

KNOWLEDGE AND PRACTICE OF
PERICONCEPTIONAL USE OF FOLIC ACID AMONG
PRIMIGRAVIDA MOTHERS IN HOSPITAL
UNIVERSITI SAINS MALAYSIA

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by

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LIST OF ABBREVIATION

FA	Folic Acid
SES	Socioeconomic Status
PFA	Preconception Folic Acid
NTDs	Neural Tube Defects
MRC	Medical Research Council
CDC	Centre for Disease Control and Prevention
PG	Primigravida
USM	Universiti Sains Malaysia
HBM	Health Belief Model

**Pengetahuan dan Amalan Penggunaan Asid Folik Secara Perikonseptif Dalam
Kalangan Ibu Primigravida Di Hospital Universiti Sains Malaysia**

ABSTRAK

Pengetahuan mengenai pengambilan asid folik memainkan peranan penting dalam kesihatan awam terutamanya bagi wanita dalam usia reproduktif, kerana kekurangan pengambilan folat boleh menyebabkan kecacatan tiub pada bayi semasa kehamilan. Matlamat kajian ini adalah untuk mengkaji pengetahuan dan amalan penggunaan asid folik secara perikonseptif dalam kalangan ibu primigravida di hospital USM. Soal selidik yang digunakan dalam kajian ini adalah pengetahuan ibu primigravida dan amalan penggunaan perikonsepsi asid folik yang diadaptasi dari kajian oleh Keshavarazi et al. (2016). Seramai 80 ibu primigravida di Hospital USM yang memenuhi kriteria kemasukan dan pengecualian dipilih secara rawak. Data yang dikumpulkan dianalisis secara statistik menggunakan perisian SPSS versi 26.0. Ujian statistik Pearson's Correlation dan Pearson's Chi-Square digunakan untuk analisis data. Bagi tahap pengetahuan dan amalan, keputusan menunjukkan 1 (1.3%) untuk pengetahuan tinggi dan 63 (78.8%) untuk amalan baik. Terdapat perkaitan antara tahap pengetahuan dan tahap amalan ($p = 0,221$). Akhir sekali tiada perkaitan antara umur, dan tahap pendidikan dengan tahap pengetahuan asid folik secara perikonseptif ($p=0.988$), dan ($p=0.743$). Kesimpulannya, dapatan kajian menunjukkan bahawa ibu primigravida di Hospital USM mempunyai pengetahuan yang tidak mencukupi tentang penggunaan asid folik secara perikonsepsi dan pengurusannya boleh dengan mendapat pendidikan kesihatan tambahan dan kempen mengenai isu tersebut supaya lebih berpengetahuan dan lebih cekap dalam amalan penggunaan asid folik.

**Knowledge and Practice of Periconceptional Use of Folic Acid Among
Primigravida Mothers in Hospital Universiti Sains Malaysia**

ABSTRACT

Knowledge regarding folic acid intake plays important role in public health especially for women in the reproductive age, since lacking folate intake may cause several tube defects in baby during pregnancy. The aim of this study was to examine the knowledge and practice of periconceptional use of folic acid among primigravida mothers in Hospital USM. The questionnaire used in this study was primigravida mother's knowledge and practice of periconceptional use of folic acid questionnaire adapted from study by Keshavarzi et.al. (2016). A total of 80 primigravida mothers in Hospital USM who fulfilled the inclusion and exclusion criteria were selected randomly. Data collected were statistically analysed using the SPSS software version 26.0. Pearson's Correlation and Pearson's Chi-Square were used for data analysis. As for the knowledge and practice level, the results show 1 (1.3%) for high knowledge and 63 (78.8%) for good practice respectively. There was as association between level of knowledge and level of practice ($p = 0.221$). Lastly, there is no association between age, educational level with the level of knowledge of periconceptional use of folic acid ($p = 0.988$) and ($p = 0.743$) respectively. In conclusion, the study finding demonstrated that primigravida mothers in Hospital USM have insufficient knowledge on the periconceptional use of folic acid and its management and could benefit from additional health education and campaign on that issue so that they are more knowledgeable and more competent in practice folic acid.

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

Folic acid (FA) is an essential vitamin sometimes referred to as vitamin B9. It is highly recommended in pregnancy especially before and during the periconceptional period since it cannot be produced by the body (Okon et al., 2020). Folic acid supplement one month before pregnancy and during first trimester of pregnancy could reduce Neural Tube Defects (Dessie & Berihun, 2019). Hence, folic acid and multivitamin supplements are routinely recommended to pregnant women. The awareness of the importance of FA prior to conception and during early pregnancy is low, and little information is available on the coverage of supplementation with FA during this period (Vo et al., 2019).

One of those large awareness studies was run in 18 European countries on women aged 15–49. It screened 22,925 women and found 58% of them had at least one child and 38% of them had an unplanned pregnancy. Only 70% heard about FA, and 40% said they knew the benefits of this vitamin. Only 17% knew that FA can reduce the risk of neural tube deformities and that it needs to be taken before pregnancy (Medawar et al., 2019). Based on the study in Vietnam (Ha et al., 2019) said that the awareness of the importance of FA before conception and during early pregnancy is low, and little information is available on the coverage of supplementation with FA during this period. In addition, no health promotion programs have been focused on FA supplementation to prevent NTDs at the national and community levels in Vietnam.

Therefore, they are many different articles showed that women's awareness on preconception folic acid supplementation is affected by socio-demographic characteristics such as age, educational status, household monthly income, and women reproductive history such as gravidity and parity (Goshu et al., 2018). Additionally,

research has shown that pregnant women who has lower socioeconomic status (SES) can increase the risk of adverse pregnancy outcomes. Previous studies have revealed that low SES is associated with pregnancy complications such as abortion, preterm delivery, preeclampsia, eclampsia, and gestational diabetes (Kim et al., 2018).

Apart from that, preconception folic acid (PFA) taken at least 3 months before conception can prevent a significant proportion of congenital birth abnormalities caused by neural tube defects (NTDs) and cleft palate. PFA is safe and is recommended for all women of child-bearing age, either through fortification of food supply or supplements (Stevens et al., 2018). According to the World Health Organisation (WHO) recommended periconceptional folic acid supplementation that all women should take a daily supplement of 400 µg FA from the moment they plan to conceive until 12 weeks of gestation (World Health Organization, 2022).

Besides that, the rate of periconceptional use of folic acid in Taiwanese women is higher than other Asian countries in the periconceptional stage Thailand, 9.7%; northern region of China, 14.7%; Korea, 10.3%; Taiwan, 15.6% before pregnancy and 90% during early pregnancy (Jou & Gau, 2009). A study on folate intake by Malaysian women of childbearing age showed that 15.1% of the women had plasma folate deficiency (6.8nmol/L), and 84.8% had red blood cell folate levels below 906 nmol/L, indicating blood folate for protection from NTDs in pregnancy (Boo et al., 2013). Consumption of folic acid in preconception period and higher maternal folate consumption during pregnancy are proven to increase the length of gestational week and helpful to reduce the risk of preterm birth among Asian women (Chen et al., 2014).

Multiple studies have suggested that folic acid and folate intake consumption play an important role in the prevention of congenital abnormalities, such as NTDs, congenital

heart diseases, cleft lips and palates, limb defects, and anorectal malformation, as well as in pregnancy outcomes, including placental abruption, placental weight, and gestational age (Yan et al., 2017).

1.2 Problem Statement

Folic acid supplementation has been shown to reduce the annual number of NTDs affected pregnancies by 50 to 70%. Despite evidence, most women are not aware that folic acid prevents neural tube defects and its supplementation rates have remained too low (Abdulmalek & Jamal, 2017). In 1991, the Medical Research Council (MRC) Vitamin Study Research Group published a large, multicentre randomized clinical trial demonstrating that 4 mg of folic acid supplementation beginning prior to conception decreased the risk of recurrent NTD by 71%, equivalent to a 3.5-fold protective effect (Dolin et al., 2018). Apart from that, the U.S. Public Health Service recommended that all women who could become pregnant get 400 micrograms (mcg) of folic acid each day to prevent neural tube defects (CDC, 2022). However, NTDs occur very early in pregnancy, often before a woman knows that she is pregnant. Thus, the Centres for Disease Control and Prevention (CDC, 2020) recommended that all women of reproductive age to get 400 mcg of folic acid every day to prevent from neural tube defects NTDs (Centres for Diseases Control and Prevention, 2020).

Periconceptual folic acid use has been assessed in several other countries yielding different outcomes on the level of understanding, perception, and usage behaviour in association to different demographic and socioeconomic characteristics. Such data, however, is lacking in Malaysia to date (Keshavarzi et al., 2016). Food fortification is considered as the most appropriate preventive approach against malnutrition caused by micronutrient deficiencies. Effectiveness of food fortification approaches to improve nutritional status has been coherently analysed and evidenced (Chadare et al., 2019).

Currently, health agencies in many countries have officially recommended the periconceptional consumption of folic acid in the range of 400–500 mg/day among those young women who can become pregnant or who are planning to conceive (Kondo et al., 2005). Thus, investigating on the level of awareness on periconceptional use of folic acid among primigravida mother is important as a baseline awareness for the healthcare providers for future planning and strategies to enhance the perinatal health.

1.3 Research Question

1. What is the level of knowledge regarding folic acid use among primigravida mothers in Hospital USM?
2. What is the level of practice of periconceptional use of folic acid among primigravida mothers in Hospital USM?
3. Is there any association between knowledge score and practice score of periconceptional use of folic acid among primigravida mothers in Hospital USM?
4. Is there any association between socio-demographic factors (age, education level, and monthly household income,) and level of knowledge of periconceptional use of folic acid use among primigravida mothers in Hospital USM?

1.4 Research Objectives

1.4.1 General Objective

To determine the level of knowledge and practice of periconceptional use of folic acid among primigravida mothers in Hospital USM.

1.4.2 Specific Objectives

1. To identify the level of knowledge regarding folic acid use among primigravida mothers in Hospital USM.

2. To identify the level of practice of periconceptual use of folic acid among primigravida mothers in Hospital USM.
3. To determine the association between knowledge score and practice score of periconceptual use of folic acid among primigravida mothers in Hospital USM.
4. To determine the association between socio-demographic factors (age, education level, and monthly household income) and level of knowledge of periconceptual use of folic acid among primigravida mothers in Hospital USM.

1.5 Research Hypothesis

Hypothesis 1:

: There is no significant association between knowledge score and practice score of periconceptual use of folic acid among primigravida mothers in Hospital USM. (**H₀**)

: There is a significant association between knowledge score and practice score of periconceptual use of folic acid among primigravida mothers in Hospital USM. (**H_A**)

Hypothesis 2:

: There is no significant association between socio-demographic characteristics (age, education level, and monthly household income) and knowledge of periconceptual use of folic acid among primigravida mothers in Hospital USM. (**H₀**)

: There is a significant association between socio-demographic characteristics (age, education level, and monthly household income) and knowledge of periconceptual use of folic acid among primigravida mothers in Hospital USM. (**H_A**)

1.6 Conceptual and Operational Definitions

Table 1.1: Conceptual Definitions and Operational Definitions

TERMS	CONCEPTUAL DEFINITION	OPERATIONAL DEFINITION
Knowledge	Awareness, understanding, or information that has been obtained by experience or study, and that is either in person's mind or possessed by people generally (Cambridge Academic Content Dictionary, 2022).	In this study, knowledge regarding folic acid is asking about the health problem related to folic acid deficiency, food added in folic acid, source of folate, recommended time, recommended age to take folic acid, function of taking folic acid and folate in food can lose through.
Practice	As standard practice, WHO recommends that all women, from the moment they begin trying to conceive until 12 weeks of gestation, take a daily 0.4mg folic acid supplement (Samson et al., 2020).	In this study, practice of periconceptional use of folic acid is referred to the regard folate intake on daily diet. The measurement in this question will be use in the form 4-point Likert scale.

Periconceptional use of folic acid	Women take a folic from the moment they begin trying to conceive or from 4 to 12 weeks before pregnancy until 12 weeks of pregnancy (Kim et al., 2017).	In this study, periconceptional use of folic acid is focused on how frequently mothers visit the physician for consultation and take folic acid in the months before pregnancy.
Folic acid	Folic acid (FA), is the synthetic form of folate, also known as vitamin B9, is a water-soluble B vitamin (B9) (Fekadu et al., 2022).	In this study, folic acid is referred to the consumption of dietary folate from the food containing high folate in periconceptional (3 month before pregnancy) and during pregnancy.
Primigravida mother	Primigravida (PG) is defined as a woman who conceived for the first time, and is in high-risk group (Sehgal et al., 2016).	In this study, all the primigravida mothers are included starting from the age 18 years old and above.

1.7 Significant of the Study

Nowadays, the effectiveness of the folic acid supplement in the prevention of neural tubes is well documented. For optimal prevention, it is recommended that folic acid supplements be commenced at least 1 month before conception as neural tube development begins early in the embryological stage of folic acid (Wilton & Foureur, 2010). According to the World Health Organisation (2022), to reduce the risk of low birth weight, maternal anaemia, and iron deficiency, daily folic acid supplementation is recommended for antenatal care. Daily supplementation throughout pregnancy, begins as early as possible after conception (World Health Organization, 2022).

The Malaysian population uses folic acid at an alarmingly low rate, which raises the possibility of major increases in birth defects if no action is taken to inform this group. Numerous studies have been conducted to raise awareness of the need for primigravida mothers to consume folic acid to prevent any anomalies or early birth problems. The goal of this study is to determine the current level of knowledge among primigravida mothers regarding the usage of folic acid and its relationship to the practice of periconceptional use of folic acid. Healthcare professionals must gauge patients' knowledge of folic acid use to create effective education campaigns that will encourage women to take a lot of folic acid pills before conception or early pregnancy among primigravida mothers.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter review a series of literature regarding the level of awareness and periconceptional use of folic acid among primigravida mothers and the association between a demographic characteristic variable with periconceptional use of folic acid. The general findings of the literature reviews will be presented in 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 study is discussed.

2.2 Folic Acid

Folate is an essential micronutrient that plays an important role in foetal development with the potential for lifelong consequences (Richmond et al., 2018). Folate is a water-soluble B vitamin (vitamin B9) that naturally occurs in foods, such as legumes, citrus, and green leafy vegetables. Folic acid is the synthetic, oxidized form of the vitamin used in supplements and fortified foods. The bioavailability of folic acid and folate differs greatly. Folic acid, which is already in an active mono-glutamate form, is almost completely bioavailable, especially when administered on an empty stomach (Dolin et al., 2018).

One of the benefits of folate when taken during pregnancy is the prevention of foetal neural tube defects (NTDs). Folate and folic acid also have shown benefits or potential benefits in the treatment of cardiovascular disease and diabetes, cancer and antiviral therapies, longer term neurological development in infants and neurological status in adults, treatment of such chronic diseases as arthritis and sickle cell disease, reduction of the effects of radiation exposure, and improvement in neurocognitive function and as additives in various treatments and medications (Brown et al., 2021).

Complication from the vitamin B12 deficiency in pregnancy has been associated with increased risk of pregnancy outcomes, including spontaneous abortion, pregnancy loss, intrauterine growth restriction, low birthweight (<2500 g) and neural tube defects (NTDs). Inadequate supply of vitamin B12 in pregnancy and early childhood can lead to long-term deficits in growth development in children (Finkelstein et al., 2019). Deficiency in B12 alters the levels of total homocysteine, methionine, methylmalonic acid (MMA) and metabolites of 1C cycle including S-adenosyl methionine (SAM) and S-adenosyl homocysteine (SAH), which is associated with various adverse pregnancy outcomes and cardiovascular complications (Adaikalakoteswari et al., 2020).

2.3 Knowledge Regarding Folic Acid Use

Folic Acid is a B vitamin, which is found in different foods but can be best got through a multivitamin. Things such as leafy green vegetables, fortified cereals, orange juice and strawberries are just some of many foods that contain folic acid (Alblowi & Alomayri, 2018). Folic acid deficiency at the time of conception is associated with neural tube defects (NTDs), which include structural anomalies such as spina bifida, encephalocele and anencephaly (Paudel et al., 2012). Folate deficiency during pregnancy is often associated with different adverse pregnancy outcome such as miscarriage, preeclampsia, premature birth, antenatal foetal death, foetal growth restriction, foetal malformations and others (Hlushko et al., 2021).

According to the Centres for Diseases Control and Prevention, its stated that in the worldwide, there are more than 300,000 babies born with neural tube defect each year. Apart from that, the total lifetime, and the direct cost of care for the child born with neural tube defect in United State is estimated \$791, 900. Increasing of folic acid intake among women of childbearing age can prevent 150,000-210,000 of the more than 300,000 neural tube defects that occur each year in low- and middle-resource countries (CDC, 2017).

Birth defect is a major health problem and a leading cause of mortality and economic burden in the world with an estimated 240 000 new-borns die within 28 days of birth every year and 170 000 deaths of children between age of 1 month and 5 years (WHO, 2022). The prevalence of NTDs is unknown in Malaysia, as no large-scale population study has been undertaken. A smaller population-based survey in the Kinta district of Malaysia in 2001–2002 reported a birth prevalence of NTDs of 0.73 per 1000 live births in 17 720 live births. The Malaysian National Neonatal Registry (MNNR) has member neonatal intensive care units from 32 out of 40 public hospitals in Malaysia. These member hospitals delivered more than half of the annual total live births in the country (Boo et al., 2013).

Maintaining a healthy balanced diet is very essential to achieve the optimum level of health throughout life. Importance of nutrition is not only limited during the pregnancy stage, but also equally important before conceiving the child. Maternal diet from the periconceptional throughout the pregnancy is helpful to reduce maternal and foetal morbidities. Good nutrition prior to conception depends upon the availability of nutrients such as calcium and iron. Deposition of such nutrients can help women to maintain good nutrition during pregnancy and ensure the adequate nutrition for development of foetus.

Strong evidence from observational and randomised controlled trials has convincingly shown that folic acid (FA) can prevent the primary and secondary occurrence of NTDs (Mida et al., 2021). Despite this scientific body of evidence and the simple ways to reduce the incidence of all these defects, only a few women found to be aware that FA should be started before pregnancy. Because the process of neural tube formation begins on the 19th day of conception, most women don't become aware of their pregnancy early enough to start FA supplementation (Medawar et al., 2019).

Therefore, it was necessary to run the proper and more effective awareness and encouragement program to promote the dietary habit of women at least before three month of pregnancy and throughout the pregnancy. Previous evidence has proved that diet containing enough folic acid is beneficial to minimize the adverse effect of the pregnancy (Chitayat et al., 2016). Therefore, folic acid is found as one of the important components of nutrition among reproductive aged women.

2.4 Practice of Periconceptional Use of Folic Acid

Primary prevention including specific practices of health promotion, protective procedures, detection, and regulation of environmental pollutants is considered as an essential way for adverse pregnancy outcomes remission. Previous studies have demonstrated that about 70% of adverse pregnancy outcomes such as birth defects are effectively prevented or cured with proper care. One critical step for the primary prevention practice is to investigate the knowledge, attitude, and practice (KAP), which mainly evaluates the understanding and grasping of knowledge, attitude, and expectation as well as related behaviours of the participants. It is confirmed that KAP interacted with each other. This survey was conducted based on the principle that increasing knowledge results in changing attitudes and practices to minimise disease burden. Some practices can be accepted before knowledge increase and attitude change to alter people's awareness of diseases and their physical condition and reduce the number of diseases and social burden (Li et al., 2019). Understanding the practice of periconceptional use of folic acid and improve knowledge on folic acid can help healthcare worker to further plan and implement for the prevention of adverse pregnancy outcomes.

2.5 Periconceptional Use of Folic Acid

Periconceptional period is associated with future noncommunicable diseases in adulthood. In humans, this period consists of about 14 weeks before and 10 weeks after conception, and the essential reproduction processes including gamete production and early embryogenesis occur in this period (Ansari-pour et al., 2019). Periconceptional use, of folic acid defined as initiation of folic acid supplementation before the last menstrual period and termination at the end of the first trimester (Li et al., 2017). Folate, also known as vitamin B9, is the generic term given to a family of chemically similar compounds that have been recognized as beneficial for the prevention of a range of conditions (Scaglione & Panzavolta, 2014).

According to the Centres for Diseases Control and Prevention (CDC) recommended to all women of reproductive age should get 400 micrograms (mcg) of folic acid each day, in addition to consuming food with folate from a varied diet, help prevent neural tube defects (NTDs). In 1992, the United States recommended that women of childbearing age should consume 400 µg of folic acid daily (CDC, 2022). The World Health Organization and many countries recommend that all women take a folic acid supplement from the moment they begin trying to conceive or from 4 to 12 weeks before pregnancy until 12 weeks of pregnancy (World Health Organisation, 2022). In Turkey, it is emphasized that all women of childbearing age planning to get pregnant should consume folic acid supplementation (400 mcg) in addition to dietary sources of folate starting before conception period and throughout the first trimester of pregnancy (Ermumcu et al., 2021).

Many studies have proven that the occurrence of NTDs can be reduced by 75% by periconceptional intake of FA and its recurrence in future pregnancies. Periconceptional period is from 1 month before conception until the first 3 months of pregnancy (Ethirajan

& Pritem, 2020). The recent Cochrane review on the effect and safety of periconceptional oral folic acid supplementation for preventing birth defect concluded that folic acid, alone or in combination with vitamins and minerals, prevent NTDs (Adhikari et al., 2021).

Studies on the influences of the socioeconomic factors have indicated that mothers with higher education and higher social status are less likely to have children with NTDs, but this finding may be partially explained by the fact that these mothers are more likely to use folic acid in preconception period and during the neural tube closure. Another study further confirmed that NTDs were elevated among women did not graduate from high school and lived in a predominantly less educated neighbourhood (Alemajo et al., 2022).

There is consensus that folic acid supplements taken during the periconceptional period substantially reduce the risk of neural tube defects (NTD) in infants (Beynum et al., 2010). The relationship between FA supplementation during the periconception period and the reduction of NTDs are well established. Taking FA orally prior to conception and during the early stages of pregnancy plays a significant role in preventing NTDs and has been associated with preventing other FA sensitive congenital anomalies (Fekadu et al., 2022).

From above evidence it is concluded that consumption of folic acid from periconceptional period is essential to have better maternal and foetal outcomes and help to reduce the infant mortality and morbidity rates. As a result, evidence show that there is need to have effective intervention program to increase the awareness of proper dietary habit and nutrition for reproductive age women prior to conception such as change in lifestyle and focus on healthy diet.

2.6 Primigravida Mothers

Survey-based studies have examined the timing of receiving folic acid supplementation. It is reasonable to assume that primigravida mothers meet health care professionals for the first time and hence, are unlikely to have been exposed to the knowledge and practice of peri-conceptual folic acid supplementation. However, multi-gravida mothers, by virtue of having met obstetricians or other professionals, are likely to have been exposed earlier to the practice of periconceptual folic acid supplementation and hence are more likely to have taken such supplementation. This should translate into higher levels of serum folic acid in multipara mothers during the first trimester as compared to primigravida mothers (Adhikari et al., 2021).

2.7 Factor Associated and Knowledge of Periconceptual Use of Folic Acid

There are many factors that will affect the knowledge of periconceptual use of folic acid. The factors that will be highlighted in this study are the age, educational level, and monthly household income.

Since 1992, the United States Public Health Service has recommended that all women of childbearing age should consume daily supplements containing 400 µg of folic acid. Currently, folic acid supplementation is officially recommended for women of childbearing age in many countries, and national campaigns have been implemented to increase the awareness and consumption of folic acid. In addition, according to the Korea National Health and Nutrition Examination Survey in 2007–2009, only 8.3% of women aged ≥ 20 years took folic acid or multivitamin supplements containing folic acid (Kim et al., 2018).

Female teachers are a well-defined group with good socioeconomic status, well educated, they are accessible, and proposed target for intervention. They are role models

for their students and could reinforce thoughts and ideas among them (Lolowa et al., 2019). In this situation we can say that having a high educational level and high-income level will improve the folic acid knowledge and practice of periconceptional use of folic acid before pregnancy which can reduce the micronutrient deficiencies and low birth defect.

The socioeconomic status (SES) is one of the important factors affecting the health condition of an individual or a family. The economic and social position relatively is being determined by various variables that are responsible for income, education, occupation, family effluence, physical assets, social position, social participation, caste, political influence, and muscle power and can be measured by SES. Several scales have been proposed and reported to evaluate the socioeconomic classes of families in specific circumstances, such as in urban or rural setting (Wani, 2019).

2.8 Theoretical and Conceptual Framework of the Study

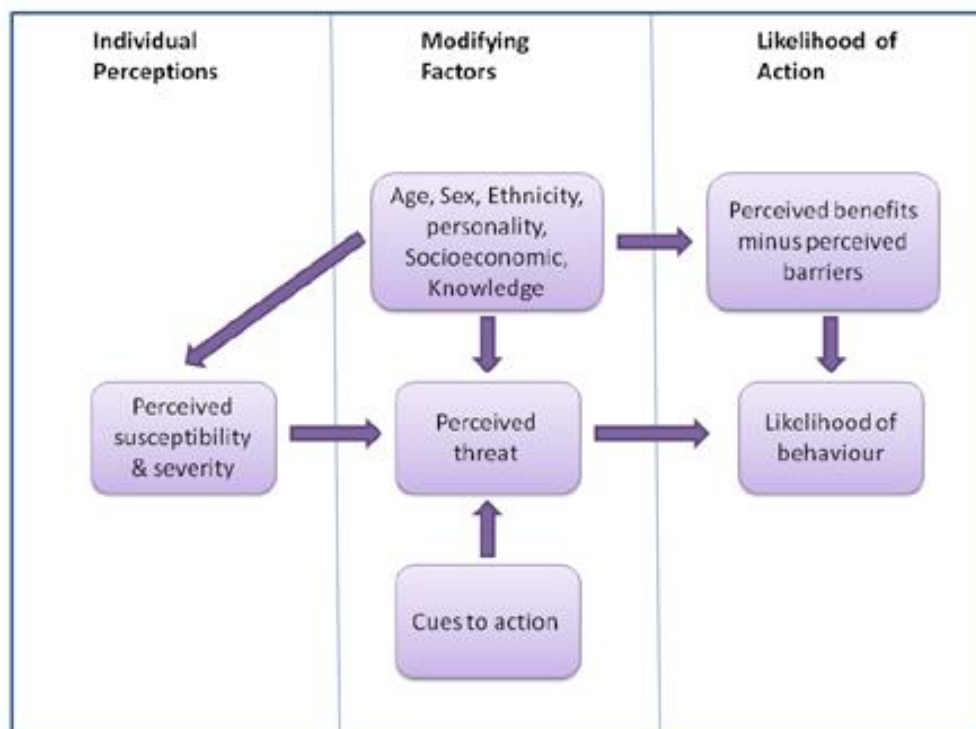


Figure 2.1: The Health Belief Model adapted from Glanz, Rimer & Lewis (2002)

The theoretical framework for this study finds place on the Health Belief Model (HBM). Health Belief Model (HBM) is defined as a health behaviour change model, and it is used to predict individuals' responses and change in their behaviour to prevent diseases. Further explaining, this model was conducted by social psychologists at the U.S. public health service in the 1950s. Today, Health Belief Model is the best-known model which is frequently used in behavioural health-related research and to predict health-promoting behaviour (Chin & Mansori, 2019).

The HBM considers a perceived threat, perceived benefits, perceived barriers, self-efficacy (SE), and cues to action as determinants of willingness to act based on health circumstances. The model assumes that people who anticipate a health threat are more willing to engage in a particular health behaviour. Perceived health threat consists of perceived susceptibility (P-SUS) and perceived severity (P-SEV). Argued that people are more likely to perform a particular action if they expect that such an action will reduce a severe illness (Daragmeh et al., 2021).

Perceived threat and its predicates, perceived susceptibility and perceived severity make the HBM well-suited to studying or modifying behaviours that may contribute to adverse health outcomes. In the HBM, an individual is considered more likely to take appropriate action if the perceived threat of the disease is large. In turn, the perceived threat will be larger if the perceived severity is larger that is, the disease is regarded as a serious problem. Similarly, perceived threat will also be larger if perceived susceptibility is larger—that is, the adverse outcome is regarded as something the individual could reasonably experience (Carico et al., 2021).

When considering folic acid use in the context of the HBM, healthcare provider may be poised to act most directly and most powerfully on these constructs. Educating the

primigravida mothers about the periconceptional use of folic acid for the early stage of the pregnancy is very important to prevent from the neural tube defect. Using the HBM, this study explores modifying factor which are socio-demographic factor that include age, education level, and monthly household income as well as periconceptional use of folic acid among primigravida mothers. Additionally, the HBM can examine if it moderated the relationship between the mentioned variables and periconceptional use of folic acid. This exploratory study will be conducted to identify the level of awareness and periconceptional use of folic acid among primigravida mothers.

This conceptual is available to determine the periconceptional behaviour related to folic acid among primigravida mothers in Hospital USM.

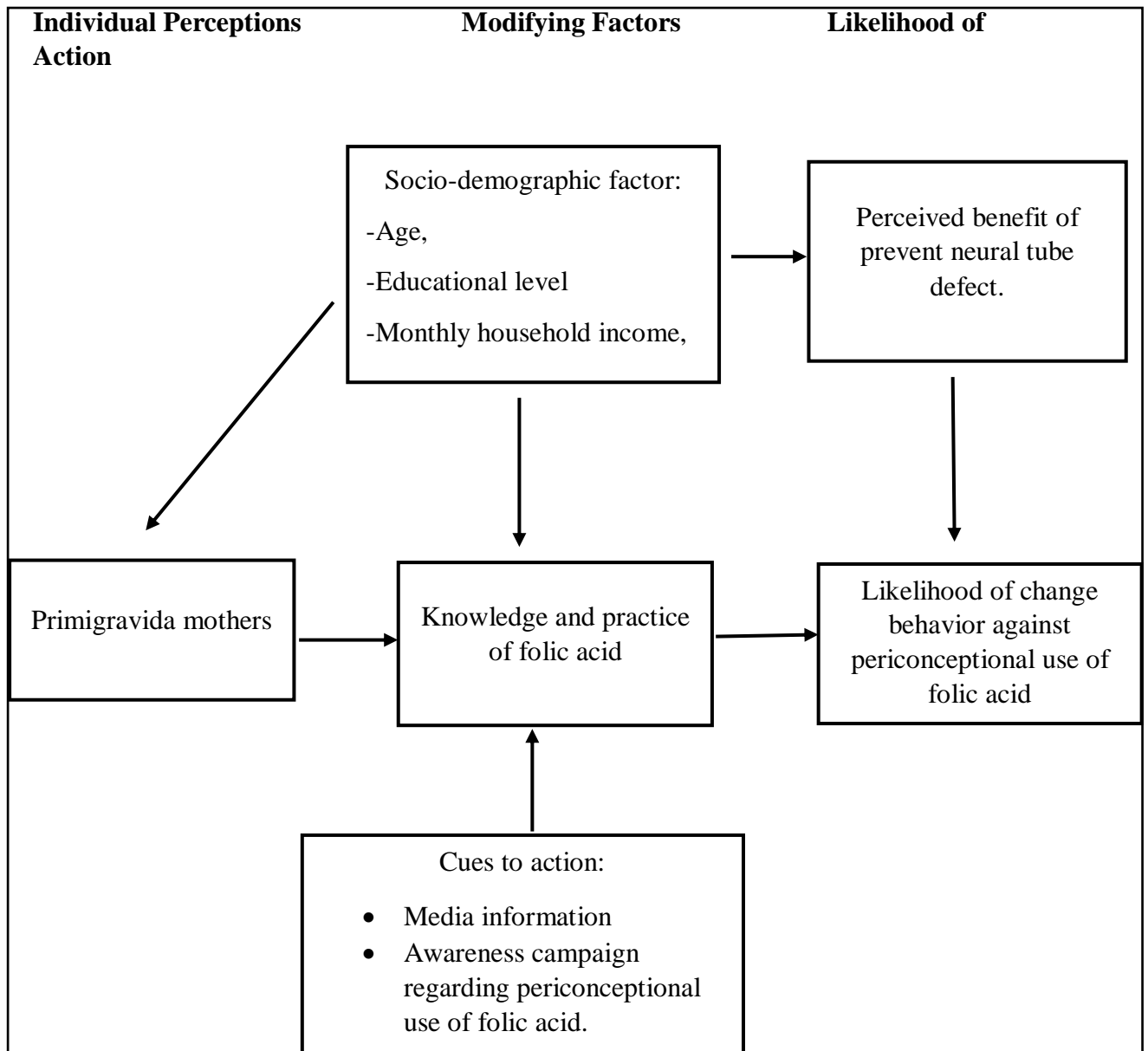


Figure 2.2: Modified Health Belief Model adapted from Glanz, Rimer & Lewis (2002)

CHAPTER 3 METHODOLOGY & METHODS

3.1 Introduction

This chapter explain how the study was carried out including the methodology and methods that has been used. Within this chapter, a flow chart of the research was presented. The actual process of carrying out the analysis, such as research design, population and study setting, sample criteria for inclusion and exclusion and sample collection, was defined along with the methodologist and approaches use. Ethical considerations and the method that has been used in the study were also detailed.

3.2 Research Design

The research design selected for this study was a cross-sectional study using a questionnaire to assess the level of knowledge and practice of periconceptional use of folic acid among primigravida mothers in Hospital Universiti Sains Malaysia.

3.3 Study Setting and Population.

This study was conducted in Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan. This study was conducted between October 2022 until August 2023. Data collection was from January until March. The study was conducted among primigravida mothers that attend the antenatal check-up at Obstetrics and Gynaecology clinic in Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan.

3.4 Sampling Plan

3.4.1 Sample Criteria

Inclusion Criteria

Specific requirement for eligibility in this study of each subject must be:

Ugo et al. (2022).

- Primigravida mother in the first trimester
- Age 19 years old and above
- Able to understand and respond in Malay language.

Exclusion Criteria

Subject is excluded this study if they: Ugo et al. (2022).

- Those who are sick or have other obstetrics complications.

3.4.2 Sample Size Estimation

The sample size was calculated for each study objective. The researcher has chosen the relative greater number of respondents at the end of the full-filled the researcher objectives.

For the first objectives (to identify the level of knowledge regarding folic acid use among primigravida mothers in Hospital USM), the sample size was determined using a single proportion formula.

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

Whereby,

n = Sample size,

z = Value of standard normal distribution, $z_{0.05} = 1.96$

Δ = desired level of precision, $\pm 5\%$

p = Anticipated population proportion = 49.6% (Ahmad Yusof, 2020)

Calculation:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.496(1-0.496)$$

$$n = 384$$

The minimal sample size was 384, and after considering a 10% drop out, the sample size calculated was:

$$n = 384 + 10\%$$

$$= 384 + 38$$

$$n = 422 \text{ participants}$$

Hence, the sample size needed for the first objective in this study is 422 primigravida mothers who fulfilled the inclusion and exclusion criteria.

For the second objectives (to identify the level of practice of periconceptional use of folic acid among primigravida mothers in Hospital USM), the sample size was determined using a single proportion formula.

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

Whereby,

n = Sample size,

z = Value of standard normal distribution, $z_{0.05} = 1.96$

Δ = desired level of precision, $\pm 5\%$

p = Anticipated population proportion = 71.5% (Keshavarzi et al., 2016)

Calculation:

$$n = \left(\frac{1.96}{0.05}\right)^2 0.715 (1-0.715)$$

$$n = 313$$

The minimal sample size was 313, and after considering a 10% drop out, the sample size calculated was:

$$n = 313 + 10\%$$

$$= 313 + 31$$

$$= 344 \text{ participants}$$

Hence, the sample size needed for the second objective in this study was 344 primigravida mothers who fulfilled the inclusion and exclusion criteria.

For the third objectives (to determine the association between socio-demographic factors (age, education level, and monthly household income) and level of knowledge of periconceptional use of folic acid use among primigravida mothers in Hospital USM.), the sample size was determined using two proportion formula.

$$n = \frac{p_1(1 - p_1) + p_2(1 - p_2) (z\alpha + z\beta)^2}{(P_1 - P_2)^2}$$

Whereby,

n = required sample size

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

$z\beta$ = Power of study, 80% ($z\beta = 0.84$)

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

p1 = Less household monthly income (Dessie et al., 2017)

p2 = Greater household monthly income (Dessie et al., 2017)

z = 1.96, Δ = 0.05, p1= 57.3%, p2= 42.7%

Calculation:

$$n = \frac{0.573(1-0.573) + 0.427(1-0.427)(1.96 + 0.84)^2}{(0.573 - 0.427)^2}$$
$$= 101$$

The minimal sample size was 101, and after considering a 10% drop out, the sample size calculated was:

$$n = 101 + 10\%$$

$$= 101 + 10$$

n = 111 participants

Hence, the sample size needed for the third objective in this study was 111 primigravida mothers who fulfilled the inclusion and exclusion criteria.

Therefore, since the available population bigger sample was 422 primigravida mothers and a short time for data collection, sample of 101 primigravida mothers was chosen. Considering 10% of drop out, the total sample size needed will be 111 was taken as a sample size help create a more significant result.