



**Perceived Nutritional Status, Perceived Dietary Self-Efficacy, and Dietary
Behavior among Bangladeshi Pregnant Women**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of
Master of Nursing Science (International Program)**

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Thesis Title Perceived Nutritional Status, Perceived Dietary Self-Efficacy,
and Dietary Behavior among Bangladeshi Pregnant Women

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ABSTRACT

Nutritional anaemia is an important issue in adverse birth outcomes. Dietary intakes affect the health of the mother and fetus. Dietary behavior is significant for appropriate weight gain and the delivery of a healthy baby. The objectives of this study were to identify the levels of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior, and examine the relationships between perceived nutritional status, perceived dietary self-efficacy, and dietary behavior. A descriptive correlation design was used. The sample consisted of 138 pregnant women. Data were obtained by using self-reporting questionnaire. The instruments consisted of four parts. The content validity of original English version questionnaires were judged by a panel of 3 experts in this field and the comments of the experts were used to modify each questionnaire for their appropriateness. The reliability of the Perceived Nutritional Status Questionnaire (PNSQ), the Perceived Dietary Self-efficacy Questionnaire (PDSEQ), and the Dietary Behavior Questionnaire (DBQ) were assessed for internal consistency with 30 pregnant women. These yielded values of .86, .82, and .86, respectively. Descriptive and inferential statistics were used for the

data analysis. Frequencies, percentages, means, standard deviations, and Pearson's product-moment correlation coefficients were used to examine the relationships among variables. The results indicated that pregnant women reported high levels of PNS ($M = 3.77$, $SD = 0.46$), PDSE ($M = 3.97$, $SD = 0.47$), and DB ($M = 3.94$, $SD = 0.47$). All sub dimensions of the PDSE and 2 sub-dimensions of DB were at a high level. Only the supplementary sub-dimension was moderate. The PNS was positively highly correlated with DB ($r = .71$, $p < .01$), and the PDSE was positively very highly correlated with DB ($r = .92$, $p < .01$). The results provide baseline information for providing antenatal care to Bangladeshi pregnant women in relation to increases in supplementary diets during pregnancy to improve childbirth outcomes. However, further studies are needed to determine whether pregnant women in other parts of Bangladesh have similar experiences as those in the urban part.

MY DEDICATION

TO

Hare Krishna. The Sri Krishna is the God in the world who gives me the miracle of my life. My mother is the model in my life; Madop Provu who prays to Krishna for my goodness. My husband, daughter, son, mother in law, brother, sister give me happiness. My best teacher has inspired me to be a good teacher and taught me wisdom. My family and friends have given me spirit.

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CHAPTER 1

INTRODUCTION

Background and Significance of the Problem

Pregnancy is a transitional period when every system in the body is affected. This involves many biological, psychological and social changes that begin from pregnancy and extend to the postpartum period (McCormick, 2003; Tarkka & Paunonen, 1996). A current report has shown that the maternal mortality rate (MMR) in Bangladesh is the worst in South Asia. It is about 570 per 100,000 live births compared to the rates found in neighboring countries such as India and Pakistan, which are about 450 and 320 per 100,000 live births respectively (Investor Relations Information Network [IRIN], 2008). Several reports from 2001-2004 showed that the MMR is 3.2 per thousand live births in Bangladesh (Human Right Impact Resources Center [HRIRC], 2002; Islam, Hossain, Islam, & Haque, 2005; Syed, Asiruddin, Helal, Manna, & Murray, 2006). A recent study found that MMR is still 3.2 per thousand live births (National Institute of Population Research and Training, as cited in Chowdhury, Hossain, & Halim, 2009).

Twenty-one thousand women die annually in Bangladesh due to childbirth (IRIN, 2008). Eighty percent of maternal deaths have occurred in the rural areas; the major causes of death are hemorrhage, infection, hypertensive disorders, obstructed labor and abortion (Daise, 2009; IRIN; Policy Project, 2002). Nutritional anemia during pregnancy is associated with maternal and infant morbidity. More than half of pregnant women were anemic in developing countries (58%) (Galloway et al., 2002).

Forty-six percent of pregnant women were anemic in Bangladesh (Hossain, n.d.). Many undesirable health problems arise during pregnancy such as nutritional anemia; 9 million women were anemic and almost half of all mothers in rural Bangladesh are undernourished (Helen Keller International, 2001). Nutritional anemia is the one leading cause of hemorrhage during childbirth. Hemorrhage is the chief causes of maternal mortality and morbidity (Lowdermilk & Perry, 2004).

Bhutta et al. (2008) found that poverty, poor education, and lack of women's empowerment are the causes of malnutrition during pregnancy. Another study found that poor quality of diet and lack of food due to poverty are the main causes of anemia in Bangladesh (Helen Keller International, 2001). The principal foods eaten by Bangladeshi pregnant women are rice, vegetables and lentils because women cannot afford to pay money for other nutritious food (Galloway et al., 2002; Helen Keller International, 2001; Hyder, Persson, Chowdhury, Lonnerdal, & Ekstrom, 2004). Inadequate supplementary diet intakes are the causes of nutritional anemia during pregnancy and neural tube defects in the newborn (Dickinson, 2002; UNICEF, 2009). Pregnant women in Bangladesh eat last and least because of cultural and traditional beliefs and the lack of resources (Darmstadt, Syed, Patel, & Kabir, 2006; Galloway et al.; Santow, 1995).

Anemia in pregnancy has a significant impact on the health of the fetus and mother. It results in 28 percent fetal loss and 30 percent perinatal and 10 percent neonatal deaths (Sahoo & Panda, 2006). Numerous studies have found that anemia during pregnancy is significantly associated with negative birth outcomes such as pre-term delivery, low birth weight, perinatal mortality and severe anemia (Daise, 2009; Galloway et al., 2002; Sultana, 1999; Wallace et al., 2009). In addition, the inadequate

intake of a nutrient diet has an impact on pregnancy outcomes such as preeclampsia, miscarriage, pre-term birth, low birth weight, and gestational diabetes (Glenville, 2006).

A wide review of the relevant literature showed that dietary behavior and nutrient supplementation could reduce the incidence of many diseases such as iron deficiency anemia and neural tube defect. It can also increase human productivity (Dickinson, 2002; Gardiner et al., 2008; Hughes, 2008). Antenatal care services have approved iron supplementation for pregnant women to reduce anemia in developing countries (Daise, 2009; Galloway et al., 2002). Several programs have been proposed in Bangladesh to reduce nutritional anemia. These include providing supplementary food, iron-folate supplements and nutrition education, distributing vitamin-A capsules after birth and even training for homestead gardening (Helen Keller International, 2001, 2002; UNICEF, 2009). Several studies proposed important interventions to prevent nutritional anemia (Bhutta et al., 2008; Hossain, n.d.). These deal with education, incomes, gardening, and disseminating information on nutrition through mass media, such as T.V, radio, and posters.

The nutritional status of pregnant women depends upon their adequate food intake and other physiological conditions (Azad, 1999). Inadequate nutritional status in pregnancy bears the risk of inadequate pregnancy performance such as low birth weight, and severe mental and physical retardation (Raaij & Groot, 2003). Numerous studies found that dietary behavior is an important for appropriate weight gain and delivering a healthy baby (Bang & Lee, 2009; Daise, 2009; Glenville, 2006). Dietary behaviors can reduce adverse birth outcomes (Bang & Lee). Self-efficacy helps make sense of people's beliefs that are held in self-evaluation and change their thinking and

behavior and affect human performance (Schumacher et al., 2006). Self-efficacy improves food consumption behavior among elderly people with diabetes mellitus (Chaiarsa, Sucamvang, & Pramoch, 2008).

Numerous studies have found that several factors influence dietary behaviors such as knowledge, attitudes, education and cultural beliefs (Chowdhury, 2009; Darmstadt et al., 2006; Hearty, McCarthy, Kearney, & Gibney, 2007; Inglis, Ball, & Crawford, 2005). Another study found that socioeconomic factors influence dietary behavior. People with less income, less education, and who are unemployed consume significantly more fatty food than less nutritious food (Lu, Samuels, & Huang, 2002).

Pregnant women perceived that they should maintain good nutritional status by consuming a well-balanced diet (Gardiner et al., 2008). Knowledge of nutrition and diet was associated with a significant rise in consumption of vegetables and fruits (Vriendt, Matthys, Verbeke, Pynaert, & Henauw, 2009). Changes in women's beliefs could improve their nutrition when they planned for pregnancy (Conlon, Proctor, Stonehouse, & Coad, 2007). Thus, perceived nutritional status may relate to dietary behavior. Dietary self-efficacy is strongly associated with children's food choice (Parcel et al., 1995). Research has shown that the eating behavior scores of an experimental group after undergoing a self-efficacy and social support enhancement program were significantly higher than the control group (Tinamas, Panuthai, & Choowattanapakorn, 2008). Self-efficacious persons have constructive beliefs about their capability to control their dietary behavior (Gutiérrez-Doña, Lippke, Renner, Kwon, & Schwarzer, 2009). Perceived self-efficacy had a significantly direct relationship to health behavior (Sriyuktasuth, 2002; Stuijbergen & Becker, 1994). Thus, perceived dietary self-efficacy may relate to dietary behavior.

Perceived nutritional status (PNS) and perceived dietary self-efficacy (PDSE) could change dietary behavior (DB) which will be more beneficial for pregnant women and their babies. Low intake of nutrients, lack of diet due to poverty, eating rice as the main food, lack of education and hemorrhage during pregnancy are the main causes of nutritional anemia. In conclusion, the reviewed literature suggests that nutritional anemia during pregnancy could be reduced by following a healthy diet, and enhancing the consumption of iron fortified food, and disseminating knowledge through antenatal care (ANC) visits by health care personnel. Therefore, this study will contribute to establish the current status of pregnant women's perception about nutritional status, dietary self-efficacy, and dietary behavior in Bangladesh. In addition, this study should help in making decisions about how to improve the nutritional knowledge of pregnant women by health care providers. Mothers should be able to maintain healthy lifestyles for the sake of the fetus through changing their dietary behavior and this could also reduce maternal and infant mortality rates. In the context of poverty and lack of knowledge, dietary behavior can be a powerful help to improve this situation.

Objectives of the Study

The objectives of this study were as follows:

1. To identify the level of perceived nutritional status among Bangladeshi pregnant women
2. To identify the level of perceived dietary self-efficacy among Bangladeshi pregnant women

3. To identify the level of dietary behavior among Bangladeshi pregnant women
4. To examine the relationships between perceived nutritional status, perceived dietary self-efficacy, and dietary behavior of Bangladeshi pregnant women

Research Questions of the Study

This study aimed to answer the following research questions:

1. What was the level of perceived nutritional status among Bangladeshi pregnant women?
2. What was the level of perceived dietary self-efficacy among Bangladeshi pregnant women?
3. What was the level of dietary behavior among Bangladeshi pregnant women?
4. Are there relationships between perceived nutritional status, perceived dietary self-efficacy, and dietary behavior among Bangladeshi pregnant women?

Conceptual Framework of the Study

The conceptual framework of this study was constructed on Bandura's concept of Self-efficacy (Bandura, 1997) and related literature. According to Bandura, perceived self-efficacy is peoples' beliefs about their capabilities to produce designated levels of performance that have an influence over events that affect their lives. Self-efficacy belief contributes to human adjustment and behavior change, it also determines how people feel, think, motivate themselves and behave (Bandura, 1997). The perception of self-efficacy is placed at the center of Bandura's social

cognitive theory. This emphasizes the role of observational learning and social understanding in the development of personality. The same person in different situations performs a task differently due to the fluctuations of personal efficacy.

Dietary behavior mainly consists of 3 dimensions that include: quality of diet, supplementary diet, and avoiding diet (Gardiner et al., 2008; Hughes, 2008). Quality of diet means a well balanced diet that is needed for proper growth and good nourishment for the health of babies and pregnant women (Hughes, 2008). Supplementary diet means different kinds of additional diet such as iron, folic acid and calcium which are most important during pregnancy (Gardiner et al.). Avoiding diet refers to diets that will be harmful for both mother and child (Hughes).

The nutritional status of pregnant women is associated with adequate food intake and other physiological conditions (Azad, 1999). Pregnant women perceived that they should maintain good nutritional status by consuming a well-balanced diet (Gardiner et al., 2008). A positive attitude towards a healthy diet was related to dietary behavior (Hearty et al., 2007). Pregnant women believe that some foods are restricted because of their dietary requirements, such as some fish, meat and twin fruits which contribute to a large and abnormal baby (Shannon, Mahmud, Asfia, & Ali, 2008). Perceived health status is positively correlated with promoting healthy behavior (Pender, Murdaugh, & Parsons, 2006). Thus, perceived nutritional status may relate to dietary behavior.

Dietary self-efficacy is strongly associated with children's food choice (Parcel et al., 1995). Self-efficacy improves food consumption behavior among elderly people with diabetes mellitus (Chaiarsa et al., 2008). A study found that self-efficacious persons had constructive beliefs about their capability to control their dietary behavior

(Gutiérrez-Doña et al., 2009). Perceived self-efficacy had a significantly direct relationship to health behavior (Sriyuktasuth, 2002; Stuijbergen & Becker, 1994). Thus, perceived dietary self-efficacy may relate to dietary behavior.

Therefore, for this study the researcher used the idea of Bandura's Self-efficacy (1997) as the main concept to describe the relationship between perceived dietary self-efficacy and dietary behavior. In addition, the literature review supported that perceived nutritional status was related to dietary behavior. Thus, the researcher would like to explore the relationship between perceived nutritional status and dietary behavior, perceived dietary self-efficacy and dietary behavior.

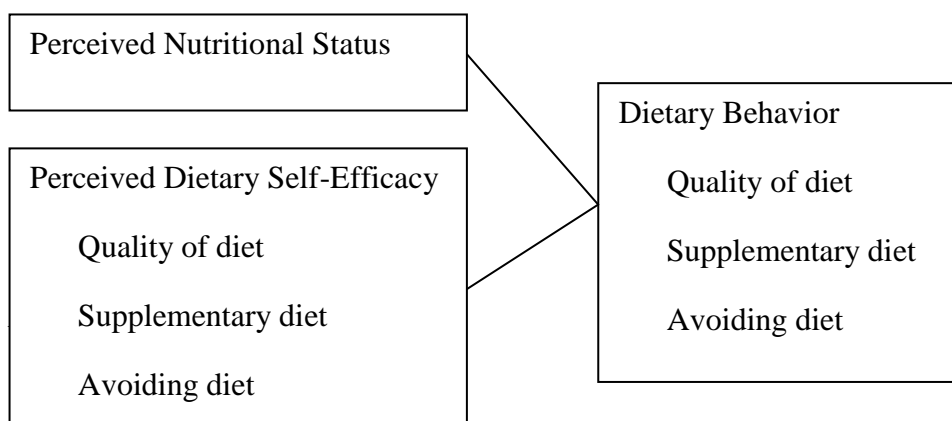


Figure 1

Conceptual Framework of the Study

Hypothesis of the Study

There are positive relationships between perceived nutritional status, perceived dietary self-efficacy, and dietary behavior among Bangladeshi pregnant women.

Definition of Terms

Perceived nutritional status is the pregnant women's opinion related to their current body status and their state of nourishment. The perceived nutritional status was measured by the structured Perceived Nutritional Status Questionnaire (PNSQ) developed by the researcher and based on the literature review. It contains 12 items, and used a five point Likert scale. The scores were divided into three levels: low, moderate, and high. The higher score indicates the higher level of perceived nutritional status.

Perceived dietary self-efficacy refers to the pregnant women's confidence in their ability to perform dietary behavior related to the quality of diet, supplementary diet, and avoiding diet that induced negative birth outcomes. Quality of diet means the well balanced diet that is needed for proper growth and good nourishment for the health of babies and pregnant women. Supplementary diet means the different kinds of additional diet such as iron, folic acid and calcium. Avoiding diet refers to diets that will be harmful for both mother and child. The perceived dietary self-efficacy was measured by the structured Perceived Dietary Self-Efficacy Questionnaire (PDSEQ) developed by the researcher and based on the literature review. It contains 20 items, and used a five point Likert scale. The scores were divided into three levels; low, moderate, and high. The higher score indicates the higher level of perceived dietary self-efficacy.

Dietary behavior refers to pregnant women's current actions to promote their nutritional status which includes quality of diet, supplementary diet and avoiding diets that may induce negative birth outcomes. Quality of diet means a well balanced diet that is needed for proper growth and good nourishment for the health of babies and

pregnant women. Supplementary diet means different kinds of additional diet such as iron, folic acid and calcium. Avoiding diet refers to diets that will be harmful for both mother and child. The dietary behavior was measured by the structured Dietary Behavior Questionnaire (DBQ) developed by the researcher and based on the literature review. It contains 20 items, and a five point Likert scales was used. The scores were divided into three levels; low, moderate, and high. The higher score indicates the higher level of dietary behavior.

Scope of the Study

This study was conducted to explore the levels and relationships between perceived nutritional status, perceived dietary self-efficacy and the dietary behavior of Bangladeshi pregnant women who attended an antenatal care unit at Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh from December 2009 to January 2010.

Significance of the Study

The findings should be valuable for health care providers to create effective nutritional programs. They could also maximize the health potential of Bangladeshi pregnant women specially those who are undernourished. Midwives and other health care providers could apply this study to improve care during prenatal period. It could also enhance the quality of care for antenatal women and reduce maternal and infant mortality and morbidity in Bangladesh.

CHAPTER 2

LITERATURE REVIEW

In this chapter, research is explored and reviewed on perceived nutritional status, perceived dietary self-efficacy and dietary behavior among Bangladeshi pregnant women. This and the literature on several related aspects of the dietary behavior of pregnant women is also dealt with in the following order:

1. Maternal Health Problems in Bangladesh
2. Nutritional Status of Pregnant Women
3. Dietary Self-Efficacy of Pregnant Women
4. Dietary Behavior of Pregnant Women
5. The Relationship between Perceived Nutritional Status, Perceived Dietary Self-Efficacy, and Dietary Behavior of Pregnant Women

Maternal Health Problems in Bangladesh

Bangladesh is the world's seventh most populated country (IRIN, 2008). The total population is 150 million, a half of them are women who live in rural areas and have been found to be less likely to seek health services than men (IRIN). The malnutrition problem is a major public health concern in Bangladesh (Chowdhury, 2009; Sultana, 1999). Almost 515,000 maternal deaths occurred in developing countries including Bangladesh (Islam, Chowdhury, & Akhter, 2006; Koenig et al., 2007). Bangladeshi pregnant women have been suffering from many birth difficulties, such as obstructed labor and prolonged labor due to malnutrition (Daise, 2009).

On the other hand, many complications occur among pregnant women during pregnancy, delivery, and after delivery. Several complications have been found during childbirth including: hemorrhage; prolonged labor; uterine rupture; obstructed labor; abdominal pain; premature leakage; convulsions and eclampsia (Islam et al., 2006). In Bangladesh the majority of pregnant women live in remote villages and the lack of well organized health care facilities contribute to these complications. All this requires adequate ANC to improve the quality of the health of the mother and fetus. A study found that government and non-government organizations (NGOs), such as Bangladesh Rural Advancement Committee (BRAC), have organized nutrition education programs which are delivered through ANC (Shannon, Mahmud, Asfia, & Ali, 2008).

A significant number of maternal deaths occur due to postpartum hemorrhage. Women who enter labor with anemia (hemoglobin concentration $<10\text{g/dl}$) react more quickly to any subsequent blood loss. Competent action by a health care provider is crucial in controlling blood loss and reducing the risk of maternal morbidity or even death. In South Asian countries, several studies found that food allocation between male and female is different; for example, in childhood girls have less to eat than boys (Chatterjee & Lambert, 1989; Darmstadt et al., 2006; Shannon et al., 2008). As a result girls develop anemia when their growing which affects them during pregnancy. Pregnant women are normally taken care of by their family and themselves (Pillitteri, 2007).

Anemia contributes to increasing the high maternal mortality rate and life threatening diseases in Bangladesh and increases and the risk of mothers dying during pregnancy (Hellen Keller International, 2001; Sarkar & Taylor, as cited in Daise, 2009).

A woman may begin pregnancy with anemia or develop it during pregnancy. Pregnant women are considered anemic if the hemoglobin concentration is 10.5 g/dl or lower (Duffy as cited by Murray, McKinney, & Gorrie, 2002). Nutritional anemia is the one leading cause of hemorrhage during childbirth. Hemorrhage is the chief causes of maternal mortality and morbidity (Lowdermilk & Perry, 2004).

Although 84% of mothers received information about diet from an ANC unit they did not utilize it properly because only 15% of mother followed a quality diet (Koenig et al., 2007). On the other hand, more than 45% of mothers were anemic in rural Bangladesh (Hellen Keller International, 2001). The causes of malnourishment during pregnancy are less education, less empowerment and getting the least of resources (Chatterjee & Lambert, 1989; Darmstadt et al., 2006; Santow, 1995). Previous studies found that social status, cultural superstitions and religious beliefs also affect the health of Bangladeshi pregnant women (Blum, Sharmin, & Ronsmans, 2006; HRIRC, 2002). Bangladesh is a developing country; women are over-burdened with poverty on, they suffer imbalanced access to health care, and have less education. These factors increase the morbidity and mortality of women (Islam, 2001). In Bangladeshi pregnant women have been and are affected by many health problems during their childbirth. Therefore, dietary behavior could help to improve this situation.

Nutritional Status

Nutritional status is the physical health of a person that results from the consumption and utilization of food by and in the body (Azad, 1999). The nutritional status of an individual has consequences and an optimal nutritional status is a

powerful factor for health and well-being (Kirch, 2008). Nutritional status is commonly assessed subjectively (directly such as through diet history) and objectively (indirect through laboratory tests). In the following the researcher proposes to discuss aspects of nutritional status, such as the definition of nutritional status, the nutritional status of pregnant women and factors influencing the nutritional status of pregnant women.

Definition of nutritional status and perceived nutritional status

Nutritional status is the state of the body in relation to the consumption and utilization of nutrients (Kirch, 2008). An adequate dietary intake of nutrients and appropriate weight gains are the determinants of nutritional status (Daise, 2009). An ideal nutritional status occurs when the supply of nutrients conforms to the need for nourishment. People can have an optimal nutritious status or they can be under, over or malnourished. Nutritional status is the current body status of a person or a population group related to their state of nourishment (Kirch). Perceived nutritional status is the person's opinion related to the current body status of their state of nourishment. Thus, perceived nutritional status during pregnancy refers to pregnant women's opinions regarding current body status of their state of nourishment.

Nutritional status of pregnant women

The nutritional status of pregnant women is a major public health problem in Bangladesh (Daise, 2009; Sultana, 1999). Iron deficiency anemia is common at child-bearing age and the mother's nutritional status directly affects the fetus weight gain (Daise; Sultana). Low maternal weight gain is associated with infants at risk to low birth weight, developmental problems and mortality. Thus, it is a complex situation for both the mother and the unborn baby. Forty-six percent of women were anemia in

Bangladesh (Hossain, n.d.). This study found that: fifty-five percent of women cannot identify protein, or food rich in energy and micronutrients; seventy-seven percent wash vegetable after cutting; thirty-six percent not consume green or yellow vegetable; and 91% of women do not eat fruit each day. Another study found that 10% of mothers were in low income groups, weight is less than 35 kilograms and, during pregnancy, their mean weight gained was less than 5 kilograms (Islam, 2001).

Pregnant women thought some food should be restricted for the first six month, in order to have a small baby who would be easy to deliver and indigestion would be avoided (Ali, Azam, & Noor, 2004). This study found that restrictions on food led to anemia, malnutrition, low birth weight and intrauterine growth retardation. Another previous study found that only iron fortification could increase the 6.90g/dl hemoglobin concentration in pregnancy (Bhutta et al., 2008). The same study also found that intrauterine growth retardation could be prevented by the consumption of a balanced diet and protein supplements. One previous study found that half of Bangladeshi pregnant women had a BMI less than 18.5. Low BMI is associated with pre-term delivery, low birth weight and anemia (Sahu et al., as cited in Daise, 2009). The nutritional status of pregnant women was not statistically significant different in relation to per capital income, because some food items were grown by the mothers (Sahoo & Panda, 2006). Participant obtained information about nutritional status from helpful sources such as TV, magazines, the Internet, and cookery books which increased their knowledge about nutrients in diets (Bernestine et al., 2008).

The nutritional status of Bangladeshi pregnant women has been assessed by anthropometric measurement, biochemical assessment and the dietary pattern of pregnant women including the intake of quality and supplementary diets (Azad, 1999).

Thus, in the present study to measure the level of perceived nutritional status, pregnant women were asked about this subjectively by using a Perceived Nutritional Status Questionnaire. Nutritional status is commonly measured in the following way:

Anthropometric measurement: Anthropometric measurements are useful criteria for assessing nutritional status. The maternal nutritional status prior to pregnancy is usually evaluated by anthropometric measurement. This measurement depends on body weight, height, and body mass index (Azad, 1999). The Body Mass Index (BMI) of the subject was calculated from the body weight in kg and the squared height in meters by using the following formula:

$$\text{BMI} = \frac{\text{Weight of the subject in kg}}{(\text{Height of the subject in meters})^2}$$

BMI is a good sign of maternal nutritional status. A woman is categorized according to BMI as obese, overweight, normal weight and underweight (Daise, 2009). Underweight is associated with increased threat of pre-term delivery, low birth weight and anemia. The nutritional status is assessed based on a diet history (usual food and beverage intake and adequately of income to purchase necessary food). A physical examination using anthropometric measurements can reveal objective signs of malnutrition. Laboratory tests can reveal nutritional status objectively (indirectly) such as the measurement of hemotocrit or hemoglobin that is necessary to screen for the presence of anemia. The physiological anemia of pregnancy has reference values of hemoglobin that must be adjusted during pregnancy (Moore, 2004). Recording the history is the best method of assessing the nutritional status of pregnant women because they can recall their 24 hours dietary intake from breakfast to dinner. It is thus easy to get more accurate information about their actual intake (Pillitteri, 2007).

Body mass index and laboratory tests are also important assessments of nutritional status. In present study a questionnaire was used to find out the nutritional status of pregnant women. Biochemical assessments regarding nutritional status can be obtained by laboratory test such as hemoglobin level and Hct.

Factors related to the nutritional status during pregnancy

Many factors directly influence the nutritional status of Bangladeshi pregnant women. These include maternal and environmental factors such as inadequate supply of nutrients and alterations in dietary intake of calories (Sultana, 1999). The nutritional status of Bangladeshi pregnant women also depends on their previous nutritional condition. The nutritional status of pregnant women depends on their lifestyle, family performances, financial resources, customs, and cultural desires (Pillitteri, 2007).

A study found that socioeconomic factors contribute to nutritional status of women (Hyder, Ekstrom, Chowdhury, & Persson, n.d.). Another study found that more educated and high income participants participated significantly more in nutrition-related disease management programs (Engelhardt, Ahn, Cho, & Joung, 2006). Dammann and Smith (2009) found that economic conditions influence the nutritional status of reproductive age groups. Women perceived that they should eat a quality diet but could not afford to buy a healthy diet. Two previous studies found that illiteracy, poverty, low income, and social inequity affect the nutritional status of pregnant women (Chatterjee & Lambert, 1989; Islam, 2001). Bangladeshi pregnant women do not eat a well-balanced diet. Malnutrition does not only relate to poverty and inadequate food, but is also related to lack of knowledge about the appropriate utilization of local sources of food. This is an important factor for malnutrition in

Bangladesh (Chowdhury, 2009). Women who had better knowledge of nutrition perform better dietary behavior (Vriendt et al., 2009).

One study found that pregnant women perceived restrictions on some foods due to cultural beliefs. Pregnant women thought that a small baby would be easy to deliver and indigestion could be avoided (Ali et al., 2004). According to Bangladeshi culture children and men are more priority over women for food (Darmstadt et al., 2006). Hindus believe that the cow was created by Brahma to be used for fertilizer and not to eat (Shatenstein & Ghadirian, 1998). Rural Bangladeshi pregnant women believe that some foods were to be avoided and some foods were good for an unborn baby.

Dietary Self-Efficacy

Dietary self-efficacy is an important factor in helping pregnant women to improve their healthy diet. Self-efficacy is mediated by a person's beliefs or expectation about his or her capacity to accomplish certain tasks successfully or to demonstrate certain behaviors (Bandura, 1997). Efficacy beliefs work as a key factor in the generation of human ability. The same person under different circumstance can perform a certain task at different levels, due to fluctuations of their personal efficacy (Bandura, 1997).

Definition of self-efficacy and perceived dietary self-efficacy

Self-efficacy refers to people's confidence in their ability to regulate their motivation, thought processes, emotional states, and social environment which affects a given behavior (Bandura, as cited in Ford et al., 2001). Perceived self-efficacy is a judgment of personal capability to organize and execute a health promoting behavior

(Bandura, 1997). Self-efficacy refers to the belief as to how well one can manage a specific challenging situation. Self-efficacy reflects a person's belief in his or her ability to overcome the difficulties inherent in performing a specific task in a particular situation (Bandura, as cited in Abusabha & Achterberg, 1997). Self-efficacy was defined as the perceived ability to change dietary behavior and outcome efficacy was defined as the beliefs regarding the causal link between diet and health outcome (Abusabha & Achterberg).

Dietary self-efficacy during pregnancy

Self-efficacy is a well-known characteristic of social cognitive theory. Through self-efficacy, pregnant women make the sense of their experience, explore their own cognitions and self-beliefs, engage in self-evaluation, and alter their thinking and behavior (Schumacher et al., 2006). Self-efficacious people are quick to take advantage of opportunity through changing their behavior (Bandura, 1997). The eating behavior scores of the experimental group after receiving a self-efficacy and social support enhancement program were significantly higher than the control group (Tinamas et al., 2008). Self-efficacy reflects a person's belief in his or her ability to overcome difficulties in a particular situation. Judgments about self-efficacy influence choices of behavior such as acquisition of a new behavior (for example, increasing the intake of well-balanced diet during pregnancy) (Bandura, as cited in Abusabha & Achterberg, 1997).

A previous study found that self-efficacy improves the food consumption behavior among the elderly with diabetes mellitus (Chaiarsa et al., 2008). Another previous study found that participants felt very capable and confident in their ability to make behavioral changes (Bernestine et al., 2008). On the other hand, a previous

study found that web-based modified health information could affect a patient's outcomes in pregnancy. For example, it may improve self-efficacy, sharing information with patients in pregnancy, and increase women's senses and satisfaction (Shaw et al., 2008). Perceived dietary self-efficacy refers to the pregnant women's confidence in their ability to perform dietary behavior related to quality of diet, supplementary diet, and avoiding diets that induce their negative birth outcomes. Thus, the present study used Perceived Dietary Self-Efficacy Questionnaire to identify the level of PDSE of pregnant women.

Factors relating to the dietary self-efficacy during pregnancy

Environmental factors influence self-efficacy. People do not live alone; they work together to produce results which they desire. All the following operate as interacting determinants that influence one another bidirectional and bring triadic reciprocal causation: internal personal factors, such as cognitive, affective, and biological events; behavior; and environmental events (Bandura, 1997). Social support is another factor that influences perceived self-efficacy. One study conducted in the United Kingdom revealed that women who received social support had stronger beliefs in self-efficacy (Colodro, Godoy-Izquierdo, & Godoy, 2010).

Vicarious experience (referred to as modeling), social persuasion (activities where people lead), and physiological and emotional states (such as anxiety which can lead to negative judgments of one's ability) strongly influence perceived self-efficacy (Bandura, 1997). Pregnant women feel many physical discomforts so that they take less food. Demographic characteristics such as maternal age, educational levels, and socioeconomic status are also influences on perceived self-efficacy. Knowledge is an important factor which influences self-efficacy. Knowledge is

needed to regulate pregnant women's behavior and firm belief in their personal efficacy to turn concerns into effective preventive actions (Bandura, 1997). People who have a low sense of efficacy are quick to drop out from the practice of healthy habits.

Self-efficacy is influenced by activity related affect. The more positive affect is, the greater the perceptions of efficacy (Pender et al., 2006). Perceived barriers affect the perceived self-efficacy. Although personal factors may have influences on cognitions, affect, and health behaviors, a few personal factors of pregnant women cannot be changed by nursing interventions (Pender et al.). In addition a previous study found that web-based personalized health information could influence the perceived self-efficacy of pregnant women (Shaw et al., 2008).

Dietary Behavior of Pregnant Women

Dietary behavior is one of the important factors for pregnant women to maintain a healthy life. Maternal nutrition can profoundly influence the growth and development of a fetus. The life of the fetus totally depends on the mothers' diet and it gets nutrients from mother through the placenta (Sahoo & Panda, 2006). Pregnant women should take an adequate calorie diet each day. Dietary behavior could be enhanced by the calorie intake of the pregnant woman (Ricci & Kyle, 2009). Energy yielding, body-building and infection-preventing foods are required during pregnancy. For example, rice, green leafy vegetables, meat, fish, egg, cereals determine the health not only the baby but also the mothers.

Definition of dietary behavior

Dietary behavior refers to eating patterns that people follow as well as behavior related to consuming foods (Breslow & Cengage, 2002). Dietary behavior differs from other types of health behavior and its basic forms are essential for life. Some eating behaviors are not necessary to sustain life, such as drinking alcoholic beverages (Breslow & Cengage). Dietary behaviors are an integral part of individual, family, and community lifestyles. Effective modification requires consideration of the factors that determine eating behavior and the use of appropriate behavior-change techniques (Pender et al., 2006). It can be concluded that dietary behavior of pregnant women is the current action followed to promote their nutritional status which affects their childbirth outcomes.

Components of dietary behaviors

Several studies have suggested that to improve mother's nutrition and promote fetal growth they need a nutrient-rich diet that includes a quality diet, a supplementary diet, and an avoiding diet (Bhutta et al., 2008; Helen Keller International, 2002; Hughes, 2008). Another study recommended that a healthy diet and avoiding substances (alcohol, tobacco, and drugs) are the ways of promoting the dietary behavior of pregnant women (Stark & Brinkley, 2007). Based on literature review and according to the functions of diets, there are 3 components of dietary behaviors. These include quality diet, supplementary diet, and avoiding diet.

Quality of diet

During pregnancy, a healthy diet means a well-balanced diet that is needed for proper growth and good nourishment for the baby and mother (Hughes, 2008). A previous study measured the dietary behavior of pregnant women by using a

self-administrated questionnaire (Verbeke & Bourdeaudhuij, 2007). In the present study the researcher measured the dietary behavior by dietary pattern and intake data: Dietary assessment including taking into account the quality of the diet, the supplementary diet and the avoiding diet. The food consumption by each subject was measured by their utensils. The subjects used standard utensils for the amount of dietary intake each day, such as serving plates, cups, spoons and glasses to get the nearest possible approximation of the size of the servings of foods consumed. The serving weights of different food items and their equivalents were based on the daily nutritional requirement for Bangladeshi pregnant women (see Table 1).

A high-quality diet plays an important role in improving the health of the mother and fetus (Bang & Lee, 2009). Three types of foods, energy yielding, body building, and food that prevents infection, are essential during pregnancy (Daise, 2009). For example rice, green leafy vegetables, meat, fish, eggs and cereals are the sources of all these kinds of food. A diet that is required for maternal well-being also brings about the birth of a healthy thriving infant (Azad, 1999). The quality of diet can reduce the risk of complication such as pre-eclampsia and gestational diabetes (Gardiner et al., 2008; Ricci & Kyle, 2009). In Bangladesh, almost two-thirds of the daily diet consists of rice, some vegetables, a small amount of pulses and small quantities of fish. Milk and meat are consumed occasionally. There is some consumption of seasonal fruits and these include mainly papaya and banana which are cultivated all the year (Bhattacharjee, Saha, & Nandi, 2007).

Table 1

Daily Nutritional Requirement of Bangladeshi Pregnant Women

Nutrient element	Quantity	Food stuff	Quantity
Calories	2,500	Rice	235 gm
Protein	1 gm per Kg body weight+extra 10 gm	Wheat	115 gm
Calcium	1 gm	Pulses	90 gm
Iron	40 gm	Leafy vegetables	145 gm
Vitamin-A	750 mg	Others vegetables	90 gm
Vitamin-B1	1.3 mg	Potato or Kachu	75 gm
Vitamin-B2	1.4 mg	Seasonal fruits	90 gm
Niacin	1.7 mg	Milk	235 gm
Vitamin-C	50 mg	Oil	45 gm
Folic acid	150-300 mg	Sugar	30 gm
Vitamin-12	1.5 mg	Fish or meat	60 gm
Vitamin-D	120 mg	Egg	1

Note. From “Nutrition Training Guide” by F. P. Chowdhury 2009, copyright 2009, by the Institute of Public Health Nutrition, Ministry of Health and Family Welfare (p. 61).

Another study found that fruits, vegetables, soybean and soybean products are healthy foods for the pregnant women (Liu et al., 2009). Several studies found that rice and cereals are the main foods of Bangladesh (Bhattacharjee et al., 2007; Helen Keller International, 2001; Hyder et al., 2004; UNICEF, 2009). Most pregnant women

have misconceptions about consuming rice. They have the perception that consuming vegetable is better than consuming more rice, but this is not so. Rice is the main energy ingredient in daily dishes. Each day pregnant women need about 400-500 grams of rice or noodles (Elaine, 2010). Food should be heated until steaming hot and women should avoid eating raw or uncooked fresh meat and freezing ready-to-eat food that is not freshly prepared, such as cold meats, salads and soft cheeses (Verbeke & Bourdeaudhuij, 2007).

A previous study found that pregnant women emphasized the quantity of food more rather than the quality (Gharaibeh, Al-Ma'aitah, & Al Jada, 2005), therefore 75% of pregnant women had nutritional anemia. A sufficient milk intake is essential during pregnancy to meet calcium requirements. Milk is a good source of nutrients such as riboflavin and vitamin D. Milk consumption increases the good feelings of the mother, and the good health of the unborn baby (Lewallen, 2004; Park & Ureda, 1999). Pregnant women should eat a well-balanced diet. This includes 5 categories of food, in accord to the recommended amounts: fruit 2 cups; vegetables 3 cups; grain 8 ounces; meat and beans 6½ ounces; and milk 3 cups (Ricci & Kyle, 2009) (see Table 2). The recommended dietary allocation for pregnant women is approximately 2,500 calories per day (Pillitteri, 2007; Reza, 2008). Murray et al. (2002) stated that extra calories are not really required during the early weeks of pregnancy but an additional 300 calories are needed each day after that time. Pregnant women can get an extra 300 calories easily by a variety of food intakes. Several studies recommended that mothers should take at least six to eight glasses of fluid per day (Hughes, 2008; Pillitteri, 2007).

Table 2

Daily Nutritional Requirement of Pregnant Women

Food Group	1st Trimester	2nd and 3rd Trimesters	Measure your diet as 1 cup or 1 ounce	How to keep in mind
Fruits	2 cups	2 cups	1 cup fruits or juice, ½ cup dried fruit.	Focus on fruits- eats a variety of fruits.
Vegetables	2 ½ cups	3 cups	1 cup raw or cooked vegetables or juice, 2 cups raw leafy vegetables.	Vary your veggies- eat more dark green and orange, vegetable and cooked dry beans.
Grains	6 ounces	8 ounces	1 slice bread; ½ cup cooked pasta, rice, cereal; 1 ounce ready- to-eat cereal.	Make half your grains whole- choose whole instead of refined grains.
Meat and beans	5½ ounces	6½ ounces	1 ounce lean meat, poultry, fish; 1 egg; ¼ cup cooked dry beans; ½ ounce nuts; 1 tablespoon peanut butter.	Go lean with protein-choose low-fat or lean meats and poultry.
Milk	3 cups	3 cups	1 cup milk, 8 ounces yogurt, 1½ ounces cheese, 2 ounces processed cheese.	Get your calcium rich foods- go low-fat or fat-free when you choose milk, yogurt, and cheese.

Note. From “Maternity and Pediatric Nursing,” by S. S. Ricci and T. Kyle, 2009, copyright 2009 by the Lippincott Williams & Wilkins (p. 303).

Good hydration can reduce pregnancy-related complications such as morning sickness, constipation, and urinary tract infections. Milk and juice are considered as

good nutrients; one cup of milk (237 ml) meets the 300 mgs calcium requirement of pregnant women (Hughes, 2008; Park, & Ureda, 1999). Water intake is important for the production of amniotic fluid and dehydration is a leading cause of pre-term labor (Hughes). Daily vitamin D requirement for pregnant women is 400-800 IU, and folic acid is 600 µg. If childbearing women take multivitamins with folic acid, it could reduce the incidence of neural tube defect by 50-70 percent (Dickinson, 2002; Gardiner et al., 2008). Zinc-containing food reduces low birth weight (Hughes; Dickinson).

A study found that pregnant women do not eat some big fish and meat because if they eat big fish the baby will be large (Shannon et al., 2008). Usually Bangladeshi, Indian, and Pakistani women take less food during pregnancy which causes major health problems. They do not taking extra food and even consciously limit their food intake in fear of developing large fetuses (Chatterjee & Lambert, 1989; Darmstadt et al., 2006; Helen Keller International, 2001). Thus, the appropriate intake of qualities diet could ensure the mothers health and fetus development and provide the adequate calories that help in preventing adverse birth outcomes.

Supplementary diet

Pregnancy is a normal physiologic process and changes every maternal organ system and metabolic pathway (Azad, 1999). Bangladeshi pregnant women's mean body weight gains during pregnancy were below the standard weight gain. Pregnant women gained weight significantly if they received supplementation of iron, folate and riboflavin during pregnancy compared with those who did not received any supplementation (Azad, 1999). Dietary counseling improves the supplementary diet of pregnant women. According to physiological demands during pregnancy, there is a

requirement for additional dietary supplementation for fetal growth and preparation for breastfeeding (Wallace et al., 2009).

During pregnancy there is a significant increase in the requirements for folic acid, calcium, iron, zinc, vitamin A, vitamin D, vitamin C and vitamin B (Gardiner et al., 2008). Pregnant women should follow adequate diets for good child births (Institute of Medicine, as cited in Murray et al., 2002). A literature review mostly showed that in early pregnancy, folic acid supplementation is important to reduce the risk of neural tube defects in the newborn (Dickinson, 2002; Gardiner et al.; Hughes, 2008). Pregnant women who received nutrient supplements BMI < 18.5 did better than pregnant women who had not received them (Shannon et al., 2008).

Supplementation of multidimensional micronutrients during pregnancy could reduce nutritional anemia and result in a decrease in maternal deaths (Bhutta et al., 2008). Several studies found that supplementary diets could reduce the risk of low birth weight (Bhutta et al.; Dickinson, 2002; Gardiner et al., 2008). Iron deficiency is the most common cause of anemia in pregnancy world-wide. Subsequent supplementary and other micronutrient diets are essential to reduce nutritional anemia during pregnancy (Hyder et al., 2004; Policy Project, 2002). Anemic pregnant women need to help in choosing iron rich foods. They should get an iron supplementary diet which provides sufficient amounts of iron. Iron is best absorbed when it is taken in between meals and with vitamin C to increase absorption (Murray et al., 2002).

Avoiding diet

Avoiding diets refer to substances that are harmful to the health of both mother and child such as caffeine, alcohol, and tobacco. Undercooked meats are dangerous as they may contain bacteria. Raw eggs, or undercooked poultry may also

contain salmonella (Hughes, 2008; Liamputtong, Yimyam, Parisunyakul, Baosoung, & Sansiriphun 2004; Stark & Brinkley, 2007; Pender et al., 2006). Two studies found that certain foods such as coffee, tea and alcohol can contribute to miscarriage and are considered as leading causes of mental retardation (Hughes, 2008; Liamputtong et al., 2004). Thanomroop (2000) found that 25.6% of pregnant women still drank tea, coffee, soft drinks, and alcohol due to their lack of skill in seeking information about appropriate nutritional behavior.

Bangladeshi pregnant women have local beliefs surrounding dietary practices. They avoid bowal or mregal fish to avoid a large baby and a large baby's mouth. They were beliefs that if they eat twin bananas or fruit the baby will be attached or abnormal (Shannon et al., 2008). Sixty-three percent of Bangladeshi pregnant women avoid fish and meat during pregnancy due to nausea, vomiting, decreased appetite, bad smell and cultural practices. Women should avoid taking alcohol during pregnancy because it interferes with the absorption of some nutrients such as protein, thiamine, folic acid, and zinc (Murray et al., 2002). Verbeke and Bourdeaudhuij (2007) stated that food handling is also an important aspect of good nutritional practices to prevent food-related diseases during pregnancy. Caffeine directly stimulates uterine contraction that results in premature delivery (Murray et al.). Shatenstein and Ghadirian (1998) found that it is a religious belief that the human body is the temple of God. Thus, it was preserved by avoiding such substances as caffeine, alcohol, and tobacco.

Factors relating to the dietary behaviors of pregnant women

Several factors such as cultural practice, social status, superstitions, and selection of food ultimately influenced the dietary behaviors of Bangladeshi pregnant

women (Darmstadt et al, 2006). Two previous studies found that cultural background influenced the eating behavior that is needed according to dietary counseling (Liamputtong et al., 2004; Verbeke & Bourdeaudhuij, 2007). Studies revealed that some dietary taboos and beliefs influence the food habits of Thai and Chinese women during pregnancy. For example: spicy food may result in a hairless baby; and if the mother ate frogs and snakes the new born baby would be naughty and have a scaly skin. Food like papaya salad causes a new born baby to be unhealthy. In addition, there are the possibilities of abortion (Lee et al., 2009; Liamputtong et al.). Traditional and cultural food patterns influence dietary behavior (Bernestine et al., 2008).

Socioeconomic status influences dietary behavior. Those with less income, fewer years of educations, or are unemployed consume significantly more fatty food than less nutritious food (Lu et al., 2002). Two previous studies conducted in developing countries found that poverty influences the dietary behavior of pregnant women. Girls and women often eat last and least due to cultural practice and poverty (Chatterjee & Lambert, 1989; Santow, 1995). Bangladeshi pregnant women ate last and have a negligible diet due to cultural practices (Shannon et al., 2008). Another study found that religious beliefs have a significant impact on dietary behavior. For example, the Hindu beliefs that the cow was created by Brahma to be used for fertilizer not for eating. However, they consume milk and ghee which have important nutritional values (Shatenstein & Ghadirian, 1998).

The educational status of pregnant women and her spouses influences the diet of pregnant women. More educated subjects, whose husband also had higher academic qualifications, had greater intakes of nutrients than those with lower educational status (Azad, 1999). Participants felt that they needed more knowledge

and skill to change their food consumption, for example buying nutritious foods and eating a healthy diet (Bernstine et al., 2008). Another report found that lack of knowledge, superstition, and unhealthy food intakes influence dietary behavior (Chowdhury, 2009). Two studies found that knowledge, attitudes, beliefs and values influenced eating behavior and weight gain during pregnancy (Hickey, 2000; Kendall, Olson, & Frongillo, 2001). One study found that lower educational attainment is associated with lower levels of perceived control and both were associated independently with poor quality diets (Barker et al., 2009).

A study found that income and small family size contribute to dietary intake. High income small families consumed more nutrients than those living in large families with lower incomes (Azad, 1999). Another previous study found that food consumption was not affected by economic status because some families grew food for themselves (Sahoo & Panda, 2006). Income is an important predictor of dietary behavior. The higher the income level, the more frequently is nutritious food consumed (Lu et al., 2002).

Two studies revealed that psychological factors have positive or negative effects on eating behaviors. For example anger, frustration, and insecurity can lead to disturbances in eating behavior (Gardiner et al., 2008; Pender et al., 2006). Good dietary practice encourages selecting food that is high in nutrients. Another study found that psychosocial characteristics, including anxiety, depressed moods, anger, fatigue, and stress were associated with variations in dietary patterns during pregnancy. Pregnant women who were more fatigued, stressed, and anxious consumed more food with macronutrients (Hurley, Caulfield, Sacco, Costigan, & Dipietro, 2005).

Environmental factors influence dietary behavior. These include: the availability of nutrition education, information about food and nutrition, homestead gardening, and the system of processing and distributing food (Bernestine et al., 2008; Popkin, Duffey, & Gorden-larsen, 2005). A study found that environmental factors influence food choices. Some may easily buy a healthy diet from the market, but others felt it difficult to gain access to healthy food in their local environment (Inglis et al., 2005). Work commitments may be a barrier to buying and preparing healthy meals. Homestead gardening has positive impacts on the diet and also increased vegetable consumption rather than eating higher fat foods (Keenan, Abusabha, Sigman-Grant, Achterberg, Ruffing, 1999). Eating outside the home enhances the risk of higher intakes of fat, cholesterol and sodium and lower intakes of calcium and fiber (Pender et al., 2006). For example eating in restaurants involves more intakes of fat and cholesterol than green leafy vegetables, other vegetables and fruits. Pregnant women took more healthy food during pregnancy due to their improved dietary behavior. Health professionals also influence them to take more vitamin supplements (Pope, Skinner, & Carruth, 1997).

The Relationship between Perceived Nutritional Status, Perceived Dietary Self-Efficacy and Dietary Behavior among Pregnant Women

Nutritional status is related to dietary behavior because a health promotion model states that perceived health status positively correlated with promoting healthy behavior (Pender et al., 2006). One study was conducted on women's beliefs about diet and health in the preconception period. They changed their eating behaviors when planning a pregnancy. Then 77% of women used strategies to control their weight

(Conlon et al, 2007). Being overweight is harmful to both mother and fetus. A previous study revealed that motivation about eating healthily was related to healthy dietary behavior (Hearty et al., 2007). No existing data was found about the relationship between perceived nutritional status and dietary behavior in Bangladesh. Therefore, the researcher tried to find the relationship between nutritional status and dietary behavior. The perceived nutritional status may relate to the dietary behavior of pregnant women and those with a good perception about nutrition followed good diet.

Higher perceived self efficacy results in lowered perceptions of barriers to the performance of a particular behavior (Bandura, 1997). Perceived self-efficacy has been concerned mostly with the predictive relationship to behavior change (Schumacher et al., 2006; Stuijbergen & Becker, 1994). One study stated that self-confidence helped in performing behavior; a person with a high perceived self-efficacy tended to have a high sense of mastery (Pichayapinyo, O'Brien, Duffy, & Agazio, 2007). Dietary self-efficacy is directly and strongly associated with the usual food choices (Parcel et al., 1995). Self-efficacy is directly and strongly associated with the health behavior (Sriyuktasuth, 2002). Self-efficacy had a strong direct relationship with promoting behaviors ($\beta = .69, p < .01$) (Bandura, as cited in Taechboonsermsak, Kaewkungwal, Singhasivanan, Fungladda, & Wilailak, 2005). A previous study found that high a self-efficacy score was significantly associated with high weight loss (Bas & Donmez, 2009). The purpose of that study was to look into weight reduction among male and female participants.

Another previous study found that self-efficacy was positively correlated with dietary behaviors (Suwonno, n.d.). Dietary self-efficacy has a positive relationship with the behaviors of haemodialysis patients (Zrinyi et al., 2003). Self-efficacy was

associated with weight loss after controlling through dietary adherence. The study emphasized that reducing fat intake meant reducing blood cholesterol and reducing caloric intake. Greater weight loss was experienced by the group who received a preferred diet (Warziski, Sereika, Styn, Music, & Burke, 2008). Two previous studies found that the food consumption behavior scores of the experimental group were higher than the control group after undergoing a self-efficacy and social support program (Chaiarsa et al., 2008; Tinamas et al., 2008). In another study conducted with gestational diabetes mellitus patients the participants reported that self-efficacy and social support from family and friends for a healthy diet was associated with better dietary scores (Kim, McEwen, Kieffer, & Herman, 2008). A previous study found that health education empowered women to adopt healthy lifestyles. There were significance differences found in the scores of the internal health locus of control and self-efficacy in the experimental group (Bastani, Hashemi, Bastani, & Haghani, 2010).

Summary

Maternal mortality seriously hampers women's life and health. More maternal deaths occur each year in the developing countries including Bangladesh when compared to developed countries. Maternal malnutrition is a serious health problem. Nutritional anemia is the one leading cause of hemorrhage during childbirth. Hemorrhage is the chief causes of maternal mortality and morbidity. The most important health problems during pregnancy are hemorrhaging anemia, infection, hypertensive disorders, obstructed labor, and abortion. Lack of knowledge and poverty are the main causes of nutritional anemia. Anemia during pregnancy is

significantly associated with negative birth outcomes such as pre-term delivery and low birth weight, and intrauterine growth retardation. Dietary behavior can improve the mother's health and development of the fetus.

There has been limited research in Bangladesh about the perceived nutritional status of pregnant women. Even the available data suggests that more than half of the pregnant women are anemic in Bangladesh. No exiting data was found about the relationship between perceived nutritional status and dietary behavior, and dietary self-efficacy and dietary behavior among pregnant women. Therefore, the current study aimed to study the level of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior and to investigate the relationships between these three variables among pregnant women in Bangladesh.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research design, population and setting, sample and sampling, instrumentation, ethical considerations, data collection procedures, and data analysis of the study.

Research Design

A descriptive correlational study was used to investigate the levels of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior and to examine the relationship between perceived nutritional status, perceived dietary self-efficacy, and dietary behavior among Bangladeshi pregnant women.

Population and Setting

The target population was pregnant women who attended an antenatal care unit for antenatal check up. The setting for this study was Shaheed Suhrawardy Medical College Hospital Dhaka, Bangladesh. This teaching hospital consisted of 375 beds. This hospital is situated in the central part of Dhaka. Thus, this hospital was representative of the setting in order to get eligible samples of the target population for the current study.

Sample and Sampling

Sample and sample size

The sample refers to the Bangladeshi pregnant women who received antenatal care from Shaheed Suhrawardy Medical College Hospital during December 2009 to January 2010. The sample size of this study was estimated by using power analysis, an effect size of .25, an accepted power of .80, and an accepted minimum significance level .05. The sample size consisted of 126 pregnant women. No existing studies related to this topic were found, thus, the researcher used an effect size of .25 to gain a sufficient sample size. Polit and Beck (2008) stated that most nursing studies used an effect size of less than average to make a sufficient sample size.

Sampling technique

Convenience sampling was used for recruiting eligible subjects for this study. The inclusion criteria for selecting the subjects for this study were as follows:

1. Primipara pregnant women (pregnant women who had no previous child)
2. No complication during pregnancy (pregnant women had no any disease such as hypertension, gestational diabetes, or anaemia).

Instrumentation

The instruments used for this study were the structured questionnaires developed by the investigator. Four instruments were constructed of four parts: 1) a Demographic Characteristics and Pregnancy History Questionnaire (DCPHQ); 2) a Perceived Nutritional Status Questionnaire (PNSQ); 3) a Perceived Dietary Self-Efficacy Questionnaire (PDSEQ) and 4) a Dietary Behavior Questionnaire (DBQ).

Part 1. Demographic Characteristics and Pregnancy History Questionnaire (DCPHQ)

This questionnaire consisted of 22 items including demographic data (11 items) and information about the present pregnancy (11 items). Information was requested regarding each woman's age, religion, education, occupation, marital status, family income, family characteristics, and geographical area of residence and distance from the hospital. The researcher constructed obstetric information regarding their last menstrual period (LMP), gestational age, common problems, planned or unplanned pregnancy, and other laboratory test reports. These included hemoglobin level, body weight, height, and BMI (APPENDIX B).

Part 2. Perceived Nutritional Status Questionnaire (PNSQ)

The Perceived Nutritional Status Questionnaire (APPENDIX B) was used to identify the level of PNS of the pregnant women. It consisted of 12 items and all items were framed positively. Each item was worded as a statement for rating the agreement or disagreement on a 5-point Likert scale.

Part 3. Perceived Dietary Self-Efficacy Questionnaire (PDSEQ)

The Perceived Dietary Self-Efficacy Questionnaire was used to identify the level of PDSE of pregnant women. It consisted of 20 items that were composed of 3 components including quality of diet (10 items), supplementary diet (6 items), and avoiding diet (4 items). Quality of diet meant a well balanced diet that is needed for the proper growth and good nourishment for the health of the baby and pregnant woman. Supplementary diet means different kinds of additional diet items such as iron, folic acid, and calcium. Avoiding foods refer to foods that are harmful to both

mother and child. A 5-point Likert scale was used to range the scores. Twenty items were framed positively.

Part 4. Dietary Behavior Questionnaire (DBQ)

The Dietary Behavior Questionnaire was used to identify the current action to promote the nutritional status of pregnant women. It consisted of 20 items that were composed of 3 components including quality of diet (11 items), supplementary diet (5 items), and avoiding diet (4 items). Quality of diet meant a well balanced diet that is needed for the proper growth and good nourishment for the health of the baby and pregnant woman. Supplementary diet means different kinds of additional diet such as iron, folic acid and calcium. Avoiding diet refers to diet items that will be harmful to both mother and child. Each item was worded as a statement for rating agreement or disagreement on a 5-point Likert scale. Twenty items were framed positively.

All of those questionnaires were scored from 1 to 5 in terms of: 1 = strongly disagree; 2 = disagree; 3 = some agree; 4 = agree; 5 = strongly agree. The higher scores indicated the higher level of each variable. Total score ranged from 1-5. The range of score was divided into three levels by using Kiess's (1996) cut off points: (1.00 - 2.33) low; (2.34 - 3.67) moderate; and (3.68 - 5.00) high.

Translation of the instruments

In this study, all questionnaires were translated using the back-translation technique (Sperdr & Deveellis, 1994). The original English versions of questionnaires were translated to a Bengali version by a Bangladeshi bilingual translator. Another bilingual translator translated the Bengali version into English. Finally, the two English versions were examined for comparability of language and similarity of interpretability by the thesis advisory committee. Comparability of language refers to

similar words; phrases, and sentences between the original and back translated versions. Similarity of interpretability refers to the degree to which the two English versions would engender the same attitudinal response even with different words.

Validity and reliability of the instruments

Validity of the instruments. The content validity of all the questionnaires the PNSQ, PDSEQ, DBQ, and DCPHQ were examined by a panel of 3 experts in this field: These were two nursing instructors from the Faculty of Nursing, Prince of Songkla University, Thailand and one nursing instructor from College of Nursing Mohakhali, Dhaka, Bangladesh. The comments of the experts were used to modify each questionnaire as appropriate.

Reliability of the instruments. The reliability of the PNSQ, PDSEQ, and DBQ were assessed by using Cronbach's alpha coefficient with 30 pregnant women. Cronbach's alpha coefficients were .86 for the Perceived Nutritional Status Questionnaire, .82 for the Perceived Dietary Self-Efficacy Questionnaire, and .86 for the Dietary Behavior Questionnaire. These values were considered to be adequate and acceptable. Furthermore, for the sample size of 138 pregnant women in this study, Cronbach's alpha coefficients of these instruments were .82, .86, and .86, respectively.

Ethical Considerations

Data were collected after the approval of the research proposal was granted by the Research Ethics Committee of the Faculty of Nursing, Prince of Songkla University, Thailand. After obtaining permission from the director of the Shaheed Suhrawardy Medical College Hospital in Dhaka, the researcher approached the potential subjects. The researcher explained the purpose of the study and asked for

volunteers to participate in this study. Verbal consent for the illiterate participants and a written consent form were obtained from the subjects. They were informed that they had freedom to ask for explanations regarding the instruments or to withdraw from the study at any time without any reason or penalty. All information and responses in connection with this study would remain confidential. A code was used, so that subjects' identity was not discovered.

Data Collection Procedures

Data were collected at Shaheed Suhrawardy Medical College Hospital in Bangladesh from December 2009 to January 2010. The steps in the data collection were as follows:

Preparation phase

1. The researcher submitted the application form for seeking permission from the director of the hospital.
2. The researcher explained the purposes and benefits of the study to the director and head nurse of the antenatal care unit.

Implementation phase

1. The researcher identified subjects who met the inclusion criteria and the subjects were recruited to participate in the study by the researcher.
2. The researcher explained and provided the written consent form (APPENDIX A) and verbally informed the participants how to complete the questionnaire.
3. The selected subjects were given the questionnaires after they signed the consent form.

4. The data were collected by using the structured questionnaires, and the researcher read these for the participants who were unable to read and write. However, if they were able to read and write the Bengali language, they were allowed to write the answer on the questionnaire given to them. If the participants could not understand, the researcher explained and clarified more fully. Data were collected from 8.00 am to 2.00 pm of the official day time (6 days in a week). Each client spent no more than half an hour filling up the questionnaire. After completing the questionnaires, the researcher thanked the participants for spending their valuable time to participate in the study.

Data Analysis

The collected data were processed using statistical analysis including descriptive statistics and inferential statistics.

Descriptive statistics

Descriptive statistics were used to analyze the data. Descriptive statistics consisting of frequencies, percentages, means, and standard deviations were used to analyze the subjects' demographic characteristics and the levels of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior among Bangladeshi pregnant women.

Inferential statistics

The assumptions of correlation tests were conducted initially to test the assumptions prior to running the parametric tests. These assumptions included the subjects must be representative of the population, the variables that were being correlated have a normal distribution, approximate the normal curve, and be linear. In

this study, all assumptions were met. Then, Pearson's product-moment correlation coefficients (r) was used to test the correlation between the perceived nutritional status, perceived dietary self-efficacy, and dietary behavior.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents and discusses the findings of the study. The results of this study are presented as follows: subjects' characteristics; level of perceived nutritional status; perceived dietary self-efficacy; dietary behavior, and relationships between perceived nutritional status; perceived dietary self-efficacy; and dietary behavior among Bangladeshi pregnant women.

Results

Subjects' demographic characteristics

The sample consisted of 138 pregnant women who attended the antenatal care unit of Shaheed Suhrawardy Medical College Hospital in Dhaka, Bangladesh. The age of the subjects ranged from 14 to 35 years with a mean score of 21.48 years (SD = 3.145). More than half of the subjects were young adults (20-25 years) (58.7%) and 32.6% of the subjects were teenagers. Most of the subjects were Muslim (94.9%). Fifty-seven pregnant women (41.3%) had completed at least high school. The majority of the pregnant women was housewives (73.2%) and lived with their spouse (99.3%). The average total family income of pregnant women was Taka 10,340.58 (\$ US 148) per month and 55% of the pregnant women had incomes ranging between Taka 5,000 - 10,000 per month (approximately \$ US 71.42 - 142.85). More than half of the subjects lived in a nuclear family (52.9%) and were living in urban areas (87.0%). Most of the subjects reached hospital within half an hour of leaving home

(67.4%). Most cooked food for themselves (71%) (see Table 3). Almost all the pregnant women (96.4%) had their baby through planning. All subjects took food with their family members and 99.3% of pregnant women regularly took 3 meals a day. Most of pregnant women (97.1%) did not know their hemoglobin level before pregnancy.

The majority of subjects did not check their hemoglobin level during pregnancy (63%). One-third (37%) of the subjects checked their hemoglobin level during pregnancy, 8.6% was <11gm/dl and 28.4% was >11gm/dl. The majority of subjects did not know their body weight before pregnancy. Only 44.7% of the subjects knew their previous body weight, thus it was not possible to interpret all the subjects' body weights in this study. The mean score of weight during pregnancy was 51.82 kgs, (SD = 9.4 kgs, Min-Max = 30-104). The mean score of height was 148.67 cms, (SD = 10.19cms, Min-Max = 118-165) (see Table 4). In the current study most participants were unable to give information about their preconception weight. Thus, it was not possible to calculate the BMI, and the questionnaire was used to know their nutritional status.

Perceived Nutritional Status, Perceived Dietary Self-Efficacy, and Dietary Behaviors of Pregnant Women

The results indicated that the level of perceived nutritional status, the perceived dietary self-efficacy, and the dietary behaviors were at a high level, but the supplementary diet of dietary behavior was found to be at a moderate level (see Table 5).

Table 3

Frequency and Percentage of Subjects' Demographic Characteristics (N = 138)

Variables	n	%
Age (years) M = 21.48, SD = 3.14, Min-Max = 14 -35		
14-19	45	32.6
20-25	81	58.7
26-30	11	8.0
31-35	1	0.7
Religion		
Muslim	131	94.9
Hindu	7	5.1
Educational level		
No schooling	13	9.4
Primary school	30	21.8
High school	57	41.3
School secondary certificate	17	12.3
Higher secondary or more	5	3.6
Bachelor degree	10	7.3
Master degree	2	1.4
Other specify	4	2.9
Occupation		
House wife	101	73.2
Labored	23	16.7
Nongovernmental employer	7	5.1
Governmental employer	7	5.1
Marital status		
Married and living with spouse	137	99.3
Divorced/ separated	1	0.7

Table 3 (Continued)

Variables	n	%
Total family income (Taka) M = 10,340.58, SD = 7,632.28, Min-Max = 2,000 - 50,000		
Equal or < 5000	30	21.7
5001-10,000	76	55.1
10,001-15000	19	13.8
15,001-20,000	5	3.6
Family characteristics		
Nuclear family	73	52.9
Extended family	65	47.1
Living place		
Rural	18	13.0
Urban	120	87.0
Distance home to hospital (hrs) M = 1.44, SD = 0.74, Min-Max = 1- 4		
½ an hour	93	67.4
½-1 hour	33	23.9
1-1½ hour	8	5.8
Other specify	4	2.9
Preparing food in your family (M = 1.38, SD = 0.60)		
Self	98	71.0
Mother/ mother in low	31	22.5
Servant	5	3.6
Other	4	2.9
Eating the same time as other people in your family		
Yes	138	100.0
No	0	0.0

Table 4

Frequency and Percentage of Subjects' Pregnancy History (N = 138)

Variables	n	%
Gestational age (weeks) M = 23.70, SD = 8.23, Min-Max = 9 - 40		
First trimester (1-13 weeks)	19	13.8
Second trimester (14-26 weeks)	64	46.4
Third trimester (27-39 weeks)	53	38.4
Knowing weight before pregnancy		
Yes	62	44.9
No	76	55.1
Taking 3 meals per day		
Yes	137	99.3
No	1	0.7
Knowing hemoglobin level before pregnancy		
Yes	4	2.9
No	134	97.1
Hemoglobin level during pregnancy		
Not done	87	63.0
<11 mg/dl	12	8.6
>11 mg/dl	39	28.4
Planning to have this baby		
Yes	133	96.4
No	5	3.6
Weight during pregnancy (kgs) M = 51.82, SD = 9.40, Min-Max = 30-104		
Height (cms) M = 148.67, SD = 10.19, Min-Max = 118-165		

Table 5

Level of Perceived Nutritional Status, Perceived Dietary Self-Efficacy, and Dietary Behavior among Bangladeshi Pregnant Women (N = 138)

Variable	M	SD	Level
Perceived nutritional status	3.77	0.46	High
Perceived dietary self-efficacy	3.97	0.47	High
Quality diet	3.86	0.54	High
Supplementary diet	3.75	0.60	High
Avoiding diet	4.57	0.43	High
Dietary behavior	3.94	0.47	High
Quality diet	3.92	0.53	High
Supplementary diet	3.41	0.70	Moderate
Avoiding diet	4.63	0.39	High

Level of perceived nutritional status

The pregnant women scored a high level of mean score of PNS (M = 3.77, SD = 0.46) (see Table 5). In addition, more than half of the pregnant women reported a high level of PNS (55.1%) (see Table 6).

Level of perceived dietary self-efficacy

The pregnant women scored a high level in the overall mean score of PDSE (M = 3.97, SD = 0.47) and in all sub-dimensions: self-efficacy seeking of quality diet (M = 3.86, SD = 0.54); self-efficacy of taking supplementary diet (M = 3.75, SD = 0.60); and self-efficacy of avoiding unhealthy diet (M = 4.57, SD = 0.43) (see Table 5). In addition, the majority of pregnant women reported a high level of PDSE

Table 6

Frequencies and Percentage, Classified by Each Level of Perceived Nutritional Status, Perceived Dietary Self-Efficacy, and Dietary Behavior among Bangladeshi Pregnant Women (N = 138)

Variables	Level					
	Low		Moderate		High	
	n	%	n	%	n	%
Perceive nutritional status	0	0	62	44.9	76	55.1
Perceived dietary self-efficacy	0	0	36	26.1	102	73.9
Quality diet	0	0	48	34.8	90	65.2
Supplementary diet	0	0	66	47.8	72	52.2
Avoiding diet	0	0	5	3.6	133	96.4
Dietary behavior	0	0	35	25.4	103	74.6
Quality diet	0	0	45	32.6	93	67.4
Supplementary diet	5	3.6	84	60.8	49	35.6
Avoiding diet	0	0	2	1.4	136	98.6

(73.9%) and 26.1% of the pregnant women reported a moderate level for this variable (see Table 6).

Level of dietary behavior

The pregnant women scored a high level for the overall mean score of dietary behavior ($M = 3.94$, $SD = 0.47$) and two sub-dimensions of dietary behavior were at high level. Only the supplementary diet was at a moderate level ($M = 3.41$, $SD = 0.70$) (see Table 5). In addition the majority of pregnant women scored a high level of

dietary behavior (74.6%) and 25.4% of the pregnant women reported a moderate level of dietary behavior (see Table 6).

The Relationship between Nutritional Status, Dietary Self-Efficacy, and Dietary Behavior among Bangladeshi Pregnant Women

The Pearson product-moment correlation coefficients (r) were used to analyze the correlations between PNS and DB, and between PDSE and DB. According to Munro (2001, pp. 233-234), the strength of the correlation coefficients categorized as .70-.89 is a high correlation and .90-1.00 a very high correlation between the variables. Thus, the study's findings show that there was a high positive statistically significant relationship between PNS and DB ($r = .71, p < .01$). There was a very high positive statistically significant relationship between PDSE and DB ($r = .92, p < .01$) (see Table 7).

Table 7

The Relationship between Perceived Nutritional Status, Perceived Dietary Self-Efficacy, and Dietary Behavior among Bangladeshi Pregnant Women (N = 138)

Variables	Dietary behavior (r)
Perceived nutritional status	.71**
Perceived dietary self-efficacy	.92**

** $p < .01$

Discussion

The findings are discussed in four parts: perceived nutritional status; perceived dietary self-efficacy; dietary behavior and the relationships between these variables.

Perceived nutritional status

These findings revealed that the pregnant women scored a high level of perceived nutritional status. The majority of subjects were young adults and most of the women lived in urban areas. They were able to get information from the health care providers because it was easy to access care. Moreover, they could get information from different sources such as non-government organizations (NGOs) and television (TV), radio, and posters to improve their nutritional status. Similarly a previous study found that participant got information about nutrition from helpful sources such as TV, magazines, internet, and cookery books which increased perceptions about healthy diets (Bernestine et al., 2008). Another study found that pregnant women reported the main sources of nutritional information as the media and they would seek advice from health professionals (Conlon et al., 2007). Thus, social acceptance seems to be a resource which increases and enhances motivation as well as promoting the need to improve nutritional status.

More than half of the pregnant women had good socio-economic status that could help to access facilities and give opportunities to obtain and maintain their high level of nutritional status and well-being. Consistently, study has found that economic conditions influence the nutritional status of the reproductive age group. Women might perceive that they should eat a quality diet but could not afford to buy food to make up a healthy diet (Dammann & Smith, 2009). In addition, 41.3% of the pregnant women attended high school and 27.4% were educated to a higher level. Education is

important for decision making, understanding information, and planning health behaviors (Pender, 1987). Education can influence the maturation of thought through knowledge. Therefore, knowledge is an important aspect of the cognitive dimension which influences the perception of pregnant women's nutritional status. Similarly, previous studies found that lower educational attainment is associated with lower levels of perceived control and that these were associated with poor quality diets (Barker et al., 2009).

This study included only subjects who were primipara and had no complications. They ate all kind of foods therefore, they might perceive a high level of nutritional status. As newly pregnant women they were more conscious about their nutritional status and other health promoting behaviors and they were more willing to obtain any new information. A previous study revealed that awareness is necessary to make the link between nutrition and related health problems (Engelhardt et al., 2006).

From Table 8, it can be seen that 54.3% of the pregnant women strongly agreed that their baby's growth depended on their own nutritional status. Moreover, 57.2% of subjects agreed to take a diet containing iron and 39.1% agreed about a healthy diet. However, a previous report found that illiteracy, poverty, low incomes, and social discrimination affect the nutritional status of pregnant women (Islam, 2001). Other studies found that inferior social status influenced the women's perceived nutritional status in developing countries (Santow, 1995). Similarly in this study the subjects were living in the city where they could access health information and most of them had some education so they might therefore report high levels of perceived nutritional status. Another reason might be because they liked to give positive answers to the health care providers.

Perceived dietary self-efficacy

These findings revealed that the pregnant women reported a high level of perceived dietary self-efficacy. From table 9, more than half of the subjects (51.4%) were healthy mothers because they agreed about appropriate amounts of food to take in every day. They were more confident about their rationale for dietary efficacy so that 80% of the subjects strongly agreed about avoiding uncooked and unclean food. As a result they were more self-efficacious women who avoided unhealthy food to prevent food borne diseases during pregnancy. Bandura (1997) stated that perceived self-efficacy beliefs contribute independently to intellectual performance. For example, different persons under the same circumstance can perform a certain task in a different way, due to fluctuations in their personal efficacy. Similarly, a previous study found that participants were very capable and confident in their ability to make behavioral changes (Bernestine et al., 2008). Self-efficacy includes the strength to be persistent in the face of obstacles to any specific behavior. For these reasons, in the present study pregnant women reported a high level of PDSE.

In this study information was important to each first pregnant woman. Most of the subjects obtained information from non-government organizations such as Bangladesh Rural Advancement Committee (BRAC) and Marry Stop Clinic before they came to the ANC. The study found that primigravida women were attentive and interested in their pregnancies because they had never previously experienced them (Klankhajhon, 2008). Such women may practice better self-care behavior than women who had had a number of pregnancies. Similarly, another study found that web-based modified health information could affect patient outcomes in pregnancy. Thus, it may improve self-efficacy, help the sharing of information with patients in pregnancy, and

increase women's good feelings and satisfaction (Shaw et al., 2008). Such theory claim that mass media, especially TV, plays a significant role in informing the public about the health risks that help to prevent disease (Bandura, 1997).

In addition, 27.4% of subjects were educated at higher levels and 41.3% of pregnant women had attended high school. Educated people are more self-efficacious. Similarly, a previous study found that health education empowers women to adopt healthy lifestyles. There were significance differences found in the scores of the internal locus of health control and self-efficacy in an experimental group (Bastani et al., 2010). Knowledge is needed to regulate pregnant women's behavior and to hold firm beliefs in their personal efficacy (Bandura, 1997). People who have a low sense of efficacy are quick to drop out from the practice of healthy habits.

Moreover, this study found that the majority of subjects (60.2%) visited an ANC early within the first and second trimester. Doctors were able to prescribe iron tablets and 28.3% of the pregnant women agreed to take iron and multivitamin tablets regularly (see Table 9). Furthermore, the data showed that most of the participants (99.3%) were married and living with their spouse and the majority lived in an extended family. Consequently they got the support for access to an ANC service easily. A previous study found that women who received social support will have strong beliefs in their self-efficacy (Colodro et al., 2010). Another study found that pregnant women who enjoyed more social support engaged in more good health practices (Cannella, 2005). In the second trimester, pregnant women improved their physical discomfort as they understood the reality of pregnancy. Such women may be eager to learn and share information with other pregnant women (Thanomroop, 2000).

All the subjects included in the present study had no complications during pregnancy, and did not feel any complications about their food intake. In addition, the pregnant women reported a high level of quality diet of PDSE ($M = 3.86$, $SD = 0.54$), and 65.2% of the pregnant women reported a high level of PDSE in terms of quality diet (see Table 6). In contrast, a previous study found that participants had no health problems, but they felt that consuming a quality diet was out of reach because they had a limited income (Dammann & Smith, 2009). Most of the pregnant women (71%) cooked food for themselves and they could eat their food of choice easily. In addition, 45.7% of subjects agreed to eat fresh vegetables to prevent constipation. Thus, they perceived high levels of dietary self-efficacy.

The highest mean score of PDSE was $M = 4.57$, ($SD = 0.43$) perceived by Bangladeshi pregnant women was about avoiding diets. In all 96.4% of subjects reported a high level of perceived dietary self-efficacy concerning avoiding diets. This result confirms that participants had more confidence about not eating unhealthy food. This study finding is in accord with a previous study. Pichayapinyo et al. (2007) found that regarding self-confidence of people about performing a behavior, a person with a high perceived self-efficacy tended to have a high sense of mastery. In addition 36.2% of subjects in the present study were strongly agreed about eating special food that contains iron to develop the health of the mother and baby. Data collection took place in the winter season when vegetables were available, even though Bangladeshi women were habituated to cooking them 3 times. For that reason the environment favorably influenced a high level of dietary self-efficacy.

In addition, the pregnant women in this study ate their food with their husband and other family members. They did not eat outside the home or in restaurants

because 73.2% of the subjects were housewives. According to Bangladeshi culture, the main job for housewives is cooking because they have enough time to cook so that they cooked suitable food based on their ability and beliefs. The study found that time constraints due to work commitments were a barrier to buying food and preparing healthy meals (Inglis et al., 2005). In addition, it has been found that perceived efficacy beliefs operate as a key factor in a generative system of human competence (Bandura, 1997). Moreover 96% of the pregnant women reported high levels of perceived dietary self-efficacy about avoiding an unhealthy diet. In summary, in this study the subjects were healthy, had some education, local food sources were available, there was easy access to these sources, and women had enough time for their tasks. These might be some of the reasons for achieving a high level of perceived dietary self-efficacy.

Dietary behavior

This study also found that pregnant women reported a high level of dietary behavior. The pregnant women had an average total family monthly income of Taka 10,340.58 (\$ US 148). Almost half of the pregnant women attended a high school and 27.4% of subjects were educated to a higher level. They had enough income to stay at school. A previous study also found that dietary behavior was associated with the socioeconomic status of the respondents. Those who had low incomes, few year of education, and were unemployed consumed significantly more fatty food than less nutritious food (Lu et al., 2002). This is consistent with previous research that found that food consumption was correlated with family income (Azad, 1999). In the same way another previous study found that pregnant women with higher education were associated with favorable dietary patterns such as consuming high levels of protein,

iron, vitamin and folate, and much more eating of vegetables and fish (Murakami et al., 2009). Another previous study found that higher social class and tertiary education influenced dietary behavior (Hearty et al., 2007). In this present study income and education favorably influenced the development of high levels of dietary behavior. Almost all the pregnant women (96.4%) had planned to have their baby and therefore, they might have eaten good quality food to make their baby healthy. It was found that women changed their eating behaviors when they planned their pregnancy. (Conlon et al., 2007).

The highest mean score perceived by pregnant women for dietary behavior was for avoiding an unhealthy diet ($M = 4.63$, $SD = 0.39$). In fact 74.6% of pregnant women reported this at a high level. This confirms that their dietary behavior was appropriate. Moreover 44.9% of the subjects (see Table 10) had agreed to eat a balanced diet such as rice, fish, meat, milk, vegetables and fruits, and 55% of pregnant women had agreed to take food containing iron. In addition, 55% of pregnant women strongly agreed to eat leafy vegetables and raw fruits. Similarly, a previous study found that pregnant women should consume a well-balanced diet including fruits, vegetables, iron, calcium-rich foods, and food containing protein (Gardiner et al., 2008).

In addition, this study's finding revealed that 99.3% of pregnant women lived with their spouse. Thus, the subjects received love and affection from husband and family. This possibly contributed to early visits to the doctor as the majority of the subjects (60.2%) came to the ANC early within the first and second trimester. For this reason subjects were more aware about a healthy diet. The data showed that 69% of subjects strongly agreed to avoid sweeter and fattier food. Furthermore, all subjects

ate with their family members and did not eat last or the least food. Social support and family bonding were very strong which positively contributed to achieve high levels of dietary behavior. Social support from spouses is related to health behavior (Pender et al., 2006). A previous study found that pregnant women perceived more social support and engaged more in good health practice such as nutrient intakes and avoiding a harmful diet (Cannella, 2005). Another study also found that family members were strong motivators for changing dietary behavior and maintaining that change (Bernestine et al., 2008). However, previous studies also found that pregnant women eat last and the least food due to less social support (Darmstadt et al., 2006; Santow, 1995; Shannon et al., 2008).

The current study revealed that subjects were more conscious about their nutritious diets because more than half of the subjects (54.3%) were strongly agreed that their baby's growth depended on their own nutrition. Most of them stated that they had obtained information from non-government organizations such as BRAC and Marry Stop Clinic before they came to the ANC. A previous study found that BRAC organized nutrition education programs which delivered through ANCs (Shannon et al., 2008). Similarly, another study found that women reported they obtained nutritional information from the media and health professionals when they planned to have a baby (Conlon et al., 2007).

This study's findings reveal that supplementary diet was at a moderate level and the total mean score for the supplementary diet was $M = 3.41$, ($SD = 0.70$) and 55.1% of pregnant women (see Table 10) agreed to take of food containing iron such as green leafy vegetables. Only 11.6% of subjects strongly agreed to take multivitamin tablets. In addition, only 13.8% of subjects strongly agreed to eat iron containing food

and 10.9% of subjects strongly agreed to take iron tablets each day. Moreover, 43.5% of the pregnant women reported low levels of dietary behavior. In this study pregnant women placed less emphasis on the supplementary diet because their perceived nutritional status was at a high level. They take a more nutritious diet from available local sources of food such as fish, meat, eggs, milk, fruits, and vegetables. They emphasized the supplementary diet less and this might explain the moderate level for the supplementary diet. In previous study, pregnant women who received supplements of nutrient had a BMI >18.5, the same as the pregnant women who had not received the supplements (with a BMI \geq 18.5) (Shannon et al., 2008). In contrast, a previous study found that pregnant women did not eat a well balance diet in developing countries (Bhutta et al., 2008). Only iron fortification during pregnancy increased 6.90g/dl hemoglobin concentration. In addition, another study found that 53% of women do not know the need for additional food requirement during pregnancy (Hossain, n.d.). Thus, these might explain the moderate level of supplementary diet.

The Relationship between Perceived Nutritional Status, Dietary Self-Efficacy and Dietary Behavior among Bangladeshi Pregnant Women

The findings of this study revealed that perceived nutritional status was highly and positively correlated with dietary behavior ($r = .71, p < .01$). This indicates that pregnant women who had higher perceived nutritional status would have higher dietary behavior. This study's findings support the self-efficacy theory of Bandura (1997). In addition, a well known study of a health promotion model stated that perceived health status positively correlated with promoting healthy behavior (Pender et al., 2006). Another study found that women who had better knowledge of nutrition

would engage in better dietary behavior (Vriendt et al., 2009). Thus, this study's findings are in accord with the health promotion model.

A previous study revealed that motivation about eating a healthy diet was related to healthy dietary habits and lifestyle behavior (Hearty et al., 2007). The findings of the current study are consistent with previous study; pregnant women perceived that eating behavior is the main factor for other health promoting behaviors (Lewallen, 2004). An inconsistent finding, Sahoo and Panda (2006), found that the nutrient intake of the pregnant women was significantly less when compared to the recommended daily allowances. In spite of better education and high incomes, this might have been due to poor knowledge of nutrition and ignorance about health. In the present study pregnant women perceived that their nutritional status was healthy because 39% of subjects agreed to take enough food during pregnancy. As forty-four percent of subjects were agreed about their regular balanced diet the subjects' demonstrated suitable dietary behavior. Another previous study found that lower educational attainment is associated with lower levels of perceived control and both were associated independently with poor quality diets (Barker et al., 2009). Therefore, this study's findings indicate that perceived nutritional status was correlated with dietary behavior.

These findings also found that perceived dietary self-efficacy was very highly and positively correlated with dietary behavior ($r = .92, p < .01$). Previous study found that dietary self-efficacy is directly and strongly associated with the usual food choices (Parcel et al., 1995). It has been found that higher levels of self-efficacy of pregnant women are positively associated with dietary behavior. For example, eating healthy food is in line with positive birth outcomes without complications

(Bandura, 1997). A previous study also found that there was a positive association between self efficacy and dietary behavior among Korean women (Gutiérrez-Doña et al., 2009). In addition, two previous studies found that self-efficacy improved food consumption behavior among elderly people with diabetes mellitus and with coronary artery disease (Chaiarsa et al., 2008; Tinamas et al., 2007). Perceived self-efficacy has been concerned mostly with the predictive relationship to behavior change (Schumacher et al., 2006). A previous study found that participants reported that self-efficacy was associated with better dietary scores (Kim et al., 2008).

Self-efficacy is directly and strongly associated with health behavior (Sriyuktasuth, 2002). In this present study 31% of subjects were strongly confident about their vegetable intake; therefore, 40% of subjects strongly agreed with about eating an appropriate amount of vegetables regularly. Thus, this study's finding support that perceived dietary self-efficacy is related to dietary behavior among pregnant women. In this study to measure the perceived nutritional status, perceived dietary self-efficacy, and dietary behavior used structured questionnaires. The PDSEQ and DBQ were constructed using the same dimensions. Some subjects could not distinguish some items in the PDSEQ and DBQ, particularly the quality diet dimension, and that made the correlations very high.

In summary, the finding of the current study showed that most of the subjects were young adults and teenagers, with high education, high income, good support from husbands and families, and living in urban areas. In addition, the construct validity of the PDSEQ and DBQ might be similar which brought about very high correlations. Some of item subjects could not be distinguished in the PDSEQ and DBQ thus, the correlation is very high. All the demographic data might influence the

high level of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior. Moreover, perceived nutritional status and perceived dietary self-efficacy had significant correlation to the dietary behavior at the high and very high levels.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

A descriptive correlational study was used to examine the levels of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior and to identify the relationships between those variables. This study was conducted in one urban hospital. One-hundred and thirty-eight pregnant women were recruited from Shaheed Suhrawardy Medical College Hospital in Dhaka, Bangladesh. The subjects who met the inclusion criteria were asked to fill the research instrument that included the DCPHQ, PNSQ, PDSEQ, and DBQ. The data gathered in this study were subsequently analyzed.

Summary of the Study Findings

The mean age of the subjects was 21.48, (SD = 3.14) and ranged from 14 - 35 years. The majority of subjects lived in urban areas. Most of the subjects were Muslim. The subjects total family income was an average of \$ US 148 per month. The results revealed that the pregnant women reported a high level of perceived nutritional status and the overall mean score of perceived dietary self-efficacy was at a high level. In addition, all sub-dimensions of perceived dietary self-efficacy were at a high level. Pregnant women reported a high level of overall mean score for dietary behavior and 2 sub-dimensions of dietary behavior were at a high level. These showed that the habit of selecting quality of diet was at the high level, taking a supplementary diet was at the moderate level, and avoiding an unhealthy diet was at the high level. This study found that perceived nutritional status was positively highly correlated

($r = .71, p < .01$) with dietary behavior, and perceived dietary self-efficacy was positively very highly correlated with dietary behavior ($r = .92, p < .01$).

Strengths and Limitations

The strengths of this study were:

1. The theory proposed in the present study was derived from Bandura's (1997) conceptual framework which used self-efficacy theory in explaining the correlates of perceived dietary self-efficacy and dietary behavior. The findings of this study supports the self-efficacy theory.

2. The strength of this study includes the homogeneity of the study subjects who consisted of Bangladeshi pregnant women with similar residential background. The 3 core indicators of socioeconomic position (education, occupation, and income) were used to assess the diets of pregnant women using validated instruments. The participants eagerly took part in this study.

The limitations of this study were:

1. Subjects required more time to understand the questionnaire. A number of subjects complained that a few items, particularly in the PNSQ, had the same meaning such as 'I have appropriate weight gain during pregnancy (PNSQ 9)' and 'My weight is normal during pregnancy (PNSQ 10)'. To overcome this situation, the researcher helped the subjects by explaining or giving examples. This situation may have had an effect on the subjects' responses to the questionnaire. All questionnaires were positive thus, some items were rated equally.

2. All pregnant women lived in urban areas and data were collected in one setting from the capital city Dhaka. The result cannot be generalized to other pregnant women who live in rural areas.

3. The perceived dietary self-efficacy questionnaires and dietary behavior questionnaires were constructed using the same dimensions, particularly the sub dimensions for quality of diet. Some subjects were illiterate and rated the number equally. In addition, these might have caused the very high correlation between perceived dietary self-efficacy and dietary behavior.

Implications and Recommendations

This study has implications for nursing practice, nursing education, and nursing research. Mothers should be able to maintain healthy lifestyles for the sake of the fetus through changing their dietary behavior. This could also reduce the maternal and infant mortality rates. The three important recommendations are as follows:

Nursing practice

1. The findings of this study provide valuable information for nurses in clinical practice to gain better understanding about food related to nutritional status and dietary self-efficacy. The nurses should not only emphasize perceived nutritional status but also be concerned with pregnant women's dietary behaviors.

2. This study revealed that the majority of subjects did not check their hemoglobin levels, thus nurses should be encouraged to confirm the results of hemoglobin level tests to pregnant women.

3. In this study the supplementary diet of dietary behavior was at a moderate level. Nurses are the key persons to disseminate knowledge. Therefore, they could

attend health education programs on the supplementary diet of pregnant women based on these study findings.

Nursing education

1. The findings of this study could provide a better understanding for nurse educators who teach about nutrition during pregnancy. These findings should be included in the nursing curriculum, especially for midwifery nursing students.

2. The findings supported the idea that nurse educators should provide short training programs for their students to give them information about providing nutritional counseling. Nurse should then be able to give proper counseling for pregnant women about the varieties of diets that are essential in pregnancy.

Nursing research

The study could contribute to a better understanding about nutritional status, dietary self-efficacy and dietary behavior. However, due to the limitations of the study, further research is recommended.

1. The study should be replicated and extended to different population settings such as those in district hospitals, health complexes and rural areas.

2. Several areas of future research are recommended. To begin such a study, the questionnaires used in this study should be further revised and tested for validity. This study featured high correlation, thus further study should be conducted particularly by modifying the quality of diet questionnaires (PDSEQ and DBQ).

3. Intervention research could be developed from these finding. A health education program about nutrient diet could be arranged through health personnel at ANC units.

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APPENDICES

APPENDIX A
WRITTEN CONSENT FORM

Research Title: Perceived Nutritional Status, Perceived dietary Self-Efficacy, and Dietary Behavior of Bangladeshi Pregnant women.

My name is Ela Rani Shom. I am a master of student of Faculty of Nursing, Prince of Songkla University, Thailand. I am a registered nurse. My working place is National Institute of Traumatology and Orthopaedic Hospital, Dhaka. I am conducting a study to identify the level of perceived nutritional status, perceived dietary self-efficacy, and dietary behavior and examine the relationships between those variable among Bangladeshi pregnant women. This study was conducted in the Shaheed Suhrawardy Medical College Hospital Dhaka, Bangladesh. This study is needed to fulfill the requirement of the master of nursing program at Prince of Songkla University, Hatyai, Thailand. The study and its procedures have been approved by the Research Ethics Committee of the Prince of Songkla University, Thailand. The study procedures involve no risk or harm to you or your organization. You are asked to respond to questions about your personal information. It should take approximately 30-60 minutes to complete the questionnaire. A code is used so that your identity will be kept in confidential. The information gathered will be used to write a research report. The information will help to provide quality nursing care in the clinical and community settings.

All information and your responses in connection with this study will remain confidential. Only the researcher and the advisor are eligible to access the data. Your name or any identifying information will not be used in the reports. Your participation

in this study is voluntary. You have the right to participate or not to participate. You also have the rights to withdraw at any time. Lastly, returning the questionnaire indicate that you understand what is involved and your consent to participate in this study. You are free to ask any question about the study being subject.

.....
(Name of Participant) (Signature of Participant) Date

.....
(Name of Researcher) (Signature of Researcher) Date

If you have any inquiries, please contact

Ela Rani Shom

Phone- 01552451823

E-mail: elashom@yahoo.com, elaranishom@gmail.com

APPENDIX B
QUESTIONNAIRES

Code No:

Date/Time:

Ward:

Introduction: The instrument is divided into four parts. Part 1(section 1 and 2) is related to demographic and pregnancy related data. Part 2 is related to the perceived nutritional status. Part 3 is related to the perceived dietary self-efficacy. Part 4 is related to the dietary behavior.

Part 1. Demographic Characteristics and Pregnancy History Questionnaire

Section 1. Demographic Characteristics Questionnaire

Directions: Please put (√) mark in the bracket that you feel match to yourself as accurately as possible.

1. Age.....years

2. Religion

1 Muslim

2 Hindu

3. Educational level

1 No schooling

2 Primary school

3 High school

4 S.S.C

5 Higher secondary or more

6 Bachelor degree

7 Master degrees

8 Others specify.....

4. Occupation

1 House wife

2 Labored

3 Nongovernmental employer

4 Governmental employer

5. Marital status

1 Married and living with spouse

2 Divorced/separated

6. Total family income.....Taka/month

7. Family characteristics

1 Nuclear family

2 Extended family

8. Where do you live in?

1 Rural

2 Urban

9. How long does it take to travel from your home to the hospital?

1 ½ an hour

2 ½- 1 hour

3 1- 1 ½ hour

4 Other specify.....

10. Who does prepare food in your family?

11. Do you eat the same time as other people in your family?

1 Yes

0 No

Section 2. Pregnancy History Questionnaire

12. Date of last menstruation period (LMP).....

13. Gravida..... Para.....Abortion.....

14. Gestational ageweeks by LMP US

15. Did you know your body weight before pregnancy?

1 Yes

0 No

16. Did you take 3 meals per day?

1 Yes

0 No

17. Did you know your hemoglobin level before pregnancy?

1 Yes

0 No

18. Did you plan to have this baby?

1 Yes

0 No

19. Hemoglobin level.....g/d

20. Weight (during pregnancykgs)

21. Height.....cms

22. BMI.....

Part 2. Perceived Nutritional Status Questionnaire

Instruction: For each of the questions, please circle the number that corresponds to your level how strongly do you agree or disagree with each of the following statement. Thanks for your cooperation.

1 = Strongly disagree
 2 = Disagree
 3 = Some agree
 4 = Agree
 5 = Strongly agree

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
1. I am healthy because I eat enough food during this pregnancy.	1	2	3	4	5
2. I have no nutritional anemia during pregnancy as I am taking iron containing food and iron tablet.	1	2	3	4	5
3. I have no nutritional anemia because I take more vegetable e.g., celkery, kochushak, spinach, bind weed, mint, basil, green banana during pregnancy.	1	2	3	4	5
4. My hemoglobin during pregnancy is normal.	1	2	3	4	5
5. I should take prescribed medicine (folic acid, and multivitamin tablet) to remain healthy during pregnancy.	1	2	3	4	5
6. I have no dehydration during pregnancy because I drink enough water.	1	2	3	4	5
7. I have no urinary tract infection.	1	2	3	4	5

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
8. I have no leg cramp during pregnancy because I got enough calcium from food.	1	2	3	4	5
9. I have appropriate weight gain during pregnancy.	1	2	3	4	5
10. My weight is normal during pregnancy.	1	2	3	4	5
11. My baby's growth depending on my nutritional status.	1	2	3	4	5
12. Overall I have good nutritional status during this pregnancy.	1	2	3	4	5

Part 3. Perceived Dietary Self-Efficacy Questionnaire

Instruction: For each of the questions, please circle the number that corresponds to your level of how strongly do you agree or disagree the following activities or tasks. Thanks for your cooperation.

1 = Strongly disagree
2 = Disagree
3 = Some agree
4 = Agree
5 = Strongly agree

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
Quality of diet					
1. I am confident that I can take 3 meals (9 big spoons of rice, wheat, etc) per day for more energy.	1	2	3	4	5
2. I am sure that I can eat fresh well vegetables to prevent constipation.	1	2	3	4	5
3. I am sure that I can eat some seasonal fruits.	1	2	3	4	5
4. It is easy that I can take sea fish, for my health and my baby's good health.	1	2	3	4	5
5. I am sure that I can eat well-cooked food for better health.	1	2	3	4	5
6. I am confident that I take one egg per day for good health.	1	2	3	4	5
7. It is easy that I can eat 2 big spoons of vegetables per day for my health and my baby's good health.	1	2	3	4	5

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
8. It is easy that I can eat 2 pieces of fruits per day for my health and my baby's good health.	1	2	3	4	5
9. I am sure that I can drink water at least 6-8 glasses per day for my health and my baby's good health.	1	2	3	4	5
10. I am certain that I can take 1 big spoon of meat, or fish per day for my health and my baby's good health.	1	2	3	4	5
Supplementary Diet					
11. I am confident that I can take 1 glass of milk per day for my health and my baby's good health.	1	2	3	4	5
12. I am certain that I can take oil 1 table spoon per day for my health and my baby's good health.	1	2	3	4	5
13. I am sure that I can take extra food that has iron e.g., green leafy vegetables for my health and my baby's health.	1	2	3	4	5
14. I am sure that I can take prescribed medicine e.g., iron and multivitamin tablet to prevent anemia.	1	2	3	4	5
15. I am confident that I can take yellow fruits and green leafy vegetables e.g., banana, pumpkin, celkery, spinach, basil, bean, kachushak, and ripe papaw for my health and my baby's good health.	1	2	3	4	5
16. I am confident that I can take calcium rich diet (milk, small fish) for my health and my baby's good health.	1	2	3	4	5
Avoiding diet					
17. I am sure that I can avoid more sweet and fatty food to prevent too much weight gain.	1	2	3	4	5

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
18. I am sure that I can avoid salty diet to minimize complication during pregnancy.	1	2	3	4	5
19. I am confident that I can avoid unclean/ uncooked food to prevent food born diseases.	1	2	3	4	5
20. I am sure that I can avoid charcoaled foods (burn wood, burn soil etc) for my health and my baby's good health.	1	2	3	4	5

Part 4. Dietary Behavior Questionnaire

Instruction: Please respond to each item as accurately as possible. Indicate the frequency with which you engage in each behavior by circling the number that corresponds with your answer. Thanks for your cooperation.

1 = Strongly disagree
2 = Disagree
3 = Some agree
4 = Agree
5 = Strongly agree

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
Quality of diet					
1. I eat balance diet including rice, fish, meat, milk, vegetables and fruits each day.	1	2	3	4	5
2. I eat well cooked food.	1	2	3	4	5
3. I eat 1 egg every day.	1	2	3	4	5
4. I eat 3 meals per day.	1	2	3	4	5
5. I eat 2 big spoons of vegetable and 2 pieces of fruits per day.	1	2	3	4	5
6. I drink about eight glasses of water per day.	1	2	3	4	5
7. I eat snacks in between meals.	1	2	3	4	5
8. I eat green leafy vegetables and raw fruits e.g., olive, amloky, lemon, plum, guava etc.	1	2	3	4	5
9. I eat sea fish for good health.	1	2	3	4	5
10. I drink I glasses of milk per day.	1	2	3	4	5

Items	Strongly disagree	Disagree	Some agree	Agree	Strongly agree
11. I eat 1 table spoon of oil per day.	1	2	3	4	5
Supplementary diet					
12. I take extra food that has iron e.g., green leafy vegetables.	1	2	3	4	5
13. I take iron tablet each day.	1	2	3	4	5
14. I take multivitamin tablet each day.	1	2	3	4	5
15. I take vitamin A containing diet e.g., yellow banana, pumpkin, each day.	1	2	3	4	5
16. I take calcium rich diet e.g., milk, small fish each day.	1	2	3	4	5
Avoiding diet					
17. I don't take more sweet and fatty food.	1	2	3	4	5
18. I don't eat more salty diet.	1	2	3	4	5
19. I don't eat unclean and uncooked food.	1	2	3	4	5
20. I don't eat charcoaled foods (Burn wood, burn soil etc).	1	2	3	4	5

APPENDIX C

TABLES

Table 8

Frequency and Percentage of Perceived Nutritional Status (N = 138)

1 = Strongly disagree 2 = Disagree 3 = Some agree 4 = Agree 5 = Strongly agree

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
1. I am healthy because I eat enough food during this pregnancy.	0	0	33	23.9	41	29.7	54	39.1	10	7.2
2. I have no nutritional anemia during pregnancy as I am taking iron containing food and iron tablet.	0	0	33	23.9	41	29.7	54	39.1	10	7.2
3. I have no nutritional anemia because I take more vegetable e.g., celkery, kochushak, spinach, bind weed, mint, basil, green banana during pregnancy.	0	0	8	5.8	37	26.8	79	57.2	14	10.1
4. My hemoglobin during pregnancy is normal.	0	0	4	2.9	53	38.4	78	56.5	3	2.2
5. I should take prescribed medicine (folic acid, and multivitamin tablet) to remain healthy during pregnancy.	0	0	49	35.5	29	21.0	53	38.4	7	5.1
6. I have no dehydration during pregnancy because I drink enough water.	0	0	2	1.4	32	23.2	50	36.2	54	39.

Table 8 (Continued)

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
7. I have no urinary tract infection.	0	0	1	0.7	16	11.6	45	32.6	76	55.1
8. I have no leg cramp during pregnancy because I got enough calcium from food.	0	0	6	4.3	47	34.1	37	26.8	48	34.8
9. I have appropriate weight gain during pregnancy.	0	0	5	3.6	45	32.6	82	59.4	6	4.3
10. My weight is normal during pregnancy.	0	0	4	2.9	48	34.8	81	58.7	5	3.6
11. My baby's growth depending on my nutritional status.	1	0.7	11	8.0	8	5.8	43	31.2	75	54.3
12. Overall I have good nutritional status during this pregnancy.	0	0	7	5.1	47	34.1	60	43.5	24	17.4

Table 9
Frequency and Percentage of Perceived Dietary Self-Efficacy (N = 138)

1 = Strongly disagree 2 = Disagree 3 = Some agree 4 = Agree 5 = Strongly agree

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
1. I am confident that I can take 3 meals (9 big spoons of rice wheat, etc) per day for more energy.	0	0	4	2.9	33	23.9	71	51.4	30	21.7
2. I am sure that I can eat fresh well vegetables to prevent constipation.	0	0	5	3.6	40	29.0	63	45.7	30	21.7
3. I am sure that I can eat some seasonal fruits.	1	0.7	12	8.7	55	39.9	24	17.4	46	33.3
4. It is easy that I can take sea fish, for my health and my baby's good health.	11	8.0	45	32.6	35	25.4	39	28.3	8	5.8
5. I am sure that I can eat well-cooked food for better health.	0	0	0	0	9	6.5	66	47.8	63	45.7
6. I am confident that I take one egg per day for good health.	1	0.7	20	14.5	51	37.0	11	8.0	55	39.9

Table 9 (Continued)

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
7. It is easy that I can eat 2 big spoons of vegetables per day for my health and my baby's good health.	0	0	9	6.5	26	18.8	60	43.5	43	31.2
8. It is easy that I can eat 2 pieces of fruits per day for my health and my baby's good health.	0	0	13	9.4	49	35.5	24	17.4	52	37.7
9. I am sure that I can drink water at least 6-8 glasses per day for my health and my baby's good health.	0	0	3	2.2	47	34.1	25	18.1	63	45.7
10. I am certain that I can take 1 big spoon of meat, or fish per day for my health and my baby's good health.	0	0	4	2.9	25	18.1	51	37.0	58	42.0
11. I am confident that I can take 1 glass of milk per day for my health and my baby's good health.	4	2.9	30	21.7	52	37.7	16	11.6	36	26.1
12. I am certain that I can take oil 1 table spoon per day for my health and my baby's good health.	0	0	2	1.4	3	2.2	32	23.2	101	73.2
13. I am sure that I can take extra food that has iron e.g., green leafy vegetables for my health and my baby's health.	0	0	18	13.0	25	18.1	45	32.6	50	36.2

Table 9 (Continued)

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
14. I am sure that I can take prescribed medicine e.g.,iron and multivitamin tablet to prevent anemia.	0	0	48	34.8	36	26.1	39	28.3	15	10.9
15. I am confident that I can take yellow fruits and green leafy vegetables e.g., banana, pumpkin, celkery, spinach, basil, bean, kachushak, and ripe papaw for my health and my baby's good health.	0	0	16	11.6	30	21.7	62	44.9	30	21.7
16. I am confident that I can take calcium rich diet (milk, small fish) for my health and my baby's good health.	0	0	6	4.3	54	39.1	60	43.5	18	13.0
17. I am sure that I can avoid more sweet and fatty food to prevent too much weight gain.	0	0	5	3.6	14	10.1	22	15.9	97	70.3
18. I am sure that I can avoid salty diet to minimize complication during pregnancy.	0	0	1	0.7	51	37.0	26	18.8	60	43.5

Table 9 (Continued)

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
19. I am confident that I can avoid unclean/ uncooked food to prevent food born diseases.	0	0	0	0	5	3.6	23	16.7	110	79.7
20. I am sure that I can avoid charcoaled foods (burn wood, burn soil etc) for my health and my baby's good health.	0	0	1	0.7	0	0	4	2.9	133	96.4

Table 10

Frequency and Percentage of Dietary Behavior (N = 138)

1 = Strongly disagree 2 = Disagree 3 = Some agree 4 = Agree 5 = Strongly agree

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
1. I eat balance diet including rice, fish, meat, milk, vegetables and fruits each day.	0	0	7	5.1	41	29.7	62	44.9	28	20.3
2. I eat well cooked food.	0	0	0	0	8	5.8	71	51.4	59	42.8
3. I eat 1 egg every day.	0	0	24	17.4	49	35.5	18	13.8	46	33.3
4. I eat 3 meals per day.	0	0	3	2.2	18	13.0	49	35.5	68	49.3
5. I eat 2 big spoons of vegetable and 2 pieces of fruits per day.	0	0	12	8.7	41	29.7	29	21.0	56	40.6
6. I drink about eight glasses of water per day.	0	0	3	2.2	41	29.7	36	24.6	60	43.5
7. I eat snacks in between meals.	0	0	15	10.9	31	22.5	38	27.5	54	39.1
8. I eat green leafy vegetables and raw fruits e.g., olive, amloky, lemon, plum, guava etc.	1	0.7	11	8.0	22	15.9	28	20.3	76	55.1
9. I eat sea fish for good health.	8	5.8	52	37.7	37	26.8	37	26.8	4	2.9

Table 10 (Continued)

Items	1		2		3		4		5	
	n	%	n	%	n	%	n	%	n	%
10. I drink 1 glasses of milk per day.	4	2.9	32	23.2	52	37.7	14	10.1	36	26.1
11. I eat 1 table spoon of oil per day.	0	0	0	0	6	4.3	32	23.2	100	72.5
12. I take extra food that has iron e.g., green leafy vegetables.	0	0	6	4.3	37	26.8	76	55.1	19	13.8
13. I take iron tablet each day.	0	0	60	43.5	25	18.1	38	27.5	15	10.9
14. I take multivitamin tablet each day.	0	0	62	44.9	27	19.6	33	23.9	16	11.6
15. I take vitamin A containing diet e.g., yellow banana, pumpkin, each day.	0	0	13	9.4	46	33.3	60	43.5	19	13.8
16. I take calcium rich diet e.g., milk, small fish each day.	0	0	6	4.3	54	39.1	65	47.1	13	9.4
17. I don't take more sweet and fatty food.	0	0	6	4.3	12	8.7	24	17.4	96	69.6
18. I don't eat more salty diet.	0	0	1	0.7	44	31.9	31	22.5	62	44.9
19. I don't eat unclean and uncooked food.	0	0	0	0	1	0.7	5	3.1	132	95.7
20. I don't eat charcoaled foods (Burn wood, burn soil etc).	0	0	1	0.7	1	0.7	1	0.7	135	97.8

APPENDIX D
LIST OF EXPERTS

Three experts were examined the content validity of Demographic Characteristics and Pregnancy History Questionnaire, Perceived Nutritional Status Questionnaire, Perceived Dietary Self-Efficacy Questionnaire, and Dietary Behavior Questionnaire. They are:

1. Assoc. Prof. Sureporn Kritcharoen

Department of Obstetrics and Gynecology, Faculty of Nursing, Prince of Songkla University, Thailand.

2. Asst. Prof. Dr. Umaporn Boonyasopun

Department of Community Nursing, Faculty of Nursing, Prince of Songkla University, Thailand.

3. Selina Chowdhury, Principal (Acting)

Nursing Lecturer, College of Nursing, Mohakhali, Dhaka, Bangladesh.

APPENDIX E

LIST OF PERSON INVOLVED IN TRANSLATION

Three persons worked on the translation of the instruments: Demographic Characteristics and Pregnancy History Questionnaire, Perceived Nutritional Status Questionnaire, Perceived Dietary Self-Efficacy Questionnaire, and Dietary Behavior Questionnaire. They are:

1. Dr. Shoel Ahmed Medical Consultant, Department of Anesthetist, National Institute of Traumatology and Orthopaedic Rehabilitation, Dhaka, Bangladesh
2. Dr. Sayema Ahmed Resident Surgeon of Obstetric & Gynecology department Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh.
3. Dibakar Mondol Medical student of Arms Force Medical College Hospital Dhaka, Bangladesh.

VITAE

Name Mrs. Ela Rani Shom

Student ID 5110420067

Educational Attainment

Degree	Name of Institution	Year of Graduation
Bachelor of Nursing Science	Dhaka University	1999
Bachelor of Arts	National University	1993

Scholarship Award during Enrollment

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Work-Position and Address

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