level of knowledge on side effects of antibiotic usage among UPM Medical Students.

Figure 12 shows that the highest percentage of medical student with 70.65% have good level of knowledge on side effects of antibiotic, while only 29.35% of medical students have poor knowledge level on side effects of antibiotic.

4.6: The association between knowledge and attitude level among UPM medical students based on socio-demographic factors.

4.6.1 The association between knowledge level on antibiotic usage and their socio-demographic characteristic.

The result in the table 4 below shows that the p-value for age is 0.001. Thus, null hypothesis is to be rejected and alternative hypothesis is to be accepted. Therefore, we can say that there is significant association between the age and knowledge level. All other demographic characteristic (race and gender) that have a p-value more than 0.05 shows that there is no statistically significant association with the knowledge level.

Table 4: Showing the knowledge level of respondent based on demographic factors.

Variables	Knowledge Level		n	Significance		
	Poor n(%)	Good n(%)		x^2	df	p
Race						
Malay	55(47)	62(53)	117	0.173	1	0.678
Non-Malay	37(44)	47(56)	84			
Gender						
Female	60(46.2)	70(53.8)	130	0.022	1	0.883
Male	32(45.1)	39(54.9)	71			
Age						
<21 years old	34(69.4)	15(30.6)	49	14.56	1	**0.001**
≥21 years old	58(38.2)	94(82.4)	152			
Educational Level						
Pre-clinical Year	60(54.5)	50(45.5)	110	7.536	1	**0.006**
Clinical Year	32(35.2)	59(64.8)	91			

4.6.2 The association between attitude level on antibiotic usage and their socio-demographic characteristic.

The result in Table 5 below shows the p-value for race was 0.042 and age was 0.030. The p-values were less than 0.05. So, the null hypothesis was rejected. Thus, there were statistically significant association between gender, age and educational level with attitude level.

Table 5: Showing the attitude level of respondent based on demographic characteristic

Variables	Attitude Level		n	Significance		
	Poor n(%)	Good n(%)		x^2	df	p
Race						
Malay	63(53.8)	54(46.2)	117	4.155	1	**0.042**
Non_Malay	33(39.3)	51(60.7)	84			
Gender						
Female	67(51.5)	63(48.5)	130	2.105	1	0.147
Male	29(40.8)	42(59.2)	71			
Age						
<21 years old	30(61.2)	19(38.8)	49	4.707	1	**0.030**
≥21 years old	66(43.4)	86(56.6)	152			
Educational Level						
Pre-clinical year	67(60.9)	43(39.1)	110	16.834	1	**0.001**
Clinical Year	29(31.9)	62(68.1)	91			

4.7 The comparison of knowledge level regarding antibiotics usage between pre-clinical and clinical year medical students of UPM.

The result below shows that the value of the chi-squared test for medical educational level which is p value equals to 0.001. Since p value < 0.05, thus there is statistically significant association between knowledge level and medical educational level. So, alternative hypothesis is accepted.

Table 6: The comparison of knowledge level regarding antibiotics usage between pre-clinical and clinical years medical students of UPM.

Variables	Knowledge Level		Significance		
	Poor n(%)	Good n(%)	x^2	df	p
Medical Educational Level					
Pre-clinical year	60(65.2)	50(45.9)	7.536	1	0.006
Clinical year	32(34.8)	59(54.1)			
n(%)	92(100)	109(100)			

4.8 The comparison of attitude level regarding antibiotics usage between pre-clinical and clinical years medical students of UPM.

The table below shows that the value of the chi-squared statistic for attitude level of medical educational level is 16.834. The chi-squared statistic has 1 degrees of freedom and the p-value equals to 0.001.Since p-value <0.05, there is a statistically significant association between attitude level and medical educational level. So, null hypothesis should be rejected and alternative hypothesis would be accepted.

Table 7: The comparison of attitude level regarding antibiotics usage between pre-clinical and clinical years medical students of UPM.

Variables	Attitude Level		Significance		
	Poor n(%)	Good n(%)	x^2	df	p
Medical Educational Level					
Pre-clinical year	67(69.8)	43(41)	16.834	1	0.001
Clinical year	29(30.2)	62(59)			
n(%)	96(100)	105(100)			

4.9 Correlation between Knowledge score and Attitude score Regarding Antibiotic Usage.

Based on table below, the result shows that there is a statistically significant relationship between knowledge score and attitude score regarding antibiotic usage among medical students of Universiti Putra Malaysia (r = 0.358 , p = 0.001).

Table 8: The relationship between knowledge score and attitude score regarding antibiotic usage.

			Total knowledge score	Total att score
Spearman's rho	Total Knowledge score	Correlation coefficient	1	0.358
		Sig. (2-tailed)	.	0.001
		N	201	201
	Total attitude score	Correlation coefficient	0.358	1
		Sig. (2-tailed)	0.001	.
		N	201	201

Notes:Notes : significant p value <0.05

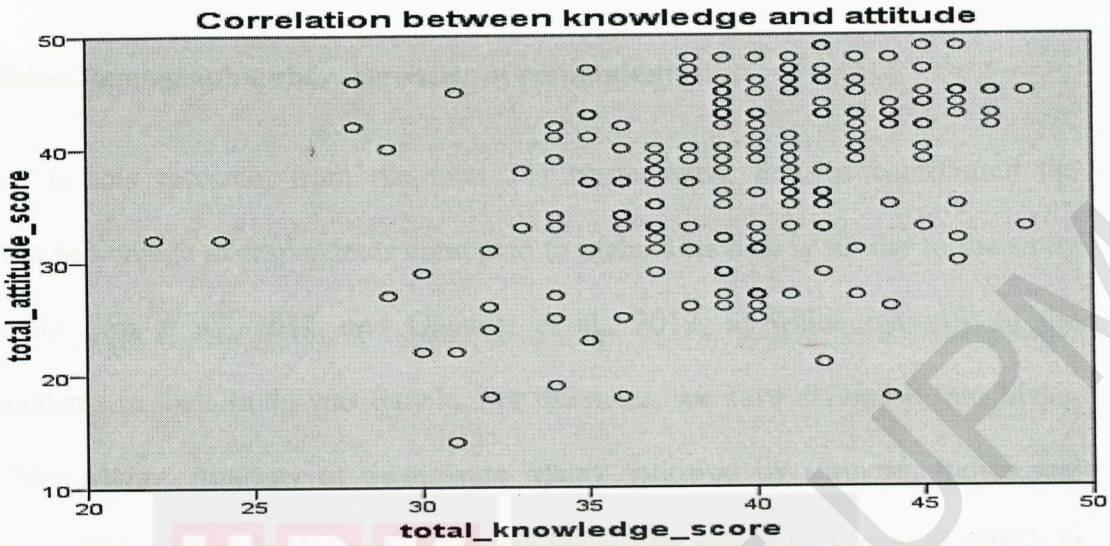


Figure 13: The correlation between knowledge and attitude score regarding antibiotic usage among UPM medical students.

Figure above shows the scatter plot diagram, as the knowledge score increases, the attitude score also increases. But, there is a weak positive correlation between knowledge and attitude score.

CHAPTER 5-DISCUSSION

5.1 Socio-demographic characteristics of respondents

In this research, from the total 201 respondents, females contributed the highest percentage of respondents compared to male. This data is similar to the study done by Lim et al., 2012, and Ghadeer et al., 2012, in which majority of the respondents in their study was female. For the races, we have divided it into Malay and Non-Malay. Majority of them were Malay followed by Chinese, Indian and Kadazan. This finding is almost similar with the results gained by Lim et al., 2012, in which majority of their respondents were Malay. Therefore the majorities of the respondents were female and Malay. This reflected the current population in UPM in which most of the students here are Malay and females. For the age group, since the median age of the respondents are 21, we have divided the group into 2 categories which are <21 and ≥21 years old. From the results, most of the respondents were within the age group of ≥21. In the aspect of medical educational level, we found that most of our respondents were pre-clinical year students with percentage of 54.7% higher than clinical years which is 45.3%. This is possibly because some of the clinical year students were preparing for their examination.

5.2 The level of knowledge on antibiotic usage among UPM Medical students

Our study showed that most of respondents from UPM medical students have good level of knowledge on antibiotic usage. This finding is consistent with a study done in Hong Kong in which majority of their respondents hold the correct knowledge of the proper use of antibiotics (Miaoyin, 2012).

Regarding UPM medical students' knowledge on the role of antibiotic, Table 2 shows almost all knew that antibiotic was used to treat bacterial infection. Surprisingly, there were still some of the respondents thought that antibiotic can be used to treat viral infection. But this finding is 18.1% better compared to the study in Jordan (Ghadeer, 2012). This is probably because some of them believed that antibiotics are effective against both bacteria and virus (Buke et al., 2005). Meanwhile, nearly half of respondents agreed that antibiotic is used for common cold and cough. This finding is almost similar with the study done by Ghadeer et. al., 2012 in which they found that 43.7% of their respondents believed antibiotics can be used for common cold and cough. This is because some of them had misconception that antibiotics can treat common cold and not aware that cold is a self-limiting viral infection, but most treated it with antiviral, antibiotic or both (Buke et al.,2012) & (Reynolds et al., 2008).

Concerning on antibiotic classification, most of the respondents have knowledge on it. Regarding antibiotic side effects, most of them believed that antibiotic produces some side effects as some of them answered that penicillin causes an allergic reaction. This finding is almost similar with the study done by Lim et al., 2012, in which majority of the respondents seemed to be aware that antibiotic may cause allergic reaction. Besides, a study done by Ghadeer et al., 2012 also found that

most of the medical students there believed that antibiotic could develop an allergic reaction which could lead to death. Regarding contraindication of antibiotic, almost half of the respondents believed that the course of antibiotic should not be stopped during pregnancy. In contrast to that, a study done by Stensballe et al., 2013, found that mothers using antibiotic in pregnancy could result in asthma and eczema in early child life. This shows that our respondents are not aware that antibiotic prescription to pregnant women is dangerous and their knowledge about this is not up to date. Therefore, an education on contraindication of antibiotic should be focused and stressed more to provide them with enough and sufficient knowledge.

Regarding the causes of antibiotic resistance, majority of our respondents answered that it is due to prolonged usage of broad spectrum of antibiotic. This is supported by the Guidelines For Antimicrobial Prescribing in Primary Care in Ireland in which their principle is to avoid over-use of broad spectrum antibiotics as they can increase the risk of penicillin non-susceptible pneumococci and MRSA. Besides, most of the respondents believed that antibiotic resistance happens when patients are not completing the full course of antibiotic and using antibiotic without physician prescription. This finding is almost similar with the study done by Ghadeer et al., 2012, in which more than half of them believed that antibiotic resistance occurs when the patients did not complete the full course of antibiotic and using antibiotic without physician prescription. Regarding knowledge on the impact of antibiotic resistance, almost all of them believed that antibiotic resistance could lead to the ineffectiveness of antibiotic, followed by increased cost of care and increased mortality rate. This finding is supported by a study done by Boothe et al.,2009, which stated that resistance results in increased morbidity and mortality, and increased costs.

In terms of preventing the emergence of antibiotic resistance, 98% of respondents believed that it can be prevented by using antibiotic with appropriate dosage and duration. This finding is supported by study done in Nigeria which found that the use of antibiotic at recommended dosage levels to treat confirmed bacterial infections is a type of exposure for which the benefit far outweighs the risk of selecting resistant strains (Iyalomhe et al., 2011). Study done in Jordan also found that 84.3% of respondents believed that antibiotic resistance is due to not completing the full course of antibiotic (Ghadeer et al., 2010). So, it is important for us to make sure that an appropriate dosage and duration should be followed when consuming antibiotic. Meanwhile about 96.5% of respondents suggested to complete the antibiotic course based on doctors' prescription to prevent antibiotic resistance. This finding is supported by the study done in Jordan in which majority of them said that antibiotic resistance is due to the usage of antibiotic without physician prescription(self medication) (Ghadeer et al., 2010). Meanwhile, about 25.4% or 51 respondents suggested to use a broad spectrum antibiotic. In contrast to it, research done by Boothe DM et al., 2009 found that the use of broad-spectrum antimicrobial drugs facilitates selection of resistant organisms. This shows that, even though some of our respondents have good knowledge in antibiotic resistance, but some are still not clear that using broad spectrum antibiotic will cause antibiotic resistance.

5.3 The level of attitude on antibiotic usage among UPM Medical students

Our study on attitude of medical students in UPM towards antibiotic usage showed that they generally have good attitude towards antibiotic. With only slight difference, about 52.24% respondents have good attitude towards antibiotic usage while 47.76% students have poor attitude towards antibiotic usage.

Table 3 showed that most of the respondents used antibiotic for bacterial infection followed by fever. This result contradict with National Antibiotic Guideline 2009 in which antibiotics are only used for bacterial infection and routine use of antibiotic to treat fever is inappropriate, as not all fever is caused by bacterial infection. Regarding origin of antibiotic, majority of respondents felt that buying antibiotic at the pharmacy is not a good attitude. Meanwhile, almost all of them take antibiotic upon doctor's prescription. This finding is almost similar with the study done in India in which most of them always consulted a doctor before starting on an antibiotic (Afzal et al., 2013).

Besides, most of respondents stopped taking antibiotic based on doctors' advise and disagreed to stop taking it when they don't feel better. Regarding reasons for not completing the full course of antibiotic, nearly half of respondents answered that they felt better. This proved that our respondents have quite good attitude when compared to the study done in Jordan in which more than half of them stop taking it when they start feeling better (Ghadeer et al., 2012). Surprisingly, in contrast to our finding(48.2%), study by Ghadeer et al., 2012 found that only 14.3% of their respondents failed to complete the last course of antibiotic because they forgot/could not be bothered.

In addition, 75,6% of respondents felt that they should stop taking antibiotic and consult the same doctor if they do not feel better after taking an antibiotic while 73.6% believed to use it for recommended period. Regarding reasoned for not taking an antibiotic, most of them disagreed for the reason it tastes bitter, size was too big and the prize was expensive. Meanwhile, most of the respondents felt that it is inappropriate to take or use left-over antibiotic when having flu or colds.

Next, reasoned for kept left-over antibiotic at home, less than 50% done that in case they might need it again compared to study in Jordan which found that more than half of them did so (Ghadeer et al., 2012). This proved that our respondents have good attitude. Meanwhile, 47.7% did that because they did not complete the course of antibiotic and about 42.2% used that for the same infection which is almost same with the finding(57%) found by Ghadeer et al., 2012 in his study. Lastly, among all of the respondents, 93.5% felt that they should not used antibiotic unnecessarily to prevent antibiotic resistance, which is supported by some study, 80.1% of medical students believed that antibiotic efficacy is undermined by their misuse(using antibiotic unnecessary) (Ghadeer et al., 2012). Additionally, more than 72% of respondents suggested that avoiding multiple antibiotic to treat the same infection and 69.6% felt that they should avoid using it for common cold infection to prevent antibiotic resistance. This is supported by journal in Nepal in which they taught the students to avoid multiple antibiotic usage (Shankar,2011) .

5.4 The knowledge level on antibiotic resistance and side effects of antibiotic among medical students of UPM

5.4.1 The knowledge level on resistance of antibiotic among medical students of UPM.

In this study, majority of medical students have good level of knowledge towards antibiotic resistance. This finding however is supported by one of previous study conducted by Ghadeer A. R. et al., 2012, which shows that medical respondents were knowledgeable about antibiotic safety.

Regarding questions on antibiotic resistance, almost all of the respondents believed that antibiotic resistance can lead to their ineffectiveness followed by causing harm to the patients. Furthermore, this finding is supported by one of the study which stated that microbes continue to become more resistant as the antibiotic pipeline continues to diminish (Brad Spellberg et al., 2008).

Besides, majority of medical students believed that prolonged use of broad spectrum antibiotic and not completing the full course of antibiotic will lead to antibiotic resistance. A previous study done by Sarahroodi and Arzi, 2009 also stated that the physician should advise their patient to complete the course of therapy so that the antibiotic resistance can be avoided. Therefore, it shows that most of medical students are knowledgeable about the causes of antibiotic resistance.

Overall we can conclude that medical students have some general knowledge regarding antibiotic resistance but more education on antibiotic resistance should be focused and stressed too, so that all medical students in UPM will have real good knowledge level regarding antibiotic resistance and in the same time to avoid the irrational use of antibiotics, as it is a key reason for the increase and spread of antibiotic resistance (Gyssens, 2001; Nordberg et al., 2004; Srinivasan et al., 2004; Morgan et al., 2011).

5.4.2 The knowledge level on side effects of antibiotic among medical students of UPM.

From this study, its proven majority of medical students in UPM have good knowledge level on side effects of antibiotic. Meanwhile, only few of them have poor knowledge level regarding the side effects of antibiotic. However, in Malaysia, an observational based study conducted in 2011 among health science students of

Masterskill University College of Health Sciences (MUCH) showed a very poor knowledge level regarding side effects of antibiotics (Kumar, et al., 2011). The result differs as medical students are being given more exposure and knowledge regarding antibiotic side effects because medical students are being the most important target groups as they are the future prescribers of antibiotic agent (Celia, et al., 2010).

Based on our study, half of them answered true regarding questions on antibiotic side effects which commonly cause mild stomach upset, while nearly half of respondents answered false regarding that question. Based on the result we concluded that more than half of medical students know and are aware about the side effects of antibiotic.

While on the question regarding penicillin causing allergic reaction, around 157(78.1%) of respondents answered true in which they agreed with that statement, however around 44(21.9%) of respondents seem to disagree with that question. Based on previous study, it revealed that the hypersensitivity of penicillin is more common than cephalosporin (Brooks, 2004), which shows that penicillin can trigger allergic reaction. Therefore, most of respondents seem to know about the side effect of penicillin and are aware about it. Regarding the question on gentamicin that can cause renal toxicity, around 157(78.1%) of respondents answered true while only 54(26.9%) of respondents answered false. Gladly, it can be said that most of the respondents seem to have some knowledge regarding this question and are aware about it.

Overall we can conclude that medical students have some knowledge on the side effects of antibiotic. However education strategies should be improved, so that all medical students who are doctors to be will have sufficient knowledge about antibiotic side effects.

5.5The association between knowledge and attitude level among UPM medical students based on socio-demographic factors.

5.5.1 The association between knowledge level on antibiotic usage based on socio- demographic factors.

By using chi-square test, the result shows that there was a statistically significant association between age and educational level with knowledge level. However, there was no statistically significant association between gender and race with knowledge level. Thus, based on the result, we can conclude that age and educational level were statistically significant associated with knowledge level. This might be because as the age increases, their experience about antibiotic usage also increases. In addition to it, a study done by Ka Keat Lim and Chew Charn Teh, 2012 found that the highest education level was found to contribute significantly to the mean knowledge score.

5.5.2 The association between attitude level on antibiotic usage based on socio- demographic factors.

While based on our study regarding the association between attitude level on antibiotic usage and their socio-demographic characteristic, the result showed that there were a statistically significant association between race, age and educational level with attitude level. The same view also expressed by a study of Ka Keat Lim and Chew Charn Teh, 2012 in which race, age and educational level were significantly associated to attitude. However, there was no statistically significant association between gender and attitude level.

5.6 The comparison of knowledge level regarding antibiotics usage between pre-clinical and clinical years medical students of UPM.

The result shows that there was a statistically significant association between medical educational level and knowledge level as the p value was 0.001. The same view also was obtained in a study done by Ka Keat Lim and Chew Charn Teh, 2012 as the highest education level contributed significantly to the mean knowledge score.

Besides, based on the result, it showed that clinical year students were more knowledgeable than pre-clinical year students as clinical years students score more percentage on good knowledge level. This is however supported by another study done in Hong Kong, which revealed that senior students were more knowledgeable than the junior students because the senior students have received clinical training and have more medical base training than the juniors (Miaoyin, 2012). Besides, clinical year students also have more exposure towards the knowledge of antibiotic usage as they have more experience dealing with antibiotic at hospital. Therefore, it provides them with more knowledge.

However, education should be stressed to both clinical and pre-clinical years, as the gap score between them were not too much. This shows that there are still some clinical year students lacking knowledge towards antibiotic usage. Thus more educational intervention should be done to avoid the irrational use of antibiotic and the emergence of antibiotic resistance.

5.7 The comparison of attitude level regarding antibiotics usage between pre-clinical and clinical years medical students of UPM

Based on our finding, there was statistically significant association between attitude level and medical educational level regarding antibiotic usage.

From the result, it showed that most of clinical year students have good attitude towards antibiotic usage than the pre-clinical year student as clinical year students have good score on attitude, compared to pre-clinical year students. This result is supported by a study done in Putrajaya which stated that factors that were expected to have huge impact on knowledge and attitude, such as higher education level, race and increased age showed score difference. They also mentioned that education level has been reported as a factor significantly associated with both knowledge and attitude on antibiotics (Lim et al., 2012).

Overall we can conclude that there was statistically significant association between medical educational level and attitude level, which shows that most of clinical year students have good attitude compared to pre-clinical year students.

5.8 Correlation between Knowledge score and Attitude score Regarding Antibiotic Usage.

From our findings, there was a statistically significant correlation between knowledge score and attitude score regarding antibiotic usage among medical students of Universiti Putra Malaysia as the p value is 0.001. Based on scatterplot diagram(Figure 13), as the knowledge score increases, the attitude score also increases. This finding indicates that there was a fairly positive correlation between knowledge and attitude score as the r value was 0.358. This result is however

supported by one of study done in Putrajaya, which revealed that knowledge of appropriate antibiotic use correlates positively with attitude (Lim KK & Teh CC, 2012). Another study conducted in Korea also showed that there was strong association between adequate knowledge on antibiotic and good attitude toward antibiotic (Kim SS, 2011).

Knowledge is somehow related to attitude towards antibiotic usage as it reflects how better the knowledge level of someone when an appropriate and correct attitude is practiced while dealing with antibiotic usage. This correlation between knowledge and attitude score indicates medical students in UPM do have a better knowledge and attitude, as those with a better knowledge will always be concern on practicing better attitude towards the antibiotic usage, to avoid the irrational antibiotic usage which can cause the emergence of antibiotic resistance.

5.9 Limitation of the study

Even though this research was conducted carefully, there are still limitations that could not be avoided occurred throughout this research was being carried out especially during the process of data collection. As this study is a questionnaire-based study, this research basically might not show the actual knowledge and attitude of UPM medical students towards the usage of antibiotic as the whole questionnaires totally depends on the honesty of respondents. There may be bias as a result of over or under reporting.

Furthermore, some of the respondents refused to give consent and participate in the study. Their refusal somehow affected the accuracy of the results. As systematic stratified method is used in this study, proper name list of 251 participants is prepared in which those who refused to full fill the questionnaire could not be

replaced. This affects the sample size as large sample size broadens the range of possible data and gives a better picture of data to be analysed.

In addition, as there was no 3rd year clinical students during data collection period, we include 1st year and 2nd year students as pre-clinical students while we had to only include 4th year and 5th year students to represent clinical year students. This might have the results affected as 3rd year students also falls under the category of clinical year students and overall result does not reflect the knowledge and attitude of 3rd year students. Moreover, since this is a cross-sectional study, the disadvantage is that temporal relationship among the variables could not be identified.

CHAPTER 6-CONCLUSION

As a conclusion, percentage of UPM medical students having good level of knowledge and attitude towards antibiotic usage is higher compared to poor level. But however there is no much difference as only almost half of the population has good level of knowledge and attitude. This obviously indicates a need of improving the attitude on behavior towards antibiotic to increase the percentage of students in the category of good level. In this study, majority of medical students are having a good level of knowledge towards antibiotic resistance and also side effects. However students are more aware on the issue of antibiotic resistance than the side effects as it's the common serious problem. Thus knowledge level of students regarding side effects of antibiotic need to be enhanced on this particular topic. Moreover, there is statistically significant association between age and knowledge level, unlike for the factors such as race and gender. While for attitude level age and race has statistically significant association with attitude level unlike the factor of gender. As a whole, these prove that there is a significant association between knowledge, attitude and demographic factors

Furthermore, there is statistically significant association between medical educational level and knowledge level, in which clinical year students have good knowledge compared to pre-clinical year students. Similarly, there was also statistically significant association between medical educational level and attitude level, which shows that most of clinical year students have good attitude compared to pre-clinical year students.

Lastly, there was a fairly positive correlation between knowledge score and attitude score regarding antibiotic usage among medical students in UPM. Since there

is no encouraging outcome on the knowledge and attitude of UPM medical students on antibiotic usage, we would like to recommend that more workshops, campaigns, health talks should be given to the students to increase the level of awareness among them. This aims to implement positive attitudes during usage of antibiotic. As a conclusion, the study findings provide information that could assist in planning health education with emphasis on the knowledge and the right attitude towards antibiotic usage.

RECOMMENDATION

We would recommend upcoming studies regarding this topic to use larger sample size in order to offer more epidemiological data and provide higher statistical reliability.

From this study, it is evident that good level of knowledge towards antibiotic among UPM medical students does not achieve a great number of percentage which is just slightly higher than students with poor level of knowledge. This highlights the need for educational strategies to be developed to enable students to reflect on the antibiotics knowledge. For that, we would recommend the responsible parties such as Ministry of Education, Ministry of Health and most importantly, the authorities of Faculty of Medicine and Health Sciences of UPM to work hand-in-hand in order to increase the awareness on antibiotic usage specifically regarding the side effects and antibiotic resistance emergence which is preventable.

Thus, we suggest that health talks should be given to the medical students on self medication of antibiotic. Additional, education campaigns should be directed towards changing the students' attitude and behaviour to rationalize antibiotic use and

limit self-medication and over use as the overall good attitude level was lower compared to knowledge level. "Self medication Awareness Campaign" is encouraged to be held in UPM as well. We would like to recommend more workshops such as "Antibiotic Usage Workshop" to be set up in UPM for the medical students so that good practices could be applied which would improve their average attitude level to an even better level. Also, the distribution antibiotic usage leaflet and booklet is another way to increase the level of awareness.

Most importantly, university's curriculum need to be reviewed and follow up studies should be conducted to ensure that our goal of reducing improper use of antibiotics has been fulfilled. We believe that the findings of this study may be useful to help develop intervention to decrease misconceptions regarding antibiotic use and to increase student's awareness regarding the risks of inappropriate use of antibiotics in general.

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APPENDICE

GANTT CHART

APPENDIX 1

TABLE 1.0 GANTT CHART FOR RESEARCH ACTIVITIES

	WEEK 1 25/3	WEEK 2 4/4	WEEK 3 15/4	WEEK 4 16/4	WEEK 5-16 22/4	WEEK 17-19 15/7	WEEK 20 5/8	WEEK 21 – 22 12/8	WEEK 22-23 21/8	WEEK 24-25 5/9
Start of module										
Proposal draft preparation										
Proposal submission										
Preparation for proposal presentation										
Proposal presentation										
Correction of proposal										
Preparation of letters										
Submission of letter										
Data collection and data analysis										
Submission of analyzed data report										
Preparation of report of analyzed data										
Presentation										

of analyzed data										
Correction of data analysis										
Report writing										
Submission of project report and scientific article										
Preparation of final presentation										
Rehearsal for final presentation										
Final Presentation										
Correction for final report and scientific article										
Submission of log book and final report										
Result										

APPENDIX 2

Research team members

Supervisor	Dr. Niazlin binti Mohd Taib
Co-supervisors	Dr. Siti Nurbaya binti Masri Dr. Tengku Zetty Maztura binti Tengku Jamaluddin
Leader	Farah Salwani binti Abd Rahim 162522
Members	Debashini A/P Chandirasekharan 164649 Nordiana binti Rusli 162523

APPENDIX 3

BUDGET PLANNING
TABLE 2.0

Item	**Quantity**	**Price**
Photostating	250	RM 250
Printing	200	RM 200
Stationery	-	RM 50
TOTAL		**RM 500.00**

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG, SELANGOR, MALAYSIA

RESPONDENT'S INFORMATION SHEET

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

STUDY TITLE
Association between socio-demographic factors with knowledge and attitude level towards antibiotic usage UPM medical students in 2013.

INTRODUCTION
Irrational and innapropiate usage of antibiotics have spread all over the world. Attitudes such as buying over the counter, practising self medication, incompleting course of treatment and misuse in viral infections are being the major contributary factors to antibiotic resistance. As these problems appear to be global, the scope has not been adequately researched among our university medical students who are being the important target group as they are the future prescriber.

WHAT WILL YOU HAVE TO DO?
You are invited to fill up some questionnaires regarding your knowledge and attitude towards antibiotic usage.

WHO SHOULD NOT ENTER THE STUDY?
The medical students who refuse to participate in this study and medical students who are not listed as respondents.

WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?
It would be a great oppurtunity to assess your level of knowledge and attitude regarding antibiotic usage by answering the questionnaires. Being apart of this study, you could improve your attitude towards antobitic usage by understanding the underlying reasons why this research is being carried out.

b) TO THE INVESTIGATOR?
Investigators could achieve the aim of their study that is to evaluate the knowledge and attitude scores of the subjects on antibiotic usage by collecting and analysing the data through questionnaires which would be very useful in order for our university to review on the currculum programme regarding antibiotic if there is any significant result.

WHAT ARE THE POSSIBLE RISKS?
None

WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?
Yes. All the informations provided are strictly confidential. Information will only be presented in a collective manner without the mentioning of any individual identity.

WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?
Farah Salwani binti Abd Rahim
Debashini Chandirasekaran

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Nordiana Binti Rusli

HELAIAN PENERANGAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

TAJUK KAJIAN
Kaitan antara faktor sosio-demografi dengan tahap pengetahuan dan sikap terhadap penggunaan antibiotik dalam kalangan pelajar perubatan UPM tahun 2013

PENGENALAN
Penggunaan antibiotik secara tidak betul dan tidak bersesuaian telah merebak ke seluruh dunia.Sikap seperti membeli antibiotik di kaunter tanpa perskripsi doktor, mengamalkan perubatan secara sendiri, tidak menyempurnakan tempoh rawatan dan penyalahgunaan antibiotik dalam jangkitan virus telah menjadi faktor yang menyumbang ke arah ketahanan antibiotik. Oleh kerana masalah ini telah timbul secara global, skop ini tidak dikaji secara secukupnya antara pelajar perubatan di universiti ini, di mana golongan ini menjadi sasaran yang penting sebagai masa hadapan mempreskripsikan antibiotik.

APAKAH YANG PERLU ANDA LAKUKAN?
Anda dijemput untuk mengisi borang soal selidik berkaitan pengetahuan dan sikap anda terhadap penggunaan antibioik.

SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?
Pelajar perubatan yang enggan menyertai kajian ini dan pelajar perubatan yang tidak tersenarai sebagai responden.

APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PENYERTA?
Ia merupakan suatu peluang yang hebat untuk menilai tahap pengetahuan dan sikap anda berkenaan penggunaan antibiotik dengan menjawab borang soal selidik ini. Dengan menjadi sebahagian daripada kajian ini, anda akan dapat membaiki sikap anda terhadap penggunaan antibiotik dengan memahami sebab mengapa kajian ini dilakukan.

b) KEPADA PENYELIDIK?
Pengkaji boleh mencapai sasaran kajian iaitu untuk menilai tahap pengetahuan dan sikap subjek terhadap pengunaan antibiotik, dengan mengumpul dan menganalisa data menerusi borang soal selidik, di mana ia akan menjadi sangat berguna kepada universiti untuk mengkaji semula program kurikulum berkaitan penggunaan antibiotik, jika sebarang keputusan yang bermakna diperolehi.

ADAKAH IA BERISIKO?

Tiada.

ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?
Ya. Semua maklumat yang diperolehi akan menjadi sulit. Maklumat ini hanya akan didedahkan dalam bentuk perkumpulan tanpa menyebut identiti individu.

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SELANGOR, MALAYSIA

BORANG PERSETUJUAN RESPONDEN

TAJUK PENYELIDIKAN : **KAITAN ANTARA FAKTOR SOSIO-DEMOGRAFI DENGAN TAHAP PENGETAHUAN DAN SIKAP TERHADAP PENGGUNAAN ANTIBIOTIK DALAM KALANGAN PELAJAR PERUBATAN UPM TAHUN 2013.**

PENYELIDIK : **1. Farah Salwani binti Abd Rahim 162522**

2. Debashini Chandirasekharan 164649

3. Nordiana binti Rusli 162523

Saya..... No Kad Pengenalan. .....
beralamat.....
.....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam menyertai penyelidikan klinikal *(pengajian klinikal/ pengajian soal selidik/ percubaan ubat-ubatan) seperti yang disebut di atas.

Saya telah diberi penjelasan secara menyeluruh mengenai dasar penyelidikan klinikal dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang dijalankan ke atas saya.

*potong yang tidak berkenaan

Tandatangan .....
(*Responden*)

Tarikh :.....

Tandatangan .....
(*Saksi*)

Nama :.....

No. K/P: .....

Saya mengesahkan bahawa saya telah menerangkan kepada responden sifat dan tujuan penyelidikan klinikal tersebut di atas.

Tarikh .....

Tandatangan .....
(*Penyelidik*)

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SELANGOR, MALAYSIA

CONSENT FORM (RESPONDENT)

RESEARCH TITLE : ASSOCIATION BETWEEN SOCIO DEMOGRAPHIC FACTORS WITH KNOWLDEGE AND ATTITUDE LEVEL TOWARDS ANTIBIOTIC USAGE UPM MEDICAL STUDENTS IN 2013

RESEARCHER : 1. Farah Salwani binti Abd Rahim 162522

2. Debashini Chandirasekharan 164649

3. Nordiana binti Rusli 162523

I ..... Identity Card No. .....
address.....
.....hereby voluntarily agree to take part in the clinical research *(clinical study, questionnaire study/ drug trial) specified above.

I have been informed about the nature of the clinical research in terms of methodology, possible adverse effects and complications (as written in the Respondent Information Sheet). I understand that I have the right to withdraw from this clinical research at any time without assigning any reason whatsoever. I also understand that this study is confidential and all information provided with regards to my identity will remain private and confidential.

I* wish / do not wish to know the results of the tests performed on me.

* delete where necessary

Signature .....
(*Respondent*)

Signature .....
(*Witness*)

Date :.....

Name :.....

I/C No.
.....

I confirm that I have explained to the respondent the nature and purpose of the above –mentioned clinical research.

Date .....

Signature .....
(Researcher)

This questionnaire consists of 3 sections which are section A, B, and C. The score o knowledge and attitude towards antibiotic usage will be assessed in section B and C Please answer all the questions

Section A : Socio-demographic characteristics (Please tick only one)

1) Races
   a) Malay ☐
   b) Chinese ☐
   c) Indian ☐
   d) Others .....(please state here)

2) Gender
   a) Female ☐
   b) Male ☐

3) Age : ..... years old

4) Medical educational level
   a) Pre-clinical year (year 1 - year 2) ☐
   b) Clinical year (year 3 - year 4) ☐

Section B : Knowledge towards antibiotic usage.(Please tick whether true(T) or false(F).

	TRUE(T)	FALSE(F)
1)	Antibiotic are	
a)	pain killers.	
b)	sedative.	
c)	used to destroy all microorganisms.	
d)	used to destroy bacteria.	
e)	used to kill virus.	
f)	used to prevent fungus infection.	
2)	Antibiotics are used for	
a)	common cold.	
b)	cough and runny nose.	
c)	stomach ache.	
d)	fever.	
e)	abscess.	
f)	clean, small superficial skin injury by sharp knife.	
3)	Antibiotics can be classified according to their action on the bacterial	
a)	cell wall.	
b)	DNA and RNA.	
c)	protein.	
d)	replication.	
e)	ribosome.	
4)	Regarding antibiotic side effects	
a)	they commonly cause mild stomach upset.	
b)	none of them causes side effects.	
c)	most of them are addictive.	
d)	penicillin causes allergic reaction.	
e)	gentamicin causes renal toxicity.	
5)	Antibiotics	
a)	should be stopped when the patient does not have fever.	
b)	are effective after 2 days.	
c)	may be continued when the patients are still feeling unwell.	
d)	may be changed when the patients are still feeling unwell.	
e)	should be stopped during pregnancy.	
f)	should not be given to child less than 1 year old.	

6) Antibiotics are contraindicated when taken along with
   a) alcohol.
   b) sweets.
   c) coca cola.
   d) contraceptive pills.

7) Antibiotic resistance
   a) leads to ineffectiveness of antibiotic.
   b) eliminates bacterial infection.
   c) occurs due to usage of aspirin.
   d) causes harm to the patients.

8) The antibiotic resistance is due to
   a) prolonged usage of broad spectrum antibiotic.
   b) buying over the counter.
   c) not completing the full course of antibiotic.
   d) using the same antibiotic of different brands.
   e) using antibiotic without physician prescription.

9) What is the impact of antibiotic resistance?
   a) Causes longer lasting illness.
   b) Increases mortality rate.
   c) Increases cost of care.
   d) Causes extended hospital stay of patients.
   e) Requires expensive antibiotic to treat infection.

10) How to prevent the emergence of antibiotic resistance nowadays?
   a) Through antibiotic stewardship.
   b) Complete the antibiotic course based on doctors' prescription.
   c) Prevent buying over the counter prescription.
   d) Using a broad spectrum antibiotic.
   e) Using antibiotics with appropriate dosage and duration.

Section C : Attitude towards antibiotic usage. (Circle one response for each of the following items)

	Strongly agree	Agree	Disagre	Strongly diagree
1) I use antibiotic when I have				
a) bacterial infection.	1	2	3	4
b) viral infection.	1	2	3	4
c) fungal infection.	1	2	3	4
d) muscle pain.	1	2	3	4
a) sore throat.	1	2	3	4
b) fever.	1	2	3	4
c) common colds	1	2	3	4
d) constipation.	1	2	3	4
e) pain when passing urine.	1	2	3	4
2) When I fall sick, I				
a) buy antibiotic at the pharmacy.	1	2	3	4
b) buy antibiotic over the clinic counter.	1	2	3	4
c) take antibiotic upon doctor's prescription.	1	2	3	4
d) take the left-over antibiotics.	1	2	3	4
e) take other family member's antibiotic.	1	2	3	4
f) use the same antibiotic every time I have infection.	1	2	3	4
3) I will stop taking antibiotic				
a) when I feel better.	1	2	3	4
b) when I start having side effects without doctors' consultation.	1	2	3	4
c) when I loss antibiotic.	1	2	3	4
d) based on the doctor's advice.	1	2	3	4
e) when I don't feel better.	1	2	3	4
4) I do not complete the last course of antibiotic because				
a) the antibiotics are finished.	1	2	3	4
b) I feel better.	1	2	3	4
c) I forget about it.	1	2	3	4
d) of the side effects of the antibiotic that made me feel unwell	1	2	3	4
e) I loss the antibiotic	1	2	3	4

5) If I do not feel better after taking an antibiotic				
a) I stop taking it and consult another doctor.	1	2	3	4
b) I stop taking it and consult the same doctor.	1	2	3	4
c) I buy another antibiotic based on friend's suggestion	1	2	3	4
d) I buy another antibiotic based on my knowledge experience	1	2	3	4
e) I persuade the doctor to give my favourite antibiotics.	1	2	3	4
f) I use it for the recommended period	1	2	3	4
6) I will not take antibiotic				
a) if the taste is bitter.	1	2	3	4
b) if the size too big.	1	2	3	4
c) if the price is expensive.	1	2	3	4
7) When I have flu or colds				
a) I take antibiotic.	1	2	3	4
b) I expect the doctor to prescribe an antibiotic.	1	2	3	4
c) I do not expect the doctor to prescribe an antibiotic.	1	2	3	4
d) I persuade the doctor to prescribe me an antibiotic.	1	2	3	4
e) I use left-over antibiotics.	1	2	3	4
8) I keep left-over antibiotics because				
a) I may need it again.	1	2	3	4
b) I did not complete the course.	1	2	3	4
c) I am lazy to see doctor.	1	2	3	4
d) It is expensive.	1	2	3	4
9) I use the left-over antibiotics				
a) for the same infection.	1	2	3	4
b) for another type of infection.	1	2	3	4
10) To prevent antibiotic resistance, I should				
a) learn not to use antibiotic unnecessarily.	1	2	3	4
b) should use expensive antibiotic to treat infection.	1	2	3	4
c) avoid buying antibiotic over the counter.	1	2	3	4
d) avoid using multiple antibiotic when treating the same infections.	1	2	3	4
e) use antibiotic for common cold condition.	1	2	3	4

11)	I should take antibiotic				
a)	before meal.	1	2	3	4
b)	with meal.	1	2	3	4
c)	after meal.	1	2	3	4

Attachment 2

JKEUPM Ref No. : FPSK_Mei (13)28

Members of the JKEUPM who reviewed the documents:

Assoc. Prof. Dr. Johnson Stanslas

Date of approval: 16/7/2013

Endorsed at JKEUPM Meeting on **2/8/2013**, attended by:

NAME	DESIGNATION	GENDER	TICK IF PRESENT
Prof. Dr. Norlijah Othman	Paediatrics& Dean, Faculty of Medicine and Health Sciences	Female	√
Prof. Dr Zamberi Sekawi	Medical Microbiologist & Deputy Dean of Research and Internationalization, Faculty of Medicine and Health Sciences	Male	\
Prof. Dato' Dr. Lye Munn Sann	Medical Statistician, Dept of Community Health, Faculty of Medicine and Health Sciences	Male	
Prof. Dr. Tengku AizanAbd Hamid	Gerontologist & Director, Institute of Gerontology	Female	√
Prof. Dr. Lekhraj Rampal	Medical Statistician, Dept of Community Health, Faculty of Medicine and Health Sciences	Male	
Prof. Dr. Elizabeth George	Pathologist, Dept of Pathology, Faculty of Medicine and Health Sciences	Female	√
Prof. Dr. Lim ThiamAun	Anesthesiologist, Dept of Surgery, Faculty of Medicine and Health Sciences	Male	
Prof. Dr. Wan Omar Abdullah	Medical Parasitologist, Dept of Medical Microbiology and Parasitology, Faculty of Medicine and Health Sciences	Male	
Prof. Dr. Patimah Ismail	Professor of Biomedicine, Dept of Biomedical Sciences, Faculty of Medicine and Health Sciences	Female	\
Assoc. Prof. Dr. Johnson Stanslas	Pharmacologist, Dept of Medicine, Faculty of Medicine and Health Sciences	Male	\
Assoc. Prof Dr. Mansor Abu Talib	Assoc. Professor of Guidance and Counselling, Dept of Human Development and Family Studies, Faculty of Human Ecology	Male	
Assoc. Prof. Dr. Noritah Omar (Lay Person)	Assoc. Professor of English Language, Dept of English Language, Faculty of Communication and Modern Languages	Female	\
Dr. RojanahKahar (Lay Person)	Lecturer of Dept of Human Development and Family Studies, Faculty of Human Ecology	Female	\
Tan Sri Dato' Napsiah Omar (Lay Person)	Chairman, National Population and Family Development Board	Female	