

**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY**

**ASSESSMENT OF BIRTH OUTCOMES AMONG MOTHERS WITH
DIABETES WHO DELIVERED AT TIKUR ANBESSA SPECIALIZED
HOSPITAL ADDIS ABABA, ETHIOPIA, 2018.**

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**JUNE 2018
ADDIS ABABA, ETHIOPIA**

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List of Abbreviation and acronyms

ADA- American diabetics association

ANC- Antenatal care

APGAR- Appearance, Pulse, Grimace, activity, Respiratory

BP- Blood pressure

CVA- Cardiovascular accident

DM- Diabetes mellitus

GDM- Gestational diabetes mellitus

HDP- hypertension disorder of pregnancy

IDF- International diabetic federation

ICU- intensive care unit

IUGR- intrauterine fetal death

LB- live birth

LBW- low birth weight

NICU- neonatal intensive care unit

OR- Odd ratio

PGDM- Pre-existing gestational diabetes

TASH- Tikur Anbessa specialized hospital

T1DM- Type one diabetes mellitus

T2DM- Type two diabetes mellitus

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Abstract

Diabetes in pregnancy is the major cause of poor birth outcome that encountered during pregnancy. Worldwide, 7% of all pregnancies are complicated by diabetes and causes for maternal and prenatal morbidity and mortality.

Objective: To assess birth outcomes among mothers with diabetes who delivered at Tikur Anbessa specialized hospital Addis Ababa Ethiopia, 2018.

Method: Facility based retrospective cross-sectional study were carried from January 2015 to 2017 out to determine the birth outcome. Total sample was 422; the required data was extracted from patient chart and checked for completeness. Then those mothers who had complete data record were separated and convenient sampling method was used from February 1 to April 30. Data entered and cleaned to Epi Data 4.2. Then entered data was transported to SPSS version 23.0 for data analysis.

Results: Out of 14039 women who gave birth, 2.5% women were found to have diabetes mellitus and from total of 346 diabetic women, 189(54.6%) had GDM and 157(45.4%) had PGDM. From the total DM mothers, 200(57.8%) of the neonates were born by caesarian section, only 39.9% born by spontaneous vaginal delivery, 17.9% were preterm delivery and 26% of pregnancies were end up with induced hypertension. Regarding to fetal outcome, 17.6% were macrocosmic, 9.2% respiratory distress, 10.1% were low birth weight, 10.1% had poor Apgar score at 5th minutes, 2.9% were hypoglycemia 2.6% were still birth, and 65% were admitted to NICU. Neonate born from working mothers were 2.1 times more develop adverse birth outcome than house wife and statistically associated with adverse birth outcomes at ($P < 0.002$) and [OR=95%CI 2.117 (1.315, 3.405)]. Preterm delivery was significantly associated with adverse birth outcome at [$P < 0.0001$] [OR=95%CI 9.763(4.560, 20.902)].

Conclusion: Diabetes cause maternal complication and adverse birth outcomes among mothers with diabetes who delivered at Tikur Anbessa specialized hospital. Body mass index

and previous history of pregnancy induced hypertension significantly associated with maternal adverse outcome. Preterm delivery and house wife mothers was associated with adverse fetal outcome

CHAPTER 1.INTRODUCTION

1.1. Background

Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin production, impaired insulin action or both. It is one of the major non-communicable diseases on that rise worldwide. Hyperglycemia in pregnancy can include pre-existing type 1 diabetes: absolute insulin deficiency, pre-existing type 2 diabetes: defective insulin secretion or insulin resistance (either previously diagnosed or during the first trimester of pregnancy) and gestational diabetes mellitus is defined as hyperglycemia that is first diagnosed during pregnancy. [1].

The global prevalence of diabetes in pregnancy worldwide varies ranges from 1% to 14% of all pregnancy. International diabetics' federation estimates that number of live births with hyperglycemia in pregnancy is 21.4 million which accounts for 16.8% of total live births in 2013. South-East Asia Region has the highest prevalence of 25.0% compared with 10.4% in the North America and Caribbean Region. It develops 1 in 25 pregnancies worldwide and is associated with complications in the period immediately before and after birth [1, 2].

Diabetes is adversely affect women and their babies during pregnancy, labor and delivery. Diabetes is associated with a higher incidence of maternal morbidity including miscarriage, cesarean deliveries, shoulder dystocia, birth trauma, hypertensive disorders of pregnancy (preeclampsia), traumatize labor, obstructed labor and subsequent development of types 2 diabetes. Perinatal and neonatal morbidities also increase; include macrosomia, congenital anomalies birth injury, hypoglycemia, IUFD, still birth, shoulder dystocia, respiratory distress polycythemia, and hyperbilirubinemia [3].

Study done in Saudi Arabia show that mothers with diabetes had 18.2% had hypertension disorder of pregnancy, 11.4% were preterm delivery, 24.1% were under go caesarean section and in 31.8% induction of labor was done. Macrosomia were 12.7% observed, neonatal intensive care units admission were 16.4%, in 2.7% hypoglycemia observed, in 1.4% congenital anomalies and less than seven in 3.2% neonate Apgar(appearance, pulse, grimace, activity, respiratory) score in five minutes [4].

study done in Tanzania identify that hyperglycemia during pregnancy was associated with an increased risk of adverse birth outcome, 2.11 times increase risk of preterm delivery before 37 weeks, 2.90 times increase incident gestational hypertension 2.87 times increase incidence of low birth weight and 3.38 times increase incidence of stillbirth than non-hyperglycemic mothers [5].

There are few studies on diabetes in pregnancy in Africa. In Sub-Saharan Africa the prevalence of diabetes during pregnancy was up to about 14% [6]. According community based Studies in Ethiopia showed that the incidence of GDM was 3.7% [7]. There are few studies exploring on DM in pregnancy in Ethiopia, only assess the prevalence GDM.

The diagnosis of GDM is made using a single-step 75-g OGTT when one or more of the following results are recorded during routine testing specifically between weeks 24 and 28 of pregnancy or at any other time during pregnancy:

- 1). Fasting plasma glucose from 5.1–6.9 mmol/L (92–125 mg/dL);
- 2). 1-hour post 75-g oral glucose load \geq 10 mmol/L (180 mg/dL);
- 3). 2-hour post 75-g oral glucose load 8.5–11.0 mmol/L (153–199 mg/dL). FIGO adopt the from WHO 2013 criteria for diagnosis of gestational diabetes [8, 9].

Management diabetes is lifestyle modification (diet and exercise), oral glyceic agents (metformin and glibenclamide) and insulin or a combination of these methods as required. The mean aim of the management is glyceic control to prevent adverse pregnancy outcomes [10].

1.2. Statement of the problem

Globally diabetes prevalence is increasing rapidly estimated 381million in 2013 to 422million in 2016 living with diabetes [2, 11]. Worldwide, 7% of all pregnancies are complicated by diabetes and causes for maternal and prenatal morbidity and mortality [1]. IDF estimate that 20.9 million or 16.2% of live birth women to women in 2015 had some form of hyperglycemia in pregnancy. One in seven births is affected by diabetes in pregnancy. Annually, more than 200,000 GDM cases worldwide [1, 11].

Diabetes occurs throughout the world but more common in the more developed countries. The greatest increase in prevalence however occurring in low, lower middle and middle-income countries follow the trend of urbanization and life style change. Even though these countries account for 80% of the global diabetes burden as well as 90% of all cases of maternal and perinatal death and major cause of poor pregnancy outcome that encountered during pregnancy. But It was sever and neglected treat to maternal and child health [12].

Diabetes in pregnancy is associated with incidence of adverse birth outcome. Study done in Brazil identifies the morbidity and mortality rates among pregnant women with diabetes. Rates of preeclampsia 12.7%, Cesarean section 44.3% and maternal mortality 0.6% found among women with type 1diabetes are considerably higher than in the background population [13].

Six countries European equating to 11% of the Africa continent, this indicate how little is known diabetes in Africa [14]. The prevalence of diabetes in pregnancy with WHO 2013 modified report in sub Saharan Africa was 8.1% [15]. According to study done in South Africa 29% preterm delivery14% hypertensive complications and 8%spontaneous pre-term labor, 55% cesarean deliveries and 26% incidence of fetal distress [16].

Study done in Sudan identify that 22% infants born diabetes mothers were preterm delivery, 84% of the mothers delivered by caesarian section, only 14% women delivered by spontaneous vaginal delivery and 2% were instrumental delivery. 28% were macrosomia, 34% were large for gestational age and 4% were of low birth weight, 6% Congenital anomalies occurred in neonate, Respiratory distress syndrome occurred in 2% neonate. Hypoglycemia occurred in 12% of the neonates. Neonatal death occurred in 4% of the neonates. 2% macrosomia neonate born to a mother with type 1 diabetes had shoulder dystocia and brachial plexus injury. Length of hospital stay ranged from 0 to 7 days, with average hospital stay of 5 days [17].

There is no current study that identifies the incident of GDM in Ethiopia, but one study done in 1999 reveals that the prevalence of gestational diabetes mellitus in Ethiopia was 3.7% [7]. This study only assesses the prevalence of gestational diabetes. Maternity outcomes are indicative of quality of the health care system and therefore it public health concern. Therefore, this study aimed to assess birth outcomes among mothers with diabetes who delivered at Tikur Anbessa specialized hospital from January 2015 to December 2017.

1.3. Significance of the Study

The study will be identifying birth outcome in mother with diabetes. This study contributes to social change by providing a better picture of magnitude and severity of the disease, in creating awareness of the seriousness of the problem, and helps to inform public health interventions in Ethiopia. This will be helping to prevent or reduce complications of diabetes in pregnancy. Women with pregnancy receiving proper health care can have decreased adverse birth outcomes which, in turn, results in healthy mothers and children forming a healthy family and leading to a healthy, productive community.

The knowledge generated from the results of this study can lead to measures that policy makers and health care workers can take to develop intervention strategies for preventing complications related to diabetes in pregnancy. This study also supports the achievement of sustainable development goal number 3 (3.1 goals, 3.2 goals and 3.4 goals). These study can also help in midwifery education program by incorporating the finding in to the curriculum and baseline data for future studies.

CHAPTER 2. LITERATURE REVIEW

2.1. Prevalence and Burden of Diabetes in Pregnancy

2.1.1. Prevalence

The prevalence of GDM has been reported variably from 1% to 14% worldwide depending on the population studied and the diagnostic tests employed [1]. In a Canadian study found the prevalence of GDM to be higher in First Nations women when compared with Non-First Nations women in Ontario with the overall prevalence of diabetes [18]. Prevalence of GDM in Qatar was found to be 2.1% [19]. Study done in Saudi Arabia the prevalence was high 24% and 4.3% for gestational diabetes and pre-existing diabetes, respectively [20].

Study in Nigeria showed a prevalence of 8.3 % GDM among antenatal population of in Nigeria [21]. The prevalence of GDM in Kigali Rwanda was 8.3% [22]. In study done in Western Kenya identify the prevalence of GDM were 2.9% which low prevalence [23].

2.1.2. Risk factors

Study done in America identify mean maternal BMI was 27.7, 13.7% were obese, and GDM was diagnosed in 16.1%. Relative to non-GDM and non-obese women, odds ratio for birth weight .90th percentile for GDM alone was 2.19 (1.93–2.47), for obesity alone 1.73 (1.50–2.00), and for both GDM and obesity 3.62 (3.04–4.32). Birth weight.90th percentile was progressively greater with both higher hyperglycemia and higher maternal BMI [24].

Women ≥ 30 years old were found to be 3.8 times more likely to develop GDM than younger women (< 20 years old). In this same model, women obese prior to pregnancy (BMI ≥ 30) were 2.7 times more likely to develop GDM than women with a healthy pre-pregnancy BMI (< 25). Race was not found to be significantly associated with GDM in Palau. In a multivariate model examining risk factors for neonatal death, women with GDM were found to be 4.9 times more likely to have a neonatal death than women without GDM when age and BMI [25].

The relationship between the prevalence of GDM/pre-existing diabetes and BMI in both conditions showed increased prevalence with increase in BMI [20]. Excessive weight gain in pregnancy similarly contributes to the risk of developing diabetes. Age is also a risk factor for

diabetes. Both risk factors (overweight and age) are especially noteworthy considering that both weight and age of, first pregnancy have increased [26, 27].

Studies identify that high body mass and a family history of diabetes were both associated with greater likelihood of developing gestational diabetes. Twenty-one percent of women with a body mass index (BMI) greater than 25 were diagnosed with gestational diabetes, while just five percent of women with a BMI lower than 18.5 had the disease. GDM prevalence among those who reported having a first-degree family member with diabetes was almost three times greater than those who did not report such a history [28].

2.2. Burden of Diabetes

Studies identify burden of diabetes had higher incidence of maternal morbidity including cesarean deliveries, shoulder dystocia, birth trauma, hypertensive disorders of pregnancy (including preeclampsia), and subsequent development of T2DM. Perinatal and neonatal morbidities also increase; which include macrosomia, birth injury, hypoglycemia, polycythemia, and hyperbilirubinemia [12].

The study done Saudi Arabia showed that almost 30% of the obstetric population in Riyadh suffers from the adverse effects of either pre-GDM or GDM and that nearly 50% of pregnant women with T2DM were unaware of their condition. In addition, the study demonstrated the increased morbidities and mortalities associated with pre-GDM compared to GDM and between T1DM and T2DM [20].

2.2.1. Maternal Outcome:

Study done Saudi Arabia show that Cesarean section delivery GDM had 26% and 46.6% for pre-GDM. They are 2.6 times more likely to be delivered by Cesarean Section. Mothers with PGDM were 8.5% and for GDM 18.1% had preterm delivery less than 37 gestation weeks, PGDM 2.6 times more risk. There was 2 times increase in frequency of stillbirth among women with pre-gestational DM compared to the gestational DM [20].

Study done in Qatar identify that 92.80% of women underwent cesarean delivery only 7.20% were had normal delivery. Co-morbidity complications like PIH were also Reported 14.4% were found with PIH, 2.7%, women with polyhydramnios [19]. Mothers with higher risk of recurrent GDM in subsequent pregnancies have chance of progression to type 2 DM. About 17% of

Australian women who have had GDM develop type 2 diabetes within 10 years, and up to 50% within 30 years and increased risk of developing cardiovascular disease [29].

Study identify diagnosed with hyperglycemia during labor, the condition was highly associated with macrosomia in neonates. Other complications associated with maternal hyperglycemia during labor were perianal tears, cesarean section, and intrauterine fetal death, though the association was not statistically significant [30].

In current study 29% of the delivered before 38 weeks' gestation with hypertensive complications 14% and spontaneous pre-term labor 8% featuring prominently. The median birth weight was 3280 grams. There was a high incidence of peripartum fetal distress in 26% reflected in the caesarean section of 55% [17]. The study done in Tanzania identify that hyperglycemia was associated with an increased risk of delivery before 37 weeks, incident gestational hypertension 2.90 low birth weight, reduced newborn head circumference and stillbirth [5]

2.2.2 Fatal Outcome

Studies show that 7.69% of the infants born to diabetic mothers were low-weight and 28.85% macrosomia compared to 6.81% and 19.44% respectively in the non-diabetic mothers. About 15.38% of diabetic mothers delivered prematurely compared to 10.18% non-diabetic women. Only 88.46% of the infants born by diabetic mothers had Apgar score 8 to 10 compared to 90.74% of the born by non-diabetic mothers [31].

The neonates of mothers with PGDM were significantly heavier compared to those of gestational diabetes and the frequency of macrosomia was 3.7 times more. Mothers with pre-gestational diabetes have increased risk of preterm delivery less than 37 gestations weeks, preterm delivery between 34 and 36 weeks, stillbirth rate, neonatal admission to intensive care unit, macrosomia, low APGAR scores, and shoulder dystocia [20].

Study done in Qatar identifies there was 53.87% babies were born as term and 46.12% were born as preterm delivery. 8.1% babies were Large for gestational age, 78.01% were Appropriate for gestational age and 32 13.79% babies were Small for gestational age. 87.93% babies Apgar score was less than or equal to 7 at the 1st minute and 40.08% babies had Apgar score and 58.15% babies had 9 at the 5th minute. 53.44% babies Random Blood Sugar value was less than the

normal level and 46.55% has normal level and 57.75% has hyperbilirubinemia and 42.24% has normal level of bilirubin and 29.74% had both hyperbilirubinemia and hypoglycemia [19].

The incidence of neonatal intensive care admission was 4.9%. The mean length of stay in the NICU was 16 days. The commonest cause of neonatal NICU admission was hyperbilirubinemia (41.2%). The risk factors for NICU admission were 4.6 times more delivery by non SVD procedure, in preterm deliveries 4.6 times risk and 2.5times risk of NICU admission of induced labor [25].

study done Tanzania identify that hyperglycemia during pregnancy was associated with an increased risk of adverse fetal outcome 2.11times increase risk of preterm delivery before 37 weeks, 2.87 times increase incidence of low birth weight and 3.38 times increase incidence of stillbirth than non-hyperglycemic mothers [5].

Study done in Sudan determine It was observed that 68% neonatal had complications; 38% were born to mothers with gestational diabetes, while 30% were born to mothers with pre-gestational diabetes), and 32% had no complications. Multiple complications were observed in 22% babies. 28% were macrosomia, 34% were large for gestational age and 4% were of low birth weight, 6% Congenital anomalies occurred in neonate, Respiratory distress syndrome occurred in 2% neonate. Hypoglycemia occurred in 12% of the neonates. Neonatal death occurred in 4% of the neonates. 2% macrosomia neonate born to a mother with type 1 diabetes had shoulder dystocia and brachial plexus injury. Length of hospital stay ranged from 0 to 7 days, with a median hospital stay of 5 days [17].

2.3. Management of Gestational Diabetes Mellitus

The aim of the management of GDM is to achieve tight glycemic control to prevent adverse pregnancy outcomes. Management entails lifestyle modification (diet and exercise), oral glycemic agents (metformin and glibenclamide) and insulin or a combination of these methods as required. International Workshop-Conference on GDM made recommendations relating to glycaemia in GDM pregnancies, and the potential role of fetal growth targets. The recommendation was to maintain capillary blood glucose at < 5.3 mmol/L (fasting state), < 7.8 mmol/L at 1- h and < 6.7 mmol/L at 2-h after starting a meal. Careful analysis of the metformin versus insulin in gestational diabetes study showed a strong association between the level of glycaemia achieved and pregnancy outcomes [10]. The study done in Qatar, identify that of the

affected women, 16.21% were managed with diet alone and 83.79% were received insulin treatment. Increased BMI, weight, marital status period and positive family history for Diabetes Mellitus shows definite influence on GDM [19].

In summary on the literature that I have reviewed variable above, preterm labor, hypertension/preeclampsia, induced labor, shoulder dystocia, C/S delivery, ICU admission, maternal death on maternal outcome was reviewed. On fetal outcome respiratory distress, macrosomia, low birth weight, macrosomia, poor Apgar score, birth injury, birth defect, still birth, IUFD, hypoglycemia, admission to the neonatal intensive care unit, or early neonatal death in most of the literatures reviewed. However other variable that will try to study remains controversial among the different studies. Although numerous studies address birth outcome in mother with diabetes, no study has strongly conclusion resulted in the pregnancy outcome and some of the studies have limited sample size and some studies analyze only one prevalence. As far as my knowledge concerned there is no published study on birth outcome of among mother with diabetes in Ethiopia. In my study those factors will be considered.

2.8. Conceptual framework

The conceptual framework illustrated below suggests how various factors could influence birth outcome and associated factors among mother with diabetes. The model includes socio demographic factors: Age, education, residence, occupation, marital status, BMI, personal behavior factors, ANC clinic visit, physical exercise, Management DM; Diet Exercise. Past obstetrics history: (still birth, PIH, macrosomia, abortion, CS delivery history). Obstetric factors: (parity, gravidity, gestational age), Mode of Delivery: (spontaneous, vaginal delivery, C/S, instrumental delivery). Maternal complication: (PIH, Polyhydroaminus, birth injury, hypothyroidism, obstructed labor) These factors may be inter-related and may contribute to birth outcomes in a mother with diabetes. This conceptual model adopted literature [32]

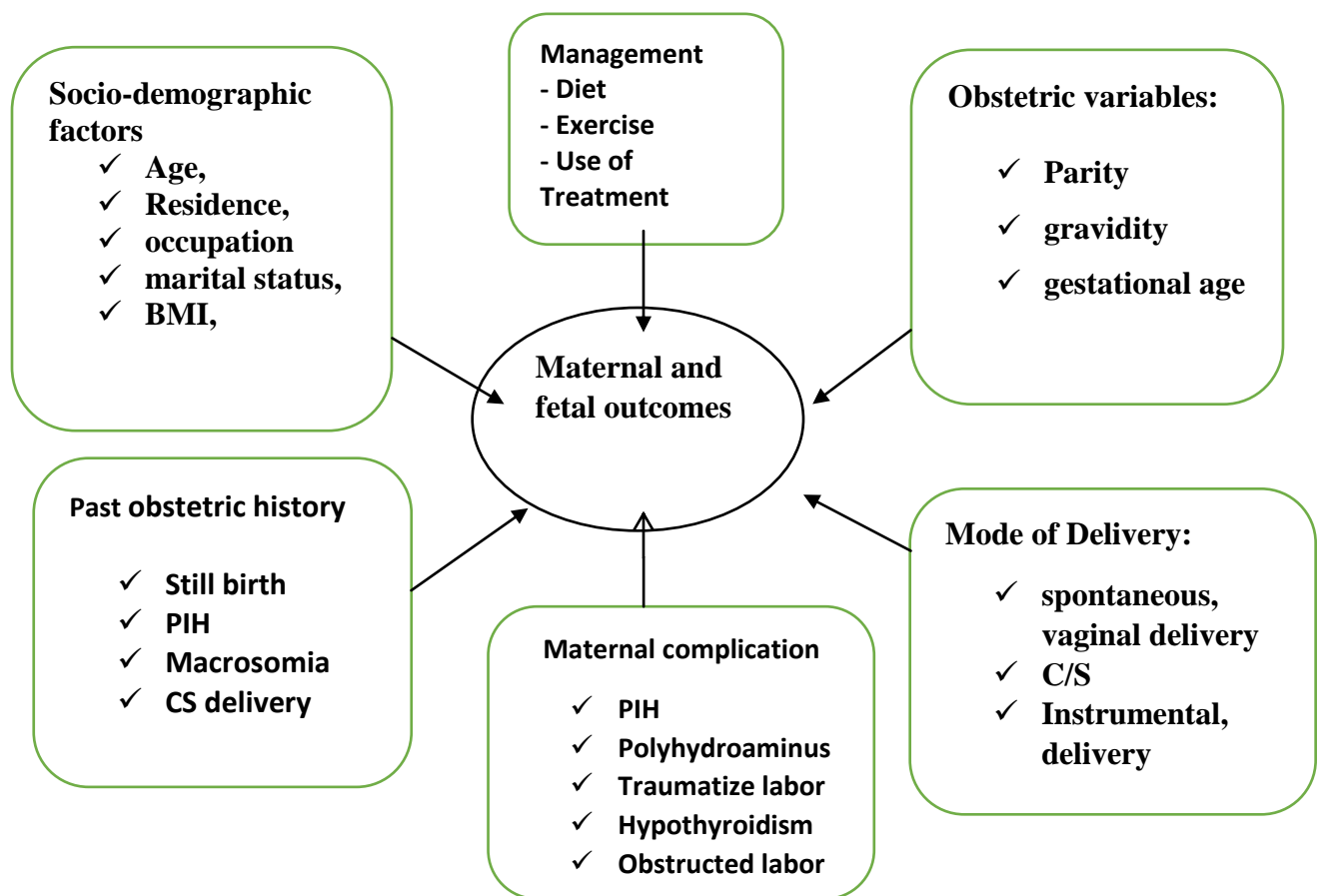


Figure 1: Conceptual framework depicting the factors that contribute to birth outcomes mother with of diabetes

CHAPTER THREE OBJECTIVES

3.1 General Objective:

To assess birth outcomes among mother with diabetes who delivered in Tikur Anbessa specialized hospital in Addis Ababa Ethiopia 2018

3.2. Specific Objectives:

- To identify complication in mother with diabetes who delivered at Tikur Anbessa specialized hospital
- To describe fetal outcome among mother with diabetes who delivered at Tikur Anbessa specialized hospital
- To assess factors associated with birth outcomes among mothers with diabetes who delivered at Tikur Anbessa specialized hospital

CHAPTER FOUR: METHODS

4.1. Study Area

The study was conducted in Tikur Anbessa specialized teaching hospital is a tertiary referral hospital in Addis Ababa. Addis Ababa is the capital city of Ethiopia with an area of 530 km² and total population of Addis Ababa as of 2007 GC was 3,384,569. It has 10 sub-cities. The health service coverage of Addis Ababa is 71%. In the city 82% of deliveries take place in public health facilities. There are 6 hospitals owned by Addis Ababa health bureau, 4 by Federal Ministry of Health and 1 by Addis Ababa University, 3 by non-governmental Organizations, 3 by defense force and police and 34 are private hospitals. There are 84 public health centers and 700 private clinics out of which 75 are higher clinics. From this Tikur Anbessa specialized teaching hospital is a tertiary referral hospital and the largest of all public hospitals in Addis Ababa. Area of TASH covers 12300m.sq of land with 8 floors and 1262 rooms with 800 beds. The hospital provides a tertiary level of health care service. It offers diagnoses and treatment for approximately 370,000-400,000 patients per year in all wards. TASH is the largest and oldest teaching hospital in the country which is classified in to different departments. From this diabetes center is one of the department in the hospital. From the total of 800 beds, 80 of which are currently being used by department of obstetrics and Gynecology. About around 4600 deliveries were attended each year and 60% of this is operative deliveries [33].

4.2. Study Design

Facility based retrospective cross-sectional study was carried to assess the birth outcomes among mothers with diabetes who delivered at Tikur Anbessa Specialized Hospital from January 2015 to December 2017.

4.3. Study period

Study was conducted from February 1 to April 30, 2018.

4.4. Source Population

All records of mothers who delivered at Tikur Anbessa specialized hospital Addis Ababa

4.4.1. Study Population

All records DM mothers who delivered at Tikur Anbessa Specialized Hospital from January 2015 to December 2017.

4.5. Inclusion criteria

Records of mother with gestational diabetes and pre gestational diabetes (type 1 and type 2) who delivered after 28wks of gestation at Tikur Anbessa Specialized Hospital from January 2015 to December 2017

4.6. Exclusion criteria

Mothers records with multiple/twin delivery

Mothers records with incomplete records of study variable

4.7. Sample size determination

Sample size was determined by using a single population proportion formula. The following assumptions were made while calculating the sample size. 95% confidence level, margin of error (0.05) and 50% anticipated population proportion was taken. Since there is no published papers on assess birth outcome among mother with diabetes in Ethiopia as far as my knowledge concerned.

$$n = \frac{(z\alpha/2)^2 \times pq}{d^2}$$

Where:

P = 50% (proportion of birth outcome)

Z $\alpha/2$ = critical value at 95% confidence level of certainty (1.96)

d= the margin of error between the sample and the Population or desired precision (5%)

n = sample size

$$\frac{(1.96 \times 1.96)(0.5 \times 0.5)}{0.05 \times 0.05} = 384$$

0.05x0.05

Where: By adding 10 % drop out rates, the final sample size equal to = 422

4.8 Sampling procedure

Tikur Anbessa specialized hospitals were purposely selected because this hospital is the largest public hospital with maternal health service and have diabetes center/department. The required data were extracted from patient chart. Firstly, from HMIS delivery registration book, post-natal registrations, admission registration and GDM registration in DM center card number were obtained and document of all delivered mothers who had DM during the planned study period at obstetrics ward was searched and checked for completeness of the data. Then those mothers who had complete data record were separated and convenient sampling method was carried out.

4.9. Variables

4.9.1. Dependent Variable

Maternal and fetal outcome

4.9.2. Independent Variables

Socio demographic variables: Age, residence, marital status, BMI.

Previous bad obstetric history: abortion, still birth, IUFD, C/S, macrosomia, PIH

Obstetric variables: Parity, gravidity, gestational age at time of delivery, past and current obstetric history

Treatment of diabetes used during pregnancy: oral ant glycemc agent, insulin, diet and exercise

Mode of delivery: Spontaneous vaginal delivery, instrumental delivery, C/S.

Maternal complication: PIH, preterm delivery, traumatized labor/tear, Polyhydroaminus, hypothyroidism and ICU admission

4.10. Operational and conceptual definitions of variables

Gestational Diabetes Mellitus (GDM) is any degree of glucose intolerance with onset or first recognition during pregnancy and disappears by the end of the periperium [1]

Pre-Gestational diabetes: diabetes diagnosed prior to onset of pregnancy. This can be type 1 or type 2 [1].

Type 1 Diabetes: Metabolic disorder resulting from absolute insulin deficiency [1].

Type 2 Diabetes: Metabolic disorder resulting from defective insulin secretion or insulin resistance [1].

Birth outcome: - include both maternal and fetal outcome

Normal maternal outcome: refers to mothers who had normal birth outcome without complications like hypertension, preterm delivery, traumatized labor/tear, C/S delivery, ICU admission, Polyhydroaminus, hypothyroidisms and maternal death

Adverse maternal birth outcome: refers to mothers who had at least one of the following complications like preterm deliveries, PIH, birth injury/tear, C/S delivery, instrumental delivery, ICU admission, Polyhydroaminus, hypothyroidisms, maternal death.

Normal Fetal outcome: refers to fetal/neonatal outcomes without the following complications (preterm, RDS, LBW, macrosomia, poor Apgar score, birth injury, birth defect, IUFD, still birth, admission to the neonatal intensive care unit).

Adverse fetal outcome: refers to neonates who had at least one of the following adverse complications (preterm, RDS, LBW, macrosomia, poor Apgar score, birth injury, birth defect, IUFD, still birth, admission to the neonatal intensive care unit).

Good Apgar score: refers to when Apgar score is greater than seven at 5min of birth [34].

Poor Apgar score: refers to when Apgar score is less than seven at 5min of birth [34].

Normal: weight; BMI 18.5 -24.9 kg/cm²

Over weight: BMI 25-29.9 kg/cm²

Class I obesity: BMI 30-34.9 kg/cm²

Class II obesity: BMI 35-39.9kg/cm² [35].

4.11. Data collection tools and procedure

A structured checklist adapted from published studies with certain modifications was used. The questionnaire was prepared in English. The check list includes information on socio-demographic characteristics, past and present obstetric history, maternal outcome and fetal outcome. Data was collected through document review in obstetrics ward. The required data were extracted from patient chart obtain card/chart number from delivery registration book, post-natal registrations, duty report registration books and operation log books. After card number were obtained and document of all delivered mothers who had DM during the study period at obstetrics and gynecologic ward was searched and checked for completeness of the data. From those mothers who have complete documents, the data was collected by three BSc Midwife/nurse who work in obstetrics department and had at least three-year work experience, two record office staff and two supervisors and the principal investigators was perform the supervision of data collection procedures on daily bases.

4.12. Data quality control

To ensure the quality of the data and checking the existence of required variable, before the actual data collection, pretest was done in Zawditu Memorial hospitals on 5% records of patient document to identify problems with the checklist and procedures of data collection then appropriate modifications was made on the checklist and procedures after analyzing the pretest result. One-day training was given to data collectors how to identify complete and incomplete data. The supervisors and the principal investigator were coordinate and checks on the data collection process and daily supervision was done to ensure the completeness and consistency of the gathered information.

4.13. Data processing and analysis

The collected data was entered and cleaned to Epi Data 4.2 software which secured further data quality by reducing errors made while data entry. Then entered data was transported to SPSS version 23.0 for data analysis. Frequencies, proportions and measures of central tendency and measures of variation were used to describe the study variable. To explain the study population in relation to relevant variables, descriptive statistics were illustrated by a frequency distribution table; graph and summary measures were computed. To identify significant associated variables for diabetes, first each independent variable with the outcome/dependent variable were checked using bivariate logistic regressions. And those variable p value <0.25 were selected and imported for further analysis using multiple logistic regressions. In multiple logistic regressions, those variables' *P*-value less than 0.05 were used to declare statistical significance.

4.14. Ethical Consideration

Ethical clearance was obtained from school of nursing and midwifery ethical review committee. Official letter of cooperation was taken from the School of Nursing and midwifery to TASH for data collection to the respective departments. To keep the confidentiality their names were not documented; rather a code was given for each card.

5. Result

In Tikur Anbessa Specialized Hospital from January 2015 to December 2017 total of 14039 deliveries were attended. From these total deliveries 362 mothers was diabetes , 346 cards of mothers who had complete records were reviewed in the study with response rate of 95.6%. Majority, 139 (40.2%) were in the age group of 30-34 years, with the mean age of 30.8 year and standard deviation of 4.7. Almost all the mothers, 345 (99.7%) were married and half of them 174(50.2%) were house wife. Majority of mothers, 322(93.1%) were from Addis Ababa. Regarding occupation 50.2% mother were house wife and 49.8% employed.

Table 1 Socio demographic data of mothers at Tikur Anbessa specialized hospital Addis Ababa, Ethiopia, 2018.

Variable		frequency	Percent (%)
Age	18-20	8	2.3
	20-24	24	6.9
	25-29	92	26.6
	30-34	139	40.2
	>35	83	24
BMI	Normal	160	46.2
	over weight	109	31.5
	class 1 obesity	63	18.2
	class 2 obesity	14	4.1
Address	Addis Ababa	322	93.1
	Out of Addis Ababa	24	6.9
Occupation	House wife	174	50.2
	Employed	172	49.8
Marital status	Married	345	99.7
	Un married	1	0.3
Parity	Primipara	66	19.1
	Multipara	280	80.9

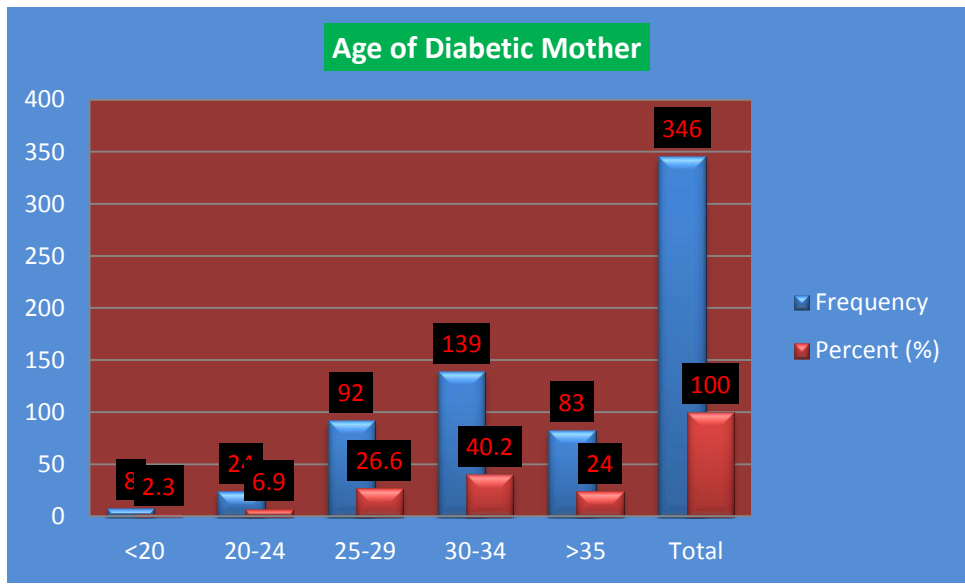


Figure 2: Shows age of diabetic mothers at Tikur Anbessa hospital Addis Ababa Ethiopia 2018.

Majority, 139 (40.2%) were in the age group of 30-34 years, followed by 25-29 age group which accounts (92)26.6% with the mean age of 30.8 year and standard deviation of 4.7.

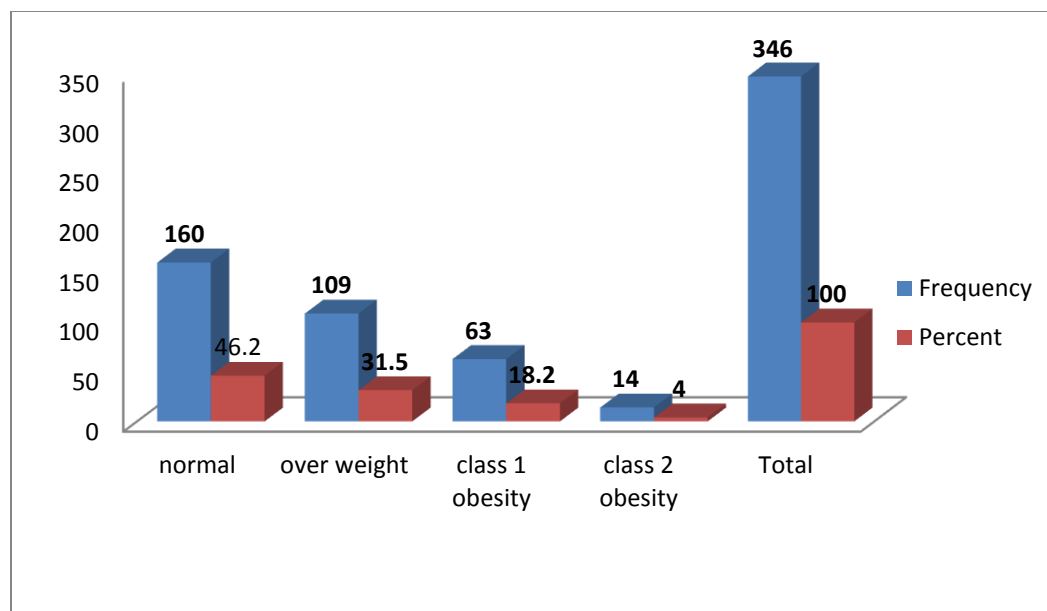


Figure 3: Shows classification of obesity of mothers at Tikur Anbessa specialized hospital Addis Ababa Ethiopia 2018.

In this study, mean body mass index (BMI) of women were 26.43 Kg/cm² and 46.2% of women had normal BMI. From the total, 31.5% of the women in diabetes group had over weight and 18.2% were class-1obesity and 4% grouped were class-2 obesity.

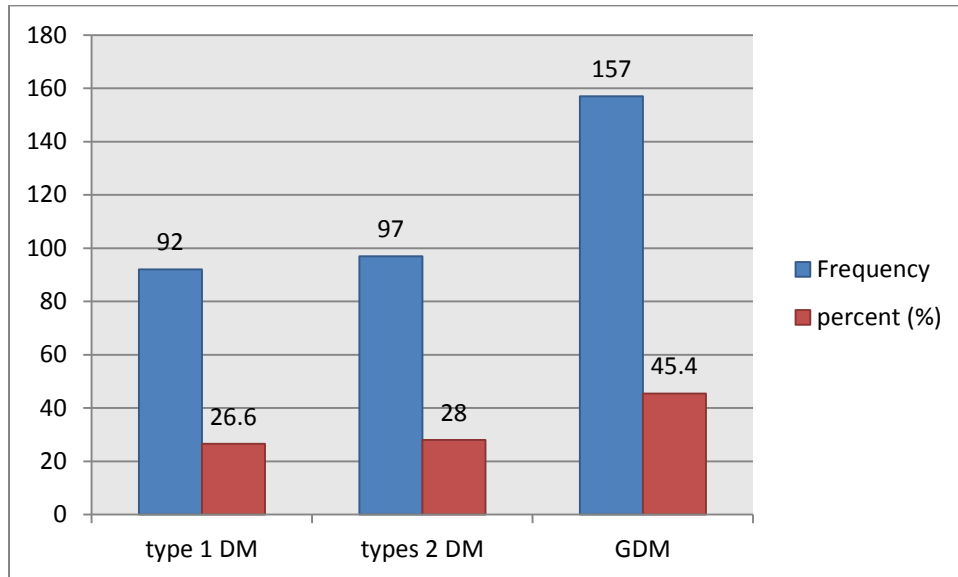
Table 2: Previous obstetrics history of mothers with diabetes at Tikur Anbessa specialized hospital Addis Ababa Ethiopia 2018.

Variables	Frequency	Percent (%)
	n=346	
History Abortion	72	20.8
Previous history CS history	70	20.2
Previous History Still birth	47	13.6
History PIH	32	9.2
Previous history of birth Wt.>4000gm	28	8.1

NB: The add percentage may not be 100%

Regarding to the obstetrics characteristics of diabetic women attended maternity ward at TASH, more than three fourth of mothers, 280(80.9%) were multipara and 66(19.1%) of mothers were Primipara. From reviewed data 72(20.8%) had history of abortion, 47 (13.6%) had history of still birth, 70(20.2%) previous history of CS delivery, 28(8.1%) previous history macrocosmic and 2(9.2%) had previous history hypertension.

Table 3: Types DM in mothers at Tikur Anbessa specialized hospital from Addis Ababa Ethiopia 2018.



Out of the total GDM (157(45.4%)), more than half 92(26.6%), 97(28%) were type1 DM and types 2 DM respectively. Of the 346 women in the study, 144 (41.6%) were managed with lifestyle modification (diet and exercise) alone. Thirty six (10.4%) used oral anti diabetic drug and 166(48%) were take insulin.

Table 2: The maternal outcomes among mothers delivered at Tikur ambessa specialized hospital Addis Ababa Ethiopia 2018.

Outcome variables		Frequency	percent
		n=346	
Onset of labor	Spontaneous	177	51.2
	Induced	64	18.5
	Elective CS	105	30.3
GA at time of delivery	Preterm	62	17.9
	Term	284	82.1
Mode of delivery	SVD	137	39.6
	AVD	9	2.6
	CS	200	57.8
Maternal complication	PIH	90	26
	Polyhydramnios	5	1.4
	Tear(traumatize labor)	7	2
	Hypothyroidism	6	1.7
	Obstructed labor	1	0.2
	Cardiac disease	3	0.8
	Chronic renal disease	1	0.9
	Others	36	10.4
Maternal ICU admission		111	32.1

NB: added percentage may not be 100%

From reviewed data, 177(51.2%) labor occurs spontaneously, 64(18.5%) were induced and the remaining 107(48%) cases were performed by elective cesarean section. 284(82.1%) of mothers were delivered at term and 62(17.9%) delivered before 37 weeks gestation (preterm) and the mean gestational age was 37.38 weeks. More than half, 200(57.8%) mothers delivered by cesarean section followed by 137(39.6%) were delivered by SVD and 9(2.6%) by assisted vaginal delivery. 35% of mothers had diabetes related complication (co-morbidity). From this 90(26%) PIH, 6(1.7%) hypothyroidism, 7(2%) of them tear, Polyhydramnios in 5(1.4%). 111(31.2%) of mothers admitted to ICU. Diabetes mothers had 9 day average length of stay in hospital.

Table 3: Comparing maternal outcomes in GDM and PGDM mothers at Tikur Anbessa specialized hospital Addis Ababa Ethiopia 2018.

Maternal Outcome Variable		GDM N=157	%	PGDM N=189	%
Onset of labor	Spontaneous	72	40.2%	105	59.8%
	Induced	27	42.2%	37	57.8%
	Elective	58	55.2%	47	44.8%
Gestational Age at Time of delivery	Preterm	19	30.6%	43	69.4%
	Term	138	48.6%	146	51.4%
Mode delivery	Spontaneous Vx delivery	48	35.0%	89	65.0%
	Instrumental delivery	3	33.3%	6	66.7%
	caesarean section	106	53.0%	94	47.0%
Types of C/S	Emergency C/S	48	51.0%	46	49.0%
	Elective CS	58	54.3%	47	45.7%
PIH		47	52.2%	43	47.8%
Polyhydroaminus		3	60.0%	2	40.0%
Traumatize labor		2	28.6%	5	71.4%
Hypothyroidism		4	80.0%	1	20.0%
Cardiac d/s		1	33.3%	2	66.7%
Obstructed labor		0	0.0%	1	100.0%
Maternal ICU admission		55	49.5%	56	50.5%

Onset of labor was spontaneous in 40.2% of mother with gestational diabetes and 105(59.8) pre-gestational diabetes. Induction of labor greater in pre-GDM than GDM which was 27(42.2%) and 37(57.8%) respectively. But elective CS was higher in mother with GDM. Preterm labor was greather in mothers with pre-GDM wich was 19(30.6%) and 43(69.4%) respectively. Majority mode of delivery was cesarean section 200(57.8%) but higher in GDM mothers which was 106(53%) of GDM and 94(47%) of pre-GDM. Spontaneous dilvery and assisted vaginal dilvery were greater in PGDM wich was 3(33.3%)GDM and 6(66.7%) PGDM. Both emegency and elective cessearean section was higher in pre-gestational diabetes than gestational diabetes wich was 196 (52.6%) and 93(47.4%) respectively. Prevalence of pregnancy induced hypertension pre-gestational diabetes and gestational diabetes were 52.2% and 43(47.8%) respectively in. Birth truama/tear was higher in pre-gestational diabetes which was 5(71.4%) and 2(28.6%) was GDM. Maternal ICU admission was 55(49.5) and 56(50.5%) with mean leangth stay of 9 days which is almost equal in both pre-gestational diabetes and gestational diabetes.

5.1. Fetal outcome

In this study, 337(97.4%) live birth were identified from this normal live birth accounts 219(63.3%) and 127(36.7%) were born with adverse fetal outcome. Multiple complications were observed in 43(12.4%) babies. Low birth weight accounts 35(10.1%) of newborn. Respiratory distress was occurred among 32(9.2%) of them. Apgar score at 5 minutes was found to be normal among 89.9% but poor Apgar in 10.1% of them. Admission to neonatal intensive care unit was only 65.3% neonate.

Table 4: The fatal outcomes among postnatal mothers with diabetes delivered at Tikur Anbessa specialized hospital Addis Ababa Ethiopia 2018.

Fetal outcome variable	Frequency N=346	Percent (%)
Live birth	337	97.4
Macrosomia	61	17.6
Preterm	62	17.9
Low birth weight	35	10.1
RDS	32	9.2
Hypoglycemia	10	2.9
Still birth	9	2.6
Jaundice	7	2
IUFD	6	1.7
Birth injury	6	1.7
Birth defect	3	0.9
NICU admission	226	65.3
Apgar score 1 th min<7	82	23.7
poor Apgar score 5 th min	35	10.1

Table 5: Comparing neonatal outcome in GDM and PGDM among postnatal mothers delivered at Tikur Anbessa specialized hospital Addis Ababa Ethiopia 2018.

Outcome Variable	GDM	%	PGDM	%
Still born	1	11.1%	8	88.9%
IUFD:	1	16.7%	5	83.3%
preterm born	19	30.6%	43	69.4%
Respiratory distress	16	50.0%	16	50.0%
LBW	9	25.7%	26	74.3%
Hypoglycemia	2	20.0%	8	80.0%
Macrosomia	33	54.1%	28	45.9%
Jaundice	1	14.3%	6	85.7%
Birth injury	2	33.3%	4	66.7%
Birth defect	3	100.0%	0	0.0%
Poor APGAR score 1st min	32	39.0%	50	61.0%
Poor APGAR score 5th min	13	37.1%	22	62.9%
NICU admission	99	43.8%	127	56.2%

Fatal adverse outcomes were more in pre-gestational diabetes than gestational diabetes. Still birth was higher in pre-GDM than GDM which was 1(11.1%) and 8(88.9%) respectively. Hypoglycemia was observed in 2(20%) GDM and 6(80%) Pre-gestational diabetes observed. Neonatal ICU admission was 99(43.8%) in GDM and 127(56.2%) in PGDM. Respiratory distress prevalence equal in both PGDM and GDM. Poor Apgar in 5th minutes was observed in 13 (37.1%) GDM and 22 (62.9%) PGDM observed. Low birth weight was greater in pre-GDM than GDM which was 9(25.7%) and 26(74.3%) respectively. Birth defect was common to GDM which 1% and macrosomia was higher in GDM which accounts 33(54.1%) neonate.

5.2. Factors associated with birth outcomes among postnatal mothers with diabetes delivered at Tikur Anbessa specialized hospital.

Bivariate analysis on maternal outcome

By bivariate analysis on maternal outcome maternal age, BMI and previous history of PIH were associated on bivariate analysis. This mentioned variable was recruited for multivariate analysis.

Multivariate analysis

In multivariate analysis Mothers with BMI (30-34) or class I obesity were 3.8 times develop adverse perinatal outcome than class II obesity and statically associated at (P <0 .020) and [OR=95% CI 3.8(1.29, 8.319)]. Mothers with previous history of PIH were 2.1 times develop adverse perinatal outcome than without PIH and statically associated at P value (P <0 .0001) and [OR=95%CI 2.1(1.03, 4.399)].

Table 6: Multivariate logistic regression on factors associated with maternal outcome among mothers diabetes delivered at Tikur Anbessa specialized hospital Addis Ababa Ethiopia 2018.

Variables		yes	No	COR(95%CI)	p-value	AOR(95%CI)
Age	15-19	5	3	711(.159, 3.169)	0.198	2.70 (.594-12.325)
	20-24	45	38	2.368(.914, 6.138)*	.751	.857(.333, 2.21)
	25-29	70	69	1.41(.777, 2.558)	.897	1.0(.563, 1.92)
	30-34	42	50	1.167(.677, 2.013)	.751	1.0(.622, 1.93)
	>35	8	16	1		1
BMI	Normal weight	11	3	5.3(1.439, 19.96)*	.758	.839(2.76, 2.55)
	Over weight	47	16	4.837(1.27, 18.31)*	.022	.567 (.182, 1.767)
	Class I obesity	47	62	1.248(.309, 5.047)	.328	3.8(1.29, 8.319)**
	Class II obesity	65	95	1	.756	1
History of PIH		32	4	9.97(3.44, 28.87)*		2.1(1.03, 4.399)**
		138	172	1	.041	1

Fetal outcome

Maternal occupation, previous history of PIH, preterm delivery, CS delivery and current history of PIH were associated on bivariate analysis then recruited to multivariate analysis.

Multivariate analysis

In multivariate analysis neonate born from house wife mothers were 2.1 times develop adverse fetal outcome than employed and statically associated at (P <0 .002) and [OR=95%CI 2.117 (1.315, 3.405)]. Preterm delivery significantly associated with adverse birth outcome at [P<0 .0001) [OR=95%CI 9.763(4.560, 20.902)]. Current and previous history of PIH in statistically not associated by multivariate analysis with adverse birth outcome.

Table 7: Multivariate analysis of the independent variables on adverse birth outcomes among postnatal mothers at Tikur Anbessa hospital specialized Addis Ababa Ethiopia 2018.

Variables	birth outcome		COR(95% CI)	P-value	AOR (95% CI)	
	Yes	No				
Occupation	House wife	88	86	5.36(1.439,19.961)*	.002	2.11(1.31, 3.40)**
	employed	64	108	1		1
Previous history of PIH		22	14	2.17 (1.073,4.412)*		1.434(.614, 3.349)
		130	180	1	.404	1
Gestational age	Preterm	52	10	9.56(4.661,19.642)*	.0001	9.76(4.56, 20.90)**
	Term	100	184	1		1
Mode of delivery	SVD	69	68	1		1
	Assisted vaginal delivery	4	5	1.268(.327, 4.926)	.796	1.067(.651, 1.751)
	Caesarian section	79	121	1.64(1.002, 2.410)*	.042	1.484(.355, 6.198)
Maternal current PIH		48	42	1.7(1.030, 2.709)*		1.145(.646, 2.031)
		104	152	1	.643	1

6. Discussion

The main objective of this study was to assess birth outcome among mothers with diabetes who delivered in TASH Ethiopia. 26 %, mother were complication by PIH, This was greater than study done Sued Arabia and Qatar which was 15%, 14% and 14.4% respectively [20,16,19]. The variations of the result may be due to awareness of prevention of diabetic related complication among mothers.

The majority of mother 57.8% delivered by cesarean section this was less than the study done in Saudi Arabia 68.7% mothers was delivered caesarean section [20]. Our finding was however lower than to the finding Cameron 19.3% mothers delivered by cesarean section [34]. The higher rate of operative delivery was related to the higher incidence of macrosomia and related to quality of care they provide

The most major complication of diabetes mother was preterm delivery, 17.6% which was greater in pre-gestational diabetes, which accounts 5.4% GDM and 12.4% PGDM. Which was smaller than study done in Bahrain which was 9.5% and 25.9% respectively, and also greater than study done Qatar 6.12% were preterm baby [37, 19]? The variations between the findings may be due to variations in quality of maternal health services.

The most common neonatal adverse outcome observed were macrosomia and which occurred in 22%, with the majority being neonates born to mothers with gestational diabetes. The study done in Cameron [36] and Sudan [17] was the prevalence was higher than this which was 38.7% and 28%, but in contrast to the finding of Bahrain [37] and Saudi Arabia [20] which was 15.1% and 11% prevalence respectively. The variations may be due to variations in quality of care they provide.

In this finding, other neonatal adverse outcome was low birth weight accounts 10.1%, which finding was higher than study done in Sudan and Saudi Arabia, which was 6% and 5.5% [20]. Other study done in Bahrain- Oman was greater than this result which was 9.2% prevalence [37]. This prevalence LBW related to termination of pregnancy as a result of diabetic complication/diabetic co-morbidity and the difference related to quality care they provide.

Respiratory distress was occurring in 9.7% of diabetic mother, which was similar to both GDM and PGDM. This finding was similar to study done in Cameron, which was 9.7% [36]. Other study done in Sudan was less than this finding which was 2%. The variations may be due to variations in quality of maternal health services they provide.

Neonatal admission to NICU was 65%, this finding was less than study done in Russia [38] showed that 100% neonatal NICU admission but study done in Saudi Arabia [20] which was less than this finding. This difference may be due to neonatal health care strategy they apply.

In this study neonate of mothers with diabetes with poor Apgar score at 5th minutes were 10.1%, this is higher than study done in Bahrain were 2.7 % [37]. The study done in India was greater than this which was 65% [39]. The fact that the complications of diabetes that have occurred during pregnancy have affected the well-being of the fetus but the difference in these studies may be due to the early institution of tight metabolic control. Neonate born from unemployed/housewife mothers were 2.1 times more likely to develop adverse birth outcomes than employed and statically associated with adverse birth outcomes at ($P < 0.002$) and [OR=95%CI 2.117 (1.315, 3.405)].

Clients with complications (preterm delivery) in recent pregnancies were found to have higher odds of experiencing adverse birth outcomes than those without the complications with [$P < 0.0001$] [OR=95%CI 9.763(4.560, 20.902)]. This finding was consistent with the study done in Sudan [17], Saudi Arabia [20], Cameron [12], and Bahrain [37]. The link may be explained in terms of the fact that the complications that have occurred during pregnancy have affected the well-being of the fetus in the uterus.

Birth injury was occurring in 1.7 % of diabetic mother, which was more common to PGDM. This finding was almost similar to study done in Sudan, which was 2% [17]. Other study done in Cameron was greater than this finding which was 2% [36]. This may be due to instrumental delivery and macrosomia but the difference may be due to the quality of maternal health services care they provide.

In this finding, other maternal adverse outcome was instrumental delivery accounts 2.6 %, which finding was lower than study done in Cameron, which was 6.4% [36]. Other study done in Sudan

was greater than this result which was 3% prevalence [17]. This prevalence instrumental delivery was related to macrosomia and the difference related to quality care they provide.

Maternal intensive care unit admission was accounts 32.1% with length of stay in hospital range from 0 to 38 days with 9 day average length of stay of which was greater than the study done in Sudan which stay in hospital ranges 0 to 38 days with 5day average length of stay in hospital [17]. This was related to poor maternal blood glucose control and diabetic related complication or co-morbidity and the difference related to quality care they provide.

Congenital anomalies were occurring in 1 % of diabetic mother, which was more common to GDM. This find was less than study done in Sudan, which was 6% [17]. This may be due to related poor glycemic control but the difference may be due to in quality of health services care they provide.

This study identify the prevalence of Polyhydramnios which accounts 1.4% which less than study done in Qatar was 2.7% of women diabetes had Polyhydramnios [19]. This result from poor glycemic control but the difference may be due to quality of maternal health care services, and logistic parameters for screening.

Still birth was occurring in 2.6 % fetus of diabetic mother, which was more common to pregestational diabetes. This find was less than study done in Saudi Arabia and Sudan, which was 3.2% and 4% [20, 17]. This may be due to related poor glycemic control but the difference may be due to in quality of health services care they provide.

6.1 Strengths and limitation of the study:

6.1.1 Strength of the study

This study tries to identify prevalence of diabetes, maternal complication and birth outcome among mother with diabetes in TASH, and it is the 1st study in Ethiopia

This study was conducted with in short period time.

6.1.2 Limitation of the study

- Difficulty of collecting expected sample data due to absence of patient cards from its place in record office; incomplete records of study variable and absence registration books of diabetes mothers before 2015 in diabetic center and maternity ward.
- Incomplete records of study variable like previous history GDM, family history DM and HbA1c measurement.
- Due to absences of study done in our country difficult for comparison
- The study designs (cross-sectional) which measure the exposure and out come at the same time, which cannot measure the cause and effect relationship.

7. Conclusions and recommendations

7.1 Conclusion

Diabetes cause maternal complication and adverse birth outcomes among mothers with diabetes who delivered at Tikur Anbessa specialized hospital. Body mass index and previous history of pregnancy induced hypertension significantly associated with maternal adverse outcome. Preterm delivery and house wife mothers was associated with adverse fetal outcome

7.2Recommendation

To health facility:

- Promotion and support for healthy lifestyles in Addis Ababa, especially among pregnant women is essential to prevent maternal complication and adverse birth outcome.
- All mothers should be screened during pregnancy for diabetes to prevent complications.
- Improving the obstetric care at delivery and timely use of obstetric interventions are essential to improve the maternal and perinatal outcomes of pregnancies complicated by the diabetes.
- All babies born to mothers with diabetes should be admitted to the neonatal care unit for a period of observation to improve the neonatal outcome and reducing the severity of neonatal complications.
- Reducing overall obesity in the population could potentially help reduce risk of pre gestational diabetes and gestational diabetes.

Researcher:

- Further in depth researches are needed in different areas and on large scale in Ethiopia for full understanding of diabetes effect on birth outcome.

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9. ANNEXES

Annex 1 - Information Sheet

Title of the Research Project: assessment of birth outcome mother with diabetes who delivered in Tikur Anbessa specialized teaching hospital Addis Ababa, Ethiopia, 2017.

Name of Investigator: Bajrond Eshetu (BSc).

Name of the Organization: Tikur Anbessa specialized teaching hospital Addis Ababa, Ethiopia,

Name of the Sponsor: AAU, College of Health Science department of Nursing and Midwifery.

Introduction: This information sheet is prepared for Tikur Anbessa specialized teaching hospital Tertiary administration office. The aim of this form is to make the above concerned office clear about the purpose of research, data collection procedures and get permission to conduct the research.

Purpose of the Research Project: assessment of birth outcome mother with diabetes who delivered in Tikur Anbessa specialized teaching hospital Addis Ababa

Procedure: To achieve the above objective, information which is necessary for the study will be extracted from registration books and patient charts.

Risk and /or Discomfort: Since the study will be conducted by taking appropriate information from chart not inflict any harm on the patients. The name or any other identifying information will not be recorded on the questionnaire and all information taken from the chart will be kept strictly confidential and in a safe place. The information retrieved will only be used for the study purpose.

Benefits: The research have no direct benefit for one whose document/ record is included in this research. But the indirect benefit of the research for the participant and other clients in the program is clear. This is because if program planners are preparing predicted plan there is a benefit for clients in the program of getting appropriate care and treatment services.

Confidentiality: The information collected will be kept confidential and it will not be revealed to anyone, except the investigator and it will be kept in key and locked system with computer password.

Person to contact: This research project will be reviewed and approved by the institutional review board of AAU, College of Health Science, and Nursing and Midwifery department. If you have any question you can contact the Investigator with the following address.

Name: BajrondEshetu (Bsc)

Institution: AAU University, College of Health Science, Department of Nursing and midwifery

Cell phone: +251- 982 62 31 47

E-mail: bajeshetu@gmail.com.

10. Annex 2: checklist

Part I SOCIO DEMOGRAPHIC DATA		year:
Q 101	Age	
Q 102.	Weight..... heightBMI	
Q 102	Address:	1. Addis Ababa 2. Out of Addis Ababa
Q 103.	Occupation	1. House wife 2. Employed 3. Student
Q104.	Marital status	1. Unmarried 3. Widowed 2. Married 4. Divorced
Part II. OBSTETRIC HISTORY		
Q201.	Gravid	-----
Q 202.	Parity----	1. Primipara 2. Multipara
Q 203.	Previous bad obstetric history. (more than one answers is possible)	1. Abortion/miscarriage 2. Still birth 3. Preterm born 4. Birth defect 5. Caesarean section delivery 6. Live birth born Wt.>4kg 7. PIH 8. Others.....
Q204.	What type of diabetes was diagnosed at this pregnancy?	1. Preexisting Type 1 DM 2. Preexisting Type 2 DM 3. Gestational diabetes
Q205.	Main treatment till delivery?	1. Oral anti diabetes 2. Insulin injection 3. Diet adjustment and exercise

	4. no treatment
IV MATHERNAL OUTCOME	
Q401. The onset of labor	1. Spontaneous 2. Induced 3. Elective C/S
Q402. Gestation age at time of delivery	-----
Q403. Mode of delivery	1. Spontaneous vaginal delivery 2. Assisted vaginal delivery 3. Caesarean section
Q404. If C/S done what type of C/S was performed?	1. Emergency C/S 2. Elective C/S
Q405. Is there any maternal complication	1. Yes 2. No
Q406. If yes, what? (more than one answers is possible)	1. Obstructed labor 2. Traumatize labor/tear 3. PIH 4. Polyhydramnios 5. Chronic renal disease 6. Cardiac diseases 7. hypothyroidism 8. Maternal death 9. Others, Specify.....
Q408. Maternal ICU admission	1. Yes 2. No
Q409. Number of days of hospitalization	-----

FETAL OUTCOME	
Q501. What outcome delivery (more than one answer is possible)	<ol style="list-style-type: none"> 1. live birth 2. still birth 3. IUFD 4. Preterm 5. Respiratory distress 6. Low Birth Weight 7. Hypoglycemia 8. Macrosomia 9. Jaundice 10. Birth injury 11. Birth defect <p>If other list-----</p>
Q502. Birth weight in gram	-----
503. Apgar score	
1. At 1 st minute	-----
2. At 5 st minute	-----
Q504. Is there neonatal admission to NICU?	<ol style="list-style-type: none"> 1. Yes 2. No

APPROVAL BY THE BOARD OF EXAMINATION

This thesis by Bajrond Eshetu is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in maternity and reproductive health nursing

INTERNAL EXAMINER:

_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE

RESEARCHADVISORS:

_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE

_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE

DEPARTMENT HEAD

_____	_____	_____	_____
NAME	RANK	SIGNITURE	DATE

STATEMENT OF DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

This thesis is submitted in partial fulfillment of the requirement for a graduate degree from the Addis Ababa University at College of Health Sciences, School Nursing and Midwifery. The thesis is deposited in the Addis Ababa University Digital Library and is made available to local, national and international scientific community. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

Brief quotations from this thesis may be used without special permission provided that accurate and complete acknowledgement of the source is made. Requests for permission for extended quotations from, or reproduction of, this thesis in whole or in part may be granted by the Head of the Department or all advisers of the theses when in his or her judgment the proposed use of the material is in the interest of scholarship and publication. In all other instances, however, permission must be obtained from the author of the thesis.

STUDENT

NAME: _____ SIGNATURE: _____ DATE: _____

RESEARCH ADVISORS:

_____	_____	_____	_____
NAME	RANK	SIGNATURE	DATE
_____	_____	_____	_____
NAME	RANK	SIGNATURE	DATE