Clinical audit in management of pregnant women with diabetes mellitus at Qena University Hospitals

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Abstract

Background: Gestational diabetes is type 1 or 2. Preconception treatment reduces problems, while poor blood glucose management increases congenital deformity risk. Diet, insulin, or oral medications are essential for blood sugar control, including insulin transition during pregnancy. Substandard care of diabetic women contributes to maternal and fetal morbidity and mortality.

Objectives: Evaluate diabetes care in pregnancy at Qena University Hospital, as compared to NICE recommendations.

Patients and methods: This Study conducted at South Valley University, covering pregnant diabetics from Jan 2019 to Dec 2020. Diabetes management during pregnancy was assessed in preconception, maternal, intrapartum, and postnatal stages. Patient assessment included history, physicals, and blood tests. Ultrasound determined fetal health, gestational age. Outcomes encompassed maternal glycemia, complications, preterm birth, cesarean section, neonatal issues.

Results: 83.3% received pertinent information, 72.2% embarked on planned pregnancies, 5.6% underwent retinal assessment, 100% received renal assessments, and 94.4% underwent HbA1c monitoring. 17.5% had glucose monitoring, 86.0% conducted ketone testing, 22.8% underwent retinal assessments, 100% received renal assessments, 80.37% underwent anomaly scans, 54.4% monitored fetal well-being, 17.5% took measures to prevent pre-eclampsia, 19.3% received antenatal care facilitated by MDT. 52.6% had DKA attacks and 26.3% had hypoglycemic attacks. 40.4% delivered before 34 weeks of gestation, 47.4% delivered between 34-37 weeks. 77.2% required admission to the NICU. Macrosomia was in 3.51% and polyhydramnios was in 1.75%. 59.6% had cesarean section.

Conclusion: Defective preconceptional and antenatal care were evident in a great proportion of patient this raise alarm for enhancing the standard of obstetric and medical management of pregnancy.

Keywords: Pregnant; Diabetes; Management

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Introduction

Diabetes stands as the most prevalent medical complication observed during pregnancy, categorizing women into two distinct groups: those with pre-existing diabetes, recognized as pregestational or overt diabetes, and those who acquire diabetes during pregnancy, referred to as gestational diabetes. A suggested framework for classification, advocated by the American Diabetes Association **(ADA)**, delineates four primary categories: A. Type 1 diabetes, historically known as insulin-dependent or juvenile-onset diabetes; B. Type 2 diabetes, formerly designated as non-insulin-dependent or adult-onset diabetes; C. Various specific types of diabetes attributed to genetic, drug-induced, or chemical-induced factors; and D. Gestational diabetes **(Acolet et al., 2005).**

Research endeavors have consistently shown a reduction in the incidence of congenital abnormalities and pregnancy complications among women who receive comprehensive preconception care **(Metzger et al., 2009).** Notably, inadequate control of blood glucose levels during the initial 8 weeks of pregnancy accentuates the risk of major congenital malformations, particularly cardiac and neural tube defects. Studies have reported malformation rates of approximately 20% when glycated hemoglobin **(HbA1c)** levels fall within the range of 8.5% to 9.5%. Nevertheless, these risks diminish with a reduction in HbA1c levels **(Macintosh et al., 2006).**

Furthermore, complications associated with diabetes during pregnancy encompass macrosomia, birth trauma, hypoglycemia, hypocalcemia, acute respiratory distress syndrome, and shoulder dystocia. For mothers, diabetes poses significant complications, including suboptimal glycemic control, exacerbation of retinopathy and nephropathy **(if already present)**, the development of gestational hypertension and preeclampsia, and potential trauma during the delivery process. Effective glycemic control emerges as a critical determinant in enhancing pregnancy outcomes for women with diabetes, achievable through a combination of dietary management, insulin therapy, and oral hypoglycemic agents. Current recommended practice dictates that women who conceive while on oral hypoglycemic agents should transition to insulin therapy as soon as pregnancy is confirmed **(Langer et al., 2000).**

Despite the established benefits of optimizing preconception care for women with diabetes, a disheartening revelation surfaced in the 2005 Confidential Enquiry into Maternal and Child Health **(CEMACH)** report, which indicated that only 35% of pregnant women with diabetes received adequate preconception counseling and care.

Recognizing the detrimental repercussions of diabetes on both maternal and fetal health, there exists an imperative need for clinical auditing to manage and mitigate adverse outcomes. Care practices exhibit variability in the preconception, conception, and post-delivery phases, largely influenced by local institutional policies. In our institution, we rely upon the guidance provided by the ADA and the National Institute for Health and Care Excellence **(NICE)** as the cornerstone of our management protocols.

The primary objectives of this study are to conduct an audit of diabetes mellitus management in pregnant women at Qena University Hospital, aiming to pinpoint discrepancies between current practices and the recommended NICE guidelines. Additionally, this study aims to identify the specific pregnancy-related complications associated with diabetes mellitus within the context of our clinical practices.

Patients and Methods

The study was conducted within the Obstetric department at South Valley University, focusing on all patients admitted to the department at Qena University Hospital with a confirmed diagnosis of diabetes between January 2019 and December 2020. Inclusion criteria encompassed pregnant patients with either pregestational or gestational diabetes, while exclusion criteria excluded individuals with pre-existing or pregnancy-induced hypertension and those with concurrent organic conditions such as chronic renal disease, cardiac, or lung diseases.

The process of data collection include a meticulous examination of patient records and their organization into dedicated record sheets. In this research, we conducted a comparative analysis of the diabetes treatment strategies used in our department with those outlined in the **(2008) Guideline Development Group** report titled "Management of diabetes from preconception to the postnatal period: summary of NICE guidance" **(BMJ, 336(7646)**, **714-717)**.

The assessment started with meticulous preconception strategizing and attentiveness, including a diverse array of subjects. This category include essential components such as providing patients with information on the results and risks associated with mother-baby interactions. Additionally, the program included elements such as pregnancy planning, contraceptive methods, nutritional guidance, pre-pregnancy monitoring of blood glucose and ketone levels, as well as the establishment of target blood glucose and HbA1c values prior to conception. The study also investigated the safety of diabetes medications during pregnancy, strategies to enhance preconception care for women, and the importance of retinal and renal screenings prior to conception. All management ad assessments followed guidelines on the management of gestational diabetes mellitus by **(Zhang et al., 2019).**

Additionally, maternal care provided to women with diabetes encompasses several components such as blood glucose monitoring, establishment of goal blood glucose thresholds, monitoring of HbA1c levels, administration of insulin while considering the risks of hypoglycemia, use of intermittently scanned and continuous glucose monitoring techniques, ketone testing, and management of diabetic ketoacidosis (**Zhang et al., 2019**). This section also emphasizes the need of conducting ocular and renal exams, preventing pre-eclampsia, diagnosing congenital deformities, monitoring fetal growth and well-being, and organizing prenatal care **(Mack & Tomich, 2017).**

The study proceeded to investigate intrapartum care, including factors such as the timing and method of birth, the control of blood glucose levels throughout labor and delivery, and the resulting consequences for the neonate. In conclusion, the research evaluated the provision of postnatal care, including several aspects such as blood glucose regulation, administration of medications, promotion of breastfeeding, management of infant health and contraception.

A thorough evaluation procedure was conducted on all individuals. The first phase included a comprehensive process of gathering historical information, which entailed obtaining details such as the individual's name, age, parity, place of residence, occupation, and medically relevant habits such as smoking. The socioeconomic standing of individuals was shown to be influenced by several factors, including income, education level, occupational status, profession, accumulated wealth and assets, living conditions, availability of essential services, family composition, as well as social capital and networks **(Oakes and Rossi, 2003)**. Following a comprehensive documentation of the complaint and its duration, the current patient complaint was subjected to analysis. In addition, the medical history, sensitivity to medicines, and surgical procedures of the patient were documented.

The comprehensive physical examination started with a comprehensive assessment to exclude the presence of systemic diseases. The clinical assessment included the examination of pallor, cyanosis, jaundice, and lymph node enlargement, as well as the measurement of blood pressure, temperature, heart rate, and breathing rate. In order to exclude the possibility of coagulation disorders or hematological illnesses, an assessment was conducted on the presence of petechiae and ecchymosis. During the abdominal obstetric examination, an assessment was made of the fundal level of the uterus as well as the presence of laparotomy scars. The evaluation of labor suspicions included the assessment of vaginal dilation, effacement, location, and consistency. Furthermore, the calculation of the Body Mass Index **(BMI)** included the division of an individual's weight in kilograms by the square of their height in meters **(Nuttall, 2015).** A body mass index **(BMI)** below 18.5 is indicative of being underweight, whereas a BMI ranging from 18.5 to 25 is considered within the proper weight range **(Van Der Linden et al., 2016).**

During the investigative phase, a series of standard laboratory tests were conducted. These tests included a complete blood count **(CBC)** to detect the presence of anemia, renal analysis to assess proteinuria, blood grouping with a specific focus on the RH factor, and urine culture sensitivity to determine the antibiogram. The HBsAg tests were conducted on patients who were suspected of having hepatitis. Morning blood tests were conducted after an overnight fast of 10-12 hours. The samples were produced, stored at a temperature of -80°C, and then examined within a period of three months **(Faria et al., 2009).** All participants in the study contributed clinical data and gave blood samples. The laboratory examination included the assessment of many biomarkers, including HbA1c, C-peptide, insulin, plasma glucose, total cholesterol **(TC)**, high-density lipoprotein cholesterol **(HDL-c)**, low-density lipoprotein cholesterol **(LDL-c)**, triglycerides **(TG)**, alanine aminotransferase **(ALT)**, aspartate aminotransferase **(AST)**, and gamma-glutamyl transferase **(GGT)**. The serum was subjected to analysis for the presence of glutamic acid decarboxylase antibody **(GADA)**, islet cell antibodies **(ICA)**, and insulin antibody **(IA)** using commercially available ELISA kits, in accordance with the instructions provided by the manufacturer. The levels of C-reactive protein **(CRP)** were quantified using the immunonephelometry technique.

The diagnostic procedures included abdominal and transvaginal ultrasonography in order to assess the well-being and sustainability of the fetus. For abdominal ultrasonography, a low-frequency convex probe **(3.5-5 MHz)** was used to examine obstetrics or pregnancies. Initially, the convex probe was positioned just above the pubic symphysis, with its orientation directed towards the superior aspect. Subsequently, the probe was moved in a sweeping motion to the right and left in order to comprehensively assess the whole of the uterus in a sagittal perspective. Transverse plane uterine visualization was achieved by rotating the probe 90 degrees counterclockwise. Precise biometric assessments of the cranial, abdominal, femoral, and crown-rump dimensions were used to determine both the gestational age and fetal weight. The M-mode line was positioned above the fetal heartbeat, and calipers were used to determine the interval between consecutive peaks for calculation purposes**.**

In contrast, the transvaginal ultrasound scan, which is widely regarded as the most reliable method for assessing intrauterine contents and determining viability, has shown helpful in the detection of missed miscarriages. The cervical length was evaluated using a 5.5-MHz ultrasound probe, which measured the distance between the internal and external os. The recorded number represented the minimum length seen. The transvaginal transducer was meticulously positioned and aligned inside the distal vagina or in contact with the external cervical os. The sagittal imaging procedure included lateral motions and a transverse/semi-coronal orientation, with a rotation of 90°. The probe was then repositioned in an anterior to posterior direction for the purpose of imaging. Following the completion of the test, the probe cover was then removed, and the gel was appropriately cleansed and sanitized **(Fig. 1).**

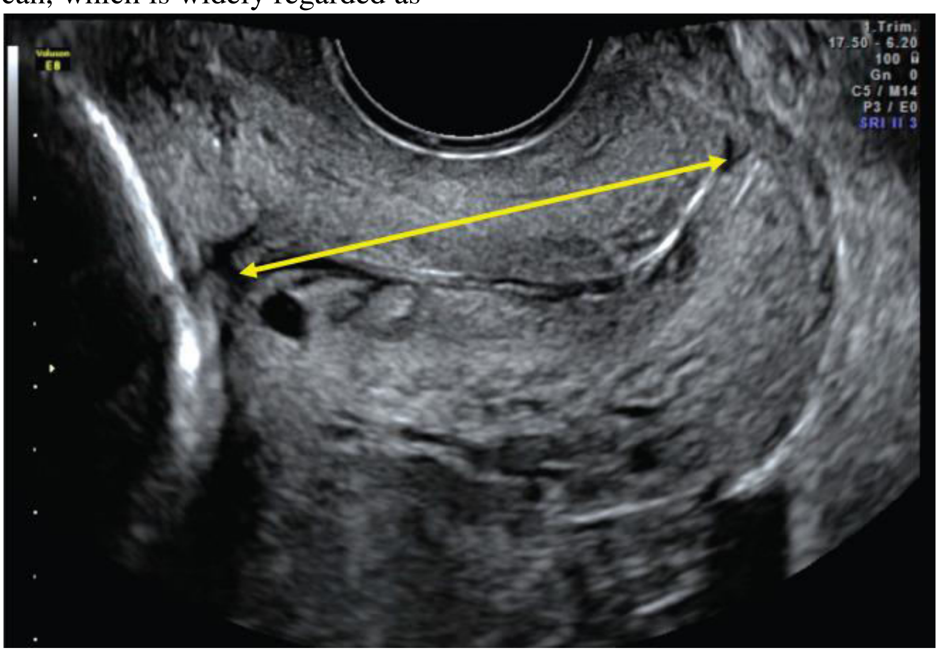

Fig. 1. Cervical length using Transvaginal ultrasound

The diagnostic criteria for missed miscarriage include the presence of a crown-rump length of 7mm or more, accompanied by the absence of a heartbeat, or a mean sac diameter of 25mm or greater, without observing the embryo during several ultrasound scans conducted by two sonographers or with a time interval of at least 7 days. A missed miscarriage may be diagnosed when an embryo does not exhibit a heartbeat for a duration of two weeks or more after a scan that reveals a gestational sac without a yolk sac, or when there is no heartbeat detected within eleven days after a scan that shows a yolk sac **(Navathe et al., 2019).**

Various essential indicators are included in assessing diabetes outcome measures and monitoring during pregnancy. Initially, it is important to note that effective treatment of maternal glycemia, as assessed via the measurement of HbA1c or self-monitoring, has been shown to decrease the likelihood of experiencing pre-eclampsia, macrosomia, and infant hypoglycemia. Ultrasonography is a medical imaging technique that is used to assess the weight of a fetus and identify the presence of macrosomia, a condition characterized by excessive fetal growth (>4kg) **(Vieira et al., 2020).** Macrosomia may potentially lead to complications such as shoulder dystocia, a condition where the baby's shoulders get stuck during delivery, and may necessitate the need for a cesarean birth **(Athukorala et al., 2006).** The rates of preterm delivery serve as an indicator of the degree of effectiveness in managing diabetes, while the rates of cesarean delivery serve as an indicator of the outcomes of childbirth **(Kong et al., 2019).** The decrease of newborn difficulties in management is assessed by the evaluation of hypoglycemia and respiratory distress syndrome **(Ogata, 2010).** The heightened susceptibility to postpartum type 2 diabetes in women with diabetes during pregnancy **(Xiang et al., 2010)** necessitates the prioritization of postpartum glycemic control to ensure favorable long-term health outcomes for both the mother and the infant.

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Statistical analysis

The data underwent verification, entry, and analysis using SPSS version 23 for data processing. Various statistical methods were employed in this study's result analysis. Qualitative variables were presented as numbers and percentages, while quantitative variables were expressed as mean ± standard deviation (SD). Several statistical tests, including the Student "t" test, Mann-Whitney test, Chi-square test (X^2), Z-test for percentages, and Odds Ratio (OR), were conducted. The significance threshold was set at a 5% level (P-value), where a P-value > 0.05 denoted non-significant results, while a P-value < 0.05 indicated statistical significance. A smaller P-value signified greater result significance.

Results

The study participants exhibited a diverse age range, spanning from 18 to 43 years, with a calculated mean age of 31.25 ± 5.91. Furthermore, a distinct BMI range of 24 to 35 years was observed, yielding a mean value of 26.81 ± 2.59. In terms of residential distribution, 30 cases (52.6%) were situated in rural areas, while 2 cases (47.4%) resided in urban locales. Socioeconomic status assessment revealed that 1 participant (1.8%) exhibited a high socioeconomic level, 12 participants (21.1%) had a low socioeconomic status, and the majority, constituting 44 individuals (77.2%), fell within the medium socioeconomic status category. Educational attainment was observed in 37 participants (64.9%), while 9 participants (15.8%) held occupations, and 34 participants (59.6%) reported a positive family history of diabetes, (**Table.1**).

Table 1. Distribution of studied sample according to age.

Demographic data	**Value (N = 57)**	
Age (years)	31.25 ± 5.91	
BMI	26.81 ± 2.59	
Residence	Number	Percentage
Rural	30	52.6%
Urban	27	47.4%
Socioeconomic level		
High	1	1.8%
Low	12	21.1%
Medium	44	77.2%
Education	37	64.9%
Occupation	9	15.8%
Family history of DM	34	59.6%

In terms of obstetric history, a notable proportion of cases exhibited previous adverse obstetric outcomes, with 20 cases (35.1%) experiencing previous intrauterine fetal demise (IUFD), 26 cases (45.6%) encountering prior episodes of obstructed labor, 8 cases (14.0%) having previous infants with congenital anomalies, 3 cases (5.26%) encountering previous instances of shoulder dystocia, and 43 cases (75.4%) having a history of previous admissions to the neonatal intensive care unit (NICU). When categorized according to their diabetes mellitus (DM) status, 22 cases (38.6%) were well controlled, 30 cases (52.6%) had experienced diabetic ketoacidosis (DKA) attacks and 15 cases (26.3%) had encountered hypoglycemic attacks. The duration of DM varied from 0 to 20 years, with a mean duration of 6.23 ± 4.12 years. The analysis of preconception care revealed that 15 cases (83.3%) received pertinent information, 5 cases (72.2%) embarked on planned pregnancies, 1 case (5.6%) underwent retinal assessment, 18 cases (100%) received renal assessments, and 17 cases (94.4%) underwent HbA1c monitoring. Regarding antenatal care, 10 cases (17.5%) engaged in glucose monitoring, 49 cases (86.0%) conducted ketone testing, 13 cases (22.8%) underwent retinal assessments, 57 cases (100%) received renal assessments, 46 cases (80.37%) underwent anomaly scans, 31 cases (54.4%) monitored fetal well-being, 10 cases (17.5%) took measures to prevent pre-eclampsia, and 11 cases (19.3%) received antenatal care facilitated by a multidisciplinary team (MDT), (**Table.2**)

Table 2.General evaluative data of included subjects

Variables	Number (N = 57)	Percentage
Obstetric history		
Previous IUFD	20	35.1%
Previous obstructed labor	26	45.6%
Previous baby with congenital anomaly	8	14.0%
Previous shoulder dystocia	3	5.26%
Previous admission to NICU	43	75.4%
DM status		
Duration of DM	Range	0 - 20
	Mean ± S.D.	6.23 ± 4.12
Well controlled	22	38.6
DKA attack	30	52.6
Hypoglycemic attack	15	26.3
Preconception Care		
Information given	15	83.3%
Planned pregnancy	5	27.8%
Retinal assessment	1	5.6%
Renal assessment	18	100%
HbA1c	17	94.4%
Antenatal Care		
Glucose monitoring	10	17.5%
Ketone testing	49	86.0%
Retinal assessment	13	22.8%
Renal assessment	57	100%
Anomaly scan	46	80.7%
Monitoring fetal wellbeing	31	54.4%
Preventing pre-eclampsia	10	17.5%
ANC by MDT	11	19.3%

The assessment of intra-partum and neonatal outcomes within the studied group revealed diverse temporal patterns of delivery, with 23 cases (40.4%) occurring before 34 weeks of gestation, 27 cases (47.4%) taking place between 34 and 37 weeks, and 7 cases (12.3%) occurring after 37 weeks. Additionally, a substantial proportion of cases, totaling 44 individuals (77.2%), necessitated admission to the neonatal intensive care unit (NICU), indicative of potential neonatal health challenges. Moreover, a smaller subset of cases, comprising 3 individuals (5.3%), (**Table.3**).

Table.3. Distribution of studied sample according to intra-partum and neonatal outcomes.

Intra-partum and neonatal outcomes.		Number N=57	Percentage
Time of delivery	**<34 w**	23	40.4%
	34-37 w	27	47.4%
	>37 w	7	12.3%
NICU admission	**No**	13	22.8%
	Yes	44	77.2%
Congenital anomaly	**No**	54	94.7%
	Yes	3	5.3%
• **Macrosomia**		2	3.51%
• **Polyhydramnios**		1	1.75%
Type of delivery			
• **Vaginal delivery**		23	40.4%
• **Cesareans section**		34	59.6%

Significant correlations were identified within the data analysis. A noteworthy positive correlation emerged between neonatal intensive care unit (NICU) admission and body mass index (BMI), with a P-value of 0.00328, suggesting that higher BMI values were associated with an increased likelihood of NICU admission. Additionally, a positive correlation was observed between NICU admission and diabetic ketoacidosis (DKA) attacks, with a P-value of 0.0223, indicating that the occurrence of DKA attacks was linked to a higher probability of NICU admission. Conversely, a significant negative correlation was established between NICU admission and well-controlled diabetes, supported by a P-value of 0.00004, signifying that effective diabetes management was associated with a reduced likelihood of NICU admission. Furthermore, a notable positive correlation was detected between the timing of delivery and BMI, marked by a P-value of 0.024, implying that higher BMI values were related to specific delivery timeframes. **(Table .4).**

Table 4. Correlation between NICU admission and Time of delivery with different patients variables

Variables	NICU Admission		Time of delivery	
	r	P. Value	r	P. Value
Age	0.087017	0.51982	-0.022	0.869
BMI	.383	0.00328*	.299	0.024*
ANC by MDT	-0.158	0.24	-0.04	0.769
Diabetes status:				
• Well controlled	-.514	0.00004*	-0.138	0.306
• DKA attack	.302	0.0223*	0.164	0.222
• Hypoglycemic attack	-0.05497	0.68464	-0.167	0.215
• Duration of DM	0.143024	0.28853	-0.125	0.355
Preconception care	0.09942	0.46185	-0.097	0.472

Discussion

In our research, age distribution of sample was shown. Ages varied from 18y to 43y, with a mean of 31.25 ± 5.91. Our findings confirmed **Macintosh et al. (2006)**, who sought perinatal death and congenital abnormality rates for infants delivered to mothers with type 1 or 2 diabetes in England, Wales, and Northern Ireland. The research comprised 2359 type 1 and 2 diabetic pregnant women. Women with type 1 diabetes (n=1707) were 15 (9-23) and type 2 diabetes (n=652) was 29 (25-34).

In our investigation, demographic data influenced sample distribution. Where 30(52.6%) of patients resided in rural regions and 2(47.4%) in urban areas, 1(1.8%) had high socioeconomic level, 12(21.1%) low, and 44(77.2%) middle. 37 (64.9%) were educated, 9 (15.8%) worked, and 34 (59.6%) had a diabetic family history. Catalano et al. (2012) found 22.7% of all examined groups had a family history of diabetes, supporting our findings. HAPO (2009) found 22.2% of all groups had a family history of diabetes, supporting our findings.

Our analysis demonstrated BMI distribution of sample. It varied from 24 to 35, with a mean value of 26.81 ± 2.59. Our findings align with **Catalano et al. (2012)**, who found a mean BMI of 27.7 ± 5.1 in the examined groups.

Our present investigation demonstrated obstetric history dispersion of sample. 20 (35.1%) had pre IUFD, 26 (45.6%) pre obstructed labor, 8 (14.0%) pre congenital abnormality, 3 (5.26%) pre shoulder dystocia, and 43 (75.4%) preadmission to NICU. Macintosh et al. (2006) found 141 significant congenital abnormalities in 109 children, supporting our findings. The number of children with several significant abnormalities was 23 (21.1%). The most prevalent diagnoses were heart or limb, musculoskeletal, and connective tissue defects. Contrary to **Catalano et al. (2012)**, shoulder dystocia/birth injury 311 (1.3%) from all groups.

In our research, sample distribution by DM status was shown. While 22 (38.6%) patients were successfully handled, 30 (52.6%) had DKA attack, 15 (26.3%) had hypoglycemic attack, and 18 (31.6%) received preconception care. **Clausen et al. (2005)** found that type II DM duration was 1–5 and type I DM was 6–19, contrary to our findings.

Our research indicated patient distribution by preconception care. With 15(83.3%) information, 5(72.2%) with intended pregnancy, 1(5.6%) with retinal evaluation, 18(100%) with renal assessment, and 17(94.4%) with HBA1c. The ADA also recommended screening/diagnosis at this time of pregnancy using routine diagnostic tests, such as an FPG 126 mg/dL (7.0 mM), random PG 200 mg/dL (11.1 mM), or 2-h 75-g GTT value 200 mg/dL. The ADA further advised women at higher risk of GDM, even those without diabetes early in pregnancy, to be tested at 24–28 weeks. **(Macintosh et al., 2006)** Our findings confirm **Murphy et al. (2007)**, who found 70% of women planned their pregnancies (73% type 1, 65% type 2). Women with type 1 diabetes had a longer diagnostic duration (18.5 ± 9.3 vs. 5.8 ±7.1 years).

Our research demonstrated intra-partum and neonatal outcome distribution of participants. The study found that the timing of birth varied among the group: 23 (40.4%) <34 w, 27 (47.4%) 34-37 w, 7 (12.3%) >37 w, 44 (77.2%) NICU admission, and 3 (5.3%) congenital abnormality. Standard: > 38 weeks for well-controlled and < 38 weeks for uncontrolled.

Our findings confirmed **Macintosh et al. (2006)**, who reported 63 stillbirths and 22 infant deaths. Two newborn fatalities happened before 24 weeks and one was a termination between 24-27 weeks. **Clausen et al. (2005)** found that births < 34 weeks' gestation resulted in 8 **(14%)** type II DM cases and 17 **(7%)** type I cases **(0.19)**. Additionally, 31% of births <37 weeks were type II DM, whereas 38% were type I. Our findings were corroborated by **Roland (2005)**, who found 25 (6.4%) significant unfavorable foetal outcomes in type 1 DM and 24 (16.4%) in type 2. **Buchanan et al. (2012)** found that women with GDM had a 9.4% frequency of birth at <37, whereas those without GDM had a 6.4% frequency. Our findings corroborated **Bartha et al. (2003)**, who tested the concept that early gestational diabetes mellitus (GDM) diagnosis might prevent diabetic complications. And compared the rates of pregnancy complications commonly related to diabetes in 189 (later screening group) and 235 (earlier screening group) women with GDM diagnosed before and after adding a universal glucose tolerance screening in the first antenatal visit to the traditional screening at 24–28 weeks. Preterm deliveries (11.8 versus 5.5%; P=0.03). All preterm premature rupture of membranes and fetal abnormalities occurred in the later screening group (P=0.03, P=0.007). Our findings corroborated **Kalra et al. (2013)** who evaluated gestational diabetes prevalence in western Rajasthan using diabetes in pregnancy Study Group India (DIPSI) criteria and feto-maternal outcomes. This research included 500 24-28-week-olds. GDM was 6.6% in this research. GDM patients had more maternal and fetal problems than non-GDM patients. Hypertension, vaginal candidiasis, and abruptio placentae were frequent maternal problems; macrosomia and stillbirths were fetal. **Buchanan et al. (2012)** found that intensive neonatal outcomes were required 9.1% of the time in GDM-affected pregnancies and 7.8% of the time in non-GDM pregnancies.

NICU hospitalization was positively correlated with BMI (P-value = 0.00328) and DKA attack (P-value = 0.0223). NICU hospitalization negatively correlated with well-controlled diabetes (P = 0.00004). BMI was positively correlated with delivery time (P = 0.024). **Callaway et al. (2006)** observed a substantial correlation between maternal BMI and NICU hospitalization, with rates of 4.0% for overweight women, 5.3% for obese women, and 10.9% for severely obese women (p < 0.001). In contrast to our research, **Roman et al. (2007)** found no statistically significant association between maternal BMI and newborn NICU hospitalization (p = 0.96). Similar to our study, **Anwer et al. (2021)** found a significant correlation between glucose levels and NICU admission, as pregnant women with hyperglycemia were 29.2% more likely to have a neonate admitted than those with euglycemia (16.9%) (P = 0.03).

Conclusion

Defective preconceptional and antenatal care were evident in a great proportion of patient this raise alarm for enhancing the standard of obstetric and medical management of pregnancy. Diabetes during pregnancy poses significant risks to both the mother and the developing fetus, with a high incidence of preterm labor (88%) and a substantial need for neonatal intensive care unit (NICU) admission (77.2%). Factors primarily contributing to NICU admissions included maternal BMI, diabetic ketoacidosis (DKA) attacks, and the control of diabetes. Furthermore, elevated maternal BMI emerged as the main determinant for preterm labor. The study also identified various areas of substandard care within our department, such as limited compliance with glucose monitoring (17.5%), patient assessment (5.7%), antenatal care (ANC) (19.3%), management of pre-eclampsia (19.3%), completion of anomaly scans

(80%), planned pregnancies (27.8%), and the high incidence of NICU admissions (77.2%). These findings underscore the need for improved care protocols and management strategies in cases of diabetes during pregnancy.

References

- **Acolet D, Fleming K, Macintosh M, Modder J (2005).** Pregnancy in Women with Type 1 and Type 2 Diabetes: England, Wales and Northern Ireland: Confidential Enquiry into Maternal and Child Health, 188(1): 91-98.
- **Anwer TZ, Aguayo R, Modest AM, Collier ARY (2021).** Reexamining intrapartum glucose control in patients with diabetes and risk of neonatal hypoglycemia. Journal of Perinatology, 41(12): 2754-2760.
- **Athukorala C, Middleton P, Crowther CA (2006).** Intrapartum interventions for preventing shoulder dystocia. Cochrane Database of Systematic Reviews, 4(1): 2-7.
- **Bartha JL, Martinez-Del-Fresno P, Comino-Delgado R (2003).** Early diagnosis of gestational diabetes mellitus and prevention of diabetes-related complications. European journal of obstetrics & gynecology and reproductive biology, 109(1): 41-44.
- **Buchanan TA, Xiang AH, Page KA (2012).** Gestational diabetes mellitus: risks and management during and after pregnancy. Nature Reviews Endocrinology, 8(11): 639-649.
- **Callaway LK, Chang AM, McIntyre HD, Prins JB (2006).** The prevalence and impact of overweight and obesity in an Australian obstetric population. Medical journal of Australia, 184(2): 56-59.
- **Catalano PM, McIntyre HD, Cruickshank JK, McCance DR, Dyer AR, Metzger BE et al (2012).** The hyperglycemia and adverse pregnancy outcome study: associations of GDM and obesity with pregnancy outcomes. Diabetes care, 35(4): 780-786.
- **Clausen TD, Mathiesen E, Ekbom P, Hellmuth E, Mandrup-Poulsen T, Damm P et al (2005).** Poor pregnancy outcome in women with type 2 diabetes. Diabetes care, 28(2): 323-328.
- **Faria MS, de Aguilar-Nascimento JE, Pimenta OS, Alvarenga LC, Dock-Nascimento DB, Slhessarenko N (2009).** Preoperative fasting of 2 hours minimizes insulin resistance and organic response to trauma after video-cholecystectomy: a randomized, controlled, clinical trial. World journal of surgery, 33(1): 1158-1164.
- **Guideline Development Group. (2008).** Management of diabetes from preconception to the postnatal period: summary of NICE guidance. Bmj, 336(7646): 714-717.
- **HAPO Study Cooperative Research Group (2009).** Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study: associations with neonatal anthropometrics. Diabetes, 58(2): 453-459.
- **Kalra P, Kachhwaha CP, Singh HV (2013).** Prevalence of gestational diabetes mellitus and its outcome in western Rajasthan. Indian journal of endocrinology and metabolism, 17(4): 677-680.
- **Kong L, Nilsson IA, Gissler M, Lavebratt C (2019).** Associations of maternal diabetes and body mass index with offspring birth weight and prematurity. Journal of the American Medical Association pediatrics, 173(4): 371-378.
- **Langer O, Conway DL, Berkus MD, Xenakis EMJ, Gonzales O (2000).** A

comparison of glyburide and insulin in women with gestational diabetes mellitus. New England Journal of Medicine, 343(16): 1134-1138.

- **Macintosh MC, Fleming KM, Bailey JA, Doyle P, Modder J, Acolet D et al (2006).** Perinatal mortality and congenital anomalies in babies of women with type 1 or type 2 diabetes in England, Wales, and Northern Ireland: population based study. British medical journal, 333(7560): 177-183.
- **Mack LR, Tomich PG (2017).** Gestational diabetes: diagnosis, classification, and clinical care. Obstetrics and Gynecology Clinics, 44(2): 207-217.
- **Metzger BE, Lowe LP, Dyer AR, Trimble ER, Sheridan B, Hod M et al (2009).** Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study: associations with neonatal anthropometrics. Diabetes, 58(2): 453-459.
- **Murphy HR, Rayman G, Duffield K, Lewis KS, Kelly S, Johal B et al (2007).** Changes in the glycemic profiles of women with type 1 and type 2 diabetes during pregnancy. Diabetes care, 30(11): 2785-2791.
- **Navathe R, Saccone G, Villani M, Knapp J, Cruz Y, Boelig R et al (2019).** Decrease in the incidence of threatened preterm labor after implementation of transvaginal ultrasound cervical length universal screening. The Journal of Maternal-Fetal & Neonatal Medicine, 32(11): 1853-1858.
- **Nuttall FQ (2015).** Body mass index: obesity, BMI, and health: a critical review. Nutrition today, 50(3): 117.
- **Oakes JM, Rossi PH (2003).** The measurement of SES in health research: current practice and steps toward a new approach. Social science & medicine, 56(4): 769-784.
- **Ogata ES (2010).** Problems of the infant of the diabetic mother. NeoReviews, 11(11): 627-631.
- **Roland JM, Murphy HR, Ball V, Northcote-Wright J, Temple RC (2005).** The pregnancies of women with type 2 diabetes: poor outcomes but opportunities for improvement. Diabetic Medicine, 22(12): 1774-1777.
- **Roman H, Robillard PY, Hulsey TC, Laffitte A, Kouteich K, Marpeau L et al (2007).** Obstetrical and neonatal outcomes in obese women. West Indian Medical Journal, 56(5): 421-426.
- **Van Der Linden EL, Browne JL, Vissers KM, Antwi E, Agyepong IA, Grobbee DE, Klipstein-Grobusch K (2016).** Maternal body mass index and adverse pregnancy outcomes: a Ghanaian cohort study. Obesity, 24(1): 215-222.
- **Vieira MC, Sankaran S, Pasupathy D (2020).** Fetal macrosomia. Obstetrics, Gynaecology & Reproductive Medicine, 30(5): 146-151.
- **Xiang AH, Kjos SL, Takayanagi M, Trigo E, Buchanan TA (2010).** Detailed physiological characterization of the development of type 2 diabetes in Hispanic women with prior gestational diabetes mellitus. Diabetes, 59(10): 2625-2630.
- **Zhang M, Zhou Y, Zhong J, Wang K, Ding Y, Li L (2019).** Current guidelines on the management of gestational diabetes mellitus: a content analysis and appraisal. BMC pregnancy and childbirth, 19(1): 1-15.