



UNIVERSITI PUTRA MALAYSIA

***THE ASSOCIATION BETWEEN PHARMACOLOGICAL TREATMENT
SATISFACTION AND ANTIHYPERTENSIVE MEDICATION ADHERENCE
AMONG HYPERTENSIVE PATIENTS IN UNIVERSITY PUTRA MALAYSIA
TEACHING HOSPITAL (HPUPM), SELANGOR, MALAYSIA***

TEE YIH LING

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**BACHELOR OF NURSING
UNIVERSITI PUTRA MALAYSIA
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HOSPITAL (HPUPM), SELANGOR, MALAYSIA**

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**Thesis Submitted to the Faculty of Medicine and Health Sciences,
Universiti Putra Malaysia, in Fulfilment of the Requirements for the
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Yih Ling Tee, Norafisyah Makhdzir

ABSTRACT

Background: Hypertension (HTN) or high blood pressure (BP) is an incurable chronic disease that may require lifelong management with antihypertensive medications. Despite a high prevalence of HTN in Malaysia, our country still recorded a low level of BP control. Poor management of this non-communicable disease (NCD) will contribute to complications like cardiovascular diseases (CVDs) and eventually premature deaths. The most significant cause of uncontrolled BP is antihypertensive medication nonadherence. **Objective:** The main objective of this study is to determine the association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients. **Methods:** A cross-sectional study with convenient sampling was conducted at Family Medicine Clinic (FMC), HPUPM, from July to September 2022 with a self-administered questionnaire. **Result:** From a total of 111 respondents who participated in the study, the majority were satisfied with their HTN pills ($n = 63$, 53.8%), but only 39 or 35.1% of the respondents adhered to the HTN drug regime. The findings proved that there was a significant positive correlation between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients ($r = 0.421$, $p = 0.001$), and confidence ($\beta = 0.268$, $p = 0.007$), and convenience ($\beta = 0.237$, $p = 0.021$) were significant predictors of antihypertensive medication adherence. **Conclusion:** The study showed that less than half of the respondents adhered to their antihypertensive medications. Thus, there is a need for healthcare providers to plan effective strategies to enhance hypertensive patients' pharmacological treatment satisfaction, especially convenience and confidence in their medication regime, to boost their adherence to antihypertensive medications.

Keywords: hypertension, blood pressure, pharmacological treatment satisfaction, antihypertensive medication adherence, patient

**KAITAN ANTARA KEPUASAN TERHADAP RAWATAN FARMAKOLOGI
DAN KEPATUHAN KEPADA UBAT ANTIHIPERTENSIF DI KALANGAN
PESAKIT HIPERTENSI DI HOSPITAL PENGAJAR UNIVERSITI PUTRA
MALAYSIA (HPUPM), SELANGOR, MALAYSIA**

Yih Ling Tee, Norafisyah Makhdzir

ABSTRAK

Latar Belakang: Hipertensi (HTN) atau tekanan darah tinggi (BP) adalah penyakit kronik yang tidak boleh diubati yang mungkin memerlukan pengurusan sepanjang hayat dengan ubat antihipertensi. Dengan prevalens HTN yang tinggi di Malaysia, negara kita masih mencatatkan tahap kawalan BP yang rendah. Pengurusan penyakit tidak berjangkit (NCD) yang lemah ini akan menyumbang kepada komplikasi seperti penyakit kardiovaskular (CVD), dan akhirnya kematian pramatang. Punca paling ketara BP yang tidak terkawal ialah ketidakpatuhan ubat antihipertensi. **Objektif:** Objektif utama kajian ini adalah untuk menentukan kaitan antara kepuasan terhadap rawatan farmakologi dengan kepatuhan kepada ubat antihipertensi di kalangan pesakit hipertensi. **Kaedah:** Kajian keratan rentas dengan persampelan mudah telah dijalankan di Klinik Perubatan Keluarga (FMC), HPUPM dari Julai hingga September 2022 dengan soal selidik yang dijawab sendiri oleh responden. **Keputusan:** Daripada sejumlah 111 responden yang mengambil bahagian dalam kajian ini, majoriti daripada mereka berpuas hati dengan pil HTN mereka ($n = 63$, 53.8%), tetapi hanya 39 atau 35.1% responden mematuhi rejim ubat HTN. Dapatan kajian ini membuktikan bahawa terdapat korelasi positif yang signifikan antara kepuasan terhadap rawatan farmakologi dan kepatuhan kepada ubat antihipertensi dalam kalangan pesakit hipertensi ($r = 0.421$, $p = 0.001$), dan keyakinan ($\beta = 0.268$, $p = 0.007$), dan kemudahan ($\beta = 0.237$, $p = 0.021$) adalah peramal penting untuk kepatuhan kepada ubat antihipertensi. **Kesimpulan:** Kajian ini menunjukkan bahawa kurang daripada separuh responden mematuhi jadual ubat antihipertensi mereka. Oleh itu, terdapat keperluan bagi penyedia penjagaan kesihatan untuk merancang strategi yang berkesan untuk meningkatkan kepuasan rawatan farmakologi antara pesakit hipertensi, terutamanya kemudahan dan keyakinan terhadap rejim ubat mereka, untuk meningkatkan kepatuhan mereka terhadap ubat antihipertensi.

Kata kunci: hipertensi, tekanan darah, kepuasan rawatan farmakologi, kepatuhan ubat antihipertensi, pesakit

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DECLARATION BY STUDENT

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LIST OF ABBREVIATIONS

ACEis	: Angiotensin-converting enzyme inhibitors
ARBs	: Angiotensin-receptor blockers
BP	: Blood Pressure
CCBs	: Calcium channel blockers
CRU	: Clinical Research Unit
DASH	: Dietary Approaches to Stop Hypertension
HTN	: Hypertension
FMC	: Family Medicine Clinic
HPUPM	: University Putra Malaysia Teaching Hospital
JKEUPM	: Ethics Committee for Research Involving Human Subjects
MAR-Scale	: Medication Adherence Reasons Scale
MYR	: Malaysia Ringgit
NCDs	: Non-communicable diseases
SKVE	: South Kajang Valley Expressway
SD	: Standard Deviation
SPSS	: Statistical Packages for Social Sciences
TPB	: Theory of Planned Behavior
TRA	: Theory of Reasoned Action
TSQM	: Treatment Satisfaction Questionnaire for Medication
YOH	: Young-onset hypertension

CHAPTER 1

INTRODUCTION

This chapter includes the background of the study, problem statement, significance of the study, research question(s), research objectives, hypotheses, and conceptual and operational definitions.

1.1 Background of Study

According to the National Health and Morbidity Survey by the Ministry of Health Malaysia in 2019, hypertension (HTN) is one of Malaysia's most common non-communicable diseases (NCDs), which affects more than six million Malaysian adults aged 18 and above (Ministry of Health Malaysia, 2020). It is important to note that poor-controlled HTN will cause unstable blood pressure (BP), which eventually damages the renal, heart, and blood vessels, leading to cardiovascular diseases and premature deaths (World Health Organization, 2021a). Especially, HTN is a chronic disease with no cure. Thus, the management of HTN is vital in preventing its complications from happening. In addition, it is crucial for people diagnosed with HTN to take antihypertensive medications regularly according to the schedule, as nonadherence to HTN medications is the most significant cause of uncontrolled BP (Abegaz et al., 2017).

In 2021, the World Health Organization published the “Guideline for the Pharmacological Treatment of Hypertension in Adults” to provide the latest evidence-based antihypertensive medications or pharmacological treatment for managing HTN (World Health Organization, 2021b). In this guideline, the World Health Organization suggests initiating the antihypertensive medication(s) once the HTN is confirmed or diagnosed in an adult as a comprehensive antihypertensive treatment plan in addition to non-pharmacological treatment, regular BP monitoring and suitable intervals of follow-up by the physician. For non-pharmacological treatment, it refers to having a healthy lifestyle by consuming the Dietary Approaches to Stop Hypertension (DASH) diet (reducing daily salt intake to five grams per day, limiting the intake of saturated fats or trans fats, eating more fruit and vegetables), reducing alcohol consumption, avoiding the use of tobacco, and having a regular physical activity (World Health Organization, 2021b). In terms of pharmacological treatment, thiazide and thiazide-like agents, angiotensin-converting enzyme inhibitors (ACEis)/angiotensin-receptor blockers (ARBs), and long-acting dihydropyridine calcium channel blockers (CCBs) are recommended as first-line agent (World Health Organization, 2021b). However, it could be monotherapy with a single antihypertensive medication or combination therapy as two or more antihypertensive medications prescribed by the physician that suit the patient’s condition (Ministry of Health Malaysia, 2018).

By referring to the latest statistics, 90.0% of Malaysians with a confirmed diagnosis of HTN are on at least one type of antihypertensive medication or monotherapy (Ministry of Health Malaysia, 2020). Therefore, it shows that pharmacological antihypertensive treatment is the mainstay of HTN management as

lifestyle modification alone would not be enough to establish a well-controlled BP and, eventually, a lower risk of cardiovascular diseases. Based on a systematic review and meta-analysis of antihypertensive medication nonadherence, uncontrolled BP will highly threaten hypertensive patients with a risk of heart failure, stroke, renal insufficiency and coronary artery diseases (Abegaz et al., 2017).

Despite the management implemented, only 50.0% of hypertensive patients in Malaysia with prescribed antihypertensive medications have a controlled BP (Ministry of Health Malaysia, 2020). One factor that hinders adherence to antihypertensive medications is whether the patient is satisfied with the treatment. The adverse reactions that hypertensive patients experience from taking antihypertensive medications, such as dizziness, headache, nausea, and increased urination, often lead to medication nonadherence (Yusoff et al., 2020). Particularly HTN is a silent disease. Hence, most hypertensive patients do not experience any symptoms of HTN, like early morning headaches, arrhythmia, or blurred vision (World Health Organization, 2021c). With the asymptomatic condition, hypertensive patients might not feel the need for pharmacological antihypertensive treatment and believe in its benefit and effectiveness in preventing health complications, like cardiovascular diseases from poor BP control. Therefore, it will be necessary to study if pharmacological treatment satisfaction affects antihypertensive medication adherence, which is the primary purpose of this study.

1.2 Problem Statement

Globally, medication adherence among patients with chronic diseases, including HTN, is about 50.0% (Kim et al., 2018). In 2021, the World Health Organization and Imperial College London published a research paper on the global analysis of trends in HTN prevalence and progress in treatment and control from 1990 to 2019, with 1201 population and 104 million participants worldwide (Zhou et al., 2021). From their study, high-income or developed countries like South Korea, Canada, and Iceland have better control of HTN with antihypertensive medications. Statistically, 70.0% of hypertensive patients adhere to antihypertensive pharmacological treatment in those three countries. Compared to middle-income or developing countries, 20.0% to 50.0% of hypertensive patients in Malaysia, Costa Rica, Brazil, Chile, and Turkey have controlled BP under antihypertensive medications (Zhou et al., 2021). In comparison, only 10.0% of hypertensive patients adhere to their antihypertensive medications to have a well-controlled BP in low-income or least-developed countries like Rwanda, Niger, and Madagascar (Zhou et al., 2021). This evidence shows a large margin of antihypertensive medication adherence among hypertensive patients between developed, developing and least-developed countries. The determinant factors are the lack of access to affordable healthcare services and antihypertensive medications for low-and-middle-income populations, as summarised in a systemic analysis of global disparities in HTN prevalence and control (Mills et al., 2016). However, it might not be the core reason hypertensive Malaysians do not adhere to their antihypertensive medications, as the treatment cost in government health

facilities is subsidised, and only one Malaysia Ringgit (MYR) will be required (Kwong et al., 2020).

According to World Health Organization (2021c), more than 80.0% of hypertensive patients live in low-and-middle-income countries worldwide, still, only half are aware of their health condition and receive antihypertensive treatment. Palafox et al. (2016) conclude in their paper on awareness, treatment, and control of HTN in high-, middle and low-income countries that HTN management outcomes increase as the countries become more affluent. It means high-income countries not only have a lower prevalence of HTN, but their hypertensive patients also have better control over their BP. Mills et al. (2016) suggest that it is due to the high educational level and patient health literacy that promotes early HTN detection through BP screening. Besides that, their heightened awareness of HTN and positive belief toward antihypertensive medications will facilitate early diagnosis of HTN by mean of regular follow-up by family physicians, which in turn prevents HTN-associated health complications when they adhere to the prescribed antihypertensive medications (Mirzaei et al., 2020; Palafox et al., 2016). As previously reported, inequality in antihypertensive medication adherence was observed between high and low-and-middle-income countries. Hence, the question arises as to whether antihypertensive medication adherence is influenced by educational level or the scantiness of reliable information given to patients with antihypertensive medications. In other words, the question now is how the socioeconomic demographic of certain countries affects the attitude and behaviour of HTN patients towards the treatment.

On the contrary, Vrijens et al. (2017) report that the increased awareness of the initiation and implementation of antihypertensive medications might not guarantee the persistence of the antihypertensive medication-taking behaviour (Vrijens et al., 2017). Nevertheless, a study by Wood (2012) on medication adherence reports that most patients with chronic diseases, like HTN, stop adhering to their medications after six months of treatment. It might be due to the asymptomatic characteristics of the HTN disease, where hypertensive patients might not feel the immediate health threat and severity in discontinuing the antihypertensive medications. On top of it, some hypertensive patients in a public hospital in Malaysia report side effects after taking the antihypertensive medicines, like dizziness, headache, nausea, and increased urination, in a cross-sectional study on medication nonadherence (Yusoff et al., 2020). Similarly, Ramli, Ahmad, and Paraidathathu (2012), who study antihypertensive medication adherence in Malaysia's primary health clinics, find that 75.0% of hypertensive patients are least likely to adhere to the medications when the total number of daily antihypertensive medications prescribed are more than three (Ramli, Ahmad & Paraidathathu, 2012). It is typical for HTN patients to be dissatisfied with the effectiveness of medication in controlling BP as they mainly feel asymptomatic. Furthermore, people might have a sense of 'being healthy' and induce an apathetic attitude and awareness toward antihypertensive medication-taking behaviour (Centre for Health Protection, 2013). An interesting question in this context is whether the complicated dosing and experiencing adverse effects from the antihypertensive medications may cause dissatisfaction with the pharmacological treatment and encourage them to choose not to adhere to antihypertensive medications.

Moreover, Zyoud et al. (2013) indicate the relationship between treatment satisfaction and medication adherence in a cross-sectional study among hypertensive patients in Palestine. They claim that treatment satisfaction is significantly related to antihypertensive medication adherence. The question that has previously never been addressed is the factors that make HTN patients feel inconvenienced and unnecessarily adhere to the antihypertensive medications prescribed. This question must be addressed because patients' satisfaction will affect their attitudes and beliefs regarding antihypertensive medication adherence (Zyoud et al., 2013). A similar study by Iloh and Amadi (2017) in the Republic of the Niger also shows that patients who have nonadherence to antihypertensive medication 90.0% are dissatisfied with their treatment. Therefore, the inquiry into whether pharmacological treatment satisfaction will increase antihypertensive medication adherence will then be identified in this study.

1.3 Significance of Study

Based on the previous section, antihypertensive medication adherence and pharmacological treatment satisfaction are vital components in managing HTN. Hence, this study studies the association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients since there is a lack of previous research on their relationship, especially none in Malaysia.

With a high prevalence of HTN but a low level of BP control in low-and-middle-income countries like Malaysia, this study will be beneficial in detecting the prevalence and possible barriers to antihypertensive medication adherence among hypertensive patients. Besides that, pharmacological treatment satisfaction among patients with HTN will be evaluated to identify the dissatisfaction that impedes them from adhering to antihypertensive medications. Furthermore, the association between pharmacological treatment satisfaction and antihypertensive medication adherence will also be studied. Not only that, but this study could also trigger awareness in hypertensive patients regarding their level of adherence and area of dissatisfaction towards antihypertensive medication adherence while answering the questionnaire. Consequently, the findings would be helpful for healthcare professionals to guide them in designing effective methods to improve antihypertensive medication adherence among hypertensive patients.

1.4 Research Question(s)

- i. Do hypertensive patients adhere to their antihypertensive medications?
- ii. Do hypertensive patients satisfy with their pharmacological treatment?
- iii. Do hypertensive patients adhere to antihypertensive medications if they satisfy with pharmacological treatment?

1.5 Research Objectives

1.5.1 General Objective

The main objective of this study is to determine the association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients.

1.5.2 Specific Objectives

- i. To assess the sociodemographic characteristic among hypertensive patients.
- ii. To determine the pharmacological treatment satisfaction among hypertensive patients.
- iii. To identify the antihypertensive medication adherence among hypertensive patients.
- iv. To assess the association between sociodemographic characteristics and pharmacological treatment satisfaction among hypertensive patients.
- v. To determine the association between sociodemographic characteristics and antihypertensive medication adherence among hypertensive patients.
- vi. To identify the association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients.

1.6 Research Hypothesis

1.6.1 Null Hypothesis (H_0)

- i. There is no association between sociodemographic characteristics and pharmacological treatment satisfaction among hypertensive patients.
- ii. There is no association between sociodemographic characteristics and antihypertensive medication adherence among hypertensive patients.
- iii. There is no association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients.

1.6.2 Alternative Hypothesis (H_a)

- i. There is an association between sociodemographic characteristics and pharmacological treatment satisfaction among hypertensive patients.
- ii. There is an association between sociodemographic characteristics and antihypertensive medication adherence among hypertensive patients.
- iii. There is an association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients.

1.7 Conceptual and Operational Definition

1.7.1 Conceptual Definition

1.7.1.1 Hypertension (HTN)

According to the Centers for Disease Control and Prevention (2021), HTN or high BP is a medical condition when the BP is higher than normal. Besides that, it is diagnosed based on the BP measurement on two different days. When a person has systolic BP readings on both days more than or equal to 140 mmHg and/or diastolic BP readings on both days more than or equal to 90 mmHg, they will be diagnosed as a hypertensive patient (World Health Organization, 2021c).

1.7.1.2 Pharmacological Treatment Satisfaction

Pharmacological treatment is a type of management for a disorder or disease with medication (Ministry of Health Malaysia, 2013). By referring to Salame et al. (2018), treatment satisfaction defines as the degree to which patients perceive the treatment fulfils their health needs. It is highly reflected in the patient's experience of the therapeutic process, including the treatment duration and outcome. Satisfying treatment is beneficial and vice versa (Salame et al., 2018).

1.7.1.3 Antihypertensive Medication Adherence

Antihypertensive medications are the pharmacological treatment of HTN that helps prevent, control, and treat HTN (Jackson & Bellamy, 2015). Ross (2019) explains medication adherence as how patients take their medications correctly as prescribed by their physician. It involves the right time, dose, and interval of medication intake daily (Gast & Mathes, 2019; United States Food and Drug Administration, 2016).

1.7.2 Operational Definition

1.7.2.1 Hypertension (HTN)

In this study, the hypertensive patient is defined as a patient who received at least one type of antihypertensive medication for more than six months as prescribed by the physician.

1.7.2.2 Pharmacological Treatment Satisfaction

Pharmacological treatment satisfaction in this research refers to the hypertensive patients' level of satisfaction with the pharmaceutical treatment or their antihypertensive medications. Sixteen questions with the format of the Five-Likert scale will be used in measuring antihypertensive pharmacological treatment satisfaction in terms of effectiveness, side effect, convenience, and confidence. If the total score obtained by the respondent is less than the mean score, it will be reported as dissatisfaction and vice versa.

1.7.2.3 Antihypertensive Medication Adherence

Antihypertensive medication adherence represents to what extent hypertensive patients follow their antihypertensive medications as ordered by the physician in this study. Ten questions with a Five-Likert scale will measure it. Once the respondent is unsure or disagrees with any of the positive statements and agrees with any negative statements, they will be reported as nonadherent and, conversely, as adherent.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

More than one billion people worldwide suffer from HTN, a significant risk for cardiovascular diseases and premature death (World Health Organization, 2021c). Uncontrolled HTN also serves as the predisposing factor for 54.0% of stroke and 47.0% of coronary heart disease cases worldwide (Wu et al., 2015). Meanwhile, the prevalence of HTN in Malaysia has remained more than or equal to 30.0% of the total population from 2006 until now, based on the National Health and Morbidity Survey (Majid et al., 2018). In other words, the global epidemic of HTN is mainly uncontrolled, which leads to non-communicable disease (NCD) deaths worldwide.

Moreover, as discussed in the previous chapter, antihypertensive medication nonadherence is the primary cause of uncontrolled BP. When looking into the previous research papers based on the objective of this study, many researchers used the Theory of Planned Behavior (TPB) as the basis of their studies. For instance, factors for medication nonadherence or barriers to medication adherence (Almeida et al., 2020; Ho & Lee, 2014; Morrison et al., 2015; Suh, 2021) and intervention for promoting antihypertensive medication adherence (Javaran et al., 2020).

Therefore, this chapter will summarise research on pharmacological treatment satisfaction and antihypertensive medication adherence based on the Theory of Planned Behavior (TPB). At the end of this chapter, all the findings will also be structured with a conceptual framework by referring to the same theory.

2.2 Theory of Planned Behavior (TPB)

Theory of Planned Behavior (TPB), as shown in Figure 1 and Figure 2, was developed by a Polish social psychologist, Icek Ajzen (1985, 1991). It is an extension of the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) with the addition of perceived behavioural control as the third determinant of behavioural intentions (Rausch & Kopplin, 2021). Besides that, his purpose in proposing the Theory of Planned Behavior is to understand better and predict human behaviours. This theory states that behaviours are directly regulated by intentions, which is the belief in the value of doing or not doing a specific behaviour, such as antihypertensive medication adherence.

Furthermore, intentions are determined by three factors or beliefs (Kan et al., 2020). The first factor is the behavioural beliefs that influence the individual attitudes toward the behaviour. It can also be seen as personal favorability or unfavourability in a specific behaviour. The second factor is normative beliefs, which affect subjective norms. It refers to significant others, like family members' opinions, that pressure the individual to carry out or not a specific behaviour. Other than that, control beliefs also

contribute to perceived behavioural control. This added determinant of behavioural intention in the Theory of Planned Behavior is related to self-efficacy or confidence in performing the behaviour, which leads to behavioural intention (Kan et al., 2020).

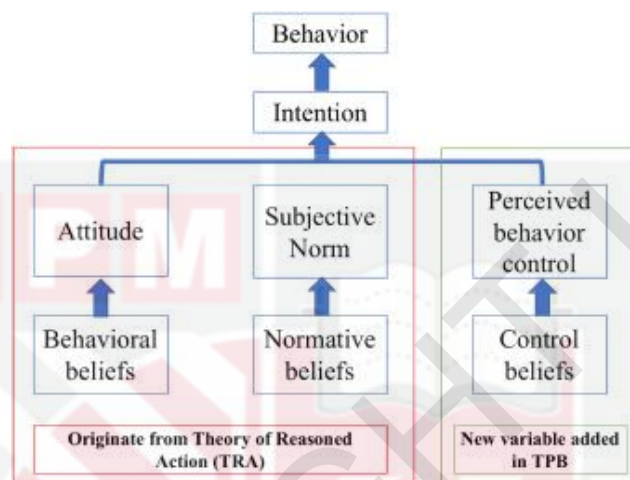


Figure 1: Theory of Reasoned Action and Theory of Planned Behavior (Mak et al., 2020)

Other than the behavioural, normative, and control beliefs suggested directly affecting an individual's intention for a specific behaviour (Ajzen & Fishbein, 2005). There are other indirect background factors, as shown in Figure 2, like the individual, social, and information that proved to be linked to behaviour changes, which will be discussed in the following sections (Ajzen & Fishbein, 2005).

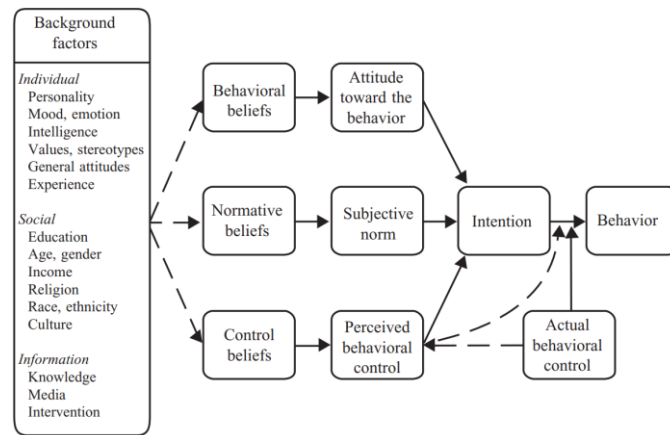


Figure 2: The Theory of Planned Behavior (TPB) (Ajzen & Fishbein, 2005)

2.3 Behavioural Beliefs

LaMorte (2019) explains that a person with behavioural beliefs is thought to trust the advantages of the behaviour. In simple words, trust comes once one evaluates the satisfiable outcomes. Ultimately, it creates a positive attitude that impels the person to take the behaviour (LaMorte, 2019).

According to a cross-sectional study on beliefs on antihypertensive medicine and medication adherence by Cinar et al. (2021), concerns about the medicines are the most influential factor in antihypertensive medication nonadherence. This study's concerns imply hypertensive patients' worries about the side effects and the belief that antihypertensive medications are harmful (Cinar et al., 2021). Hence, these insights affect their attitude towards antihypertensive medication and intend them not to take the prescribed medications as they think it is better to stop or change the treatment for their health.

On the other hand, another similar study conducted in Oman by Noumani et al. (2018) shows that HTN patients with a stronger belief about the necessity of antihypertensive medication and the severity of HTN towards their health are significantly more likely to have high adherence to the prescribed antihypertensive medications (Noumani et al., 2018). In other words, when the patients think the medication is valuable for their health, it will create a positive attitude that leads to antihypertensive medication-taking behaviour. On the contrary, when patients believe the antihypertensive medication is unfavourable to their health, they will not adhere to the prescribed medication.

2.4 Normative Beliefs

As stated by LaMorte (2019), normative beliefs in the Theory of Planned Behavior refer to the external judgment of the behaviour, especially from the trusted ones. It impacts the subjective norms, which is the personal belief in the need to take the behaviour (LaMorte, 2019). For instance, when the loved ones, like the wife, approve and support her husband to follow the antihypertensive treatment as ordered, it will drive the husband to engage in medication adherence.

In 2014, Jannuzzi et al. studied antihypertensive medication adherence according to the Theory of Planned Behavior with qualitative and quantitative approaches. Their study finds that the presence of family members, like spouses and children surrounding HTN patients will promote medication adherence. These significant others assisted the patients in getting the medications, organising the

medicines, and reminding patients to take the prescribed antihypertensive medicines according to the medication schedule (Jannuzzi et al., 2014). It means medication adherence can be achieved if people close to the HTN patients support and encourage the patients to start and consistently take the antihypertensive medications. At the same time, it may also reduce unintentional medication nonadherence simply due to forgetfulness (Shyuan et al., 2020).

Other than that, Jannuzzi et al. (2014) also discovered that medication nonadherence is common in patients who reported having family problems or living alone. In this regard, the study finds that age plays a significant influence where patients who are too old or too young are among the nonadherent category of patients as both are groups that thirst for the concern of other people, especially family (Thomas et al., 2017). In 2020, a study on the psychosocial determinants of antihypertensive medication adherence based on the Theory of Planned Behavior was conducted by Almeida et al. (2020). They suggest that motivational interviews or consultations, telephone contacts, and home visits from healthcare workers are effective strategies for improving antihypertensive medication adherence (Almeida et al., 2020; Javaran et al., 2020). In this case, the healthcare workers act like those who care for the HTN patients' health and keep exposing them to the knowledge and severity of uncontrolled HTN. Eventually, it lessens intentional medication nonadherence due to misperception over HTN, own health status, and antihypertensive medications (Shyuan et al., 2020).

2.5 Control Beliefs

In the Theory of Planned Behavior, control beliefs urge the perceived behavioural control, which is the self-efficacy and the confidence of someone in their ability to do a specific behaviour (LaMorte, 2019). Usually, people feel confident to do something when it is convenient to do without difficulty and doubts. Hence, when someone feels it is easy to perform a favourable behaviour, it will motivate them to perform that behaviour.

By referring to Shen et al. (2020), in a cross-sectional study on self-efficacy and medication adherence among HTN patients, a higher level of self-efficacy significantly increases the patient's adherence to antihypertensive medications. They explain that a low level of self-efficacy in self-management of HTN will produce a negative attitude towards their ability to persist in lifelong medication-taking behaviour. It means that when HTN patients are not confident that they can take antihypertensive medications as prescribed for the rest of their lives, they will feel hard to adhere to them (Shen et al., 2020).

Furthermore, Jannuzzi et al. (2014) claim in their study that factors enhancing medication adherence included easy access to treatment (free or subsidised medicines, availability of transport to follow-up); well-explained prescription (function of medications, ways of administration); easy-to-follow regimen without disturbing daily activities (different types of medicines, number of medications, frequency per day); and easily accessible to differentiated medications (colour, shape, and size). In short,

when the treatment does not burden the patient financially, physically, and mentally, it makes patients feel convenient and confident to have control over their health through following the treatment.

2.6 Background Factors

2.6.1 Individual

2.6.1.1 Personality

In 2020, Voloshyna et al. carried out a study regarding personality with adherence to treatment for HTN patients. Based on their study, melancholy people tend to fear burdening family members and worry about the side effects of antihypertensive medications that lead to nonadherence to HTN medicines. Yet, patients with strong personalities will wish to have control over their health and are unwanted to be treated as a patient. The desire for health and a maintained ability to work will contribute to adherence to antihypertensive medications (Voloshyna et al., 2020).

2.6.1.2 Mood or Emotion

According to Kretchy et al. (2014), who studied the mental health of HTN patients, stress promotes antihypertensive medication nonadherence. It is because patients with stress have higher odds of experiencing the side effects of HTN medicines than those who are not (Kretchy et al., 2015).

2.6.1.3 Experience

Based on research on treatment satisfaction and antihypertensive medication adherence by Rusli et al. (2021), HTN patients with less than or equal to one year of diagnosis adhere the most. In this case, the reason for nonadherence could be the misperception over own health status based on the asymptomatic nature of HTN as time passes. Moreover, most hypertensive patients with comorbidity (Ajayi et al., 2018) and prescriptions of more than three units per day (Ramli et al., 2012) will have poorer medication adherence due to complex treatment regimens. Although it is recommended to have a simplified regimen with single-pill combination (SPB) therapy that incorporates two or more antihypertensive drugs into one pill to increase antihypertensive medication adherence, it is still not widely used in Malaysia due to the cost issue (Bruyn et al., 2022; Kishore et al., 2018; Ministry of Health Malaysia, 2013). Nevertheless, more than half of HTN patients also report not adhering to antihypertensive medications after experiencing side effects from antihypertensive medications (Tedla & Bautista, 2016). It is possibly because of the reduced convenience of medication-taking behaviour and self-efficacy.

2.6.2 Social

According to a previous study regarding medication adherence among hypertensive patients, highly educated patients with tertiary education adhere the most (Ajayi et al., 2018). Algabbani and Algabbani (2020) explain that higher education leads to a better knowledge of HTN and medication adherence intention. In line with this, female patients also adhere more than males (Dego & Bobasa, 2016), as more females enrol in their studies at the university level in Malaysia (Tienxhi, 2017). Besides that, Park et al. (2018) suggest that age unrelated to antihypertensive medication adherence. However, the study by Kim et al. (2019) claims that medication adherence increases with age as older patients receive greater severity of HTN than younger ones, thus increasing their awareness of their health. Studies show that patients over 70 might fear becoming a burden to their families, leading to intentional hypertensive medication nonadherence (Kim et al., 2019; Voloshyna et al., 2020). Not only that, but they may also have a higher risk of unintentional medication nonadherence due to forgetfulness (Shyuan et al., 2020).

Furthermore, Ramli et al. (2012) find that Malay and Chinese HTN patients are about twice more likely to adhere than Indians. It might be due to Indians having higher stress than others, leading to antihypertensive medication nonadherence (Flett et al., 2020). Moreover, Dego and Bobasa (2016) also discovered that unemployed patients have poorer adherence to antihypertensive medications than those employed, as they may experience more financial stress. In addition, the study by Almeida et al. (2020) reveals that married patients who live with someone adhere better than those who do

not. The possible cause would be the increased subjective norms over antihypertensive medication through family support.

2.6.3 Information

According to a study about HTN knowledge and medication adherence by Rahmawati and Bajorek (2018), HTN knowledge increases the odds of good medication adherence with a positive belief in its health benefits. Similarly, Qian et al. (2020) also recommend that patient education may enhance medication adherence, as reported in the paper on the effectiveness of interventions in antihypertensive medication adherence (Qian et al., 2020). Nevertheless, a survey of knowledge, awareness and antihypertensive medication adherence by Pirasath et al. (2017) find that adequate knowledge does not guarantee a greater awareness of medication adherence. Their study discovers that the forgetfulness and complexity of the medication that disturbs the daily routine are attributed to medication nonadherence. In regards to this, simplifying the treatment regimen might be more impactful in improving antihypertensive medication adherence rather than thoughtlessness in providing health education to HTN patients.

2.7 Conceptual Framework

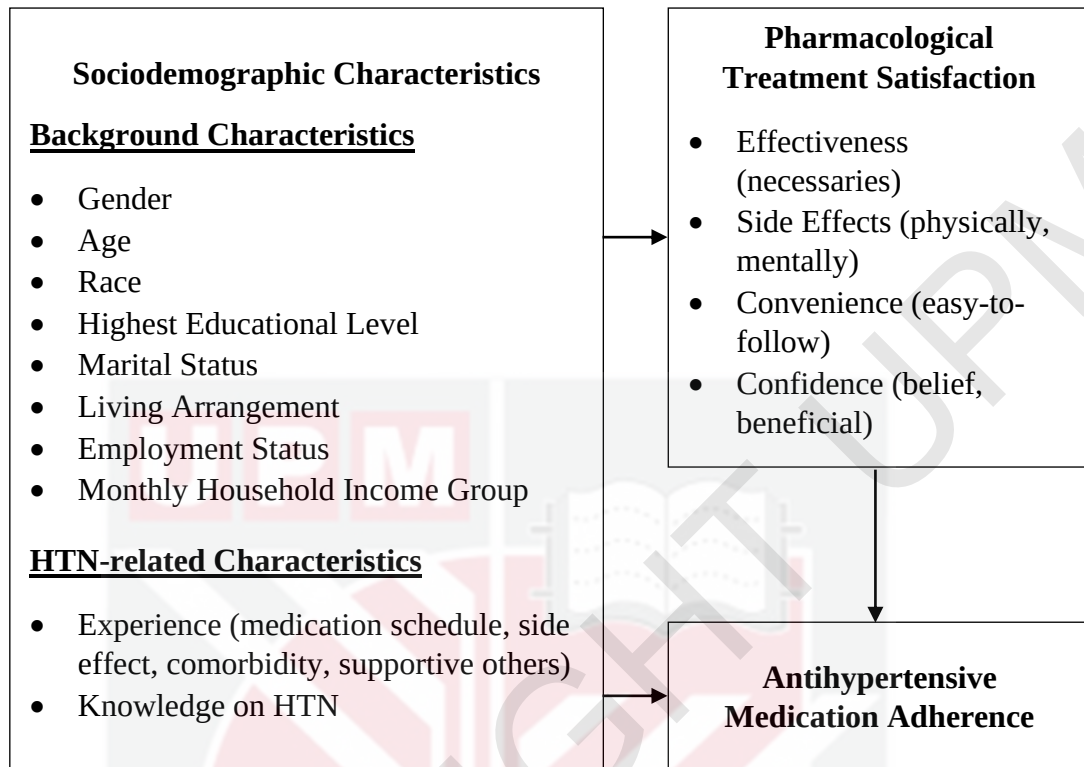


Figure 3: Conceptual Framework

The diagram above illustrates the variables of this study, with the base of the literature review done. By referring to Figure 3, the independent variables are pharmacological treatment satisfaction and sociodemographic characteristics, while the dependent variable is antihypertensive medication adherence. In this study, sociodemographic characteristics included patients' background characteristics, and HTN-related characteristics would act as mediators or control variables. In other words, pharmacological treatment satisfaction (primary independent variable) directly affects antihypertensive medication adherence, while sociodemographic characteristics (secondary independent variable) have an indirect effect.

2.7.1 Sociodemographic Characteristics

2.7.1.1 Background Characteristics

Algabbani and Algabbani (2020) report that higher education leads to a better knowledge of HTN and medication adherence. In line with this, gender might impact medication adherence as more females enrol in their studies at the university level in Malaysia (Tienxhi, 2017). Besides that, Kretchy et al. (2015) suggest that patients with stress have higher odds of experiencing the side effects of HTN medicines (Kretchy et al., 2015). In this regard, Ramli et al. (2012) prove that Indians have poorer antihypertensive medication adherence due to higher stress than other races (Flett et al., 2020). Moreover, unemployed patients who experience more stress financially would probably have poorer adherence to antihypertensive medications (Dego & Bobasa, 2016).

Other than that, Almeida et al. (2020) reveal that married patients who live with someone adhere better than those who do not. It is because the presence of family members, like spouses and children surrounding the HTN patients will favour adherence by supporting and encouraging the patients to start and consistently take the prescribed antihypertensive medications (Jannuzzi et al., 2014). In this case, patients who are living by themselves or too old or young with family problems would contribute to antihypertensive medication nonadherence (Jannuzzi et al., 2014), as both of them are groups that thirst for the concern of other people, especially family (Thomas et al., 2017).

2.7.1.2 HTN-related Characteristics

According to Rahmawati and Bajorek (2018), HTN knowledge increases the odds of good medication adherence with a positive attitude toward its health benefits. It is because HTN patients with a stronger belief about the severity of HTN towards their health were significantly more likely to adhere to the prescribed antihypertensive medications (Noumani et al., 2018). As Qian et al. (2020) recommended, it can be actualised through one of the interventions, which is health education. However, the level of adherence starts to reduce when the HTN is diagnosed after six months (Wood, 2012) or more than one year (Rusli et al., 2021). It could be due to the misperception of the hypertensive patients over their health status with asymptomatic HTN. However, this situation worsens when hypertensive patients have a comorbidity (Ajayi et al., 2018), as they will have a more complex treatment regimen.

2.7.2 Pharmacological Treatment Satisfaction

Al Noumani et al. (2018) claim that HTN patients with a stronger belief about the necessity of antihypertensive medication for their health will have higher adherence to the prescribed antihypertensive medications (Noumani et al., 2018). In other words, doubt about the effectiveness or benefits of antihypertensive medications is an influential factor in medication nonadherence (Cinar et al., 2021). Besides that, nonadherence levels increase when the patients experience side effects from antihypertensive medications (Tedla & Bautista, 2016). The side effects will further influence the patients' confidence in their ability to persist in lifelong medication-

taking behaviour (Shen et al., 2020). This situation deteriorated when the prescription was too complex, which disturbed the daily routine (Pirasath et al., 2017).

Nevertheless, Jannuzzi et al. (2014) claim in their study that factors for enhancing antihypertensive medication adherence included a simplified dosage regimen. The prescription of fewer than four units per day dramatically reduces the inconvenience of medication-taking behaviour and increases self-efficacy (Ramli et al., 2012). It happens because HTN patients will feel easy to follow and differentiate the medicine by their differences (shape, size, colour).

CHAPTER 3

RESEARCH METHOD

This chapter discusses the methods implemented for this study, including study design, study location, sampling frame, sample size, sampling method, subject requirement, study instrument, data collection process, data analysis, ethical consideration, expected outcome, budget, and study flowchart.

3.1 Study Design

This study used a cross-sectional design. In a cross-sectional study, the prevalence of particular traits among study participants can be assessed (Kesmodel, 2018). At the same time, independent and dependent variables can be studied (Setia, 2016). Meanwhile, the researcher can also recruit related respondents by setting inclusion and exclusion criteria (Setia, 2016). For example, pharmacological treatment satisfaction and antihypertensive medication adherence can be determined by analyzing the data through the questionnaire filled out by selected eligible hypertensive patients. Apart from that, a cross-sectional study can be used as a population-based survey (Setia, 2016), which enables a generalized result representing the interested population with a suitable sampling method. Nevertheless, it can also be conducted relatively faster at a one-time point and inexpensively, which is suitable to

be carried out by undergraduate students (Setia, 2016). Additionally, the study result from this time-saving method can be referenced for future in-depth research studies.

3.2 Study Location

This study was conducted at Family Medicine Clinic (FMC), University Putra Malaysia Teaching Hospital (HPUPM), Selangor in Malaysia, which is a teaching hospital for the Faculty of Medicine and Health Sciences of Universiti Putra Malaysia (Hospital Pengajar Universiti Putra Malaysia, 2022a). It is located in Mukim Dengkil, Sepang District. Besides that, it is bordered by the Serdang Hospital, South Kajang Valley Expressway (SKVE) and the Faculty of Medicine and Health Science of Universiti Putra Malaysia (Hospital Serdang, 2021). Furthermore, it can also be reached in a three-minute walk after getting off from the fare-free public transport, bus SMART Selangor SJ 04 from KTM Serdang to the Faculty of Medicine and Health Science of Universiti Putra Malaysia (Google Maps, 2022; Subang Jaya City Council, 2022). The total daily bus trip is 66 from 6.00 a.m. to 10.00 p.m. With the strategically planned location and the convenience of transportation, it will benefit not only Serdang but also residents from areas of Putrajaya, Kajang and Bangi (Hospital Serdang, 2021). Approximately 570,000 residents from those areas are expected to receive their medical services at HPUPM as the shared burden from Serdang Hospital (Hospital Serdang, 2021). Thus, it was chosen rather than primary care clinics to have more representative of the community population (Shyuan et al., 2020).

3.3 Sampling Frame

3.3.1 Study Population

The target population for this study was adult hypertensive patients who received at least one type of antihypertensive medication for more than six months as prescribed by the physician and attend the FMC, HPUPM, from 1st July 2022 to 30th September 2022.

3.3.2 Study Duration

The data for this study were collected within three months, from 1st July 2022 until 30th September 2022.

3.3.3 Subject Criteria

Table 1: Subject Criteria

Inclusion Criteria	Exclusion Criteria
i. Respondents must have a physician's diagnosis of HTN as reported in the patient's record.	i. Non-Malaysian. It prevents cultural influences and ensures a generalised result among adult hypertensive Malaysians.
ii. Respondents must have a physician's prescription for at least one type of antihypertensive medication for more than six months.	ii. Respondents with a physician's diagnosis of gestational HTN and reported in the patient's record.
iii. Respondents must be at least 18 years old or above to be able to sign the informed consent on their own.	iii. Respondents with a physician's diagnosis of active mental health issues, as reported in the patient's record.
iv. Respondents must be able to read, understand and converse in Malay and/or English.	iv. Respondents that are not willing to participate in this study.

The subject criteria included inclusion and exclusion criteria of this study were listed in Table 1.

3.4 Sample Size

Sample size estimation was calculated through the online sample size calculator, as presented in Figure 4 (Select Statistical Services, 2022). The formula used showed as below (Daniel, 1999).

$$n = N * X / (X + N - 1),$$

where,

$$X = Z_{\alpha/2}^2 * p * (1-p) / MOE^2,$$

n: sample size

N: population size = 467 (Based on the census of May 2022 in FMC, HPUPM, there is a total of 467 patients under follow-up in HPUPM.)

X: Z-score = 95.0% confidence level

α : significance level = 1 – 95.0% = 0.05

$Z_{\alpha/2}$: critical value of the Normal distribution at $\alpha/2 = 1.96$

p: sample proportion = 75.8% or 0.758 (Previous research by Shyuan et al. (2020) found that 75.8% of hypertensive patients in a public hospital in Malaysia adhere to their antihypertensive medications.)

MOE: margin of error = 0.05

Hence,

$$X = 1.96^2 * 0.758 * (1 - 0.758) / 0.05^2$$

$$= 281.875$$

$$n = 467 * 281.875 / (281.875 + 467 - 1)$$

$$\approx 177 \text{ respondents}$$

The image shows a screenshot of a sample size calculator interface. The interface is titled "Calculator" in red text. It contains four input fields with corresponding labels and a final output field. The input fields are: "What margin of error do you need?" with a value of 5, "What confidence level do you need?" with a value of 95, "How big is the population?" with a value of 467, and "What do you believe the likely sample proportion to be?" with a value of 75.8. Each input field has a red information icon (i) to its right. The output field is a red bar at the bottom that says "Your recommended sample size is" followed by the value 177 and a red information icon (i). The background of the calculator interface is white, and the entire image is overlaid with a large, semi-transparent UPM watermark.

Question	Answer	Info
What margin of error do you need? 5% is a common choice	5 %	i
What confidence level do you need? Typical choices are 90%, 95%, or 99%	95 %	i
How big is the population? If you don't know, use 100,000	467	i
What do you believe the likely sample proportion to be? If you're not sure, leave this as 50%	75.8 %	i
Your recommended sample size is		177 i

Figure 4: Sample Size Calculation

Based on the calculation shown in Figure 4, the recommended sample size, n , is 177 respondents needed to be in this study. The non-response rate is estimated to be 10.0%. Hence, by adding the non-response rate to the estimated sample size, the final sample size required for this study would be 195 respondents.

3.5 Sampling Method and Subject Recruitment

In order to obtain a sample representing the population, a simple random sampling method was planned to be implemented in this study to sample the respondents (Westfall, 2018). It was also a probability sampling technique that allowed all individuals in the sampling frame to have an equal chance to be selected as the representative sample (Taherdoost, 2016). However, due to several limitations, the sampling method was changed to convenience sampling. In addition, this process was carried out after completing the validity and reliability test of the questionnaire, which will be discussed later in Section 3.6.4 Validity and Reliability.

For subject recruitment, as shown in Figure 5, the researcher approached all the patients that attended the FMC, HPUPM during the data collection within three months from 1st July 2022 to 30th September 2022. After considering the inclusion and exclusion criteria, all the eligible individuals were recruited as the subjects. Five minutes were given to the respondents to read the Respondent's Information Sheet to understand the study before they decided to participate. Only the respondents who agreed to participate and signed the informed consent form will receive the questionnaires to answer. Meanwhile, the researcher also ensured that the respondents were aware that they were free to refuse or drop out of the study at any time if they wanted and that there would be no harm to them.

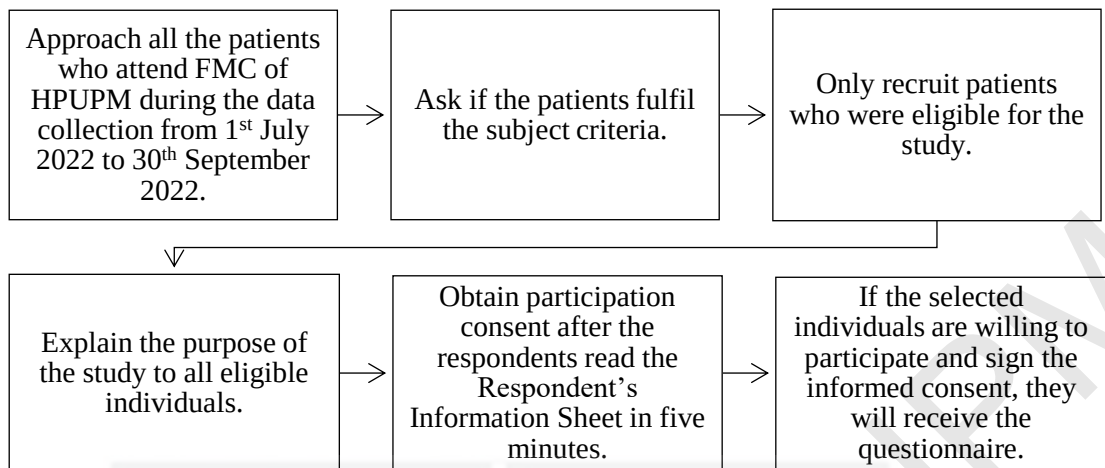


Figure 5: Flowchart on Subject Recruitment

3.6 Study Instrument

3.6.1 Questionnaire

The questionnaire, which was the study instrument of this study, was adapted from two previous researchers with similar study backgrounds. Both instruments had Cronbach's alpha value equal to or higher than 0.70, which explains that it was practical to be used in this study (Taber, 2018). The first was the modified Malaysian version of the 11-item Medication Adherence Reasons Scale (MAR-Scale) developed by Shima et al. (2015a). It was available in English and Malay, with Cronbach's alpha value of 0.78. A further modification was done by referencing the studies by Ramli et al. (2012) and Shima et al. (2015b) to fit the context of this study. Written permission was obtained from the corresponding authors before carrying out this study.

Next, the second tool used was the modified Treatment Satisfaction Questionnaire for Medication - version 1.4 (TSQM 1.4) with Cronbach's alpha value of 0.855 (Alam et al., 2018). This questionnaire was originally in the English version and was adapted from a paper by Alam et al. (2018), which was initially developed by Atkinson et al. (2004). Like the previous one, this tool was further modified and translated into the Malay language for respondents who feel comfortable with Malay. Ultimately, the final questionnaire for this study was available in dual languages, which was English and Malay, with three sections, which are Part A (Sociodemographic), Part B (Treatment Satisfaction towards Antihypertensive Medications), and Part C (Antihypertensive Medication Adherence) require 10 to 15 minutes to complete by the respondents.

3.6.2 Scoring Method

The first section, Part A, focused on collecting sociodemographic data, including respondents' background and HTN-related characteristics (experience in taking HTN medications and knowledge about HTN). For this section, the respondents must tick the box and fill in the space provided on the information that represents themselves. The data collected includes gender, age, race, highest education level, marital status, living arrangements, employment status, monthly household income group, duration of taking HTN medications, number of types of antihypertensive medications taken, the total number of daily HTN medications, presence of side effect, other prescribed medications, presence of significant supportive others, and level of knowledge about HTN. There were five positive and negative statements for determining the respondents' level of knowledge about HTN, with the response

options of Yes, No, and Not Sure. The respondent was scored based on their response; the correct, not sure, and wrong response was scored as 2, 1, and 0, respectively. By referring to the mean score, the respondents who received scores more than the mean were categorized as having good knowledge, and those lower than the mean were categorized with poor knowledge (Sun & Pan, 2013).

The following section, Part B, consisted of 16 questions to assess patients' pharmacological treatment satisfaction with antihypertensive medications. This section included statements that measure the patients' satisfaction regarding antihypertensive medications. There was a total of four aspects with four items for each, which were effectiveness (Item One until Item Four), side effect (Item Five until Item Eight), convenience (Item Nine until Item 12), and confidence (Item 13 until Item 16). Those items were in positive or negative-worded statements to prevent response bias. Each statement had Five-point Likert scales with the response options of strongly disagree, disagree, neutral, agree, and strongly agree. The positive statements were scored 1, 2, 3, 4, and 5, respectively. In contrast, the negative statements were scored reversely as 5, 4, 3, 2, and 1. The range of scores for each aspect was four to 20. In total, the score of this section ranged from 16 to 80. By totalling up the score, the respondent's overall level of satisfaction toward antihypertensive medications was determined by the mean score, where the respondents with a score higher mean value are considered to be satisfied with their pharmacological treatment, and vice versa (Sun & Pan, 2013).

Lastly, patients' antihypertensive medication adherence was assessed in Part C. The respondents were required to answer the questions based on their level of adherence. Ten statements will be asked about the respondents' frequency of breaking the medication schedule, experience in missing, reducing, skipping and stopping the medications, feelings regarding medication adherence, and understanding of the medication regime. The statements were either positive or negative words with Five-point Likert scales representing the strongly disagree, disagree, neutral, agree, and strongly agree. As in Section B, the positive statements were scored 1, 2, 3, 4, and 5, respectively. In contrast, the negative statements were scored reversely as 5, 4, 3, 2, and 1. The range of total scores for this section is five to 50. Only if the respondent answered agrees or strongly agrees with all positive statements and disagrees or strongly disagrees with all negative statements will they be categorized as adherent. In other words, they need to score four or five for each statement. Otherwise, they will be classified as nonadherent.

3.6.3 Pilot Study

As mentioned in Section 3.6.1 Questionnaire, the instrument of this study was adapted from the established questionnaires by Shima et al. (2015a) and Alam et al. (2018), with their studies conducted in Malaysia and India, respectively. Although both questionnaires have proved their reliability through Cronbach's alpha value equal to or higher than 0.70 (Taber, 2018), a pilot study would still be required. Nevertheless, further modification and translation with references from studies by Ramli et al. (2012) and Shima et al. (2015b) were done to suit the context of this study.

Nevertheless, the researcher designed the questions to collect respondents' sociodemographic characteristics. Thus, running a pilot study will ensure that the survey instruments are contextually applicable, valid, and reliable to use in this study (Ruel et al., 2016). In addition, it also helps in determining problems that need to be improved, minimising measurement errors, reducing respondents' burden, analysing respondent interpretation of the questions, and preventing bias (Ruel et al., 2016).

In that regard, the pilot study was carried out among the researcher's coursemates' parents, relatives and friends. Twenty respondents, equivalent to 10.0% of the estimated sample size, were involved in this pilot study using the convenience sampling method through distributed Google Forms. The 20 respondents were all hypertensive adults who were willing to participate. In addition, this pilot study was run after obtaining ethical approval from Ethics Committee for Research Involving Human Subjects (JKEUPM) with a validated questionnaire.

3.6.4 Validity and Reliability

Before actual data collection, it is crucial to have a valid questionnaire to ensure the validity of the data collected. This study's validity covered face and content validity (Connell et al., 2018). For face validity, the supervisor of this study reviewed the questionnaire to ensure the questions adequately covered all aspects related to all variables of the study in general. During the process, the revision was done accordingly. For content validity, the questionnaire's content validation form was prepared with response options of not relevant, somewhat relevant, quite relevant and highly relevant,

scored as 1, 2, 3, and 4, respectively, for all questions. There were two experts invited to fill up the content validation form, who were Madam Siti Aishah Binti Hamzah, a lecturer of Bachelor of Nursing from Universiti Putra Malaysia (UPM), who taught the course regarding pharmacology, and Madam Suhasliza Binti Subdin, a sister of the medical ward from Serdang Hospital. By calculating the content validity index (CVI) based on their answer, the average CVI for items (I-CVI) or overall validity index for scale (S-CVI) is 0.81. It was acceptable as it was equal to or greater than 0.80, with only two experts involved (Yusoff, 2019). In addition, this validated questionnaire was available in dual languages, English and Malay, to aid different respondents in answering.

For the reliability test, Statistical Packages for Social Sciences (SPSS) 28.0 for Windows was used to determine the trustworthiness of the instrument for the actual data collection through the values of Cronbach's Alpha (α) analysed from data from the pilot study (Taber, 2018). According to Hinton et al. (2014), Cronbach's Alpha of 0.50 and below refers to low reliability, 0.50 to 0.70 indicates moderate reliability, 0.70 to 0.90 shows high reliability, and 0.90 and above suggests excellent reliability. After conducting the reliability analysis with Statistical Packages for Social Sciences (SPSS), the overall questionnaire had Cronbach's Alpha (α) of 0.79, which certified its high reliability to be implied in this study.

3.7 Data Collection Procedure

Data collection began after ethical approval was granted, which will be explained later in Section 3.9 Ethical Consideration. At first, a pilot study was carried out to ensure the validated questionnaire was reliable. Then, the convenience sampling method was implemented to select respondents that meet the subject criteria. After getting the required sample, the researcher explained the purpose of the study and got the participation consent for subject recruitment. The selected respondents had five minutes to read the Respondent's Information Sheet to understand the study before they decided to participate. Once the respondents agreed to participate and signed the informed consent, a self-administered questionnaire was distributed for them to answer in 10 to 15 minutes. The respondents who refused to participate or requested to pull out from this study in between answering the questionnaire were allowed to do so, and no punishment was given. After the respondents completed the questionnaire, the researcher checked thoroughly on the answered questionnaire to ensure it was completed. Additionally, all data collected was handled carefully to maintain confidentiality for data analysis. The summary of the data collection showed as a flowchart in Figure 6.

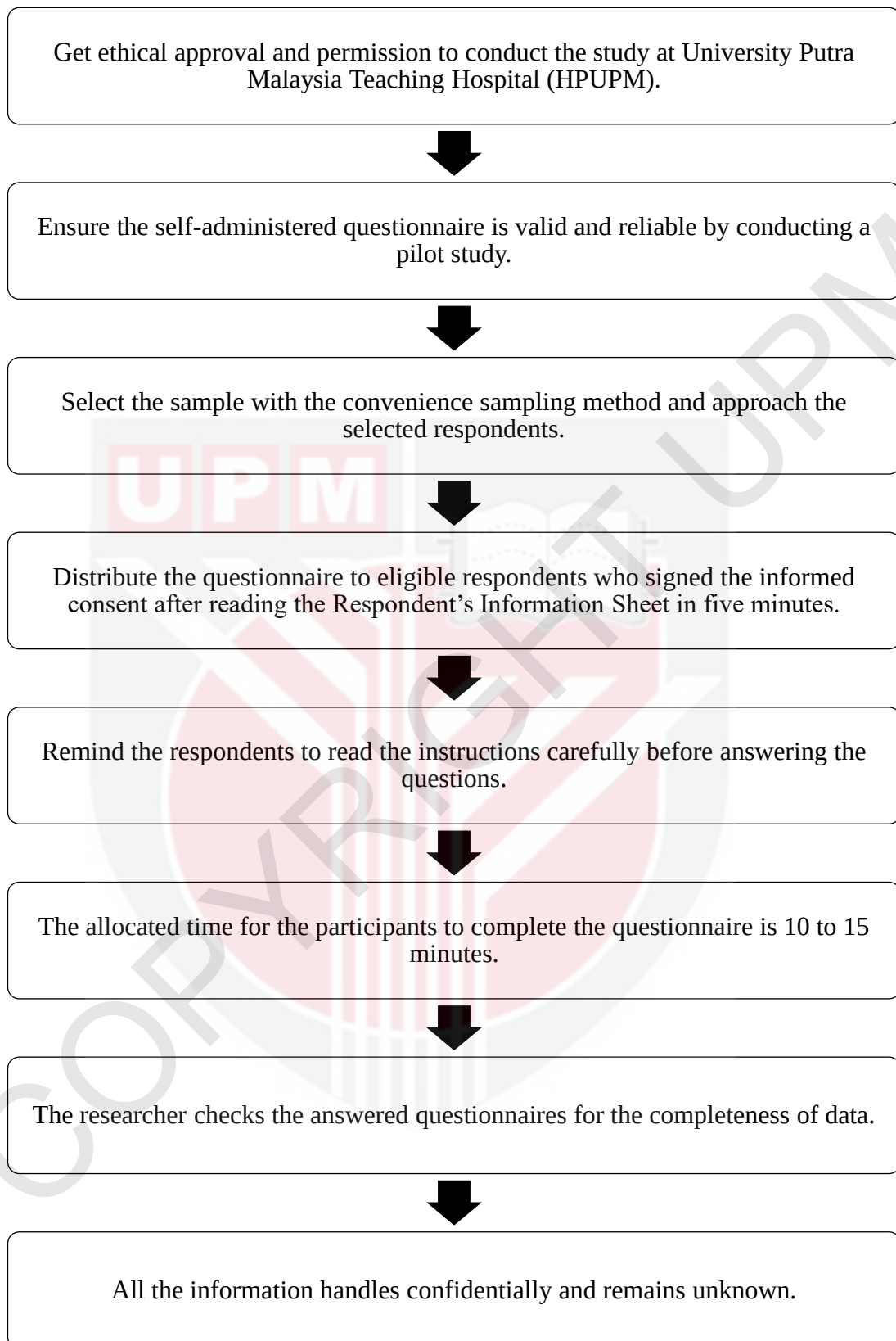


Figure 6: Data Collection Flowchart

3.8 Data Analysis

After completing the data collection, the researcher entered the data into Statistical Packages for Social Sciences (SPSS) version 28.0 for Windows for analysis purposes. This study's independent variables are sociodemographic characteristics and pharmacological treatment satisfaction. For the sociodemographic characteristics, it contains both continuous data (age, duration of taking HTN medications, number of types of antihypertensive medications taken, the total number of daily HTN medications, and level of knowledge), categorical data with two categories (gender, living arrangement, employment status, presence of side effects, other prescribed medications, presence of significant supportive others), and categorical data with more than two categories (race, highest education level, marital status, and monthly household income group). Meanwhile, pharmacological treatment satisfaction (effectiveness, side effect, convenience, and confidence) is a continuous variable. The same goes for the dependent variable of this study, which is antihypertensive medication adherence; it is also continuous data.

The normality test is the first step of data analysis to determine the data distribution and ensure the correct statistical analysis methods are used. In this regard, the dependent variable of this study, antihypertensive medication adherence, was used for testing the distribution of the data as it is continuous data. This test involved histogram, skewness and kurtosis, with the addition of the Kolmogorov Smirnov and Shapiro-Wilk test. Conformably, normally distributed data should have a bell-shaped histogram, -1 to +1 for the value of skewness and kurtosis, and a *p*-value greater than

0.05 (Mishra et al., 2019). After determining the data distribution, the data analysis continued with descriptive and inferential data analysis.

Table 2: Descriptive Data Analysis

Descriptive Data Analysis			
Objectives	Variable	Type of Variable	Statistical Measurements
To identify the sociodemographic characteristic among hypertensive patients.	Sociodemographic Characteristic	Continuous	Mean/Median and Standard Deviation (SD)
		Categorical	• Frequency • Percentage
To determine the antihypertensive medication adherence among hypertensive patients.	Antihypertensive Medication Adherence	Continuous	Mean/Median and SD
To assess the pharmacological treatment satisfaction among hypertensive patients.	Pharmacological Treatment Satisfaction	Continuous	Mean/Median and SD

For the descriptive data analysis, as shown in Table 2, the continuous data for both independent variables (sociodemographic characteristics and pharmacological treatment satisfaction), and dependent variable (antihypertensive medication adherence), as listed in the first paragraphs of this section, was described in the mean with standard deviation (SD) for normally distributed data. For skewed data, the median with SD was used. Meanwhile, the categorical data for the independent variable (sociodemographic characteristics) was described using frequency and percentages.

Table 3: Inferential Data Analysis

Inferential Data Analysis			
Objectives	Dependent Variable	Independent Variable	Statistical Measurements
To identify the association between sociodemographic characteristics and pharmacological treatment satisfaction among hypertensive patients.	Pharmacological Treatment Satisfaction (Continuous)	Sociodemographic Characteristics (Continuous) • Age • Duration of taking HTN medications • Number of types of antihypertensive medications taken • Total number of daily HTN medications taken • Level of knowledge	<u>Parametric:</u> • Pearson Correlation <u>Nonparametric:</u> • Spearman Correlation
		Sociodemographic Characteristics (Categorical data with only two categories) • Gender • Living Arrangement • Employment status • Presence of side effects • Other prescribed medication	<u>Parametric:</u> • Independent t-test <u>Nonparametric:</u> • Mann-Whitney U Test

		• Presence of significant supportive others	
		Sociodemographic Characteristics (Categorical data with more than two categories) • Race • Highest educational level • Marital status • Monthly household income group	<u>Parametric:</u> • One Way Independent ANOVA <u>Nonparametric:</u> • Kruskal-Wallis Test
To identify the association between sociodemographic characteristics and antihypertensive medication adherence among hypertensive patients.	Antihypertensive Medication Adherence (Continuous)	Sociodemographic Characteristics (Continuous)	<u>Parametric:</u> • Pearson Correlation <u>Nonparametric:</u> • Spearman Correlation
		Sociodemographic Characteristics (Categorical data with only two categories)	<u>Parametric:</u> • Independent t-test <u>Nonparametric:</u> • Mann-Whitney U Test

		Sociodemographic Characteristics (Categorical data with more than two categories)	<u>Parametric:</u> - One Way Independent ANOVA <u>Nonparametric:</u> - Kruskal-Wallis Test
To determine the relationship between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients.	Antihypertensive Medication Adherence (Continuous)	Pharmacological Treatment Satisfaction (Continuous) - Effectiveness - Side Effect - Convenience - Confidence	<u>Parametric:</u> - Pearson Correlation - Multiple Regression <u>Nonparametric:</u> - Spearman Correlation

For inferential data analysis, as displayed in Table 3, the result depended on the two-sided p -value. If the value is less than 0.05, it will indicate a significant relationship or association between the two variables and vice versa. The first hypothesis, the association between sociodemographic characteristics and pharmacological treatment satisfaction among hypertensive patients, was analyzed using Pearson Correlation or Spearman Correlation (depending on the distribution of data) for sociodemographic characteristics with continuous data. For categorical

sociodemographic characteristics data with only two categories, Independent T-test (parametric test) or Mann-Whitney U Test (nonparametric test) will be applied. On the other hand, categorical sociodemographic characteristics data with more than two categories were tested by the one-way independent ANOVA (parametric test) or Kruskal-Wallis Test (nonparametric test), depending on the data distribution.

Next, the second hypothesis analyzed the association between sociodemographic characteristics and antihypertensive medication adherence among hypertensive patients. For sociodemographic characteristics with continuous data, Pearson Correlation was used for normally distributed data, and Spearman Correlation was used for non-normally distributed data. Meanwhile, sociodemographic characteristics with categorical data were tested with Independent T-test (parametric test) or Mann-Whitney U Test (nonparametric test) for categorical data with only two categories and one-way independent ANOVA (parametric test) or Kruskal-Wallis Test (nonparametric test) for categorical data with more than two categories.

In the third hypothesis analysis, the strength of the association between pharmacological treatment satisfaction (continuous data) and antihypertensive medication adherence (continuous data) among hypertensive patients was measured with Pearson Correlation and Multiple Regression (parametric test) or Spearman Correlation (nonparametric test).

3.9 Ethical Consideration

3.9.1 Respondent's Approval

After getting the ethical clearance, the researcher approached all the patients in FMC, HPUPM, to screen the subject criteria. The study's purpose was explained before getting the participation consent from the selected eligible respondents. They were given five minutes to read the Respondent's Information Sheet to decide their participation. Respondents who agreed to participate in this study had filled in the required information and signed the informed consent to confirm their participation. Once the respondents completed the informed consent, the questionnaire was distributed for them to answer in 10 to 15 minutes. Meanwhile, there was no information regarding the respondent's identity, such as name, identity card number or house address, questioned in the questionnaire. However, if the respondents refused to join, repelled to answer some of the questions or wished to withdraw from the study, they were permitted to do so, and no punishment or effect was exerted.

Furthermore, the data collected from the answered questionnaire was entered into the password-secured computer to perform statistical analysis. All the information collected was only used for research purposes, and the confidentiality of data was maintained. Moreover, access to those data was only available for the researcher, supervisor, qualified monitors and auditors, and its affiliates and governmental or regulatory authorities. Not only that, but the data secured will be kept for five years before being permanently disposed of.

3.9.2 Institution's Approval

This study involved patients from HPUPM, a teaching hospital under Universiti Putra Malaysia (UPM). Hence the researcher had received ethical approval from the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (JKEUPM) before applying for site approval (Hospital Pengajar Universiti Putra Malaysia, 2022b).

3.9.3 Access to Study Site

For accessing the study site, the clinical research application form and other related documents were sent to the Clinical Research Unit (CRU) of the HPUPM after the ethical approval was issued from the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (JKEUPM). The study then proceeded after the written approval was received from HPUPM. Not only that, but the researcher had asked for permission from the Head of the Department of Family Medicine and the sister of the FMC before drawing the sample and starting data collection in the respective hospital department. The staff in the respective department were aware of the research's purpose and cooperated throughout the sampling and data-collecting process.

3.10 Expected Outcome

This study was expected to determine the current antihypertensive medication adherence and pharmacological treatment satisfaction among hypertensive patients at FMC of HPUPM. From this study, the researcher anticipated proving an absolute association between pharmacological treatment satisfaction and antihypertensive medication adherence. Hence, the findings of this study were beneficial for healthcare providers in planning appropriate strategies for enhancing HTN patients' antihypertensive medication adherence by increasing their satisfaction with antihypertensive pharmacological treatment.

3.11 Budget

This study was self-sponsored, and the researcher itself fully funded all expenses.

3.12 Study Flowchart

In short, the study was conducted as shown in the flowchart presented in Figure 7 below.

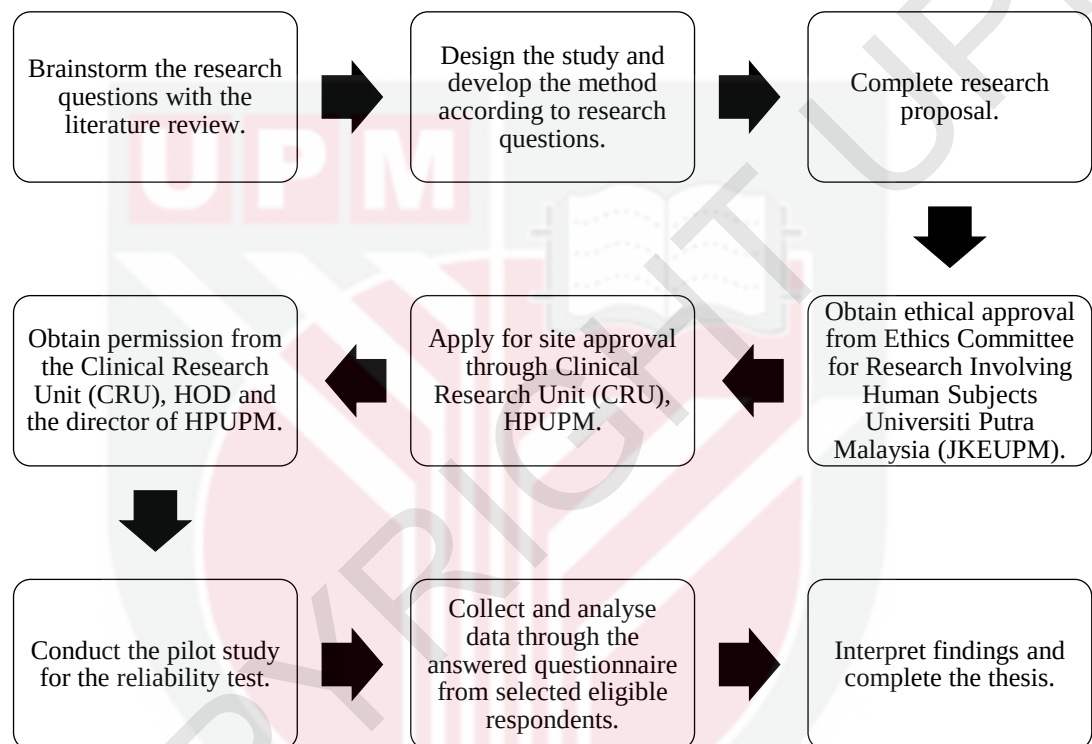


Figure 7: Study Flowchart

CHAPTER 4

RESULT

4.1 Introduction

This chapter concludes the results and findings of this study according to the objectives set. Before starting the descriptive and inferential data analysis, the response rate and normality test results will be shown to describe the data distribution. Based on the data distribution, the descriptive analysis of sociodemographic characteristics (respondents' background characteristics and HTN-related characteristics), pharmacological treatment satisfaction, and antihypertensive medication adherence among hypertensive patients will then be presented. The last part of this chapter reveals the hypothesis testing of the association between sociodemographic characteristics and pharmacological treatment satisfaction; the association between sociodemographic characteristics and antihypertensive medication adherence as well as the association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients, which is under the section on inferential data analysis.

4.2 Response Rate

The sample size required for this study is 195 respondents, with a 95.0% confidence level and a 5.0% margin error. Nevertheless, only 111 respondents were sampled and completed the questionnaire disseminated during the data collection. Hence, the response rate is equivalent to 56.9%.

4.3 Normality Test

The normality result of this study was based on one of the continuous data, which was the dependent variable, antihypertensive medication adherence. The Skewness value is -0.147, and Kurtosis is -0.425, both within -1 and +1. Besides that, this variable has a Kolmogorov-Smirnova of 0.001 and a Shapiro-Wilk of 0.003, which is statistically significant with $p < 0.05$. Based on Figure 8, the histogram is also in a bell-shaped curve, which justifies the normal distribution of the data. Hence, the next section will then display the descriptive data analysis of continuous data in mean with standard deviation (SD) as well as frequency (n) and percentage (%) for categorical data. While for inferential statistics, parametric tests were applied.

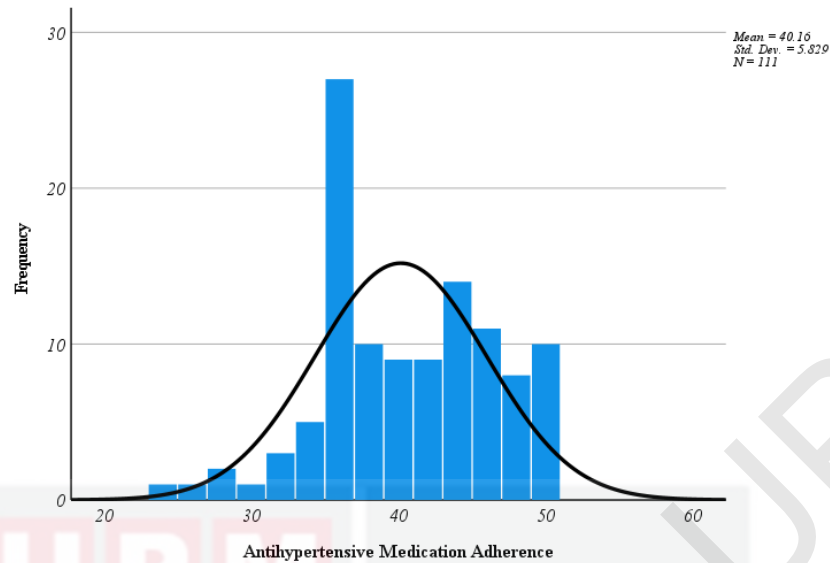


Figure 8: Histogram of Normality Test for Antihypertensive Medication Adherence

4.4 Descriptive Data Analysis

4.4.1 Sociodemographic Characteristics of the Respondents

Sociodemographic characteristics of this study include respondents' background characteristics (gender, age, race, highest educational level, marital status, living arrangement, employment status, and monthly household income group) and HTN-related characteristics, which are respondents' experience in taking antihypertensive medication (duration of taking HTN medications, types of HTN medication taken, daily HTN pills, presence of side effects, other prescribed medications, and significant supportive others), and knowledge on HTN. The continuous section summarized the descriptive statistics on each of the characteristics.

4.4.1.1 Background Characteristics of the Respondents

The first subsection of sociodemographic characteristics includes continuous (age) and categorical data (gender, race, highest educational level, marital status, living with others, employment status, and monthly household income group) on the background characteristics of the respondents.

Table 4: Descriptive Analysis of Background Characteristics of the Respondents

Characteristic	n (%)	Mean $\pm$ SD	Range
Gender			
Male	47 (42.3)		
Female	64 (57.7)		
Age		59.11 $\pm$ 14.577	24.0 – 86.0
Race			
Malay	65 (58.6)		
Chinese	27 (24.3)		
Indian	19 (17.1)		
Highest Educational Level			
No Formal Education	5 (4.5)		
Primary School	20 (18.0)		
Secondary School	43 (38.7)		
Tertiary Education	43 (38.7)		
Marital Status			
Single	9 (8.1)		
Married	81 (73.0)		
Widowed	21 (18.9)		
Living Arrangement			
Family	104 (93.7)		
Alone	7 (6.3)		

Characteristic	n (%)	Mean $\pm$ SD	Range
Employment Status			
Employed	67 (60.4)		
Unemployed	44 (39.6)		
Monthly Household Income Group			
B40 (< RM4,850)	58 (52.3)		
M40 (RM 4,850 - RM10,959)	41 (36.9)		
T20 ($\geq$ RM10,960)	12 (10.8)		

Based on Table 4, descriptive analysis of background characteristics of the respondents for continuous data was reported in mean with SD, while categorical data were displayed in frequency (n) and percentage (%). The results clearly showed that the female (n = 64, 57.7%) respondents were more than male respondents (n = 47, 42.3%). From the aspect of age, the youngest respondent was 24 years old, and the oldest was 86 years old, while on average, they were 59.11 ± 14.577 years old. Besides that, majority of the respondents were Malay (n = 65, 58.6%), followed by Chinese (n = 27, 24.3%), and Indian (n = 19, 17.7%). Regarding higher education level, most respondents were pursuing their studies until secondary to tertiary education (n = 86, 77.5%), while 25 (22.5%) had primary or no formal education. Furthermore, predominant of the respondents were married (n = 81, 73.0%), and others were either widowed or single (n = 30, 27.0%). Moreover, the greatest number of the respondents were living with family (n = 104, 93.7%) but not alone (n = 7, 6.3%). In addition, more than half of the respondents were still working (n = 67, 60.4%), while the others were unemployed (n = 44, 39.6%). Not only that, but the majority of the respondents had a monthly household income that is less than RM 4,850 (n = 58, 52.3%), 41 or 36.9% of the respondents earned RM 4,850 to RM 10,959 a month, and the minority of the

respondents were from T20 with a monthly household income of more than RM 10,959 (n = 12, 10.8%).

4.4.1.2 Experience of the Respondents in Taking Antihypertensive Medication

The second subsection of sociodemographic characteristics involves the HTN-related characteristics of the respondents' experience taking antihypertensive medication. This section also has continuous data (duration of taking HTN medications, number of types of antihypertensive medications taken, and total number of daily HTN medications taken) and categorical data (presence of side effects, other prescribed medications, and presence of significant supportive others).

Table 5: Descriptive Analysis of the Experience of the Respondents in Taking Antihypertensive Medication

Characteristic	n (%)	Mean $\pm$ SD	Range
Duration of Taking HTN Medications		8.59 $\pm$ 9.0814	0.5 – 40.0
Types of HTN Medication Taken		1.46 $\pm$ 0.671	1.0 – 4.0
Daily HTN Pills		1.554 $\pm$ 0.6985	0.5 – 4.0
Presence of Side Effects			
Yes	23 (20.7)		
No	88 (79.3)		
Other Prescribed Medications			
Yes	76 (68.5)		
No	35 (31.5)		

Characteristic	n (%)	Mean $\pm$ SD	Range
Presence of Significant Supportive Others			
Yes	40 (36.0)		
No	71 (64.0)		

As shown in Table 5, the descriptive analysis of the respondents' experience taking antihypertensive medication for continuous data was summarized in mean with SD, and categorical data were presented in frequency (n) and percentage (%). By referring to the result displayed, it showed that some of the respondents had their HTN medication for only half a year, but some had it for up to 40 years. On average, the respondents had 8.59 ± 9.0814 years of experience in taking HTN pills. They were also prescribed one to four antihypertensive medications with an average of 1.46 ± 0.671 types, which required them to take half to four HTN pills or an average of 1.554 ± 0.6985 units in a day. Besides that, most respondents did not experience any side effects (n = 88, 79.3%). However, there were 23 of the respondents complained of dizziness, headache, fatigue, increased urination, or dryness of the throat after taking the HTN medications (n = 23, 20.7%). Furthermore, 76 (68.5%) of the respondents presented comorbidity with other medications for diabetes mellitus, hypercholesterolemia, cardiovascular diseases, chronic kidney disease, osteoporosis, gout, or asthma. Nevertheless, 35 or 31.5% of the respondents have been prescribed only antihypertensive medications. Additionally, the preponderance of the respondents used to remind themselves to take their medications on time (n = 71, 64.0%), but 40 (36.0%) of the total 111 respondents were having significant supportive others, such as a spouse, children, grandchildren, or parents that acted as their reminder.

4.4.1.3 Knowledge of the Respondents on HTN

The third subsection of sociodemographic characteristics is regarding the respondents' knowledge of HTN. It covers questions that test the respondents' understanding of the normal range of BP, complications, management and treatment of HTN.

Table 6: Descriptive Analysis of Knowledge of HTN of the Respondents

Statement	n (%), N= 111			Mean $\pm$ SD
	Correct	Wrong	Not Sure	
1. A normal blood pressure level is less than 120/80 mmHg.	96 (86.5)	6 (5.4)	9 (8.1)	1.81 $\pm$ 0.514
2. A high blood pressure level is considered 140/90mmHg or higher.	86 (77.5)	16 (14.4)	9 (8.1)	1.63 $\pm$ 0.725
3. Uncontrolled high blood pressure will not lead to stroke, heart attack, heart failure or kidney failure.	79 (71.2)	24 (21.6)	8 (7.2)	1.50 $\pm$ 0.830
4. Medication is enough to control my blood pressure, and I do not need to have a healthy lifestyle.	87 (78.4)	17 (15.3)	7 (6.3)	1.63 $\pm$ 0.738
5. Hypertension has no cure.	49 (44.1)	33 (29.7)	29 (26.1)	1.14 $\pm$ 0.851

Table 6 summarizes the frequency (n), percentage (%), and mean $\pm$ SD of the respondents' answers for each item in the section regarding knowledge of HTN. The respondents' answers revealed that most of them acknowledged the normal range of BP, which covered the normal (n = 96, 86.5%) and cut-off point of high BP (n = 86, 77.5%). Besides that, they also knew about the complication (n = 79, 71.2%), and proper management of HTN (n = 87, 78.4%). However, 62 or 55.8% of the respondents were unsure or unaware that HTN cannot be cured.

On the other hand, only a few respondents wrongly answered the normal range of BP, which included the normal (n = 15, 13.5%) and cut-off point of high BP (n = 25, 22.5%). Besides that, minority of them were uncertain about the complication (n = 32, 28.8%), and proper management of HTN (n = 24, 21.6%). However, 49 or 21.6% of the respondents realised HTN was not a curable disease.

Table 7: Level of Knowledge of the Respondents regarding HTN

Knowledge on HTN	n (%), N = 111	Mean $\pm$ SD	Range
Total Score		7.71 $\pm$ 1.729	4.0 – 10.0
Level of Knowledge			
Good Knowledge (Score: $\geq$ 8/10)	69 (62.2)		
Poor Knowledge (Score: < 8/10)	42 (37.8)		

By referring to Table 7, the mean $\pm$ SD for the total score of knowledge of the respondents on HTN was calculated as 7.71 ± 1.729 with a range score of four to 10. As stated in Section 3.6.2 Scoring Method, the mean score acted as a cut-off point to classify the level of knowledge. The respondents were further categorized as having 'Good Knowledge' if the total score obtained was more than or equal to eight and the rest as 'Poor Knowledge'. Hence, it can be concluded that more than half of the respondents ($n = 69$, 62.2%) had good knowledge of HTN, and the minority had poor knowledge of HTN ($n = 42$, 37.8%).

4.4.2 Pharmacological Treatment Satisfaction among the Respondents

This subsection reports the result of pharmacological treatment satisfaction among the respondents towards HTN medicines from their answers to 16 statements that covered aspects of effectiveness, side effect, convenience, and confidence.

Table 8: Descriptive Analysis of Pharmacological Treatment Satisfaction among the Respondents

Statement	n (%), N= 111					Mean ± SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Effectiveness						
1. Hypertension medication is effective in controlling my blood pressure.	0 (0.0)	5 (4.5)	12 (10.8)	84 (75.7)	10 (9.0)	3.89 ± 0.608
2. I feel satisfied with the amount of time the medication takes to work.	1 (0.9)	6 (5.4)	10 (9.0)	84 (75.7)	10 (9.0)	3.86 ± 0.681
3. Hypertension medication effectively prevents hypertension-related complications (e.g., heart attack, stroke).	0 (0.0)	7 (6.3)	4 (3.6)	75 (67.6)	25 (22.5)	4.06 ± 0.717
4. I do not feel sick even if I forget to take my medications.	13 (11.7)	36 (32.4)	19 (17.1)	34 (30.6)	9 (8.1)	3.09 ± 1.195
Side Effect						
5. The side effect of hypertension medication affects my daily activities.	12 (10.8)	67 (60.4)	20 (18.0)	12 (10.8)	0 (0.0)	3.71 ± 0.802
6. I think the side effects of hypertension medication will worsen my health.	16 (14.4)	61 (55.0)	14 (12.6)	17 (15.3)	3 (2.7)	3.63 ± 0.999
7. I reduced my medication dose because I wish to reduce the side effect.	15 (13.5)	84 (75.7)	0 (0.0)	9 (8.1)	3 (2.7)	3.89 ± 0.835

8. I cannot bear the side effect of hypertension medications until I wish to stop taking them.	20 (18.0)	75 (67.6)	1 (0.9)	13 (11.7)	2 (1.8)	3.88 ± 0.902
Convenience						
9. I feel burdened to take hypertension medications for the rest of my life.	3 (2.7)	67 (60.4)	4 (3.6)	32 (28.8)	5 (4.5)	3.28 ± 1.055
10. I find it easy to take the medications at the same time every day.	8 (7.2)	17 (15.3)	5 (4.5)	68 (61.3)	13 (11.7)	3.55 ± 1.110
11. I feel trouble taking many medications in a day.	10 (9.0)	65 (58.6)	1 (0.9)	28 (25.2)	7 (6.3)	3.39 ± 1.146
12. My medication schedule is easy to remember.	0 (0.0)	16 (14.4)	6 (5.4)	77 (69.4)	12 (10.8)	3.77 ± 0.831
Confidence						
13. I believe that taking hypertension medications is good for my health.	4 (3.6)	12 (10.8)	10 (9.0)	83 (74.8)	2 (1.8)	3.60 ± 0.845
14. I will continue to take these medications even if I do not feel any changes in my health status.	8 (7.2)	15 (13.5)	12 (10.8)	68 (61.3)	8 (7.2)	3.48 ± 1.052
15. I will not continue to take these medications if I experience any side effects.	4 (3.6)	67 (60.4)	16 (14.4)	20 (18.0)	4 (3.6)	3.42 ± 0.949
16. I will follow the medication schedule if I find it easy to follow.	3 (2.7)	8 (7.2)	4 (3.6)	87 (78.4)	9 (8.1)	3.82 ± 0.789

Based on Table 8, the descriptive analysis of pharmacological treatment satisfaction among the respondents was presented in frequency (n), percentage (%), and mean $\pm$ SD based on the respondents' responses. In terms of effectiveness, most respondents (n = 94, 84.7%) agreed that the HTN medication's function and outcome were satisfactory. More than 90% of the respondents also deemed the HTN medication helpful in preventing complications of HTN (n = 100, 90.1 %). Nevertheless, 62 or 55.8% of the respondents were unsure or did not feel any changes without taking the medication.

From the side effects of the pharmacological treatment, a minimum of the respondents agreed that the side effect of the HTN medications affected their daily life (n = 32, 28.8%) or even worsened their health (n = 34, 30.6%). Besides that, more than half of the respondents disagreed that the side effect of the medication was the contributing factor that would make them choose not to follow the medication schedule (n = 99, 89.2%) or even stop taking the medication (n = 95, 85.6%).

In terms of the convenience of the pharmacological treatment, less than half of the respondents thought it was inconvenient to take antihypertensive medications for the rest of their life (n = 41, 36.9%) or were uneasy with polypharmacy (n = 36, 32.4%). On the other way round, the predominant of the respondents found it easy to remember their medication schedule (n = 99, 80.2%) or even have their HTN pills at the same time every day (n = 81, 73.0%).

By looking into the confidence level of the respondents on HTN medication, they were confident that taking antihypertensive medication benefits them (n = 85, 76.6%) even if they are asymptomatic (n = 76, 68.5%). The majority of them agreed that the side effects of HTN pills would not stop them from believing the advantage of the medication (n = 71, 64.0%), and they were even more confident to take it with simple instructions given (n = 96, 86.5%).

Table 9: Level of Pharmacological Treatment Satisfaction among the Respondents

Pharmacological Treatment Satisfaction	n (%), N= 111	Mean ± SD	Range
Total Score		58.33 ± 6.820	38.0 – 74.0
Level of Satisfaction			
Satisfied (Score < 59)	63 (56.8)		
Not Satisfied (Score ≥ 59)	48 (43.2)		

As shown in Table 9, the range of total scores of pharmacological treatment satisfaction recorded by the respondents was 38 to 74 with the mean ± SD of 58.33 ± 6.820 as computed based on the scoring system mentioned in Section 3.6.2 Scoring Method. With the use of the mean score as the cut-off point to sort the level of pharmacological treatment satisfaction, the respondents were further classified into ‘Satisfied’ if the total score obtained was more than or equal to 59 and ‘Not Satisfied’ if the total score were less than 59. The findings showed that more than half of the respondents (n = 63, 56.8%) were satisfied with their current pharmacological treatment for HTN, and only 48 (43.2) of the respondents had the opposite opinion.

4.4.3 Antihypertensive Medication Adherence among the Respondents

This part concludes the antihypertensive medication adherence among the respondents based on their responses to 10 positively or negative statements.



Table 10: Descriptive Analysis of Antihypertensive Medication Adherence among the Respondents

Statements	n (%), N= 111					Mean $\pm$ SD
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. I do not follow the medication schedule prescribed by the doctor 1 - 3 times a month.	44 (39.6)	45 (40.5)	3 (2.7)	18 (16.2)	1 (0.9)	4.02 $\pm$ 1.079
2. I do not follow the medication schedule prescribed by the doctor 4 - 6 times a month.	52 (46.8)	52 (46.8)	2 (1.8)	4 (3.6)	1 (0.9)	4.35 $\pm$ 0.770
3. I do not follow the medication schedule prescribed by the doctor 7 - 9 times a month.	50 (45.0)	51 (45.9)	1 (0.9)	6 (5.4)	3 (2.7)	4.25 $\pm$ 0.929
4. I do not follow the medication schedule prescribed by the doctor more than 9 times a month.	55 (49.5)	47 (42.3)	1 (0.9)	4 (3.6)	4 (3.6)	4.31 $\pm$ 0.942
5. I never missed taking my medications on time, even when busy.	21 (18.9)	37 (33.3)	5 (4.5)	28 (25.2)	20 (18.0)	2.90 $\pm$ 1.439
6. I never reduced the medication dose without consulting the doctor.	4 (3.6)	27 (24.3)	5 (4.5)	42 (37.8)	33 (29.7)	3.66 $\pm$ 1.239
7. Sometimes, I purposely skipped my medication without following the medication schedule prescribed by the doctor.	36 (32.4)	64 (57.7)	3 (2.7)	6 (5.4)	2 (1.8)	4.14 $\pm$ 0.847
8. I stop taking the medication when I think my blood pressure is under control.	39 (35.1)	61 (55.0)	2 (1.8)	7 (6.3)	2 (1.8)	4.15 $\pm$ 0.876
9. I find it hard to adhere to the antihypertensive medication schedule as I take many medications.	37 (33.3)	62 (55.9)	5 (4.5)	7 (6.3)	0 (0.0)	4.16 $\pm$ 0.781
10. I am confused about my medication regimen.	39 (35.1)	63 (56.8)	4 (3.6)	5 (4.5)	0 (0.0)	4.23 $\pm$ 0.722

In Table 10, the descriptive analysis of antihypertensive medication adherence among the respondents was summarized in frequency (n), percentage (%), and mean $\pm$ SD based on the respondents' answers. Based on the result, there were only 22 or 19.8% of the respondents not sure or confessed they broke the medication schedule about one to three times in the past month, seven (6.3%) respondents had four to six times, nine (9.0 %) respondents had seven to nine times, and eight respondents (8.1%) had more than nine times of experience in not following their therapy regime. Among 111 respondents, more than half missed taking their medication on time due to forgetfulness (n = 63, 56.7%). Otherwise, most of them denied for reducing (n = 75, 67.6%), skipping (n =100, 90.1%) or even stopping (n = 100, 90.1%) from taking medication. Besides that, about 90.0% of the respondents (n = 102, 91.9%) fully understood their medication schedule and agreed to have no problem adhering (n = 99, 89.2%).

Table 11: Level of Antihypertensive Medication Adherence among the Respondents

Antihypertensive Medication Adherence	n (%), N= 111	Mean $\pm$ SD	Range
Total Score		40.16 $\pm$ 5.829	24.0 – 50.0
Level of Adherence			
Adherent	39 (35.1)		
Nonadherent	72 (64.9)		

By referring to Table 11, the mean $\pm$ SD for average antihypertensive medication adherence scores ranging from 24 to 50 was 40.16 $\pm$ 5.829. As stated in

Section 3.6.2 Scoring Method, once the respondent scored less than four for any of the questions, they will be classified as ‘Nonadherent’ and otherwise as ‘Adherent’. Hence, it can be summarized that most respondents (n = 72, 64.9%) did not fully adhere to their antihypertensive medication, and only 39 or 35.1% of the respondents followed their medication schedule.

4.5 Inferential Data Analysis

4.5.1 Association between Sociodemographic Characteristics and Pharmacological Treatment Satisfaction

This subsection shows the hypothesis testing of the relationship between sociodemographic characteristics and pharmacological treatment satisfaction. Pearson correlation was performed for continuous data of sociodemographic characteristics, while an independent T-test and one-way independent ANOVA were used for categorical data of sociodemographic characteristics.

Table 12: Relationship between Sociodemographic Characteristics and Pharmacological Treatment Satisfaction

Variable	Pharmacological Treatment Satisfaction			
	Mean $\pm$ SD	Range	r-value	p-value
Age	59.11 $\pm$ 14.577	24.0 – 86.0	0.405	0.001 ^{a*}
Duration of taking HTN Medications	8.59 $\pm$ 9.0814	0.5 – 40.0	0.265	0.005 ^{a*}
Types of HTN Medications	1.46 $\pm$ 0.671	1.0 – 4.0	-0.012	0.901 ^a

Daily HTN Pills	1.554 ± 0.6985	0.5 – 4.0	0.012	0.897 ^a
Knowledge on HTN	8.59 ± 9.0814	4.0 – 10.0	0.304	0.001 ^{a*}
Variable	Mean ± SD	t	df	p-value
Gender		-0.075	109	0.941 ^b
Male	58.28 ± 6.409			
Female	58.38 ± 7.157			
Living Arrangement		-0.038	109	0.970 ^b
Family	58.33 ± 6.816			
Alone	58.43 ± 7.435			
Employment Status		-3.156	109	0.002 ^{b*}
Employed	55.91 ± 6.974			
Unemployed	59.93 ± 6.272			
Presence of Side Effects		-4.941	109	0.001 ^{b*}
Yes	52.65 ± 8.155			
No	59.82 ± 5.588			
Other Prescribed Medications		3.305	109	0.001 ^{b*}
Yes	59.72 ± 6.041			
No	55.31 ± 7.502			
Presence of Significant Supportive Others		-1.706	109	0.091 ^b
Yes	56.88 ± 6.182			
No	59.15 ± 7.064			
Variable	Mean ± SD	F	df (Between Groups, Within Groups)	p-value
Race		1.516	2, 108	0.224 ^c
Malay	59.28 ± 5.002			
Chinese	56.96 ± 8.401			
Indian	57.05 ± 9.252			

Highest Education Level		1.135	3, 107	0.339 ^c
No Formal Education	58.00 ± 4.848			
Primary School	60.85 ± 8.008			
Secondary School	57.95 ± 6.313			
Tertiary Education	57.58 ± 6.853			
Marital Status		2.407	2, 108	0.095 ^c
Single	55.78 ± 10.244			
Married	59.19 ± 6.364			
Widowed	56.14 ± 6.398			
Monthly Household Income Group		2.183	2, 108	0.118 ^c
B40 (< RM4,850)	59.38 ± 6.841			
M40 (RM 4,850 - RM10,959)	56.59 ± 6.823			
T20 (≥ RM10,960)	59.25 ± 5.941			

* $p \leq 0.05$ considered as statistically significant

a. Analysis was performed using Pearson correlation

b. Analysis was performed using Independent T-test

c. Analysis was performed using one-way independent ANOVA

Based on the finding summarized in Table 12, the Person Correlation result proved that age had a significant moderate and positive correlation ($r = 0.405$, $n = 111$, $p = 0.001$) with pharmacological treatment satisfaction. Not only that, but duration of taking HTN medications ($r = 0.265$, $n = 111$, $p = 0.005$), and knowledge on HTN ($r = 0.304$, $n = 111$, $p = 0.001$) also had a similar result. In other words, an increase in age between 24 to 86 years old, duration of taking HTN medications the range from half a year to 40 years, and knowledge of HTN with a total score of four to 10 increase the pharmacological treatment satisfaction.

Furthermore, the result of the independent T-test certified that employment status ($t(109) = -3.156, p = 0.002$) was statistically significant to pharmacological treatment satisfaction, which unemployed respondents (59.93 ± 6.272) had a higher level of satisfaction than employed respondents (55.91 ± 6.974). Apart from that, the presence of side effects ($t(109) = -4.941, p = 0.001$) was also significantly related to pharmacological treatment satisfaction, where the respondents with side effects (52.65 ± 8.155) had a lower level of satisfaction with their pharmacological treatment than those who were not (59.82 ± 5.588). For other prescribed medications ($t(109) = 3.305, p = 0.001$), the presence of comorbidity with other prescribed medications was significant, resulting in better satisfaction (59.72 ± 6.041) than those who were only on HTN medication (55.31 ± 7.502). Otherwise, types of HTN medications, daily HTN pills, gender, living arrangement, presence of significant supportive others, race, highest education level, marital status, and monthly household income group had no significant relationship with pharmacological treatment satisfaction as their p -values are more than 0.05, where the researcher failed to reject the null hypothesis.

4.5.2 Association between Sociodemographic Characteristics and Antihypertensive Medication Adherence

The second hypothesis testing is for the association between sociodemographic characteristics and antihypertensive medication adherence. Pearson correlation was performed for continuous sociodemographic characteristics, and independent T-test and one-way independent ANOVA were used for categorical data of sociodemographic characteristics.

Table 13: Association between Sociodemographic Characteristics and Antihypertensive Medication Adherence

Sociodemographic Characteristics	Antihypertensive Medication Adherence			
	Mean $\pm$ SD	Range	<i>r</i> -value	<i>p</i> -value
Age	59.11 $\pm$ 14.577	24.0 – 86.0	0.390	0.001 ^{a*}
Duration of Taking HTN Medications	8.59 $\pm$ 9.0814	0.5 – 40.0	0.431	0.001 ^{a*}
Types of HTN Medications	1.46 $\pm$ 0.671	1.0 – 4.0	0.160	0.094 ^a
Daily HTN Pills	1.554 $\pm$ 0.6985	0.5 – 4.0	0.018	0.852 ^a
Knowledge on HTN	8.59 $\pm$ 9.0814	4.0 – 10.0	0.189	0.047 ^{a*}
Sociodemographic Characteristics	Mean $\pm$ SD	<i>t</i>	df	<i>p</i> -value
Gender		0.374	109	0.709 ^b
Male	40.40 $\pm$ 5.191			
Female	39.98 $\pm$ 6.291			
Living with Someone		1.324	109	0.188 ^b
Yes	42.36 $\pm$ 4.154			
No	39.92 $\pm$ 5.950			
Employment Status		-2.819	109	0.006 ^{b*}
Employed	38.30 $\pm$ 5.047			
Unemployed	41.39 $\pm$ 6.015			
Presence of Side Effects		-2.368	109	0.020 ^{b*}
Yes	37.65 $\pm$ 4.792			
No	40.82 $\pm$ 5.920			
Other Prescribed Medications		2.019	109	0.046 ^{b*}
Yes	42.15 $\pm$ 6.136			
No	39.55 $\pm$ 5.628			

Presence of Significant Supportive Others		-1.553	109	0.123 ^b
Yes	39.03 ± 6.095			
No	40.80 ± 5.615			
Sociodemographic Characteristics	Mean ± SD	F	df (Between Groups, Within Groups)	p-value
Race		0.267	2, 108	0.766 ^c
Malay	40.43 ± 5.690			
Chinese	40.11 ± 6.166			
Indian	39.32 ± 6.047			
Highest Education Level		3.145	3, 107	0.028 ^{c*}
No Formal Education	36.60 ± 2.702			
Primary School	42.95 ± 6.117			
Secondary School	40.60 ± 5.430			
Tertiary Education	38.84 ± 5.888			
Marital Status		2.091	2, 108	0.129 ^c
Single	37.00 ± 5.979			
Married	40.77 ± 5.771			
Widowed	39.19 ± 5.689			
Monthly Household Income Group		1.899	2, 108	0.155 ^c
B40 (< RM4,850)	40.88 ± 6.230			
M40 (RM 4,850 - RM10,959)	38.78 ± 5.461			
T20 (≥ RM10,960)	41.42 ± 4.316			

* $p \leq 0.05$ considered as statistically significant

a. Analysis was performed using Pearson correlation

b. Analysis was performed using Independent T-test

c. Analysis was performed using one-way independent ANOVA

By referring to the result of the statistical analysis in Table 13, it certified that age ($r = 0.390$, $n = 111$, $p = 0.001$), duration of taking HTN medications ($r = 0.431$, $n = 111$, $p = 0.001$), and knowledge on HTN ($r = 0.189$, $n = 111$, $p = 0.047$) had a mild to moderate, and positive correlation to antihypertensive medication adherence. It means an increased age range between 24 and 86, with more years of taking HTN medication between half of a year to 40 years, and better knowledge of HTN would greatly improve the level of adherence among hypertensive respondents towards their HTN medications.

Besides that, there was enough evidence ($t(109) = -2.819$, $p = 0.006$) to conclude that unemployed respondents (41.39 ± 6.015) adhered more than respondents that busy with work (38.30 ± 5.047). Besides that, the absence of side effects from HTN medication (40.82 ± 5.920) also significantly ($t(109) = -2.368$, $p = 0.020$) increased the level of adherence as compared to the respondents who experienced side effects (37.65 ± 4.792). Furthermore, when the respondents have comorbidity with prescribed medication other than HTN pills (42.15 ± 6.136), they become significantly ($t(109) = 2.019$, $p = 0.046$) more adhere than those who only have HTN medications (39.55 ± 5.628).

In terms of the highest educational level, there was a significant difference found between the groups with the antihypertensive medication ($F(3, 107) = 3.145$, $p = 0.028$). Based on the result, respondents who studied until primary school were the most adhered population (42.95 ± 6.117) as compared to respondents with secondary school of educational level (40.60 ± 5.430), tertiary education (38.84 ± 5.888) or no formal education (36.60 ± 2.702). Otherwise, types of HTN medications, daily HTN

pills, gender, living arrangement, presence of significant supportive others, race, marital status, and monthly household income group had no significant relationship with antihypertensive medication adherence as their p -values were more than 0.05, where the researcher failed to reject the null hypothesis.

4.5.3 Association between Pharmacological Treatment Satisfaction and Antihypertensive Medication Adherence

This section uses Pearson Correlation and Multiple Regression to describe the association between pharmacological treatment satisfaction and antihypertensive medication adherence.

Table 14: Association between Pharmacological Treatment Satisfaction and Antihypertensive Medication Adherence

Characteristic	Antihypertensive Medication Adherence	
	r -value	p -value
Pharmacological Treatment Satisfaction	0.421	0.001*

* $p \leq 0.05$ considered as statistically significant

According to Table 14, the Pearson Correlation result proved a significant relationship between pharmacological treatment satisfaction and antihypertensive medication adherence with a moderate and positive correlation ($r = 0.421$, $n = 111$, $p = 0.001$). Thus, the null hypothesis was rejected.

Table 15: Multiple Regression between each aspect of Pharmacological Treatment Satisfaction and Antihypertensive Medication Adherence

Antihypertensive Medication Adherence	<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>F</i>	df (Regression , Residual)	<i>p</i> -value
Pharmacological Treatment Satisfaction	0.464	0.216	0.186	7.283	4, 106	0.001
Antihypertensive Medication Adherence				<i>β</i>	<i>t</i>	<i>p</i> -value
Pharmacological Treatment Satisfaction						
Effectiveness				-0.003	-0.033	0.974
Side Effect				0.059	0.652	0.516
Convenience				0.237	2.138	0.035*
Confidence				0.268	2.531	0.013*

* $p \leq 0.05$ considered as statistically significant

As shown in Table 15, a multiple regression was run to predict the antihypertensive medication adherence from each aspect of the pharmacological treatments (effectiveness, side effect, convenience, confidence). These variables statistically significantly predicted antihypertensive medication adherence ($F(4, 106) = 7.283, p = 0.001, R^2 = 0.216$). It could then be concluded that both convenience ($t = 2.138, p = 0.035$), and confidence ($t = 2.531, p = 0.013$) in the pharmacological treatment satisfaction were significant predictors for antihypertensive medication adherence. Besides that, confidence ($\beta = 0.268$) was a slightly stronger predictor of antihypertensive medication adherence than convenience ($\beta = 0.237$) in pharmacological treatment satisfaction. However, effectiveness ($p = 0.974$), and side effects ($p = 0.516$) were not statistically significant to the prediction.

CHAPTER 5

DISCUSSION

The main objective of this study is to determine the relationship between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients. In this chapter, findings obtained from the analyzed data will be further discussed according to the specific objectives of this study.

5.1 Sociodemographic Characteristics among Respondents

The sociodemographic characteristics of this study include respondents' background characteristics and HTN-related characteristics (experience in taking HTN medications and knowledge of HTN).

5.1.1 Background Characteristics

By performing statistical analysis through the data entered, the researcher found that there were more female respondents with HTN ($n = 64$, 57.7%) than males ($n = 47$, 42.3%) in this study. It is similar to research conducted by Naidu et al. (2019) on the factors associated with the severity of HTN among Malaysian adults, where stage 2 HTN is more common in females as compared to males, as the great majority

of the females are physically inactive that posed the risk factor to HTN (Zulkifli et al., 2021). However, more men globally have HTN (Santosa et al., 2020), as men are prone to unhealthy lifestyles, like heavy alcohol consumption or being overweight (Cherfan et al., 2020).

Besides that, the respondents in this study ranged from 24 to 86 years old, with an average age of 59.11 ± 14.577 years old. Based on previous research on the prevalence of antihypertensive medication nonadherence in Malaysia conducted by Yusoff et al. (2020), the prevalence of HTN increases with age, especially among older adults over 60 years old (Buford, 2016). Nevertheless, another study about young-onset hypertension (YOH) in Malaysia by Khoo et al. (2022) discovered a recent surge in the prevalence of HTN from 2006 to 2015 among citizens less than 30 years old. According to Ewald and Haldeman (2016), unhealthy food habits like fast foods among youth that lead to obesity might be the cause that further contribute to the epidemics of HTN.

Furthermore, preponderance of the respondents in this research were Malays ($n = 65$, 58.6%), followed by Chinese ($n = 27$, 24.3%), and Indian ($n = 19$, 17.1%). This finding is in line with a survey by Naing et al. (2016) on the prevalence of HTN in Malaysia, with the highest prevalence among the Malays and the lowest among Indians, as well as a study on ethnicity and HTN by Chan et al. (2021) in Singapore also get the likeness of findings. Perhaps it is because non-Malays are more aware of HTN than Malays (Yusoff et al., 2020). Nevertheless, the latest Malaysia National

Survey and Morbidity Survey in 2019 found that Malays have a reduced trend of HTN cases and recorded lesser cases than non-Malays (Ministry of Health Malaysia, 2020).

In terms of the highest educational level, most of the respondents of this study ($n = 86$, 77.5%) were educated with secondary or tertiary education, and only 25 (22.5%) respondents received primary or no formal education. Referring to a paper regarding self-reported HTN by Muhammad et al. (2022), higher education will lead to healthcare utilization and contribute to this study's result. However, a study on the association between educational level and HTN in China reported that respondents with lesser education, such as elementary school education and below, tend to have more unhealthy diets and sedentary lifestyles, which is associated with the onset of HTN (Sun et al., 2022).

Moreover, this study had more married respondents ($n = 81$, 73.0%) than those who were not, like single or widowed ($n = 31$, 27.0%). It is similar to the result Zaki et al. (2021) found regarding the prevalence of HTN in Malaysian adults. Based on this study result, more married people are having HTN, which might be because of the stress received from spousal or partner that leads to increased BP (Birditt et al., 2014). Grundström et al. (2021) also discovered in their research on relationship status and health that an unhappy married might worsen mental and physical health. On the other way round, being single also might pose a risk for HTN (Ramezankhani et al., 2019). Research by Hosseini et al. (2021) on social connection and HTN among Canadians concluded that single females are inclined to engage less in social activities associated with weaker social ties that promote the occurrence of HTN.

In this study, there were 104 (93.7%) of the respondents lived with their family members, and only seven (6.3%) respondents lived alone, which resembles the result of the study by Rashid and Azizah (2011) on the prevalence of HTN among the elderly. According to Fonseca et al. (2018), who surveyed family-origin lifestyles, lifestyle choices are commonly influenced by family members, where it is common for a family to have a shared unhealthy lifestyle that gives rise to HTN. However, living alone may also contribute to loneliness, especially among older adults, which causes adverse physiological effects that trigger HTN from being diagnosed (Momtaz et al., 2012).

Apart from that, this study's hypertensive respondents were mainly employed ($n = 67$, 60.4%), while the minority were unemployed ($n = 44$, 39.6%). According to Zagodzón et al. (2014), in their research paper on the effect of unemployment on health, unemployment increases the odds of HTN as it is related to mental health. In contrast, high job stress could be associated with a higher likelihood of HTN (Mezuck et al., 2011). A study on the relationship between high-stress employment and HTN by Buenz and Bauer (2017) also reported that termination of high-stress work significantly reduces BP.

For the monthly household income of the respondents of this study, more than half of them were B40 with income less than RM4,850 ($n = 58$, 52.3%), followed by M40 with income between RM 4,850 to RM10,959 ($n = 41$, 36.9%) and T20 with income at least RM10,960 ($n = 12$, 10.8%). This finding is similar to a previous study about socioeconomic status and its relation to HTN conducted by Bhattarai et al. (2021), where the higher the income, the lower prevalence of HTN. It might be due to

increased knowledge, awareness, and better accessibility to medical treatment among the high-income population (Bhattarai et al., 2021). Nevertheless, lower-income people might have a relatively healthier lifestyle due to unfordable cigarette smoking, and more physical exercise through working reduces the risk for HTN (American Heart Association, 2019).

5.1.2 HTN-related Characteristics

5.1.2.1 Experience in Taking HTN Medications

Based on the study result, the respondents had half a year to 40 years of experience in taking HTN medication, with a mean of 8.59 ± 9.0814 years. According to the study on determinants of newly-diagnosed HTN by Lim et al. (2021), although there is an upward trend in newly-diagnosed HTN, HTN has been a preexisting issue for years. Thus, it contributes to the hypertensive respondents with about 10 years of experience in taking HTN pills.

Besides that, the hypertensive respondents in this study were on one to four types of antihypertensive medications with an average of 1.46 ± 0.671 types. In other words, the respondents, on average, have only one antihypertensive medication; this result might be because first-line therapy for uncomplicated HTN is monotherapy as referred to the Clinical Practice Guidelines on the Management of Hypertension from the Ministry of Health Malaysia (2018).

Furthermore, the daily HTN pills for the respondents of this study ranged from half to four units. On average, the respondents had 1.554 ± 0.6985 units of antihypertensive medications, as the respondents are commonly on monotherapy. According to the Ministry of Health Malaysia (2013), reducing the pill burden in units and simplifying the treatment regimen in types is the strategy for improving adherence.

Moreover, the predominant respondents in this research were not experiencing any side effects ($n = 88$, 79.3%), and only a minimum of them complained of the side effect ($n = 23$, 20.7%). This finding is similar to a study on antihypertensive medication nonadherence conducted in a public hospital in Selangor, where only 10.0% of the respondents experienced side effects from HTN medication (Yusoff et al., 2020). It is probably because the majority of the respondents in this study are on monotherapy and a relatively simple regime that minimizes the side effects (Ministry of Health Malaysia, 2013). However, a study on the side effects of antihypertensive medication and adherence conducted in the United States by Tedla and Bautista (2016) found that about 90.0% of the respondents experienced side effects that led to nonadherent.

Apart from that, more than half of the respondents from this survey had other prescribed medications ($n = 76$, 68.5%), while only 35 (31.5%) respondents had only antihypertensive medications. According to a survey on risk factors, prevalence, and comorbidities of HTN in Malaysia by Kadir et al. (2019), half of the hypertensive respondents are diagnosed with diabetes mellitus or dyslipidemia. Similar to the study regarding comorbidities among HTN patients completed by Kennard and O'Shaughnessy (2016) in the United Kingdom, about 70.0 % of hypertensive patients

have comorbidity. However, Koshy et al. (2017) found that hypertensive patients with well-controlled BP could have a lower risk of developing comorbid.

According to the result of this study, a greater number of the respondents had to remind themselves to take the medication ($n = 71, 64.0\%$), while there were 40 (36.0%) of the respondents had significant others that help in reminding them to follow the medication schedule. This result is in line with a study regarding social support and self-care practice among HTN patients in Malaysia, where the majority of hypertensive patients do not have supportive family members as social support in adhering to the medication (Nazeri et al., 2022). Although family support is useful in achieving optimal BP (Kurniawati et al., 2019), support is less required in respondents who have their antihypertensive medication for a longer time as they are inclined to adapt and accept the existing disease (Nazeri et al., 2022).

5.1.2.2 Knowledge of HTN

By referring to the result of this study, more than half of the respondents ($n = 69, 62.2\%$) had good knowledge about HTN. The respondents' answers revealed that most of them acknowledged the normal range of BP, which covered the normal ($n = 96, 86.5\%$) and cut-off point of high BP ($n = 86, 77.5\%$). Besides that, they also know about the complication ($n = 79, 71.2\%$), and proper management of HTN ($n = 87, 78.4\%$). However, 62 or 55.8% of the respondents were unsure or unaware that HTN cannot be cured.

The result is concurrent with the studies related to knowledge of HTN among hypertensive patients conducted in Ethiopia and Malaysia, where more than half of the hypertensive respondents have good knowledge of HTN (Worku Kassahun et al., 2020), especially management of HTN (Baharudin et al., 2021). It might be because most of this survey's respondents have formal higher education. Similarly, another research regarding knowledge, attitudes and practices of HTN in the community of Zimbabwe revealed that hypertensive patients with poor knowledge are probably due to a lack of education (Chimberengwa & Naidoo, 2019). While, despite the high level of knowledge on HTN, the point that more than half of the respondents are remarkably unaware that antihypertensive medications are used to control but not cure HTN might possess a negative impact on belief in following the medication schedule.

5.2 Pharmacological Treatment Satisfaction among Hypertensive Patients

The result of this study is similar to a study conducted in Malaysia on the management of HTN, where more than half of the hypertensive patients were satisfied (n = 63, 56.8%) with their current treatment (Baharudin et al., 2021).

From the aspect of effectiveness, most of the respondents in this research were pleased with it (n = 67, 60.4%). It might be because most of them had monotherapy (Khalil & Zeltser, 2022) that was effective in lowering BP with minimal side effects (Mann, 2022). However, Burnier and Egan (2019) concluded in their study on adherence to HTN medications that the asymptomatic nature of HTN may make hypertensive respondents question the usefulness of the medication in controlling BP.

Apart from that, the preponderance of the respondents in this study felt satisfied with the treatment, as more than half of them were free from the side effects of monotherapy ($n = 84, 75.7\%$). Kretchy et al. (2015) suggested in their research paper regarding the psychosocial perspective of medication adherence that even though side effects might pose comfortlessness that contributes to nonadherent, some of them perceived the benefits outweigh the side effect experienced in preventing complications of uncontrolled BP. Hence, it can be concluded that experiencing some mild side effect that does not enough affect their daily activities does not give rise to dissatisfaction.

In terms of convenience, the majority of the hypertensive respondents in this survey also agreed that they feel convenient following the medication schedule ($n = 64, 57.7\%$). It might be because they had an average of about 10 years of experience in taking antihypertensive medication that probably established a medication-taking routine or habit among them (Molloy et al., 2014). However, the lifelong medication-taking behaviour could also create a sense of bothersome among patients (Krska et al., 2018), especially for those with combination therapy, like two or more antihypertensive medications (World Health Organization, 2021b).

By looking into the confidence level of the respondents from this study in taking antihypertensive medications, more than half of them were sure that it benefits them ($n = 69, 62.2\%$). It might be due to the high education level and knowledge that makes them aware of the complications of uncontrolled BP. According to Black et al.

(2022), in their study on patients' satisfaction with medication consultations, good health education from healthcare providers on medication information will instil trust and confidence toward antihypertensive medications. However, respondents with comorbidity on other prescribed medications increase the risk of side effects. Thus, the respondents may have believed that the treatment is harmful with little or no benefit to them (Świątoniowska-Lonc et al., 2021).

5.3 Antihypertensive Medication Adherence among Hypertensive Patients.

The majority of the respondents in this study did not adhere to their medication schedule (n = 72, 64.9%). It is in line with a systematic review and meta-analysis on medication adherence, where nonadherence among hypertensive patients is approximately 43.0% to 65.5% (Abegaz et al., 2017). However, this is in contrast to a survey in a public hospital that the prevalence of nonadherence with antihypertensive medications was 25.0%, mainly due to side effects (Yusoff et al., 2020).

Besides that, more than half of the respondents from this research did not even try to reduce (n = 75, 67.6%), skip (n = 100, 90.1%) or even stop (n = 100, 90.1%) from taking medication. It might be because 90.0% of the respondents (n = 102, 91.9%) fully understood their medication schedule and found it easy to adhere to (n = 99, 89.2%). According to the study regarding medication adherence completed by Usherwood (2017), the patient's attitudes, experiences, and opinions of significant others greater influence the decision to take medicines. In other words, there is probably no cause for respondents of this study to intentionally medication

nonadherence, such as having a negative belief in necessity and effectiveness, concerns about adverse effects, and confusing regime.

Nevertheless, more than half of them missed taking their medication on time due to forgetfulness ($n = 63$, 56.7%). Based on the result, there were only 22 or 19.8% of the respondent not sure or confessed they broke the medication schedule about one to three times in the past month, seven (6.3%) respondents had four to six times, nine (9.0 %) respondents had seven to nine times, and eight respondents (8.1%) had more than nine times of experience in not taking their HTN pills as per doctor's order. It might be due to factors beyond the patient's control, such as busyness, cost and other practical difficulties, like difficulty swallowing pills among older respondents, that lead to unintentional medication nonadherence (Usherwood, 2017).

5.4 Association between Sociodemographic Characteristics and Pharmacological Treatment Satisfaction among Hypertensive Patients

According to the result of this study, age was significantly positively correlated to pharmacological treatment satisfaction ($r = 0.405$, $p = 0001$) among the hypertensive respondents with an average age of 59.11 ± 14.577 years old. However, this study showed a statistically nonsignificant difference between gender and race in pharmacological treatment satisfaction ($p > 0.05$). The result is similar to a study among older hypertensive patients over 60 years old in India, where the majority of the patients are delighted with their treatment (Ponnusankar et al., 2022), as increased age is associated with more accumulated knowledge and experiences (National

Institute on Aging, 2020) that promote trust in medicine. Yet, the risk of adverse drug reactions increases with the respondents' age due to age-related changes, comorbidity, and polypharmacy that lead to negative belief in the effectiveness of the pills (Lavan & Gallagher, 2016).

Besides that, the longer the experience of the hypertensive respondents of this study in taking the HTN medication between half a year to 40 years, the significantly higher their satisfaction level over pharmacological treatment ($r = 0.431$, $p = 0.001$). According to Arlinghaus, and Johnston (2018), in their paper on the importance of creating medication habits, it might be because the years of performing the medication-taking behaviour promote the formation of habit, which makes it the respondents easy to perform every day as a natural routine. Therefore, it then reduces the respondents' need for family support from significant others, contributing to the result of this study with no significant relationship or difference ($p > 0.05$) between marital status, living arrangement, presence of significant supportive others, total type and the daily number of antihypertensive medications to pharmacological treatment satisfaction. However, some respondents feel inconvenienced and burdened with their medications, especially those on combination therapy or comorbid with the complicated regime (Lavan & Gallagher, 2016).

For knowledge of HTN in this study, it was significantly positively correlated to pharmacological treatment satisfaction ($r = 0.304$, $p = 0.001$). It is in concordance with another study of HTN knowledge, attitude, and practice in adult hypertensive patients in Sri Lanka, where more than two-thirds of the study population was aware

of the complications of HTN (Ralapanawa et al., 2020), creating confidence in them to follow the therapy regime for their health (Brown et al., 2018). However, although the level of knowledge is associated with good adherence that contributes to proper BP control (Akoko et al., 2017), the gaps in specific knowledge over the ability of medicine to cure HTN among this study's respondents might create an enquiry over the effectiveness of the medicine. Similarly, a study in Ethiopia on knowledge and practice of HTN among hypertensive patients by Asmelash et al. (2020) discovered that knowledge does not guarantee preventive practice like medication adherence among respondents. It is in line with the result of this study, where there is no significant association between the highest education level and pharmacological treatment satisfaction.

From the aspect of employment status, there was enough evidence ($p = 0.002$) for the researcher to conclude that the unemployed respondents averagely had a greater level of satisfaction with their pharmacological treatment (59.93 ± 6.272) as compared to those employed (55.91 ± 6.974). However, no significant differences were found between the monthly household income group with pharmacological treatment satisfaction among the respondents of this study. By referring to a study regarding antihypertensive medication adherence completed by Pirasath et al. (2017), it might be due to being busy with work which interrupts the daily routine that creates a feeling of uneasiness among the employed population. While this finding contrasts with a study regarding satisfaction over medication among patients with chronic disease conducted in the United States that employment is a predictor of higher satisfaction scores for respondents with chronic disease (Robinson et al., 2022), this difference may be explained due to different setting of the study conducted.

Furthermore, this research found that there was a significant difference between side effects and pharmacological treatment satisfaction among hypertensive respondents ($p = 0.001$), where respondents who experienced side effects had a lesser score of satisfaction (52.65 ± 8.155) than those who were not (59.82 ± 5.588). This result is similar to a study regarding difficulties in medication adherence conducted in Brazil, where the side effect predicts dissatisfaction with the pharmacological treatment (Paula et al., 2016). However, this result might be because most of the respondents in this study did not suffer from the side effect of taking the medication, which creates a positive attitude towards the pharmacological treatment.

From the view of respondents in this study with other prescribed medications, respondents with other medications were significantly more satisfied (59.72 ± 6.041) than those only prescribed HTN medication (55.31 ± 7.502) with $p = 0.001$. In other words, the respondents with comorbid that on pharmacological treatment are more pleased with their antihypertensive medications. It might be because the respondents are already familiar with the medication, with an average of 8.59 ± 9.0814 years of taking their antihypertensive medications, with more than half of the respondents experiencing no side effects, with monotherapy that possesses no effect over the level of satisfaction. Nevertheless, this finding is a contrast to a study on medication burden and complexity in the United States, where respondents with chronic diseases and comorbidity commonly have complex medication regimens that give rise to the side effect through medication interactions that lead to dissatisfaction over the effectiveness of the medicine (Boye et al., 2020).

5.5 Association between Sociodemographic Characteristics and Antihypertensive Medication Adherence among Hypertensive Patients

As referred to in this study's result, age was significantly positively correlated to antihypertensive medication adherence, and age was found to be significantly positively correlated to antihypertensive medication adherence ($r = 0.390$, $p = 0.001$) with no significant difference between gender, and race, with antihypertensive medication adherence. It is in line with a systematic literature review on medication adherence in patients with chronic disease, where the older population tends to have greater severity of illness, which increases their awareness about their health that promotes adherence (Krueger et al., 2015). According to Rupprecht et al. (2021), in their research paper on ageing-related fears, the older population would also have an increased fear of ageing-related diseases and the fear of death, which creates trust in medicine in managing their health status. However, the aged population may also have difficulty remembering to take their medications on time, which contributed to unintentional medication nonadherence, as concluded by Smaje et al. (2018) in a study on medication adherence among older adults.

Besides that, the duration of antihypertensive medication taking significantly positively correlated to antihypertensive medication adherence ($r = 0.431$, $p = 0.001$). This result contrasts with a systematic review of medication adherence, where disease-related factors, including the duration of medication-taking behaviour, showed no impact on adherence (Gast & Mathes, 2019). However, similar studies from BAdawy et al. (2020); Thorneloe et al. (2018) found that habit strength is strongly related to

medication adherence, which occurs automatically as the daily behaviours become habitual, such as taking the medication at the same time every day that prevents unintentional nonadherence through forgetfulness (Phillips et al., 2021). A strong habit minimizes the need for family support (Nazeri et al., 2022). It then contributes to the result of this study with no significant difference ($p > 0.05$) between marital status, living arrangement, presence of significant supportive others, total type and the daily number of antihypertensive medications to antihypertensive medication adherence.

Furthermore, the knowledge of HTN showed a significant positive correlation with antihypertensive medication adherence ($r = 0.189$, $p = 0.047$). This finding concurs with a study on knowledge and antihypertensive medication adherence conducted in Poland, where patients' knowledge of HTN is a significant factor in preventing medication nonadherence (Jankowska-Polańska et al., 2016). In contrast, a similar study in Sri Lanka discovered that respondents with good knowledge about HTN do not represent that they will be more aware of their health status or better adherence (Pirasath et al., 2017). The respondents even misconceive that their BP is adequately controlled in their study.

Not only that, but the highest education level in this study was also found to be significantly related to antihypertensive medication adherence ($p = 0.028$), where respondents with no formal education had the poorest score for antihypertensive medication adherence (36.60 ± 2.702) as compared to those with primary school (42.95 ± 6.117), secondary school (40.60 ± 5.430), and tertiary education (38.84 ± 5.888). This result is similar to the research on the effect of patient education on

medication adherence conducted in Thailand (Taibanguay et al., 2019) and China (Sun et al., 2022), where education significantly improves adherence, and the population with elementary school education and below shows poor compliance with antihypertensive medications. However, Liu et al. (2011) have contrary findings from their study on educational credentials and HTN, where years of schooling might not be directly related to the level of knowledge regarding HTN that promote antihypertensive medication adherence.

In terms of employment status, this research discovered that it had a significant relationship with antihypertensive medication adherence ($p = 0.006$), where unemployed respondents adhered more (41.39 ± 6.015) than employed (38.30 ± 5.047). Kearney et al. (2016) suggest that the job strains among the employed respondents contributed to less adherence to their medication regimen. However, loss of employment may also reduce medication adherence due to subsequent loss of insurance and income, as Nguyen et al. (2022) found in a paper on the effect of job loss on health. While it might not apply to the result of this study as the monthly household income group was not significantly related to antihypertensive medication adherence, thought group T20 with a monthly income of more than RM10,960 had the highest score for adherence (41.42 ± 4.316) than B40 with income less than RM4,850 (40.88 ± 6.230), and M40 with income between RM 4,850 to RM10,959 (38.78 ± 5.461).

Furthermore, the findings of this study showed that the absence of side effects made the respondents score significantly better for adherence (40.82 ± 5.920) than those with side effects (37.65 ± 4.792), $p = 0.020$. It is in line with the studies

conducted by Tan (2020); DiBonaventura et al. (2012) regarding medication adherence, which found that side effects significantly reduced the likelihood of adherence. However, another study on antihypertensive medication adherence by Tedla and Bautista (2016) found that only severe side effects that affect daily activities, such as excessive urination and a decrease in sexual drive, will significantly reduce adherence.

Apart from the points mentioned above, the researcher also found that the hypertensive respondents of this research with only antihypertensive medication significantly adhered poorer (39.55 ± 5.628) than those with other medications (42.15 ± 6.136) with $p = 0.046$. It is in contrast to systematic review and meta-analysis on medication nonadherence, where hypertensive respondents with comorbidities lead to nonadherence (Abegaz et al., 2017) due to the complexity of drug regimens (Ajayi et al., 2018). Nevertheless, Zhang et al. (2020), who completed a study regarding comorbidities and HTN, discovered that hypertensive respondents with comorbidity may have increased knowledge of multiple diseases, thus indirectly improving their health literacy which promotes medication adherence.

5.6 Association between Pharmacological Treatment Satisfaction and Antihypertensive Medication Adherence among Hypertensive Patients

As mentioned in the result section, there was a moderate and statistically positive correlation between pharmacological treatment satisfaction and antihypertensive medication adherence ($r = 0.421$, $n = 111$, $p = 0.001$). This result is similar to several studies conducted in Indonesia (Rusli et al., 2021), Lebanon (Jneid et al., 2018; Saarti et al., 2016), Nigeria (Ajayi et al., 2018; Iloh & Amadi, 2017; Oluwole et al., 2019), and Palestine (Zyoud et al., 2013). Besides that, pharmacological treatment satisfaction is also a predictor of antihypertensive medication adherence (Saarti et al., 2016).

By looking into each of the aspects of pharmacological treatment satisfaction in this study, the confidence aspect was proved to be the strongest predictor for antihypertensive medication adherence, where an increase in score of the pharmacological treatment satisfaction in the confidence aspect for one will increase the prediction of the score of antihypertensive medication adherence for 0.268 ($t = 2.531$, $p = 0.013$). The study result concurs with research on self-care confidence and adherence conducted by Hammash et al. (2017), where they found that confidence greatly maximizes patients' adherence to their treatment. Sweileh et al. (2014) suggested in their paper on beliefs about medicines on medication adherence that confidence comes from solid beliefs in the necessity of taking medications with high knowledge, while firm belief over the medicines as harmful and concerns about the side effect of the medications will suppress the confidence, which makes the

respondents more likely to be nonadherent. However, based on a systematic review of influencing factors for medication adherence by Gast and Mathes (2019), symptomatic respondents are more adherence than asymptomatic respondents. Although most of the respondents in this study did not feel any changes after starting their medication, they primarily have good knowledge of HTN and experienced no side effects. Hence it might then make them feel confident about adhering to antihypertensive medications.

From the aspect of convenience, the researcher discovered that convenience is directly associated with antihypertensive medication adherence, where an increase in score of the pharmacological treatment satisfaction in the convenience aspect for one will then increase the prediction of the score of antihypertensive medication adherence to 0.237 ($t = 2.138$, $p = 0.035$). This finding is in line with a study conducted by Alkatheri et al. (2016) on medication adherence and treatment satisfaction, where an increase in satisfaction score in the convenience aspect will increase the likelihood of adherence. According to an overview of secondary literature on the importance of convenience for patient adherence to drug treatments completed by Vinther et al. (2015), the convenience that patient-perceived is related to the number of HTN pills, types of antihypertensive medications and frequency. Thus, it could be why the respondents of this study felt at ease to keep adhering to their antihypertensive medications, as most of the respondents had monotherapy with almost 10 years of experience in taking HTN medications.

For the aspect of side effects, it was not significantly related to antihypertensive medication adherence ($t = 0.652, p = 0.516$). This finding is similar to a study on the relationship of treatment satisfaction to medication adherence among hypertensive patients in Palestine (Zyoud et al., 2013), where there is no significant difference in the mean scores in the side effects ($p > 0.05$) domain among patients with different levels of adherence. Nevertheless, a study on the side effect of antihypertensive medication and adherence completed by Tedla and Bautista (2016) concluded that side effects from antihypertensive medications are associated with hypertensive patients' adherence, which is associated with dissatisfaction with the pharmacological treatment that contributes to poorer medication adherence. While it might not apply in this study, as predominant of the respondents experienced no side effects, more than half of the respondents were still not adhering.

Not only that, but the effectiveness was also found to be statistically insignificant in predicting antihypertensive medication adherence ($t = -0.033, p = 0.974$). This result is similar to a study on adverse drug events and treatment satisfaction on patient adherence with antihypertensive medication by Berhe et al. (2017), where the effectiveness of HTN medicine was not associated with adherence due to the asymptomatic nature of HTN. Thus, it then explains the finding of this study as the majority of the respondents are asymptomatic with no perceived changes before and after taking the antihypertensive medication. In a study on the reasons for nonadherence, Lee et al. (2016) concluded that a low perceived need for treatment is one of the predictors of the respondents' choice to not adhere to their medication. However, research regarding treatment satisfaction and effectiveness facilitators among patients with chronic health conditions conducted by Volpicelli Leonard et al.

(2020) found that there is an improved adherence in the patient with the perception of medication as effective in controlling their condition. Yet, they did not manage to figure out how patients perceive effectiveness.



CHAPTER 6

LIMITATION AND RECOMMENDATION

This chapter discusses the limitation of this study and further recommendations for current nursing education, practice, and research.

6.1 Limitation

When looking back on this study, a few limitations need to be acknowledged. First, this study is a cross-sectional study conducted within a short period that only managed to generate causal hypotheses but not actual causality between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients (Jacob & Ganguli, 2016). Besides that, due to unexpected events that arose during the ethical application, the researcher has no choice but to change the study site to HPUPM, a relatively new hospital but not a tertiary referral hospital. It then causes a reduction in sample size that makes it questionable for the data to be said to represent the Selangor community or even other states of Malaysia (Edgar & Manz, 2017). Furthermore, due to the limited time available for data collection, the researcher was forced to use a convenient sampling method instead of simple random sampling. This non-probability sampling method cannot generalize the

result that expresses the target population (Tipton et al., 2017). Not to say that the response rate of this study was only 56.9% of the targeted sample size.

Apart from that, there is a lack of related previous studies in Malaysia, especially with a well-constructed questionnaire that can be referred to or implied in this study to get a more reliable result among Malaysians. Although a modified questionnaire with an acceptable reliability result was used, it still possesses response biases with the Likert scale of self-reporting data (Smith, 2014). The biases include the possibility of over-reporting and under-reporting satisfaction, dissatisfaction, good adherence, and poor adherence to pharmacological treatment and antihypertensive medications among hypertensive respondents.

6.2 Recommendation

6.2.1 Nursing Education

From the aspect of nursing education, the nursing curriculum can have revised teaching guidelines with a separate subject on pharmacology that contains a subtopic that focuses on common NCDs, especially HTN and hypertensive medications. It is to ensure the nurses have enough knowledge to deliver sufficient and correct information on this common problem to the public. Other than focusing on the biological interaction of the medicine, it is also necessary to have a subtopic regarding medication adherence. It is to help the nurses know the patients' physical, social, and psychological aspects regarding adhering to the prescribed medications. With the

recommendation, it is believed to bring up knowledgeable nurses who can foresee the possible problems hypertensive patients face in taking HTN and then plan appropriately to prevent the common problem from happening. For example, it is predictable for an older hypertensive patient to have unintentional medication nonadherence due to forgetfulness. Thus it will be helpful to get the involvement of family members in the treatment plan from the beginning.

6.2.2 Nursing Practice

In terms of nursing practice, nurses should strengthen their soft skills to provide effective health education to hypertensive patients. Besides that, more comprehensive health education materials should be prepared based on the patient's needs. For instance, most respondents are unsure or wrongly perceive HTN as a curable disease in this study. Thus, healthcare providers can emphasize that HTN is an incurable disease when providing health education to inpatient or outpatient hypertensive individuals. Besides that, periodically reassessing the pharmacological treatment satisfaction and antihypertensive medication adherence, such as during every follow-up with the hypertensive patients, would be useful in discovering the underlying factors that might impede the hypertensive patients from adhering to their antihypertensive medications. Through the assessment data, further interventions can be planned and implemented to enhance adherence by ensuring satisfaction over effectiveness, side effect, convenience, or confidence toward HTN medications that the hypertensive patient lacks. For instance, encourage self-monitoring BP at home, provide ways to overcome side effects, provide a pill organizer box, and give health education.

6.2.3 Nursing Research

For future researchers with a similar topic of interest, it is recommended to involve more than one hospital from the same or even different state, with a bigger sample size to recruit respondents through a probability sampling method, like a simple random sampling method to generate a generalized finding that enough to represent whole Selangor or Malaysia population. Besides that, a longitudinal randomized control trial (RCT) or quasi-experimental study can be applied to identify the causal relationship between pharmacological treatment satisfaction and antihypertensive medication adherence. At the same time, treatment satisfaction could not only be limited to pharmacological but also non-pharmacological treatment, like dietary modifications, and also health delivery systems, such as patient-physician interaction, quality of service from nurses, and health care facilities (Alam et al., 2018). In addition, further additional research into the factors that predict medication adherence is also recommended to be carried out.

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APPENDICES

Appendix A: Gantt Chart

Project Activities	2021		2022									
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Proposal Preparation												
Proposal Presentation												
Ethical Application												
Conduct a Pilot Study												
Data Collection												
Data Analysis												
Final Thesis Write Up												
Thesis Presentation												

Appendix B: Written Permission for Study Instrument



Yih Ling <yihling98@gmail.com>

Written Permission for Instrument of Final Year Project

3 messages

Yih Ling <yihling98@gmail.com>

29 December 2021 at 18:44

To: "moddassir.alam@gmail.com" <moddassir.alam@gmail.com>

Good day, Dr. Moddassir Alam,

My name is Tee Yih Ling, an undergraduate student studying for Bachelor of Nursing from Universiti Putra Malaysia (UPM), Malaysia. Currently, I am in my final year, and I am going to do a thesis with the title of "A Cross-sectional Study on the Association between Treatment Satisfaction and Medication Adherence among Hypertensive Patients in Hospital Serdang, Malaysia". I had read Dr's research article entitled "Assessing adherence and patient satisfaction with medication: Validation of TSQM in emerging markets" published through the International Journal of Pharmaceutical and Healthcare Marketing in 2018 and I found Dr's questionnaire is suitable to be used in my thesis. Therefore, I wish to ask for Dr's permission to use Dr's questionnaire in my thesis. However, I do not have the questionnaire. If Dr allows me to use Dr's questionnaire, would Dr like to send or attach me a soft copy of the questionnaire? I will surely acknowledge the owner of the questionnaire in my course of study. Your consideration is much appreciated.

Thank you, Dr.

Regards,
Tee Yih Ling
Undergraduate student,
Bachelor of Nursing,
Universiti Putra Malaysia

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Mohammad Moddassir Alam <moddassir.alam@gmail.com>

29 December 2021 at 18:55

To: Yih Ling <yihling98@gmail.com>

Dear Tee Yih Ling,

Thank you for your interest in my work.

You can use the statements in appendix 6 of my paper as the items of your questionnaire

You can also refer to the Atkinson paper for the development of the questionnaire

Feel free to contact for any assistance

Best of Luck

Dr. Md. Moddassir Alam

[Quoted text hidden]

MD MODDASSIR ALAM

Yih Ling <yihling98@gmail.com>

29 December 2021 at 20:31

To: Mohammad Moddassir Alam <moddassir.alam@gmail.com>

Dear Dr. Md. Moddassir Alam,

Thank you dr for the reply. I really appreciate your help!

Regards,
Tee Yih Ling
Undergraduate Student
Bachelor of Nursing
Universiti Putra Malaysia

Written Permission for Instrument of Final Year Project

3 messages

Yih Ling <yihling98@gmail.com>
To: hazreen@um.edu.my

2 November 2021 at 01:45

Good day, Associate Professor Dr. Hazreen bin Abdul Majid,

My name is Tee Yih Ling, an undergraduate Bachelor of Nursing student from University Putra Malaysia (UPM), Malaysia. Currently, I am in my final year and I am going to do a thesis with the title of "A Cross-sectional Study on the Association between Treatment Satisfaction and Medication Adherence among Hypertensive Patients in Hospital Serdang, Malaysia". I had read Dr's research article entitled "The 11-item Medication Adherence Reasons Scale: reliability and factorial validity among patients with hypertension in Malaysian primary healthcare settings" published through the Singapore Medical Journal in 2015 and I found that Dr's questionnaire (modified Malaysian version of the Medication Adherence Reasons Scale) is suitable to be used in my thesis. Therefore, I wish to ask for Dr's permission to use Dr's questionnaire in my thesis. However, I do not have the questionnaire. If Dr allows me to use Dr's questionnaire, would Dr like to send or attach me a soft copy of the questionnaire? I will surely acknowledge the owner of the questionnaire in my course of study. Your consideration is much appreciated.

Thank you.

Regards,
Tee Yih Ling
Undergraduate student,
Bachelor of Nursing,
University Putra Malaysia.SMJ-56-460.pdf
822KHAZREEN BIN ABDUL MAJID <hazreen@um.edu.my>
To: Yih Ling <yihling98@gmail.com>

2 November 2021 at 08:54

Hope this helps. The one that you are asking is the first section from this attachment.

(Quoted text hidden)

--

Associate Professor Dr Hazreen Abdul Majid (RD, PhD, FMDA)
Head
Centre for Population Health,
c/o Department of Social and Preventive Medicine
Faculty of Medicine, University of Malaya,
50603 Kuala Lumpur,
Malaysia
Tel: +603-7967 4757
Fax: +603-7967 4975
<https://spm.um.edu.my/>



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201808071319.pdf
1158KYih Ling <yihling98@gmail.com>
To: HAZREEN BIN ABDUL MAJID <hazreen@um.edu.my>

2 November 2021 at 14:34

Dear Associate Prof. Dr. Hazreen,

Thank you, dr. for the permission and the softcopy given. I really appreciate your help.

Regards,
Tee Yih Ling
Undergraduate student
Bachelor of Nursing
Universiti Putra Malaysia

Written Permission for Instrument of Final Year Project

3 messages

Yih Ling <yihling98@gmail.com>

To: paraidathu.thomas@taylors.edu.my

3 November 2021 at 18:07

Good day, Prof Thomas Paraidathathu.

My name is Tee Yih Ling, an undergraduate student studying for Bachelor of Nursing from University Putra Malaysia (UPM), Malaysia. Currently, I am in my final year and I am going to do a thesis with the title of "A Cross-sectional Study on the Association between Treatment Satisfaction and Medication Adherence among Hypertensive Patients in Hospital Serdang, Malaysia". I had read Prof's research article entitled "Medication adherence among hypertensive patients of primary health clinics in Malaysia" published through the Patient preference and adherence in 2012 and I found that Prof's questionnaire (new Medication Adherence Scale) is suitable to be used in my thesis. Therefore, I wish to ask for Prof's permission to use Prof's questionnaire in my thesis. However, I do not have the questionnaire. If Prof allows me to use Prof's questionnaire, would Prof like to send or attach me a soft copy of the questionnaire? I will surely acknowledge the owner of the questionnaire in my course of study. Your consideration is much appreciated.

Thank you.

Regards,
Tee Yih Ling
Undergraduate student,
Bachelor of Nursing,
University Putra Malaysia.

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P.T. Thomas <Paraidathathu.Thomas@taylors.edu.my>

To: Yih Ling <yihling98@gmail.com>

3 November 2021 at 18:07

Dear Yih Ling,

Attached the Medication Adherence scale that was used. Please cite the paper. I have also asked the co-author Dr Azuana to send you a copy and she may have done it or will also do it.

Regards,
Thomas

P T Thomas, PhD
Executive Dean and Emeritus Professor
Faculty of Health and Medical Sciences
Taylor's University

From: Yih Ling <yihling98@gmail.com>
Sent: Wednesday, November 03, 2021 5:07 PM
To: P.T. Thomas <Paraidathathu.Thomas@taylors.edu.my>
Subject: Written Permission for Instrument of Final Year Project

You don't often get email from yihling98@gmail.com. Learn why this is important

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Medication Adherence Form (2021_09_14 22:53:20 UTC).pdf
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Yih Ling <yihling98@gmail.com>

To: "P.T. Thomas" <Paraidathathu.Thomas@taylors.edu.my>

3 November 2021 at 20:53

Dear Prof. Thomas,

Thank you, prof. for the permission and the softcopy given. I will cite the paper properly and I really appreciate your help!

Regards,
Tee Yih Ling
Undergraduate Student
Bachelor of Nursing
Universiti Putra Malaysia

Appendix C: Respondent's Information Sheet and Informed Consent Form
(Malay Version)



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

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

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

1. TAJUK KAJIAN

Kaitan antara Kepuasan terhadap Rawatan Farmakologi dan Kepatuhan kepada Ubat Antihipertensif di kalangan Pesakit Hipertensi di Hospital Pengajar Universiti Putra Malaysia (HPUPM), Selangor, Malaysia.

2. PENGENALAN

Penyelidikan ini telah mendapat kelulusan Jawatankuasa Etika Penyelidikan Melibatkan Manusia Universiti Putra Malaysia (JKEUPM). Tujuan penyelidikan ini dilakukan adalah untuk menyiasat kaitan antara kepuasan terhadap rawatan farmakologi dan kepatuhan kepada ubat antihipertensif di kalangan pesakit hipertensi. Penyelidikan ini diperlukan oleh pegawai-pegawai kesihatan untuk mengetahui keperluan pesakit hipertensi dan meningkatkan tahap kepatuhan mereka kepada ubat antihipertensif dengan menimbulkan kepuasan terhadap rawatan farmakologi.

Anda telah dijemput untuk menyertai penyelidikan ini kerana anda memenuhi kriteria kajian ini yang memerlukan pengalaman anda mengenai pengambilan ubat tekanan darah tinggi. Risalah ini menjelaskan hal-hal berkenaan penyelidikan tersebut dengan lebih mendalam dan terperinci. Amat penting anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini. Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini. Jika ada sebarang kemusykilan ataupun maklumat lanjut yang anda ingin tahu, anda boleh bertanya dengan penyelidik dalam penyelidikan ini. Setelah anda berpuashati bahawa anda memahami penyelidikan ini, dan anda berminat untuk turut serta, anda dikehendaki untuk menandatangani Borang Penerangan Dan Persetujuan Responden, pada muka surat akhir risalah ini. Untuk menyertai penyelidikan ini, anda perlu memberi penyelidik anda maklumat sejarah kesihatan ataupun penyakit anda yang lalu; jika anda tidak berterusterang anda mungkin boleh menimbulkan masalah pada diri anda di kemudian hari.

Sejumlah 195 orang responden seperti anda di Klinik Perubatan Keluarga (FMC), Hospital Pengajar Universiti Putra Malaysia (HPUPM), Selangor, Malaysia akan turut serta. Penyelidikan ini akan berlangsung selama 3 bulan (1 Julai 2022 – 30 September 2022) dan tempoh pembabitan anda dianggarkan selama 10 – 15 minit.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Penyertaan anda dalam penyelidikan ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu. Anda juga mempunyai hak untuk tidak menjawab mana-mana soalan yang anda tidak mahu jawab. Anda juga boleh menarik diri daripada penyelidikan ini pada bila-bila masa. Jika anda menarik diri, segala maklumat yang telah diperolehi sebelum anda menarik diri tetap akan digunakan dalam penyelidikan ini. Jika anda tidak mahu menyertai ataupun menarik diri dari penyelidikan ini, tindakan anda tidak akan menjejaskan segala hak dan keistimewaan perkhidmatan perubatan dan kesihatan yang selayaknya anda terima.

Anda mesti menjawab kesemua soalan yang ditanyakan oleh penyelidik dan dalam borang soal selidik dengan jujur dan lengkap. Jika keadaan atau kesihatan anda berubah sepanjang penyelidikan ini, anda mesti memberitahu penyelidik.

Penyelidik boleh menamatkan penyelidikan ini ataupun menamatkan penyertaan anda dalam penyelidikan ini pada bila-bila masa sekiranya anda tidak memenuhi kriteria untuk kajian ini. Anda akan dimaklumkan jika penyelidikan ini dihentikan terlebih awal atas sebab-sebab tertentu.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Kriteria Pengecualian:

- i. Bukan warganegara Malaysia. Ia menghalang sebarang pengaruh budaya dan memastikan keputusan umum di kalangan rakyat dewasa Malaysia yang menghidap hipertensi.
- ii. Responden dengan diagnosis doktor tentang hipertensi dalam kehamilan dan dilaporkan dalam rekod pesakit.
- iii. Responden dengan diagnosis doktor tentang isu kesihatan mental yang aktif dan dilaporkan dalam rekod pesakit.
- iv. Responden yang tidak bersetuju untuk menyertai kajian ini.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

(a) KEPADA ANDA SEBAGAI PESERTA?

Maklumat yang anda berikan mengenai kepuasan dan kepatuhan anda terhadap ubat tekanan darah tinggi adalah berharga dan amat dihargai. Ia tidak memberi manfaat langsung kepada responden, tetapi ia akan mewujudkan kesedaran tentang kepentingan kepatuhan ubatan dalam kalangan responden dan pegawai-pegawai kesihatan bagi meningkatkan tahap kepuasan rawatan farmakologi bagi pesakit hipertensi. Tiada bayaran akan diberikan kepada responden kerana penyertaan ini adalah secara sukarela. Selain itu, kajian ini juga dijalankan oleh seorang pelajar sarjana muda dan ia merupakan penajaan sendiri.

(b) KEPADA PENYELIDIK?

Maklumat dan data yang diperolehi daripada kajian ini akan membolehkan penyelidik menilai hubungan antara kepuasan terhadap rawatan farmakologi dan kepatuhan kepada ubat antihipertensif dalam kalangan pesakit hipertensi di Hospital Pengajar Universiti Putra Malaysia (HPUPM), Selangor, Malaysia. Penyelidik dapat mengenal pasti tahap kepuasan terhadap rawatan farmakologi dan kepatuhan kepada ubat antihipertensif semasa dalam kalangan pesakit hipertensi. Selain itu, dapatan kajian boleh dijadikan

sebagai cadangan untuk sebarang penambahbaikan supaya pegawai-pegawai kesihatan dapat mengetahui keperluan pesakit hipertensi dan meningkatkan tahap kepatuhan ubatan mereka dengan menimbulkan kepuasan pesakit terhadap rawatan farmakologi.

6. ADAKAH IA BERISIKO?

Terdapat risiko dan kesan sampingan yang minimum apabila anda mengambil bahagian dalam kajian ini.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Ya. Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu. Pihak- pihak tertentu seperti penyelidik, penyelia, juruaudit dan jurupantau yang terlatih, berkuasa kerajaan atau undang-undang, boleh memeriksa dan membuat salinan laporan perubatan anda jika berkenaan dan diperlukan.

Anda juga tidak akan dimaklumkan tentang keputusan kajian. Walau bagaimanapun, sekiranya kajian ini diterbitkan dalam bentuk jurnal, pautan artikel akan dikongsi di lokasi penyertaan iaitu Hospital Pengajar Universiti Putra Malaysia (HPUPM). Sebaliknya, sekiranya kajian diterbitkan dalam bentuk tesis bertulis, abstrak kajian ini akan dikongsi bersama Hospital Pengajar Universiti Putra Malaysia (HPUPM) untuk memaklumkan kepada peserta berkenaan keputusannya. Sesi perkongsian melalui pembentangan atau persidangan di lokasi yang mengambil bahagian akan dirancang jika diperlukan. Tidak kira bagaimana kajian itu akan diterbitkan atau dibentangkan, maklumat peribadi anda tidak akan didedahkan.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Anda boleh menghubungi penyelidik utama (penyelia) untuk penyelidikan ini, Dr. Norafisyah Binti Makhdzir pada sambungan telefon +60397692583 atau emel: norafisyah@upm.edu.my atau penyelidik bersama (pelajar) untuk penyelidikan ini, Tee Yih Ling pada sambungan telefon +60167416952 atau emel: yihling98@gmail.com sekiranya anda mempunyai sebarang pertanyaan mengenai penyelidikan ini atau jika anda mengesyaki anda mengalami kecederaan yang terhasil daripada penyelidikan ini dan anda mahukan maklumat tentang rawatannya.

Jika anda mempunyai sebarang pertanyaan berkaitan dengan hak-hak anda sebagai peserta dalam penyelidikan ini, sila hubungi: Jawatankuasa Etika Penyelidikan Melibatkan Manusia Universiti Putra Malaysia (JKEUPM), melalui talian telefon +60397691605.

9. PERSETUJUAN

Saya.....No Kad
Pengenalan.....beralamat.....
.....
dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini 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 melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan
(Responden)

Tandatangan
(Saksi)

Tarikh:.....

Nama:.....

No. K/P:

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

Tarikh

Tandatangan
(Penyelidik)

Appendix D: Respondent's Information Sheet and Informed Consent Form
(English Version)



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

**FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED
CONSENT FORM**

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

1. STUDY TITLE :

The Association between Pharmacological Treatment Satisfaction and Antihypertensive Medication Adherence among Hypertensive Patients in University Putra Malaysia Teaching Hospital (HPUPM), Selangor, Malaysia

2. INTRODUCTION:

This study has been approved by the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (JKEUPM). The purpose of this study is to determine the relationship between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients. This research is necessary for healthcare providers to know the needs of hypertensive patients and improve their level of antihypertensive medication adherence by posing patient satisfaction towards pharmacological treatment.

You are invited to participate in a research study because you have criteria for this study that requires your experience regarding antihypertensive medications. The details of the research are described in this document. It is important that you understand why the research is being done and what it will involve. Please take your time to read through and consider this information carefully before you decide if you are willing to participate. Ask the investigator if anything is unclear or if you like more information. After you are properly satisfied that you understand this study and that you wish to participate, you must sign this informed consent form. To participate in this study, you may be required to provide your investigator with information on your health history; you may harm yourself if you are not truthful with the information provided.

A total of 195 subjects like you in the Family Medicine Clinic (FMC), University Putra Malaysia Teaching Hospital (HPUPM), Selangor, Malaysia will be participating in this study. The whole study will last about 3 months (1st July 2022 – 30th September 2022) and your participation will be about 10 – 15 minutes.

3. WHAT WILL YOU HAVE TO DO?

Your participation in this study is voluntary. You do not have to be in this study if you do not want to. You may also refuse to answer any questions you do not want to answer. If you volunteer to be in this study, you may withdraw from it at any time. If you withdraw, any data collected from you up to your withdrawal will still

be used for the study. Your refusal to participate or withdraw will not affect any medical or health benefits to which you are otherwise entitled.

You must answer all of the questions asked by the investigator and in the questionnaire honestly and completely. If your condition or circumstances change during the study, you must tell the researcher.

The investigator can terminate this study and your participation anytime if not fulfil the inclusion criteria of participants. If this study is to be ended early, you will be informed immediately.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

Exclusion Criteria:

- i. Non-Malaysian. It prevents any cultural influences and ensures a generalised result among adult hypertensive Malaysians.
- ii. Respondents with a physician diagnosis of gestational HTN and reported in the patient's record.
- iii. Respondents with a physician diagnosis of active mental health issues reported in the patient's record.
- iv. Respondents that are not willing to participate in this study.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

The information that you provided regarding your pharmacological treatment satisfaction and antihypertensive medication adherence is valuable and much appreciated. It has no direct benefits to the respondents, but it will create awareness about the importance of antihypertensive medication adherence among respondents and healthcare providers to improve the level of pharmacological treatment satisfaction for hypertensive patients. There will be no payment given to the respondents as this participation is voluntary. Besides that, this study is also conducted by an undergraduate student and it is self-sponsored.

(b) TO THE INVESTIGATOR?

The information and data obtained from this study will allow the investigator to assess the association between pharmacological treatment satisfaction and antihypertensive medication adherence among hypertensive patients at University Putra Malaysia Teaching Hospital (HPUPM), Selangor, Malaysia. The investigator can identify the current antihypertensive medication adherence and the level of treatment satisfaction with antihypertensive medications among hypertensive patients. Besides that, the findings from this study can suggest improvements to be done so that healthcare providers can know the needs of hypertensive patients and improve their level of antihypertensive medication adherence by posing patient satisfaction towards pharmacologic treatment.

6. WHAT ARE THE POSSIBLE RISKS?

There are minimal risks and side effects when you participate in this study.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

Yes. All your information obtained in this study will be kept and handled confidentially, following applicable laws and/or regulations. When publishing or presenting the study results, your identity will not be revealed without your expressed consent. Individuals involved in this study include the investigator, supervisor, qualified monitors and auditors, and governmental or regulatory authorities who may inspect and copy your medical records, where appropriate and necessary.

You will also not be informed of the study results. However, if this study is published in journal form, the article link will be shared at the participating location which is University Putra Malaysia Teaching Hospital (HPUPM). On the other hand, if the study is published in the form of a written thesis, the abstract of this study will be shared with University Putra Malaysia Teaching Hospital (HPUPM), to notify the participants regarding the result. A sharing session through a presentation or conference at the participating location will be planned if it is needed. No matter how the study will be published or presented, your personal information will not be revealed.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any questions about the study or if you think you have a study-related injury and you want information about treatment, please contact the principal investigator (supervisor), Dr. Norafisyah Binti Makhdzir at telephone number +60397692583 or through email: norafisyah@upm.edu.my or co-investigator (student), Tee Yih Ling at telephone number +60167416952 or through email: yihling98@gmail.com.

If you have any questions about your rights as a participant in this study, please contact the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia (JKEUPM), at telephone number +60397691605.

9. CONSENT

I Identity Card No.
address.....
.....hereby voluntarily agree to
take part in the research stated above *(clinical /drug trial/video recording/ focus
group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology,
possible adverse

effects and complications (as written in the Respondent's Information Sheet). I
understand that I have the right to withdraw from this research at any time without
giving any reason whatsoever. I also understand that this study is confidential and all
information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research.

I agree/do not agree that the images/photos/video recordings/voice recordings related
to me be used in any form of publication or presentation (if applicable)

* 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 research.

Date

Signature

(Researcher)

Appendix E: Questionnaire (Malay & English Version)



**FACULTY OF MEDICINE AND HEALTH SCIENCES
DEPARTMENT OF NURSING
BACHELOR OF NURSING**

BORANG SOAL SELIDIK (*QUESTIONNAIRE*)

TAJUK KAJIAN (*RESEARCH TITLE*):

**KAITAN ANTARA KEPUASAN TERHADAP RAWATAN FARMAKOLOGI
DAN KEPATUHAN KEPADA UBAT ANTIHIPERTENSIF DI KALANGAN
PESAKIT HIPERTENSI DI HOSPITAL PENGAJAR UNIVERSITI PUTRA
MALAYSIA (HPUPM), SELANGOR, MALAYSIA**

***(THE ASSOCIATION BETWEEN PHARMACOLOGICAL TREATMENT
SATISFACTION AND ANTIHYPERTENSIVE MEDICATION ADHERENCE
AMONG HYPERTENSIVE PATIENTS IN UNIVERSITY PUTRA MALAYSIA
TEACHING HOSPITAL (HPUPM), SELANGOR, MALAYSIA)***

JKEUPM ID: JKEUPM-2022-371

PENYELIDIK (*RESEARCHER*) : TEE YIH LING (196852)

PENYELIA (*SUPERVISOR*) : DR. NORAFISYAH BINTI MAKHDZIR

ARAHAN (*INSTRUCTION*):

Kajian ini dijalankan untuk tujuan akademik. Semua maklumat akan disimpan secara peribadi dan sulit. Terima kasih atas kerjasama anda dalam menjawab soal selidik ini.
(This study is conducted for academic purposes. All information will be kept private and confidential. Thank you for your cooperation in answering this questionnaire.)

5. Status Perkahwinan
(*Marital Status*) : ☐ Bujang (*Single*)
☐ Berkahwin (*Married*)
☐ Kematian Pasangan (*Widowed*)
☐ Bercerai (*Divorced*)
6. Anda tinggal bersama sekarang?
Anda boleh tanda lebih dari satu.
(*Who do you currently live with?*
You may choose more than one.) : ☐ Ibu Bapa (*Parents*)
☐ Adik-beradik (*Siblings*)
☐ Pasangan (*Spouse or Partner*)
☐ Anak (*Children*)
☐ Kawan (*Friends*)
☐ Sendiri (*Myself only*)
☐ Lain-lain (*Others*)
Nyatakan (*Specify*):

7. Status pekerjaan
(*Employment status*) : ☐ Berkerja sendiri (*Self-employed*)
☐ Kakitangan kerajaan (*Government servant*)
☐ Pekerja swasta (*Private sector*)
☐ Tidak berkerja (*Unemployed*)
8. Kumpulan pendapatan isi rumah
kasar bulanan
(*Monthly household income group*) : ☐ B40 (< RM4,850)
☐ M40 (RM 4,850 - RM10,959)
☐ T20 ($\geq$ RM10,960)

II. Pengalaman dalam Pengambilan Ubat Hipertensi (Experience in Taking Hypertension Medications)

Arahan (Instruction):

Sila isi atau tandakan (✓) pada bahagian yang disediakan.
(Please fill in or tick (✓) in the space provided)

1. Berapa lamakah anda mula mengambil ubat : _____ Tahun (Years)
hipertensi?
(How long have you started taking the
hypertension medications?)
2. Berapakah jenis ubat hipertensi yang anda : _____ Jenis (Types)
ambil?
(How many types of hypertension medications
do you take?)
3. Berapakah jumlah pil hipertensi yang anda : _____ Biji sehari
ambil dalam sehari?
(What is the total number of hypertension
pills you take in a day?)
4. Adakah anda mengalami kesan sampingan : ☐ Ya (Yes)
selepas pengambilan ubat hipertensi?
(Do you think you experience side effects after
taking hypertension medications?) ☐ Tidak (No)
☐ Tidak pasti (Not sure)

5. **Jika ya**, apakah kesan sampingan yang anda alami? Anda boleh tanda lebih dari satu.
Jika tidak, sila tandakan 'Tidak berkaitan'.
(If yes, what are the side effect you experience? You may choose more than one.
If no, please choose 'Not related'.)
- : ☐ Pening kepala (*Dizziness*)
☐ Sakit kepala (*Headache*)
☐ Keletihan (*Fatigue*)
☐ Kerap kencing (*Increased urination*)
☐ Tidak berkaitan (*Not related*)
☐ Lain-lain (*Others*)
Nyatakan (*Specify*):

6. Adakah anda dipreskripsikan dengan ubat-ubatan yang lain selain daripada ubat hipertensi?
Anda boleh tanda lebih dari satu.
Jika tidak, sila tandakan 'Tidak'.
(Are you prescribed with other medications other than hypertension medication? You may choose more than one.
If no, please choose 'No'.)
- : ☐ Ubat Kencing Manis (*Diabetes medication*)
☐ Ubat Kolesterol Tinggi (*Hypercholesterolemia medication*)
☐ Tidak (*No*)
☐ Lain-lain (*Others*)
Nyatakan (*Specify*):

7. Siapakah yang mengingatkan anda untuk mengambil ubat darah tinggi pada waktu yang ditetapkan? Anda boleh tanda lebih dari satu.
(Who will remind you to take high blood pressure medication on time? You may choose more than one.)
- : ☐ Diri sendiri (*Myself*)
☐ Pasangan (*Spouse or Partner*)
☐ Anak (*Children*)
☐ Lain-lain (*Others*)
Nyatakan (*Specify*):

III. Pengetahuan mengenai Penyakit Hipertensi (*Knowledge about Hypertension*)

Arahan (*Instruction*):

Sila baca soalan dibawah and tandakan (✓) jawapan anda pada ruangan yang disediakan.

(Please read the questions below and tick (✓) your answer in the space provided.)

Soalan (<i>Question</i>)	Betul (<i>True</i>)	Salah (<i>False</i>)	Tidak pasti (<i>Not sure</i>)
1. Bacaan normal tekanan darah adalah kurang daripada 120/80 mmHg. (<i>A normal blood pressure level is less than 120/80 mmHg.</i>)			
2. Bacaan tekanan darah tinggi dianggap sebagai 140/90mmHg atau lebih tinggi. (<i>High blood pressure level is considered 140/90mmHg or higher.</i>)			
3. Tekanan darah tinggi yang tidak terkawal tidak akan menyebabkan strok, serangan jantung, kegagalan jantung atau kegagalan buah pinggang. (<i>Uncontrolled high blood pressure will not lead to stroke, heart attack, heart failure or kidney failure.</i>)			
4. Ubat sudah cukup untuk mengawal tekanan darah saya, saya tidak perlu mempunyai gaya hidup yang sihat. (<i>Medication is enough to control my blood pressure, and I do not need to have a healthy lifestyle.</i>)			
5. Hipertensi tidak dapat disembuhkan. (<i>Hypertension has no cure.</i>)			

**BAHAGIAN B: TAHAP KEPUASAN RAWATAN TERHADAP UBAT
DARAH TINGGI**
**(PART B: TREATMENT SATISFACTION TOWARDS ANTIHYPERTENSIVE
MEDICATIONS)**

Arahan (Instruction):

Sila baca pernyataan dibawah dan tandakan (✓) pada bahagian yang disediakan berdasarkan sejauh manakah anda bersetuju dengan pernyataan berikut.

(Please read the following statements and tick (✓) in the box provided based on to what extent you agree with the following statements.)

No.	Pernyataan (Statement)	Sangat Tidak Setuju (Strongly Disagree)	Tidak Setuju (Disagree)	Neutral	Setuju (Agree)	Sangat Setuju (Strongly Agree)
Keberkesanan (Effectiveness)						
1.	Ubat darah tinggi berkesan dalam mengawal tekanan darah saya. <i>(Hypertension medication is effective in controlling my blood pressure.)</i>					
2.	Saya berasa puas hati dengan jumlah masa yang diambil oleh ubat untuk berfungsi. <i>(I feel satisfied with the amount of time the medication takes to work.)</i>					
3.	Ubat hipertensi berkesan dalam mencegah komplikasi penyakit hipertensi (cth., serangan jantung, strok). <i>(Hypertension medication effectively prevents hypertension-related complications (e.g., heart attack, stroke).)</i>					
4.	Saya tidak berasa sakit walaupun saya terlupa mengambil ubat. <i>(I do not feel sick even if I forget to take the medications.)</i>					

No.	Pernyataan (Statement)	Sangat Tidak Setuju (Strongly Disagree)	Tidak Setuju (Disagree)	Neutral	Setuju (Agree)	Sangat Setuju (Strongly Agree)
Kesan Sampingan (Side Effect)						
5.	Kesan sampingan ubat darah tinggi menjejaskan aktiviti harian saya. <i>(Side effect of hypertension medication affects my daily activities.)</i>					
6.	Saya berpendapat kesan sampingan ubat darah tinggi akan memburukkan lagi kesihatan saya. <i>(I think the side effects of hypertension medication will worsen my health.)</i>					
7.	Saya mengurangkan dos ubat saya kerana saya ingin mengurangkan kesan sampingan ubat tersebut. <i>(I reduced my medication dose because I wish to reduce the side effect.)</i>					
8.	Saya tidak boleh tahan dengan kesan sampingan ubat darah tinggi sehingga saya ingin berhenti mengambilnya. <i>(I cannot bear the side effect of hypertension medications until I wish to stop taking them.)</i>					

No.	Pernyataan (Statement)	Sangat Tidak Setuju (Strongly Disagree)	Tidak Setuju (Disagree)	Neutral	Setuju (Agree)	Sangat Setuju (Strongly Agree)
Keselesaan (Convenience)						
9.	Saya berasa terbeban untuk mengambil ubat hipertensi sepanjang hayat saya. <i>(I feel burdened to take hypertension medications for the rest of my life.)</i>					
10.	Saya meraskan ianya mudah untuk mengambil ubat pada masa yang sama setiap hari. <i>(I find it easy to take the medications at the same time every day.)</i>					
11.	Saya berasa sukar untuk mengambil ubat-ubatan yang banyak dalam masa sehari. <i>(I feel trouble taking many medications in a day.)</i>					
12.	Jadual ubat saya mudah diingati. <i>(My medication schedule is easy to remember.)</i>					

No.	Pernyataan (Statement)	Sangat Tidak Setuju (Strongly Disagree)	Tidak Setuju (Disagree)	Neutral	Setuju (Agree)	Sangat Setuju (Strongly Agree)
Keyakinan (Confidence)						
13.	Saya percaya bahawa pengambilan ubat hipertensi adalah baik untuk kesihatan saya. <i>(I believe that taking hypertension medications is good for my health.)</i>					
14.	Saya akan terus mengambil ubat-ubatan ini walaupun saya tidak merasakan sebarang perubahan dalam status kesihatan saya. <i>(I will continue to take these medications even if I do not feel any changes in my health status.)</i>					
15.	Saya tidak akan meneruskan pengambilan ubat-ubatan ini jika saya mengalami sebarang kesan sampingan. <i>(I will not continue to take these medications if I experience any side effects.)</i>					
16.	Saya akan mengikut jadual pengambilan ubat jika saya rasa mudah untuk diikuti. <i>(I will follow the medication schedule if I find it easy to follow.)</i>					

BAHAGIAN C: KEPATUHAN KEPADA UBAT DARAH TINGGI
(PART C: ANTIHYPERTENSIVE MEDICATION ADHERENCE)

Arahan (Instruction):

Sila baca pernyataan dibawah dan tandakan (✓) pada bahagian yang disediakan berdasarkan sejauh manakah anda bersetuju dengan pernyataan berikut.

(Please read the following statements and tick (✓) in the box provided based on to what extent you agree with the following statements.)

No.	Pernyataan (Statement)	Sangat Tidak Setuju (Strongly Disagree)	Tidak Setuju (Disagree)	Neutral	Setuju (Agree)	Sangat Setuju (Strongly Agree)
1.	Saya tidak mengikut jadual pengambilan ubat seperti yang ditetapkan oleh doktor 1 - 3 kali sebulan. <i>(I do not follow the medication schedule prescribed by the doctor 1 - 3 times a month.)</i>					
2.	Saya tidak mengikut jadual pengambilan ubat seperti yang ditetapkan oleh doktor 4 - 6 kali sebulan. <i>(I do not follow the medication schedule prescribed by the doctor 4 - 6 times a month.)</i>					
3.	Saya tidak mengikut jadual pengambilan ubat seperti yang ditetapkan oleh doktor 7 - 9 kali sebulan. <i>(I do not follow the medication schedule prescribed by the doctor 7 - 9 times a month.)</i>					
4.	Saya tidak mengikut jadual pengambilan ubat seperti yang ditetapkan oleh doktor lebih daripada 9 kali sebulan. <i>(I do not follow the medication schedule prescribed by the doctor more than 9 times a month.)</i>					
5.	Saya tidak pernah terlepas mengambil ubat tepat pada masanya walaupun saya sibuk. <i>(I never missed taking my medications on time, even busy.)</i>					

No.	Pernyataan (Statement)	Sangat Tidak Setuju (Strongly Disagree)	Tidak Setuju (Disagree)	Neutral	Setuju (Agree)	Sangat Setuju (Strongly Agree)
6.	Saya tidak pernah mengurangkan dos ubat tanpa arahan daripada doktor. <i>(I never reduced the medication dose without consulting the doctor.)</i>					
7.	Saya adakalanya, saya sengaja tidak pengambilan ubat tanpa mengikut jadual pengambilan harian yang disarankan oleh doctor. <i>(Sometimes, I purposely skipped my medication without following the medication schedule prescribed by the doctor.)</i>					
8.	Saya berhenti mengambil ubat apabila saya rasa tekanan darah saya masih terkawal. <i>(I stop taking the medication when I think my blood pressure is under control.)</i>					
9.	Saya merasa sukar untuk mematuhi jadual pengambilan ubat antihipertensi kerana saya mengambil banyak jenis ubat. <i>(I find it hard to adhere to the antihypertensive medication schedule as I take many medications.)</i>					
10.	Saya keliru dengan regimen ubat saya. <i>(I am confused with my medication regimen.)</i>					

Tamat. Terima kasih atas kerjasama anda.

(The end. Thank you for your cooperation.)

**ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS
(JKEUPM)
UNIVERSITI PUTRA MALAYSIA**

Research title	: The Association Between Pharmacological Treatment Satisfaction and Antihypertensive Medication Adherence Among Hypertensive Patients in University Putra Malaysia Teaching Hospital (HPUPM), Selangor, Malaysia.
Study Site	: HPUPM, UPM.
JKEUPM Ref No.	: JKEUPM-2022-371
Researcher	: Tee Yih Ling
Supervisor	: Ms. Norafisyah Binti Makhdzir

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 23/05/2022
2. Respondent's Information Sheet /Consent (English), Version 1 dated 23/05/2022
3. Respondent's Information Sheet /Consent (Malay), Version 1 dated 23/05/2022
4. Proposal (English), Version 2 dated 16/06/2022
5. Questionnaire / Interviews (English), Version 1 dated 23/05/2022
6. Curriculum Vitae of:
 - a. Ms. Norafisyah Binti Makhdzir

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

- ☒ Approved
- ☒ **Permission MUST BE OBTAINED from the respective hospitals/ institutions before conducting the research**
- ☐ Disapproved

Please note that the approval is **VALID UNTIL 22 JULY 2023**

Researchers should comply with the following:

- I. Complete a Study Final Report upon study completion (Form 3.2).
- II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.
- III. Applicable for Clinical Trial Studies and Clinical interventional Studies only: Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse Reaction (SUSARs) and Protocol Deviation/ Violation at all JKEUPM approved sites to JKEUPM. SAEs are to be reported within 15 calendar days from awareness of event by investigator. Initial report of SUSARs are to be reported as soon as possible but not later than

Appendix I: Turnitin Report

ORIGINALITY REPORT			
9%	6%	5%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
PRIMARY SOURCES			
1	Derbew Fikadu Berhe, Katja Taxis, Flora M. Haaiker-Ruskamp, Afework Mulugeta et al. "Impact of adverse drug events and treatment satisfaction on patient adherence with antihypertensive medication - a study in ambulatory patients", British Journal of Clinical Pharmacology, 2017 Publication	<1%	
2	etd.lib.metu.edu.tr Internet Source	<1%	
3	acamedicine.org Internet Source	<1%	
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