KNOWLEDGE AND PERCEPTION OF VENOUS THROMBOEMBOLISM AMONG ANTENATAL WOMEN IN HOSPITAL UNIVERSITI SAINS MALAYSIA

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UNIVERSITI SAINS MALAYSIA

2021

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by

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Dissertation submitted in partial fulfilment of the requirement for the degree of Bachelor of Nursing (Honours)

July 2021

ACKNOWLEDGEMENT

First of all, I would like to dedicate my dissertation to both of my supervisors, Mrs. Duangta Shet and Dr. Norhasmah Mohd Zain for spending their invaluable time and tremendous support in guiding, supervising, and encouragement throughout the process until the completion of the dissertation.

Next, I would like to express my gratitude towards all the respondents for their willingness to participate in this research and cooperation in complete the questionnaires.

I would also like to extend my appreciation to my parents, Lim Chin Pheng and Tan Pek Jeng who continuously giving unconditional love and motivation in my journey of years of education in Universiti Sains Malaysia especially when unable to reunion for a year due to the Covid 19 situation. Thanks to my sister, Lim Suk Na who consistently giving me stimulation and inspiration in my life.

Finally, special thanks to my friends and coursemates for willing to share their knowledge and guide me in the completion of this dissertation. Thank you for being considerate and always been supportive all the time.

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LIST OF ABBREVIATIONS AND ACRONYMS

VTE	-	Venous thromboembolism
DVT	-	Deep vein thrombosis
PE	-	Pulmonary embolism
PTS	-	Post-thrombotic syndrome
CT	-	Computed tomography
HUSM	-	Hospital Universiti Sains Malaysia
MMR	-	Maternal mortality ratio
VT	-	Venous thrombi
PERC	-	The Pulmonary Embolism Rule Out Criteria
CTEPH	-	Chronic thromboembolic pulmonary hypertension
LMWH	-	Low molecular weight heparin
UFH	-	Unfractionated heparin
VKA	-	Vitamin K antagonist
INR	-	International normalized ratio
DOAC	-	Direct oral anticoagulants
CUS	-	Compression ultrasonography
CTPA	-	Computed tomography pulmonary angiography
GCS	-	Graduated elastic compression stockings
HBM	-	Health Belief Model
O&G	-	Obstetrics & Gynecology
SPSS	-	Statistical Package for Social Science
HREC	-	Human Research Ethics Committee

PENGETAHUAN DAN PERSEPSI TERHADAP VENA TROMBOEMBOLISME DALAM KALANGAN WANITA ANTENATAL DI HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRAK

Wanita antenatal mempunyai risiko yang tinggi untuk menghidapi vena tromboembolisme kerana kehamilan menimbulkan keadaan di mana gumpalan darah dapat terbentuk dengan mudah. Di Malaysia, obstetrik embolisme adalah penyebab kematian ibu kedua tertinggi pada tahun 2018 dan terdapat kekurangan data yang diterbitkan untuk menilai pengetahuan dan persepsi vena tromboembolisme di kalangan wanita antenatal. Kajian ini bertujuan untuk mengkaji tahap pengetahuan dan persepsi wanita antenatal serta untuk mengkaji perkaitan ciri-ciri demografik dengan tahap pengetahuan mengenai vena tromboembolisme. Kajian keratan rentas telah dijalankan di wad obstetrik serta klinik Obstetrik dan Ginekologi, Hospital Universiti Sains Malaysia pada bulan Januari hingga Februari 2021. Seramai 143 responden dipilih melalui kaedah persampelan mudah dan data dikumpulkan menggunakan borang soal selidik yang diterima pakai dari Jarab et al., (2019). Ujian Khi-kuasa dua digunakan untuk menentukan perkaitan antara ciri-ciri demografik dan tahap pengetahuan. Hasil kajian menunjukkan bahawa tahap pengetahuan dan persepsi vena tromboembolisme di kalangan wanita antenatal adalah rendah (n = 137, 95.8%) dan majoriti mempunyai persepsi positif (n = 142, 99.3%). Hasilnya juga menunjukkan hubungan statistik yang signifikan antara ciri demografik bidang pekerjaan ($p = 0.003$) dan pendapatan isi rumah bulanan ($p < 0.001$) dengan tahap pengetahuan. Kesimpulannya, pengetahuan mengenai vena tromboembolisme di kalangan wanita antenatal adalah rendah dan terdapat persepsi yang positif. Wanita antenatal yang bekerja di bidang kesihatan dan pendapatan isi rumah

bulanan yang tinggi mempunyai tahap pengetahuan yang tinggi. Pendidikan kesihatan pada wanita mengenai vena tromboembolisme harus dilakukan dengan mengadakan kempen pendidikan umum nasional yang bertujuan untuk meningkatkan kesedaran wanita mengenai penyakit ini.

Kata kunci: vena tromboembolisme, wanita antenatal, tahap pengetahuan, persepsi, ciri demografik

KNOWLEDGE AND PERCEPTION OF VENOUS THROMBOEMBOLISM AMONG ANTENATAL WOMEN IN HOSPITAL UNIVERSITI SAINS MALAYSIA

ABSTRACT

Antenatal women have a high risk of developing venous thromboembolism as pregnancy raises to a condition where a blood clot can form easily. In Malaysia, obstetrics embolism is the second-highest leading cause of maternal mortality in 2018 and there is a lack of published data to assess the knowledge and perception of venous thromboembolism among antenatal women. This research aimed to determine the level of knowledge and perception of antenatal women as well as to determine the association of demographic characteristics with the level of knowledge of venous thromboembolism. A cross-sectional study was conducted in the obstetrics ward and Obstetrics and Gynaecology Clinic of Hospital Universiti Sains Malaysia from January to February 2021. A total of 143 participants was conveniently selected and data were collected using a structured self-administered questionnaire adopted from Jarab et al., (2019). Chi-square test was used to determine the association between demographic characteristics and level of knowledge. Results showed the level of knowledge and perception of venous thromboembolism among antenatal women was low (n=137, 95.8%) and the majority have positive perception (n= 142, 99.3%). The result also showed a statistically significant association between demographic characteristics of the field of occupation (p-value = 0.003) and monthly household income (p-value < 0.001) with the level of knowledge. In conclusion, knowledge of venous thromboembolism among antenatal women was low and have a positive perception. Antenatal women who worked in the field of healthcare and high monthly household income had a high level of knowledge.

Health education on women regarding venous thromboembolism should be carried out by constructing a national public education campaign aiming to improve awareness of women regarding this disease during pregnancy and postpartum.

Keywords: venous thromboembolism, antenatal women, level of knowledge, perception, demographic characteristics

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Venous thromboembolism (VTE) is used to refer blood clots in the vein. There are two types of VTE which are deep vein thrombosis (DVT), blood clots that usually formed in the deep vein of the lower extremities such as leg, and pulmonary embolism (PE), blood clots that formed detached from the vein wall and travel through the blood vessels to the lungs (Moheimani & Jackson, 2011). The systemic literature review found the incidence of VTE is increasing globally with an annual incidence of 0.75 to 2.69 per 1000 individuals in the studies from western Europe, North America, Australia, and southern Latin America (Argentina), 0.079 to 0.171 per 1000 population in studies from Taiwan, Hong Kong and Korea. VTE is a global disease burden that affects many countries (Raskob et al., 2014).

Pregnancy gives rise to a condition of Virchow's triad, whereas the body is in venous stasis, endothelial damage and hypercoagulability, leading to the development of venous thrombus. Pregnancy and postpartum are the factors of developing VTE, women are five times more likely to develop VTE if pregnant (Devis & Knuttinen, 2017). The risk of developing VTE is highest at the time of postpartum, which is after delivery up to six weeks postpartum (Wendelboe et al., 2015). A meta-analysis concluded that the incidence of VTE during pregnancy and postpartum is high (Meng, Hu, Peng, & Zhang, 2015). There are several risks associated to increase the development of VTE during pregnancy and postpartum which are previous personal VTE history, thrombophilias, obese or overweight, immobility, superficial thrombophlebitis, stillbirth, assisted reproduction, postpartum infection, family history, varicose veins, postpartum haemorrhage, emergency caesarean delivery, hyperemesis, pre-eclampsia, smoking, age

more than 35 years, race or ethnicity and high body mass index (>25) (Khan, Vaillancourt, & Bourjeily, 2017).

Every 1 in 1000 pregnant women had been diagnosed with VTE (Simcox, Ormesher, Tower, & Greer, 2015). A study carried out at a maternity hospital in Sudan showed that 88.8% cases of VTE are classified as DVT while 11.2% as PE (Fazari, Eltaher, & Rahman, 2017). DVT usually present in the left lower extremities due to the compression of the enlarged uterus which give pressure to the left common iliac vein by the right common iliac artery (Devis & Knuttinen, 2017), prevent the return of blood to the heart and form blood clots with the signs and symptoms of discomfort, edema, and pain (Khan et al., 2017). PE is an acute complication of DVT. When the blood clot breaks off from the vein wall and travels to the lungs, signs and symptoms such as hypotension, tachypnea, tachycardiac, chest pain and sudden collapse or death can occur (Orfanoudaki, 2019).

Global awareness about VTE is low (Wendelboe et al., 2015). Cross-sectional study conduct in Saudi Arabia showed a knowledge deficit and lack of awareness regarding VTE among pregnant and postpartum women (Ahmed, Alfehaid, & Almodaimegh, 2019).

1.2 Problem Statement

VTE possesses a high mortality rate. A cohort study in Canada showed that the risk of mortality post one-year VTE is high, and the risk continues up to 30 years of follow-up (Tagalakis, Patenaude, Kahn, & Suissa, 2013). VTE deteriorates rapidly and the mortality rate is undercalculated as VTE is not diagnosed at the time of death (Behravesh et al., 2017). Difficulties of diagnosis during post-mortem to validate the

cause of death result in the lower reporting mortality rate of VTE (Fazari et al., 2017). Aside from high mortality rate, acute DVT give rise to chronic complication post-thrombotic syndrome (PTS) such as chronic leg pain, edema, redness and ulceration up to 20–50% of the patient (Behravesh et al., 2017). PTS diminish the quality daily life activity with poor maintenance of therapeutic anticoagulant (Siddiqui et al., 2020).

VTE in pregnancy and postpartum leads to high mortality globally. The rate of maternal mortality from PE is way higher than DVT (Fazari et al., 2017). According to statistics on causes of death, Malaysia, 2019, obstetrics embolism that comprised of VTE is the second-highest leading cause of maternal mortality, accounting for 20.3 % of overall maternal mortality in 2018 (Department Of Statistics Malaysia, 2019). Hence this study is conducted. In the United Kingdom, VTE is the leading cause of direct maternal mortality which accounts for 16 % between 2015 and 2017 (MBRRACE-UK, 2019). In the United States, PE is the second leading cause of direct maternal mortality which accounts for 9.2 % of the pregnancy-related mortality between 2011 and 2013 (Creanga, Syverson, Seed, & Callaghan, 2017). Apart from morbidity and mortality, VTE also accounts for PTS for women during pregnancy and postpartum which is a condition of edema, ulceration and skin changes related to DVT (Devis & Knuttinen, 2017).

PE is the acute complication of DVT, and it is very difficult in detection and diagnosis as the nonspecific presentation of signs and symptoms in PE (Morrone & Morone, 2018). Some signs and symptoms also commonly present in a normal pregnancy. Besides, diagnostic investigation imaging tests such as computed tomography (CT) scan rise the concern of risk of contracting radiation during pregnancy (Malhotra & Weinberger, 2019). Moreover, evidence base protocol of thromboprophylaxis created for the management of VTE among pregnant women is insufficient, the practice is varying, no consistency and mainly depends on the consensus of expert opinion (Fogerty, 2018).

Most of the recommendation management is extracted from the non-pregnant population which is lacking evidence base study specific to the pregnant population (Guimicheva, Czuprynska, & Arya, 2015).

VTE exhibit a low global awareness compare to other thrombotic disorder such as stroke (Wendelboe et al., 2015). A study in Jeddah shows that women lack of knowledge regarding the risk of developing VTE and VTE complications (Alharbi, Alamri, & Bafanaa, 2020). Another study reveals that there is low awareness and knowledge related to VTE among the pregnant and postpartum, with 26.8% knowledge of DVT, 13.8% knowledge of PE (Ahmed et al., 2019). Pregnant women in Korea also demonstrate a low knowledge of risk factors about VTE with a mean score of 0.98 (0–44) (Kim & Kim, 2019). Meanwhile in Malaysia, there is a lack of published data to assess VTE knowledge among antenatal women. There is a lack of data or research regarding the awareness and health education of VTE among pregnant and postpartum women.

1.3 Research Question

i. What is the level of knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia?
ii. What is the level of perception of VTE among antenatal women in Hospital Universiti Sains Malaysia?
iii. Is there association between demographic characteristics (age, ethnicity, educational level, occupational status, field of occupation, monthly household income, parity, previous admission history during pregnancy, personal history of VTE and family history of VTE) with knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia?

1.4 Research Objective

Research objectives are divided into general and specific objectives. The general objectives are to determine the knowledge and perception of VTE and the association between demographic characteristics with knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia.

The specific objectives are:

1. To determine the level of knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia.
2. To determine the level of perception of VTE among antenatal women in Hospital Universiti Sains Malaysia.
3. To examine the association between demographic characteristics (age, ethnicity, educational level, occupational status, field of occupation, monthly household income, parity, previous admission history during pregnancy, personal history of VTE and family history of VTE) with knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia.

1.5 Research Hypothesis

Hypothesis H_0: There is no significant association between demographic characteristics (age, ethnicity, educational level, occupational status, field of occupation, monthly household income, parity, previous admission history during pregnancy, personal history of VTE and family history of VTE) with knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia.

Hypothesis H_1: There is a significant association between demographic characteristics with knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia.

1.6 Significance of Study

VTE is a condition which can cause acute complication such as PE and eventually result in maternal mortality. Based on the report by the Ministry of Health, 2019, average annual rate of maternal mortality ratio (MMR) per 100,000 live births is increasing 4.6 % between 2012-2016 in Malaysia and Kelantan state has an increase of 14.0% of average annual MMR (Ministry of Health Malaysia, 2019). There is an increasing trend of MMR. Obstetrics embolism that is comprised of VTE contribute to this increasing trend of MMR as it is the second-highest leading cause of maternal mortality, comprise of 20.3 % of overall maternal mortality in 2018 (Department Of Statistics Malaysia, 2019). The findings of the research help the healthcare provider and community to realise the necessity to raise awareness of VTE among pregnant and postpartum women in Malaysia, which decreases the MMR subsequently.

There are many studies done to determine the knowledge of VTE; however, it appears only a few studies that specify to antenatal population. Therefore, this research aid to determine the level of knowledge and perception about VTE among the antenatal population. The knowledge about the disease, understanding about signs and symptoms, risk factors and complications allows women to assess themselves and report any irregularities to the healthcare provider immediately. Besides, it can enhance involvement in disease management and improve health outcomes. Moreover, this research provides an overview of population demographics and characteristics that can associate with the knowledge of VTE in Malaysia.

On top of that, this research act as a reference for the healthcare provider to construct a more effective intervention or protocol in conduct health education among the community. Health education is one of the main components in nursing, this benefits society by contributing more holistic care.

1.7 Conceptual and Operational Definitions

Definitions for operational terms used in this research proposal are as showed below:

Knowledge	Understanding of information about a subject that you get by experience or study, either known by one person or by people generally (Cambridge University Press, 2020a). In this research, it refers to antenatal women's knowledge about VTE and assessed using a self-administered questionnaire adopted from Jarab et al., (2019).
Perception	A belief or opinion, often held by many people and based on how things seem (Cambridge University Press, 2020b). In this research, it refers to the antenatal women's perception regarding VTE and assessed using a self-administered questionnaire adopted from Jarab et al., (2019).
Venous thromboembolism	Venous thromboembolism (VTE) refers to a condition where a blood clot that forms in the deep vein of leg, thigh or arm known as deep vein thrombosis (DVT) and a blood clot that break free from the vein wall and travel to the lungs is known as pulmonary embolism (PE) (American Heart Association, 2017). In this research, it refers to the condition of blood clot form in antenatal women. Knowledge about VTE assessed using a self-administered questionnaire adopted from Jarab et al., (2019).
Antenatal	Referring to the period between conception and birth (Farlex Partner Medical Dictionary, 2012). In this research, it refers to women who pregnant and before childbirth

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter review a series of literature regarding the knowledge and perception of VTE among antenatal women and the association between demographic characteristics variable with knowledge of VTE. The general findings of the literature reviews were presented into a few sections by the key term of the research. The recent articles and related issues were included in this chapter. The chosen conceptual framework to guide this proposed research was discussed.

2.2 Review of Literature

2.2.1 Venous thromboembolism

VTE describes a condition where blood clots (thrombus) in the vein. It encompasses the condition of deep vein embolism (DVT) and pulmonary embolism (PE). Blood clot that forms in the deep vein such as leg, thigh, arm known as DVT while the blood clot that breaks free and travels to the lungs is known as PE. PE is an acute complication of DVT (Moheimani & Jackson, 2011). Venous thrombi (VT) are rich in fibrin and red blood cells, it mainly appears at deep vein and may detach from vein wall. Mechanism of activation of VT started with venous endothelium as a result of inflammation, causes the attachment of platelets and leucocytes and initiates expression of tissue factor that activates the coagulation cascade. Slow blood flow in vein increases the molecule adherence for thrombus formation (Koupenova, Kehrel, Corkrey, & Freedman, 2017). A recent study proposed that red blood cells also cause the formation of a thrombus (Cines et al., 2014).

Risk factors for development of VTE can be categorised as strong, moderate and weak. Strong risk factors include fracture (hip or leg), hip or knee replacement, major general surgery, major trauma and spinal cord injury. Moderate risk factors are arthroscopic knee surgery, central venous lines, chemotherapy, congestive heart or respiratory failure, hormone replacement therapy, malignancy, oral contraceptive therapy, paralytic stroke, pregnancy or postpartum and previous VTE and thrombophilia. Weak risk factors are bed rest of more than three days, extended immobility such as air travel more than 8 hours, increasing age (≥40years), laparoscopic surgery, obesity, pregnancy or postpartum and varicose veins (Moheimani & Jackson, 2011). There are three commonly used assessment that performed by the clinicians to assess the risk which are The Pulmonary Embolism Rule Out Criteria (PERC) score, Wells Score and Revised Geneva Score (Morici, 2014).

Primary diagnostic testing for VTE including clinical assessment, D-dimer test and imaging test such as venous ultrasound (Kearon, 2016). Clinical signs and symptoms of DVT are asymmetrical swelling, warmth or pain in an extremity (Stone et al., 2017) whereas PE is more commonly presented with dyspnea, chest pain, and cough (Morrone & Morone, 2018). Diagnosis for PE is challenging due to its non-specific clinical presentation, most of PE is diagnosed during post-mortem. Complications of VTE including post-thrombotic syndrome (PTS) which occurs after DVT and PE which is the acute complication of DVT (Kabashneh, Singh, & Alkassis, 2020). A complication of chronic thromboembolic pulmonary hypertension (CTEPH) can occur after PE (Winter, Schernthaner, & Lang, 2017). Besides, VTE can cause death and patient diagnosed with VTE have high mortality and recurrence rate (Arshad et al., 2017).

Management of VTE is mostly with an anticoagulant such as fondaparinux, low molecular weight heparin (LMWH), unfractionated heparin (UFH) with vitamin K

antagonist (VKA) warfarin until 2 consecutive days achievement of 2.0 of international normalized ratio (INR) (McRae, 2014). Direct oral anticoagulants (DOAC), rivaroxaban or apixaban is favourable for the treatment of VTE due to its fixed-dose administration, high efficacy, and low bleeding risk, however it is contraindicated with the pregnant population. Patient with acute VTE is required to take a least three months of medication, and the shorter duration can result in recurrence easily. Therefore, the reassessment for risk of recurrence and bleeding, INR monitoring needed to be done routinely (Stevens, Tran, & Gibbs, 2019). Catheter-based endovascular therapy is also one of the alternative therapy that decreases the PTS complication rate (Jarrett & Bashir, 2017).

2.2.2 Venous Thromboembolism in Pregnancy and Postpartum

Pregnancy is one of the risk factors of developing VTE, postpartum women have a higher risk compared to antenatal women. A study showed 60% of VTE develops after postpartum, 40% develops during antenatal. 75% of pregnancy-related VTE is DVT, 16.7% is PE and 8.3% of developed DVT progressed to PE (Alsheef et al., 2020). According to the statistic of HUSM from January 2020 to November 2020, total patient that have DVT is 8 patients while PE is 6 patients. The associate factor that further increases the risk for developing VTE during pregnancy and postpartum include in vitro fertilization, history of VTE, obesity, medical disease, stillbirth, pre-eclampsia, postpartum haemorrhage and caesarean section (Konstantinides et al., 2020). Virchow's triad, hypercoagulability, venous stasis and vascular damage are the principles that cause the development of VTE (Unger, Bhaskar, & Mahmood, 2018).

Diagnosis is mainly based on the assessment of clinical probability, D-dimer measurement, compression ultrasonography (CUS) and computed tomography pulmonary angiography (CTPA). Pregnancy increases the level of D-dimer may result in false positive. For suspected DVT, CUS is the first line diagnostic investigation that

should be done immediately to prevent the complication of acute PE. Diagnosis for pregnancy-related PE is tricky as many symptoms are nonspecific. Overdiagnosis could lead to haemorrhage complications at the time of delivery, decreasing oestrogen contraception and thromboprophylaxis during future pregnancies (Konstantinides et al., 2020).

LMWH enoxaparin is the main treatment for pregnancy related VTE as it is relatively safe which does not cross the placenta however it is contraindicated in active antenatal and postpartum bleeding and women who at risk of major haemorrhage. The dosage of LMWH is the same as the non-pregnancy population and the regime is according to early pregnancy weight (Bates, Middeldorp, Rodger, James, & Greer, 2016). UFH is the alternative treatment for the Muslim population as LMWH is derived from porcine deoxyribonucleic acid (Voon, Chai, Hii, Amin, & Suharjono, 2018). Heparin-induced thrombocytopenia and bone loss are associated with UFH while VKAs cross the placenta and may result in embryopathy, foetal and neonatal haemorrhage and placental abruption, while DOACs are contraindicated in pregnancy (Myers, Neal, Myers, & Ruparelia, 2016). Therapeutic LMWH or UFH can be stopped prior to the epidural insertion or anticipated delivery to eliminate the risk of haemorrhage. Treatment should be continuing after six weeks of delivery and can be administered to breastfeeding mother as well. Only life-threatening PE is recommended for thrombolytic treatment (Konstantinides et al., 2020).

Mechanical methods include graduated elastic compression stockings (GCS), neuromuscular electrostimulation devices (foot impulse devices) and intermittent pneumatic calf compression devices (leg pumps) are the method to prevent VTE. Risk assessment for VTE should be done as earlier as possible and continuously reassessing throughout the whole period of pregnancy and postpartum (Unger et al., 2018).

2.2.3 Knowledge of Venous Thromboembolism

Knowledge of VTE is showed relatively low globally, which the lack of knowledge about signs and symptoms, risk factors, complications and prevention (Wendelboe et al., 2015). A street survey performed in Birmingham, United Kingdom revealed a low knowledge of DVT, specifically on the complication of DVT with only 8.88% stated DVT can travel to lungs, 31.3% stated DVT can cause death and a high proportion of incorrectly identify the complication of DVT such as DVT can travel to heart or brain (Boulton, Fenton, Loka, Sharif, & Greenfield, 2015).

A cross-sectional study showed poor awareness of VTE, only 32% of the hospitalised patient has the knowledge of DVT while 15% with PE. They exhibit poor knowledge regarding the signs and symptoms of DVT and PE. 55% aware swelling of leg is the sign and symptoms for DVT, pain or tenderness in leg is 49%, noticeable changes in the colour of the leg is 29% and noticeable changes in the temperature of the leg is 18%. For PE, chest pain 69%, shortness of breath 69%, light-headedness 23% and coughing up blood 23% (Almodaimegh et al., 2017).

Another cross-sectional study conducted also supports the above statement of poor knowledge of VTE with 38.2% of the hospitalised patient has the knowledge of DVT while 22.2% with PE. This study further revealed poor knowledge on both signs, symptoms and complications. Knowledge of DVT is higher than the knowledge of PE which can assume that most of the population did not know PE is the complication of DVT. 75.1% able to identify “not moving for a long time” as a risk factor for developing a blood clot, however only 36.9% correctly identify pregnancy or giving birth as a risk factor. 88.4% aware walking or stretching the legs for the prevention of blood clots eating lots of fibre and washing/bathing regularly were highly incorrectly identified as measures

to prevent blood clots with 48.9% and 26.7% respectively (Jarab, Al-Azzam, Badaineh, Mukattash, & Bsoul, 2019).

Study on pregnant and postpartum women showed poor awareness of VTE with 26.8% of has the knowledge of DVT while 13.4% with PE. 32% aware swelling of leg is the sign and symptoms for DVT, pain or tenderness in leg is 24.9%, noticeable changes in the colour of the leg is 20.4% and noticeable changes in the temperature of the leg is 13.1%. PE knowledge of signs and symptoms showed shortness of breath is 25.2%, chest pain is 19.4%, rapid heart rate is 18.0%, light-headedness is 10.1% and slow, shallow breathing is 8.6%. This study demonstrates poor knowledge regarding signs and symptoms of VTE. Besides, only 7.5% of the respondents correctly identified pregnancy and gave birth as the risk for VTE (Ahmed et al., 2019). Study on patients undergoes caesarean section also showed a low awareness and knowledge about VTE clinical manifestation, risk factors and symptoms (Alzoubi, Khassawneh, Obeidat, Asfoor, & Al-azzam, 2013).

A study showed that the knowledge level of DVT among hospitalised patients is low which is 0.1 (max:0, max:3) before an educational training (Serpici & Gürsoy, 2018). Besides, a study conducted on healthcare providers in teaching hospital indicated low knowledge regarding the importance of DVT prophylaxis, the prevalence and clinical implications of hospital-acquired DVT (Bhatti, Ahsin, Salim, & Mansoor, 2012). Another study conducted among nurses showed a low level of knowledge on DVT risk and preventive measures with poor prevention practices (Al-Mugheed & Bayraktar, 2018).

2.2.4 Perception of Venous Thromboembolism

VTE is the leading cause of direct maternal death. Changes in population demographics, the rise of obesity, increased maternal age and rising surgical delivery

rates may explain stagnation in reducing the rate of VTE despite the introduction of guidelines or protocols of prevention of VTE (Unger et al., 2018).

A qualitative semi-structured interviews research done on surgical patients revealed that most of the patient perceived thrombotic events important than the risk of bleeding complication and they have less understanding about the knowledge of DVT and PE, with 50% of respondents do not know the possible side effect of antithrombotic treatment (Najafzadeh et al., 2015). Qualitative study conducted in the patient who require thromboprophylaxis percept themselves of high risk for blood clots but lacked understanding about VTE complication and prevention such as the use of non-pharmacological preventive measures, anti embolism stockings (Apenteng et al., 2016). Moreover, another qualitative study of perceptions on prevention of VTE conducted among surgical patients found out that the following of poor understanding related to VTE, severity of postoperative VTE and VTE prevention (Xu, Zhao, & Chen, 2018).

A study showed 76.7% of the hospitalised patient percept that blood clots can cause death, 57% considered a medical emergency, 55.5% believe that blood clots can develop at any age, however only 42.2% percept that most blood clots can be prevented and only 37.2% knew that blood clots can travel to the lungs which reveal the weak relatedness of DVT to PE among the population due to non-specific sign and symptoms of PE. (Almodaimegh et al., 2017). Moreover, a study also conducted on the pregnant and postpartum women population at the same hospital settings showed different perception about VTE, with 99.1% of the percept that blood clots can cause death, 54.0% considered a medical emergency, however 90.3% percept that most blood clots cannot be prevented, 74.4% agree that people under 40 years of age do not have to worry about blood clots and 94.4% do not know that blood clots can travel to the lungs (Ahmed et al., 2019).

Another study showed that 80.4 % of the hospitalised patients percept that blood clots can cause death, 90.7% considered a medical emergency, 54.7% percept that most blood clots can be prevented and 62.2% knew that blood clots can travel to the lungs (Jarab et al., 2019).

2.2.5 Knowledge of Venous Thromboembolism and Demographic Characteristic

Knowledge of VTE is associated with demographic characteristics. A study showed the knowledge of DVT or PE was significantly higher among those with personal history ($p = 0.001$) and family history ($p = 0.046$) (Almodaimegh et al., 2017). Study on the pregnancy and postpartum women also showed knowledge of DVT was significantly higher among those with personal history ($p < 0.001$) and family history of VTE ($p = 0.01$) (Ahmed et al., 2019).

Another study showed an association of poor knowledge with either DVT or PE in the population with the age of 65 and above ($p = 0.015$), who had low education level ($p < 0.001$), who had no personal history of VTE ($p= 0.004$) and had a negative perception toward VTE ($p = 0.001$) (Jarab et al., 2019).

Study conducted on women in Jeddah review that high knowledge of VTE when pregnancy and postpartum was associated with the high socioeconomic level ($p=0.008$). Moreover, high knowledge is also associated with younger age ($p=0.049$), with higher education ($p=0.002$) but with a lower number of births ($p=0.035$). The knowledgeable group can recognize better the main VTE risk factors ($p<0.001$), the emergency ($p=0.015$) and the pulmonary complications of VTE ($p=0.030$) compared to the unknowledge group (Alharbi et al., 2020). A study in Daegu on pregnant and postpartum indicate association of previous experience of hearing VTE to high knowledge of VTE ($P=0.048$) (Kim & Kim, 2019).

Study among orthopaedic surgical patient in hospital of China indicated there is an association of living condition, knowledge of VTE prior to hospitalization and prevention knowledge acquired during hospitalization to the knowledge of risk factors, clinical manifestation, preventive measures and prevention VTE with $p<0.001$ (Xu, Zhao, Fan, & Zhao, 2020).

2.3 Conceptual Framework of the Study

Health belief model (HBM) is utilized as a conceptual framework in guiding this study. HBM is an instrument developed in the 1950s by a group of social psychologists, Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles and Howard Leventhal in the United States. Public Health Service to understand the failure of people in adopt disease prevention strategies. Over the years, this model has been improved and used to explain health-related behaviour.

HBM is composed of components which are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action and self-efficacy. Perceived susceptibility is the belief of an individual about the probability to get sick, perceived severity is the individual judgment of the seriousness of health condition, perceived benefit is the belief of positive outcome of health behaviour, perceived barriers is the belief about the hindrance of the health action, cue of action is the readiness to take action after perceived susceptibility and benefit and self-efficacy is the self-motivation the individual to execute the health behaviour to produce the positive outcome. Demographic variables such as age, gender and psychological characteristics such as personality, peer group pressure may indirectly influence health behaviour (Conner & Norman, 2015).

To change health behaviour, an individual must perceive treat by a current health condition which is perceived susceptibility and severity, belief the health action will result in a positive outcome which is perceived benefit and must be self-efficacy to conquer the perceived barriers for the health action to occur (Figure 2.1).

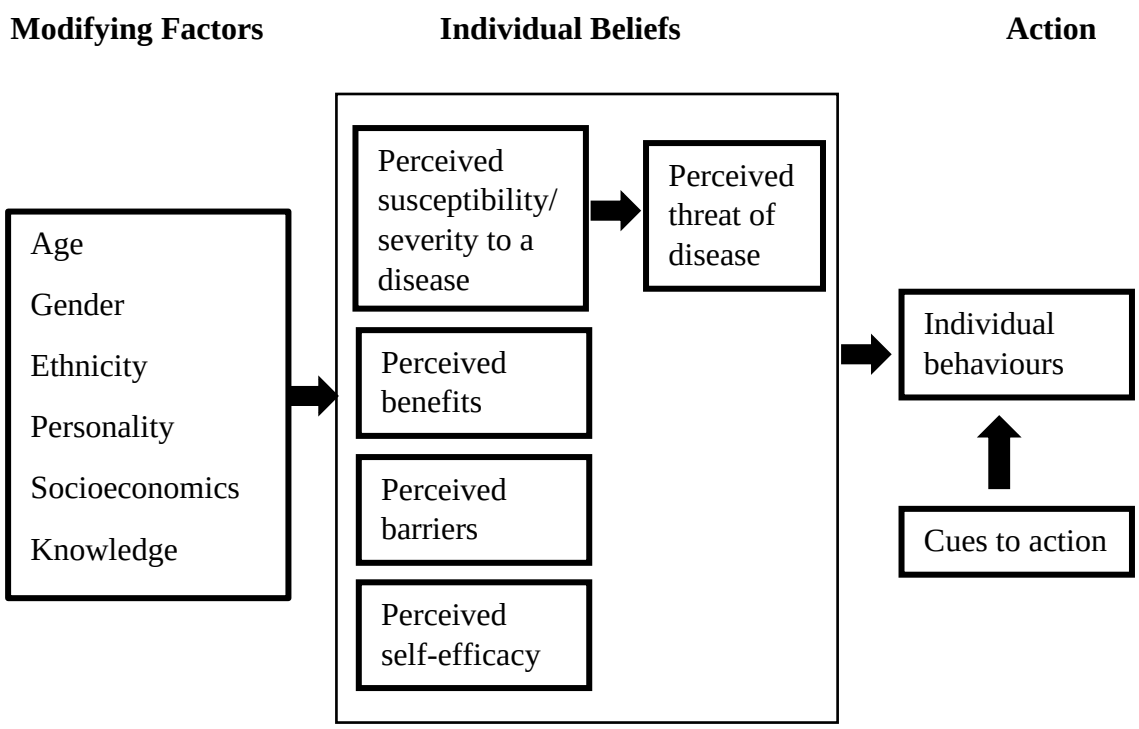

Figure 2.1: Structure of the Health Belief Model (Glanz, Rimer, & Viswanath, 2008).

HBM explained the perception of VTE among antenatal women to change their health beliefs through knowledge of VTE about the cause, signs and symptoms, complication, risk factor and prevention. Figure 2.2 shows the adopted theory of HBM in this study.

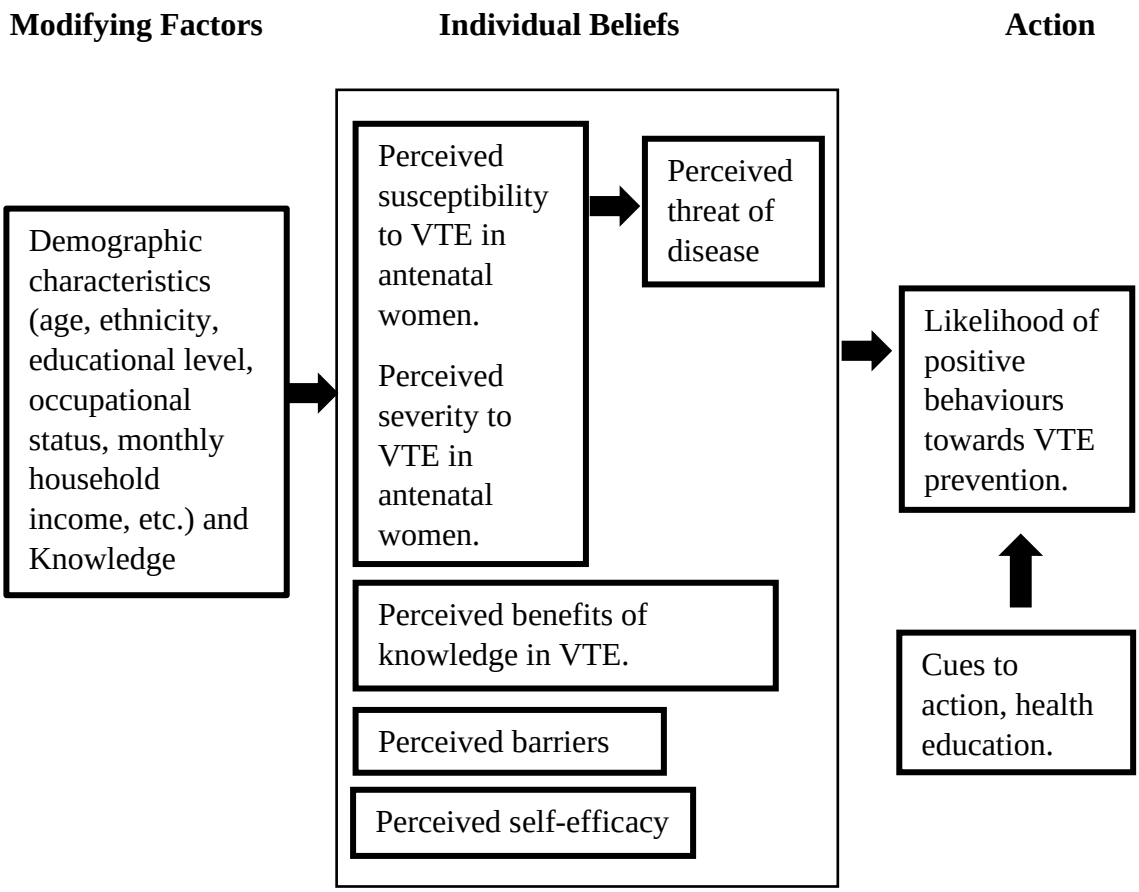

Figure 2.2: The adopted theory of Health Belief Model (HBM).

CHAPTER 3

METHODOLOGY AND METHODS

3.1 Introduction

In this chapter, a detailed explanation of the research design which was cross-sectional design and justification for choosing this approach was described. Description of the study population and setting, sampling plan, participant selection criteria, sample size determination, instrumentation, variables and data collection plan were written. The final section explained the method for data analysis, ethical consideration and expected research outcome.

3.2 Research Design

In this research, a cross-sectional design was used. Cross-sectional design is a descriptive study, data were collected on the whole population at a single point of time to examine variables of interest (Saleh, 2018). This allows the researcher to measure the outcome and the exposure of the respondents at the same time based on the researcher's objective. The objective was to determine the level of knowledge and perception of VTE among the antenatal women, the association between demographic characteristics with knowledge of VTE among antenatal women in Hospital Universiti Sains Malaysia (HUSM).

3.3 Study Setting and Population

The location of this research is at the obstetrics ward and Obstetrics and Gynaecology (O&G) clinic in Hospital Universiti Sains Malaysia. Obstetrics ward located at 2 Akik and 2 Baiduri. O&G clinic opens every Sunday till Thursday, the patient

who visits O&G clinic is the woman who was pregnant or has gynaecology problem. The research duration was from January until February 2021. The target population of this research was antenatal women. The study sample was the antenatal women who attend the obstetrics ward and Obstetrics and Gynaecology (O&G) clinic in Hospital Universiti Sains Malaysia.

3.4 Sampling Plan

Sampling is to select numbers of subjects from the target population as research respondents (Chua, 2020). Sampling ensures that the validity and reliability of research to be representative of the population of interest. An effective sampling method enables researcher to achieve the research goal.

3.4.1 Sample Criteria - Inclusion Criteria and Exclusion criteria

Specific requirements for eligibility in this research of each subject must be:

- Antenatal women
- Aged 18 years old and above
- Able to understand, speak and write Malay or English

The subject is excluded from this research if they:

- Have intellectual disability (mental retardation)

3.4.2 Sampling Size Estimation

For the first and second objective, single proportion was used in sample size estimation.

$$n = (\frac{z}{\Delta})^2 p(1-p)$$

n = required sample size

z = value of the standard normal distribution curve cutting off probability Alpha (α) in one tail for one-sided alternative or $\frac{\alpha}{2}$ in each tail for a two-sided alternative (z 0.05=1.96)

Δ = desired level of precision

p = estimated proportion of an attribute that is present in the population

For the first objective, to determine the level of knowledge of VTE among antenatal women in HUSM,

z = 1.96, Δ = 0.05, p = 7.7 % (Alharbi et al., 2020)

$$n = (\frac{z}{\Delta})^2 p(1-p)$$

$$n = (\frac{1.96}{0.05})^2 0.077(1-0.77)$$

= 109 respondents

The minimal sample size was 109 and after considering 10% of drop out, the calculated sample size is 120.

For second objective, to determine the level of perception of VTE among antenatal women in HUSM,

z = 1.96, Δ = 0.05, p = 90.7 % (Jarab et al., 2019)

$$n = (\frac{z}{\Delta})^2 p(1-p)$$

$$n = (\frac{1.96}{0.05})^2 0.907(1-0.907)$$

= 130 respondents

The minimal sample size was 130 and after considering 10% of drop out, the calculated sample size is 143.

For the third objective, to determine the association between demographic characteristics with knowledge of VTE among antenatal women in HUSM, two proportion was used.

$$n = \frac{p1(1-p1) + p2(1-p2)(z\alpha + z\beta)^2}{(P1 - P2)2}$$

n = required sample size

z_{α} = value of the standard normal distribution curve cutting off probability Alpha (α) in one tail for one-sided alternative or $\frac{\alpha}{2}$ in each tail for a two-sided alternative (z 0.05=1.96)

z_{β} = Power of study, 80% (z_{β} = 0.84)

p = estimated proportion of an attribute that is present in the population

p1 = High educational level (Jarab et al., 2019)

p2 = Low educational level (Jarab et al., 2019)

z = 1.96, Δ = 0.05, p1= 57.1%, p2= 42.9%

$$n = \frac{0.571(1-0.571) + 0.429(1-0.429)(1.96+0.84)^2}{(0.571-0.429)2}$$

=107

The minimal sample size is 107, and after considering a 10% drop out, the sample size calculated is 118.

The bigger sample size of 143 was taken as larger sample size help create a more significant result.

3.4.3 Sampling Method

Convenient sampling was used in this research to recruit samples. Convenient sampling is a non-probability sampling technique which the researcher chooses the samples from the population who were conveniently available. This method was chosen due to uncomplicated, economical and the population was readily approachable to be a part of the research (Chua, 2020).

3.5 Instrumentation

In this study, data was collected from the respondents by using a structured, self-administered questionnaire.

3.5.1 Instrument

The instrument employed in this research was adopted from Jarab et al., (2019) with permission (Appendix B). The instrument consists of three sections: Section A is demographic characteristic data, Section B contains questions to assess the knowledge of VTE among the respondents, and Section C contains questions to determine the perception of VTE of respondents.

Section A: Demographic Characteristic Data

This section consists of ten close-ended questions that represent demographic characteristic of age, ethnicity, educational level, occupational status, field of occupation, monthly household income, parity, previous admission history during pregnancy, personal history of VTE and family history of VTE.

Section B: Knowledge of VTE

This section consists of ten close-ended questions to determine the level of knowledge of VTE among respondents, multiple answers can be chosen.

Section C: Perception of VTE

This section consists of four close-ended questions to assess the level perception of VTE, 5-point Likert scale ranging from 1 to 5 (strongly agree = 5, agree = 4, neutral = 3, disagree = 2 and strongly disagree =1).

3.5.2 Translation of Instruments

The original version of the questionnaire used in this research is in English. A forward and backward translation from English to Malay and Malay to English again was performed. The purpose of the translation of questionnaire into Malay language is to accommodate the national language that is commonly used among Malaysians. The translation process was validated and done by a bilingual expert in Pusat Pengajian Bahasa, Literasi dan Terjemahan Universiti Sains Malaysia, Kubang Kerian, Kelantan (Appendix E).

3.5.3 Validity and Reliability of Instrument

The instrument employed in this research was adopted from Jarab et al., (2019) which the content validity was validated panel of experts and the pilot-testing was carried out. Besides, the content validity of the instrument was further validated by three nursing experts from School of Health Science. A pilot study was conducted to test the clarity, simplicity and applicability of the instrument prior to the real study. The pilot study was conducted at O&G clinic. The questionnaire was given to 15 participants who meet similar inclusion criteria to ensure that questions were appropriate and reasonable. The