COMPARISON OF MATERNAL AND FETAL OUTCOME AMONG OBESE AND NORMAL MOTHERS IN VIEW OF DEVELOPING MATERNAL OBESITY MANAGEMENT STRATEGY AT SELECTED HOSPITALS, CHENNAI

DISSERTATION SUBMITTED TO
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APRIL 2014
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Approved by Research Committee in December 2012

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<td>APGAR</td>
<td>Appearance, Pulse, Grimace, Activity, Respiration</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval</td>
</tr>
<tr>
<td>CMACE</td>
<td>Centre for Maternal and Child Enquiries</td>
</tr>
<tr>
<td>ETIP</td>
<td>Exercise Training in Pregnancy</td>
</tr>
<tr>
<td>GDM</td>
<td>Gestational Diabetes Mellitus</td>
</tr>
<tr>
<td>GWG</td>
<td>Gestational Weight Gain</td>
</tr>
<tr>
<td>ICCR</td>
<td>International Centre for Collaborative Research</td>
</tr>
<tr>
<td>IOL</td>
<td>Induction of Labour</td>
</tr>
<tr>
<td>Kg/m²</td>
<td>Kilogram per Meter square</td>
</tr>
<tr>
<td>LMP</td>
<td>Lifestyle Modification Program</td>
</tr>
<tr>
<td>NICU</td>
<td>Neonatal Intensive Care Unit</td>
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<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>OR</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>PIH</td>
<td>Pregnancy Induced Hypertension</td>
</tr>
<tr>
<td>PPH</td>
<td>Post Partum Haemorrhage</td>
</tr>
<tr>
<td>PROM</td>
<td>Premature Rupture of Membrane</td>
</tr>
<tr>
<td>RR</td>
<td>Relative Risk</td>
</tr>
<tr>
<td>SGA</td>
<td>Small for Gestational Age</td>
</tr>
<tr>
<td>SMF</td>
<td>Sundaram Medical Foundation</td>
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<tr>
<td>USA</td>
<td>United States of America</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>UTI</td>
<td>Urinary Tract Infection</td>
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<td>WHO</td>
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ABSTRACT
Comparison of maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai.

**Aims and objectives:** To compare the maternal and fetal outcome among obese and normal mothers in view of developing obesity management strategy. **Methodology:** Comparative study to assess the maternal and fetal outcome among 200 mothers who were in labour were grouped according to their BMI by purposive sampling technique, 100 normal mothers (BMI 18.5-24.9kg/m²) and 100 obese mothers (BMI ≥25kg/m²) in selected hospitals at Chennai. The antenatal outcomes were retrieved from antenatal record retrospectively where as intranatal, postnatal and neonatal outcomes were assessed by using observation checklist. **Result:** compared with women of normal BMI, the outcomes among obese mothers were significantly associated with PIH (p<0.001), GDM, preterm labour, forceps delivery, cesarean section and malposition at the level of p<0.05. The maternal and fetal outcomes were compared by odds ratio. Obese women were about 6 times likely to develop PIH (Odds Ratio (OR) – 6.37), 2 times more likely to deliver by forceps application (OR – 2.69), 3 times of risk to deliver by vacuum extraction (OR – 3.59) and prolonged wound healing (OR – 3.12), 6 times are very high risk for malposition, 3 times are likely to have meconium aspiration (OR – 3.06). **Conclusion:** Maternal obesity in early pregnancy is strongly associated with a number of maternal and fetal outcomes. Hence the maternal obesity management strategy will create awareness among future mothers with obesity to keep their weight gain goal in order to protect from adverse maternal and fetal outcomes.

**Key words:** obese mothers, maternal and fetal outcome, maternal obesity management strategy

**INTRODUCTION**

Pregnancy is a process that invites women to experience the unseen force behind all life. Throughout pregnancy, mother is at the center stage. Even though pregnancy gives pleasure and makes feel proud, it gives pressure on her due to some health determinants like obesity.

As the prevalence of obesity is increasing, the number of obese women of reproductive age is also increasing and consequently obesity complicates about 18.5 - 38.5% of pregnancies. These pregnancies are at an increased risk of several maternal as well as fetal adverse outcomes. The increasing risks among obese mothers are gestational hypertension and pre eclampsias are 2.5-3.2 and 1.6-3.3 times, gestational diabetes is 3
to 5 times higher. Fetal macrosomia is 1.5-2 times, 2 to 3 fold risk of still birth, fetal structural anomalies such as neural tube defects, omphalocele and cardiac defects are up to 3 times more in obese mothers. Obesity also frequently complicates delivery 1.7 fold increased risk of operative vaginal delivery and 2 to 3 times increased risk of cesarean section. Greater awareness of these adverse effects needs to be made to healthcare professionals in order to prevent complications which are associated with obesity during pregnancy. (Expert Review of Obstetrics and Gynecology, 2012).

**OBJECTIVES**

To compare the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy.

**METHODOLOGY**

**Research design**

The research design used in this study was non-experimental comparative descriptive design.

**Research variable**

The study variable includes maternal and fetal outcome of obese and normal mothers.

**Setting**

The study was conducted in labour ward of Vijaya Hospital, K.S. Hospital, Sir Ivan Stedeford Hospital, and Sundaram Medical Foundation at Chennai.

**Samples**

The study sample comprised of 200 antenatal mothers – 100 normal mothers and 100 obese mothers who fulfilled the inclusive criteria.

**Measurement and tool**

Assessment of maternal and fetal outcome among obese and normal mothers in which antenatal outcome was retrieved from antenatal record retrospectively and intranatal, postnatal and neonatal outcome were assessed by using observation checklist
prepared by the researcher. Both descriptive and inferential statistics were used for data analysis.

RESULTS

The findings of the study revealed that obesity is significantly associated with pregnancy induced hypertension at the level of $p<0.001$, gestational diabetes mellitus, preterm labour, forceps delivery, malposition, cesarean section at the level of $p<0.05$. The maternal and fetal outcomes were compared by odds ratio. Obese women were about 6 times likely to develop PIH (OR – 6.37), 2 times more likely to deliver by forceps application (OR – 2.69), 3 times of risk to deliver by vacuum extraction (OR – 3.59) and prolonged wound healing (OR – 3.12), 6 times were at high risk for malposition, 3 times were likely to have meconium aspiration (OR – 3.06).

DISCUSSION

The study findings showed that obese mothers are at more risks of adverse maternal and fetal outcome than the normal mothers. Thus the researcher has prepared a poster regarding maternal obesity management strategy in order to create an awareness among future mothers with obesity, thereby controlling obesity related complications during pregnancy.

IMPLICATIONS

Enables nurse midwife to assess, plan and implement maternal obesity management strategy and equip her to create awareness among obese mothers thereby preventing obesity related complications. Nursing curriculum should include obese pregnancy risk assessment topics so that the student nurses are trained to assess and educate obese mother on management strategy. The nurse administrator should plan for an appropriate schedule for conducting an awareness program on obesity management strategy in hospital setting. This study implies on utilization of evidence-based practice in clinical and community setting in preventive aspects of obesity related complications during pregnancy.
CONCLUSION

Maternal obesity in early pregnancy is strongly associated with a number of maternal and fetal outcomes. Pregnancy in obese women should be managed as high risk pregnancy with strategies for prevention, early detection and management of complications arising from obesity. Hence the researcher had prepared maternal obesity management poster which creates awareness among obese mothers to keep their weight gain goal and to protect from adverse maternal and fetal outcomes.
CHAPTER-1

Introduction
INTRODUCTION

Pregnancy is a process that invites women to experience the unseen force behind all life. Childbirth is an experience that holds the power to transform her forever. Passing through these powerful gates on her way makes to think twice, one for herself and one for her child. Throughout pregnancy, mother is at the center stage and brings about an easy labor, without risking injury to the mother or the child.

Birth is a natural, normal physiological function for normal, healthy women and their healthy babies. According to physiological law, all natural, normal functions of the body are achieved without peril or pain. Having a baby will change the physiology, even when the pregnancy goes smoothly, but complications can lead to even physiology, pathological and psychological change due to many factors which is associated with socio demographic and health factors like age, parity and dietary habits. Treating normal labors as though they were complicated can become a self-fulfilling prophecy. Even though pregnancy gives pleasure and makes feel proud, it gives pressure too on the mother due to some health determinant like obesity.

Obesity is a condition in which excess of fat has accumulated to such an extent that health may be affected and is defined as Body Mass Index $\geq 30$kg/m$^2$. Obesity in pregnancy is widely defined as a maternal BMI of 30 or more, usually at the time of the first antenatal consultation. Problems of overweight and obesity are caused by chronic imbalance between energy intake and actual energy needs of the body. Rapidly changing diets and lifestyles are fueling the global obesity epidemic. In many developing countries, with increasing urbanization, mechanization of job and transportation, availability of processed and fast foods, and dependence on television for leisure, people are fast adopting less physically active lifestyles and consuming more “energy-dense, nutrient-poor” diets.

The world wide incidence of obesity is increasing. In fact a new word - "globesity" has now been coined to reflect the escalation of global obesity and overweight among maternities. The World Health Organization published a report entitled "obesity: preventing and managing the Global Epidemic", which classified
"obesity" as a growing epidemic and if immediate action is not taken, millions will suffer from an array of serious weight-related disorders during pregnancy. (WHO 2012)

Obesity in pregnancy has numerous potential detrimental effects on the mother and the newborn. The increasing risks among obese mothers are gestational hypertension and pre eclampsias are 2.5-3.2 and 1.6-3.3 times, gestational diabetes is 3 to 5 times higher, Fetal macrosomia is 1.5-2 times, 2 to 3 fold risk of still birth, fetal structural anomalies such as neural tube defects and omphalocele and cardiac defects are up to 3 times more in obese mothers. Obesity also frequently complicates delivery causing 1.7 fold increased risk of operative vaginal delivery and 2 to 3 times increased risk of cesarean section. (Expert Review of Obstetrics and Gynecology, 2012)

1.1. BACKGROUND OF THE STUDY

During the past 20 years, obesity has become a worldwide epidemic. The WHO estimates that approximately 700 million adults will be obese by 2015. As the prevalence of obesity is increasing, the number of obese women of reproductive age is also increasing and consequently obesity complicates about 18.5 - 38.5% of pregnancies. These pregnancies are at an increased risk of several maternal as well as fetal adverse outcomes. (WHO 2012)

Obesity has reached epidemic proportions globally, with more than 1.5 billion adults are overweight - at least 300 million of them clinically obese - and it is a major contributing factor to the global burden among reproductive age group.. Among women of childbearing age, it is of paramount importance because of its association with multiple adverse health outcomes for the mother and fetus, once a woman becomes pregnant. About 4 million births occur in the United States annually and at present approximately 60% of women of childbearing age are either overweight or obese. In Mexico, 32% of women of reproductive years are obese; in Brazil, 50% of the population is overweight or obese, in Ghana, 64.7% of women are either overweight or obese. The latest data from the US National Centre for Health Statistics show that 35% of women of reproductive years are obese. (Advances in nutrition, International Review, 2012).
In the United Kingdom, 1 in 5 women at booking are obese. About 56% of all women are over the recommended BMI, that is 33% of them classified as overweight (BMI>25) and 23% as obese (BMI >30). The prevalence of women with a known BMI ≥35 (class II and class III obesity) is 4.49%. This translates into approximately 38.47 maternities with obesity each year in the UK. The prevalence of women with a pregnancy BMI≥40 (class III obesity) in the UK is 2.01%, while super-morbid obesity BMI ≥50 affects 0.19% of all women giving birth. The confidential enquiry into maternal and child health reported that 35% of all maternal deaths is occurring due to obesity related complications. Obesity in reproductive age group is classed as the sixth most important risk factor contributing to overall burden of disease which is attributed to 30,000 deaths in UK per year. (CMACE- obesity report, 2010).

For the first time, the number of overweight individuals around the world, rival the number of individuals who is underweight. Developing nations have also joined the ranks of countries troubled by obesity. In China, the number of overweight people rose from less than 10% to 15% in just three years. In Brazil and Colombia, the figure of overweight is about 40%. Even sub-Saharan Africa, where most of the world's hungry live, is seeing an increase in obesity, especially among urban women. In all regions, obesity appears to escalate as income increases.

The prevalence of obesity and overweight in United Arab Emirates (UAE) reached 39.9% among pregnant women. Most of the studies reporting the effect of obesity on pregnancy outcomes are from developing countries. The highest obesity levels are in America (26% of adults) and the lowest in the South-East Asia Region (3% obese). In all parts of the world, women are more likely to be obese than men, and thus at greater risk of complications. (Clinical Epidemiology and global health, 2012).

In India, the percentage of married women aged between 15- 49, who are overweight or obese increased from 11% in to 15%. The prevalence is more profound in the women who are residing in cities (23.5%), having high qualification (23.8%), and belonging to Sikh community (31.6%) and households in the highest wealth quintile (30.5%). The percentage of obese women among reproductive in Mumbai was 37.5%, in Punjab 29.9% recent data show that prevalence of overweight and obesity was comparatively high of about 15–61% especially in Jaipur. In India overall 26% of
women of reproductive years are overweight and 8% are obese. In India prevalence of abdominal obesity has been consistently higher in women of about 20% who were not overweight or obese as per the BMI definition still had abdominal obesity (Journal of Clinical Gynecology and Obstetrics, 2012)

Greater awareness of these adverse effects needs to be made to healthcare professionals, who can target obese and/or overweight women of child-bearing age. Such women should be informed of the risks associated with obesity during pregnancy and receive appropriate dietary and lifestyle advice in order to prevent complications which are associated with obesity during pregnancy. (FOCUS, Missouri Department of Health & Senior Services, 2011)

1.2. SIGNIFICANCE AND NEED FOR THE STUDY

Obesity is a global public health problem that has received much attention for the past two decades. Among women of childbearing age, it is of paramount importance because of its association with multiple adverse health outcomes for the mother and the fetus once a woman becomes pregnant. According to WHO, if immediate action is not taken, millions will suffer from an array of serious obesity related problems during pregnancy.

Pooja Rajesh Vaswani, (2012) conducted a retrospective study among 1985 women at United Arab Emirates to evaluate the effect of varying degrees of maternal obesity on perinatal outcome. Morbidly obese women were about five times more likely to develop hypertensive disorders of pregnancy (OR-4.97), four times more likely to develop gestational diabetes (OR 3.7), three times more at risk of delivery by cesarean section (OR 2.73) and at a high risk of delivering big babies (OR 17.30). Maternal obesity especially morbid obesity in early pregnancy is strongly associated with a number of obstetrical and perinatal complications. Pregnancy in obese women should be managed as high risk pregnancies with strategies for prevention, early detection and management of complications arising from obesity.

Dimuthu Vinayagam and Edwin Chandraharan, (2012) conducted a retrospective case-control analysis among 100 women at tertiary referral centre, London, with a BMI above 40 kg/m² (class III Obesity) and a control group (100 women) BMI
between 20 and 25 kg/m² to determine the impact of increased body mass index (BMI) on intra partum outcomes. The study result showed that there is a significant increase in delivery by caesarean section (OR 2.32, 95% CI 1.26–4.29), minor and major postpartum hemorrhage (OR 5.93, 95% CI 2.34–11.98, OR 16.11, 95% CI 2.08–125.09, resp.), perineal trauma (OR 2.59, 95% CI 1.44–4.69), and fetal macrosomia (OR 3.11, 95% CI 1.25–7.79) among study group. Babies also had an increased risk of having a lower APGAR scores in the study group as compared to the control group (OR 3.09, 95% CI 1.07–8.94).

Shahla Yazdani, (2012) conducted a retrospective cohort study among 1356 primi gravid with a singleton uncomplicated pregnancy at Mumbai to evaluate the effect of maternal body mass index on pregnancy outcome women. The study concluded that women with an above-normal body mass index had a higher incidence of pre-eclampsia, induction of labour, cesarean section, preterm labor and macrosomia than women with a normal BMI (controls). BMI of women in the first trimester of pregnancy is associated with the risk of adverse pregnancy outcomes.

International journal of obstetrics and gynecology, (2013) conducted a retrospective study among 30,298 singleton pregnancies at Texas University, USA to assess the impact of BMI on maternal and neonatal outcome. The result showed that, compared with normal weight women, women in the overweight and obese class I (BMI 30 to 34.9) category had an increased risk of hypertensive disorders, gestational diabetes, induction of labour, cesarean section, postpartum hemorrhage and macrosomia. Furthermore, women in obese class III (BMI 40 or more) were identified to be at the most risk of adverse outcomes including having a preterm delivery, a newborn requiring neonatal admission and stillbirth.

Arrowsmith S, S Wray and S Quenby, (2011) conducted a retrospective cohort study among 29,224 singleton pregnant women at Liverpool Women's Hospital NHS Foundation Trust, UK to investigate the effect of maternal obesity on mode of delivery following induction of labour for prolonged pregnancy. The study result showed that 3076 of obese mothers had a prolonged pregnancy and had a significantly higher rate of induction of labour (IOL) ending in caesarean section compared with women of normal weight following IOL (38.7% versus 23.8% in primiparous; 9.9% versus 7.9% in
multiparous women, respectively). Higher maternal body mass index at booking is associated with an increased risk of prolonged pregnancy and increased rate of IOL.

**Bloomberg M, (2013)** conducted a cohort study among 1,024,471 women from Swedish Medical Birth Registry in Sweden to evaluate the adverse neonatal outcome which is associated with maternal body mass index (BMI) of singleton pregnancies. The study compared the neonates born to women of normal weight with the neonates born to women with BMI of 40 or more (morbidly obese) and stated that the latter are at increased risk of birth injury to the peripheral nervous system (odds ratio [OR] 3.80, 95% confidence interval [CI] 2.83-5.12; 0.2% compared with 0.6%), birth injury to the skeleton (OR 2.59, 95% CI 2.10-3.21; 0.5% compared with 1.1%), respiratory distress syndrome (OR 2.08, 95% CI 1.88-2.30; 2.9 compared with 5.8%), bacterial sepsis (OR 2.90, 95% CI 2.43-3.46; 0.6% compared with 1.7%), convulsions (OR 3.43, 95% CI 2.63-4.47; 0.2% compared with 0.8%), and hypoglycemia (OR 3.48, 95% CI 3.20-3.78; 2.4% compared with 7.9%). The study concluded that the neonates born to morbidly obese women are at markedly increased risk of adverse neonatal outcome regardless of mode of delivery.

**Bogaerts et.al., (2009)** conducted a longitudinal interventional study by a randomized controlled trial among 235 eligible obese pregnant women to assess the effects of lifestyle intervention in obese pregnant women on gestational weight gain. The study result showed a significant reduction of Gestational Weight Gain (GWG) in the brochure (9.5kg) and lifestyle intervention (10.6kg) group compared with normal care group (13.5kg) (P=0.007). Obese pregnant women who stopped smoking recently showed a significant higher GWG (OR=3.04; P=0.01); those with concurrent gestational diabetes mellitus (GDM) (OR=3.54; P=0.03). A targeted lifestyle intervention programme based on the principles of motivational interviewing reduces GWG in obese pregnant women.

Hence, effective obesity management strategies are needed at a national and international level to stop this growing problem. The health and economic impact of rising obesity rates in women of reproductive age group is of significant public health importance, as obesity is an important modifiable risk factor for adverse pregnancy outcome.
The researcher felt that the complications of pregnancy can involve the mother's health, baby's health or both. Some women have health problems that arise before they become pregnant and other problem arises during pregnancy that could lead to complication. The investigator found that there is a rise in complications among obese mothers which troubled them physically, physiologicaly and psychologically instead giving them joy and excitement during their pregnancy. This created a provoking thought in the researchers mind that it is very important for women to receive health care before and during pregnant to decrease the risk of pregnancy complications among obese mothers by developing maternal obesity management strategy.

1.3 STATEMENT OF THE PROBLEM

A comparative study to assess the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai.

1.4. OBJECTIVES

1. To assess the maternal and fetal outcome among obese and normal mothers.
2. To compare the maternal and fetal outcome between obese and normal mothers.
3. To associate the selected demographic variables with maternal and fetal outcome among obese and normal mothers.
4. To develop maternal obesity management strategy.

1.5. OPERATIONAL DEFINITION

1.5.1. Maternal outcome

It is the occurrence of selected predictable conditions that arises due to obesity during antenatal, intra natal, postnatal period which was assessed using checklist. The predictable conditions are;

Antenatal period – It is assessment of predictable complications like pregnancy induced hypertension, gestational diabetes mellitus, hypothyroidism, hydramnios, obstetric cholestasis, placenta previa, abruptio placenta, urinary tract infection which was retrieved from antenatal record retrospectively.
**Intranatal period:** It is the observation of predictable complications like meconium stained liquor, premature rupture of membrane, malpresentation, malposition, caesarean section, normal vaginal delivery, preterm labour, operative vaginal delivery, post term delivery, fetal distress which was assessed by using observation check list.

**Postnatal period:** It is the observation done till discharge of the mothers from hospital for presence of any respiratory or wound infection, prolonged hospitalization, prolong wound healing, primary post partum hemorrhage, which was assessed by using observation check list.

1.5.2. Fetal outcome

It is the condition of newborn at birth and its degree of wellness which includes Apgar score < 7 at 5 min, still birth, macrosomia, meconium aspiration syndrome, admission to NICU which was assessed by using observation checklist.

1.5.3. Normal mother

A singleton pregnant woman who admitted for labour with the first trimester Body Mass Index between 18.5 to 24.9kg/m$^2$ which was calculated by the researcher based on the height and weight documented in the antenatal record.

1.5.4. Obese mother

A singleton pregnant woman who are admitted for labour with the first trimester Body Mass Index of $\geq$ 25 kg/m$^2$ which was calculated by the researcher based on the height and weight documented in the antenatal record.

1.5.5. Maternal obesity management strategy

It is the preparation of poster regarding prevention and control of obesity related complications during pregnancy.

**Components include** early identification of obesity, dietary management, lifestyle modification and physical exercise.
1.6 ASSUMPTIONS
   1. Maternal obesity may have an impact on maternal and fetal outcome
   2. Development of maternal obesity management strategy may help the forthcoming obese mothers to be aware of weight management measures.

1.7. RESEARCH HYPOTHESES

   RH₁: There is a significant difference in maternal and fetal outcome between obese and normal mothers

   RH₂: There is a significant association of selected demographic variables with maternal and fetal outcome among obese and normal mothers at the level of p<0.05.

1.8. DELIMITATION

   The study is limited to a period of 4 weeks.
1.9. CONCEPTUAL FRAMEWORK

A conceptual framework or model refers to interrelated concepts or abstractions assembled together in a rational scheme by virtue of their relevance to a common theme that structure or offer a framework for conducting research.

The researcher has adopted **Grounded Theory of Glaser and Strauss with Action Research.**

According to Glaser and Strauss, the Grounded theory approach is designed to enable the researcher for constant comparison of collected and coded data and to formulate proposition.

Action research is a process of gaining information about the situation through a deliberate process of making explicit assumption about how and why things work and planning to improve the act.

The investigator comprised these two models to prepare a proposition by assessing and comparing maternal and fetal outcome among obese and normal mothers. The components of Grounded theory are as follows;

**Data generation**

Data generation refers to collection of data. Data collection can be done by interview, observation or documents or from a combination of these sources. Here, the researcher has reviewed the clients’ antenatal record, calculated the first trimester BMI with the height and weight of mothers who are admitted for labour.

**Concept formation**

Concept formation refers to collection, coding and analysis of the data from the beginning that was gathered. The researcher’s concept was to categorize the mother according to their BMI as obese and normal mothers. Then, the researcher selected samples by non probability purposive sampling technique and collected the demographic data by using formulated tool.
Concept development

Concept development involves steps which describes the images of phenomena and the need for proposition. Through this process, the core variable emerges. The concept of core variable refers to a category which accounts for most of the variation in a pattern of behavior and which helps to integrate other categories that have been discovered in the data.

Concept modification and integration

Concept modification and integration are accomplished as researcher continues to analyze data. Theoretical coding provides direction and memoing preserves the researchers.
1.10 OUTLINE OF THE REPORT

CHAPTER 1 : Dealt with the background of the study, need for the study, and statement of the problem, objectives, operational definitions, null hypotheses, assumptions, delimitations and conceptual framework.

CHAPTER 2 : Focuses on scientific review of literature related to the present study.

CHAPTER 3 : Enumerates the methodology of the study.

CHAPTER 4 : Presents the data analysis and data interpretation.

CHAPTER 5 : Deals with the discussion of the study

CHAPTER 6 : Gives the summary, conclusion, implications, recommendations and limitations of the study.

The study report ends with selected References and Appendices.
Review of antenatal record of mothers who are in labour

Assessment of BMI and categorize it

Obese mother
BMI ≥ 25 kg/m²

Normal mother
BMI 18.5 - 24.9

Non probability purposive sampling

Collection of data using formulated tool

Assessment of demographic variables- age, education, religion, type of family, diet pattern, exercise pattern, BMI, family history of obesity.

checklist to assess maternal and fetal

Identification of maternal and fetal outcome
Antenatal outcome by using antenatal health record
Intranatal, postnatal and neonatal outcome by using observation checklist

comparison of maternal and fetal outcome

Obese mother

Normal mother

Preparation of poster regarding maternal obesity management strategy

FIG.1.9.1. CONCEPTUAL FRAMEWORK BASED ON GROUNDED THEORY OF GLASER AND STRAUSS

CONTEXT
SMF, SISH, Vijaya Hospital, K.S. Hospital
CHAPTER-2

Review of Literature
REVIEW OF LITERATURE

This chapter deals with the related literature review which aids to generate a picture of what is known and not known about a particular situation.

Review of literature is an organized critique of important scholarly literature which supports a study and a key step in research process (Polit & Beck).

An extensive review of literature was done by the investigator to gain an insight into the problem, collect maximum information from systematic and critical review of scholarly publications, unpublished scholarly print materials. The logical sequence of the chapter is organized in the following sections:

SECTION 2.1: Scientific reviews related to impact of obesity on pregnancy
SECTION 2.2: Scientific reviews related to effect of obesity on maternal outcome.
SECTION 2.3: Scientific reviews related to effect of obesity on fetal outcome
SECTION 2.4: Scientific reviews related to effectiveness of obesity management strategy.

SECTION 2.1: SCIENTIFIC REVIEWS RELATED TO IMPACT OF OBESITY ON PREGNANCY

Magann EF et al., (2013) conducted an observational study based on secondary analysis among 4,490 mothers at University of Arkansas for the Medical Sciences USA to determine the effect of an increasing gradient of maternal obesity and pregnancy outcomes. Comparison was done between normal BMI and different BMI thresholds and the study conveyed an increased risk for 5 specific pregnancy complications. BMI $\geq 25$ are prone to gestational diabetes, induction of labour, caesarean delivery and large for gestational age neonate ($P < 0.001$); BMI $\geq 30$ for pre-eclampsia, wound infection, shoulder dystocia and meconium stained liquor ($P = 0.001$); BMI $\geq 35$ for urinary tract infection and postpartum hemorrhage ($P < 0.001$); BMI $\geq 40$ for endometritis ($P < 0.001$). The study concluded that BMI thresholds exist at different level was significantly had increased pregnancy complication and they vary depending on outcome ranging from BMI $\geq 25$ to BMI $\geq 40$. 
Valerie Holmes et al., (2013) conducted a cohort study among 30,298 pregnancies at referral unit, Northern Ireland to find the prevalence of overweight and obese women and their risk of adverse neonatal and maternal outcomes. The study revealed that 2.8% of women were categorized as underweight, 5.25% normal weight, 27.8% overweight, 11% obese class I, 3.9% obese class II and 1.9% obese class III and concluded that, compared with normal weight women, women in the overweight and obese class I category had an increased risk of hypertensive disorders, gestational diabetes, induction of labour, caesarean section, postpartum hemorrhage and macrosomia (large birth weight baby) are significantly increased for obese class II and III women.

Meenakshi et al., (2012) conducted a prospective study among 83 normal weight and 87 obese singleton pregnant women at Nehru Hospital, Gorakpur, to compare maternal and fetal complications among normal and obese. The study inferred that gestational hypertension (p<0.05), preeclampsia(p<0.001), preterm delivery (p<0.01), induction of labour (p<0.05), instrumental vaginal delivery (p<0.05), cesarean section (p<0.01), increased operative time (p<0.01), still birth (p<0.05), early neonatal death (p<0.05), Apgar score < 7 at 5minutes (p<0.05) and admission to NICU (p<0.001) are the adverse pregnancy outcome among overweight and obese mothers and concluded that overweight and obesity are definite risk factor for adverse pregnancy outcomes.

Pooja Rajesh Vaswani, (2012) conducted a retrospective study among 1985 women in United Arab Emirates to evaluate the effect of varying degrees of maternal obesity on perinatal outcome. Morbidly obese women were about 5 times more likely to develop hypertensive disorders of pregnancy (OR = 4.97), 4 times more likely to develop gestational diabetes (OR 3.75), 3 times more likely to deliver post-term (OR 2.99), 3 times more at risk of delivering by caesarean section (OR 2.73) and at a very high risk of delivering big babies (OR 17.30). The study concluded that the pregnancies in obese women should be managed as high risk pregnancies with strategies for prevention, early detection and management of complications arising from obesity.

Sreedevi C et al., (2012) conducted a correlation study among 250 primi gravid at Karnataka, India to assess the effect of first trimester BMI on obstetric outcome. The study result showed that complications like gestational diabetes mellitus, gestational hypertension, preterm delivery, meconium stained liquor, low birth weight, small for
gestational age and IUGR were found to be more in abnormal first trimester BMI categories and concluded that abnormal first trimester BMI revealed to be associated with severe maternal and neonatal complications. Therefore pregnant women should maintain a normal BMI to achieve a healthy pregnancy outcome.

Vellanki Venkata Sujatha et al., (2011) conducted a prospective non randomized descriptive study among 100 women with high BMI were compared with 100 women with normal BMI at Narketpally, India to examine the maternal and fetal risks of adverse pregnancy outcome in obese women (BMI > 30). The result revealed that compared to women with normal BMI, the following outcomes were significantly more common in obese pregnant women) for BMI > 30 gestational diabetes mellitus (OR 4.8, CI-1.01 - 3.02); pre-eclampsia (OR 2.52, CI-1.04-6.11); macrosomia (OR 13.8, CI -3.1 - 60.57); caesarean section (OR 3.45, CI - 1.65 - 7.15) and infections (OR 1.7, CI - 0.39 - 7.32) and concluded that there is a strong association between maternal morbid obesity in early pregnancy and a number of threatening complications during pregnancy, delivery, and in the neonatal period.

Baeten et al., (2008) conducted a population-based cohort study among 100,000 pregnancies to examine the prevalence of complications of maternal obesity during pregnancy. The study result showed that gestational diabetes is of 6% for obese participants, but only 1.6% of normal weight individuals. Also, preeclampsia had a 13.5% incidence for obese women versus 5.7% for normal weight. The study concluded that gestational diabetes, preeclampsia, and eclampsia conditions that can cause severe maternal illness or even death, were significantly higher in the overweight and obese BMI groups compared to lean women.

SECTION 2.2: SCIENTIFIC REVIEWS RELATED EFFECT OF OBESITY ON MATERNAL OUTCOME

Nil Halvdan Morken et al., (2013) conducted a population based cohort study among 50,416 singleton pregnant mothers at Norwegian Mother to estimate the risk of operative delivery with that of maternal pre pregnant body mass index and gestational weight gain. The study revealed that there was increased risk of vacuum extraction among BMI > 30 (RR 1.5, 95% CI 1.04 - 2.2), women with a gestational weight gain of ≥ 16kg had a significantly increased risk of forceps and vacuum extraction (RR1.2, 95%
Semins M.J. et.al., (2012) conducted a cohort study 95,598 subjects with national private claims database, Baltimore, to describe the way in which an increasingly obese body mass index is associated with urinary tract infection. The study result showed that women were 4.2 times more likely to be diagnosed with urinary tract infection and concluded that elevated BMI appears to be associated with an increased risk for urinary tract infection.

Halloran D.R. et.al., (2012) conducted a retrospective cohort study among 3,75,003 singleton births in Asia to examine the effect of pre pregnancy weight and maternal gestational weight gain on post term delivery. The study revealed that overweight women who gain within or above recommended weight were at increased risk of post term delivery, and obese women were at increased risk of post term delivery with increasing weight. (Odds ratio 1.21 and 1.27 within and above recommended).

Rami Gilead et al., (2012) conducted a retrospective population based study among 1,73,623 deliveries at Israel to investigate pregnancy outcomes, particularly cesarean delivery among women with "isolated" obesity (without additional co morbidities). The study compared the pregnancy outcomes of obese (BMI $\geq$30 kg/m$^2$) and non obese women and the result revealed that higher rates of cesarean delivery were found among patients with “isolated” obesity (30.7% vs. 12.3%; odds ration [OR] = 3.2; $p < 0.001$). The study concluded that "isolated" obesity is an independent risk factor for cesarean delivery.

Tristan Gauthier et.al., (2012) conducted a retrospective study among 190 non obese and 90 obese mothers at France to estimate the impact of obesity on cervical ripening. He compared the cervical ripening efficiency on mother with BMI above 30 kg/m$^2$ and normal weight mothers with BMI between 20kg/m$^2$ and 25 kg/m$^2$. The study concluded that obesity seems to be associated to lower sensitivity and failure rate of the first attempt at cervical ripening was significantly higher among obese women (PR 2.32 CI 1.47 - 4.00, $P=0.0019$).
Elaine M Fyle et al., (2012) conducted a cohort study among 11,363 mothers in National Women Hospital, Auckland to determine whether overweight and obesity are independent risk factor for major post partum hemorrhage after vaginal and cesarean section delivery. Result shows that two fold increase of risk in obese women, odd ratio was 1.86 (1.51- 2.28). The study concluded that obesity is an important high risk factor for post partum hemorrhage.

Stephen T. Vermillion MD et.al., (2012) conducted s cohort study to estimate the effect of the thickness of subcutaneous tissue at the surgery site on abdominal wound infection. The risk factors identified were thickness of subcutaneous tissue, maternal weight and body mass index was significantly associated with wound infection by univariate analysis. He concluded that thickness of subcutaneous tissue appears to be the only significant risk factor associated with abdominal wound infection after cesarean delivery.

Mamum et.al., (2011) conducted a population based cohort study among 6632 women in Brisbane, Australia to determine the association of pre pregnancy obesity and excess gestational weight gain with pregnancy complications and increased length of postnatal hospital stay. The study concluded that women who were obese prior to pregnancy and women who gained excess weight during pregnancy were at greater risk and longer length of hospital stay. Gestational weight gain is associated with a longer stay in hospital after delivery.

Rita Andersen Leth et al., (2011) conducted a prospective cohort study among 2,492 women having cesarean section at Obstetric departments at three hospitals in Denmark to assess the impact of obesity and the risk of post cesarean infection. The study result showed that the risk of post cesarean infection was higher among obese than non obese women (OR 1.43, 95% CI 1.09 - 1.88) and concluded that obesity increases the risk of post cesarean infection.

Tarakeshwari Surapaneni, Evita Fernandez, (2010) conducted a retrospective cohort study among 320 pregnant women in Fernandez Hospital, India to determine the association of obesity and gestational diabetes with adverse pregnancy outcomes. The study result showed that one in five pregnant women was obese and nearly one in ten
pregnant women had gestational diabetes and were more likely to have cesarean section (OR 2.04), large of gestational age babies (OR 3.82) and macrosomia (OR 20.90) due to impact of obesity on gestational diabetes mellitus. The study concluded that gestational diabetes and obesity are increasingly important priorities for perinatal care.

**Shabnam Shamim Asim, Humaira Naeem et al., (2010)** conducted a prospective study among 200 gravid women by non probability purposive sampling at Antenatal Clinic and Obstetrics Ward of Abbasi Shaheed Hospital, Karachi to compare the frequency of pregnancy induced hypertension between obese and non obese women. The study revealed that the frequency of PIH was found to be higher in obese women; overall PIH was 67 out of 200 (33.5%). PIH was present in 41% of obese women and in 26% of non obese women and P-value=0.025 (OR= 1.98, 95% CI=1.09 to 3.59) and concluded that pregnancy induced hypertension was two times more likely in obese women than non-obese women.

**Sarah D Mc Donald et al., (2010)** conducted a systemic review and Meta analysis among singleton pregnancies with 84 studies and totally 1,095,834 women in developed and developing countries from Medline and Embase reviews to determine the relation between overweight and obese mothers with that of preterm birth. He concluded that overweight and obese women have increased risks of spontaneous preterm birth (relative risk 1.30, 95% confidence interval 1.23 to 1.37) and induced preterm birth (OR 1.24, CI: 1.13 to 1.37).

**Eliezer Burstein et al., (2008)** conducted a prospective cohort study among 376 women at Israel to investigate pregnancy outcome among obese women by comparing consecutive deliveries of obese and non obese patients. The result showed that maternal obesity was associated with multiparity, fertility treatment, insulin treated gestational diabetes and hydramnios. (OR 20.46, 95% CI 2.17 to 197.89) and concluded that obesity is a risk factor for developing gestational hypertension, gestational diabetes mellitus and hydramnios.
SECTION 2.3: SCIENTIFIC REVIEWS RELATED TO EFFECT OF OBESITY ON FETAL OUTCOME

Samantha Vanhorn M et al., (2012) conducted a retrospective study among 1740 births of singleton live born ≥ 35 weeks of gestation at New York Methodist Hospital, Brooklyn New York to evaluate the correlation of maternal obesity on NICU admission. The study result revealed that greater maternal BMI was associated with higher rates of NICU admission and concluded that maternal obesity is significantly associated with increased NICU admission.

Upadhyay et al., (2011) conducted a retrospective study among 811 singleton delivery of different ethnic Nepalese women to assess the association between maternal body mass index and the birth weight of neonates. The study revealed that maternal BMI, gestational weight gain and birth weight of the newborn were significantly higher in Sherpa/Tamang community, mean BMI and weight of newborn was 23.53 ± 2.28 and the increasing BMI and gestational weight gain was found to be strongly associated with the birth weight of the newborn among this ethnic community.

Minghua Chen et.al., (2010) conducted a retrospective study among 58,089 women with Maine State Birth Records Database at USA to determine whether maternal obesity in early pregnancy is associated with low neonatal 5 minute Apgar score. Compared with newborn of normal weight women, the risk to receive low Apgar scores 4-6 is increased in newborns of obese (OR 1.4, 95% CI 1.1 - 1.7) and morbidly obese mother (OR 2.0, 95% CI 1.5 - 2.7). He concluded that maternal obesity is associated with a significantly increased risk for decreased Apgar score at birth.

SECTION 2.4: SCIENTIFIC REVIEWS RELATED TO EFFECTIVENESS OF OBESITY MANAGEMENT STRATEGY.

Thangaratinam et al., (2012) conducted a systemic review Meta analysis with 44 relevant randomized controlled trial to assess the effects of dietary and lifestyle interventions in pregnancy on maternal weight and obstetric outcomes. Overall, there was 1.42 kg reduction (95% confidence interval 0.95 to 1.89 kg) in gestational weight gain with any intervention compared with control. Dietary intervention resulted in the largest reduction in maternal gestational weight gain (3.84 kg, 2.45 to 5.22 kg), with improved pregnancy outcomes compared with other interventions. The overall evidence
rating was low to very low for important outcomes such as pre-eclampsia, gestational diabetes, gestational hypertension, and preterm delivery. Dietary and lifestyle interventions in pregnancy can reduce maternal gestational weight gain and improve outcomes for both mother and baby. Among the interventions, those based on diet are the most effective and are associated with reductions in maternal gestational weight gain and improved obstetric outcomes.

**Furness PJ, (2011)** conducted a qualitative study on perspectives of women and midwives, maternal obesity support services. Two overarching themes were identified, 'Explanations for obesity and weight management' and 'Best care for pregnant women'. 'Explanations' included a lack of knowledge about weight, diet and exercise during pregnancy; self-talk messages which excused overeating; difficulties in maintaining motivation for a healthy lifestyle; the importance of social support; stigmatization; and sensitivity surrounding communication about obesity between midwives and their clients. The study concluded that, Women need unambiguous advice regarding healthy lifestyles, diet and exercise in pregnancy to address a lack of knowledge and a tendency towards unhelpful self-talk messages.

**Isabelle Guelinckx et al., (2010)** conducted a randomized controlled trial among 195 white obese pregnant women in USA to evaluate the effect of lifestyle intervention on dietary habits, physical activity to reduce gestational weight gain in obese pregnant women. Fat intake, specifically saturated fat intake was decreased and protein intake increased from the first to the third trimester in the passive and active groups. Calcium intake and vegetable consumption increased during pregnancy in all groups. The study concluded that both lifestyle interventions improved the nutritional habits of obese women during pregnancy. There is a significant decrease in gestational weight gain with an individually designed caloric intake restriction based on energy expenditure data.

**Trine T Moholdt et al., (2011)** conducted a randomized controlled trial among 150 women of previously sedentary worker, pregnant women with a pre-pregnancy BMI at or above 30 kg/m² at Norway to assess the study protocol knowledge on effects of regular Exercise Training in Pregnancy for obese women (ETIP) The study result has revealed that knowledge provided by this trial run regarding the effects of regular exercise training in previously sedentary, obese pregnant women in reducing gestational
weight gain and adverse pregnancy outcomes, such programs should be considered as part of routine pregnancy care for obese women.

Shirazian T et al., (2008) conducted a prospective matched controlled study to assess the impact of a lifestyle modification program (LMP) on weight gain in pregnancy and evaluated its effect on adverse outcomes. Study participants gained significantly less weight in their pregnancies when compared with control group (mean weight gain 17 versus 34 pounds, respectively; p = 0.008). This study suggests an effective method of reducing prenatal weight gain in the obese population. Secondary outcomes of preeclampsia, gestational diabetes, cesarean section, as well as infant birth weight did not significantly differ between the groups and concluded that type of comprehensive intervention could be an important, cost-effective risk-reduction strategy.

Wolff, (2010) conducted a randomized trial of the effects of dietary counseling on gestational weight gain and glucose metabolism in obese pregnant women, among fifty non diabetic nonsmoking Caucasian obese pregnant women. The study result revealed that women in the intervention group successfully limited their energy intake, and restricted the gestational weight gain to 6.6 kg vs. a gain of 13.3 kg in the control group (P=0.002, 95% confidence interval (CI): 2.6–10.8 kg). Both s-insulin and s-leptin were reduced by 20% and fasting b-glucose were reduced by 8% compared to control group. The study concluded that restriction of gestational weight gain in obese women is achievable and reduces the deterioration in the glucose metabolism.

Claesson IM, (2009) conducted a prospective case control intervention study among 155 pregnant women in study group and 193 in control group at Sweden to minimize obese women’s total weight gain during pregnancy to less than 7 kg and to investigate the delivery and neonatal outcome by intervention programme with weekly motivational talks and aqua aerobic classes for obese pregnant women. The study result revealed that the study group had a significantly lower weight gain during pregnancy compared with the control group (P < 0.001) and concluded that the intervention programme was effective in controlling weight gain during pregnancy and did not affect delivery or neonatal outcome.
CHAPTER-3

Research Methodology
RESEARCH METHODOLOGY

This chapter describes the methodology adopted in this study to compare the maternal and fetal outcome among obese and normal mothers at selected hospital, Chennai in view of developing maternal obesity management strategy.

This phase of the study included selecting a research design, variables, setting of the study, population, sample, criteria for sample selection, sample size, sampling technique, development and description of the tool, content validity, pilot study, reliability of the tool, procedure for data collection and plan for data analysis.

3.1 RESEARCH APPROACH

The research approach used in this study was Quantitative research approach

3.2 RESEARCH DESIGN

The research design used in this study was non-experimental comparative descriptive design. Descriptive study is to observe, describe and documentations of a situation as it naturally occurs. Comparing and contrasting two or more samples of study subjects is called a comparative descriptive design. The researcher aim is assess and compare maternal and fetal outcome among obese and normal mothers.
SCHEMATIC REPRESENTATION OF RESEARCH DESIGN

Calculate first trimester BMI for mothers who are in labour

BMI 18.5 to 24.0 kg/m² Normal mother

Collection of demographic data

BMI ≥ 25.0 kg/m² Obese mother

Assessment of maternal and fetal outcome

Antenatal outcome

Retrieved from antenatal record

Intrapartum outcome

Postnatal outcome

Neonatal outcome

Assessed by observational checklist

Comparison of maternal and fetal outcome
3.3 VARIABLES

Research variable

The study variable includes maternal and fetal outcome of obese and normal mothers.

Extraneous Variables

The extraneous variables were age, educational status, marital status, residential area, type of family, diet pattern, work pattern, habits of doing exercise, parity, family history of obesity, first trimester BMI.

3.4 SETTING OF THE STUDY

The Research study was conducted at

- Sir Ivan Stedeford Hospital, Ambattur: It is a 220 bedded hospital with 60 beds in maternity ward and 300 deliveries per month are conducted.
- Vijaya Hospital, Vadapalani: It is a 200 bedded Multi speciality hospital with 30 beds for maternity ward and 80-100 deliveries per month are conducted.
- Sundaram Medical Foundation (SMF), Anna nagar. It is 250 bedded multispecialty hospitals with 30 beds for maternity ward and 150-200 deliveries per month are conducted.
- K.S. Hospital, Velachery. It is 20 bedded maternity hospital and 50-80 deliveries per month are conducted.

3.5 POPULATION

Target Population

The target population for the study included all antenatal mothers who are in labour.

Accessible Population

Accessible population for the study was all antenatal mothers who were in labour admitted in selected hospital, who fulfilled the inclusive criteria.
3.6 SAMPLE

The study sample comprised of all antenatal mothers who fulfilled the inclusive criteria.

3.7 SAMPLE SIZE

A sample of 200 mothers whose first trimester BMI was \( \geq 18.5 \) kg/m\(^2\)

- 100 samples – normal mothers (BMI is 18.5 to 24.9 kg/m\(^2\))
- 100 samples – obese mothers (BMI is \( \geq 25.0 \) kg/m\(^2\))

3.8 CRITERIA FOR SAMPLE SELECTION

Inclusive Criteria

1. All singleton pregnant mothers who were in labour with BMI \( \geq 18.5 \) kg/m\(^2\) at the time of registration during first trimester.
2. All antenatal mothers who were willing to participate in the study.

Exclusive Criteria

1. Mothers who were known case of chronic medical conditions like diabetes mellitus, hypertension, cardiovascular disease, and hypothyroidism.
2. Mothers who had undergone abdominal and genital tract surgery.
3. Mothers whose height and weight were not recorded during first trimester.
4. Mothers who were taking regular medications like steroids, hormonal treatments etc.

3.9 SAMPLING TECHNIQUE

200 antenatal mothers (100 obese mothers and 100 normal mothers) who are in labour in selected settings were selected using non probability purposive sampling technique.

3.10 DEVELOPMENT AND DESCRIPTION OF THE TOOL

The tool was constructed after an extensive review of literature and guidance from medical and nursing experts and with the investigator’s personal and professional experience, checklist was developed to assess the maternal and fetal outcome.
The tool constructed in this study was divided into two parts.

**PART A: DATA COLLECTION TOOL**  
**PART B: DEVELOPMENT OF MATERNAL OBESITY MANAGEMENT STRATEGY**

### 3.10.1 PART A: DATA COLLECTION TOOL

This consists of 3 sections.

**Section A: Demographic variables**

The demographic variables consisted of age, education, marital status, residential area, type of family, diet pattern, work pattern, habits of doing exercise, parity, family history of obesity, first trimester BMI.

**Section B: Tool to assess the antenatal outcome**

Checklist was used to retrieve the antenatal outcome among obese and normal mothers retrospectively from the antenatal record. The items were in “present” or “absent” form. The score for “present” was ‘one’ and “absent” was ‘zero’.

Checklist consists of predictable complications like pregnancy induced hypertension, gestational diabetes mellitus, hypothyroidism, hydramnios, obstetric cholestasis, placenta previa, abruptio placenta, urinary tract infection which was retrieved from antenatal record retrospectively.

**Section C: Tool to assess the intra natal, postnatal and neonatal outcome.**

Observational checklist to assess the anticipated outcome during intra natal, postnatal and neonatal period among obese and normal mothers. The items were in “present” or “absent” form. The score for “present” was ‘one’ and “absent” was ‘zero’.

The observation checklist consisted of predictable complications during

- **Intra natal period** - meconium stained liquor, premature rupture of membrane, malpresentation, malposition, caesarean section, abnormal vaginal delivery, preterm labour, operative vaginal delivery, post term delivery, fetal distress.

- **Post natal period** - respiratory or wound Infection, prolonged hospitalization, prolong wound healing, primary post partum hemorrhage.
Neonatal period - Apgar score < 7 at 5 min, still birth, macrosomia, meconium aspiration syndrome, admission to NICU.

PART B: DEVELOPMENT OF MATERNAL OBESITY MANAGEMENT STRATEGY

Preparation of poster regarding maternal prevention and control of obesity related complications during pregnancy.

Components include

- Early identification of obesity,
- Dietary management,
- Life style modification and
- Physical exercise.

Utilization of obesity management strategy is planned to be done in the following ways.

- Nurse researcher has planned to provide the poster to the hospital in which the study was conducted.
- Conduction of continuous nursing education programme for all nurse midwives who are working in selected setting regarding impact of obesity on maternal and fetal outcome and its management strategies.
- Organization of training program for all student nurses of Omayal Achi College of nursing.
- Participating in poster competitions at all levels.
- Arranging for mass education programme in Omayal Achi community health centre.

3.11 CONTENT VALIDITY

The content validity of the data collection and intervention tool was ascertained from the expert’s opinion in the following field of expertise.

- Obstetrics and Gynecologist– 2
- Nursing experts – 5

Modifications were made as per the expert suggestions and incorporated in the tool. Expert suggested for increasing the sample size for generalization of result and tool was
separated into sections as checklist for antenatal outcome and observation checklist for intranatal, postnatal and neonatal outcome.

3.12 ETHICAL CONSIDERATION

The research study was approved by Institutional Ethics Review Board (IERD) held on December-2012 by International Centre for Collaborative Research (ICCR), Omayal Achi college of Nursing.

The ethical principles followed in the study were,

A. BENEFICENCE

The investigator followed the fundamental ethical principle of beneficence by adhering to

a) Freedom from harm and discomfort

Participants were not subjected to unnecessary risks for harm or discomfort during the study period. The study was beneficial for the participants as it enhances their knowledge about obesity related maternal complications after the results.

b) Protection from exploitation

The investigator explained the procedure and nature of the study to the participants and ensured that none of the participants in both group would be exploited or denied fair treatment. Participants were assured that their participation or information provided would not be used against them in any way.

B. RESPECT FOR HUMAN DIGNITY

The investigator followed the second ethical principle of respect for human dignity. It includes the right to determination and the right to self disclosure.

a) The Right to self determination

The researcher gave full freedom to the participants to decide voluntarily whether to participate in the study or to withdraw from the study and the right to ask questions.
b) The right to full disclosure

The researcher has fully described the nature of the study, the person’s right to refuse participation and the researcher’s responsibilities based on which both oral and written informed consent was obtained from the participants.

C. JUSTICE

The researcher adhered to the third ethical principle of justice; it includes participants right to fair treatment and right to privacy

a) Right to fair treatment

The researcher selected the study participants based on the research requirements.

b) Right to privacy

The researcher maintained the participants privacy throughout the study.

D. CONFIDENTIALITY

The researcher maintained confidentiality of the data provided by the study participants

3.13 RELIABILITY OF THE TOOL

The Reliability of the tool was determined by using inter rater method. The inter rater was explained about the tool and data collection procedure. The researcher done the inter rater reliability with the trained person and the information obtained was the same in all aspects and the number of observations is also the same. The reliability score was r=0.86 respectively. The ‘r’ value reveals there was a high positive correlation. So, the tool was considered reliable for proceeding with the study.

3.14 PILOT STUDY

The pilot study is a trial run, done in preparation for the main study. The pilot study was planned and conducted after a formal research proposal presentation approval by the ethical committee, ICCR and the faculty of Omayal Achi College of Nursing. It was conducted in the month of February 2013, for a period of 1 week (from 21st - 28th) at the labor ward of Sir Ivan Stedeford hospital, Ambattur Chennai, after receiving a formal
permission letter from the Principal, Omayal Achi College of Nursing and the Medical Director and Nursing Superintendent of Sir Ivan Stedeford hospital, Chennai. The investigator conducted the pilot study by selecting 20 samples, out of which 10 samples were normal mothers and 10 samples were obese mothers who fulfilled the sample selection criteria by using non probability purposive sampling technique.

The investigator gave brief introduction about self and the purpose of the study to the mother who was admitted for labour, after obtaining verbal and written informed consent for willingness to participate in the study.

Retrospectively assessing the antenatal record, the researcher retrieved maternal weight and height of mothers those who have registered their pregnancy during first trimester retrospectively. Body mass index was calculated from weight (kg) divided by height$^2$ (cm). BMI was used to categorize women as normal (BMI 18.5 - 24.9kg/m$^2$) and obese mothers (BMI $\geq$ 25kg/m$^2$)

Information on demographic data was obtained by a structured one to one interview schedule in confidential and comfortable setting. A complete review of antenatal record of mothers who were in labour was done and antenatal outcomes were retrieved from the record. The researcher monitored and observed the intranatal, postnatal and neonatal outcome among mothers who delivered singleton babies consecutively by using observation checklist prepared by the researcher. The result of the pilot study showed that the tool was reliable, feasible and predictable to conduct the main study.

### 3.15 PROCEDURE FOR DATA COLLECTION

The investigator obtained permission from the International Center for Collaborative Research (ICCR) and ethical committee approval to conduct the main study. A formal permission was obtained from the Principal, Omayal Achi College of Nursing and the Medical Director and Nursing superintendent of Sir Ivan Stedeford hospital-Ambattur, SMF –AnnaNagar, K.S. Hospital velachery and Human Resource Manager of Vijaya hospital-Vadapalani, at Chennai.
The investigator gave brief introduction about herself and the purpose of the study to the mother who was admitted for labour, after obtaining verbal and written informed consent for willingness to participate in the study.

The investigator selected two research assistants who were working in labour room, whose qualification was B.Sc (N) in Sir Ivan Stedeford hospital and K.S. hospital. The investigator gave thorough description about the tool and explained the procedure for data collection. Researcher gave adequate training to each research assistance. Reliability was checked by inter rater method and found to be reliable.

The height and weight of all antenatal mothers who were in labour was retrieved from their antenatal record retrospectively. Body mass index was calculated from weight (kg) divided by height$^2$ (cm). BMI was used to categorize women as normal (BMI 18.5 - 24.9kg/m$^2$) and obese mothers (BMI $\geq$25kg/m$^2$).

Information on demographic data was obtained by a structured one to one interview schedule in confidential and comfortable setting. A complete review of antenatal record of mothers who were in labour was done and antenatal outcome was retrieved from the record retrospectively. The investigator monitored and observed the intranatal, postnatal and neonatal outcome among mothers who delivered singleton babies consecutively by using observation checklist prepared by the investigator.

The investigator observed the maternal and fetal outcome in two settings namely in Sundaram Medical Foundation and Vijaya Hospital whereas the trained researcher observed in two other settings such as in K.S. Hospital and Sir Ivan Stedeford Hospital.

3.16 PLAN FOR DATA ANALYSIS

Data was analysed by using both descriptive and inferential statistics.

3.16.1 Descriptive Statistics

1. Frequency and percentage distribution was used to analyse the demographic variables of obese and normal mothers.
3.16.2 Inferential Statistics

1. Chi-square test was used to compare the maternal and fetal outcome among obese and normal mothers.
2. Chi-square test was used to associate the demographic variables of obese and normal mothers with their maternal and fetal outcome.
3. Odds ratio was used to determine significant association of maternal and fetal outcome between obese and normal mothers.
SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY

TARGET POPULATION
All antenatal mothers who are in labour

ACCESSIBLE POPULATION
All antenatal mothers who are in labour admitted in selected hospital, who fulfilled the inclusive criteria

DESIGN
Non-experimental comparative descriptive design.

SAMPLING
200 antenatal mothers who are in labour in selected setting selected by non probability purposive sampling technique

DATA COLLECTION PROCEDURE
Checklist was used to assess the maternal and fetal outcome

Comparison of maternal and fetal outcome among obese and normal mothers

Data analysis and interpretation

Preparation of obesity management strategy
CHAPTER-4
Data Analysis and Interpretation
DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data collected from 200 mothers. The data was organised, tabulated and analysed according to the objectives of the study. The findings based on the descriptive and inferential statistical analysis are presented under the following sections.

ORGANISATION OF DATA

SECTION 4.1 : Description of the demographic variables of obese and normal mothers.

SECTION 4.2 : Frequency and percentage distribution of the maternal and fetal outcome among obese and normal mothers.

SECTION 4.3 : Comparison of maternal and fetal outcome between obese and normal mothers

SECTION 4.4: Association of selected demographic variables with maternal and fetal outcome among obese and normal mothers
SECTION 4.1: DESCRIPTION OF THE DEMOGRAPHIC VARIABLES OF OBESE AND NORMAL MOTHERS.

Table 4.1.1: Frequency and percentage distribution of demographic variables of obese and normal mothers with respect to age, educational status, religion, residential area and type of family.

N=200

<table>
<thead>
<tr>
<th>S.No</th>
<th>Demographic Variables</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>Age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 – 24</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>25 – 29</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>30 – 34</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>&gt; 35</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Education status</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary education</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Secondary education</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Higher secondary education</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Graduate and above</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>3.</td>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hindu</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>4.</td>
<td>Residential area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>5.</td>
<td>Type of family</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nuclear family</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Joint family</td>
<td>51</td>
<td>51</td>
</tr>
</tbody>
</table>
Table 4.1.1 depicts the frequency and percentage distribution of demographic variables of the obese and normal mothers with respect to age in years, educational status, religion, residential area and type of family.

With regard to age in years, 53(53%) of obese mothers were between the age group of 25 -29 years, 75(75%) were graduates and above, 83(83%) belongs to Hindu religion, 76 (76%) resides in urban area and 51(51%) of them belongs to joint family.

With regard to age in years 47(47%) of normal mother were between the age group of 25-29years, 68(68%) were graduates and above, 82(82%) belongs to Hindu religion, 70(70%) resides in urban area and 59(59%) of them belongs to joint family.
Table 4.1.2: Frequency and percentage distribution of demographic variables of obese and normal mothers with respect to total family income, diet pattern, work pattern and family history of obesity.

N = 200

<table>
<thead>
<tr>
<th>S.No</th>
<th>Demographic Variables</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>Family monthly Income (Rs.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;5,000</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5,000 - 10,000</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>11,000 - 20,000</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>&gt;21,000</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>2.</td>
<td>Diet pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vegetarian</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Non vegetarian</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>3.</td>
<td>Work pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sedentary worker</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Moderate worker</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Heavy worker</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>4.</td>
<td>Family history of obesity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 4.1.2 shows the frequency and percentage distribution of demographic variables of obese and normal mothers with respect to family monthly income, diet pattern, work pattern and family history of obesity.

With regard to family monthly income 49(49%) were earning more than 21,000 per month, 85(85%) were non vegetarian, 70(70%) were moderate worker and 70(70%) of them were not having family history of obesity among obese mothers.
With regard to family monthly income 47(47%) were earning more than 21,000 per month, 89(89%) were non vegetarian, 80(80%) were moderate worker and 83(83%) of them were not having family history of obesity among normal mothers.
Table 4.1.3: Frequency and percentage distribution of demographic variables of obese and normal mothers with respect to parity, habits of doing exercise and BMI

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Demographic variables</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primi</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Multi</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>2.</td>
<td>Habits of doing Exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>3.</td>
<td>BMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.5 - 24.9 kg/m²</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>25 - 29.9 kg/m²</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>30 - 34.9 kg/m²</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>35 - 39.9 kg/m²</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4.1.3 shows the frequency and percentage distribution of demographic variables of obese and normal mothers with respect to parity, habits of doing exercise and BMI.

With regard to parity 64(64%) of them are primi mother, 72(72%) of them are not having the habit of doing exercise, 80(80%) of them have BMI between 25 - 29.9 kg/m² among obese mothers.

With regard to parity 72(72%) of them are primi mother, 87(87%) of them are not having the habit of doing exercise, 100(100%) of them have BMI between 18.5 - 24.9 kg/m² among normal mothers.
SECTION 4.2: FREQUENCY AND PERCENTAGE DISTRIBUTION OF THE MATERNAL AND FETAL OUTCOME AMONG OBESE AND NORMAL MOTHERS.

Table 4.2.1 : Frequency and percentage distribution of antenatal outcome among obese and normal mothers.

<table>
<thead>
<tr>
<th>Antenatal outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Pregnancy induced hypertension</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Gestational Diabetes Mellitus</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Hydramnios</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Obstetrics cholestasis</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Abruptio placenta</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Placenta praevia</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4.2.1 shows the frequency and percentage distribution of antenatal outcome among obese and normal mothers.

With regard to antenatal outcome 21(21%) of obese mothers had pregnancy induced hypertension, 29(29%) of mothers developed gestational diabetes mellitus, 16(16%) of them had hypothyroidism, 19(19%) of them had hydramnios, 3(3%) of them had obstetric cholestasis, 1(1%) had abruption placenta, 5(5%) of them had placenta previa and 5(5%) were affected with urinary tract infection.

With regard to antenatal outcome, 4(4%) of normal mothers had pregnancy induced hypertension, 15(15%) of them had gestational diabetes mellitus, 10(10%) of them had hypothyroidism, 21(21%) of them had hydramnios, 3(3%) of them had placenta previa, 4(4%) were affected with urinary tract infection and none of them had abruption placenta and obstetric cholestasis.
Table 4.2.2: Frequency and percentage distribution of Intra natal outcome among obese and normal mother.

<table>
<thead>
<tr>
<th>Intranatal Outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Preterm labour</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Post term delivery</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Vacuum delivery</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Premature rupture of membrane</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Meconium stained liquor</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Malpresentation</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Malposition</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Fetal distress</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 4.2.2 depicts the frequency and percentage distribution of Intra natal outcome among obese and normal mother.

With regard to intra natal outcome, 19(19%) had preterm labour, 4(4%) had post term delivery, 10(10%) of mothers delivered by forceps application, 5(5%) had vacuum extraction, 42(42%) underwent LSCS,  21(21%) of their membranes ruptured prematurely, 14(14%) had meconium stained liquor, 4(4%) had malpresentation, 6 (6%) had malposition and of fetal distress was about 23(23%) among obese mothers.

With regard to intra natal outcome, 8(8%) had preterm labour, 5(5%) had post dated labour, 3(3%) mothers delivered by forceps application, 3(3%) had vacuum extraction, 30(30%) underwent LSCS, 18(18%) of their membranes ruptured prematurely, 9(9%) had meconium stained liquor, 3(3%) had malpresentation, 1(1%) had malposition and fetal distress was about 21(21%) among normal mothers.
Table 4.2.3: Frequency and percentage distribution of postnatal outcome among obese and normal mothers.

<table>
<thead>
<tr>
<th>Postnatal Outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Prolonged hospitalization</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Primary post partum haemorrhage</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Prolonged wound healing</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Respiratory or wound infection</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 4.2.3 depicts the frequency and percentage distribution of postnatal outcome among obese and normal mothers.

With regard to postnatal outcome, 7(7%) had prolonged hospitalization and developed primary PPH respectively, 6(6%) of them had delayed wound healing and developed either respiratory or wound infection respectively among obese mothers.

With regard to postnatal outcome, 7(7%) had prolonged hospitalization, 4(4%) developed primary PPH, 2(2%) of them had delayed wound healing, 1(1%) had either respiratory or wound infection among normal mothers.
Table 4.2.4: Frequency and percentage distribution of neonatal outcome among obese and normal mothers.

<table>
<thead>
<tr>
<th>Neonatal Outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Apgar score &lt;7 at 5 min</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Admission to NICU</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Meconium aspiration</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4.2.4 shows the frequency and percentage distribution of neonatal outcome among obese and normal mothers.

With regard to neonatal outcome among obese mothers, 13(13%) of babies had Apgar score <7 at 5 minutes, 18(18%) of them were admitted in NICU and 3(3%) had meconium aspiration.

With regard to neonatal outcome among normal mother, 7(7%) of babies had Apgar score <7 at 5 minutes, 13(13%) are admitted in NICU and 1(1%) had meconium aspiration.

Hence, tables 4.2.1 to 4.2.4 depict the frequency and percentage distribution of maternal and fetal outcome that is during antenatal, intranatal, postnatal and neonatal period among obese and normal mothers. The researcher found that the frequency and percentage distribution of maternal and fetal outcome among obese mothers was higher than among normal mothers.
SECTION 4.3 : COMPARISON OF MATERNAL AND FETAL OUTCOME BETWEEN OBESE AND NORMAL MOTHERS.

Table 4.3.1 : Comparison of the antenatal outcome between obese and normal mothers.

<table>
<thead>
<tr>
<th>Antenatal outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
<th>Chi-square value</th>
<th>p value</th>
<th>Significance</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIH</td>
<td>21</td>
<td>79</td>
<td>4</td>
<td>96</td>
<td>13.211</td>
<td>0.001</td>
</tr>
<tr>
<td>GDM</td>
<td>29</td>
<td>71</td>
<td>15</td>
<td>85</td>
<td>5.711</td>
<td>0.05</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>16</td>
<td>84</td>
<td>10</td>
<td>90</td>
<td>1.592</td>
<td>0.207</td>
</tr>
<tr>
<td>Hydramnios</td>
<td>19</td>
<td>81</td>
<td>21</td>
<td>79</td>
<td>0.125</td>
<td>0.724</td>
</tr>
<tr>
<td>Obstetrics Cholestasis</td>
<td>3</td>
<td>97</td>
<td>-</td>
<td>100</td>
<td>3.046</td>
<td>0.081</td>
</tr>
<tr>
<td>Abruptio placaenta</td>
<td>1</td>
<td>99</td>
<td>-</td>
<td>100</td>
<td>1.005</td>
<td>0.031</td>
</tr>
<tr>
<td>Placenta praevia</td>
<td>5</td>
<td>95</td>
<td>3</td>
<td>97</td>
<td>0.521</td>
<td>0.47</td>
</tr>
<tr>
<td>UTI</td>
<td>5</td>
<td>95</td>
<td>4</td>
<td>96</td>
<td>0.116</td>
<td>0.733</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, S – Significant, N.S- Non Significant

Table 4.3.1 describes the comparison of the antenatal outcome between obese and normal mothers.

About 21(21%) of obese mothers and 4(4%) of normal mothers had PIH. There was a significant association with obesity at the level of p<0.001 and 6 times a very high risk of developing PIH (OR - 6.379).

About 29(29%) of obese mothers and 15(15%) of normal mothers had GDM. There was a significant association between obesity and GDM at the level of p<0.05 and odds ratio was 1.48.

There was no significant association between other antenatal outcomes, but the risk was of 1.71 times for hypothyroidism, 1.701 times for placenta previa and 1.26 times for urinary tract infection.
Table 4.3.2: Comparison of the intranatal outcome between obese and normal mothers.

<table>
<thead>
<tr>
<th>Intra natal Outcome</th>
<th>Obese Mothers (N = 100)</th>
<th>Normal Mothers (N = 100)</th>
<th>Chi-square value</th>
<th>P value</th>
<th>Significance</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preterm labour</td>
<td>19</td>
<td>71</td>
<td>8</td>
<td>92</td>
<td>5.058</td>
<td>0.025</td>
</tr>
<tr>
<td>Post dated labour</td>
<td>4</td>
<td>96</td>
<td>5</td>
<td>95</td>
<td>0.116</td>
<td>0.733</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>10</td>
<td>90</td>
<td>3</td>
<td>97</td>
<td>4.108</td>
<td>0.43</td>
</tr>
<tr>
<td>Vacuum delivery</td>
<td>5</td>
<td>95</td>
<td>3</td>
<td>97</td>
<td>0.542</td>
<td>0.462</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>42</td>
<td>58</td>
<td>30</td>
<td>70</td>
<td>3.922</td>
<td>0.048</td>
</tr>
<tr>
<td>Meconium stained liquor</td>
<td>14</td>
<td>86</td>
<td>9</td>
<td>91</td>
<td>1.228</td>
<td>2.68</td>
</tr>
<tr>
<td>PROM</td>
<td>21</td>
<td>79</td>
<td>18</td>
<td>92</td>
<td>0.287</td>
<td>0.592</td>
</tr>
<tr>
<td>Malpresentation</td>
<td>4</td>
<td>96</td>
<td>3</td>
<td>97</td>
<td>0.148</td>
<td>0.7</td>
</tr>
<tr>
<td>Malposition</td>
<td>6</td>
<td>94</td>
<td>1</td>
<td>99</td>
<td>3.701</td>
<td>0.054</td>
</tr>
<tr>
<td>Fetal distress</td>
<td>23</td>
<td>77</td>
<td>21</td>
<td>79</td>
<td>0.117</td>
<td>0.733</td>
</tr>
</tbody>
</table>

*p<0.0, S – Significant, N.S- Non Significant

Table 4.3.2 shows the comparison of the intranatal outcome between obese and normal mothers.

About 19(19%) are obese mother and 8(8%) of normal mothers had preterm labour. There was a significant association with obesity at the level of p<0.05 and about 2 times likely to have preterm labour (OR - 2.69).

About 10(10%) of obese mothers and 3(3%) of normal mothers had forceps delivery. There was a significant association with obesity and about 3 times more the risk of delivering by forceps application (OR - 3.59).
About 42 (42%) of obese mothers and 30 (30%) of normal mothers undergone caesarean section. There was a significant association between obesity and caesarean section and odds ratio was 1.689.

About 6(6%) of obese mothers and 1(1%) of normal mothers had malposition. There was significant association with obesity and 6 times a high risk for developing malposition (OR - 6.31).

There was no significant association between obesity and other intranatal outcome but the risk for developing premature rupture of membrane was 1.27, 1.689 times risk for vacuum delivery, 1.64 times for meconium stained liquor, 1.34 times for malpresentation, and 1.12 times for fetal distress.
Table 4.3.3: Comparison of the post natal outcome between obese and normal mothers.

<table>
<thead>
<tr>
<th>Post natal Outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
<th>Chi-square value</th>
<th>P value</th>
<th>Significance</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged hospitalization</td>
<td>7</td>
<td>93</td>
<td>7</td>
<td>93</td>
<td>0</td>
<td>0.984</td>
</tr>
<tr>
<td>Primary PPH</td>
<td>7</td>
<td>93</td>
<td>4</td>
<td>96</td>
<td>0.898</td>
<td>0.343</td>
</tr>
<tr>
<td>Prolonged wound healing</td>
<td>6</td>
<td>94</td>
<td>2</td>
<td>99</td>
<td>0.349</td>
<td>0.555</td>
</tr>
<tr>
<td>Respiratory or wound infection</td>
<td>6</td>
<td>94</td>
<td>1</td>
<td>100</td>
<td>1.015</td>
<td>0.314</td>
</tr>
</tbody>
</table>

N.S- Non Significant

Table 4.3.3 shows the comparison of the post natal outcome between obese and normal mothers.

With regard to post natal outcome, there was no significant association between obese and normal mothers, but the risk of prolonged hospitalization was 1.00 and of primary PPH was 1.08, prolonged wound healing risk was 3.12 and they are 6.2 times more likely to develop respiratory or wound infection.
Table 4.3.4: Comparison of the neonatal outcome between obese and normal mothers.

<table>
<thead>
<tr>
<th>Neonatal outcome</th>
<th>Obese mothers (N = 100)</th>
<th>Normal mothers (N = 100)</th>
<th>Chi square value</th>
<th>P value</th>
<th>Significance</th>
<th>odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apgar score &lt;7 at 5 min</td>
<td>13</td>
<td>87</td>
<td>7</td>
<td>93</td>
<td>2.069</td>
<td>0.15</td>
</tr>
<tr>
<td>Admission to NICU</td>
<td>18</td>
<td>82</td>
<td>13</td>
<td>87</td>
<td>1.016</td>
<td>0.314</td>
</tr>
<tr>
<td>Meconium aspiration</td>
<td>3</td>
<td>97</td>
<td>1</td>
<td>99</td>
<td>1.041</td>
<td>0.308</td>
</tr>
</tbody>
</table>

N.S- Non Significant

Table 4.3.4 shows the comparison of the neonatal outcome between obese and normal mothers.

With regard to Neonatal outcome, there was no significant association between obese and normal mothers, but the risk for developing Apgar score <7 at 5 min was 1.98, admission to NICU risk was 1.46 and about 3 times more the risk for Meconium aspiration.

Hence, the tables 4.3.1 to 4.3.4 depict the comparison of maternal and fetal outcome among obese and normal mothers. The researcher inferred that greater the risk of maternal and fetal complications among obese mothers than normal mothers.
SECTION 4.4: ASSOCIATION OF SELECTED DEMOGRAPHIC VARIABLE WITH MATERNAL AND FETAL OUTCOME AMONG OBESE AND NORMAL MOTHERS.

Table 4.4.1: Association of selected demographic variable with maternal and fetal outcome among obese mothers

<table>
<thead>
<tr>
<th>Maternal and Fetal Outcome</th>
<th>Demographic variable</th>
<th>Present</th>
<th>Absent</th>
<th>Chi square value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal Work pattern</td>
<td>sedentary worker</td>
<td>2</td>
<td>7</td>
<td>15.82</td>
<td>df = 8 S*</td>
</tr>
<tr>
<td></td>
<td>Moderate worker</td>
<td>54</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heavy worker</td>
<td>16</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intranatal Residential area</td>
<td>Urban</td>
<td>59</td>
<td>17</td>
<td>9.972</td>
<td>df = 4 S*</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>15</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family monthly income</td>
<td>&lt;5,000 rupees</td>
<td>2</td>
<td>0</td>
<td>28.32</td>
<td>df = 12 S*</td>
</tr>
<tr>
<td></td>
<td>5,000 - 10,000 rupees</td>
<td>10</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11,000 - 20,000 rupees</td>
<td>20</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;21,000 rupees</td>
<td>42</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post natal BMI (kg/m$^2$)</td>
<td>18.5 - 24.5</td>
<td>0</td>
<td>0</td>
<td>24.105</td>
<td>df = 6 S**</td>
</tr>
<tr>
<td></td>
<td>25 - 29.9</td>
<td>5</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 - 34.9</td>
<td>5</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35 - 39.9</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonatal Type of Family</td>
<td>Nuclear family</td>
<td>11</td>
<td>38</td>
<td>11.871</td>
<td>df = 3 S**</td>
</tr>
<tr>
<td></td>
<td>Joint family</td>
<td>11</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, S – Significant
Table 4.4.1. Shows the association of selected demographic variables with maternal and fetal outcomes among obese mothers.

With regard to antenatal outcome among obese mothers, there is a significant association with work pattern at the level of p<0.05.

With regard to intranatal outcome among obese mothers, there is a significant association with residential area and family monthly income at the level of p<0.05.

With regard to postnatal outcome among obese mothers, there is a significant association with BMI at the level of p<0.01.

With regard to neonatal outcome among obese mothers, there is a significant association with type of family at the level of p<0.01.

There was no significant association of selected demographic variables with maternal and fetal outcomes.
Table 4.4.2: Association of selected demographic variables with maternal and fetal outcome among normal mothers.

N = 200

<table>
<thead>
<tr>
<th>Maternal and fetal</th>
<th>Demographic variable</th>
<th>Present</th>
<th>Absent</th>
<th>Chi square value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antenatal Outcome</td>
<td>Work pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>sedentary worker</td>
<td>4</td>
<td>4</td>
<td>14.427</td>
<td>S*</td>
</tr>
<tr>
<td></td>
<td>Moderate worker</td>
<td>40</td>
<td>40</td>
<td>df = 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heavy worker</td>
<td>6</td>
<td>6</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Hindu</td>
<td>40</td>
<td>42</td>
<td>17.766</td>
<td>S**</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>1</td>
<td>1</td>
<td>df = 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>9</td>
<td>7</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>Intranatal Outcome</td>
<td>Type of Family</td>
<td></td>
<td></td>
<td>11.242</td>
<td>S*</td>
</tr>
<tr>
<td></td>
<td>Nuclear family</td>
<td>33</td>
<td>8</td>
<td>df = 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Joint family</td>
<td>33</td>
<td>26</td>
<td>0.024</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td>Primi</td>
<td>55</td>
<td>30</td>
<td>df = 4</td>
<td>S**</td>
</tr>
<tr>
<td></td>
<td>Multi</td>
<td>11</td>
<td>4</td>
<td>0.009</td>
<td></td>
</tr>
</tbody>
</table>

* p<0.05, **p<0.01, S – Significant

Table 4.4.2 shows the association of selected demographic variables with maternal and fetal outcome among normal mothers.

With regard to antenatal outcome among normal mothers, there is a significant association with work pattern at the level of p<0.05 and religion at the level of p<0.01.

With regard to intranatal outcome among normal mothers, there is a significant association with type of family at the level of p<0.05 and parity at the level of p<0.01.
There is no significant association of selected demographic variables with postnatal and neonatal outcome among normal mothers.

Hence, the tables 4.4.1 and 4.4.2 shows the association of selected demographic variable with maternal and fetal outcome among obese and normal mothers. The researcher found that there was significant association of selected demographic variables like work pattern, residential area, family monthly income, BMI, type of family, religion and parity with maternal and fetal outcome among obese and normal mothers.
CHAPTER-5

Discussion
DISCUSSION

The study was conducted to compare the maternal and fetal outcome among obese and normal mothers.

The discussion is based on the objectives, the review of literature and research hypothesis specified in this study.

5.1 Description of demographic variables of obese and normal mothers.

With regard to age in years majority of 53(53%) of them were between the age group of 25-29 years, 75(75%) were graduate and above, 83(83%) belongs to Hindu religion, 76(76%) resides in urban area and 51(51%) of them belongs to joint family, 49(49%) were earning more than 21,000 per month, 85(85%) were non vegetarian, 70(70%) were moderate worker and 70(70%) of them were not having family history of obesity, 64 (64%) of them are primi mother, 72(72%) of them do not have the habit of doing exercise, 80(80%) of them had BMI between 25 - 29.9 kg/m² among obese mothers.

With regard to age in years majority of 47(47%) of them were between the age group of 25-29 years, 68(68%) were graduate and above, 82(82%) belongs to Hindu religion, 70(70%) resides in urban area and 59(59%) of them belongs to joint family, 47(47%) were earning more than 21,000 per month, 89(89%) were non vegetarian, 80(80%) were moderate worker and 83(83%) of them were not having family history of obesity, 72(72%) of them are primi mother, 87(87%) of them are not having the habit of doing exercise, 100(100%) of them had BMI between 18.5 - 24.9 kg/m² among normal mothers.

5.2 The first objective was to assess the maternal and fetal outcome among normal and obese mothers.

The analysis in Table 4.2.1 shows the frequency and percentage distribution of antenatal outcome among obese and normal mothers, and revealed that with regard to antenatal outcome, 21(21%) of them had pregnancy induced hypertension, 29(29%) of mothers developed gestational diabetes mellitus, 16(16%) of them had hypothyroidism,
19(19%) of them had hydramnios, 3(3%) of them had obstetric cholestasis, 1(1%) had abortion placenta, 5(5%) of them had placenta previa and 5(5%) were affected with urinary tract infection among obese mothers.

About 4(4%) of them had pregnancy induced hypertension, 15(15%) of them had gestational diabetes mellitus, 10(10%) of them had hypothyroidism, 21(21%) of them had hydramnios, 3(3%) of them had placenta previa, 4(4%) were affected with urinary tract infection and none of them had abortion placenta and obstetric cholestasis among normal mothers.

The analysis in Table 4.2.2 describes the frequency and percentage distribution of intranatal outcome among obese and normal mothers and revealed that with regard to intranatal outcome, 19(19%) had preterm labour, 4(4%) had post term delivery, 10(10%) of mothers delivered by forceps application, 5(5%) had vacuum extraction, 42(42%) underwent LSCS, 21(21%) of their membranes ruptured prematurely, 14(14%) had meconium stained liquor, 4(4%) had malpresentation, 6(6%) had malposition and fetal distress was about 23(23%) among obese mothers.

About 8(8%) had preterm labour, 5(5%) had post dated labour, 3(3%) of mothers delivered by forceps application, 3(3%) had vacuum extraction, 30(30%) underwent LSCS, 18(18%) of their membranes ruptured prematurely, 9(9%) had meconium stained liquor, 3(3%) had malpresentation, 1(1%) had malposition and fetal distress was about 21(21%) among normal mothers.

The analysis in Table 4.2.3 describes the frequency and percentage distribution of postnatal outcome among obese and normal mothers.

The table reveals that, with regard to postnatal outcome, 7(7%) had prolonged hospitalization and developed primary PPH respectively, 6(6%) of them had delayed wound healing and developed either chest or wound infection respectively among obese mothers.
About 7(7%) had prolonged hospitalization, 4(4%) developed primary PPH, 2(2%) of them had wound healing, 1(1%) had either chest or wound infection among normal mothers.

The analysis in Table 4.2.4 describes the frequency and percentage distribution of neonatal outcome among obese and normal mother.

With regard to neonatal outcome among obese mothers, 13(13%) of babies had Apgar score <7 at 5 minutes, 18(18%) of them were admitted in NICU and 3(3%) had meconium aspiration and among normal mothers about 7(7%) of babies had Apgar score <7 at 5 minutes, 13(13%) were admitted in NICU and 1(1%) had meconium aspiration.

The finding were supported by a prospective study conducted by Meenakshi T. Sahu, Anjoo Agarwal (2009) regarding the impact of maternal body mass index on obstetric outcome among 380 singleton women. Out of the 380 women studied, 46 (12.1%) were underweight (group II), 99 (26.1%) were overweight (group III) and 30 (7.9%) were obese (group IV). The remaining 205 women (53.9%) had normal BMI. The study result shows that there is a significant difference in maternal weight gain among the BMI groups. The impact of obstetric outcome is higher among obese than among normal that is gestational diabetes mellitus is 16.7%, PIH is 26.7% Abruption placenta is 3.3%, preterm delivery is 6.7%, cesarean section is 50%, apgar score <5 at 1min is 43.3%, macrosomia is 3.3% and neonatal complications are 10% when compared to normal weight mothers for whom, gestational diabetes mellitus is 1.0%, PIH is 7.8% Abruption placenta is 1%, preterm delivery is 3.9%, cesarean section is 27.3%, apgar score <5 at 1min is 4.9%, macrosomia is 0% and neonatal complications are 5.4% respectively. They concluded that there is a significant difference in maternal weight among the BMI groups.

5.3. The second objective was to compare the maternal and fetal outcome between normal and obese mothers

The analysis Table 4.3.1 describes the comparison of the antenatal outcome between obese and normal mothers.

About 21(21%) of obese mothers and 4 (4%) of normal mothers had PIH. There was a significant association with obesity at the level of p<0.001 and 6 times at a very high risk of developing PIH (OR - 6.379).
The present finding was consistent with a prospective study conducted by Shabnam Shamim Asim, Humaira Naeem (2010), to compare the frequency of pregnancy induced hypertension between obese and non-obese women among 200 gravid women by non probability purposive sampling. The study concluded that the frequency of PIH was found to be higher in obese women; overall PIH was 67 out of 200 (33.5%). PIH was present in 41% of obese women and in 26% of non-obese women and the P-value=0.025. This indicates that pregnancy induced hypertension was two times more likely in obese women than in non-obese women (OR=1.98).

About 29(29%) of obese mothers and 15(15%) of normal mothers had GDM. There is a significant association between obesity and GDM at the level of p<0.05 and odds ratio is 1.48.

This result was consistent with a retrospective cohort study conducted by Tarakeshwari Surapaneni, Evita Fernandez (2010), to determine the association of obesity and gestational diabetes with adverse pregnancy outcomes in India among 320 pregnant women. They concluded that one in five pregnant women was obese and nearly one in ten pregnant women had gestational diabetes mellitus. One hundred and six women OR 3.32% has both obesity and GDM and 99 women OR 3.09% had GDM and overweight.

There is no significant association between other antenatal outcomes, but the risk is 1.71 times for hypothyroidism, 1.701 times for placenta previa and 1.26 times for urinary tract infection.

The analysis in Table 4.3.2 describes the comparison of the intranatal outcome between obese and normal mothers.

About 19(19%) of obese mother and 8(8%) of normal mothers had preterm labour. There was a significant association with obesity at the level of p<0.05 and about 2 times likely to have preterm labour (OR - 2.69).

This result was consistent with a systemic review and Meta analysis conducted by Sarah D Mc Donald (2010), to determine the relation between overweight and obesity
in mothers and preterm birth in singleton pregnancies with 84 studies and totally 1,095,834 women were included. The risk of preterm birth appeared significantly higher in overweight and obese women (OR1.24, 1.13 to 1.37). He concluded that overweight and obese women have increased risks of spontaneous preterm birth and induced preterm birth

About 10(10%) of obese mothers and 3(3%) of normal mothers had forceps delivery. There was a significant association with obesity and about 3 times more the risk of delivering by forceps application (OR - 3.59).

This result was supported by population based pregnancy cohort study conducted by Nil Halvdan Morken et al., (2013), regarding the risk of operative delivery according to maternal pre pregnant body mass index and gestational weight gain among 50,416 singleton term deliveries and concluded that there was increased risk of vacuum extraction delivery among women with pre pregnancy BMI > 30 (RR 1.5, 95% CI 1.04 - 2.2), women with a gestational weight gain of ≥16kg had a significantly increased risk of forceps and vacuum extraction (RR1.2, 95% CI 1.03 - 1.4, RR 1.2, 95% CI 1.1 - 1.23).

About 42(42%) of obese mothers and 30(30%) of normal mothers undergone caesarean section. There is a significant association between obesity and caesarean section and odds ratio is 1.689.

This result was consistent with a retrospective population based study conducted by Rami Gilead et al., (2012) on pregnancy outcomes, particularly cesarean delivery among women with "isolated" obesity (without additional co morbidities) among 1,73,623 deliveries. The study compared the pregnancy outcomes of obese (BMI ≥30 kg/m²) and non obese women (30.7% vs. 12.3%; odds ration [OR] = 3.2; p < 0.001). The study concluded that "isolated" obesity is an independent risk factor for cesarean delivery

About 6(6%) of obese mothers and 1(1%) of normal mothers had malposition. There was significant association with obesity and 6 times the a very high risk for developing malposition. (OR - 6.31).
There is no significant association between obesity and other intranatal outcome except the risk for developing premature rupture of membrane, 1.689 times risk for vacuum delivery, 1.64 times risk for meconium stained liquor, 1.34 times risk for malpresentation, and 1.12 times for fetal distress.

The analysis in Table 4.3.3 describes the comparison of the postnatal outcome among obese and normal mothers.

With regard to postnatal outcome, there is no significant association between obese and normal mothers, except the risk of prolonged hospitalization is 1.00, 1.08 times risk for primary PPH, 3.12 times risk for prolonged wound healing and 6.2 times for developing chest and wound infection.

The analysis in Table 4.3.4 describes the comparison of the neonatal outcome between obese and normal mothers.

With regard to Neonatal outcome, there is no significant association between obese and normal mothers, but the risk for developing Apgar score <7 at 5 min is 1.98, admission to NICU risk is 1.46 and Meconium aspiration risk is about 3.06.

Hence, the research hypothesis RH1 which was stated earlier, "There is significant difference in maternal and fetal outcome among normal and obese mothers at the level of p<0.05 was accepted".

Thus, according to the conceptual framework adopted based on Grounded Theory of Glaser and Strauss with action research, the researcher compared the maternal and fetal outcome of obese and normal mothers and formulated proposition with the basis of components like data generation in which BMI of mothers who are in labour was calculated, concept formation where the researcher categorized the mother according to BMI and collected demographic data, in concept development, the researcher had assessed the maternal and fetal outcome and concluded that obesity during pregnancy is one of the risk factor for Pregnancy induced hypertension, Gestational diabetes mellitus, Preterm labour, Forceps delivery, Cesarean section, Malposition, Hypothyroidism, Placenta previa, Urinary tract infection, Vacuum delivery, Meconium stained liquor,
Premature rupture of membrane. In concept modification and integration, maternal obesity management strategy was prepared as a poster for future mothers with obesity.

5.3. The third objective was to associate the selected demographic variables with maternal and fetal outcome among obese and normal mothers.

The analysis in Table 4.4.1. Shows the association of selected demographic variables with maternal and fetal outcome among obese mothers.

With regard to antenatal outcome, there is a significant association with work pattern at the level of p<0.05, and intranatal outcome there is a significant association with residential area and total family income at the level of p<0.05.

With regard to postnatal outcome, there is a significant association with BMI at the level of p<0.01.

With regard to neonatal outcome, there is a significant association with type of family at the level of p<0.01.

The analysis in Table 4.4.2 shows the association of selected demographic variables with maternal and fetal outcome among normal mothers.

With regard to antenatal outcome, there is a significant association with work pattern at the level of p<0.05 and religion at the level of p<0.01.

With regard to intranatal outcome, there is a significant association with type of family at the level of p<0.05 and parity at the level of p<0.01.

Hence, the research hypothesis RH₂ stated earlier that, "There is a significant association of selected demographic variables with maternal and fetal outcome among obese mothers was accepted" for work pattern in antenatal period, residence and total family income in intranatal outcome, BMI with postnatal outcome and type of family in neonatal outcome at the level of p<0.05 " and it was rejected for other demographic variables.
The research hypothesis $RH_2$ stated earlier that, "There is a significant association of selected demographic variables with maternal and fetal outcome among normal mothers was accepted" for work pattern and religion in antenatal outcome and type of family and parity in intranatal outcome at the level of $p<0.05$ and it was rejected for other demographic variables.
CHAPTER-6
Summary, Conclusion, Recommendations, Implications and Limitation
SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATION

This chapter deals with summary, conclusion, implications, recommendations and limitations.

6.1 SUMMARY

Obesity is an excess of adipose tissue to such an extent of health impairment and is usually defined as Body Mass Index \( \geq 30 \text{kg/m}^2 \). The world wide incidence of obesity is increasing. In fact a new word - "globesity" has now been coined to reflect the escalation of global obesity and overweight. The World Health Organization published a report entitled "obesity: preventing and managing the Global Epidemic", which classified obesity as a growing epidemic, if immediate action is not taken, millions will suffer from an array of serious weight-related disorders.

Among women of childbearing age, it is of paramount importance because of its association with multiple adverse health outcomes for the mother and fetus once a woman becomes pregnant. In India, the percentage of married women aged between 15-49, who are overweight or obese were increased. The prevalence of obesity is increasing so is the number of obese women of reproductive age and consequently, obesity complicates as many as 18.5 - 38.5% of pregnancies. The incidence of gestational diabetes is three to five times higher in obese women. Fetal macrosomia is 1.5-2 times, 2 to 3 fold risk of still birth, fetal structural anomalies such as neural tube defects, omphalocele and cardiac defects are up to 3 times more in obese mothers.

The purpose of the study was to assess the maternal and fetal outcome among obese and normal mothers in view of developing obesity management strategy.

6.1.1 The objectives of the study were

1. To assess the maternal and fetal outcome among obese and normal mothers.
2. To compare the maternal and fetal outcome between obese and normal mothers
3. To associate selected demographic variables with the maternal and fetal outcome among obese and normal mothers.
4. To develop maternal obesity management strategy.
6.1.3 The research hypotheses formulated were

\textbf{RH}_1: There is a significant difference in maternal and fetal outcome between normal and obese mothers

\textbf{RH}_2: There is a significant association of selected demographic variables with maternal and fetal outcome at p<0.05.

The investigator have done an in depth review of literature which included both theoretical and empirical related studies and statistics which provided a strong foundation for the experimental, including the basis for the conceptual framework and formation of the tool and to select the research methodology, namely non experimental comparative descriptive design which was found to be suitable for the study.

The conceptual framework for the study was based on \textit{Grounded theory of Glaser and Strauss with action research} which provided a comprehensive framework for comparing the maternal and fetal outcome among obese and normal mothers and to prepare a plan of action for it.

The content validity of the data collection tool was obtained from 2 medical experts and 5 nursing experts in the field of obstetrics and gynecology.

The reliability of the tool was determined by inter-rater method and the feasibility of the study was analyzed by conducting a pilot study at Sir Ivan Stedeford hospital, Chennai. The pilot study reports supported the investigator to conduct the main study.

The main study was conducted at selected hospitals, Chennai namely Sir Ivan Stedeford Hospital, K.S. Maternity Hospital, Sundaram Medical Foundation and Vijaya Hospital. Non probability purposive sampling technique was used and the sample size for the study was 200 mothers who fulfilled the sample selection criteria and ethical aspects were maintained throughout the study.

Refined tools were used for data collection. Data collected were analyzed and interpreted based on the objectives and hypothesis using descriptive and inferential statistics. The findings revealed that there was a significant difference in maternal and fetal outcome between the obese and normal mothers.
6.1.4 The major findings of the study revealed that

The study was to compare the maternal and fetal outcomes among obese and normal mothers and the study result revealed that there is a significant association of PIH (p<0.001) and GDM (p<0.005) with obesity and the risk were almost 6 times for development of PIH (OR – 6.37) and more than one and half the times for GDM (OR – 1.58) during antenatal period among obese mothers. During intranatal period, there is a significant association of obesity with preterm labour, forceps delivery, caesarean section and malposition at the level of p<0.05 and there is a chance for increased risk for malposition of about 6 times (OR – 6.31), almost 3 times risk for development of preterm labour (OR – 2.69) and forceps delivery (OR – 3.59) and nearly twice likely to develop caesarean section (OR – 1.689) among obese mothers.

There is no significant association of postnatal and neonatal outcome with obesity as inferred by statistics but there is risk of more than one and half times for the development of hypothyroidism (OR -1.71), placenta previa (OR -1.70), vacuum delivery (OR -1.70), meconium stained liquor (OR -1.64), primary PPH (OR -1.80), Apgar score <7 at 5min (OR -1.98), admission to NICU (OR - 1.56) and 3 times likely to develop prolonged wound healing (OR -3.12), meconium aspiration syndrome (OR -3.06) and there is least risk for development of prolonged hospitalization (OR -1.00), fetal distress (OR -1.12), PROM (OR -1.27) and UTI (OR -1.26) among obese mothers.

6.2 CONCLUSION

The present study aimed to compare the maternal and fetal outcome among obese and normal mothers and the concluded that there is a strong association between obesity and many maternal and fetal complications like pregnancy induced hypertension, gestational diabetes mellitus, preterm labour, malposition, forceps delivery and cesarean section are at the level of p<0.05.

The study findings also shows that there is risk for development of hypothyroidism, obstetric cholestasis, abruption placenta, placenta previa, urinary tract infection during antenatal period due to obesity. During postnatal period, the risk factors identified are vacuum delivery, meconium stained liquor, premature rupture of membrane, malpresentation and fetal distress. The risks related with obesity during
Some of the identified risk factors are modifiable. Lifestyle is a major contributor to obesity. There is a need for widespread education about obesity related complications and role of diet and exercise. Hence the researcher had prepared obesity management poster which will create awareness among obese mothers to keep their weight gain goal in order to protect from adverse maternal and fetal outcome.

6.3 IMPLICATIONS

The investigator has drawn the following implications from the study, which is of vital concern in the field of Nursing practice, Nursing Administration, Nursing Education and Nursing Research.

6.3.1 Nursing Practice

Nurse midwives working in health care settings should be aware of the impact of obesity on maternal and fetal outcome. This enable the nurse midwife to assess, plan and implement obesity management strategy accordingly.

1. Obesity associated maternal and fetal outcome is a criterion reference for nurse midwives in screening and identification of high risk pregnancy and categorizes them accordingly.

2. Enables the midwives to equip as a skillful and potential nurse with confidence while handling critical situation during perinatal period by anticipating the complications among obese mothers.

3. Poster regarding obesity management strategy creates awareness among obese mothers in prevention of adverse effects related with obesity.

4. Motivate nurse midwives to identify the prevalence of obesity related complication ad to implement mass educational program on creating awareness regarding obesity management strategy.
6.3.2 Nursing Education

1. Conference, workshop, seminars and symposium should be held for all health care personnel regarding the impact of obesity on maternal and fetal outcome and its management.
2. Nursing curriculum should include obese pregnancy risk assessment topics so that the student nurses are trained to assess and educate the public on maternal obesity management strategy.
3. Encourage the nursing students for effective utilization of research based practice by implementing in their clinical practice.

6.3.3 Nursing Administration

1. The nurse administrator in hospital setting should plan for an appropriate schedule for conducting awareness program on obesity management strategy.
2. Make the staff to carry out periodical screening for all obese mothers throughout pregnancy in order to prevent unanticipated complications
3. Incorporate the finding of the study to plan training program regarding maternal obesity management strategy for all health personnel of peripheral health units.
4. Collaborate with Governing bodies and non-governmental organization to create policies, mobilizes resource and create awareness regarding impact of obesity and its management strategy.

6.3.4 Nursing Research

As a nurse researchers

1. Disseminate the findings of the study through conference, seminars and by publishing in journals and websites
2. Promote in depth research on impact of obesity during pregnancy and late offspring outcome.
3. Study implies on utilization of evidence based practice in clinical and community setting in preventive aspects of obesity related complications during pregnancy.
4. Utilize evidence and research findings in planning, implementing and evaluating maternal obesity management strategy.
6.4 RECOMMENDATIONS

1. Assessment of BMI during first trimester is made mandatory in all the setting where study was conducted.
2. Obesity management poster can be displayed in health care settings where the study was conducted and to Omayal Achi Community Health Centre which has adopted 43 villages rendering comprehensive health care services to 49,000 populations.
3. The study inference creates awareness among obese antenatal mothers to adopt obesity management strategy in order to prevent complications during pregnancy.

The study recommends the following for future research

1. To conduct similar study retrospectively in large population and in different geographical areas.
2. To assess the effectiveness of obesity management strategy in prevention of adverse maternal and fetal outcome among obese mothers.
3. To motivate public to organize campaign regarding maternal obesity management strategy.
4. To create awareness regarding impact of obesity during pregnancy in community health centers.
5. To assess the knowledge and attitude regarding impact of obesity on maternal and fetal outcome among obese pregnant mothers.
6. To evaluate the effect of first trimester BMI on maternal and fetal outcome.
7. To assess the prevalence of obesity during pregnancy among community people in view of creating awareness program regarding obesity management strategy.

6.5 LIMITATION

The researcher found difficulty in

1. Identifying the samples

6.6 PLAN FOR RESEARCH DISSEMINATION

1. The study result will be disseminated to the entire maternity unit where the study was conducted in order to create awareness among all nurses.
2. The result will be disseminated in International conference conducted at various institutions and also will be published in Indian Journal of Midwifery.
6.7 PLANS FOR RESEARCH UTILIZATION

1. Obesity management strategy will be given to all health care setting OPD where study was conducted and to Omayal Achi Community Health Centre.

2. The impact of obesity on maternal and fetal outcome and its management strategy will be taught to undergraduate final year students to create awareness among them, thereby this information can be disseminated to the maximum extent for beneficiaries.
REFERENCES

BOOKS:


**JOURNALS:**


Alexis Shub, (2013). Pregnant women’s knowledge of weight, weight gain, complications of obesity and weight management strategies in pregnancy. *BMC*


**INTERNET:**


REPORT:


FOCUS (2011, January), Missouri Department of Health & Senior Services: Bureau of Health informatics; jefferson city; missouri 65102-0570 (573) 751-6272
APPENDIX – C

LETTER SEEKING EXPERTS OPINION FOR CONTENT VALIDITY

From

Ms. Baby Shobana. N,
M. Sc (N) II year,
Omayal Achi College of Nursing,
Puzhal, Chennai – 600 066

To

Respected Madam / Sir,

Sub: Requisition for expert opinion on suggestion for content validity of the tool

I am Ms. Baby Shobana. N doing my M.Sc Nursing II year specializing in Obstetrics and Gynecological Nursing at Omayal Achi College of Nursing. As a part of my research project to be submitted to the Tamilnadu Dr.M.G.R University and in partial fulfillment of the University requirement for the award of M.Sc (N) degree, I am conducting “A comparative study to assess the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai.”.

I have enclosed my data collection tool and intervention tool for your expert guidance and validation. Kindly do the needful.

Thanking you,

Yours Faithfully,

(Baby Shobana. N)

Enclosures:
1. Research proposal
2. Data collection tool
3. Intervention tool
4. Content validity form
5. Certificate for content validity
LIST OF EXPERTS FOR CONTENT VALIDITY

MEDICAL EXPERTS:
1. Dr. Mrs.Hidayatunnissa MBBS, DNB (O &G)
   Consultant of Obstetrics and gynecology,
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2. Dr. Mrs. Sucharita MBBS, DNB (O&G)
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   Sir Ivan Stedeford Hospital,
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NURSING EXPERTS:
1. Mrs. Sathyalatha
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   Chennai.

2. Mrs. Rosaline Rachel
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3. Mrs. Nalini
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   Chennai
4. Mrs. Gayathri Priya  
Professor,  
Obstetric and Gynecological Nursing,  
Sri Ramachandra College of Nursing,  
Chennai

5. Mrs. Latha  
Professor,  
Obstetric and Gynecological Nursing,  
SRM college of Nursing,  
Chennai.
APPENDIX – D

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work “A comparative study to assess the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai”, done by Ms. Baby Shobana N. M.Sc. (Nursing) II year student of Omayal Achi College of Nursing, Chennai, is edited for English language appropriateness by ________________.

Seal with Date     Signature
APPENDIX – E

CERTIFICATE OF TAMIL EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work “A comparative study to assess the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai”, done by Ms. Baby Shobana. N. M.Sc. (Nursing) II year student of Omayal Achi College of Nursing, Chennai, is edited for Tamil language appropriateness by ____________________.

Seal with Date

Signature
APPENDIX – F

INFORMED CONSENT REQUISITION FORM

Good morning,

I Ms. Baby Shobana. N, M.sc. (Nursing) II year student from Omayal Achi College of Nursing, Chennai, conducting “A comparative study to assess the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai” as a partial fulfilment of the requirement for the degree of M.Sc. Nursing under the Tamil Nadu Dr. M.G.R. Medical University.

I assure you that information provided by you will be kept confidential. So, I request you to kindly cooperate with me and participate in this study by giving your frank and honest responses to the questions being asked.

Thank You
ஜெய்ப்பாத் பாடல்

பொருளில்,

டூபி சாமானியா. புதுக்கோட்டை என்று குறிப்பிட்டேன் ஒன்று என்று குறிப்பிட்டேன் ஒன்று என்று குறிப்பிட்டேன் ஒன்று என்று குறிப்பிட்டேன். அது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெரும்பானது. அது பெரும்பானது பெரும்பானது பெருmur
INFORMED WRITTEN CONSENT FORM

I understand that I am being asked to participate in a research study conducted by Ms. Baby Shobana, N Msc (N) student of Omayal Achi College of Nursing. This research study will assess the maternal and fetal outcome among obese and normal mothers in view of developing maternal obesity management strategy at selected hospitals, Chennai.

If I agree to participate in the study, I will be interviewed. The interview may be recorded and will take place in privacy. No identifying information will be included when the interview is transcribed. I understand that there are no risks associated with this study.

I realize that the knowledge gained from this study may help either me or other people in the future. I realize that my participation in this study is entirely voluntary, and I may withdraw from the study at any time I wish. If I decide to discontinue my participation in this study, I will continue to be treated in the usual and customary fashion.

I understand that all study data will be kept confidential. However, this information may be used in nursing publication or presentations. If I need to, I can contact Ms. Baby Shobana .N, M.Sc. (N) II year student of Omayal Achi College of Nursing, #45 Ambattur road, Puzhal, Chennai at any time during the study.

The study has been explained to me. I have read and understood this consent form, all of my questions have been answered, and I agree to participate. I understand that I will be given a copy of this signed consent form.

----------------------------------      --------------- ---
Signature of Participant      Date:
----------------------------------      --------------- ---
Signature of Investigator      Date:
2. செயல்முறை ஆர்வேற்றத் தொடர், நேர்முனை-66.

புது ஆர்வேற்ற நூற்றாண்டு போதம்

2. செயல்முறை ஆர்வேற்றத் தொடர், நேர்முனை-66.

புது ஆர்வேற்ற நூற்றாண்டு போதம்

2. செயல்முறை ஆர்வேற்றத் தொடர், நேர்முனை-66.

புது ஆர்வேற்ற நூற்றாண்டு போதம்

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புது ஆர்வேற்ற நூற்றாண்டு போதம்

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புது ஆர்வேற்ற நூற்றாண்டு போதம்

2. செயல்முறை ஆர்வேற்றத் தொடர், நேர்முனை-66.

புது ஆர்வேற்ற நூற்றாண்டு போதம்

2. செயல்முறை ஆர்வேற்றத் தொடர், நேர்முனை-66.

புது ஆர்வேற்ற நூற்றாண்டு போதம்

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புது ஆர்வேற்ற நூற்றாண்டு போதம்

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புது ஆர்வேற்ற நூற்றாண்டு போதம்
அம்மன் எழுதியவள் விஷயில் கேரளாவூர் குறிப்பிட்டு பின்னர் பக்தன் துடுப்பிறைத்து கொண்டப் பதிவு.
SECTION A

DEMOGRAPHIC DATA

1) Age
   a) 20 – 24 years
   b) 25 – 29 years
   c) 30 – 34 years
   d) > 35 years

2) Educational status
   a) primary education
   b) secondary education
   c) higher secondary education
   d) graduate and above

3) Religion
   a) Hindu
   b) Muslim
   c) Christian

4) Residential area
   a) Urban
   b) Rural

5) Type of family
   a) Nuclear family
   b) Joint family

6) Family monthly income
   a) < 5000
   b) 5,000 – 10,000
   c) 11,000 – 20,000
   d) > 21,000
7) Diet pattern  
a) Vegetarian  
b) Non vegetarian

8) Work pattern  
a) Sedentary worker  
b) Moderate worker  
c) Heavy worker

9) Parity  
a) Primi  
b) Multi

10) Habits of doing exercise  
a) Yes  
b) No

11) Family history of obesity  
a) Yes  
b) No

12) First trimester BMI of the mother---------  
a) 18.5 – 24.9 kg/m^2  
b) 25 – 29.9 kg/m^2  
c) 30 - 34.9 kg/m^2  
d) 35 - 39.9
SECTION – B
CHECKLIST TO ASSESS ANTENATAL OUTCOME

<table>
<thead>
<tr>
<th>ANTENATAL OUTCOME</th>
<th>PRESENT</th>
<th>ABSENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy induced hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational diabetes mellitus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydramnios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abruptio placenta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placenta praevia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thromboembolic diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Deep vein thrombosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Pulmonary embolism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incompetent cervix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal mortality</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OTHER RISK FACTORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurological complaints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Head ache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpal tunnel syndrome</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SECTION C: OBSERVATION CHECKLIST TO ASSESS THE INTRANATAL, POSTNATAL AND NEONATAL OUTCOME

<table>
<thead>
<tr>
<th>INTRANATAL PERIOD</th>
<th>PRESENT</th>
<th>ABSENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meconium stained liquor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seizures during labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premature rupture of membrane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precipitate labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstructed labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malpresentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malposition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caesarean section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preterm labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operative vaginal delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forceps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrauterine death</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### POSTNATAL PERIOD

<table>
<thead>
<tr>
<th>Infections</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>genitai,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prolonged hospitalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post partum hemorrhage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEONATAL OUTCOME</td>
<td>PRESENT</td>
<td>ABSENT</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>APGAR score at 5 min &lt;7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal distress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macrosomia &gt;4499gms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meconium aspiration syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth trauma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth asphyxia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to NICU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX-H

PLAGIARISM REPORT

Hyperlink : http://plagiarism-detector.com
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Document name : Baby Shobana N. M.Sc(N) II-year
Document word count : 17629
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Signature of the candidate

Signature of the principal
APPENDIX – I

CODING FOR DEMOGRAPHIC VARIABLES

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Age</td>
<td></td>
</tr>
<tr>
<td>a. 20 – 24 years</td>
<td>1</td>
</tr>
<tr>
<td>b. 25 – 29 years</td>
<td>2</td>
</tr>
<tr>
<td>c. 30 – 34 years</td>
<td>3</td>
</tr>
<tr>
<td>d. &gt; 35 years</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2) Educational status</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. primary education</td>
<td>1</td>
</tr>
<tr>
<td>b. secondary education</td>
<td>2</td>
</tr>
<tr>
<td>c. higher secondary education</td>
<td>3</td>
</tr>
<tr>
<td>d. graduate and above</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3) Religion</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Hindu</td>
<td>1</td>
</tr>
<tr>
<td>b. Muslim</td>
<td>2</td>
</tr>
<tr>
<td>c. Christian</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4) Residential area</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Urban</td>
<td>1</td>
</tr>
<tr>
<td>b. Rural</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5) Type of family</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Nuclear family</td>
<td>1</td>
</tr>
<tr>
<td>b. Joint family</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6) Family monthly income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. &lt; 5000</td>
<td>1</td>
</tr>
<tr>
<td>b. 5,000 – 10,000</td>
<td>2</td>
</tr>
<tr>
<td>c. 11,000 – 20,000</td>
<td>3</td>
</tr>
<tr>
<td>d. &gt; 21,000</td>
<td>4</td>
</tr>
</tbody>
</table>
7) Diet pattern
   a. Vegetarian 1
   b. Non vegetarian 2

8) Work pattern
   a. Sedentary worker 1
   b. Moderate worker 2
   c. Heavy worker 3

9) Parity
   a) Primi 1
   b) Multi 2

10) Habits of doing exercise
    a) Yes 1
    b) No 2

11) Family history of obesity
    a. Yes 1
    b. No 2

12) First trimester BMI of the mother
    a. 18.5 – 24.9 kg/m² 1
    b. 25 – 29.9 kg/m² 2
    c. 30 - 34.9 kg/m² 3
    d. 35 - 39.9 4
SCORING KEY

Section B: Tool to assess the antenatal outcome

Checklist was used to retrieve the antenatal outcome among obese and normal mothers retrospectively from the antenatal record. The items were in “present” or “absent” form. The score for “present” was ‘one’ and “absent” was ‘zero’.

Section C: Tool to assess the intra natal, postnatal and neonatal outcome.

Observation checklist to assess the anticipated conditions during intra natal, postnatal and neonatal outcome among obese and normal mothers. The items were in “present” or “absent” form. The score for “present” was ‘one’ and “absent” was ‘zero’.
APPENDIX – J

MATERNAL OBESITY MANAGEMENT STRATEGY

OVER WEIGHT AND OBESITY
An individual is said to be overweight if the body mass index is $\geq 25\text{kg/m}^2$ and obese means body mass index is more than $30\text{kg/m}^2$.

CALCULATION OF BMI
We need height in meters, and weight in kilograms.

$$\text{BMI} = \frac{\text{Weight}}{\text{Height}^2} \text{in meters}$$

STICK TO YOUR WEIGHT GAIN GOAL

<table>
<thead>
<tr>
<th>PRE PREGNANCY BMI Kg/m²</th>
<th>CLASSIFICATION</th>
<th>RECOMMENDED WEIGHT GAIN (kgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>Under weight</td>
<td>12.5 to 18</td>
</tr>
<tr>
<td>18.5 to 24.9</td>
<td>Normal range</td>
<td>11.5 to 16</td>
</tr>
<tr>
<td>25.0 to 29.9</td>
<td>Over weight</td>
<td>7 to 11.6</td>
</tr>
<tr>
<td>&gt;30.0</td>
<td>Obese</td>
<td>5 to 9</td>
</tr>
</tbody>
</table>

A HEALTHY PREGNANCY
- Lose weight before you get pregnant.
- Get early and regular prenatal care
- Don’t diet during pregnancy
- Know how much weight to gain
- Exercise on most days

PRE PREGNANCY CARE
- BMI $\geq 30$ should receive information and advice about the risk of obesity during pregnancy and childbirth and be supported to lose weight before conception.
- Should take 5mg folic acid supplement daily, one month before conception.
**DURING PREGNANCY**
- Document BMI in each successive antenatal visits
- Consider an early booking visit
- Consider an increased frequency of antenatal visits in the second and/or third trimester

*Maternal investigations*
- Oral Glucose Tolerance Test (OGTT) to assess for overt diabetes at the initial antenatal visit or in the first trimester repeat at 26-28 weeks if initial OGTT negative
- Establish baseline renal and liver function.

*Fetal assessment and monitoring*
- A detailed anomaly scan and serum screening for congenital abnormality should be recommended including:
  - first trimester Combined Test performed between 11.0 and 13.6 weeks or
    Triple Test performed between 15-20 weeks if Combined Test not done
  - morphology scan performed between 18 and 20 weeks consider serial ultrasound monitoring of fetal growth where clinical assessment is limited by obesity

**DIET FOR OBESE PREGNANT WOMEN**
If you are overweight before pregnancy, you should try to bring it within normal levels (BMI 18.5 – 24.9) by planning a pregnancy or else try to gain minimum weight i.e (12 – 15 lbs) by the end of pregnancy. Overweight women need not go on a diet for keeping their weight normal. Instead, they should include nutrient rich and low calorie foods in their diet.

**DIET FOR HEALTHY PREGNANCY**

*Low fat/non fat milk products*
It is important to opt for low fat/non fat milk products that includes milk, cheese. It will help to cut down unwanted calories, and it is advisable to take 3 to 4 servings in a day.
Dairy products should be limited to thrice a week and not every day, except for may be a glass of milk which you can have every day.

Alternatives to dairy – soy milk, rice milk, almond milk, oat milk or coconut milk.

_Eat food made at home_

It is important to avoid outside food, to be on the safe side when dealing with bacteria and germs. Avoid fast foods, greasy food, artificially sweetened products.

_Go easy on salty foods_

Don’t overindulge with salty foods, since this cause the body to retain water. Slash your intake of sodium and limit it as much as possible.

_Healthy cooking methods_

It is important to eat foods that haven’t been deep fried one, fried in unhealthy oils or other alternatives (like butter).

Opt for healthier options like roasting or baking. It will help to stay clear from oily foods ad charred meats from grilling. Sauté foods using olive or sunflower oil.

_Salads_

End your day with a generous portion of leafy greens, cruciferous vegetables, bell peppers, garlic, tomatoes, olives, herbs and other beautiful fruits and vegetables.

Avoid salad dressing that come in bottled packaging and opt instead for lemon juice, olive or sesame oil as dressing alternatives

This will fill up nicely and serve as a good way of providing everyday minerals and vitamins that the body needs.
**Avoid processed products**

Besides healthy foods like milk products that come packaged, don’t overindulge with preservative soaked foods like tinned fruits and vegetables, soups, ready to eat meals, microwavable dinners/ lunch and so on.

**Going brown**

Make sure you eat carbohydrate like bread, in their healthier whole wheat versions. If you like eating rice, opt for brown instead of white.

**COMMON DO’S AND DON’TS FOR AN OBESE PREGNANTWOMEN**

1. Drink plenty of fluids including plain water, clear soups, non-sweetened fresh fruit juices, skimmed buttermilk, coconut water, lime water etc.
2. Incorporate lots of fresh fruits- Orange, Sweet lime, Apple, Pear, Peach, Pineapple, Guava, Melons, Berries etc. They will provide loads of antioxidants, vitamins and fiber.
3. Avoid Mangoes, Sapota and Papaya. You may limit Bananas and grapes to once or twice a week, they have a high glycemic index.
4. Consume plenty of green leafy vegetables, variety of salads- Cucumbers, Carrots, Tomatoes, Turnip greens. Limit cabbage and radish as they may produce gas.
5. Include plenty of milk & milk products in the daily diet- Curds, buttermilk, cottage (paneer). All milk products should be skimmed and non-sweetened. They will fulfill the increased Calcium requirement in the body without adding to the fat.
6. Other fiber rich foods such as Oats, Wheat bran, Rice bran, barley, sprouted pulses and whole grains must be a part of daily diet to avoid constipation.
7. The requirement for iron increases greatly. Foods such as black currants, raisins, dates, rice flakes, ragi, green leafy vegetables, red/purple cabbage, watermelon, pineapple, pomegranate may help you correct iron and folic acid deficiencies. You may prefer white meat (turkey or chicken) or even fresh water fishes.
8. Dietary sources of proteins such as egg white, lean chicken, turkey, fish or soy products, sprouted pulses, legumes, milk products should be included as they are the building blocks in your body. Also commercially available protein powders, protein bars or biscuits may substitute well.
9. Avoid deep fried foods, sweets, desserts, highly salted foods (chips, pop corn, pickles, sauces etc). Avoid ice creams. May grab on a dark chocolate bar once in a
while or even desserts prepared using artificial sweeteners. Avoid foods at extreme temperatures- too hot or too cold.

10. Have small and frequent meals, almost 6-8 meals/day with the total calories distributed as per your nutritionist's or doctor's recommendations

11. Watch the portion size of meals and snacks and how often you are eating.

**PHYSICAL ACTIVITY**

- Obese pregnant women should be encouraged to be active as part of a healthy lifestyle.
- Overall health including obstetric and medical risk should be evaluated.
- Activities such as walking, cycling, swimming, aerobics and gardening are part of everyday life and build activity into daily life, eg. By taking the stair instead of lift or taking a walk at lunch time.
- Minimize sedentary activities such as sitting for long period, watching television, at a computer or playing video games.
- Brisk Walking, riding a stationary bike or taking pregnancy aerobic or yoga classes are safe form of exercise.
- If a women have not exercised routinely they should begin which no more than 15 minutes of continuous exercise, 3 times/week. Then increase gradually to daily 30 minutes session.

**LIFE STYLE MODIFICATION**

- Eat small and well balanced meals.
- Avoid tight fitting clothing especially around the abdomen.
- Exercise under a doctor’s supervision.
- Manage psychological stressors
- Avoid smoking
- Avoid beverages like tea, coffee and cola
- Avoid taking medications without doctor's prescription.
MATERNAL OBESITY MANAGEMENT STRATEGY

DOES YOUR WEIGHT MATTER DURING PREGNANCY?

Don’t Worry, let us check your BMI according to your Height & Weight.

Doctor, I feel there is a problem with my pregnancy. I'm Concerned about my Body Weight.

FLUIDS (2.5 - 3 Litres/Day)
- Lime Water
- Clear Soup
- Tender Coconut
- Fresh Juice
- Plea Water
- Green Tea
- Butter Milk

FRUITS
- Apple
- Pears
- Guava
- Orange
- Peach
- Pomegranate
- Pineapple

GREEN LEAFY VEGETABLES
- Peas
- Bottle Gourd
- Bottle Gourd
- Ridge Gourd
- Bitter Gourd
- Bitter Gourd

IRON RICH
- Rice Flakes
- Dates
- Red Meat
- Liver

PROTEINS
- Legumes
- Spondid Gourds
- Leen Chicken
- Egg
- Cow

CEREALS
- Dry Raisins
- Brown Rice
- Brown Bread & Oats
- Wheat

MILK & MILK PRODUCTS
- Soya Milk
- Skimmed Milk
- Butter Milk
- Cord

CHAT ITEMS
- Chips
- Sweets
- Pop Corn
- Chocolate

FRUITS
- Mango
- Grapes
- Chicken

GREEN LEAFY VEGETABLES
- Peas
- Bottle Gourd
- Bottle Gourd
- Ridge Gourd
- Bitter Gourd
- Bitter Gourd

LIFE STYLE
- Avoid Alcohol
- Avoid Smoking & Expose
- Avoid Puff & Chalk & Ashes
- Avoid High Harmful
- Avoid Frequent Sitting
- Avoid Tight Fitting Garments

PHYSICAL ACTIVITY
- Walking
- Yoga & Leg Exercise
- Sitting
- Swimming
- Stretching
- Gardening

For further Details
Kindly consult your Doctor Today!!