

MORBIDITY PROFILE OF NEONATES BORN TO DIABETIC MOTHERS IN A RURAL TERTIARY CARE HOSPITAL

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Abstract

Background: According to WHO Fact Sheet, about 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.6 million deaths are directly attributed to diabetes each year. The prevalence of diabetes mellitus has been increasing over the past few decades. Around 463 million adults (20-79 years) were living with diabetes, and by 2045 this will rise to 700 million. To evaluate the morbidity profile of neonates born to diabetic mothers. **Materials and Methods:** Details of the study methods. Study Design: Observational study, Study Period: 02- Sep-2022 to 20-march-2023, Study Area: Maheshwara Medical College & Hospital, Chitkul village, Hyderabad Source of data: Department of Paediatrics. Study Population: Neonates born to diabetic mothers. Inclusion criteria: All live-born Neonates born to diabetic mothers, Exclusion criteria: Parents who refuse to give informed consent for the study. Sample size: 80. **Result:** The analysis and interpretation of this study was based on the data collection. The results were compared with the help of descriptive and inferential statistics. The data were compared into excel sheets and analyzed by using STATA. A probability of less than 0.05 was considered as significant. **Conclusion:** The following conclusions can be drawn from this study. Among the pregnancies complicated by diabetes, GDM continues to have a significant contribution. Hypoglycemia remains the most common biochemical abnormality, followed by hypocalcaemia and hypomagnesemia.

INTRODUCTION

According to WHO Fact Sheet, about 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.6 million deaths are directly attributed to diabetes each year. The prevalence of diabetes mellitus has been increasing over the past few decades.^[1] Around 463 million adults (20-79 years) were living with diabetes, and by 2045 this will rise to 700 million. More than 1 million children and adolescents were living with type 1 diabetes mellitus.^[2] More than 20 million live births (one in six live births) are affected by diabetes during pregnancy.^[3] In a broad sense, gestational diabetes is defined as it is carbohydrate intolerance of variable severity with onset or first recognition in pregnancy.^[3] The recent data on the prevalence of GDM in our country prevalence was 16.55% by WHO criteria of 2hr PG \geq 140 mg/dl. The neonatal mortality rate in diabetic

pregnancies is five times more than that of no diabetic pregnancies.^[4] Two out of every five women with diabetes are of reproductive age, accounting for over 60 million women worldwide. 1 in 7 births is affected by gestational diabetes (GDM), a very neglected threat to maternal and also child health.^[5] Long-range complications include an increased childhood and adolescent obesity rate, impaired glucose tolerance or diabetes mellitus, and subtle neuropsychological dysfunctions.^[6] This study also showed a high percentage of neonatal complications due to poor glycemic control in pregnancy. Hypoglycemia in IDMs was strongly associated with congenital anomalies and macrosomia, which was the primary cause for morbidity and mortality in IDMs.^[7] So the current study was undertaken to assess the morbidity profile of neonates born to diabetic mothers in rural tertiary care hospital Maheshwara Medical College & Hospital, Chitkul village, Hyderabad.

MATERIALS AND METHODS

Study Design: Observational study

Study Period: 02- Sep-2022 to 20-march-2023

Study Area: Maheshwara Medical College &Hospital, Chitkul village, Hyderabad.

Source of Data: Department of Paediatrics, Maheshwara Medical College &Hospital, Chitkul village, Hyderabad.

Study Population: Neonates born to diabetic mothers

Inclusion Criteria

All live-born Neonates born to diabetic mothers

Exclusion Criteria

Parents who refuse to give informed consent for the study.

Sample size: 80

Formula

$$n = \frac{Z_{1-\alpha/2}^2 * p(1-p)}{d^2}$$

Calculation

$$n = \frac{1.96^2 * 0.15(1-0.15)}{0.10^2} = 48$$

Sampling Technique: Convenient sampling

Tools & techniques to be used:

1. 2DEcho
2. Chest X-ray
3. Ultrasound
4. Glucometer
5. Laboratory investigations
6. Measuring tape
7. Digital electronic weighing scale
8. Proforma (self-prepared)

Procedure for data collection: Infants born to a diabetic Maheshwara Medical College & Hospital, Chitkul village, Hyderabad hospital from september 2022 to march 2023 was enrolled in the study. Written informed consent was obtained. Maternal history and details of glycemic control (blood glucose and HbA1c levels) were taken from

maternal records. Neonatal history and detailed examination of these babies were done. Birth weight was measured using a digital electronic weighing scale before first feed after removing the baby's clothes. The length was measured by using an infantometer and head circumference was measured using a measuring tape. Laboratory investigations like blood glucose, serum calcium, serum bilirubin, hematocrit, 2D Echo, chest X-ray was done if required. The mothers with HbA1c levels less than 6.5% were labeled as having a satisfactory glycemic control, whereas mothers with HbA1c levels of more than 6.5% were grouped as having unsatisfactory glycemic control. Finally, the outcome of neonates born to diabetic mothers was assessed.

Plan of Analysis of Data

The data will be entered into MS Excel 2007 version and further analyzed using STATA14.1.

For descriptive analysis, the categorical variables were analyzed using percentages and graphical presentations, and continuous variables were analyzed by calculating mean +/- standard deviation. For inferential analysis, tests such as t-test, Chi-square test will be applied, and p<0.05 will be considered statistically significant.

Significant Figures

+ Suggestive significance (P value: 0.05<P<0.10)

* Moderately significant (P value: 0.01<P ≤ 0.05)

** Strongly significant (P value : P≤0.01)

RESULTS

The analysis and interpretation of this study was based on the data collection. The results were compared with the help of descriptive and inferential statistics. The data were compared into excel sheets and analyzed by using STATA. A probability of less than 0.05 was considered as significant.

Table 1: Frequency and Percentage Distribution of Neonates Born to Diabetic Mothers.

Total no of deliveries in Maheshwara Medical college	Noof IDM Babies	Percentage
2944	80	2.71%

Table 2: frequency and percentage distribution of demographic variables of neonates

SLNO	Demographicvariables ofneonates	FrequencyF	PercentageP
1.	GESTATIONALAGE		
	a)Term	48	60
	b)Preterm	32	40
2	BIRTHWEIGHT		
	a)1.5-2KG	15	18.75
	b)2.1-2.5KG	11	13.75
	c)2.6-3KG	31	38.75
	d)3.1-3.5KG	14	17.50
	e)>3.6KG	9	11.25
3.	SEX		
	a)Male	38	47.50
	b)Female	42	53
4.	BIRTHWEIGHTFORGESTATIONALAGE		
	a)SmallforGA	10	12.50
	b)AppropriateforGA	57	71.25
	c)LargeforGA	13	16.25

Gestational Age: Out of 80 IDM, 48(60%) were term babies and 32(40%) were preterm.

Birth weight, 31(38.75%)IDM birth weights were between 2.6-3kg, 14(17.5%) were between 3.1-3.5kg, 11(13.75%) were between 2.1-2.5kg, 15(18.75%)were between1.5-2 kg, and remaining 9(11.25%) were between >3.6kg.

Sex of the Baby: 38(47.5%) were males and 42(53%) were females Birth weight for Gestational age: 57(71.25%),13 (16.25%) and 10(12.5%) belongs to Appropriate for Gestational age, Large for Gestational age and small for Gestational age respectively.

Table 3: frequency and percentage distribution of maternal demographic and co morbid variables

SL.NO	Demographic variables of mothers	Frequency F	Percentage%
1.	MATERNAL AGE		
	a)<20years	10	12.50
	b)21-25years	16	20.00
	c)26-30years	46	57.50
	d)31-35	8	10.00
2	TYPESOFDIABETES		
	a)Overt diabetes	18	22.50
	b)Gestational diabetes	62	77.50
3.	GLYCEMICCONTROL		
	a)Good	47	58.75
	b)Poor	33	41.25
4.	ASSOCIATEDCOMPLICATIONS		
	a)Hypertension	14	17.50
	b)Hypothyroidism	10	12.5.
	c) None	56	70.00
5.	MODEOFDELIVERY		
	a)Vaginal	42	52.50
	b)Assisted Vaginal	9	11.25
	c)LSCS	29	36.25
6.	PROM		
	a)Yes	18	22.50
	b)No	62	77.50

Maternal age: 10(12.5%) Mothers age were less than 20 years, 16(20.5%) were between 21-25 years of age, 46(57.5%) were between 26-30 years of age and 8(10%) were between the age group of 31-35 years of age.

Glycemic control: Most of the mothers 47(58.75%) had good glycemic control and 33(41.25%) mothers had poor glycemic control.

Associated complications: Majority 56(70%) doesn't develop any complications, whereas 14(17.5%) were diagnosed as hypertension and only 10(12.5%) mothers had hypothyroidism.

Mode of delivery:42(52.5%) IDM were delivered by normal Vaginal delivery,29(36.5%) delivered by LSCS and remaining 9(11.25%) had assisted vaginal delivery.

PROM: Majority 62(77.5%) doesn't had premature rupture of membranes whereas 18(22.5%) had PROM.ars.

Table 4: frequency and percentage distribution of complications of IDM

SLNO	Demographic variables of neonates	Frequency F	Percentage P
1.	HYPOGLYCEMIA		
	a)Yes	15	18.75
	b)No	65	81.25
2	HYPOCALCEMIA		
	a)Yes	14	17.50
	b)No	66	82.50
3.	HYPOMAGNESEMIA		
	a)Yes	6	7.50
	b)No	74	92.50
4.	SEPSISSCREENING		
	a)Positive	14	17.50
	b)Negative	66	82.50
5.	SERUMBILIRUBINLEVEL		
	a)On phototherapy range	15	18.75
	b)Not on range	65	81.25
6.	POLYCYTHEMIA		
	a)Present	5	6.25
	b)Absent	75	93.75
7.	SEIZURES		
	a)Yes	10	12.50
	b)No	70	87.50
8.	BIRTH ASPHYXIA		
	a)Yes	13	16.25

	b)No	67	83.75
9.	HYPOXICISCHEMICENCEPHALOPATHY		
	a)No HIE	n=13	
	b)1HIE	4	30.77
	c)2HIE	5	38.46
	d)3HIE	2	15.38

Complications of IDM

Hypoglycemia, Hypocalcemia and Hypomagnesemia, Out of 80, 15(18.75%), 66(82.50%) and 6(7.5%) developed hypoglycemia, hypocalcemia, hypomagnesemia respectively.

Sepsis screening, 66(82.50%) IDM were found to be negative whereas 14(17.5%) were positive for sepsis screening.

Serum bilirubin level, majority 65(81.25%) IDM sr.bilirubin levels was not on phototherapy range and 15(18.75%) were on phototherapy range.

Polycythemia, out of 80, only 5(6.25%) developed polycythemia, and majority 75(93.75%) doesn't developed polycythemia.

Seizures, only 10(12.5%) IDM developed seizures and remaining 70(87.5%) doesn't develop seizures.

Birth asphyxia, out of 80, 13(16.25%) developed birth asphyxia and 67(83.75%) were normal.

Hypoxic Ischemic Encephalopathy, Out of 13, 5(38.46), 2(15.38), 2(15.38) and 4(30.77), IDM were categorized as grade 1HIE, grade 2 and grade 3 and no HIE.

Table 5: Frequency and percentage distribution of neonates with neuro sonogram abnormalities

Neuro sonogram abnormalities	Frequency	Percentage
Caudothalamic groove Cyst	3	37.5
Periventricular flare	3	37.5
Intracranial bleed	2	25

Out of 80, in neuro sonogram 3(38) IDM had caudothalamic groove cyst, 3(37.5) had Peri ventricular flare and 2(25) had Intracranial bleed

Table 6: Frequency and percentage distribution of IDM with congenital heart diseases

S.No	Congenital heart disease	Frequency	Percentage
1.	VSD	3	33.3
2.	ASD	4	44.4
3	PDA	2	22.2
4	Asymmetrical Septal Hypertrophy	0	0
		n=9	100

Out of 80 IDM, 9 developed congenital heart disease, 3(33.3) VSD, 4(44.4) ASD and 2(22.2) PDA respectively.

Table 7: Frequency and percentage distribution of IDM with chest x ray abnormalities

S.no	Chest Xray abnormalities	Frequency	Percentage%
1.	Respiratory distress syndrome	3	30
2.	Meconium aspiration syndrome	2	20
3	Transient tachypnoea of newborn	3	30
4	Congenital pneumonia	2	20
		n=10	100

Respiratory distress syndrome was found in 3(30%), 2(20%) Meconium aspiration syndrome, 3(30%) Transient tachypnoea of newborn and 2(20%) Congenital pneumonia.

Table 8: Frequency and percentage distribution of IDM with mortality(n=80)

Outcome	Gestation	Frequency	%age
Death	Term(Meconium aspiration)	2	2.5
	Preterm(IVH)		
Anomalies	Hemi vertebra	1	1.25

Out of 80 neonates, 2 neonates were died, (1 was Term with Birth asphyxia and Meconium aspiration syndrome and other was Preterm IVH.

Table 9: Association between glycemic control with diabetic status among mothers

Glycemic control	Status	Diabetic	Chi square	
	GDM	OVERDM	p.value	Result
GoodHba1c<6.5%	38(61.29%)	9(50%)	0.7338	NotSignificant
PoorHba1c>6.5%	24(38.71%)	9(50%)	0.392	

The above Table shows the Comparison between the glycemic control with diabetic status, among the mothers with good glycemic control, 38 (61.29%) had GDM, 9(50%) had overt diabetes, with poor diabetic control 24(38.71%) had GDM and 9(50%) had overt diabetes and the obtained "p" value was 0.3 and it was statistically not significant.

Table 10: Association between maternal glyceimic control with mode of delivery

Glyceimic control	Mode of delivery			Chi-square P-value Pr=0.834	Result
	Vaginal	Assisted vaginal	LSCS		
Good	26(55%)	5(10%)	16(34%)		Not significant.
Poor	16(48%)	4(12%)	13(40%)		

The above Table describes the association between the maternal glyceimic control with mode of delivery. Among mother with good glyceimic control 26(55%),5(10%) and 16(34%).And in poor glyceimic control , 16(48%),4(12%) and 13(40%) were undergone vaginal, assisted vaginal and LSCS, the obtained “p” value was < 0.834 and it was statistically not significant.

Table 11: Association between maternal glyceimic control with intrauterine growth

Glyceimic Control	Birth weight with gestational age			P-value Pr=0.044	Result
	SGA	AGA	LGA		
Good	8(17%)	35(74%)	4(9%)		Significant
Poor	2(6%)	22(67%)	9(27%)		

The above Table shows the association between the maternal glyceimic control with the gestational age of neonates, and the obtained “p” value was < 0.044 and it was statistically significant.

Table 12: Association between maternal glyceimic control with sex of baby

Glyceimic control	Sex of baby		P-value Pr=0.759	Result
	Female	Male		
GOOD	23(49%)	24(51%)	0.0942	Not significant
POOR	15 (45%)	18(55%)		

The above Table shows the association between maternal glyceimic control with sex of baby, among the mothers with good glyceimic control 45% of them were females and 51% were male babies, the obtained “p” value was < 0.759 and it was statistically not significant.

Table 13: Association between maternal glyceimic control with neonatal birth weight

Glyceimic control	Record of birth weight (birth weight in kg)					P-value Pr=0.190
	1.5 -2	2.1-2.6	2.6– 3	3.1-3.5	>3.6	
Good	12(25.53%)	7 (14.89%)	16(34.04%)	9 (19.15%)	3(6.38%)	6.1311
Poor	3(9.09)	4 (12.12%)	15(45.45%)	5 (15.15%)	6 (18.18%)	

The above Table depicts the association between maternal glyceimic control with neonatal birth weight, majority of IDM s birth weight were between 2.6 to 4 kgs the obtained “p” value was < 0.190 and it was not statistically significant

Table 14: Association between maternal glyceimic control with polycythemia

Glyceimic control	Polycythemia		P-value Pr=0.30	Result
	Yes	No		
Good	4(8.7%)	42(91.3%)		Not Significant
Poor	1(3%)	33(97%)		

In this study, least 8.70% and 3% of IDM developed polycythemia in both the groups and the obtained “p” value was < 0.30and it was not statistically significant.

Table 15: Association between the maternal glyceimic control with complications of IDM

Complications	Glyceimic control	N=80			
		Good	Poor		
Hypoglycemia	Yes	5(6.25%)	10(12.5%)	4.9212	p.0.02
	No	42(56%)	23(29%)		
Hypocalcemia	Yes	5(6.25%)	9(11.25%)	3.7157	p.0.05.
	No	42(56%)	24 (30%)		
Hypomagnesemia	Yes	2(4.26%)	4(12%)	1.7291	0.189
	No	45(95%)	29(88%)		
Birthasphyxia	Yes	9(19.15)	4(12.12%)	0.402	0.7036
	No	38(80%)	29(88%)		
Seizures	YES	3(3.75%)	7(9%)	3.8979	0.04
	NO	44(55%)	26(33%)		

5(6.25%) neonates of diabetic mothers with good glyceimic control manifested with hypoglycemia,whereas 10(12.5%) neonates of diabetic mothers with poor glyceimic control manifested with hypoglycemia,the obtained p value was 0.02 hence it was significant. 5(6.25%)neonates of diabetic mothers with good glyceimic control

developed hypocalcemia, whereas 9(11.25%) neonates of diabetic mothers with poor glycemic control manifested with hypocalcemia, the obtained p value was 0.05, hence it was significant Hypomagnesemia, 2(4.26%),4(12%) was found among neonates of diabetic mothers with good and poor glycemic control respectively. All neonates who had hypomagnesemia, also had hypocalcemia Birth asphyxia, out of 13, 9(19.15) and 4(12.12%) among neonates of diabetic mothers with good and poor glycemic control respectively. The obtained p value was 0.7036. 3(3.75%) neonates of diabetic mothers with good glycemic control developed seizures whereas 7(9%) neonates of diabetic mothers with poor glycemic control developed seizures(N=80).

Table 16: Association between the of metabolic abnormalities with seizures among IDM

Metabolic abnormalities	Criteria	Seizure		P-value
		Yes	No	
Hypoglycaemia	a)Yes	6 (40%)	9(60%)	12.7648 p=<0.05
	b) No	4(6%)	61(94%)	
Hypocalcemia	a)Yes	5(36%)	9(64%)	8.3612 P=0.004
	b) No	5(8%)	61(92%)	
Hypomagnesemia	a)Yes	3(50%)	3(50%)	8.3398 P<0.05
	b) No	7(9%)	67(91%)	

Out of 15 babies with Hypoglycemia,6 (40%) had hypoglycemicseizures ,Out of 14 babies with Hypocalcemia,5(36%) had hypocalcemic seizures and Out of 6 babies,3(50%) had hypomagnesemic seizures.All babies who had hypomagnesemia, also had hypocalcemia. Most of the babies who had seizures had co-existing abnormalities and obtained p value was statistically significant.

Table 17: Frequency and percentage between the glycemic control with cardiac abnormalities.(N=9)

Cardiac abnormalities	GOOD	POOR
ASD	1(11.11%)	3(33.33%)
VSD	1(11.11%)	2(22.22%)
PDA	0	2(22.22%)
Asymmetrical Septal Hypertrophy	0	0

Cardiac abnormalities are more common with neonates born to diabetic mothers with poor glycemic controls.

DISCUSSION

This study was conducted in the Department of Paediatrics, Maheshwara Medical College &Hospital,Chitkul Village, Hyderabad.. A total of 80 mothers with diabetes were included in this study,

The morbidity of infants born to diabetic mothers has been progressively decreasing owing to the tight glycemic control during pregnancy.The risk of neonatal morbidity is directly related to the control of maternal diabetes during pregnancy.^[8]

Incidence

The incidence of infants born to diabetic mothers in the present study was 2.71%. The total number of infants born to diabetic mothers included in the study was 80. In a study done by Hafeez Ullah et al. in 2019, a total of 200 patients were included, out of which 162(81%) women were identified to have GDM. A study done by Syeda Kausar Anjum showed the incidence of diabetes around 2.8%.

Type of diabetes

During pregnancy, GDM is the most prevailing type of diabetes. In the current study, out of 80 mothers, 22.50% with Overt diabetes and 77.50% with gestational diabetes. This was found to be similar with Hafiz Hafeez Ullah et al. 2019, 162 (81% of 58 the total cases) women were presented with GDM, while with type I only 5% and with type II 14%.

Gestational age, in this study, 48(60%) are term neonates, and 32(40%) are preterms. Whereas in

Devi Meenakshi et al., they found (87.9%) were term and 24 (12.1%) were preterm neonates. Birth weight: In this study, Majority of them ,31(38.75%) are between 2.6-3kg, 15(18.75%) are between1.5-2 kg, 14(17.5%) are between 3.1-3.5kg, 11(13.75%) are between 2.1-2.5kg and remaining 9(11.25%) >3.6kg.And a study by Syeda kausar Anjum,Yashoda HT et al. 2018 showed Mean birth weight of 3.28 kg. Macrosomia (birth weight >4 kg) was observed in 15% of cases while 12% had low birth weight (birth weight <2.5 kg). Gestational age about 57(71.25%) belonged to Appropriate for Gestational age,13 (16.25%) Large for Gestational age remaining and 10(12.5%) small for Gestational age.

Mode of Delivery

In this study, mothers with good glycemic control,most of them are delivered vaginally(55%). In a study by Hafiz Hafeez Ullah, 28% (29) cases delivered 59vaginally, whereas 72% (76) cases underwent C-section. A study by Syeda kausaranjum,Yashoda HT et al. 1 2018 study showed that 79 of G.D.M./Type 2 diabetic mothers delivered by cesarean section and 21 by normal vaginal delivery.

Hypoglycemia, Hypocalcemia, Hypomagnesemia, and polycythemia

In this study, out of 80,15(18.75%),66(82.50%) 6(7.5%) and 5(6.33%)developed Hypoglycemia, Hypocalcemia, Hypomagnesemia and Polycythemia respectively.

A study by Kushvanth K. N et al. showed Hypoglycemia (16%) and Polycythemia (14%) in newborns of GDM. Sepsis

In this study, sepsis screen among mothers with good glycemic control was found positive in 9(19%), and with poor glycemic control, 5(15%) were positive, which was not significant statistically. Only one culture-positive Sepsis (klebsiella) was identified in the present study.^[9]

Birth asphyxia

In this study, out of 80,13(16.25%) developed birth asphyxia. However, the Association between birth asphyxia and glycemic control was not significant statistically. A study was Syeda Kausar anjum showed 3 cases of birth asphyxia.

Respiratory distress syndrome

A study by Hafiz Hafeez Ullahet al. Found respiratory distress among 23%. According to Syeda Kausar anjum 16% of babies had respiratory distress syndrome; among them, five babies required CPAP, and 2 cases required mechanical ventilation.

Hyperbilirubinemia

In our study, 15(18%) IDM had. S.bilirubin levels on phototherapy range and 65 (82%) not on phototherapy range. A study by Devi Meenakshi et al. showed Neonatal hyperbilirubinemia observed in 49 (24.4%) and were all treated with phototherapy.

Neurosonogram Findings

In the present study, neuro sonogram findings show that 03 neonates have caudothalamic groove cyst, periventricular flare in 3, and intracranial bleed in 2 neonates.^[10]

Congenital Heart Diseases

In this study out of 80, with regard to congenital heart diseases, Patent foramen ovale was seen in 10 neonates, and A.S.D.was seen in 4 neonates, of them all are of Ostium secundum type., V.S.D.is seen in 3 neonates; of them, all are of a perimembranous type. Small PDA is seen in 2 neonates, and no septal hypertrophy was noted in our study. Mohan Makwana et al. in their study, found congenital anomalies in six patients, which was higher than nondiabetic mother.^[11]

Congenital Abnormalities

Only one neonate in our present study had congenital abnormalities(hemivertebra).A study by Devi meenakshi et all, congenital anomalies (1%). Niranjan Thomas et al in their study found that congenital anomalies in 5.4%.

Glycemic Level

In this study, mothers with GDM with good glycemic control are 38 (61.29%) and with poor glycemic control are 24(38.71%).Mothers with Overt DM with good glycemic control are 9(50%) and poor glycemic control 9(50%). In Hafiz Hafeez Ullahet al 2020. A study results showed that 84% (n=271) of the pregnancies were planned. Glycemic control early in pregnancy was good in most women (HbA1c 7.0% in 75% (n=212) of the population).^[12]

Seizures

Out of 80 neonates,10 neonates developed seizures,of which hypoglycemic seizures are most

common(40%). All babies with hypomagnesemia seizures also had hypocalcemia, and most of the complications co-exists. In Devi Meenakshi, a study by Neonatal seizures were seen in 7 %. Syeda kausaranjum found Polycythemia was seen in 35% in IDM.

Polycythemia

In the study, mothers with Good glycemic control 4 (8.7%) neonates had polycythemia, and with poor glycemic control, 1(3%) developed polycythemia. Thomas et al. in their study found that polycythemia in 2.3% and Kushvanth K. N. found polycythemia in 2.3%. %. Syeda kausaranjum found Polycythemia was seen in 35% in IDM. 71-76.

CONCLUSION

The following conclusions can be drawn from this study

Among the pregnancies complicated by diabetes, GDM continues to have a significant contribution Hypoglycemia remains the most common biochemical abnormality, followed by hypocalcemia and hypomagnesemia

Metabolic complications like hypoglycemia, hypocalcemia, hypomagnesemia were seen in neonates born to diabetic mothers with poor glycemic control and were statistically significant.

Hypoglycemic seizures were the most common type of seizures followed by hypocalcemic seizures and seizures secondary to birth asphyxia, and all were statistically significant.

All neonates who had hypomagnesemia also had hypocalcemia

ASD was the most common congenital heart disease, followed by VSD

The occurrence of mortality and morbidity was more significant in infants born to diabetic mothers with poor glycemic control before and during the pregnancy.Hence a good glycemic control in diabetic mothers has a better outcome.

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