

Assessment of Adverse Birth Outcomes and Associated Factors among Diabetic Pregnant Mothers Who Delivered at Mettu Karl Hospital, Illubabor Zone, South West Ethiopia-2018

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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 and associated factors among diabetic pregnant mothers who delivered at MKH, Illubabor, south west Ethiopia, 2018.

Method: Facility based retrospective cross-sectional study were carried from January 2014 to December 2017. 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 data was reviewed from January 1 to April 30 2018. Data entered and cleaned to EpiData v4.2. Then entered data was transported to SPSS version 23.0 for data analysis.

Results: Out of 422 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 macrosomic, 9.2% respiratory distress, 10.1% were low birth weight, 10.1% had poor Apgar score at 5th minute, 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 out comes 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 mettu Karl 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.

Keywords: Birth outcome; Fetal outcome; PGDM; Pregnant mothers

Abbreviations: 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; MKH: Mettu Karl Hospital; NICU: Neonatal Intensive Care Unit; OR: Odd Ratio; PGDM: Pre Existing Gestational Diabetes; T1DM: Type One Diabetes Mellitus; T2DM: Type Two Diabetes Mellitus

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INTRODUCTION

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 that rise worldwide. Globally diabetes prevalence is increasing rapidly estimated 381 million in 2013 to 422 million in 2016 living with diabetes. The global prevalence of diabetes in pregnancy worldwide varies ranges from 1% to 14% of all pregnancy and worldwide, 7% of all pregnancies are complicated by diabetes and causes for maternal and prenatal morbidity and mortality. IDF estimate that 20.9 million or 16.2% of live birth women to women in 2015 had some form of hyperglycemia in pregnancy. 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. One in seven births is affected by diabetes in pregnancy. Annually, more than 200,000 GDM cases worldwide [1-6].

However diabetes occurs throughout the world but more common in the more developed countries. The greatest increase in prevalence occurs 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 [7,8].

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. Study done in Saudi Arabia the prevalence was high 24% and 4.3% for gestational diabetes and pre-existing diabetes, respectively [9,10]. 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 [1,11]. 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 [6,12].

Diabetes adversely affects 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 hyper bilirubinemia [7].

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 [7].

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 adverse birth outcome 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 1 diabetes are considerably higher than in the background population [4].

Six countries European equating to 11% of the Africa continent, this indicate how little is known diabetes in Africa. The prevalence of diabetes in pregnancy with WHO 2013 modified report in sub Saharan Africa was 8.1% [13].

Study showed in South Africa 29% preterm delivery, 14% hypertensive complications and 8% spontaneous pre-term labor, 55% cesarean deliveries and 26% incidence of fetal distress [14].

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 [7,8].

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 0-7 days, with average hospital stay of 5 days [14,15].

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 [16]. 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% [3]. According community based Studies in Ethiopia showed that the incidence of GDM was 3.7% [4].

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 [2]:

- 1) Fasting plasma glucose from 5.1-6.9 mmol/L (92-125 mg/dL);
- 2) 1-hour post 75 g oral glucose load ≥ 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 form WHO 2013 criteria for diagnosis of gestational diabetes [5].

Management diabetes is lifestyle modification (diet and exercise), oral glycemic agents (metformin and glibenclamide) and insulin or a combination of these methods as required. The main aim of the management is glycemic control to prevent adverse pregnancy outcomes [7].

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% [5].

This why the researchers are interested to update on prevalence of adverse birth outcomes and associated factors among mothers with gestational diabetes who delivered at MKH, Illubabor, south west Ethiopia and 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, improve maternity outcomes of quality of the health care system and helps to inform public health interventions in Ethiopia.

MATERIALS AND METHODS

Study area

The study area was governmental hospitals in Illubabor zone. One of oromia region which is located 600 km away from the capital city, Addis Ababa, Ethiopia. It is bordered on the south by the south nation, nationality and Peoples, on the southwest by the gambela on the west by kelem welega zone, on the north by mirab wellega zone, and benishanigul gumuz region, on the northwest by misirak welega zone, and on the east by Jima zone, with an area of 15,135.33 square kilometers.

From the total of 200 beds, 40 of which are currently being used by department of obstetrics and Gynecology.

Study design

Facility based retrospective cross-sectional study was carried to assess the birth outcomes among mothers with chronic diseases who delivered at Mettu Karl Hospital from January 2014 to December 2017.

Study period

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

Source population

All records of mothers who delivered at Mettu Karl Hospital.

Study population

All records DM mothers who delivered at Mettu Karl Hospital from January 2014 to December 2017.

Inclusion criteria

Records of mother with chronic diseases who delivered after 28 weeks of gestation at Mettu Karl Hospital from January 2014 to December 2017.

Exclusion criteria

Mothers records with multiple/twin delivery; mothers records with incomplete records of study variable

Sample size determination

Based on inclusion criteria all records that fulfill the outlined criteria from January 2014 to December 2017 were taken as sample.

Sampling procedure

Mettu Karl hospital was purposely selected because this hospital is the largest public hospital with maternal health service and different 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 chronic disease 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.

Operational definitions

Chronic diseases: Pregnant mother with chronic HTN, DM and cardiac problem

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

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

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

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

Birth outcome: Include both maternal and fetal outcome

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 35-39.9 kg/cm²

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 two principal investigators were perform the supervision of data collection procedures on daily bases.

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 bedele 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.

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 was 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.

Ethical consideration

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

RESULT

Socio-demographic characteristics of the mothers

From 422 of the total deliveries 362 mothers with different chronic diseases (100 with HTN, 210 with diabetes and 52 with different problem), 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 (Table 1).

Table 1: Socio demographic data of mothers at Mettu Karl hospital, Southwest 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
Address	class 2 obesity	14	4.1
	Addis Ababa	322	93.1
Occupation	Out of Addis Ababa	24	6.9
	House wife	174	50.2
Marital status	Employed	172	49.8
	Married	345	99.7
Parity	Un married	1	0.3
	Primipara	66	19.1
	Multipara	280	80.9

PREVIOUS OBSTETRICS HISTORY OF MOTHERS WITH DIABETES

Regarding to the obstetrics characteristics of women attended maternity ward at MKH, more than three fourth of mothers, 280 (80.9%) were multipara.

From reviewed data 72 (20.8%) had history of abortion (Table 2).

Table 2: Previous obstetrics history of mothers with diabetes at Mettu Karl hospital, Illubabor, southwest Ethiopia, 2018.

Variables (n=346)	Frequency	Percent (%)
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.>4000 gm	28	8.1

More than half 92 (26.6%) were type 1 DM and 144 (41.6%) were managed with lifestyle modification (diet and exercise) alone and 166 (48%) were take insulin.

Maternal outcomes among mothers delivered at MKH

From reviewed data, 64 (18.5%) were induced and 284 (82.1%) of mothers were delivered at term 200 (57.8%) by caesarian section and 35% of mothers had developed diabetes related complication (co-morbidity).Form 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. Mothers had 9 day average length of stay in hospital (Tables 3 and 4)

Table 3: The maternal outcomes among mothers delivered at MKH, Illubabor south west Ethiopia 2018.

Outcome (n=346)	Variables	Frequency	Percent (%)
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
	SVD	137	39.6
Mode of delivery	AVD	9	2.6
	CS	200	57.8
	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 admission	ICU	111	32.1

Table 4: Comparing maternal outcomes at MKH hospital Illubabor, South west Ethiopia 2018.

Maternal Outcome Variable		GDM		PGDM	
		N=157	%	N=189	%
Onset of labor	Spontaneous	72	0.402	105	0.598
	Induced	27	0.422	37	0.578
	Elective	58	0.552	47	0.448
Gestational Age at time of delivery	Preterm	19	0.306	43	0.694
	Term	138	0.486	146	0.514

	Spontaneous delivery	48	0.35	89	0.65
	Instrumental delivery	3	0.333	6	0.667
Mode delivery	caesarean section	106	0.53	94	0.47
	Emergency C/S	48	0.51	46	0.49
Types of C/S	Elective CS	58	0.543	47	0.457
PIH		47	0.522	43	0.478
Polyhydramnios		3	0.6	2	0.4
Traumatize labor		2	0.286	5	0.714
Hypothyroidism		4	0.8	1	0.2
Cardiac d/s		1	0.333	2	0.667
Obstructed labor		0	0	1	1
Maternal ICU admission		55	0.495	56	0.505

Table 5: The fatal outcomes among postnatal mothers with chronic diseases delivered at MKH hospital, Illubabor, South west Ethiopia 2018.

Fetal outcome variable	Frequency	Percent (%)
	N=346	
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 1th min<7	82	23.7
Poor Apgar score 5 th min	35	10.1

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 (Tables 5 and 6).

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 (Tables 5 and 6)

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.

Table 6: Comparing neonatal outcome in GDM and PGDM among postnatal mothers delivered at MKH, south west Ethiopia 2018.

Outcome Variable	GDM	%	PGDM	%
Still born	1	0.111	8	0.889
IUFD	1	0.167	5	0.833
Preterm born	19	0.306	43	0.694
Respiratory distress	16	0.5	16	0.5

LBW	9	0.257	26	0.743
Hypoglycemia	2	0.2	8	0.8
Macrosomia	33	0.541	28	0.459
Jaundice	1	0.143	6	0.857
Birth injury	2	0.333	4	0.667
Birth defect	3	1	0	0
Poor APGAR score 1st min	32	0.39	50	0.61
Poor APGAR score 5th min	13	0.371	22	0.629
NICU admission	99	0.438	127	0.562

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.

FACTORS ASSOCIATED WITH BIRTH OUTCOMES AMONG POSTNATAL MOTHERS WITH DIABETES DELIVERED AT MKH 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 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 7).

Table 7: Multivariate logistic regression on factors associated with maternal outcome among mothers delivered at MKH hospital, Illubabor, South west Ethiopia 2018.

Variables	Yes	No	COR (95%CI)	p-value	AOR (95%CI)
Age					
15-19	5	3	711 (0.159, 3.169)	0.198	2.70 (0.594-12.325)
20-24	45	38	2.368 (0.914, 6.138)*	0.751	0.857 (0.333, 2.21)
25-29	70	69	1.41 (0.777, 2.558)	0.897	1.0 (0.563, 1.92)
30-34	42	50	1.167 (0.677, 2.013)	0.011	1.0 (1.622, 1.93)
>35	8	16	1		1
Normal weight	11	3	5.3 (1.439, 19.96)	0.75	0.839 (2.76, 2.55)
Over weight	47	16	4.837 (1.27, 18.31)	0.022	0.567 (1.182, 1.767)
Class I obesity	47	62	1.248 (0.309, 5.047)	0.342	3.8 (1.29, 8.319)
Class II obesity	65	95	1	0.706	1
History of PIH	32	4	9.97 (3.44, 28.87)	0.001	2.1 (1.03, 4.399)
Without history of PIH	13	17	8 (0.041, 1)	0.041	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)].

Table 8: Multivariate analysis of the independent variables on adverse birth outcomes among postnatal mothers at MKH hospital, south west

Variables		Birth outcome		COR (95% CI)	p-value	AOR (95% CI)
		Yes	No			
Occupation	House wife	88	86	5.36 (1.439,19.961)*	0.002	2.11 (1.31, 3.40)**
	Employed	64	108	1		1

Ethiopia, 2018.

Previous history of PIH		22	14	2.17 (1.073,4.412)*		1.434 (.614, 3.349)
		130	180	1	0.404	1
Gestational age	Preterm	52	10	9.56 (4.661,19.642)*	0.0001	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)	0.796	1.067 (.651, 1.751)
	Caesarian section	79	121	1.64 (1.002, 2.410)*	0.042	1.484 (.355, 6.198)
Maternal current PIH		48	42	1.7 (1.030, 2.709)*		1.145 (.646, 2.031)
Maternal without current PIH		104	152	1	0.643	1

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 8).

DISCUSSION

26% mother were complication by PIH, This was greater than study done Sued Arabia and Qatar which was 15%, 14% and 14.4% respectively [10,17,18]. 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 [17]. Our finding was however lower than to the finding Cameron 19.3% mothers delivered by cesarean section [19]. 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 [18,20]. 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 [21] and Sudan [22] was the prevalence was higher than this which was 38.7% and 28%, but in contrast to the finding of Bahrain [20] and Saudi Arabia [17] 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% [17]. Other study done in Bahrain- Oman was greater than this result which was 9.2% prevalence [20]. 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 find was similar to study done in Cameron, which was 9.7% [21]. 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 Russia [23] showed that 100% neonatal NICU admission but study done in Saudi Arabia [17] 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% [20]. The study done India was greater than this which was 65% [24]. The fact that the complications diabetes that have occurred during pregnancy have affect the

well-being of the fetus but the difference this studies may be due to the early institution of tight metabolic control. Neonate born from unemployed/house wife mothers were 2.1 times develop adverse birth outcome than employed and statically associated with adverse birth out comes 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 [22], Saudi Arabia [17], Cameron [25], and Bahrain [20]. 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 find was almost similar to study done in Sudan, which was 2% [22]. Other study done in Cameron was greater than this finding which was 2% [21]. This may be due to instrumental delivery and macrosomia but the difference may be due to in 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% [21].

Other study done in Saudi was greater than this result which was 3% prevalence [22]. 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 5 day average length of stay in hospital [22]. 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% [22]. 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 [18]. 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% [17,22]. This may be due to related poor glycemic control but the difference may be due to in quality of health services care they provide.

STRENGTHS AND LIMITATION OF THE STUDY

Strength of the study

This study tries to identify prevalence of diabetes, maternal complication and birth outcome among mother with chronic diseases.

Limitations of the study

1. Difficulty of collecting expected samples of data due to absence of patient cards from its place in record office.
2. Incomplete records of study variable and absence registration books of mother.
3. Incomplete records of study variable like previous history GDM, family history DM
4. Due to absences of study done in our country difficult for comparison
5. The study designs (cross-sectional) which measure the exposure and out come at the same time, which cannot measure the cause and effect relationship.

CONCLUSIONS

According to this study Body mass index, maternal age, previous history of pregnancy induced hypertension and number of parity significantly associated with maternal adverse outcome. Preterm delivery and house wife mothers was associated with adverse fetal outcome.

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CONSENT FOR PUBLICATION

This manuscript contains original material. Neither the article nor any part of its essential substance, tables, figures, has been or will be published elsewhere. We have submitted for publication without conflict of interest.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available on request from the corresponding authors.

COMPETING INTERESTS

We declare that we have no significant competing financial, professional or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

AUTHOR'S CONTRIBUTIONS

AB and DN conceived the study, the design, field work, data analysis and interpretation, report writing and manuscript preparation.

REFERENCES

- Kirkman MS, Schaffner W. Another shot to protect people with diabetes: Add hepatitis B vaccination to the checklist. *Diabetes Care*. 2012;35(5):941-942.
- Association AD. Diagnosis and classification of diabetes mellitus. *Diabetes Care*. 2014;33(1):S81-S90.
- Boyd E, Metzger. International association of diabetes and pregnancy study groups recommendations on the diagnosis and classification of hyperglycemia in pregnancy. *Diabetes Care*. 2010;33(3):676-682.
- Gibson KS, Waters TP, Catalano PM. Maternal weight gain in women who develop gestational diabetes mellitus. *Obstet Gynecol*. 2012;119(3):560-565.
- Bener A, Saleh NM, Al-Hamaq A. Prevalence of gestational diabetes and associated maternal and neonatal complications in a fast-developing community: Global comparisons. *Int J Womens Health*. 2011;3:367-373.
- Roglic G. WHO Global report on diabetes: A summary. *Int J Non-Commun Dis*. 2016;1(1):3-8.
- Catalano PM, McIntyre HD, Cruickshank JK, McCance DR, Dyer AR. The hyperglycemia and adverse pregnancy outcome study: Associations of GDM and obesity with pregnancy outcomes. *Diabetes Care*. 2012;35(4):780-786.
- Centers for Disease Control and Prevention. National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the United States, 2011. US department of health and human services. CDC 2011.
- Wahabi H, Fayed A, Esmail S, Mamdouh H, Kotb R. Prevalence and complications of pregestational and gestational diabetes in Saudi women: Analysis from Riyadh mother and baby cohort study (RAHMA). *BioMed Res Int*. 2017.
- Wahabi HA, Esmail SA, Fayed A, Alzeidan RA. Gestational diabetes mellitus: Maternal and perinatal outcomes in King Khalid University Hospital, Saudi Arabia. *J Egypt Public Health Assoc*. 2013;88(2):104-108.
- Aguirre F, Brown A, Cho NH, Dahlquist G. IDF Diabetes atlas (6th edition). International Diabetes Federation. 2013.
- Liu S, Shah B, Naqshbandi M, Tran V, Harris S. Increased rates of adverse outcomes for gestational diabetes and pre-pregnancy diabetes in on-reserve first nations women in Ontario, Canada. *Diabetic Medicine*. 2012;29(8):e180-e183.
- Hod M, Kapur A, Sacks DA, Hadar E, Agarwal M. The international federation of gynecology and obstetrics (FIGO) initiative on gestational diabetes mellitus: A pragmatic guide for diagnosis, management, and care. *Int J Gynaecol Obstet*. 2015;131(3):S173-S211.
- Kheir AE, Berair R, Gulfan IG, Karrar MZ, Mohammed ZA. Morbidity and mortality amongst infants of diabetic mothers admitted into Soba University Hospital, Khartoum, Sudan. *Sudan J Paediatr*. 2012;12(1):49-55.
- Landon MB, Gabbe SG. Gestational diabetes mellitus. *Obstet Gynecol*. 2011;118(6):1379-1393.
- Pastakia SD, Njuguna B, Ajwang'Onyango B, Washington S, Christoffersen-Deb A. Prevalence of gestational diabetes mellitus based on various screening strategies in western Kenya: A prospective comparison of point of care diagnostic methods. *BMC pregnancy childbirth*. 2017;17(1):226.
- Negrato CA, Mattar R, Gomes MB. Adverse pregnancy outcomes in women with diabetes. *Diabetol Metab Syndr*. 2012;4(1):41.
- Wendland EM, Torloni MR, Falavigna M, Trujillo J, Dode MA. Gestational diabetes and pregnancy outcomes - A systematic review of the world health organization (WHO) and the international association of diabetes in pregnancy study groups (IADPSG) diagnostic criteria. *BMC pregnancy childbirth*. 2012;12:23.
- Cowlew, Brown WA, Considine RV. Obesity problem and its management adult and pediatric Philadelphia (7th Edition) Elsevier Saunders. 2016.
- Omran BS, Ammari F, Nawal MD. Pregnancy outcomes in relation to different types of diabetes mellitus and modes of delivery in macrosomic fetuses in Bahrain. *J Taibah Univ Sci*. 2017;12(1):55-59.
- Djomhou M, Sobngwi E, Noubiap JJ, Essouma M, Nana P. Maternal hyperglycemia during labor and related immediate postpartum maternal and perinatal outcomes at the Yaoundé Central Hospital, Cameroon. *J Health Popul Nutr*. 2016;35(1):28.
- Niyibizi JB, Safari F, Ahishakiye JB, Habimana JB, Mapira H. Gestational diabetes mellitus and its associated risk factors in pregnant women at selected health facilities in Kigali city, Rwanda. *J Diabetes Mell*. 2016;6:269.
- Deryabina EG, Yakornova GV, Pestryaeva LA, Sandryeva ND. Perinatal outcome in pregnancies complicated with gestational diabetes mellitus and very preterm birth: Case control study. *Gynecol Endocrinol*. 2016;32(2):52-55.
- Muhil M, Priyanka D, Umopathy Sembian, Pillai K. Prevalence of adverse birth outcome of gestational diabetes mellitus in Trichy district. *IOSR J Pharm*. 2017;7:30-33.
- Sacks DB. Diagnosis of gestational diabetes mellitus: It is time for international consensus. *Clin Chem*. 2014;60(1):141-143.