Food Consumption Pattern of Rural Pregnant Women and Lactating Mothers and Impact of Nutrition Education

By

Jayanthi. K

(11PD07)

A thesis submitted to the
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore - 641 043.

In Partial Fulfilment of the requirements for the Degree of

Master of Science in Food Service Management and Dietetics

May 2013

Certified as Bonafide Research Work

Signature of the 9/5/13
Head of the Department

Signature of the 9/5/13
Guide

Food Consumption Pattern of Rural Pregnant Women and Lactating Mothers and Impact of Nutrition Education

By

Jayanthi. K

(11PD07)

A thesis submitted to the
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore - 641 043.

In Partial Fulfilment of the requirements for the Degree of

Master of Science in Food Service Management and Dietetics

May 2013

Food Consumption Pattern of Rural Pregnant Women and Lactating Mothers and Impact of Nutrition Education

By

Jayanthi. K

(11PD07)

A thesis submitted to the
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore - 641 043.

In Partial Fulfilment of the requirements for the Degree of

Master of Science in Food Service Management and Dietetics

May 2013

Certified as Bonafide Research Work

Signature of the **Head of the Department**	**Signature of the** **Guide**

ACKNOWLEDGEMENT

The investigator expresses her deep sense of gratitude to **God Almighty** who graciously blessed her with good health, strength and wisdom to complete the study.

The investigator extends her profound gratitude to **Thiru.T.S.K.Meenakshi Sundaram, M.A., M.Phil., Ph.D.** Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for providing opportunity to expose herself to the world of knowledge.

The investigator would like to express her sincere gratitude to **Dr.(Tmt) Sheela Ramachandran, M.Sc., P.G. Dip., Ph.D.,** Vice chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for giving the project in the first instance and providing the infrastructural facilities.

The investigator records her special thanks to **Dr (Tmt) Gowri Ramakrishnan, M.Sc., M.Phil., Ph.D.** Registrar, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for providing all the administrative support and help required to carry out the project.

The researcher conveys her deepest sense of gratitude to **Dr (Tmt) K.Thangamani, M.Sc., Dip.Ed., M.Phil., Ph.D.,** Dean, Faculty of Home Science and Professor and Head of the Department of Home Science Extension Education, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for her valuable support and motivation.

The investigator owes her heartfelt thanks and gratitude to **Dr.(Tmt.) G.Vasanthamani. M.Sc., Dip. Ed., M. Phil., Ph.D.,** Professor and Head of the department of Food Service Management and dietetics, Avinashilingam institute for Home Science and Higher Education for Women, Coimbatore, for her inspiration, encouragement and support.

With glowing sense of gratitude and honesty, the researcher places her sincere and grateful thanks to her most honored guide **Dr. (Mrs.) G.Vasanthamani, M.Sc.,Dip. Ed., M.Phil., Ph.D., (Avinashilingam).** Professor and Head Department of Food Service Management and Dietetics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for her dynamic guidance, constant encouragement, valuable suggestions, supportive wisdom, perfectionism, untiring enthusiasm and gentle care rendered for the successful completion of the study.

The investigator takes this opportunity to extend her thanks to all the **Faculty members, Department of Food Service Management and Dietetics,** Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for their support throughout the study.

The investigator is immensely grateful to her **beloved parents, husband, child, family members and friends** for extending their moral support and encouragement without which the study would never have seen the light of the day.

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES

I INTRODUCTION

"Our food should be our medicine and medicine should be our food"- Hippocrates

Healthy eating requires a basic understanding of nutrition and in particular of our own body's nutritional needs at different stages of the life. Biological and social factors affect the women's health throughout their lives and have cumulative effects.

Jennifer (2009) speculated that the nutritional requirement of pregnant women is high because of the rapid buildup of tissue of the growing fetus. The physiological changes that occur during pregnancy and lactation affect the nutritional requirements.

The health of the fetus is highly dependent on the mother's health and what she eats. It is important to include foods in the daily diet that would assure a normal and healthy baby. A lactating mother has higher nutritional demands than when she was pregnant because she has to produce milk, the nutrient content of which depends on the adequacy of her diet.

The common saying that a women is eating for two while pregnant implies that a mother should consume twice as much during pre pregnancy. Pregnancy is a time of tremendous bio-chemical and physiological changes and these changes demand healthful lifestyle choices. As pregnancy imposes a great metabolic strain it is essential that mother leads healthy life throughout child bearing stage. Her nutritional status at the moment of conception is also important.

Pregnant and lactating mother have been recognized as vulnerable groups from the health and nutritional point of view requiring additional nutritional support. The nutritional status of mother prior to and during pregnancy has a strong influence on the reproductive performance and on the health to both mother and child. Maternal nutritional status not only determines the state of the off spring at the time of birth but also the future course of its development and health in the late adult years.

The consequence of social and cultural taboos, deprive the women from nutritional reserves. Beliefs about prenatal diets and food cravings or food aversion influence food choices in pregnant women, according to Miriam (2008). It is widely believed by women of all ages, ethnic groups, income and education that the consumption of certain food marks a child before birth. It is well accepted that the nutritional status of pregnant women affects the outcome of their pregnancy.

This is true with respect to the birth weight of infants, energy and nutrient needs. The need for calories increase by a smaller percentage than the need for most vitamins and minerals. Hence food choices during pregnancy must be nutrient dense (Elaine, 2010).

The duration of pregnancy 38 to 42 weeks, is commonly divided into three periods called trimester. The first trimester carries the highest risk of miscarriage, natural death of embryo. Growth begins in the first trimester with a rapid increase in cell number. Even though many women experience loss of appetite and nausea during the first trimester maintaining adequate nutrition is still extremely important. During the second trimester the development of the fetus can be more easily monitored and diagnosed. By the beginning of the 2^{nd} trimester arms, hands, fingers, legs, feet and toes are fully formed. By far the greatest growth of the fetus occurs during the last trimester of pregnancy. Its weight almost doubles during the last two months of pregnancy. So the nutritional requirement is high compared with first and second trimester of pregnancy (Guyton, 2006).

According to Klein (2005) the Amount of weight gained by the pregnant women depends strongly on the pre pregnant weight. Generally a normal weight is strongly recommended for mothers when entering gestation as it promotes overall health of infant. This group has the lowest risk of adverse birth outcomes low pre pregnancy BMI (18.5 or below) increase the risk of low birth weight infant.

A good diet is essential for meeting the demands of pregnancy, but a long way toward meeting the demands of pregnancy (Insel, 2010).

The ICMR (2010) recommended energy requirement of pregnant women increase 350 kcal, ICMR prescribed, for a pregnant woman 78g day additional protein for rapid growth of fetus. Iron requirement increase during pregnancy (21mg per day). Normal requirements of beta - carotene for an adult women is 2400 mcg, same level is suggested during pregnancy. The calcium requirement is 1200 mg. Vitamin D is highly essential as it enhance the maternal calcium absorption. Vitamin K is essential for synthesis of prothrombin, which is necessary for normal coagulation of blood. ICMR recommendations of folic acid during pregnancy are 500 mg/day. ICMR recommendations of vitamin C during pregnancy are 60 mg.

Morgon (2003) said that success of lactation as well as the health status of infant depends entirely on type of diet consumed by women during lactation. The nutrient demands of lactation are considerably greater than those of pregnancy. In the 4 to 6 months of post partum period infants double their birth weight accumulated during the months of weight after delivery. It is often stated that the fat component of this retained weight represents a physiological reserve of energy for use during lactation especially in well nourished, affluent women.

During pregnancy physiological changes in breast tissue and fat stores prepare the women's body for the demands of lactation (Insel, 2010).

Miriam (2008) found the milk secreted in four months represents an amount of energy roughly equivalent to the total energy cost of pregnancy. However some of the energy and many of the nutrients stored milk production. Milk production is most affected by the frequency of suckling and maternal hydration. However milk composition varies according to the mothers diet.

The first four to six months breast feeding lays a very strong foundation for health of the new born. This period of lactation is a great drain on the mother's body. As such there is an increased need for some of the essential nutrients than that of the pregnancy period. Lactating mother's nutritional requirements should meet her own daily needs, provide enough nutrients for

the growing infant and furnish the energy for the mechanics of milks production.

According to ICMR (2010) diet of lactating mother and her nutritional status during pregnancy affect to a certain extent quality and quantity of breast milk. The recommended energy increase is 550 kcal for first six months and 400 kcal during the next six months more than the usual adult allowance. During lactation protein requirement has been computed on the basic of secretion in milk. During 0-6 months 74 g of protein and 6-12 months 68 g of protein visible fat should 45 g. Both pregnancy and lactation 1200mg of calcium has been prescribed by ICMR. The iron requirement during lactation 35mg/day. As calorie and protein requirement are increased during lactation, B vitamin requirements are also increased. An increased intake of fluids is necessary for adequate milk production.

Rao (2012) stated that various complication have been reported during pregnancy for the past two years.

According to Mukarjee (2012) Ninety two percent of women in India suffer from gynecological problems. In India 300 women die every day due to child birth and pregnancy related causes. Maternal complications cause death and disability among women. More than 99 percent of the estimated 536,000 maternal death each year occur in the developing world.

Bhattacharya (2011) depicted anemia in pregnancy is a public health issue taking heavy tolls in the form of absorption, premature birth, intrauterine growth retardation, high infant mortality and 20 to 40 percent maternal deaths of India.

Swarnalatha (2012) stated that in India anemia is around 65 percent in urban areas and 75 percent in rural areas. Anemia is second most common cause of maternal deaths accounting for 20 percent of total maternal deaths. It also significantly increases maternal morbidity, fetal and neonatal mortality and morbidity including premature delivery and low birth weight.

Diet consumed by many lactating mothers and pregnant women in our country are poor and lack many nutrients. Thus special attention should be given to the diet of mother during lactation and pregnancy (Manisha, 2008).

The food consumption pattern of the pregnant women and lactation mothers vary from place to place. An average woman in India is estimated to spend a greater part of her reproductive years in pregnancy and lactation. Women growth has been stunted by chronic malnutrition.

Majority of Indian females suffer from nutritional deficiency and are anaemic. In India particularly in rural areas there are several social reservations for women. Lack of awareness leads to closely spaced pregnancies. A majority of Indian women do not know the complications during pregnancy and delivery (Manisha, 2006).

Kanade (2008) said that Creating nutritional awareness and motivating rural mothers for consuming micronutrients rich foods like green leafy vegetables and seasonal fruits that are easily available in rural areas, will be a much affordable solution for combating the problem of low birth weight rather than waiting for improvement in the existing nationwide program for pregnant women.

There is greater need in India to study the food and nutrient intake of pregnant and lactating women so that necessary modification can be suggested in the food intake for improving nutritional status of the mother and infant too.

Hence the present research was undertaken to study the "Food consumption pattern of rural pregnant women and lactating mothers and to improve their existing consumption pattern" with the following objectives.

a. Assess socio economic status of selected pregnant women and lactating mothers in selected rural area in Coimbatore
b. Evaluate the nutritional status of the selected pregnant women and lactating mothers
c. Find out the pattern of intake of foods and nutrients of selected subjects
d. Examine clinical symptoms and blood haemoglobin and blood glucose of the selected subjects
e. Impart the nutrition education and evaluate the impact of nutrition education.

II REVIEW OF LITERATURE

The literature pertaining to the present research entitled "**Food Consumption Pattern of Rural Pregnant Women and Lactating Mothers and Impact of Nutrition Education"** was reviewed and are presented under the following headings.

A. Factors affecting pregnancy outcome

B. Food consumption pattern of pregnant women

C. Food consumption pattern of lactating mothers

D. Prevalence of deficiency among pregnant women and lactating mothers

E. Impact of nutrition education on pregnant women and lactating mothers.

A. FACTORS AFFECTING PREGNANCY OUTCOME

Parvathy (2007) stated that majority of women attending government hospitals had low body weight possibly due to the low pre pregnancy body weight and low weight gains during pregnancy. Poor nutrient intakes during the later stages of pregnancy decreased tremendously the maternal factors such as maternal height, abdominal girth, correlation to birth weight of neonates.

According to pallavi (2002) compared the nutritional status of young mother (21 year) and older mother above (27 year) with respect to the outcomes of pregnancy. Energy and iron intakes of both groups were similar. Protein and calcium intakes were higher among older mothers. Pre pregnancy weight and weight at thirty eight weeks of gestation were higher among older mothers, as was the BMI. Both systolic and diastolic blood pressures were similar in the two groups, although blood haemoglobin was higher in older mothers compared to young ones. Babies born to older mother had higher birth weight. The infant born to younger mother reflected this poor nutritional status in terms of lower anthropometric measurements.

Maternal vitamin - A, but not vitamin E and C, during pregnancy had a significant effect on birth outcomes (Wang, 2009).

At the other extreme, high maternal hemoglobin and high levels of the iron storage protein ferritin have consistently been associated with an increased risk of adverse outcomes. And also risk of poor outcomes like preeclampsia or gestational diabetes (Therasa, 2011).

Jalaja (2009) had established that there is greater association between maternal nutritional status and pregnancy outcomes. Hence there is a need to improve the health of adolescent girls in order to confirm that they do not enter pregnancy in a nutritionally disadvantage state.

As pregnancy progresses, those women who experienced morning sickness, especially severely are likely to be deficient in major nutrients like energy, protein and carbohydrate (Lee, 2005).

Noel (2011) found that nausea and vomiting are common experiences in pregnancy, affecting 70 to 80 per cent of all pregnant women. Various metabolic and neuromuscular factors have been implicated in the pathogenesis of nausea and vomiting of pregnancy (NVP) and hyperemesis gravidarum (HG), an entity distinct from nausea and vomiting of pregnancy. However, their exact cause is unknown. Consequently, treatment of nausea and vomiting of pregnancy and hyperemesis gravidarum can be difficult, as neither the optimal targets for treatment nor the full effects of potential treatments on the developing fetus are known.

Avoiding iron containing prenatal multivitamins in the 1st trimester is effective in improving nausea and vomiting of pregnancy symptoms in the majority of pregnant women suffering from morning sickness (Gill, 2009).

Body composition of women whose newborns are SGA (Small for Gestational Age) differs significantly from that of women whose new born are AGA (Appropriate for Gestational Age) a result which suggests that the mother of

SGA infants may have disordered hemodynamic stake during the 2nd trimester of pregnancy (Lavario, 2009).

According to Bethesda (2008) Anemia, poor weight gain during pregnancy and low BMI in HIV infected pregnant women are associated with increased risk of adverse infant outcomes and Mother to child Transmission of HIV (MTCT).

Ludwig (2010) proposed apparent association between birth weight and adult weight. Obesity prevention efforts targeted at women during pregnancy might be beneficial for off spring.

In more developed populations, overweight, diabetes and metabolic syndrome in young women are associated with a number of major complications during pregnancy delivery and in the new born (Hennrikshen, 2006). Furthermore both the mother and her child are increase risk of poorer health in later life.

Pregnant women with normal pre-pregnancy BMI, gestational weight gain are predicted to have intrauterine fetal weight as well as infant birth weight (Letbunnaphong, 2012).

Ying (2011) explained the preventing premature delivery and enriching the nutritional status of women during pregnancy are effective measures to reduce the incidence of low birth weight infants.

According to Nohr et al. (2005) pre-pregnancy obesity was associated with an increasing risk of fetal death with advancing gestation and speculated that placental dysfunction may be contributing factor.

Roshan (2005) indicated that the weight gain during pregnancy between prime para and multi para was not statisficantly significant. The mean haemoglobin concentration of prime para women was lower when compared to second and third para. The anthropometric variable of the mother especially body weight during pregnancy correlated significantly with the anthropometric variables of new born. Haemoglobin and serum iron appeared to be positively associated with the weight of the new born.

Women's gestational weight gains tend to follow the recommendations of health care providers. Current intervention demonstrate efficacy in influencing gestational weight gain in low income women with normal weight [Olson, 2008].

Poor glyacemic control before and throughout pregnancy is associated with abnormal fetal growth, women with micro vascular complications to detect fetal growth restriction (Glinianaia, 2012).

Inadequate intake of various nutrients during pregnancy has been implicated in reduced birth weight and in poor birth outcomes and increased the neural tube defect (Rekha, 2008).

Kathleen (2008) speculated that less than half of the total weight gain of a singleton pregnancy of a normal weight women resides in the fetus. Gradually increased subcutaneous fat in the abdomen, back and upper thigh serves as an energy reserve for pregnancy and lactation.

Hilakivi (2012) explained that women in the life style intervention group exhibited a stronger association between gestational weight gain and leptin seeds indicating that they maintained insulin sensitivity.

Ferrara (2011) found that lifestyle intervention that starts during pregnancy and continue post partum is feasible and may prevent pregnancy weight retention and help overweight women to lose their weight. Strategies to help postpartum women to overcome the barriers to increasing physical activity are needed.

These results vividly point out that the birth weight of the infant is directly related with maternal weight gain and hemoglobin concentration (Varma, 2008).

Complication of pregnancy may be induced by a high blood lead level possibly through the alterations in trace element metabolism (Ugwuja, 2011).

Anemia in pregnancy with unfavorable pregnancy outcome resulted high infant mortality and 20 to 40 percent maternal death is serious public health menace of India. Apart from various socio cultural milieus Inadequate and

improper cereal based diet with poor bio available iron food taboos, faulty cooking habits frequent child birth etc**.** (Majumdar, 2009).

Lawrence (2005) concluded that women who have diabetes are stressed during delivery and have retained placental fragment and are at risk for delayed milk production, occurring when signs of lactogenesis are absent 72hours after birth.

According to Surdacka (2011) diabetes in pregnant women significantly changes saliva properties, which may contribute to accelerated deterioration of the oral status in this population.

Elevated maternal triglyceride levels measured during early pregnancy are associated with pregnancy complication and adverse pregnancy outcomes (Vrijkotte, 2012).

Larchmt (2011) found that women pregnancy alcohol consumption and exposure to abuse or violence were consistently associated with weight gain during pregnancy.

Maternal cigarette consumption is associated with an increased incidence of low birth weight in new born (Abraham, 2013).

Swee (2010) found that pregnant women with a history of migraine may benefit from increased vigilance for screening and treating depressive symptoms.

Lisa (2009) stated the depressive symptoms to elevated maternal serum proinflammatory cytokines during pregnancy. Due to the relatively low base rate of preterm delivery and preeclampsia and also examine effects of depressive symptoms and inflammation on negative prenatal outcomes.

Fdalallah (2013) speculated that gastroesophageal reflux symptoms in pregnant women screened for sleep disordered breathing symptoms correlate with pre-pregnancy BMI and BMI at delivery. Maternal age, smoking, race, and sleep disordered breathing (SDB) are also associated with GERD.

Faruk (2007) found that obsessive-compulsive disorder is present relatively frequently among pregnant women during the third trimester of

pregnancy, and it has similar clinical features during gestation and non gestation period.

A significant proportion of young tribal women had experienced any one of the self reported gynecological symptoms and the data have established a base link pregnancy among young women and reproductive health consequence (Ravikrishnan, 2012).

Abnormal breathing during sleep (that is frequently, but not always, associated with loud, chronic snoring, and may be a consequence of edema induced by hormonal changes associated with pregnancy), can be seen in healthy young pregnant women. It may contribute to the symptom of daytime sleepiness. The changes in blood pressure noted were of no pathological significance in high-risk pregnancies (Christian, 2007).

Mathuravalli (2001) revealed that the socio economic status played on important role in the pregnancy outcome. Most of the pregnant women selected for the study were engaged unskilled (moderate work) to increase the family income. The other associated factor such as age of the mother (safest age group 20 - 28 year) special nutrition feeding (nutrition flour, iron and folic acid supplementation) and health service (ICDS) might have helped to maintain the nutritional status of the mother for the better pregnancy outcome.

Every year, about 10 million women endure life threatening complications during pregnancy and child birth, sometimes leading to long term disability (Elizabeth, 2012).

B. FOOD CONSUMPTION PATTERN OF PREGNANT WOMEN

Plant foods such as cereals, pulses and legumes, green leafy vegetables, non-leafy vegetables, roots and tubers form bulk of the Indian diets. (Saxena et al., 2007).

Intake of soya bean lecithin during pregnancy may reduce the incidence of hypertensive disorders of pregnancy, as well as improve the overall pregnancy outcome (Li wei wei, 2011).

Maternal junk food diet promotes adiposity in off spring and the earlier set of hyperglycemia, hyper insulin and hyper lipidemia (Bayol, 2008). The male and female off spring also display a different metabolic cellular and molecular response to junk food - diet induced adiposity.

The consumption of date fruit in the last four weeks labour significantly reduced the need for induction and augmentation of labour, and produced a more favorable, but no significant, delivery outcome (Kuran, 2011).

Herra (2008) says that the erratic food habits and the conceptual confusion of the adolescents (pregnancy) cause a low intake of nutrients and place them in a nutritional risk.

Women who reported habitual intake of probiotic dairy had a reduced risk of spontaneous preterm delivery (Myhre, 2011).

Milk intake in pregnancy was associated with higher birth weight for gestational age , lower risk of SGA (Small for gestational age) and higher risk of LGA (Large -for-Gestational Age) (Sjurdur, 2007).

Epidemiologic evidence that prenatal (PAH) polycyclic aromatic hydrocarbons exposure from diet including grilled meat might be hazardous for fetal development (Chowski, 2012).

Nikoui (2012) recommended pregnant women to avoid uncontrolled consumption of food that contain caffeine or drugs that contain high amounts of caffeine. They should not also take caffeine in the 1st trimester of pregnancy.

In this meta- analysis Ekaterina (2010) observed no important association between caffeine intake during pregnancy and risk of preterm birth cohort.

According to Meng (2008) the dietary intake of SFA, MUFA and PUFA among pregnant women reasonably adequate**.**

Halldorsson (2009) Indicates that dietary pattern of pregnant women associated with high fat intake may lead to increased plasma dioxin activity and utero exposure might be related to early infant development.

The difference between pregnancy body weight and ideal body weight was shown to be determinant of Dietary intake of energy and nutrient. Prevention of various pathological state, the supplementation or modification of nutritional intake of food with folate, iron, Vitamin -D, Zinc, iodine and fiber for pregnant is recommended (Miloslw, 2013).

The benefit of fish intake is strengthened with adjustment for mercury levels suggests that if mercury contamination were not present the cognitive benefits of fish intake would be greater. Maternal consumption of fish lower in mercury and reduced environmental mercury contamination would allow for stronger benefits of fish intake. Recommendations for fish consumption during pregnancy should take into account the nutritional benefits of fish as well as the potential harm from mercury exposure (Oken, 2008).

Life style including a dietary pattern characterized by high intake of vegetables, plant foods, and vegetables oils and low intake of processed meats and sweet beverages may be beneficial. Pregnancy is a period when most women are highly motivated for advice on a healthy diet and changes toward a healthy diet may also benefit their children. Dietary changes have low cost and low risk compared with medical intervention and even a moderate increase in the intake of vegetables and plant foods may be of public health importance (Brantsaeter, 2009)

C. FOOD CONSUMPTION PATTERN OF LACTATING MOTHERS

A healthy balanced diet for lactation is important for both mother and infant in order to have a positive long term effect on the outcome of their health and resistance to diseases (Hajaochen, 2012).

The feeding practices, dietary intakes and nutritional status of the lactating women were short of the national and international recommendations. Therefore sustained health and nutrition education is recommended to the women and their families and communities on increased food intake, proper dietary practice and dietary divertication during lactation in order to improve health and nutrition outcomes of lactating women (Afework, 2013).

Fish is an important as a source of long chain n-3 fatty acids but intake is low in many countries. The supply of n-3 fatty acids can be increased by using vegetables oils with higher ALA content (EG: Soya been or rapeseed oil) and by increasing fish production (Michaelsen, 2011).

Fetal blood fatty acid composition essentially depends on and is altered by the maternal fatty acid supply. However in addition to dietary factory, other aspects also contribute to the individual fatty acid distribution (Enke, 2011).

Shoshar (2007) says Mothers of heavier infants have significantly higher average intake of the most nutrients.

D. PREVALANCE OF DEFICIENCY AMONG PREGNANT WOMEN AND LACTATING MOTHERS

Nutrition is the intake of food, considered in relation to the body's dietary needs. Good nutrition means an adequate well balanced diet combined with regular physical activity. Poor nutrition can lead to reduced immunity, increases susceptibility to disease impaired physical and mental development and reduced productivity (Victor Soreng, 2008).

Parul (2006) explained that maternal nutrition has a potentially important role in maternal health and mortality. Improving maternal nutrition will result in reducing in the enormous burden of maternal morbidity and mortality in the developing world.

According to Yang (2012) the intake of nutrients can satisfy the demands of most of the pregnant women during second trimester of pregnancy.

Intake of several nutrients by pregnant women in Indonesia is below estimated average requirement (Haritriyanti, 2012).

Sumalika (2004) founded that pregnant women had low intakes of thiamin, riboflavin, calcium, iron, calorie and protein. This is of great public health concern. There is increasing evidence that nutrient deficiencies or malnutrition in the fetus is associated with chronic disease in later life

Rugayya (2012) speculated that the pregnant women should consume diet adequate in calories and essential micronutrients especially in iron, calcium, zinc , folate and vitamin B12.

According to Vilma (2008) concentrations of the nutrients, especially retinol and α-tocopherol, in mature milk of lactating adolescents were, in general, lower than in milk of adult lactating women. Milk concentrations were associated with plasma concentrations only for β-carotene, α-carotene, and lutein plus zeaxanthin.

Aidan (2012) stated that Insulin therapy is essential for optimal glycemic control during pregnancy in women with type 1 diabetes and is frequently required to optimize control in women with type 2 diabetes. Less commonly, women with gestational diabetes mellitus (GDM) require insulin for glycemic control.

Charlcar (2007) found that the diet of the studied population did not meet the nutritional recommendations pregnant women should be educated on nutrition during pregnancy especially those affected by diabetes mellitus.

Sanjeev (2008) stated that high pregnancy weight gain is associated with an increased risk of HTN in pregnancy, toxemia and gestational diabetes.

Pemmouche (2012) that the iron supplementation improves some parameters hematological the age gestation and the weight of new born baby.

Kalimbira (2009) founded that Malawi. S. efforts to increase awareness on anemia in women of reproductive age in rural areas are largely effective. Iron supplementation is a big challenge which requires strategic planning and implementation of ways to ensure that pregnant women consistently take iron supplements throughout pregnancy.

The body weight of rural lactating women was significantly more than that of lactating women of urban area. A markedly high percentage of lactating women as well as rural area was found to have aneamia of moderate degree (Joshi, 2000).

Emmanuel (2010) speculated that both high and low prenatal BMI are associated with alternations in trace element status, hemoglobin concentration and adverse pregnancy outcomes. Deficiencies of micro nutrient in this population as in most developing countries is appears that maintenance of appropriate weight and food diversification during pregnancy would be alternative ways.

A supplement of 600mg DHA in the last half of gestation resulted in over all greater gestation and infant size. A reduction in early preterm and ovary low birth weight could be important clinical and public health of DHA supplementation (Carkon, 2013).

Stein (2011) stated that maternal DHA supplementation during and second half of gestation may enhance growth of eighteen months of children born to prime gravid women.

The DHQ had acceptable validity and reproducibility for assessing folate and vitamin B12 intakes in Japanese pregnant women (Mieshiraish, 2012).

Lee (2011) said that sufficient amount of zinc intake from animal food sources of a relatively higher Zinc bio availability is thus encouraged for women during pregnancy.

Zinc deficiency during pregnancy in various population recent data and some preliminary findings indicate a beneficial effect of maternal zinc supplementation on neonatal immune status and infant morbidity from infections disease. There is preliminary evidence of possible prevention of congenital malformations with zinc Supplementation. Zinc supplementation cannot be advocated to improve pregnancy outcome (Dheeraj, 2006).

According to Barna (2009) zinc deficiency is more prevalent in Hb < 12 despite if iron supplementation. Iron and Zinc supplementation during pregnancy seem to be more effective for HB correction in pregnant women.

John (2013) founded that pregnant women in developed countries are at risk of sub-optimal micronutrient intakes. Folate, iron and vitamin D intakes were

consistently below nutrient recommendations in each geographical region and calcium intakes in Japan were below the Japanese recommendations and the average intake levels in other developed countries. The implication of potential nutrient insufficiency on maternal and off spring health outcomes is needed along with improvements in the quality of dietary intake.

Monashis (2009) indicated that high prevalence of vitamin - D deficiency disease among pregnant women and adolescent girls from a rural Indian community.

Baiz (2012) speculated that gestational exposure to ambient air pollution, especially during late pregnancy, may contribute to lower vitamin D levels in off spring. This could affect the child's risk of developing disease later in life.

The micronutrient powder was at least as efficacious as the iron and folic acid tablets in controlling moderate to severe anemia during pregnancy (Nuzhat Choudary, 2012).

Folate supplementation which is proven to reduce the risk of neural tube and heart defects can improve female fertility. Potentially offering the chance for an improved pregnancy outcome (Margit et al., 2010).

It is important to continue to encourage all women reproductive capability to consume a daily multivitamin containing 400kg /day of folic acid for reduced risk of a neural tube defect affected pregnancy (Stephanie et al, 2011).

Khan (2010) founded that the pregnant anemic women had iron (51 percent) deficiency and folate (20 percent) deficiency followed by combined iron folate (19 percent) deficiency and cobalamin (4 percent) deficiency during first antenatal visit. Low income, multiparty, poor diet and lack of supplements are the main contributor in development of anemia during pregnancy.

Mario Murcia (2013) found the impact of iron supplementation during pregnancy extends beyond the pregnant women to her developing fetus. Additional focus on the role of iron in promoting optimal maternal and neonatal outcomes is needed at these key life stages.

Feketeal (2012) said that significant dose -response between folate intake and birth weight. However the results indicated no evidence of any affect of floate supplementation on placental weight and length of gestation. The relative paucity of data that were able to collect into this systematic review indicates that three is an urgent need to develop further high quality studies focusing on health outcomes of folate supplementation after first trimester.

The folate or other micronutrients deficiency during fetal development may be an important risk for schizophrenia (Gunawardana, 2011)

Pemir (2011) found that ferritin levels were significantly low in pregnant women 25years and in those who were in five months pregnant.

Importantly to the evidence base for iodine supplementation of pregnant women increases the mild iodine during pregnancy (Melse-Boonstra, 2012).

Lindsay (2005) concluded that early prevention of B-Vitamin deficiencies may also be important to prevent homouysteinemid and iron depletion throughout pregnancy. The efficiency of giving multiple micronutrients supplements once or twice a week to women capable of becoming pregnancy and then possibly more frequently during pregnancy.

Ainy (2006) founded that 60 percent of women in the first trimester, 48 percent in the second and 47 percent in the third trimester had either severe or moderate vitamin D deficiency. It is recommended that the importance of calcium supplements with Vitamin - D in pregnant women be stressed for these individuals.

According to Andra (2012) **w**omen who begin pregnancy with adequate intakes of 1000 mg calcium/day may not need additional calcium. The effects of supplemental and food based calcium is women with chronically low calcium intakes to determinant the effect on both maternal and infant bone out comes and difference calcium metabolism during pregnancy.

Kimberly (2006) found that net deficit in bone calcium balance occurred during pregnancy and lactation. Increased dietary calcium intake was associated

with improved calcium balance therefore greater calcium intake may minimize bone loss across pregnancy and lactation.

The effect if n-3 LCPUFA [Long chain poly unsaturated fatty acid] and supplementation on reducing allergic disease in off spring area premising (Larque, 2012).

McBride (2012) stated that alcohol use during pregnancy which results in fetal alcohol spectrum disorder is the loading environmental related birth defects and mental retardation in the western world.

E. IMPACT OF NUTRITION EDUCATION ON PREGNANT WOMEN AND LACTATING MOTHERS

Fouda (2012) speculated that most of women had a very poor level of knowledge about nutrition during pregnancy. The essential knowledge regarding the basic nutrients and adequate nutrition during pregnancy also the importance and sources of most of the types of vitamins and minerals and other essential food elements. It is necessary to encourage pre-pregnancy teaching and counseling for future mothers and during early pregnancy, about proper and balanced maternal nutrition, also to enforce good prenatal care nutritional counseling of supplementation of iron and folic acid and other basic nutrients that are crucial for the mother and her growing fetus.

Kanade (2008) said that creating nutritional awareness and motivating rural mother for consuming micronutrients rich foods like green leafy vegetables and seasonal fruits that are easily available in rural areas, will be a much affordable solution for combating the problem of low birth weight rather than waiting for improvement in the existing nationwide programs for pregnant women.

Sanjeev (2011) opines providing awareness about nutritional requirement during pregnancy and suggested pragmatic ways to measure to deal with under nutrition.

Vijayalakshimi (2009) suggested that socio-economic status plays an important role in determining the nutritional status of the mothers and health status of the new born. There is a strong need to provide nutrition education mother to increase their awareness knowledge to inculcate appropriate dietary practice and to include cheap locally available nutrient dense foods in their diet.

Pregnant women requires targeted advice on their weight, ideal weight gain and impact of these on pregnant (Thompson, 2011).

Midwifery (2008) has advised to women experiencing nausea and/or vomiting was to eat frequent small meals and snacks (91 percent). Other common advice was given by half the midwives or less: avoidance of fatty/spicy foods (53 percent); eating before rising in the morning, e.g. consumption of dry biscuits/toast (51percent) and keeping hydrated (49 percent). Most midwives (39/46, 85 percent) included some form of vitamin or herbal supplement in their advice for nausea and vomiting in pregnancy; however, many were unaware of potential harmful side effects or what would constitute appropriate doses.

According to Kaur (2008) poor purchasing power, lack of knowledge and environmental production appeared to be the key factor's of poor obstetric outcome. Thus besides the remedial techniques, environmental education and awareness programme should be implemented for the masses became "unless the environment is healthy, the individual cannot be healthy.

Breast feeding is valued by incarnated pregnant women and has the potential to contribute to their psychosocial well being and left worth as a mother, understanding the breast feeding experience and views of women at high risk for poor pregnancy outcomes and inadequate new born child care during period of incarceration in local jails important for guiding breast feeding promotion activities in this transient and vulnerable population (Huang, 2012).

Shahid (2011) stated there is need to identify local socio -cultural beliefs and practice through large community based studies and improve the nutritional knowledge of the mothers through awareness and health education will decrease the malnutrition in pregnant women.

Maughan (2012) said that prenatal nutrition education and knowledge and attitudes about nutrition and pregnancy, four major themes were identified, incomplete knowledge or practice, lack of comprehension, cultural beliefs and non compliance with medical advice.

Victoria (2010) reported that low levels of vegetables and fruit consumption and high reported levels of soft drink and fast food consumption among pregnant women, dietary interventions to prevent adverse health consequences need to be tailored to meet the need of pregnant women of low-socio economic status in order to improve their own healthy eating behavior. Increase water and fruit consumption could lead to reduced pregnant women**.**

According Usha (2011) that to Nutrition education and supplementation either single or in combination, developed positive attitudes regarding maternal and infant nutrition and significance of vitamin A in pregnant women, the breast feeding and infant feeding practice of the women, also improved after the interventions. These findings preset the twin advantage of supplementation and nutrition education in augmenting the KAP and vitamin - A of pregnant women.

Caire (2007) found that education about importance of the maternal during lactation should be directed toward increasing consumption of food rich in micronutrients.

We determined daily mean intake of energy and fluids and also beverages consumption pattern in lactating mothers and the possible effect of some maternal factors on infant's weight with regards to the effect of maternal nutritional status on weight of infants, appropriate nutritional educations and interventions are suggested for lactating women (Mahdevi, 2009).

III METHODOLOGY

The methodology followed in the present research entitled **"Food Consumption pattern of rural pregnant women and lactating mothers and impact of nutrition education"** is discussed under the following headings.

A. Selection of area

B. Selection of sample

C. Formulation of interview schedule

D. Collection of Data

1. Socio - economic profile of the selected subjects

2 . Assessment of nutritional status of the selected subjects

a. Dietary survey

b. Anthropometric measurements.

c. Clinical Examination

d. Biochemical parameters.

E. Imparting nutrition education

F. Evaluation the impact of nutrition education.

A. SELECTION OF AREA

The study was conducted in selectd rural areas of Coimbatore, namely Nallampalayam, Maniyakaranpalayam, Suppunayakanpudur, udayampalayam, Gandhinagar, Chinnavedampatti, AnjugamNagar, Kavundampalayam, Nanjekoundampudur, Goundermills, Vellakinar, and poosaripalayam.These areas were selected as more number of pregnant women and lactating mothers were available.

B. SELECTION OF SAMPLE

Random sampling is also known as chance sampling or probability sampling where each and every item in the population has an equal chance of inclusion in the sample. (Pankaj, 2010).

Sampling is the process of selecting units from a population of interest so that by studying the sample, it may fairly generalize results back to the population from which they were chosen (Chakraborty, 2009).

A house to house survey was conducted in the selected areas. All women who were pregnant or lactating were selected randomly wherever they were present. Those who were between 18 to 40 years and willing to co-operate were selected. A total number 100 pregnant women and 100 lactating mothers were selected. Thirty pregnant women and 30 lactating mothers who were willing to give blood for bio - chemical analysis were selected as sub-sample.

C. FORMULATION OF INTERVIEW SCHEDULE

An interview schedule was formulated by the investigator for collection of data. The interviews schedule included questions on anthropometric measurement of the subjects, dietary habits, clinical assessments and biochemical parameters.

The interview method of collecting data involves presentation of oral verbal stimuli- and reply in terms of oral verbal responses. Personal interview method requires a person known as the interviewer asking questions generally in a face to face contact to the other person or persons (Kothari, 2007).

The methods of collecting information through personal interviews are usually carried out in a structured way. Such interviews involve the use of a set of pre determined questions and highly standardized techniques of recording. Thus the interview in the structured interview follows a rigid procedure laid down asking questions in a form and order prescribed (Kothari, 2007). Plate I depicts the interview being conducted.

The interview schedule developed in presented in Appendix - I.

D. COLLECTION OF DATA

Utilizing the interview schedule and face to face method the required data were collected from the pregnant and lactating mothers. The answers given by the respondents were recorded by the investigator.

The quality and dependability of statistics more or less depend on their collection (Bhujancra, 2008).

Personal interviews have the advantage that the interviewer can establish rapport with the people interviewed. Interviewer can direct the attention of the respondents to the material and motivate them to answer the questions carefully (Donald, 2007).

1. Socio- economic profile of the selected subjects

The interview schedule included the information about socio-economic profile of the selected subjects. The details of the interview schedule regarding the demographic profile included age, sex, education, type of family, occupation, family income and family size were collected.

2. Assessment of nutritional status of the subjects

a. Dietary Survey

In the dietary survey information such as type of the diet, number of meals, consumption of cereals, fruits, meat, roots and tubers, green leafy vegetables and other vegetables of all the selected subjects were collected.

Information on dietary intake was collected by 24hours dietary recall method for three consecutive days. The subjects were asked to recall the type and approximately the amount of foods consumed over the previous three days. In this method the house wife or the member of the household, who cook the food was asked about the type of food preparations made for breakfast, lunch, evening tea and dinner.

A twenty four hour recall method was used to study the amount and type of food consumed. Nutrient intake was assessed by twenty four hour dietary recall method which was then compared with Recommended dietary allowance (ICMR, 2010).

An account of raw ingredients actually used at the household for each food preparation were obtained by using the measuring cup recommended by the Home Science Association of India. Care was taken to avoid fasting and festival days while noting the intake. To further validate the 24hours nutritive intake data, the consumption of major food items was assessed using food frequency table. Measuring cups for solid foods and measuring glass for liquid items, were shown to the respondents to find out the amount of food stuff consumed. Raw equivalent of foods were back calculated and the nutrient intake was calculated using ICMR food composition tables (ICMR 2010).

Intake was compared with Recommend dietary Allowances (RDA) for Indian pregnant women and lactating mothers.

b. Anthropometric measurements

Anthropometric technique is concerned with the measurement of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition (Joshi, 2002)**.**

i. Height

The height was measured with a non-stretchable measuring tape. The procedure recommended by Bamji et al. (2009) was followed in measuring the height of the selected subjects.

The subjects were allowed to stand straight on a flat floor against the wall without foot wear. They were made to stand such that their head, back, shoulders, buttocks and heal touched the wall and their head was erect. A horizontal scale was gently placed over the head of the subject without pressing and a mark was made on the wall. Distance between the position of the marked point and the height was recorded for all the subjects. The height was recorded to the accuracy of 0.1cm. Plate II depict the measurement of height of pregnant woman and lactating mother.

ii. Weight

Body weight is a simple measurement of total body composition and growth. It is generally compared to an ideal or desirable weight. Body weight is most widely used and the simplest reproducible anthropometric method. (Michael et al., 2005).

The weight of the selected subjects were measured using a weighing scale. The weights of the entire selected subjects were recorded with ordinary light cloths and after removing their foot wear. Plate III shows the measurement of body weight of pregnant woman.

c. Clinical examination

Clinical assessment attempts to identify the initial nutritional state as well as the interplay of the factors influencing the progression of nutritional abnormalities. Therefore, a clinical nutritional assessment is a dynamic process which is not limited to a single “snap shot” at the moment of measurement but provides picture of current nutritional status and insight into the patient (Khursheed, 2005).

The clinical signs were observed for the pregnant women and lactating mothers. Clinical test was carried out with the help of the physician of the primary health center. With the help of physician the hair, eye, tongue, skin, enlargement of neck, nail, breast size, abdomen, leg and weight changes were noted using ICMR clinical assessment Performa for the pregnant women and lactating mothers.

d. Biochemical parameters

Bio chemical estimations are the most objective and sensitive measure of nutritional status of the people (Hammond, 2008).

In the biochemical examination the blood glucose and blood hemoglobin levels were estimated for sub sample.

i. Blood glucose

Blood glucose estimation is the method to know the type of sugar present in the blood. The blood glucose was measured by the electronic glucometer. It is the simplest and easy way to identify the blood glucose for large sample. The reflectance photometry test principle is used in the glucometer. To perform a test, the meter requires 1 -2 microliter of blood (Plate IV).

ii. Blood heamoglobin estimation

For heamoglobin estimation, 20µl of blood was taken in a heamoglobin(Hb) pipette and transferred to a pre numbered glass bottle containing 5ml drabkin's reagent. Heamoglobin estimation was done by the cyanmetheamoglobin method using a photoelectric colorimeter with green filter (500- 570nm wave lenth) (Tarvinderjeet, 2013).

With the help of technician the Cyanmethheamoglobin method was used to measure the hemoglobin level of lactating mothers. It is most famous method to identity the haemoglobin level of the selected subjects. Blood haemoglobin level of pregnant women were recorded from the hospital record (Plate IV).

iii. Blood pressure

Blood pressure means pressure during contraction of the heart ventricle and the pressure during their relaxation. The numbers are given as fraction, with the first number representing the systolic pressure (ventricular contraction) and second number the diastolic pressure (relaxation) (Sizer, 2003).

Blood pressure was measured for all the selected subjects. Measurement was done with the subjects when comfortably seated with bare arm supported at high level. It indicates the normal, mild and danger zone of the subjects by the color code of the electronic machine (Plate V).

E. IMPARTING NUTRITION EDUCATION

Nutrition education and counseling should be tailored to meet the specific dietary issues identified during the nutrition assessment (Stang, 2008).

The goal of nutrition education is to help the people acquire the knowledge and skills needed to make changes, including modifying behavior to facilitate sustained changes (Charney, 2008).

A sub sample of thirty pregnant women and lactating mothers were enrolled for nutrition education. Nutrition education was given thrice in a month. The education was given by face to face contact.

During nutrition education the pregnant women were advised to take plenty of greens, iron rich foods include plenty of salads like carrot and other raw vegetable in the diet. And also advised to take small frequent meals, drink plenty of fluids as milk and coconut water and to avoid the excess tea or coffee consumption and not to keep the stomach empty.

Nutrition education information included about importance of vitamins, minerals, physical activity, food pyramid and cooking methods. Nutrition education was given by oral method and by using charts, pamphlets and stickers. Pamphlets were prepared in the local language and distributed to the pregnant women and lactating mothers (Plate VI).

The pamphlets used in nutrition education are presented in Appendix - VI.

F. EVALUATION THE IMPACT OF NUTRITION EDUCATION

The impact of nutrition education on dietary knowledge and dietary practices of pregnant women and lactating mothers was assessed by administrating a questionnaire before and after the one month of nutrition education.

Charts, stickers and pamphlet highlighting the importance of iron rich foods and and food pyramid was used. The nutrition education materials developed were used to impart knowledge in ICDS centers. Charts were stuck on the walls of the centers. This was done to educate rural pregnant women and lactating mothers who are not included the nutrition education.

Group meeting were conducted to assess the impact of nutrition education on nutrition knowledge of rural pregnant women and lactating mothers.

IV RESULTS AND DISCUSSION

The results emerged from the present research entitled "**Food Consumption Pattern of Rural Pregnant Women and Lactating Mothers and Impact of Nutrition Education"** and the relevant discussions are presented under the following headings.

A. Demographic and economic profile of the selected subjects

B. Nutritional status of the selected subjects

C. Life style pattern of the selected subjects

D. Impact of nutrition education of the selected subjects

A. DEMOGRAPHIC AND ECONOMIC PROFILE OF THE SELECTED SUBJECTS

1. Age

The distribution of the selected subjects according to their age is presented in Table I.

TABLE I

DISTRIBUTION OF SELECTED SUBJECTS ACCORDING TO AGE

Age in years	Pregnant women (n = 100) No. (%)	Lactating mothers (n = 100) No. (%)
16 - 20	12	11
21 - 25	51	51
26 - 30	32	31
31 - 35	5	7
Total	**100**	**100**

It is evident from Table I that 51 percent of the pregnant women were in the age group of 21 to 25 years followed by 26 to 30 years of age. Same trend was observed in the case of lactating mothers also. These results show that majority of pregnant women were in the best reproductive age when they were pregnant. Teenage pregnancy below the age of 20 was observed in 12 percent of pregnant women and an equal number of lactating mothers.

Inspite of the advertisement and education given by the government a sizeable number of women had pregnancy below 20 years of age.

Age is an important demographic variable that determines biological and mental maturity. Teenage pregnancy may lead to reproductive health problems and may place the women at greater risk of miscarriage. In the present study 12 percent of pregnant women and 11 percent of lactating mothers were in this group.

Sexual education programs are necessary for the reduction of teenage pregnancies and adequate medical prenatal care, as well as psychological and social support, must be given to avoid both medical and psychological problems for the sensitive young mother (George, 1991).

Only a minority of five percent of pregnant women were above the age of 30.

2. Education

The classification of the selected subjects according educational level is depicted in Table II.

TABLE II

EDUCATIONAL LEVEL OF THE SELECTED SUBJECTS

Education level	Pregnant women (n = 100) No. (%)	Lactating mothers (n = 100) No. (%)
Illiterate	20	17
Middle upto10th	40	45
Inter middle upto 12th	22	28
Graduate	18	10
Total	**100**	**100**

As evident in Table II educational status of rural women was poor. Majority had studied upto middle class. Higher education of girls in the rural sector was not possible as there are only a very few secondary schools near the village. In the selected area there were schools upto high school level only are available. Hence illiterate further adds to their ignorance and

unawareness of surrounding environment which continues to envelop them into deep religious beliefs.

Low literacy level, especially among rural women, has aggravated their problems and further lowered their health status (Manisha, 2007).

3. Occupation

The occupational status of the selected subjects is given in Table III.

TABLE III

OCCUPATIONAL STATUS OF THE SELECTED SUBJECTS

Type of occupation	Pregnant women (n = 100) No. (%)	Lactating mothers (n = 100) No. (%)
House wife	34	48
Agriculture	18	10
Employee on government concern	14	12
Employee on private concern	12	17
Coolie	22	13
Total	**100**	**100**

Occupational status of the selected subjects given in Table III, shows that as they were more subjects with low level of education or illiteracy, many of them were house wives (34percent and 48percent). Other 50 percent were engaged in agricultural activities or they worked in school lunch programme and in small scale industries located in the selected area. Their income was very low.

Even if the subjects were working after they become pregnant, many stopped going for work and this further reducing their income.

4. Income

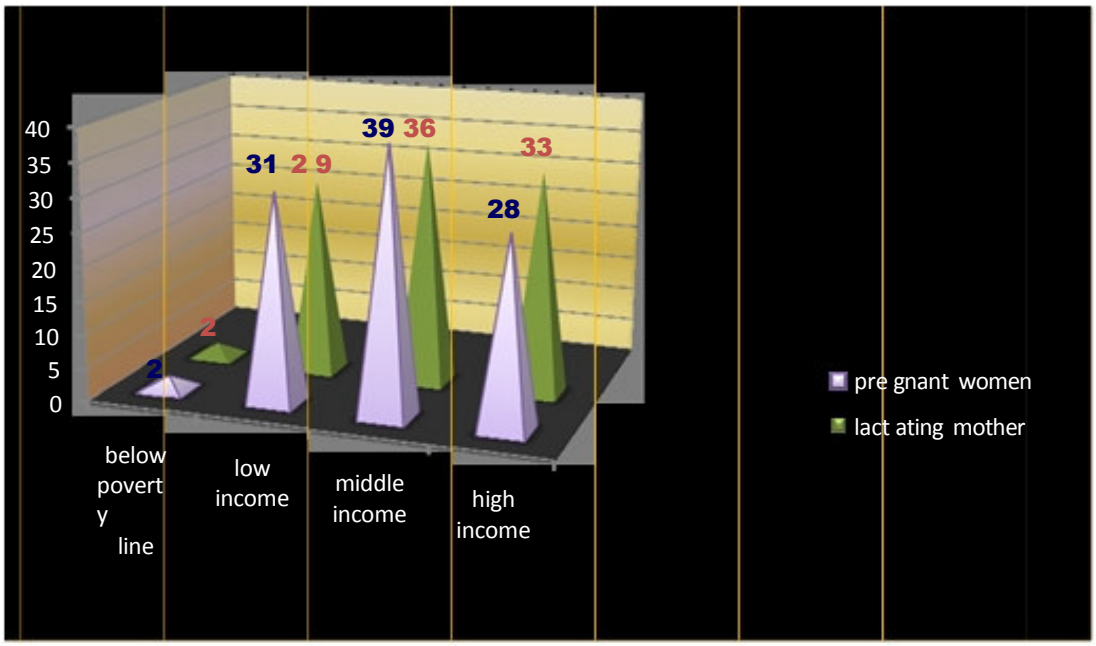
The classification of subjects according to their total family income is depicted in Table IV and Figure 1

TABLE IV

INCOME LEVEL OF THE SELECTED SUBJECTS

Income*	Pregnant women (n = 100) No. (%)	Lactating mothers (n = 100) No. (%)
< `3,300 (Be low poverty line)	2	2
` 3301 - 730 1 (low inco me)	31	29
` 7301 - 14,3 00 (middle income)	39	36
> `14,300 (H igh income)	28	33
Total	**1 00**	**1 00**

*** HUDCO (20 07)**



INCOME LEVEL OF THE SEL ECTED SU BJECTS

FIGURE 1

Table IV reflects the classification of selected subjects according to were total family income. It is evident that 70 percent of pregnant women and 65 percent of lactating mothers belonged to low income and middle income groups. In rural areas there was more number of low income families. An average of 30 percent of the selected subjects was in the high income group. Most of the subjects in high income group were from agricultural families who were land lords. Middle and low income family members were agricultural worker or were employed in coolie works.

The majority of the world's poorest people were rural areas. Three quarters of the estimated 1.2 billion persons sustaining their income level is very low. Source of rural poverty are numerous, ranging from both natural and manmade environmental problems to relations of inequality (Tickamyer, 2009).

5. Type of family

Table V brings out the data on type of family of the selected subjects.

TABLE V

TYPE OF FAMILY

Family type	Pregnant women (n = 100) No (%)	Lactating mothers (n = 100) No (%)
Nuclear	61	70
Joint	39	30
Total	**100**	**100**

As indicated in Table V, sixty percent to 70 percent of pregnant women and lactating mothers respectively were in nuclear families. Rest of the subjects belonged to joint families.

This results clearly indicate that the recent trend of the society where nuclear family system predominance.

6. Religion

Analysis of collected data pointed out that 95 percent of pregnant women and 98 percent of lactating mothers belong to Hinduism and rest were

Christian. Though they were a few Muslim families, pregnant women and lactating mothers were not available during the study.

7. Family size

Table VI presents the number of members in the families of the selected subjects.

TABLE VI

FAMILY SIZE OF THE SELECTED SUBJECTS

Family size	Pregnant women (n = 100) No (%)	Lactating mothers (n = 100) No (%)
2 - 4	70	76
4 - 6	23	19
6 - 8	7	5
Total	**100**	**100**

As depicted in Table VI, 70 percent and 76 percent of the subjects had two to four members living in the families. Twenty three and 19 percent of families consisted four to six members and only seven percent and five percent consisted of more than six members in families.

B. NUTRITIONAL STATUS OF THE SELECTED SUBJECTS

The nutritional status of the subjects was studied through dietary pattern, anthropometric measurement and clinical examination and by studying biochemical parameters. The results of dietary pattern are depicted in the following Tables.

1. Dietary pattern

a. Type of diet

Table VII presents the type of diet consumed by the selected subjects.

TABLE VII

TYPE OF DIET CONSUMED BY THE SELECTED SUBJECTS

Dietary pattern	Pregnant women (n = 100) No (%)	Lactating mothers (n = 100) No (%)
Vegetarian	-	3
Non - vegetarian	100	96
Ova vegetarian	-	1
Total	**100**	**100**

Table VII depicts that 100 percent of pregnant women and 96 percent of lactating mothers were non vegetarian's diet. Only one percent of lactating mothers followed ova - vegetarianism and three percent of subjects were pure vegetarians.

This three percent of vegetarians belonged to a particular community also followed only vegetarianism. Except that all the subjects were non - vegetarianism. Though they were non - vegetarians they consumed non - vegetarian foods only weekly or occasionally due to the increased cost of non vegetarian foods.

Non - vegetarian diet is a rich source of iron compared with vegetarian diet (Kathleen, 2008). A majority of the subjects followed a non-vegetarian diet they have a high chance of consuming iron.

b. Meal pattern

Table VIII presents the type of meal pattern followed by the selected subjects.

TABLE VIII

MEAL PATTERN OF THE SELECTED SUBJECTS

Meals / day	Pregnant women (n = 100) No (%)	Lactating mothers (n = 100) No (%)
1meal / day	8	Nil
2meals / day	12	8
3meals / day	39	80
>3meals	41	12
Total	**100**	**100**

Analysis of meal pattern indicated that more number of subjects (41percent) consumed more than three meals/day. They said that they consumed small frequent meals on the advice of the doctor in the primary health center and due to feeling of nausea they were not able to consume more quantity in one meal. In lactating mothers majority of the subjects (80 percent) were consumed 3meals/day.

Breast feeding women consumed lunch and snacks more frequently. This reported higher intake of cereals and other foods than pregnancy. Because their requirement is high they consumed more quantity.

According to Chang (2008) predictors of healthful eating behavior by weight status of obese mothers.

c. Frequency of food purchase

Table IX presents the frequency of food purchase of the selected subjects.

TABLE IX

FREQUENCY OF FOOD PURCHASE

Frequency of food purchase	Pregnant women (n = 100) No (%)	Lactating mothers (n = 100) No (%)
Daily	1	9
Weekly	34	32
monthly	65	59
Total	**100**	**100**

Table IX shows the frequency of purchase of the foods. Sixty five percent and 59 percent of the subjects purchased groceries once in a month. The second majority of the selected subjects 34 percent and 32 percent pregnant women and lactating mothers respectively purchased weekly. Fruits and vegetables were purchased on daily basis or once or twice a week by both the groups.

d. Food consumption pattern of pregnant women and lactating mother

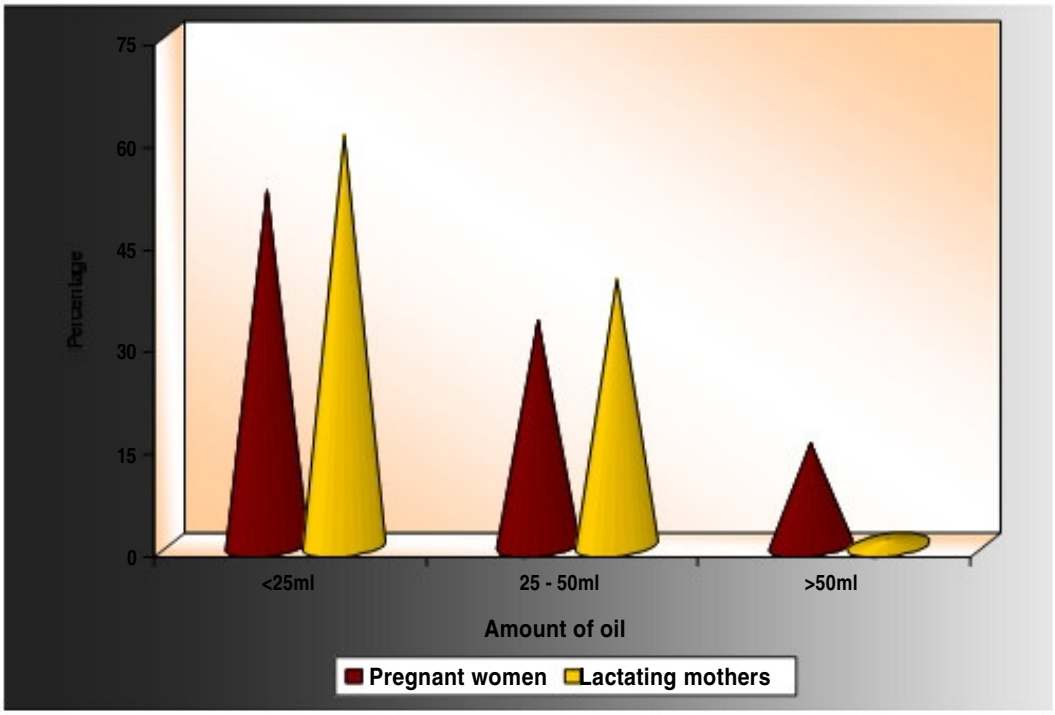
Table X depicts the Food consumption pattern of selected pregnant women and lactating mothers.

TABLE X

DISTRIBUTION OF SELECTED SUBJECTS ACCORDING TO FOOD CONSUMPTION PATTERN

Food items	Daily		Weekly		Monthly		Occasionally	
	Pregnant Women n=100	Lactating mother n = 100	Pregnant Women n=100	Lactating mother n = 100	Pregnant Women n=100	Lactating mother n = 100	Pregnant Women n=100	Lactating mother n = 100
Cereals								
Raw rice	22	10	16	8	45	24	17	58
Boiled rice	100	100	-	-	-	-	-	-
Wheat flour	6	32	52	60	42	10	-	-
Sago	-	-	18	31	42	40	40	29
Ragi flour	12	-	4	-	47	36	37	64
Pulses								
Redgram dhal	2	-	74	63	4	18	20	19
Blackgram dhal	17	3	69	77	2	14	12	6
Bengalgram dhal	-	-	47	21	18	52	35	27
Greengram dhal	4	-	64	48	17	52	15	-
Cowgram	-	-	16	27	35	44	49	29
Soya	-	-	25	14	15	34	60	52
Roots and tubers								
Onion	100	100	-	-	-	-	-	-
Potato	-	-	69	41	17	32	14	27
Beetroot	-	-	72	67	15	30	13	3
Carrot	8	-	80	76	20	24	-	-
Green leafy vegetables								
Curry leaves	100	100	-	-	-	-	-	-
Coriander leaves	100	100	-	-	-	-	-	-
Manathakali leaves	-	-	6	2	72	69	22	29
Other vegetables								
Brinjal	-	-	22	15	47	34	31	54
Beans	-	-	79	67	21	33	-	-
Pumpkin	-	-	42	45	24	52	34	3
Ladies finger	-	-	75	82	25	18	-	-
Cabbage	-	-	80	77	20	23	-	-
Tomato	47	52	53	48	-	-	-	-
Cauliflower	-	-	48	64	52	36	-	-
Ridge gourd	-	-	4	12	47	54	49	34
Snack gourd	-	-	22	14	48	16	30	70
Cluster beans	-	-	64	52	36	38	-	10
Fruits								
Banana	34	17	52	44	14	9	-	30
Apple	45	12	55	28	-	40	-	20
Orange	34	2	47	15	19	44	-	39
Pomegranate	18	-	34	10	42	60	6	30
Guava	1	-	10	17	20	14	70	69

Nuts								
Ground nut	2	-	18	27	22	16	58	57
Coconut	24	32	62	58	14	10	-	-
Cashew nut	4	-	-	-	18	6	78	94
Oils								
Groundnut oil	12	18	7	14	-	-	81	68
Gingelly oil	1	-	44	52	18	37	38	11
Palm oil	21	25	17	32	42	27	20	16
Sunflower oil	64	57	24	12	12	31	-	-
Vanaspathi	-	-	2	-	80	60	18	38
Ghee	1	-	4	12	8	6	87	82
Flesh foods								
Fish	-	-	34	47	44	52	22	4
Egg	4	-	42	47	48	13	6	40
Chicken	-	-	58	82	32	18	10	-
Mutton	-	-	44	32	12	28	44	40
Milk product								
Milk	98	100	-	-	-	-	-	-
Curd	4	-	75	44	21	54	-	2
Fried foods	18	13	48	57	6	10	28	20
Sugars								
Sugar	100	100	-	-	-	-	-	-
Sugar cane Jaggery	-	-	-	-	-	-	100	100
Palm Jaggery	-	-	-	-	-	-	100	100



AMOUNT OF OIL CONSUMPTION OF THE SUBJECTS

FIGURE 2

Cereal consumption pattern (Table X) points out that rice was the cereal consumed daily. Raw rice was consumed for using rice kanji. Wheat was consumed as chapattis for dinner and rarely for breakfast majority of the sample consumed wheat weekly twice or thrice. it was found that some of the sample consumed ragi flour for preparation of ragi porridge for breakfast among pregnant women. In lactating mothers, their ragi consumption was on monthly basis. Sago was consumed only for preparation of uppuma for dinner. Very few subjects consumed sago in among pregnant women and lactating mothers. Other cereal products consumed occasionally. Compared to other people the pregnant women and lactating mother should consume high quality and quantity of food. Cereal contributes more than 70 percent of energy to the diet. They contain 6 to 14 percent of protein depending on the type of cereal.

With regard to pulse consumption, no one consumed pulses daily. Only few subjects consumed pulses on daily. Only a few subjects consumed black gram as Idli and dosai. Bengal gram dhal, green gram dhal, red gram dhal, and cow pea were consumed once in a week. Majority of the samples were included soya on occasionally, very few subjects consumed once in a month.

The consumption pattern of roots and tubers was weekly once, 100 percent of subjects consumed onion on daily basis. Beet root, Potato, carrot were consumed once in a week.

Green leafy vegetables consumption indicated that 100 percent of samples consumed curry leaves and coriander leaves on daily basis. Other greens consumed on monthly basis. Few of them consumed weekly. Because their worked in agriculture. They have high chance to get green leafy vegetables from the agriculture land.

The consumption pattern of other vegetables revealed that the requirement quantities of vegetables were consumed weekly by the by the selected subjects. The vegetables were consumed according to seasonal availability.

Fruits consumed by the pregnant women were high compared to lactating mothers, most of the pregnant women consumed fruits twice or thrice in a week. The lactating mothers consumed fruits monthly once or

occasionally. Because some of the lactating mothers believe that fruits are cold foods for lactating period. They did not consume that. So majority of the lactating mothers avoided fruits during lactation. It indicates the inadequate fruit consumption among lactating mothers.

Majority of the subjects consumed coconut weekly twice. Some of the sample used for daily for preparation of curry and poriyal mainly cashew consumption indicate their inadequate consumption cashew nut were consumed by the subjects on occasionally.

As evident the refined sunflower oil was the most preferred oil and 64 percent of women consumed refined oil on daily basis. Only 1 percent of subjects consumed gingili oil on daily basis. Ghee and butter were consumed only by minimum number of subjects on weekly basis. Some of the subjects were using combination of oils. It was found that 21 percent and 24 percent of the subjects were consuming palm oil. Palm oil is most effective at overcoming vitamin A deficiency when the price can be kept low (Ponne, 2012).

The oil normally consumed was sunflower oil, palm oil, and ground nut oil, saturated fats namely vanaspathi and ghee were consumed by majority of subjects either monthly or occasionally. Fifty percent and 60 percent of the subjects consumed less than 25g of fats and oils per day and also 33 percent and 39 percent of the subjects consumed oil between 25 to 50g.only very few subjects (15percent) and (1percent) consumed oil above 50g. Hence they were advised to take less amount of oil.

Among the selected sample majority were non vegetarian. They preferred fish, meat, chicken and egg. The amount of chicken consumed by the lactating mothers was high compared to pregnant women. The chicken consumption is low in pregnant women because they believed that chicken is a heat producing food. But non - vegetarians diet is rich source of iron. it is essential for pregnant women.

Milk was consumed on daily basis by majority of the subjects. The milk products namely curd and butter milk were consumed weekly once or twice. It was found the sugar was consumed daily among the subjects.

Majority of the subjects consumed fried foods once a week. Twenty eight percent of sample indicated that they consumed fried foods occasionally. The fried foods like vadai, baji, pani poori and bonda.

e. Food habits

Analysis of food habits of the pregnant women and lactating mothers indicated that 80 and 87 percent of the subjects respectively had good appetite. They consumed more than three meals per day. Thirteen and 12 percent of pregnant women and lactating mothers respectively had less than normal appetite. Only seven percent of lactating mothers and one percent of pregnant women had poor appetite. These mothers indicated that over work at place and due to the ill health of the infant they experienced loss of appetite. In general majority said they had good appetite.

f. Food fads and Fallacies

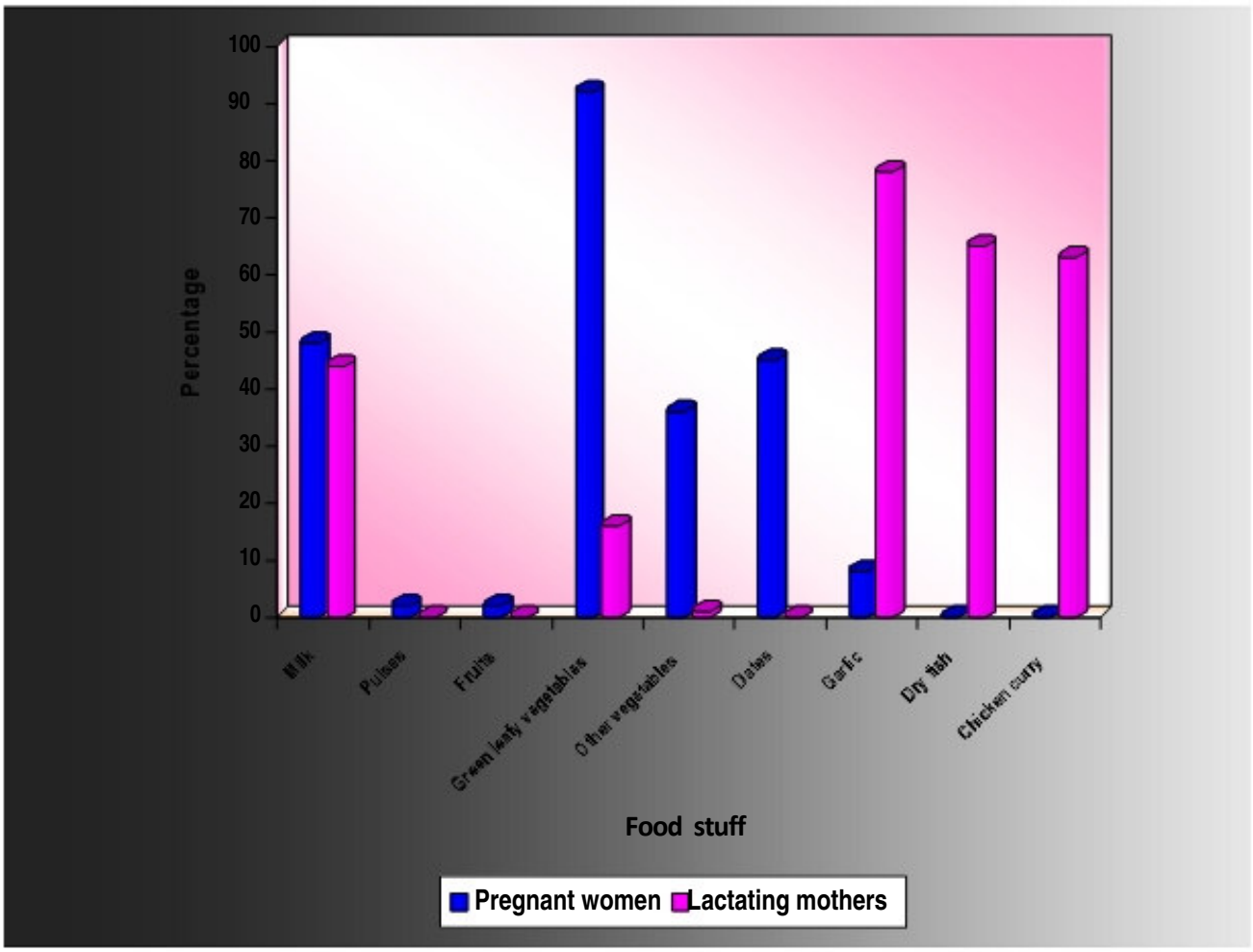
i. Reasons for including foods

Table XI and Figure 3 brings out the fads and fallacies of the selected subjects had with regards to different foods.

TABLE XI

FOODS SPECIALLY INCLUDED BY THE SELECTED SUBJECTS

Food stuff	Pregnant women (n = 100)		Lactating mothers (n = 100)	
	No (%)	Reason for including	No.(%)	Reason for including
Milk	48	Good for growth of the fetus	44	Increase the milk secretion and improve the health status of mother
Pulses	2	Increase the weight of women	-	-
Fruits	2	Improving health	-	-
Green leafy vegetables	92	Increase the weight and blood volume of the fetus	16	Good for health
Other vegetables	36	Important during pregnancy	1	Good for health
Dates	45	Good for health	-	-
Garlic	8	Purifies blood	78	Increases the milk secretion
Dry fish	-	-	65	Increases the milk secretion
Chicken curry	-	-	63	Increases the milk secretion



FOODS SPECIALLY INCLUDED BY THE SELECTED SUBJECTS

FIGURE 3

Table XI brings forth the foods specially included in the diet of the pregnant women and lactating mothers. Milk, green leafy vegetables, other vegetables and dates were found to be special foods which were preferred by the pregnant women.

They believed that inclusion of these foods will improve the health of mother and fetus.

Lactating mothers consumed garlic, dry fish and chicken for increasing milk secretion. They also indicated that milk consumption increases milk secretion and improve the health of mothers.

ii. Foods excluded

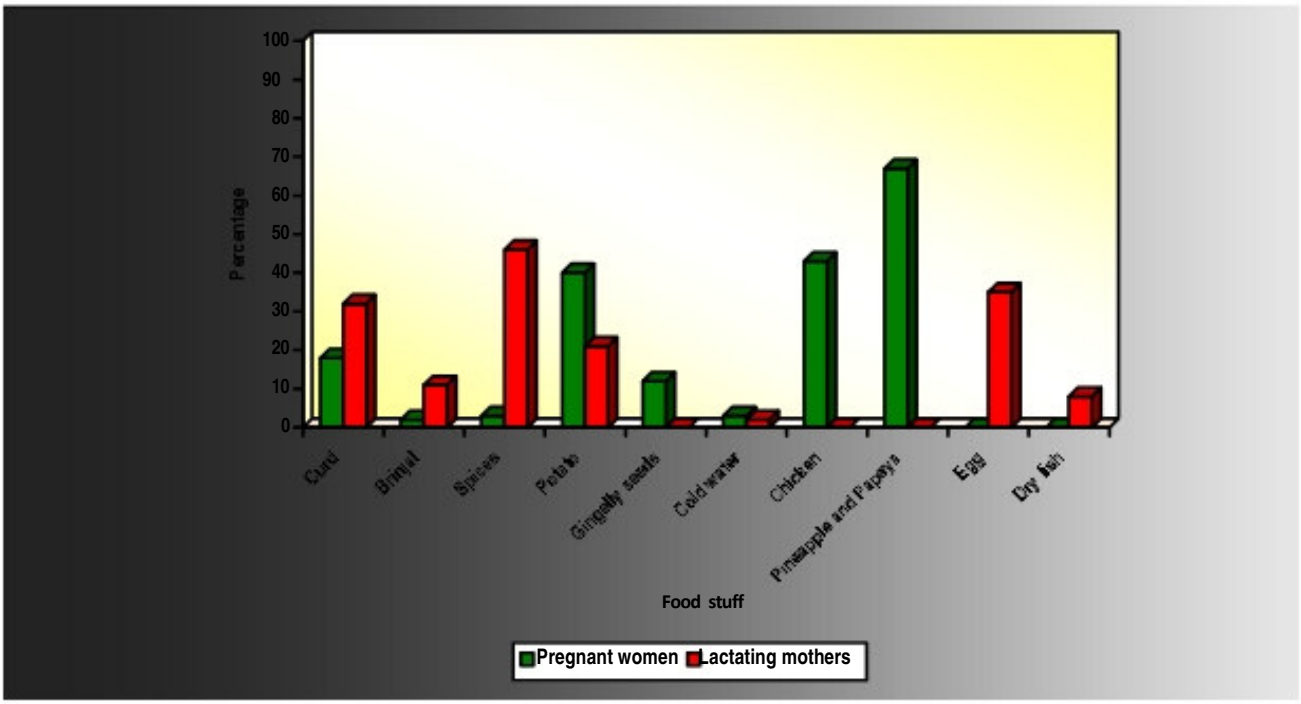
Table XII and Figure 4 shows the list of foods excluded by pregnant women and lactating mothers.

TABLE XII

FOODS SPECIALLY EXCLUDED BY THE SELECTED SUBJECTS

Food stuff	Pregnant women (n = 100)		Lactating mothers(n = 100)	
	No. (%)	Reason for excluding	No. (%)	Reason for excluding
Curd	18	Cough and cold food	32	Cough and cold food
Brinjal	2	Itching the skin	11	Itching the wound
Spices	3	Heart burn and sour food	46	Heart burn and sour food
Potato	40	Gas producing food	21	Gas producing food
Gingelly seeds	12	Abortive food	Nil	Nil
Cold water	3	Cold food	2	Cold food
Chicken	43	Hot food	Nil	Nil
Pineapple & papaya	67	Abortive food	Nil	Nil
Egg	-	Nil	35	Gas producing food
Dry fish	-	Nil	8	Itching the skin

Table XII depicts foods excluded by the selected subjects. Eighteen percent of pregnant women and 32 percent of lactating mothers avoided curd for the reason that it causes cough and cold. Thirteen percent of pregnant women and lactating mothers avoided brinjal as it itches the skin and wound. Sixty one percent of the subjects avoided potato as they believed that it is gas producing food. Twelve percent of pregnant women avoided the gingelly seeds as it was considered to by abortive food. Majority of the people strongly believed that pineapple and papaya were abortive and hot foods. Thirty five percent of lactating mothers believed that egg is gas producing food. Eight percent of people avoided dry fish as it itches the wound.



FOODS SPECIALLY EXCLUDED BY THE SELECTED SUBJECTS

FIGURE 4

g. Mean Nutrient intake

The mean nutrient intakes of the selected subjects are presented in the Table XIII. The individual nutrients intake is presented in Appendix - II

TABLE XIII

MEAN NUTRIENT INTAKE OF THE SELECTED SUBJECTS

Nutrients	Pregnant women		Lactating mothers	
	RDA	Mean nutrient intake (n = 30)	RDA	Mean nutrient intake (n = 30)
Energy (kcal)	2527	1870	2745	2054
Protein (g)	78	36.6	68	43
Fat (g)	30	34	30	46
Calcium (mg)	1200	270	1200	325
Iron (mg)	38	16	35	21.5
Carotene (μg)	2400	538	3800	762
Thiamine (mg)	1.3	1.1	1.5	1.8
Riboflavin (mg)	0.3	0.9	0.4	1.3
Niacin (mg)	16	14	20	11.2
Folic acid (μg)	500	77.3	300	93.9
Vitamin - c (μg)	40	28	80	22

*(ICMR, 2010)

It is evident from the Table XIII that the diet was deficit in major nutrients like protein, energy, calcium, iron and folic acid among the selected pregnant women and lactating mothers. Iron and calcium intake of the selected subjects were found to be below normal which in turn showed a high prevalence of anemia and osteoporosis. Compared to lactating mothers the nutrients were very low in the diet of pregnant women. The first trimester the pregnant women consumed very low amount of food due to nausea and vomiting. But the intakes of fat by the subjects were found to be higher than the RDA among pregnant women and lactating mothers. Thiamine, riboflavin and niacin intake by the subjects were normal. It met requirement of the subjects. Iron consumption was very low compared with RDA among pregnant women. It was evident that they consumed very low quantity of major nutrient from the foods.

2. Anthropometric measurement

The anthropometric measurement of the subjects height and weight of the individual showed in Appendix - III

3. Clinical examination

a. Clinical examination of the selected pregnant women and lactating mothers

The Table XIV indicates the clinical examination of the pregnant women and lactating mothers.

TABLE XIV

CLINICAL SYMPTOMS OF THE SELECTED SUBJECTS

Organs and symptoms	Pregnant women no. (%)	Lactating mothers no. (%)
Hair		
a. Growth of hair	35	-
b. Falling hair	-	55
c. Brittle hair	12	22
Face		
Puffiness	47	23
Eye		
a. Color of conjunctiva	12	1
b. Discharge	15	-
c. Dryness	18	-
Teeth		
a. Dental caries	15	23
b. Gum bleeding	2	-
Mouth		
a. Cracks corner of mouth	19	4
Neck		
a. Goiter (enlargement of neck size)	-	-
Breast		
a. enlargement of breast	68	100
b. color changes in nipple	47	100
Hands		
a. Dryness of hand	-	5
b. swelling of hand	12	-
Abdomen		
a. enlargement of abdomen	79	27
Skin		
a. stretch marks	12	35
b. silver color marks	8	28
c. softness of the skin	46	40
Legs		
a. Swelling of legs	26	-

The Table XIV presents the clinical symptoms of pregnant women and lactating mothers. Thirty five percent of pregnant women had increase in growth of hair. For lactating mothers 55 percent had hair falling. Twelve percent and 22 percent of pregnant women and lactating mothers respectively had brittle hair. Forty seven percent of pregnant women had

puffiness of the face. It shows the pregnant women affected by protein deficiency. Lactating mothers (23 percent) had puffiness of the face.

The clinical signs of eye were noted. Twelve percent and one percent of pregnant women and lactating mothers had color conjunctiva. Fifteen percent of pregnant women had discharge observed from the eye and 18 percent of the pregnant women were observed by dryness of the eye. Fifteen and 23 percent pregnant women and lactating mothers respectively were observed dental carries. Very low (2 percent) of pregnant women had gum bleeding. The clinical signs of mouth were observed. Nineteen percent of pregnant women were noticed cracks in the corner of mouth. And very low majority of the lactating mothers had crack corner of the mouth. No one have goiter among the subjects.

The clinical signs of pregnancy the changes in hormone levels results in increased pigments in the areola and nipple. Sixty eight percent of pregnant women were observed enlargement of breast size and 47 percent were reported that color changes in nipple. Hundred percent of lactating mothers were observed enlargement of breast and they reported that they had color changes in nipple. Milk secretion was high in the lactating period. Five percent of lactating mothers had dryness of hand and 12 percent pregnant women swelling of hand. Majority (79 percent) of the pregnant women were observed enlargement of abdomen. Low majority (27 percent) of lactating mothers observed enlargement of abdomen during the first 6 months.

In the middle of the abdomen stretch marks of silver and pink color that noticed on the abdomen, breast, and thigh during the 3rd trimester of the pregnant women. And also stretch mark observed in abdomen among lactating mothers. Forty percent of lactating mothers reported that they had softness of skin. Swelling of hands and legs observed among 3rd trimester pregnant women.

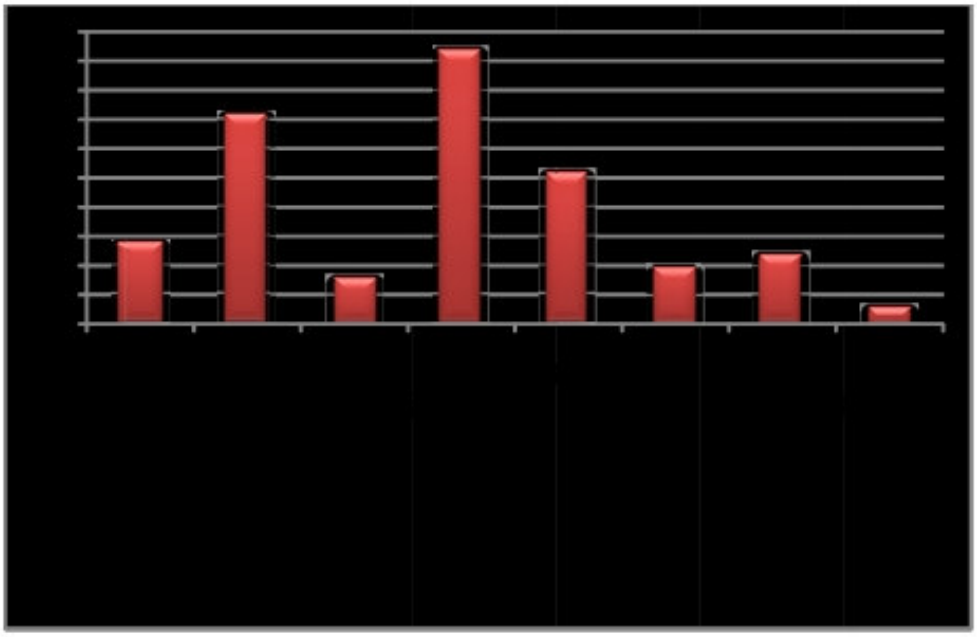
b. Disorders experienced by the pregnant women

Table XV and Figure 5 represents the disorders experienced by the pregnant women.

TABLE XV

DIS ORDERS EXPERIEN CED BY T HE PREG NANT WO MEN

Disorders	No (%)
Morning sickness	14
Quickening (movement of the fetus)	36
Poor weight gain	8
Normal Weight gain	47
Back ache	26
Heart burn	10
Nausea	12
Constipation	3



DIS ORDERS EXPERIEN CED BY T HE PREG NANT WO MEN

FIGURE 5

The Table XV shows prevalent of disorder among the pregnant women. Fourteen percent of pregnant women reported that morning sickness in the first trimester and 36 percent of pregnant women they felt the quickening (movement of the fetus) in the end of the second trimester. Eight

V SUMMARY AND CONCLUSION

The present study **on "Food Consumption Pattern of Rural Pregnant Women and Lactating Mothers and Impact of Nutrition Education"** was under taken to analyze the food consumption pattern and nutritional status of the pregnant women and lactating mothers.

The study was conducted in selected twelve rural areas of Coimbatore. One hundred pregnant women and one hundred lactating mothers were selected in the age range of 18 to 35 years. An interview schedule was designed by the investigator to elicit the socio economic back ground, dietary pattern, anthropometric measurements, clinical examination, bio chemical parameters and life style pattern. The investigator collected the data by house to house visit, using face to face interview method of data collection. Anthropometric measurements were measured by the investigator. Clinical examination was conducted with the help of the physician in the Primary Health Center. A Heamoglobin level was assessed by the investigator using cyanmethaemoglobin method. Blood glucose was tested using glucometer. Blood pressure was measured for all the subjects. Nutrition education was given for all the subjects and evaluated after one month.

The results revealed following

- Fifty one percent of the pregnant women were in the age group of 21 to 25 years followed by 26 to 30 years. Same was observed in the case of lactating mothers also. Teenage pregnancy may lead to reproductive health problems and may place the women at greater risk of miscarriage. In the present of study 12 percent of pregnant women and 11 percent of lactating mothers were in this category.
- Educational status of rural women was poor. Majority had studied upto middle class. Higher education of girls in the rural sector was not possible as there are only a very few secondary schools near the village. In the selected area there were schools upto high school level only are available. Hence illiterate further adds to their ignorance and unawareness of surrounding environment which continues to envelop them into deep religious beliefs.

- Fifty percent were engaged in agricultural activities or they worked in school lunch programme and in small scale industries located in the selected area. Their income was very low.
- Seventy percent of pregnant women and 65 percent of lactating mothers belonged to low income and middle income groups. In rural areas there was more number of low income families. Middle and low income family members were agricultural worker or were employed in coolie works.
- Majority of pregnant women and lactating mothers respectively were in nuclear families.
- Ninety five percent of pregnant women and 98 percent of lactating mothers belong to Hinduism and rest were Christian. Though they were a few Muslim families, pregnant women and lactating mothers were not available during the study.
- Twenty three and 19 percent of families consisted four to six members and only seven percent and five percent consisted of more than six members in families.
- One hundred percent of pregnant women and 96 percent of lactating mothers were non vegetarian's diet. Only one percent of lactating mothers followed ova - vegetarianism and three percent of subjects were pure vegetarians.
- More number of subjects (41percent) consumed more than three meals / day. They said that they consumed small frequent meals on the advice of the doctor in the primary health center and due to feeling of nausea they were not able to consume more quantity in one meal. In lactating mothers majority of the subjects (80percent) were consumed 3meals/day.
- Second majority of the selected subjects 34 percent and 32 percent pregnant women and lactating mothers respectively purchased weekly. Fruits and vegetables were purchased on daily basis or once or twice a week by both the groups.

- Raw rice was consumed for using rice kanji. Wheat was consumed as chapattis for dinner and rarely for breakfast majority of the sample consumed wheat weekly twice or thrice. Compared to other people the pregnant women and lactating mothers could consume high quality and quantity of food. Cereal contributes more than 70 percent of energy to the diet.
- Only few subjects consumed pulses on daily basis. Bengal gram dhal, green gram dhal, red gram dhal, and cow pea were consumed once in a week.
- Consumption pattern of roots and tubers was weekly once, 100 percent of subjects consumed onion on daily basis. Beet root , Potato ,carrot were consumed once in a week.
- Greens consumed on monthly basis. Few of them consumed weekly. Because their worked in agriculture. They have high chance to get green leafy vegetables from the agriculture land.
- Consumption pattern of other vegetables revealed that the requirement quantities of vegetables were consumed weekly by the subjects. The vegetables were selected according to seasonal availability.
- Fruits consumed by the pregnant women were high compared to lactating mothers, most of the pregnant women consumed fruits twice or thrice in a week. The lactating mothers consumed fruits monthly once or occasionally. Because some of the lactating mothers believe that fruits are cold foods for lactating period.
- Sunflower oil was the most preferred oil and 64 percent of women consumed refined oil daily. Only one percent of subjects consumed gingili on daily basis. Ghee and butter were consumed only by minimum number of sample on weekly basis. Some of the samples were using combination of oils.
- Among the selected subjects majority of were non vegetarian. They preferred fish, meat chicken and egg. The amount of chicken consumed by the lactating mothers was high compared to pregnant

women. The chicken consumption is low in pregnant women because they believed that chicken is a heat producing food.

- pregnant women and lactating mothers indicated that 80 and 87 percent of the subjects respectively had good appetite. They consumed more than three meals per day. Thirteen and 12 percent of pregnant women and lactating mothers respectively had less than normal appetite. Only seven percent of lactating mothers and one percent of pregnant women had poor appetite.
- They believed that inclusion of these foods will improve the health of mother and fetus. Lactating mothers consumed garlic, dry fish and chicken for increasing milk secretion. They also indicated that milk consumption increases milk secretion and improve the health of mothers.
- Eighteen percent of pregnant women and 32 percent of lactating mothers were avoided curd for the reason that it causes cough and cold. Thirteen percent of pregnant women and lactating mothers avoided brinjal as it itches the skin and wound. Sixty one percent of the subjects avoided potato as they believed that it is gas producing food. Twelve percent of pregnant women avoided the gingelly seeds as it was considered to by abortive food. Majority of the people strongly believed that pineapple and papaya were abortive and hot foods.
- The diet was deficit in major nutrients like protein, energy, calcium, iron and folic acid among the selected pregnant women and lactating mothers. Iron and calcium intake of the selected subjects were found to be below normal which in turn showed a high prevalence of anemia and osteoporosis. Compared to lactating mothers the nutrients were very low in the diet of pregnant women.
- Forty seven percent of pregnant women had puffiness of the face. It shows the pregnant women affected by protein deficiency. Twelve percent and one percent of pregnant women and lactating mothers had color conjunctiva.

- During pregnancy the changes in hormone levels results in increased pigments in the areola and nipple. Sixty eight percent of pregnant women were observed enlargement of breast size and 47 percent were reported that color changes in nipple. Hundred percent of lactating mothers were observed enlargement of breast and they reported that they had color changes in nipple.
- Fourteen percent of pregnant women reported that morning sickness in the first trimester and 36 percent of pregnant women they felt the quickening (movement of the fetus) in the end of the second trimester. Eight percent of pregnant women had poor weight gain in the first trimester.
- Twenty two percent of pregnant women had difficulty in walking during pregnancy. Seven percent of the subjects expressed difficulty in performing household activities. They experienced tiredness even while eating.
- Majority of the subjects had normal haemoglobin. Only few numbers of pregnant women and lactating mothers respectively had below normal. The mean haemoglobin of the pregnant women was 10.16 and SD 1.359. lactating mothers mean of the haemoglobin level is 11.054 and SD 1.173.
- The sub samples were selected for blood glucose test. 30 pregnant women and 30 lactating mother had normal range of glucose in their blood.
- Fifty six percent of pregnant women and 67 of lactating mothers had inadequate sleep of less than 7 hours per day. At the same time 38 percent of 21 percent of pregnant women and lactating mothers respectively had more than adequate sleep.
- Majority of 10 percent and 5 percent of pregnant women and lactating mothers respectively undertook regular walking.
- Twenty percent of lactating mothers had habit of chewing betel leaves which had produced discoloration of the teeth. Six percent of the subjects had habit of chewing tobacco.
- Twenty percent of subjects fed the sugar water and eight percent fed honey to their new born baby. Thirty five percent indicate that as

they unconscious after cesarean delivery, infant feeding formulae were given to the infants.

- Most of the pregnant women answered nutrition related question wrongly before the nutrition education. After the education they were able answered correctly.
- Before the nutrition education most of lactating mothers answered wrongly. Because they did not have any knowledge about the nutrition. After the education they were able to answer all the nutrition related questions. Most of them got high score after the nutrition education.
- Remarkable changes were noticed in the intake of some of the food items. The pregnant women and lactating mothers could answer the questions regarding balanced diet foods for growth, importance of iron intake during pregnancy.

CONCLUSION

The results of the present study revealed poor nutritional status of rural pregnant women and lactating mothers. This indicates the necessity to impart nutrition education to all these women. More than donation in the form of money, rural women need knowledge on good food habits.

BIBLIOGRAPHY

Abraham, Alice, M., Susheela Thirumaran, A., Grace Ogunnaike. (2013), Effect of maternal smoking on birth outcomes, Ind.J.Nutri.Diet, Vol. 50(1), Pp. 8-13.

Afe work mulugeta, Kiday Haileslassie, and meron girma. (2013), Feeding practices, Nutritional status and associated factors of lactating women in samre woreda, south Eastern Zone, Nutrition Journal, Vol. (28)12, Pp. 2891.

Aidan Mcelduff, Robert, G. (2012), Insulin therapy in pregnancy, Endocrinology and Metabolism clinics of north America, Vol. 41(4), Pp. 161 - 173.

Ainy, E., Ghazi, A., Aizzi, F. (2006), changes in calcium, vitamin D3 and other biochemical factors during pregnancy, Journal Of Endocrinology investigation, Vol. 29(4), Pp. 303-307.

Andrea, N., Hacker, Ellen, B., Fung and Janet, c. King. (2012), Role of calcium during pregnancy, maternal and fetal needs, Nutrition Reviews, Vol. 70(7), Pp .409.

Baiz, N., Dargent Molina. (2012), Gestational exposure to urban air pollution related to decrease in cord blood vitamin - D level, Journal of clinical endocrinology and metabolism, Vol. 97 (11), Pp. 4087 - 4095.

Bamji, M.S.(2009),Text Book of Human Nutrition,3rd Edition; Pp.280-285.

Bayol, S.A., Simbi, Bertrand. (2008), Off spring from mothers fed a junk food diet in pregnancy and lactation exihibit exacerbated adiposity, Journal of physiology, Vol. 586 (13), Pp. 3219-3230.

Bethesda, Mehta,S., Manji, K.P., Young, A.M. (2008), Nutritional indicators of adverse pregnancy outcomes and mother to child transmission of HIV among HIV infected women, Am. J.cli Nutri, Vol. 87(6), Pp. 1639-1649.

Bhujancra, Aditham, Rao. (2008), Collection of Data, Research methodology for management and social science, 1st Edition, Pp. 42.

Bhattacharya, Haldar, T., K. (2011), Correlates aneamia among pregnant women in rural area of west Bengal, The journal of family welfare, Vol. 57(1), Pp.72 - 75.

Borna, S., Haghllahi, F., (2009), A comparative study of zinc deficiency prevalence in pregnant and non pregnant women, Tehran University Medical Journal, Vol. 67(5), Pp. 360-367.

Brantsaeter Anne Lise, Margaretha Haugen, sven ove samulelsen. (2009), Dietary pattern characterized by high intake of vegetables, fruits and vegetable oils is associated with reduced risk of preeclampsia in pregnant Norwegian women, J.Nutri, Vol. 139(6), Pp. 1162 - 1168.

Caire- Juverg, G., Ortega, M.I. (2007), Food component and dietary pattern of two different group of Mexican lactation women, J Am college of Nutri, Vol. 26(2), Pp. 156-162.

Carlson, Susan, E. John Colombo, Byron,J., Gajewski Kathleen. (2013), DHA Supplementation and pregnancy outcomes, Am J cli Nutri, Vol. 2(3), Pp. 97.

Chakraborty Dehashi's. (2009), Sampling, Book of research methodology, Pp. 101.

Chang, Mei., Wei., Susan., Eilen. (2008), Motivation and barriers to healthful eating and physical activity among low income overweight and obese mothers, J. Am. Dietet. Association, Vol. 108(6), Pp. 1023 - 1028.

Charlcar, Z.W., Merkiel,S., Wan delt, K. (2007), Assessment of dietary intake in women with gestational diabetes mellitus preliminary report, New medicine, Vol. 11(2), Pp. 27-30.

Chouduary, N., Aimone. A. J. (2012) Relative efficiency of micronutrient powders / Iron, Folic acid tablets in controlling anemia in women in the 2nd trimester of pregnancy, Food and Nutrition Bulletin, Vol. 33(2).

Chowski Jedry, W., Perpera, F.P. Jang. (2012), Impact of barbecued meat consumed in pregnancy to airbone polycylic aromatic hydrocarbon, Birth cohort study in poland nutrition, Vol .28(4), Pp. 372-377.

Dheeraj shah, MP., Sachdav fams. (2006), Zinc deficiency and fetal outcome, Nutrition Review, Vol. 64, Pp. 15- 30.

Donald, H., M.C. Burney, Theresa, L. White. (2007), Non Experimental research survey research, Research methods, chapter.10, Pp. 224, 1st Edition.

Ekarterina Maslova, Sayanti Bhattacharya, Shih Wen Lin. (2010), Caffeine consumption during pregnancy risk of preterm birth, a meta analysis, Am.J.Clini.Nutri, Vol. 92, Pp. 1120-1132.

Elaine Turner, Paul Insel. (2010), Pregnancy and lactation, Life cycle, chapter 11th, Pp. 456.

Emmanuvel, I., Uguiya, I., onyechi obidoea, Ama U Ibiam .(2010), Both high and low prenatal BMI are associated with alterations in trace element status ,Haemoglobin concentration and adverse pregnancy outcomes, International Health Research, Vol. 3(2), Pp. 71-78.

Enke, V., Jau- dszus,A., Schleussner. (2011), Fatty acid distribution of cord and maternal blood in human pregnancy, Lipid in health and disease, Vol.10, Pp. 247.

Fadallah, H., Christian Raker. (2013), Predictors of gastroesophagal reflux symptoms in pregnant women screened for sleep disordered breathing, Clinics and Research in Hepatology and Gastroenterology, vol. 37, Pp. 93 - 99.

Faruk uguz, kazim gezginc, Ismet Esra zeytinci. (2007), Obsessive - compulsive disorder in pregnant women during the third trimester of pregnancy, Comprehensive Psychiatry, vol. 48 (5), Pp. 441 - 445.

Fekete., al. (2012), Meta analysis demonstrated significant dose response between folate intake and birth weight, Nutrition Journal, Vol. 84(3), Pp. 6-8

Ferrara, Hedderson. (2011), A pregnancy and postpartum life style intervention in women with gestational diabetes mellitus reduce, diabetes risk factors, The American Diabetes Association, Vol. 34(7), Pp. 1519 - 1525.

Fouda, L. M., Ahmed, M.H., Shehab, N.S. (2012), Nutritional awareness of women during pregnancy, The journal of American Science, Vol. 8(7), Pp. 494-502.

George creatsas, Niscos Goumalates. (1991), Teenage pregnancy: comparison with two groups of older pregnant women.

Gill, S.K., Maltepe. (2009), The effectiveness of discontinuing iron containing prenatal multivitamins and reducing the severity of nausea and vomiting of pregnancy, Journal of obestrics and gynecology, Vol. 29(1), Pp. 13 - 16.

Glinianaia, S, V., Tennant. (2012), HbA_{1c} and birth weight women with pre - conception type - I and type - II, Diabetologict, Vol. 55(72), Pp. 3193 - 3203.

Gunawardana, L., Smith, G.P., Zamitt, S. (2011), Pre conception inter pregnancy interval and risk of schizophernia, British Journal of psychiatry, Vol. 99(4), Pp. 333-339.

Guyton, Hall. (2006), pregnancy and Lactation, text book of medical physiology, chap. 82, 11th edition, Pp. 1034 - 1035.

Hajochen, Ping wang, Yao feng han., Jing ma. (2012), Impact on the health of mothers and infants, BMC women's Health, Vol. (7). Pp. 32.

Halldorsson, T, I., thorsdottir, I., Meltzer. (2009), Dioxin - like activity in plasma among Danish pregnant women, dietary predictors, birth weight and infant development environmental research, Vol. 109(1), Pp. 22 - 28.

Henrikshen, T.,MD.PH.D. (2006), Nutrition and pregnancy outcomes, Nutrition Review, Vol. 64, Pp. S19-S23.

Herrea - Suarez, C.C., Vasque, Z., Garibay, E.M. (2008), Food habits and culture factors in pregnant adolescents, Archivos latino americanos de Nutrition, Vol. 58(1), Pp. 19-26.

Hilakivi Clarke, L., Assis, S. De., Raitanen.,J . (2012), Effects of dietary and physical activity intervention during pregnancy on leptin and adipobecting levels, Food and nutrition science, vol. 3(4), Pp. 556-567.

Huang, K., Atlas, R. (2012) ,The siginificance of breast feeding to incarcerated pregnant women, J.birth, vol. 39(2),Pp. 145-155.

Jalaja Kumar, D., Sri Hari Krishna, B., Anjaneyulu, G.V.S.R. (2009), Health and nutritional status of rural teenage pregnant girls and prevalence of low birth weight, Ind.J.Nutri.Diet, Vol. 46(6), Pp. 246-250.

Jayashree, S., Kavitha. (2004), pregnancy induced hypertension and its effect on the fetus, Indian journal of nutrition and dietetics, Vol. 41, Pp. 256.

Jennifer, L., Bueche. (2009), Nutritional requirements during pregnancy and lactation, Book of life cycle nutrition an evidence based approach, Pp. 40-43.

John yeast, David Mundy, Lisa, A., Markly. (2013), A systematic reviews and meta analysis of micronutrients intakes during pregnancy in developed countries, Nutrition Review, Vol .71(2), Pp. 118-132.

Joshi meena, Nalwade vijaya and shen halatha Reddy., N. (2000), The study food and nutrient intake, anthropometric measurement and haemoglobin status of lactating women in urban and rural areas of the Parbhani district, Indian journal of nutrition and dietetics, Vol. 37, Pp. 288.

Joshi, A. Text Book of Nutrition and Diabetics; 2nd Edition,(2002); Pp.383-384.

Kalimbira, A, A., Mtimuni, B, M., Chilima, D. (2009), Maternal knowledge and practices related to anaemia and iron supplementation in rural Malawi, African journal of food agriculture, Nutrition and development, vol. 9(1), Pp. 550 - 564.

Kanade, A.N., Rae, Kellar, S. (2008), maternal nutrition and birth size among urban affluent and rural women in India, Journal American college nutrition, Vol. 27 (1), Pp. 137 - 145.

Kaur Piverjeet, Sachdeva Rajbir, Kochar Anita. (2008), Food consumption pattern and obstetric outcome of pregnant women in industrial areas of Bathinda, Journal of Research, Vol. 45(3), Pp. 200-205.

Kelly, R., Evenson. (2010), Beliefs about exercise and physical activity among pregnant women, Patient Education and Counseling, Vol. 79, Pp.124 - 129.

Khan, D. A Samia Fatima, Rabia Imran , Khan F.A (2010), Iron folate and cobalamin deficiency in anemic pregnant females in tertiary care center at Rawalpindi, Journal of Ayub medical college, Vol. 22(1), Pp. 17-21

Kimberly, O., Brien, Carmen, M., Donangelol, vargas. (2006), Bone calcium turn over during pregnancy and lactation in women with low calcium diets is associated with calcium intake, American journal of clinical nutrition, Vol. 83(2), Pp. 317 - 323.

Klein, J.D. (2005), Adolescent pregnancy, Pediatrics, Vol. 116, Pp. 281 -286.

Kothari, C.R. (2007), Methods of data collection, Research methodology and Techniques, Pp. 97-98, 2nd Edition.

Kuran, AL., O. AL., Mehaisen, L., Bawadi, H., Beitawi, S., Amarin. (2011), The effect of late pregnancy consumption of date fruit on labour and delivery, J Obs and Gynaeco, Vol. 31(1), Pp. 29-31.

L.Kathleen Mahan , Syvia, Escolt stump. (2008), Nutrition and diet therapy, 12th edition, Pp. 160-185.

Larque, E., Gill Sanche, Z.A. (2012) Omega 3 fatty acids, gestation and pregnancy outcome, British Journal of nutrition, Vol. 107(S2), Pp. s77-s84.

Lawrence, R.A., Lawrence, R.M. (2005), Breast feeding a guide for the medical profession, Philadel phia.

Lee Jeonga, Lee Jongim , lim Hyeon. (2005), Influence of morning sickness on dietary iron intake and its bio availability its of pregnant women during early pregnancy, Ecology of food and nutrition, Vol. 44(5), Pp. 375-389.

Lee, Y. A., H. Wang. (2011), Relationships of maternal zinc intake from animal foods with fetal growth, British journal of nutrition, Vol. 106(2), Pp. 237 - 242.

Lertbunnaphong, T., Talungjit, P., Titapant. (2012), Does gestational weight gain in normal pre - pregnancy BMI pregnant women reflect fetal weight gain, Journal of medical association of Thailand, Vol. 95 (7), Pp. 853 - 858.

Levario carrilo, M., Rodrigue, Z, N., Tufino. (2009), Body composition of women with new born who are small for gestational age, Neonatollogy, Vol. 95, Pp. 15 - 22

Li wei wei, Renlina. (2011), Impacts of lecithin on the concentration of 6- keto PGF in pregnancy MP predicting positive HDIP,

Lindsay, H., Allen. (2005), Multiple micro nutrients in pregnancy and lactation, Nutrition and reviews, Vol. 81(5), Pp. 1206s - 1212s.

Lisa, M., Christian, Albert franco. (2009), Depressive symptoms are associated with elevated serum proinflammatory cytokines among pregnant women, Brain Behavior and Immunity, Vol. 23 (6), Pp. 750 - 754.

Ludwig, D. S., Currie. J. (2010),The association between pregnancy weight gain and birth weight a within family comparison, Lancet (British Edition), Vol. 376 (9745), Pp. 984- 990.

Maheshwari, G. (2013), Health of gift from god, Heath action, Vol. 26(2), Pp. 7 - 8.

Majumdar, T.K., Bisoi. S., Haldar. D. (2009), A study on hookworm infestation among pregnant women in a rural areas of west Bengal, Ind. J.Nutri. Dietet, Vol. 47(2), Pp. 51 - 56.

Manisha. (2006), Maternal morbidity, Health action, Vol. 10, Pp. 26

Manisha. (2007), Maternal morbidity, Health action, Vol. (1-12), Pp. 33.

Mario Murcia , Marisa Rebagliato, Carmen Iniquez. (2013), Pregnancy and iron homeostatis" Nutrition Review, Vol. 71(1), Pp. 35-51.

Mathuravalli, S. M. D., Mangalai, G., jayalakshimi. (2001), Effect of socio economic status of pregnant women and pregnancy outcome in sselected urban slums of Madurai district, Indian journal of nutrition and dietetics, Vol. 38, Pp. 350

Maughan, E., Hess, C.M. (2012), Understanding of prenatal nutrition among argentine women, Health care for women international, Vol. 33(2),Pp.153-167.

Mcbride, N., Carruther, S., Hutchinson. (2012), Reducing alcohol use during pregnancy, listening be women who drink as an intervention starting point, Global Helath promotion, Vol. 19(2).

Meng liping, zhang jian, Wang Yian. (2008), Survey on the falty acids intake in pregnant women in different intake regions, Acta Nutrimenta sinica, Vol. 30(3), Pp. 249.

Michelsen, K.F., Devey, K.G., Roos. (2011), Food source and intake of n-3 fatty acids in low income countries with emphasis on infants, young children (6-12 months), pregnant women and lactating women, Maternal and Child Nutrition, Vol. 7, S2, Pp. 124-140.

Midwifery. (2008), Nausea and vomiting in pregnancy, Vol. 24, Pp. 390 - 398.

Mieshiraishi, Megumi Haruna, Masaya Matisuzaki, Ryoko murugama .(2012), Validity and reproducibility of folate and vitamin B12 intakes estimated from a self administered diet history questionnaire in Japanse pregnant women, Nutrition Journal ,Pp .1-9.

Miloslaw Hronek, Pavlina Doubkova, Dana Hmciarikova, Zdenek, Zadal. (2013), Dietary intake of energy and nutrients in relation to resting energy expenditure and anthropometric parameters of pregnant women, Europ J Nutri, Vol. 52(2), Pp. 117-125.

Miriam Erick MS. RD. CDE. (2008), Nutrition during pregnancy and lactation, Food and nutrition therapy, Pp. 181-193, 12th Edition.

Monashasis sahu, vijalakshimi. (2009), Vitamin D deficiency in rural girls and pregnant women despite abundant sunshine northen india, Clinical endocrinology, Vol. 70(5), Pp. 680 - 684.

Morgan, J.W.T., Jane, B., Dickerson. (2003), Nutrition in early life, Maternal physiology and nutrition during reproduction, Pp. 73-81.

Mukherjee., Munmum. (2012), Improving womens Health, Health Action, Vol. (4), Pp. 3-4.

Myhre, R., Brantsater, A.L., Myking, S., Gjessing, H. (2011), Intake of probiotic food and risk of spontaneous preterm delivery, Am. J. Cli. Nutri, Vol. 93(1), Pp. 151-157.

Nikniaz . L , Mahadevi .R , Arefhosseinis (2009) " Energy fluid intakes and beverage consumption pattern among lactating mothers in Tabriz" Pakistan J nutri : 8 (1) PP: 69-73.

Noel, M., lee, sumona. (2011), Nausea and vomiting of pregnancy, Gastroentrology Clinics of North America, Vol. 40(2), Pp. 309 - 334.

Nohre et. al. (2005), Pre pregnancy obesity and fetal death, A study within the Danish national British cohort, Gynecology, Vol. 106, Pp. 205

Oken, E., Jenny, S., Radesky, Robert, O., Wright David, Bellinger, Chitra, (2008), Maternal fish intake during pregnancy, blood Mercury and child cognition at age 3 years in US cohort, Am J of Epidemol, Vol.167(10), Pp. 1171-1181.

Olson, C.M. (2008), Achieving a healthy weight gain during pregnancy, Annual Review of Nutriton , Vol. 28, Pp. 411-423.

Olson, C.M. (2008), Achieving a healthy weight gain during pregnancy, Annual Review of Nutriton, Vol. 28, Pp. 411 - 423.

P.C. Rao. (2012), Addressing women health and issue, Health Action, Vol. (4), Pp. 17.

Pallavi, P., charade, Usha Antony. (2002), Nutritional status and outcome of pregnancy in young and older mother in Mumbai, Indian journal of nutrition and dietetics, Vol. 39, Pp. 26.

Pankaj Madan, Vageesh paliwal, Rajul bhard waj. (2010), Book of Research, Research Methodology, Pp. 16, 1st Edition.

Parul chritian, P.H. (2006), Maternal nutrition, Health and survival, Nutrition Reviews, Pp. S59- S62.

Parvathi, M., Kyrunnsia begum. (2007), Dietary intakes Anthropometric measurement and pregnancy outcome among women from low income families, Ind J Nutri Dietetics, Vol. 44, Pp. 484-489.

Paul Insel, R. Elanie Ture Don Ross. (2010), Nutrition during lactation pregnancy, Discovering nutrition. Pp. (539-545), 3rd Edition.

Pemir, C., Kochaman, C.E. Balkan. (2011), Serum ferritin levels in pregnancy, Medical Journal , Vol. 28(1), Pp. 23-25.

Pemmouche, A., Moulesshoul., S. (2012), Iron Supplementation in pregnancy and birth weigh, African J of pharmacy and pharmacology, Vol 22(6),Pp. 1581-1586.

Ponne. (2012), call for second green revolution to prevent ma nutrition, Health action, Vol. 25(7), Pp. 9 - 10.

Ravi, D., Sousza. (2013), Healthy life styles, Health action, Vol. 26(2), Pp. 4 - 5.

Ravikrishnan, A, K. (2012), Incidence of early pregnancy and self reported Gynecology symptoms among tribal community in india, vol. 58(1), Pp. 34 - 42.

Rekha Sinha, Bindu Sharma and phuspa mahant. (2008), Dietary patterns in pregnancy and associations with nutrient intakes, British J.Nutri, vol. 99(2), Pp. 406-415.

Roshan habeeb, A., susila srivasta. (2005), Maternal and biosocial factors influencing pregnancy outcome, Indian journal of nutrition and dietetics , Vol. 42, Pp. 131.

Rugayya, sajjad and Alamkhan. (2012), Nutrient intakes of pregnant women in comparison to the reference intake, Pakistan.J.Nutri, vol. 11(2), Pp. 166-171.

Sanjeev Rastogi, Rangjana Rastogi. (2011), Evaluating the impact of prugmatic nutrition awareness program for expectant mothers upon birth weight of the new born, Evidence based complementary and alternative medicine, vol. 6, Pp.34-39.

Sanjev, S. (2008), Obesity and female infertility, vol. 21(11), Pp. 24

Saskia, M., Willers, Alet, H., Wijga, Bert Brune Kreef, Marjan Kerkhof. (2008), Maternal food consumption during pregnancy and the longitudinal development of childhood Asthma, Am J critical Care & Med, vol. 42 (3), Pp. 261-265.

Saxena.et.al. (2007), Antioxidant activity of community consumed plant food of food, Ind J Food Sci Nutri, Vol. 58(4), Pp. 250-260.

Shahid A., Mahmood Ahmed, Mohamed wasif khan. (2011), Socio cultural beliefs and practice among pregnant women, Professional medical journal, Vol. 18(2), Pp. 189-194.

Shoshar, A. L. (2007), Diet history and birth weight relationship among Saudi pregnant women, Pakistan J of Med Science, Vol. 23, Pp. (176-181).

Sijurdur, F., Olsen, Thorhallur, I., Halldorsson, Walter, C., Willet Vibeke, K., Knudsen. (2007), Milk consumption during pregnancy is associatied with increased infant size at birth, Am J cli Nutri, Vol. 86(4), Pp. 1104-1110.

Stein, A. D., Wang, M., Martorell, R., Neufeld, L.M., flores Ayala. (2011), Growth to age 18 months following prenatal supplementation with docosahexaenoic acid (DHA) differs by maternal gravidity in mexico, Journal of Nutrition, Vol. 141(2), Pp. 316-320.

Stephaine, M.C., Wilson, Brittney, N., Bivins, Katelyn, A., Rusell, Bailey. (2011), Oral contraceptive use, impact on folate, vitamin B6 and Vitamin B12, Nutrition Review, Vol. 69(10), Pp. 572- 599.

Sumalika Piammongkol. (2004), Food and nutrient consumption patterns in third Trimester Thai-Muslim pregnant women in rural Southern Thailand, Asia Pac J Clin Nutr, Vol. 13 (3) Pp. 236.

Surdaca, A., Eddyta ciezka., Maria piorunsska. (2011), Relation of salivary antioxidant status and cytokine levels of clinical parameters of oral health in pregnant women with diabetes, Archives of oral Biology, Vol. 56(5), Pp. 428 - 436.

Swarnalatha and Ravi prabhu, G. (2012), Prevalance of aneamia and its socio demographic, Determinants among pregnant women attending government maturnity hospitals, Ind J Nutri Diet, Vol. 49, Pp. 390-394.

Swee may cripe., sixto sanchez., Nelly lam. (2010), Depressive symptoms and migraine comorbidity among pregnant Peruvian women, Journal of affective disorders, Vol. 122(1), Pp. 149 - 153.

The World Alliance Breast Feeding Action, (2007), Early initiation of breast feeding can save more than one million babies, Vol. 20 (8), Pp. 42.

Theresa, O., Scholl. (2011), Meternal iron status relation to fetal growth, lenth of gestation and iron endowment of the neonate, Nutrition Review, Vol. 69(11), Pp S23 - S29.

Thompson, M. W., Nassar, N., Roberts. (2011), Pregnant women's knowledge of obesity and ideal weight gain in pregnancy and health behavior of pregnant women, Australian and Newzeeland, journal of obstetrics and Gynaecology, Vol .51(5), Pp. 460-463.

Tickamyar, A, R. (2009), poverty, Rural international encyclopedia of human geography, Pp. 416 - 420.

Toshina varma, Prajakta nande. (2008), Birth weight of new borne in relation to maternal weight gain and haemologlobin level, Ind J. Nutri Diet, Vol. 45(2), Pp. 63-68.

Ugwuja .E.I., Ejikeme, B. (2011), Impacts of elevated prenatal blood lead on trace elements status and pregnancy outcomes in occupationally non - exposed women, The International journal of occupational and environmental medicine, Vol. 2(3), Pp. 143 - 156.

Usha Chandrasekhar, Sylvia, Subapriya, M. (2011), Effect of nutrition education on KAP of pregnant women, Ind. J. Nutri Dietetics, Vol. 48(2), Pp. 51-60.

Victor soreng. (2008), Mitigating malnutrition, Health action, Vol. 21(5), Pp. 32.

Victoria, M., Li. M., Wen, Flood, Judy, M. Flood., Judy, M. Simpson, Chris Rissel. (2010) , Dietary behaviors during pregnancy findings from first three mothers in south west sueney, Australia, Ind. J, Behavioural nutria and physical activity, Vol. 3(7), Pp. 1479-5868.

Vijayalakshmi, K.G., Asha Urooj. (2009), Impact of socio-economic status on nutritional status of pregnant women and pregnancy outcome, Ind.J.Nutri.Diet, Vol. 46(2), Pp. 51-58.

Vrijkotte, T, G, M. (2012), Maternal lipid profile during early pregnancy and pregnancy complications and outcomes, Journal of clinical endocrinology and metabolism, Vol. 97, Pp. 3917 - 3925.

Wang Yong zhong. (2009), Concentration of antioxidant vitamin in maternal and cord serum their after on birth outcomes, Journal of nutritional science and vitaminology, Vol. 55(1), Pp. 1 - 8.

Yang, sheng XV. (2012), Investigation on nutritional status and influencing factors of women during second trimester of pregnancy, Maternal child health care china, Vol. 27(30), Pp. 4755 - 4758.

Yayuk Haritriyanti., Say oto. P.S.T. (2012), nutrient intake of pregnant women in Indonesia, Malaysian J of nutri, vol. 18(1).

Ying Xiangi, wang liping. (2011), A Cast Control study on risk factors of low birth weight infants during pregnancy in Lanzhou city, Maternal and child health care of china, vol. 26(3), Pp. 5735-5736.

APPENDIX I

SCHEDULE TO ELICIT INFORMATION IN THE SOCIOECONOMIC AND FOOD CONSUMPTION PATTERN OF RURAL PREGNANT WOMEN AND LACTATING MOTHER AND IMPACT OF NUTRITION EDUCATION

Interview Schedule

Socio - economic back ground

1. Name of the interviewer :

2. Name of the interviewee :

3. Address :

4. Age :

5. Name of the head of the family :

6. Religion and caste :

7. Educational qualification of

   The subject :

8. Income per month :

9. Type of family : Joint Nuclear

10. Composition of the family :

11. Family background

S.No	Name of the Family Members	Relation to the head of the family	Age	Marital status	Education	Occupation Income/month

12. Other source of income : Rs:

A) Business earning :

B) Receipts from properties :

Land :

Building :

C) Other earning :

Total family income :

13. Details regarding the pregnant women and lactating mothers of the family:

S.No	Name	Term of pregnancy	Age at 1st pregnancy	No. Of children Alive dead	Still birth and abortion

Dietary pattern of the subjects

14. Do you maintain accounts for food expenditure?

……yes …….no

15. If yes in what form ?

…….daily …….weekly ……...monthly

16. Type of Diet consumed

……veg ……..non veg …….. Ova veg

17. Food frequency pattern of the subjects

Food items	Daily	Weekly	Monthly	Occasionally
Cereals				
Raw rice				
Boiled rice				
Wheat flour				
Sago				
Ragi flour				
Pulses				
Redgram dhal				
Blackgram dhal				
Bengalgram dhal				
Greengram dhal				
Cowgram				
Soya				
Roots and tubers				
Onion				
Potato				
Beetroot				
Carrot				

Green leafy vegetables				
Curry leaves				
Coriander leaves				
Manathakali leaves				
Other vegetables				
Brinjal				
Beans				
Pumpkin				
Ladies finger				
Cabbage				
Tomato				
Cauliflower				
Ridge gourd				
Snack gourd				
Cluster beans				
Fruits				
Banana				
Apple				
Orange				
Pomegranate				
Guava				
Nuts				
Ground nut				
Coconut				
Cashew nut				
Oils				
Groundnut oil				
Gingelly oil				
Palm oil				
Sunflower oil				
Vanaspathi				
Ghee				
Flesh foods				
Fish				
Egg				

Chicken				
Mutton				
Milk product				
Milk				
Curd				
Fried foods				
Sugars				
Sugar				
Sugar cane Jaggery				
Palm Jaggery				

18. Methods of cooking:

Food items	Boiling	Steaming	Frying SF/DF	Stewing or Roasting
Cereals Pulses Greens Vegetables Eggs Meat Fish Others				

19. Daily Meal Pattern:

Days	Early morning	Breakfast	Mid morning	Lunch	Tea time	Dinner
Day 1st						
Day 2nd						
Day 3rd						

20. Details regarding food fads and taboos:

S.no	Food stuff	Reason for including	Reason for excluding

21. What type of oil you consume?

……..Sunflower oil ……..Groundnut oil ……. Palm oil

…….. Gingerly oil ……Coconut oil …..Rice brand oil

22. How much amount of oil consumed/day?

…..< 25ml ….. 25-50ml …..> 50ml

23. How is your appetite?

…….. Good …….. Fair ……..Poor

24. What do you think is the reason for poor appetite? ……

25. How many times a day does you usually eat …..Meal/day ….. Snacks/day?

26. Are you following a prescribed special diet or weight control diet?

a) Yes b) No

27. Do you suffer from any food allergy?

a) Yes b) No

If yes describe ……..

28. Which groups of food below do you find most challenging to eat enough of?

a) Milk and milk product

b) Chicken, Meat, Fish, Egg.

c) Fruits

d) Vegetables

e) Cereals

f) Any other

29. 24 HOUR DIETARY PATTERN:

Timings	Menu	Quantity	Raw ingredients	Amount
Early morning Break fast Mid morning Lunch Tea time Dinner Bed time				

Life style pattern

30. How long do you sleep daily?

a)……<7hrs ……..7hrs ……..>7hrs

31. How would you describe your daily activity?

a) Heavy work b) light household work c) Gardening d) No work

32. Do you smoke?

A) Yes b) No

33. Do you drink?

a) Yes b) No

34. Does anyone else living in your household smoke inside the home?

a) Yes b) No

If yes name of the person ……

Relationship to the family head ……

35. Do you have any of the following habits?

a) yes b) No

if yes……chewing pan …….Tobacco …..Chewing beetle leaves

36. Does any member of your family suffer from?

1. Diabetes

2. High blood pressure ……

3. Obesity ……

5. Cancer ……

6. Asthma ……

If yes name of the person:

Relationship to the head of the family:

PREGNANT:

37. Anthropometric measurement of the selected pregnant women

Pre pregnancy 1st trimester 2nd trimester 3rd trimester

Weight in kg:

Height cm :

38. How are you controlling above mentioned symptoms

a) Taking prescribed pills

b) Using home remedies

c) Not taking anything

39. Are you feeling tired or weakness during pregnancy?

a) Yes b) No

If yes what? a) Difficulty of Eating b) Difficulty of walking

c) Difficulty to perform any activity

40. How much weight have you been advised to gain?

41. Do you take any of the following?

A) Prenatal vitamin b) Multi vitamin c) Iron d) Herbal Remedies e) Any other

42. **Clinical examination**

Organs and symptoms	Pregnant women	Lactating mothers
Hair a. Growth of hair b. Falling hair c. Brittle hair		
Face Puffiness		
Eye a. Color of conjunctiva b. Discharge c. Dryness		
Teeth a. Dental caries b. Gum bleeding		

Mouth a. Cracks corner of mouth		
Neck a. Goiter (enlargement of neck size)		
Breast a. enlargement of breast b. color changes in nipple		
Hands a. Dryness of hand b. swelling of hand		
Abdomen a. enlargement of abdomen		
Skin a. stretch marks b. silver color marks c. softness of the skin		
Legs a. Swelling of legs		

Disorders experienced by the pregnant women

Disorders	Trimester		
	1st	2nd	3rd
a. Morning sickness b. Quickening (movement of the fetus) c. poor weight gain d. Normal Weight gain d. Back ache e. Heart burn f. Nausea g. Constipation			

LACTATING MOTHER:

43. Anthropometric measurement of the selected lactating mother:

0 - 6 months 6 - 12 months

Weight in kg:

Height cm :

44. Delivery pattern:

a) Normal b) cesarean

45. Sex of the infant ……

46. Birth weight of the infant:

47. Do you suffer from gestational diabetes?

a) Yes b) No

48. Are you comfortable in feeding baby?

a) Yes b) No

49. If a mother complains of breast milk in sufficiency which of the following option will help to resolve the problem?

a) Increase frequency of breast milk feeding

b) Advice mother to drink more fluids

c) Unsure / don't know

d) Any other

50. Which feed did you feed first?

a) Colostrums b) Honey c) Sugar water d) feeding formulae

51. Did you feed the baby during the first two days?

A) Yes b) No

If you not what you feed?

a) Cow milk b) powder milk c) others

Reason for that ……

52. Special foods consumed by lactating mothers?

a) Pulses …..Yes ….. No

b) Meat / Chicken ….. Yes …..No

c) Fish ….. Yes …..No

d) Milk ….. Yes …..No

e) Drumstick leaves ….. Yes …..No

f) Garlic, Pepper, Ginger ….. Yes …..No

g) Any other ….. Yes …..No

Bio chemical assessment

53. Haemoglobin Level :

54. Blood pressure :

55. Blood sugar :

56. Other disease

Related parameters :

APPENDIX II

NUTRITVE VALUE FOR PREGNANT WOMEN

	Energy (Kcal)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Carotene (Ug)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Folic acid (ug)	Vitamin - c (mg)
1	848	33	25	352	7.5	122	6.4	0.5	7.4	50	16
2	1406	30	48	257	4.8	574	1	0.5	8.4	57	75
3	1790	31	29	400	13	1215	1.3	0.9	4.8	155	93
4	757	36	16	485	3	269	1	0.3	5.8	18	7
5	1746	27	42	332	12	471	1.6	0.5	3.1	52	89
6	1867	46	5	370	16	215	0.5	0.3	8.6	62	77
7	1285	29	30	247	6	1337	1.7	0.5	10	107	83
8	1786	34	6	233	3	204	0.5	1.1	6.2	14	66
9	830	18	46	267	4	220	0.2	0.3	9	50	6
10	1460	35	7	282	16	290	0.6	0.5	12	114	7
11	1906	46	53	357	10	387	1.4	0.7	4.1	191	73
12	1202	31	49	243	6	380	0.7	1.1	7.5	52	12
13	1538	35	46	433	7	319	1.6	0.5	10.1	91	39
14	2061	30	29	478	8	315	0.6	1.1	7.4	116	13
15	1558	42	35	210	7	518	1.5	0.5	3.3	99	22
16	2621	35	38	382	9	458	1.6	1	3.4	93	44
17	2451	38	34	325	8	584	1.2	0.5	3.6	105	43
18	2354	36	17	310	4	1423	1.5	0.5	2.3	69	97
19	1878	39	52	105	16	697	0.7	0.9	12.8	55	40
20	2378	37	30	208	4	1576	1	0.2	9.8	43	22
21	2486	39	53	479	8	511	0.8	0.5	7.8	104	24
22	2429	47	45	464	17	408	0.6	0.5	10.8	40	39
23	2682	39	35	348	12	378	0.9	0.7	12.5	147	12
24	1620	34	27	134	11	328	0.7	0.2	12.1	39	41
25	2741	42	34	833	12	722	0.8	1	13.6	82	97
26	2507	36	31	347	18	367	0.8	0.5	5.5	55	14
27	1607	45	38	286	8.7	599	0.9	1.5	10.6	87	32
28	2549	36	40	333	16	728	0.7	0.5	10	43	41
29	1415	46	27	307	6	310	1.3	0.5	11.2	63	12
30	2304	39	29	389	7	425	1.6	0.4	6.9	52	36
Mean	**1870**	**36.6**	**34**	**270**	**16**	**538**	**1.1**	**0.9**	**14**	**77.3**	**28**

NUTRITVE VALUE FOR LACTATING MOTHERS

	Energy (Kcal)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Carotene (Ug)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Folic acid (ug)	Vitamin - c (mg)
1	1867	45	38	266	7.9	481	1.6	0.5	11.8	54	20
2	1712	35	37	437	12	998	1	0.6	13	39	53
3	1748	31	58	162	11	815	2	0.3	0.3	118	33
4	1363	29	8	328	6.4	656	2.2	0.4	3.5	94	39
5	2025	49	34	320	35	681	2.1	0.6	5.4	174	145
6	1914	59	49	634	9.7	462	1.5	0.7	2.4	88	20
7	2739	41	45	312	8.8	550	1.2	0.3	12	132	40
8	1973	39	40	416	7.6	825	1.6	0.3	3	189	20
9	1690	17	15	180	3.6	392	0.5	0.4	4	15	7.9
10	2429	61	70	337	9.9	1065	2.2	0.7	6.3	261	36
11	1546	36	30	252	6.7	587	1.4	0.5	10	41	39
12	2762	32	47	107	6.2	393	1.2	0.3	13	53	63
13	2750	36	45	291	7.7	725	1.5	0.7	3	138	153
14	1687	34	42	334	14	713	1.6	0.5	11.5	45	26
15	1518	25	61	181	5.6	495	0.9	0.5	10.5	64	6
16	1693	40	40	349	9.3	597	1.7	0.4	12.4	134	39
17	1732	41	35	402	12	882	1.9	0.3	5.1	144	34
18	1883	38	41	343	12	568	2.2	0.6	5.6	69	87
19	1910	43	42	414	13	685	1.7	0.5	15.3	177	41
20	2552	33	32	282	11	636	1.8	0.5	12	94	39
21	1660	31	41	155	36	519	1.7	1	3.2	105	30
22	2710	29	46	214	16	735	1.2	0.5	11	51	73
23	1820	31	55	266	6.6	874	1.6	0.5	12.8	70	143
24	2665	34	52	335	6.1	2306	1.2	0.2	9.7	128	39
25	2917	41	63	411	7.1	830	1.7	1	2.4	149	38
26	1650	33	52	234	12	848	1.5	0.5	11.6	64	75
27	2694	29	58	313	6	842	1.5	0.3	2.8	77	42
28	1697	40	44	393	15	1738	1.9	0.7	13.2	144	71
29	2460	30	27	237	8.5	1066	1.2	6	3.1	80	45
30	1881	37	47	284	10	438	1.3	0.5	13.3	56	26
Mean	**2054**	**43**	**46**	**325**	**22**	**762**	**1.8**	**1.3**	**11.2**	**93.9**	**22**

APPENDIX III

ANTHROPOMETRIC MEASUREMENT OF THE SELECTED SUBJECTS

(Pregnant women n = 100)

No	weight	Height	No	weight	Height	No	weight	Height
1	46	150	**48**	52.5	153	**95**	65	159
2	38	146	**49**	70	157	**96**	68	159
3	49	161	**50**	50	149	**97**	62	152
4	65	154	**51**	53	150	**98**	45	150
5	63.5	152	**52**	40	156	**99**	38	149
6	52	164	**53**	59	149	**100**	43	162
7	55	150	**54**	45.5	154	**Mean**	**51.96**	**153.37**
8	60	152	**55**	40	150	**SD**	**±8.55**	**±4.39**
9	55	162	**56**	48	149			
10	43	150	**57**	61	152			
11	52	156	**58**	49	150			
12	57	153	**59**	55	156			
13	46	156	**60**	56	149			
14	46	156	**61**	53	150			
15	50	162	**62**	36	150			
16	52	154	**63**	45	156			
17	53	155	**64**	49	150			
18	57	156	**65**	57	155			
19	45	158	**66**	52	154			
20	43	154	**67**	46	154			
21	44	150	**68**	52	160			
22	49	150	**69**	49	155			
23	48	154	**70**	58	156.5			
24	50	154	**71**	49	154			
25	45	156	**72**	55	148			
26	36	146	**73**	47	150			
27	48	152	**74**	86	162			
28	49	156	**75**	73	160			
29	58	152	**76**	57	153			
30	52	147	**77**	49.5	153			
31	46	150	**78**	50	150			
32	63	150	**79**	36.5	149			
33	50.2	158	**80**	52.5	142			
34	47	151	**81**	50	162			
35	52	159	**82**	48.5	156			
36	48	150	**83**	70	159			
37	56	152	**84**	45	154			
38	57	151	**85**	50.5	160			
39	45	157	**86**	53	150			
40	40.5	150	**87**	49	146			
41	49	156	**88**	61	152			
42	48	150	**89**	55.5	160			
43	50	160	**90**	60	159			
44	55.5	152	**91**	70	159			
45	52	148	**92**	58	150			
46	47	151	**93**	52	149			
47	53	154	**94**	53	149			

ANTHROPOMETRIC MEASUREMENT OF THE SELECTED SUBJECTS

(Lactating mother n = 100)

No	weight	Height	No	weight	Height	No	weight	Height
1	58	164	**48**	60	155	**95**	55	151
2	60	161	**49**	59	150	**96**	47	152
3	49	154	**50**	52	156	**97**	49	150
4	54	162	**51**	57	153	**98**	36	149
5	47.5	153	**52**	54	142	**99**	39	150
6	65	156	**53**	50	160	**100**	55	160
7	63	157	**54**	57	155	**Mean**	**51.79**	**153.14**
8	48	152	**55**	45	158	**SD**	**±8.27**	**±4.42**
9	95	162	**56**	69	154			
10	64	154	**57**	63	152			
11	42	153.5	**58**	56	150			
12	53	156	**59**	51	155			
13	47	150	**60**	49	152			
14	46	148	**61**	46	156			
15	49	154	**62**	52	150			
16	35	145	**63**	49	150			
17	49	159	**64**	56	148			
18	64	160	**65**	36	142			
19	40	152	**66**	48	149			
20	55	155	**67**	47	155			
21	37	150	**68**	52	159			
22	52	154	**69**	55	152			
23	60	154	**70**	56	150			
24	45	158	**71**	46	150			
25	54	148	**72**	48	153			
26	53	150	**73**	49	156			
27	42	151	**74**	56	155			
28	49	152	**75**	47	152			
29	41	154	**76**	52	153			
30	48	156	**77**	52	156			
31	45	158	**78**	57	152			
32	69	154	**79**	50	153			
33	63	152	**80**	57	159			
34	56	150	**81**	45	154			
35	51	154	**82**	44	150			
36	59	150	**83**	46	150			
37	49	156	**84**	52	148			
38	51.5	146	**85**	56	152			
39	46	156	**86**	55	160			
40	52	149	**87**	52	156			
41	46	150	**88**	53.5	149			
42	58	146	**89**	49	150			
43	56	161	**90**	49.5	152			
44	52	150	**91**	50	153			
45	63.5	159	**92**	36	146			
46	52	164	**93**	49	152			
47	55	150	**94**	47	149			

APPENDIX - IV
MEAN BLOOD HAEMOGLOBIN OF THE SELECTED SUBJECTS

No	Pregnant women	No	Lactating mother
1	10.0	**1**	9.95
2	10.5	**2**	11.05
3	11.9	**3**	10.17
4	11.0	**4**	12.64
5	10.5	**5**	11.09
6	11.2	**6**	10.77
7	10.4	**7**	10.48
8	9.12	**8**	10.88
9	8.20	**9**	9.72
10	11.4	**10**	11.67
11	11.2	**11**	11.03
12	9.60	**12**	12.69
13	12.0	**13**	10.10
14	11.7	**14**	11.36
15	9.0	**15**	11.03
16	10.3	**16**	12.27
17	12.0	**17**	11.46
18	10.4	**18**	11.90
19	10.5	**19**	13.77
20	7.0	**20**	12.82
21	9.21	**21**	9.01
22	10.0	**22**	11.97
23	10.3	**23**	11.63
24	9.42	**24**	11.0
25	6.92	**25**	10.9
26	9.70	**26**	8.86
27	10.1	**27**	11.98
28	9.0	**28**	9.23
29	12.1	**29**	10.20
30	8.42	**30**	9.82
Mean	**10.106**	**Mean**	**11.054**
SD	**±1.359**	**SD**	**± 1.173**

APPENDIX - V
MEAN BLOOD GLUCOSE OF THE SELECTED SUBJECTS

No	Pregnant women	No	Lactating mother
1	99	**1**	122
2	101	**2**	82
3	88	**3**	70
4	120	**4**	130
5	120	**5**	110
6	96	**6**	101
7	110	**7**	97
8	120	**8**	90
9	120	**9**	112
10	116	**10**	123
11	108	**11**	83
12	128	**12**	92
13	109	**13**	110
14	98	**14**	115
15	80	**15**	95
16	115	**16**	88
17	99	**17**	122
18	122	**18**	106
19	118	**19**	118
20	88	**20**	112
21	90	**21**	80
22	99	**22**	87
23	126	**23**	122
24	132	**24**	116
25	107	**25**	120
26	87	**26**	96
27	96	**27**	82
28	110	**28**	76
29	127	**29**	132
30	102	**30**	139
Mean	**107.214**	**Mean**	**102.036**
SD	**14.019**	**SD**	**17.035**

APPENDIX - VI

MEAN BLOOD PRESSURE OF THE SELECTED SUBJECTS

(Pregnant women n = 100)

No	Systolic	diastolic	No	Systolic	diastolic	No	Systolic	diastolic
1	110	70	**48**	100	60	**95**	117	70
2	110	70	**49**	101	70	**96**	116	75
3	120	80	**50**	100	70	**97**	100	60
4	120	80	**51**	120	80	**98**	100	70
5	100	70	**52**	100	70	**99**	120	80
6	120	80	**53**	101	70	**100**	120	80
7	110	70	**54**	110	70	**Mean**	**113.1**	**73.27**
8	110	72	**55**	116	70	**SD**	**±9.42**	**±10.75**
9	124	77	**56**	115	78			
10	120	80	**57**	101	60			
11	120	74	**58**	117	73			
12	120	80	**59**	90	60			
13	116	69	**60**	119	70			
14	110	70	**61**	120	80			
15	110	70	**62**	120	80			
16	110	68	**63**	120	80			
17	110	70	**64**	126	70			
18	110	70	**65**	110	80			
19	101	60	**66**	110	65			
20	110	68	**67**	120	80			
21	100	70	**68**	110	72			
22	100	60	**69**	116	74			
23	110	77	**70**	114	72			
24	110	70	**71**	110	70			
25	90	60	**72**	110	70			
26	110	70	**73**	118	70			
27	110	70	**74**	130	80			
28	110	67	**75**	108	75			
29	120	80	**76**	100	60			
30	110	70	**77**	110	70			
31	120	80	**78**	160	75			
32	101	68	**79**	110	70			
33	110	70	**80**	110	68			
34	123	77	**81**	130	85			
35	110	70	**82**	120	80			
36	128	78	**83**	100	60			
37	110	70	**84**	122	80			
38	100	60	**85**	116	70			
39	110	65	**86**	116	77			
40	120	74	**87**	110	70			
41	110	70	**88**	120	70			
42	126	80	**89**	120	80			
43	114	82	**90**	110	80			
44	120	80	**91**	120	80			
45	120	80	**92**	122	80			
46	115	72	**93**	110	60			
47	110	70	**94**	119	70			

MEAN BLOOD PRESSURE OF TH ESELECTED SUBJECTS

(lactating mothers n = 100)

No	Systolic	diastolic	No	Systolic	diastolic	No	Systolic	diastolic
1	110	65	**48**	120	60	**95**	110	60
2	120	74	**49**	110	70	**96**	100	70
3	110	70	**50**	120	80	**97**	110	80
4	126	80	**51**	120	80	**98**	120	80
5	114	86	**52**	110	70	**99**	110	70
6	120	80	**53**	110	70	**100**	100	70
7	110	72	**54**	110	70	**Mean**	**113.18**	**72.38**
8	100	70	**55**	120	80	**SD**	**±8.05**	**±6.69**
9	115	70	**56**	126	73			
10	110	60	**57**	110	70			
11	110	70	**58**	123	70			
12	120	80	**59**	110	60			
13	120	80	**60**	101	66			
14	110	60	**61**	110	70			
15	110	70	**62**	90	66			
16	120	80	**63**	120	80			
17	126	73	**64**	110	70			
18	130	76	**65**	101	68			
19	120	80	**66**	123	73			
20	116	78	**67**	110	70			
21	110	70	**68**	100	60			
22	121	70	**69**	110	65			
23	122	70	**70**	120	74			
24	120	80	**71**	110	70			
25	110	70	**72**	126	80			
26	110	70	**73**	120	80			
27	120	80	**74**	110	77			
28	100	70	**75**	120	70			
29	90	60	**76**	110	70			
30	110	70	**77**	120	80			
31	120	80	**78**	110	70			
32	120	80	**79**	110	60			
33	126	80	**80**	100	60			
34	110	80	**81**	120	80			
35	123	80	**82**	110	70			
36	110	70	**83**	110	70			
37	100	60	**84**	120	80			
38	100	70	**85**	100	70			
39	120	75	**86**	110	70			
40	114	85	**87**	116	72			
41	120	80	**88**	115	78			
42	110	70	**89**	119	70			
43	120	80	**90**	126	70			
44	110	70	**91**	110	80			
45	101	70	**92**	110	65			
46	105	70	**93**	120	80			
47	110	70	**94**	119	60			

NUTRITION EDUCATION PAMPHLET