

PREGNANCY OUTCOME AMONG DIABETIC PREGNANT WOMEN WHO DELIVERED IN JIMMA UNIVERSITY MEDICAL CENTER, SOUTHWEST ETHIOPIA



A FINAL RESEARCH PAPER TO BE SUBMITTED TO JIMMA UNIVERSITY INSTITUTE OF HEALTH, MEDICAL FACULTY, DEPARTMENT OF INTERNAL MEDICINE; IN THE PARTIAL FULFILMENT OF THE REQUIREMENTS OF SPECIALITY CERTIFICATE IN INTERNAL MEDICINE

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JIMMA, ETHIOPIA.

**PREGNANCY OUTCOME AMONG DIABETIC PREGNANT WOMEN WHO
DELIVERED IN JIMMA UNIVERSITY MEDICAL CENTER, SOUTHWEST
ETHIOPIA**

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Abstract

Background: *Pregnancy outcome in diabetic women is strictly related to glycemic control during pregnancy. The disease affects women and their babies during pregnancy, labor, and delivery. However, little is known about its prevalence, birth outcomes, and associated factors in the study setting.*

Objective: *To assess pregnancy outcomes among diabetic mothers who delivered at Jimma University Medical Center in, Southwest Ethiopia from between October 1, 2019 to November 28, 2022*

Methods and Participants: *We conducted an institution based retrospective study, identifying all mothers who delivered with diabetes from October 1, 2019 to November 28, 2022 at Jimma University Medical Centre. We reviewed the records of mothers who had complete data entering the information into EpiData Version 4.2 and analyzing it using SPSS Version 23.0*

Result: *of the 17355 deliveries at Jimma University Medical Centre, 96 mothers had diabetes and 76 of these cards had complete record for review. The mean age of the study participants was 30.8 ± 4 . Among diabetic mother, 39.6% gave birth by Spontaneous Vaginal delivery, and 65% of admissions to neonatal critical care units were related to adverse fetal outcome. Being a house wife and preterm deliveries were associated with adverse fetal outcomes (AOR = 95%CI 1.49[1.315, 3.405] and AOR = 95% CI 9.763[4.560, 20.902], respectively).*

Conclusion: *Our finding suggests that preterm delivery and being a housewife mother are associated with adverse fetal outcomes in diabetic pregnancies. The main maternal complication in this study was PIH.*

Recommendation: *critical care during ANC follow-up specially for housewife diabetic mothers and optimizing preterm and PIH care is crucial.*

KEY WORDS: **DIABETES, PREGNANT WOMEN, DIABETES IN PREGNANCY, JMC, ETHIOPIA.**

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LIST OF ACRONYMS

APH: Antepartum haemorrhage

ARR: Adjusted relative risk

CI: Confidence interval;

CS: Caesarean section

EDPS: Edinburgh postnatal depression scale;

FANTA: Food and nutrition technical assistance

FPG: Fasting plasma glucose;

GDM: Gestational diabetes mellitus

IPAQ: International physical activity questionnaire

LMIC: Low and middle-income countries

MDDS: Minimum dietary diversity score

MUAC: Mid-upper arm circumference

OGTT: Oral glucose tolerance test

PIH: Pregnancy induced hypertension;

PPH: Postpartum haemorrhage

PROM: Premature rupture of membranes;

WHO: World health organization

CHAPTER ONE: - INTRODUCTION

1.1.BACKGROUND

Diabetes mellitus (DM), which is one of the major non communicable diseases worldwide, is a metabolic disorder that results from a defect in insulin production, impaired insulin action, or both. Hyperglycemia in pregnancy can include preexisting type 1 diabetes which result from absolute insulin deficiency and preexisting type 2 diabetes which result from defective insulin secretion or insulin resistance (either previously diagnosed or during the first trimester of pregnancy); gestational diabetes mellitus is defined as hyperglycemia that is first diagnosed during pregnancy (1)

Globally, the spread of diabetes is increasing rapidly from an estimated 381 million in 2013 to 422 million in 2016 (2, 3), from all the pregnancies, 7% are complicated by diabetes and results in prenatal morbidity and mortality (1). IDF estimated that 16.2% of 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 DM cases occur worldwide (2, 3).

Diabetes adversely affects women and their babies during pregnancy, labor, and delivery. It is associated with a higher incidence of maternal morbidity, including miscarriage, cesarean deliveries (C/S), birth trauma, pregnancy induced hypertension (PIH), traumatized labor, obstructed labor, and subsequent development of type 2 diabetes. Also, prenatal and neonatal morbidities increase; these includes macrosomia, congenital anomalies, birth injury, hypoglycemia, intrauterine fetal death (IUFD), still birth, shoulder dystocia, respiratory distress syndrome (RDS), polycythemia, and hyperbilirubinemia (4).

There is an increased concern in the prevalence of diabetes during pregnancy, along with an increase in the prevalence of diabetes in the general population (4). Around 1 in 6 live births are affected by hyperglycemia in pregnancy, and almost 85% of these patients suffer from gestational diabetes mellitus (GDM), with the remaining being pre-gestational diabetes (5,7).

While the adverse maternal outcomes of women with DM can be improved by proper antenatal care and positive lifestyle changes (13, 14), the risk for adverse outcomes drastically increased as result of increase in maternal glucose level in the second or third trimester, even within ranges previously considered normal for pregnancy (15, 16).Therefore, this study will attempt to assess the pregnancy outcomes among diabetic mothers that delivered in Jimma University medical center.

1.2 STATEMENT OF THE PROBLEM

Diabetes Mellitus (DM) is a group of metabolic disorders characterized by a high blood sugar level over a prolonged period of time and caused by either from deficiency in insulin secretion, decreased insulin action or both (17). Along with other form of DM; child-bearing women are at a higher risk of developing DM in pregnancy (2, 17). This result in hyperglycemia in pregnancy is a medical condition resulting from either pre-existing diabetes or gestational diabetes which increases the risks of adverse birth outcomes (5). Globally, the prevalence of GDM among women aged 20–49 years was estimated to be 17% with more than 90% cases occurring in low- and middle-income countries (18).

Even though preterm birth can occur in the general population; the risk is higher among diabetic pregnant women. According to 2016 World Health Organization (WHO) report, the risk of preterm birth from diabetics mother were increased by 5% in LMICs (27). Similarly, DM in pregnancy increases the likelihood of macrosomia by 50%, a 3-fold increase as compared with non-diabetic pregnant women (28). Systematic review by WHO and International Association of Diabetes and Pregnancy Study Groups (IADPSG) identified that DM in pregnancy have 81% higher risk of macrosomia (29).

In addition, systemic review done in sub-Saharan Africa found that the rate of macrosomia from diabetic pregnant women accounts 80% (30). Currently, the rate of spontaneous abortion accounts 9–14% among diabetic pregnant women. Besides, the magnitude of congenital anomaly among the general populations accounts 1–2%. But in women with DM, the risk of congenital anomaly increased by 4–8 folds. Furthermore, around 15–25% of neonates delivered from diabetic pregnant women develop hypoglycemia (31). Similarly, the magnitude of still birth is higher among diabetic mother. Systematic review in LMICs indicated that the incidence of stillbirth was 6.3% higher among diabetics' mothers (33). Lastly, evidence in different part of Ethiopia showed that the magnitude of adverse birth outcomes ranges from 1.42% -8% (34–39).

Evidence advocated that inadequate antenatal medical and preconception care are factors affecting adverse birth outcome among diabetic women (21, 25, and 40). American Diabetes Association (ADA) (27) and International Diabetic Federation (IDF) (28) set standards of medical cares like preconception counseling and preconception care to prevent the resulting adverse birth out comes. There is limited current study that identifies the outcome of DM in pregnancy in Ethiopia specifically no data in southwest part of Ethiopia (Jimma zone), Therefore, this study will assess birth outcomes, among DM mothers that delivered in JUMC, So12uth west, Ethiopia.

CHAPTER TWO

2.1 LITERATURE REVIEW

2.1.1 Overview of DM in Pregnant Women

Diabetes during pregnancy has long been associated with morbidity in the mother and offspring, as well as infant mortality. While gestational diabetes is the most common form of diabetes during pregnancy (42), pre-gestational diabetes has been associated with worse outcomes for both the mother and her offspring (43,44), with type 1 and type 2 diabetes having equal contributions to pre-gestational diabetes (45). With the overall increase in the incidence of type 2 diabetes, especially in youth, the percentage of pregnancies affected by type 2 diabetes has increased 85% over an 8-year period (46). Type 2 diabetes during pregnancy has been associated with increased risk for adverse outcomes (47, 48). Prenatal mortality in infants born to mothers with adult-onset type2 diabetes has been reported to be approximately fourfold higher than in infants born to mothers with type1 diabetes (49).

2.1.2 Birth outcomes Among Diabetic Pregnant Mothers

A study conducted by Mohammad A. et al., in 2017, on Maternal and neonatal outcomes in mothers with diabetes mellitus in Qatari population, the result showed that the prevalence rate of GDM was 24.25%.The mean gestational age (weeks) of neonates born to healthy non-diabetic women was significantly higher (38.34 ± 2.57) than those born to women with pre-pregnancy DM (36.71 ± 2.34) and GDM mothers (38.12 ± 2.04). The rate of caesarian section, in healthy non-diabetic women, was significantly lower (29.5%) than in women with pre pregnancy DM (69.1%) and women with GDM (35.5%). Macrosomia (Birth weight >4000 gm) was observed in 2.7% of the control group compared to 4.8% of infants born to women with DM, and 4.6% of infants born to women with pre-pregnancy DM. (50)

A study conducted by Mohammed N. et al., in 2010, a 1-year retrospective review of registry on Pregnancy outcomes of diabetic women, the result showed that more than half of the women were between the age of 30 and 40 years. Nearly equal proportions of women reported gravidity and parity of more than six times. 24.07% of infants born to mothers with PGDM had an Apgar score of less than 7 at 1 minute. The rate of macrosomia was 16% among infants born to women with GDM, while it reached 33% among those born to women with PGDM. 26% of women with GDM and 37% of those with PGDM had a CD. Admission to the

special care baby unit was higher among infants born to mothers with PGDM (OR=5.70, 95% CI=2.40-13.51) and GDM (OR=2.85, 95% CI=1.68-4.83) (51).

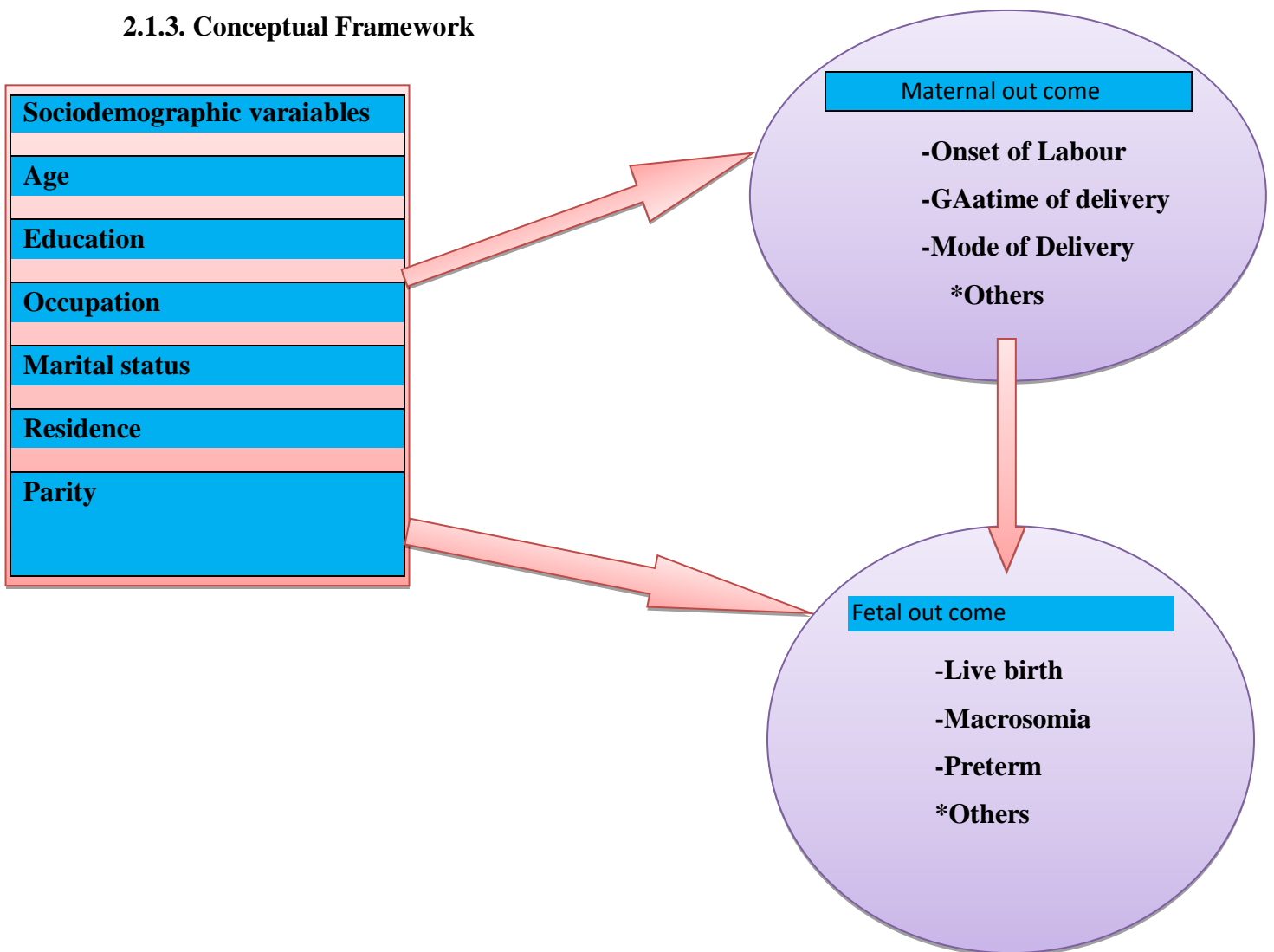
A study conducted by Malak M. Alhakem in 2006, A hospital-based prospective study performed at King Khalid University hospital (KKUH), on pregnancy outcome of gestational diabetic mothers: experience in a tertiary center, the result showed that there were 511 (74.6%) spontaneous vertex deliveries, and 148 (21.6%) were delivered by lower segment cesarean section. Maternal morbidity in these women was 1.2%. 1% died in utero and 0.43% died in the neonatal period. Congenital anomalies 5.9%, and sepsis 5.9% and the incidence of neonatal intensive care admission were 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 delivery by non SVD procedure (52)

A study conducted by Yasmin A. et al., in 2017, on Pregnancy Outcome in Diabetes Mellitus in Bangladesh, Complications like preeclampsia (2.4% vs. 0%), gestational hypertension (3.6% vs. 2.3%), spontaneous abortion (1.3% vs. 0.0%), recurrent UTI (12.3% vs. 4.7%), PROM (4.9% vs. 0.0%), preterm delivery (12.0% vs. 7.1%) were relatively higher in the DM mothers. Caesarean section was occurred 85.3% Of the complications in infants, birth weight (2.91 ± 0.51 vs. 2.80 ± 0.44 kg, mean \pm SD), neonatal hypoglycemia (2.7% vs. 0.0), hyperbilirubinemia (12.0% vs. 11.8%) and congenital anomalies (4.0% vs. 1.2%) were relatively higher in the GDM mothers. 1.4% babies were large for gestational age (LGA). Conversely, small for gestational age (SGA) baby were 26.4%. (53)

A study conducted by Ifunanya, N. et al. in 2019 on Evaluation of Pregnancy Outcomes among Women with Pregnancies Complicated by Diabetes Mellitus in Abakaliki, South-East, Nigeria, the result showed that the age distribution of the women ranged from 15 to 45 years. The majority of the women were between 35 and 45 years. Grand multiparas accounted for majority of the study participants in diabetics (46.1%). Diabetic pregnant women were delivered at earlier gestational age when compared with non-diabetic controls (diabetic; 38.2 ± 1.2 versus control; 39.6 ± 1.3). Pregnant women with diabetes were more likely to be delivered by caesarean (86%) while incidence of polyhydramnios was 26%. The incidence of fetal macrosomia, neonatal hypoglycemia and neonatal respiratory distress syndrome were significantly higher among women whose pregnancies were complicated by diabetes when compared with the control [Diabetics; fetal macrosomia (62.7%), neonatal hypoglycemia (44.4%) and neonatal respiratory distress syndrome (22.2%) versus Control; fetal macrosomia (34.1%), neonatal hypoglycemia (7.9%) and neonatal respiratory distress syndrome (5.6%) respectively (55).

A study conducted by Bajrond Eshetu et al.,2019, in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia on pregnancy outcomes of diabetes, 51.16% of the labors occurred spontaneously, and 57.8% delivered by cesarean section . The majority (82.1%) were delivered at term with a mean gestational age of 37.38 weeks, and 35% with diabetes-related complication. PIH accounts 26% which was the main complication of DM in pregnancy, whereas 31.2% of the mothers were admitted to the Intensive Care Unit. In this study, 97.4% live births were identified. From these, 63.3% were born with adverse fetal outcomes: 12.4% with multiple complications and 10.1% with poor APGAR score at 5 minutes; 65.3% were admitted in the Neonatal Intensive Care Unit (NICU).(56).

2.1.3. Conceptual Framework



2.2 SIGNIFICANCE OF THE STUDY

Assessing the burden of pregnancy outcomes among diabetic mothers gives a chance to have a good feto maternal unit, which is well equipped and has multidisciplinary team to prevent feto maternal complications and will assist as an input for improving feto maternal outcomes and in the management of diabetes in pregnancy for JUMC GYN/OBS unit.

It will help Clinicians to have awareness about screening measures and to strengthen the follow up of diabetic pregnant mothers in order to reduce the harmful effect of the mothers and their fetus and also it was beneficial for diabetic women to be informed about preventive measures and to have insight about adverse maternal and fetal outcomes

In addition, provision of baseline information on this issue can serve the service providers working in this unit of Jima university medical center to give due attention on screening, prevention and proper follow up.

By doing so it will give a scientific feedback to the policy makers, clinicians and at most to the health system of the country since there is no base line study done in this area, it will have a scientific benefit and give an entry point for other researchers

CHAPTER THREE: OBJECTIVES

3.1. GENERAL OBJECTIVES

- To assess pregnancy outcomes among diabetic mothers who delivered in Jimma University Medical Center, Southwest Ethiopia from October 1, 2019 to November 28, 2022

3.2 SPECIFIC OBJECTIVES

- To describe socio-demographic characteristics of diabetic pregnant mothers
- To determine the Maternal Out comes among diabetic mothers who delivered in Jimma University Medical Center during the study period.
- To determine the Fetal Outcomes among diabetic mothers who delivered in Jimma University Medical Center during the study period.

CHAPTER FOUR: METHODES

4.1. STUDY AREA AND PERIOD

The study was conducted in Jimma university medical center, Oromia Regional state which is tertiary level health care, having 15 million catchment populations. Jimma University medical center (JUMC) is one of the oldest public hospitals in the country. It was established in 1930 E.C. geographically, it is located in Jimma city 352 km southwest of Addis Ababa (44). This hospital currently is the only teaching and referral hospital in the southwestern part of the country. The study was conducted from November 01 2022 to November 30 2022.

4.2 STUDY DESIGN

Institution based cross sectional study was conducted through retrospective data identification with the past records of DM pregnant women who delivered in JUMC from October 1, 2019 to November 28, 2022.

4.3 POPULATIONS

4.3.1 Source population

A total of mothers who delivered from October 1, 2020 to November 28, 2022 in Jimma University Medical Center, Southwest Ethiopia, were reviewed to identify DM cases.

4.3.2 Study population

From all deliveries, mothers were identified with DM cases; and cards of the mothers who had complete records were reviewed.

4.4. INCLUSION AND EXCLUSION CRITERIA

4.4.1Inclusion criteria

- ✚ The cards of the pregnant mothers which were diagnosed with DM and gave birth from October 1, 2020 to November 28, 2022 was included.

- ✚ DM pregnant mothers who had complete records was reviewed

4.4.2 Exclusion Criteria.

- ✚ With incomplete records of the study variables was excluded.

4.5 SAMPLE SIZE AND SAMPLING TECHNIQUE

The sample size was all delivered mothers' those with DM records from October1, 2019 to November 28, 2022 in Jimma University Medical Centre, Southwest Ethiopia. The study site is selected since it is the largest public hospital with maternal health service and has diabetes centre. The required data was extracted from the health management information system, which is a system which contained pregnant mothers information, delivery registration, postnatal registrations, admission registration and the documents of all the delivered mothers who had DM during the study period at obstetrics ward was selected and checked for completeness. The cards which had complete data was identified and consecutively reviewed.

4.6 DATA COLLECTION TOOLS AND METHODS

4.6.1 Data collection tools

Data was collected by a structured checklist developed by the investigators after reviewing different literature studies. The checklist includes information on socio-demographic characteristics, past and present obstetric history, and maternal and fetal outcomes. Data was collected through document review from client chart. After card numbers obtained, documents of all delivered mothers who had DM during the study period at obstetrics and gynaecologic ward was searched and checked for completeness of data.

4.6.2 Data collection methods

By using a structured checklist containing socio demographic characteristics and Maternal outcomes of diabetic pregnant women data were collected through document review from client chart obtained from delivery registration book, postnatal registrations, duty report registration books, and operation logbooks.

4.7 VARIABLE OF THE STUDY

4.7.1 Dependent variables

- **Pregnancy Outcome**

✓ Maternal Outcome:

- ❖ Onset of Labour
- ❖ GA at time of delivery
- ❖ Mode of Delivery
- ❖ Maternal complication

✓ **Adverse Foetal outcome**

- ❖ Live birth
- ❖ Macrosomia
- ❖ Preterm*Others

4.7.2 Independent variables

Demographic characteristics: -

- ❖ Age
- ❖ Education level
- ❖ Occupation
- ❖ Marital status
- ❖ Place of residence

4.8 DATA PROCESSING AND ANALYSIS

The data was entered in Epi-Data Version 4.2 and exported to SPSS Version 23.0 for analysis. Descriptive statistics such as frequencies, proportions, measures of central tendency, and measures of variation was used to describe the study variables. Multiple logistic regressions analysis was carried out to examine the associations between the dependent and the independent variables, and the variables with P valueless than 0.05 was considered statistically significant.

4.9. OPERATIONAL DEFINITION

Diabetes mellitus (DM) a pregnant mothers with metabolic disorder resulting from a defect in insulin production, impaired insulin action, or both.

Maternal outcome: Pregnant mothers delivered by cesarean section, spontaneous vaginal delivery, pregnancies ended up with pregnancy-induced hypertension and other maternal complications

Fetal outcome: a born fetus with preterm delivery, macrocosmic, respiratory distress, low birth weight, admitted to neonatal intensive care unit and other fetal outcomes

4.10 DATA QUALITY ASSURANCE

Before data collection, a two-day training program was given to the data collectors and the supervisors; and a pre-test was done on 11 client documents, and appropriate modification was made on the checklist and procedures.

4.11 ETHICAL CONSIDERATION

Ethical clearance was obtained from Institutional Ethical Review Committee of Jimma University. An official letter of cooperation from the Institutional Ethical Review Committee of Jimma University was given to JUMC. Throughout the study period; the confidentiality of the data was strictly followed.

4.12 LIMITATIONS OF THE STUDY

The study was undertaken with data from a single institution potentially limiting its external validity. It is however informative for local changes and adaptations required to improve outcomes in pregnancy in women with DM in our service. Larger population-based studies evaluating models of care are limited and attempts at such studies must be underpinned by the ability to measure confounders at institutional level. In addition, BMI, length of stay in the NICU and other variables are not recorded on the client chart.

4.13 DISSEMINATION OF THE RESULTS

The results of the study were given to Jimma University, JUMC, Internal Medicine and Obstetrics and Gynecology departments and regional and national responsible bodies. An attempt was made to present the findings in different conferences, workshops and was sent to publication to scientific journals.

CHAPTER FIVE: RESULT

5.1. SOCIODEMOGRAPHIC CHARACTERISTICS

Between October 1, 2019 and November 28, 2022, a total of 17355 deliveries were attended at Jimma University Medical Centre in Southwest Ethiopia. Among these deliveries 96 of the mothers were identified as having diabetes. Of these, only 76 cards had complete data available for review. The mean age of the mothers was 30.8 ± 4.7 , and of the participants 31(40.79%) of the participants were fall between the ages of 30 and 34. Almost all the mothers, 72(94.74%) were reported married, while 44(57.89%) were housewife. Furthermore 46(60.53%) of them were reported as living in rural areas. Additional information is summarized and present in Table 1

Table 1: Sociodemographic characteristics of Diabetic Mothers

	Variable	Frequency	Percentile (%)
Age	<20	2	2.63
	20-24	5	6.58
	25-29	20	26.32
	30-34	31	40.79
	>35	18	23.68
Address	Urban	46	60.53
	Rural	30	39.47
Occupation	Housewife	44	57.89
	Merchant	8	10.51
	Employee	24	31.50
Marital Status	Married	72	94.74
	Divorced	4	5.26

5.2. MATERNAL OUTCOMES

Of the total numbers of labors, 39(51.2%) occurred spontaneously. Of the 76 mothers with complete data, 62 (82.08%) delivered at term with a mean gestational age of 37.38 weeks. Among the deliveries, 44 (57.8%) were by cesarean section, and 35% of the mothers experienced diabetes-related complication. PIH, 24 (31.58%) was the most common complication of DM in pregnancy, Additionally 25 (32.89%) of the mothers were admitted to the Intensive Care Unit (ICU) (Table 2).

Table 2: Maternal outcomes among diabetic mothers

	Variable	Frequency	Percentile (%)
Onset of Labor	Spontaneous	39	51.2
	Induced	37	48.8
GA at time of delivery	Preterm	14	17.92
	Term	62	82.08
Mode of Delivery	Spontaneous Vaginal delivery	30	39.6
	Assisted Vaginal delivery	2	2.6
	C/S	44	57.8
Maternal Complication	PIH	24	31.58
	Polyhydramnios	6	7.89
	Tear(traumatize Labor)	8	10.53
	ICU admission	25	32.89
	UTI	7	9.21
	PROM	3	3.95
	APH	2	1
	Endometritis	2	1.32
	Heelp syndrome	1	1.32
	Hypoglycemic	1	1.32

Total may not add to 100% because of multiple responses

5.3. FETAL OUTCOMES

Out of the total number of live births recorded in this study, 74 (97.3%) were successfully documented. However, among these births, 48 (63.3%) were associated with poor fetal outcomes, specifically 10.1% of the neonates had a low APGAR score at 5 minutes. Additionally 10.1% had various problems at birth, which includes RDS, hypoglycemic, and stillbirth. Furthermore, a significant percentage of the neonates (65.79%) required admission to the neonatal intensive care unit (NICU) for specialized care and monitoring. Detailed information can be found in Table 3.

Table 3 Fetal Outcomes among diabetic mother

Fetal outcome variable	Frequency	Percentile (%)
Live birth	74	97.3
Macrosomia	14	17.64
Preterm	15	19.74
Low Birth weight	8	10.53
RDS	7	9.25
Hypoglycemia	2	2.63
Stillbirth	2	2.63
Jaundice	1	1.32
Birth injury	1	1.32
Birth defect	1	1.32
NICU admission	50	65.79
Apgar score 1st min < 7	18	23.7
Poor Apgar score 5 th min	8	10.53

Total may not add to 100% because of multiple responses

5.3.1. Factors Associated with Maternal Adverse Outcomes among Mothers with Diabetes Delivered at Jimma University medical center

Mothers who were employees are 2.34 times more likely than their peers to experience adverse maternal outcomes, and this was statistically related at $p < 0.0001$ and an OR = 95%CI 2.34 (1.03, 4.399). (Table 4)

Table 4: Multivariate logistic regression on factors associated with maternal outcomes among diabetes

	Variables	Adverse maternal outcome		COR(95% CI)	AOR(95% CI)
		Yes	No		
Age	<20	2	1	2.02(0.16-3.17)	0.89(0.59-12.33)
	20-24	10	8	1.29(0.91-6.14)	0.54(0.33-2.21)
	25-29	15	14	1.38(0.78-2.56)	0.9(0.563-1.92)
	30-34	9	11	1.07(0.68-2.01)	0.9(0.622-1.93)
	>35	2	4	1	1
Occupation	Employee	18	6	5.79(3.44-28.87)	2.34(1.03-4.40)
	Housewife	17	25	1	1

5.4 FETAL OUTCOME

In the multivariate analysis, the neonates born to housewives were 1.43 times more likely to develop adverse fetal outcomes than those born to employed and statically associated at $p < 0.002$ and AOR = 95%CI 2.1 (1.32–3.41). Preterm delivery was significantly associated with adverse birth outcomes at $P < 0.0001$ AOR = 95%CI 5.79 (4.56–20.90) (Table 5)

Table 5: multivariate logistic regression on adverse fetal outcome among diabetic's mothers

	Variables	Adverse Birth outcome		COR(95% CI)	AOR(95% CI)
		Yes	No		
Occupation	Housewife	20	18	3.69(1.44-19.96)	1.43(1.31-3.40)
	Employed	14	24	1	1
GA age	Preterm	12	2	5.67(4.66-19.6)	5.79(4.56-20.90)
	Term	22	40	1	1
Mode of Delivery	SVD	15	14	1	1
	Assisted vaginal delivery	1	2	1.09(0.33-4.93)	0.89(0.65-1.75)
	Cesarean Section	17	28	1.03(1.00-2.41)	1.24(0.36-6.20)
PIH	Yes	11	8	1.2(1.03-2.71)	0.87(0.65-2.03)
	No	22	34	1	1

CHAPTER SIX: DISCUSSION

This study examines birth outcomes in those women with DM. The results showed that 26% of the mothers in the this study had a PIH problem which was higher than the rates observed in Qatar (15.2%), Oman (17.3%), and Saudi Arabia (14.4%), as reported in previous studies[50, 51, 52]. Possible explanations could be suboptimal maternal care, inadequate lifestyle measures, and inadequate glycemic control before and during pregnancy, poor metabolic control and poor ANC follow up. Interestingly, a significant number of mothers (57.8%) in our study gave birth via cesarean section, which was nearly similar to the 60.3% rate seen in Bangladesh [10].

Additionally, maternal ICU admission was 32.89% which was nearly similar to that of Nigeria 33.74% [55] and 2.6% of deliveries were via instrument, which was comparable to a research from Oman that found 2.9% [51].

In this study, we conducted a multivariate analysis and found that mothers who had a history of PIH were 1.43 times more likely to develop adverse maternal birth outcomes than those without PIH history (AOR = 1.43 and 95% CI = 1.03–4.4), in fact this is in line with the general truth in standard literatures.

The percentage of premature births in our study (18%) is higher than that of Nigeria (15.23%) study, but lower than that of Qatar (23.45%) study [54, 55]. This variation may be due to the difference in optimal glycemic control, blood pressure management and variations in treatment of diabetic complications and comorbidities.

The study also examined the rate of neonatal admission to the NICU and found that it was 63%, which was lower than the rates observed in Bangladesh (94%) [53] and Nigeria 92% [55] This difference may be due to the variation in study design, as the Nigerian study was a retrospective case-control study and in a Bangladesh study, HbA1c was done in all recruited mothers. And also the discrepancy might result from differences in peripartal maternal care, intrapartal maternal glycemic control, and immediate optimal newborn care.

Additionally, the study found that 2.6% of diabetic pregnant women experienced stillbirth, a rate that was similar to that reported in Qatar [50].

Furthermore, the study found that 1.7% of babies born to diabetic mothers suffered birth injuries. This result was very similar to the 1.75% result in Nigeria [55].

In the final multivariate model, we discovered that neonates born to housewives or jobless mothers were 1.46 times more likely to experience unfavorable birth outcomes than those born to employed mothers, with an AOR of 1.46 and a 95% confidence interval of 1.32 to 3.41. This may be due to the fact that working mothers interact with their employed peers more frequently than unemployed mothers, giving them access to more recent information about preventing negative outcomes and also exercise will be promoted, they will be financially developed and psychologically reassured with mental health. Unemployed mothers did not have this opportunity because they spent the majority of their time at home.

Moreover, the study found that preterm infants born to diabetic mothers were 5.79 times more likely to have unfavourable birth outcomes compared to their peers [(AOR = 5.76 and 95% CI = 4.56-20.90)]. Preterms are therefore more likely to have negative effects. This is a general truth in standard literatures.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1 CONCLUSION

The study identified that Preterm delivery and being a housewife mother were associated with adverse fetal outcomes. The main maternal complication in this study was PIH.

7.2 RECOMMENDATIONS

Critical ANC care in terms of optimized maternal glucose control, exercise, and dietary modification along with enhanced preterm care is crucial.

Optimized maternal glycaemic control with blood pressure management is needed for PIH.

Special ANC care for housewife diabetic pregnant ladies is required from clinicians.

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ANNEX I- CONSENT FORM

Greetings! My name is Dr. Alemu Chanie a final year Internal Medicine resident doing research on assessing the pregnancy outcomes among diabetic mothers who delivered in Jimma University Medical Center, Southwest Ethiopia from October 1, 2019 to November 28, 2022 which is important to improve our quality of maternal health care. After i get your permission, I would like to review some diabetic pregnant mothers documents, those gave birth during the indicated study period, related to their pregnancy outcome including maternal and fetal outcome. By participating in this data collection, you may sacrifice your time otherwise; you may not face any risk in participating in this data collection. By contributing to this study your organization may not get compensation or benefit right now, but the result of the study will provide information for developing a recommendation on the diabetic pregnant mothers caring activities of the medical center.

The checklist included information on socio-demographic characteristics, past and present obstetric history, and maternal and fetal outcomes. Data will be collected through document review from client chart obtained from delivery registration book, postnatal registrations, duty report registration books, and operation logbooks.

This research will be reviewed and approved by Institutional Ethical Review Committee of JimmaUniversity.If you have any question you can contact the principal investigator by the address provided below.

Name of principal investigator: Dr. Alemu Chanie

Mobile no-: +251920236881 E-mail addresses: natanemchanie16_@gmail.com

Are you willing to participate in the interview? A. Yes B. No

If yes, signature_____

Name and signature of the physician who fills the questionnaire _____/_____

Date _____

Thank you!

CONSENT FORM AMHARIC VERSION

ለጥናት እና ምርመራ ተሳታፊ የስምምነት መጠይቅ

ሰላም እንዴት ነዎት ውድ የጥናታችን ተሳታፊ። ስሜ ዶ/ር □□□ ይባላል የ ሦስትኛ ዓመት የውስጥ ደዌ ህክምና ረዚደንት ስሆን □ጅማ ዩኒቨርሲቲ ህክምና ማእከል ከ□□□ □□□□□□ ነፍሰ ጡር እናቶች □□□□□□□□□□□□□□□□□□□□/□□□□□□□□□□□□ ለማወቅ ያለመ ጥናት እና ምርመራ እያካሄድኩኝ እገኛለሁኝ። ጥናቱም የጤና ሥርዓቱን ጥራት ለማሻሻል ያግዛል። እርስዎም በጥናቱ ከሚሳተፉት መካከል ነዎት። አስረግጬ የምንግረዎት ስምዎን በመጠይቅ ወረቀቱ ላይ አይገለጽም፤የሚሰጡት መረጃም ምስጢራዊነቱ የተጠበቀ ነው፤ ለጥናት እና ምርመራ ሥራው ብቻ ይውላል።በጥናት እና ምርመራ አልሳተፍም የማለት፤የመሳተፍ እና

ጀምረው በማንኛውም ሠዓት የማቋረጥ መብት አለዎት። ነገር ግን እርስዎ የሚሰጡን መረጃ የጥናቱን ዓላማ ለማሳካት በጣም አስፈላጊ ነው።

መጠይቁ አራት ክፍሎች አሉት። 1ኛ □□□□□□□□□□□□□□□□ መጠይቅ፣ 2ኛ □□□□□□□□□□□□□□□□□□□□፣ 3ኛ □□□□□□□□□□□□□□□□□□□□፣ 4ኛ የ □□□□□□□□□□□□□□□□□□□□□□□□□□□□። በጥናቱ በመሳተፍዎትም ምንም ዓይነት ጥቅማ ጥቅም ወይም ክፍያ አይሰጥዎትም።

ጥናትና ምርምሩም በጅማ ዩኒቨርሲቲ ኢንስቲትዩትና አቲካል ሪቪው ኮሚቴ ታይቶ ይረጋገጣል። ማንኛውም ዓይነት ጥያቄ ካለዎት የጥናቱን ዋና ተመራማሪ በሚከተለው አድራሻ ማግኘት ይችላሉ።

የጥናቱ ዋና ተመራማሪ _ዶ/ር □□□

□□□□ ቁጥር _+2519202368□□□□ አድራሻ Natanemchanie16@gmail.com

በጥናት እና ምርምሩ ለመሳተፍ ፈቃደኛ ነዎት? U_አዎ ነኝ
ለ_አይደለሁም

ለመሳተፍ ፈቃደኛ ከሆኑ፣ ፊርማዎትን ይፈርሙልን፤ _____

መጠይቁን የሚሞላው ሐኪም ስም እና

ፊርማ _____ / _____

ቀን _____

አመሰግናለሁ።

ANNEX II-CHECKLIST

CHECKLIST FOR THE PREGNANCY OUTCOMES AMONG DIABETIC MOTHERS WHO DELIVERED IN JIMMA UNIVERSITY MEDICAL CENTER

Date _____ Questionnaire identification number _____ Medical record number _____

Address; Region _____ Zone _____ Wereda _____ Kebele _____ House No- _____

S.NO-	Questions	Response categories	Skipping
PART I: Demographic characteristics			
1.	Age	_____ years	
2	Occupation	A. Housewife B. Merchant C. Employee D. Daily laborer E. Student F. Other (specify), _____	
3	Marital status	A. Single B. Married C. Divorced D. Widowed E. Separated	
4	Address	A. Urban B. Rural	
PART II: Maternal outcomes			
1	Onset of labor	A. Spontaneous <input type="checkbox"/> B. Induced <input type="checkbox"/>	
2	GA at time of delivery	A. Preterm <input type="checkbox"/> B. Term <input type="checkbox"/>	
3	Mode of delivery	A. Spontaneous vaginal delivery <input type="checkbox"/> B. Assisted vaginal delivery <input type="checkbox"/> C. C/S <input type="checkbox"/>	
4	Maternal complication	A. PIH <input type="checkbox"/> B. Polyhydramnios <input type="checkbox"/>	

		C. Tear (traumatize labor) <input type="checkbox"/> D. Obstructed labor <input type="checkbox"/> E. ICU admission <input type="checkbox"/> F. Others _____	
Part III. Fetal outcomes			
	Fetal outcomes	A. Live birth <input type="checkbox"/> B. Macrosomia <input type="checkbox"/> C. Preterm <input type="checkbox"/> D. Low birth weight <input type="checkbox"/> E. RDS <input type="checkbox"/> F. Hypoglycemia <input type="checkbox"/> G. Stillbirth <input type="checkbox"/> H. Jaundice <input type="checkbox"/> I. Birth injury <input type="checkbox"/> J. Birth defect <input type="checkbox"/> K. NICU admission <input type="checkbox"/> L. Apgar score 1st min <7 <input type="checkbox"/> M. Poor Apgar score 5th min <input type="checkbox"/>	

ANNEX III: DUMMY TABLE

Table 1 Socio- demographic characteristics of diabetic pregnant women those delivered at JUMC during the study period

Variables	Categories	Percentage
Age in years	A. <20 B. 20-35 C. >35	
Occupation	A. Housewife B. Merchant C. Employee D. Daily laborer E. Student F. Other (specify)	
Marital status	A. Single	

	B. Married C. Divorced D. Widowed E. Separated	
Address	C. Urban D. Rural	

Table 2 Maternal outcomes of diabetic pregnant women those delivered at JUMC during the study period

Variables	Categories	Percentage
Onset of labor	B. Spontaneous B. Induced	
GA at time of delivery	B. Preterm C. Term	
Mode of delivery	D. Spontaneous vaginal delivery E. Assisted vaginal delivery F. C/S	
Maternal complication	A. PIH B. Polyhydramnios C. Tear (traumatize labor) D. Obstructed labor E. ICU admission F. Others	

Table 3 Fetal outcomes of diabetic pregnant women those delivered at JUMC during the study period

Variables	Categories	Percentage
Fetal outcomes	N. Live birth O. Macrosomia P. Preterm Q. Low birth weight R. RDS S. Hypoglycemia T. Stillbirth U. Jaundice V. Birth injury W. Birth defect X. NICU admission Y. Apgar score 1st min <7 Z. Poor Apgar score 5th min	

**ANNEX IV: DECLARATION
DECLARATION**

I, the undersigned, internal medicine 3rd year resident declare that this research is my original work in the partial fulfillment of the requirements of specialty certificate in Internal Medicine

Name: Dr. Alemu Chanie

Signature: _____

Place of submission: Jimma University Institute of Health, Medical Faculty, Department of Internal Medicine.

Date of Submission: _____

This research has been approved by the university advisors.

Advisors Name	Signature
1. <u>Dr.Ermias Habtie</u>	
2. <u>Mr.Mukitar Beshir</u>	
3. Dr. _____	