

Study of maternal and fetal outcomes in gestational diabetes mellitus, tertiary care hospital, India

Estudio de los resultados maternos y fetales en la diabetes mellitus gestacional, hospital de atención terciaria, India

Maedeh Maghrourzefreh¹ , Malini Muraleedharan Nair¹ , Sreelatha S² 

1. Doctors of Pharmacy, Department of Pharmacy practice, Acharya and BM Reddy College of Pharmacy, Bengaluru, Karnataka, India
2. Doctor of Pharmacy, Department of Obstetrics and Gynecology, ESICMC, PGIMSR, Bengaluru, Karnataka, India

Corresponding author

Maedeh Maghrourzefreh

E-mail: maedehmgh@gmail.com

Received: 16 - IV - 2022

Accepted: 27 - IV - 2022

doi: 10.3306/AJHS.2022.37.04.30

Abstract

Objective: The main objective of the research was to assess the maternal and fetal outcome of subjects with Gestational Diabetes Mellitus. The other objectives of the study were to assess the KAP of subjects, Nutritional assessment of subjects with Gestational Diabetes Mellitus.

Methodology: This was an observational study, carried out over a period of 6 months among in-patients of the department of Obstetrics & Gynecology. Based on the inclusion and exclusion criteria, 130 subjects were selected and informed the purpose of the study and details were collected using the proforma developed. KAP questionnaire was filled by the subject to assess the knowledge, attitude and practice.

Results: A total of 130 patients were enrolled in the study based on the inclusion and exclusion criteria. The mean age of the study subjects was found to be 29.56 ± 4.64 years. Majority of the subjects belonged to the age group of 25-32 years (46.15%). Maternal distress (84.61%) was the most common maternal complication followed by cesarean section (73.84%). Jaundice (27.69%), followed by NICU admissions and Respiratory distress each with (16.92%) were the fetal complications. Subjects were administered the self-designed KAP questionnaire, to assess the knowledge, attitude and practice. Using statistical analysis, a weak positive correlation was observed between knowledge and attitude was statistically not significant, a weak negative correlation was observed between attitude and practice was not statistically significant, and a moderate positive correlation was observed between knowledge and practice which was statistically significant. Majority of the subject's showed poor physical activity (49.23%)

Conclusion: Pregnancies complicated with GDM are associated with adverse maternal and fetal outcome in terms of maternal distress, LSCS, hypertensive disorders, prolonged labor, infections, IUGR, macrosomia, jaundice, respiratory distress, low birth weight, low Apgar score at birth and high rates of admission to NICU. Low birth weight due to prematurity, IUGR and fetal distress are the main reasons for NICU admissions. Majority of the subjects had good knowledge, positive attitude and good practice regarding the disease condition and its management. Knowledge and practice were found to be interdependent.

Key words: Gestational diabetes, KAP questionnaire, pregnancy.

Resumen

Objetivo: El objetivo principal de la investigación fue evaluar el resultado materno y fetal de los sujetos con Diabetes Mellitus Gestacional. Los otros objetivos del estudio fueron evaluar el KAP de los sujetos, la evaluación nutricional de los sujetos con Diabetes Mellitus Gestacional.

Metodología: Se trata de un estudio observacional, llevado a cabo durante un período de 6 meses entre los pacientes internos del departamento de Obstetricia y Ginecología. Sobre la base de los criterios de inclusión y exclusión, se seleccionaron 130 sujetos, a los que se informó del propósito del estudio y se recopilaron datos utilizando el formulario elaborado. Los sujetos rellenaron el cuestionario KAP para evaluar sus conocimientos, actitudes y prácticas.

Resultados: Un total de 130 pacientes se inscribieron en el estudio según los criterios de inclusión y exclusión. La edad media de los sujetos del estudio fue de $29,56 \pm 4,64$ años. La mayoría de los sujetos pertenecían al grupo de edad de 25-32 años (46,15%). El sufrimiento materno (84,61%) fue la complicación materna más frecuente, seguida de la cesárea (73,84%). Las complicaciones fetales fueron la ictericia (27,69%), seguida de los ingresos en la UCIN y el sufrimiento respiratorio (16,92%). Se administró a los sujetos el cuestionario KAP diseñado por ellos mismos, para evaluar los conocimientos, la actitud y la práctica. Mediante un análisis estadístico, se observó una correlación positiva débil entre los conocimientos y la actitud, que no fue estadísticamente significativa, una correlación negativa débil entre la actitud y la práctica, que no fue estadísticamente significativa, y una correlación positiva moderada entre los conocimientos y la práctica, que fue estadísticamente significativa. La mayoría de los sujetos mostraron una actividad física deficiente (49,23%).

Conclusiones: Los embarazos complicados con DMG se asocian con resultados maternos y fetales adversos en términos de sufrimiento materno, LSCS, trastornos hipertensivos, parto prolongado, infecciones, RCIU, macrosomía, ictericia, sufrimiento respiratorio, bajo peso al nacer, baja puntuación de Apgar al nacer y altas tasas de ingreso en la UCIN. El bajo peso al nacer debido a la prematuridad, el RCIU y el sufrimiento fetal son las principales razones de los ingresos en la UCIN. La mayoría de los sujetos tenían un buen conocimiento, una actitud positiva y una buena práctica respecto a la condición de la enfermedad y su manejo. Se comprobó que los conocimientos y la práctica son interdependientes.

Palabras clave: Diabetes gestacional, cuestionario KAP, embarazo.

Introduction

Gestational diabetes mellitus (GDM) is defined as "hyperglycemia first detected during pregnancy that is clearly not preexisting or overt diabetes"¹. It is believed to be the drastically increased prevalence of GDM had a negative impact on various short- and long-term maternal and neonatal adverse outcomes².

Gestational diabetes mellitus has been related with an expanded risk for pregnancy-induced hypertension (PIH) with relative risk going from 1.4 to 4.15³⁻⁵ albeit a few examinations propose that the connection between PIH and GDM isn't surely known⁶. It additionally builds the pace of cesarean delivery by up to 57.4% and has a more noteworthy effect in instances of obesity as well as past history of cesarean area^{7,8}.

Gestational diabetes mellitus (GDM) is diabetes that is analyzed during the second or third trimester of pregnancy and isn't obviously clear diabetes⁹. As indicated by American Diabetes Association, Gestational Diabetes mellitus (GDM) has been defined as any level of glucose bigotry with beginning or starting determination during pregnancy.¹⁰ Many risk factors for creating GDM are like those for type 2 diabetes mellitus (T2DM), including obesity, family background of diabetes and high-risk nationalities. Extra risk factors incorporate expanded maternal age, past macrocosmic infant, and individual history of GDM¹¹. GDM not only influences immediate maternal complications (hypertensive disorders such as preeclampsia, gestational hypertension and chronic hypertension, need for cesarean section, Hypoglycemia, Abortion, polyhydramnios,) and neonatal complications (hypoglycemia, respiratory distress, macrosomia, Jaundice, Hypothermia and still birth), but also increases the risk of future type 2 diabetes in mother as well as the baby¹². There is no specific prevention for gestational diabetes but more healthy habits adopted before pregnancy can be a benefit. Some possible measures that can be considered are, eating healthy foods, being active and fit.¹³ Worldwide there are many guidelines with recommendations for appropriate management strategies for GDM. Most guidelines recommend screening all patients for GDM at 24-28 weeks of gestation. GDM can be diagnosed using fasting glucose reading, glucose challenge test (GCT) or oral Glucose tolerance test (OGTT)¹⁴. According to American college of obstetricians and gynecologist (ACOG), once patient has been diagnosed with GDM, they should receive proper diet plan and exercise counselling¹⁵. It is estimated that 70-85% of cases, can be controlled with lifestyle modifications alone. If treatment targets are not met, pharmacotherapy should be initiated. Insulin is generally the recommended first line therapy as it does not cross placenta. Glyburide and Metformin are both pregnancy category B drugs which makes them safe and effective for a long- term use¹⁶. Approximately 7% of all pregnancies

are confounded by GDM, which brings about in excess of 200,000 cases every year. The pervasiveness might go from 1 to 14% of all pregnancies, contingent upon the population contemplated and diagnostic tests employed. The predominance of high blood glucose (hyperglycemia) in pregnancy increases quickly with age and is most noteworthy in ladies beyond 45 years old.¹⁵ In 2017, there were an estimated 204 million ladies living with diabetes. This number is projected to increase to 308 million by 2045. 1 out of 3 ladies with diabetes was of regenerative age. 16.2% of live births had some type of hyperglycemia in pregnancy. An estimated 85.1% were because of Gestational diabetes and 1 of every 7 births were impacted by gestational diabetes. It is important for women with diabetes in pregnancy or GDM to carefully control and monitor their blood glucose levels to reduce the risk of adverse effect during pregnancy¹⁷. The present study is aimed to understand the effect of Gestational Diabetes Mellitus in maternal and fetal outcomes. Our study identifies the most significant factors that are responsible for developing Gestational Diabetes mellitus.

Materials and methods

This was an observational study, where according to the inclusion and exclusion criteria the subjects were identified from the in-patient department of obstetrics and gynecology. The purpose of the study was explained to the subjects and the consent was obtained. The subject was followed from the date of admission till delivery and maternal outcomes like placental abruption, oligohydramnios, mode of delivery, complications etc. and fetal outcomes like Apgar score, NICU admission, IUGR etc. was assessed. Relevant data (demographic details, laboratory investigations and medication chart) was reviewed with the case report form, and study tools were administered to obtain relevant information. The data thus obtained was entered in a Microsoft Excel sheet and was analyzed appropriately.

Data collected for this study was entered into Microsoft excel and analyzed statistically by computing proportion for all qualitative data and mean, standard deviation, for quantitative data. The result is also expressed in terms of 95% confidence interval. It is presented in the form of frequency format and diagrammatic representation wherever necessary. Statistical analysis was performed using Chi-square test to find the association between low birth weight and NICU admission. Fisher's exact probability test was done to find the association between Apgar score and NICU admission. Pearson correlation was done to find the interdependence between knowledge and attitude, knowledge and practice and attitude and practice. For inferential statistics the relationship between NICU admission and variables (Apgar score and low birth weight) the results were considered statistically significant wherever p value is less than 0.05.

Result

The study was conducted for a period of 6 months, included 130 subjects who were fulfilling the inclusion criteria and admitted in the patient wards of the department of Obstetrics and Gynecology in ESIC-MC-PGIMSR, Bengaluru. Gestational age plays an important role in the maternal and fetal outcome, 78 subjects delivered at 36-38 weeks (60%), followed by 52 subjects at 38-40 weeks (38.46%). The mean gestational age was found to be 37.78 ± 1.268 weeks. Hypothyroidism was the most common diagnosis 34(26.15%), followed by Gestational Hypertension 26 (20%), 6 (4.61%) candidiasis, 2 (1.53%) anaemia, 2 (1.53%) Epilepsy, Lower Respiratory Tract Infection 2 (1.53%), Fever 2 (1.53%), Polio rescue paralysis 2 (1.53%) and 70 (53.84%) had No co-morbidities. Gestational Diabetes Mellitus Type A2 was the most common diagnosis 72 (55.38%), followed by Gestational Diabetes Mellitus Type A1 58 (44.61%). Maternal complications of the subjects were assessed and the most common complication was Maternal distress 110 subjects (84.61%) followed by Cesarean Section 96 (73.84%), 72 subjects (55.38%) with other co-morbidities, 28 subjects with Lactational failure (13.4%), 24 (18.46%) subjects with Pre-mature Rupture of Membrane (PROM), 18 (13.85%) with Polyhydramnios and 12 (9.23%) each with oligohydramnios and infection, 10 (7.69%) subjects with obesity and 2 (1.53%) subjects with Anhydramnios, hypoglycemia, Intra Uterine Growth Restricted in each category. Detailed distribution of subjects based on maternal complication is represented in **table I**.

Table I: Distribution of subjects based on maternal complications.

Complication	Number of subjects	Percentage (%)
Co-morbidity	72	55.38
Cesarean section	96	73.84
Oligohydramnios	12	9.23
polyhydramnios	18	13.85
Anhydramnios	2	1.53
Hypoglycemia	2	1.53
PROM	24	18.46
Pre-term	12	9.23
Maternal Distress	110	84.61
Obesity	10	7.69
Infection	12	9.23
Lactational Failure	28	13.4
IUGR	2	1.53

Fetal complications were assessed and the most common fetal complications were Jaundice 36 (27.69) followed by NICU admission and Respiratory Distress each with 22 (16.92%) subjects, 8 (6.15%) subjects has been found to have birth injuries, Hypoglycemia has been recorded in 10(7.69%) subjects 6 (4.62%) macrosomia and premature birth was recorded followed by 2 (1.53%) large for gestational age and 18 (13.8%) with other minor complications such as hypothermia,

Infection etc. Detailed distribution of subjects based on fetal complications is represented in **table II**.

Table II: Distribution of subjects based on fetal complications.

Complication	Number of subjects	Percentage (%)
Hypoglycemia	10	7.69
Large for Gestational Age	2	1.53
Macrosomia	6	4.62
Respiratory Distress	22	16.92
Jaundice	36	27.69
Birth Injuries	8	6.15
Premature Birth	6	4.62
NICU Admission	22	16.92
Others	18	13.8

The APGAR score describes the condition of the newborn baby immediately after birth and if it is accordingly applied, it can be a standardized instrument for assessment. The APGAR is affected by many factors such as gestational age, Medications taken during pregnancy, any other co morbidity conditions etc.

Majority of the neonates 90 (69.23%) had APGAR score of greater than 14 (Normal), followed by 40 (30.77%) subjects had APGAR score between 4-6 (Mild asphyxia) at 1 min. APGAR score of 5 min was assessed and 130 (100%) neonates had APGAR score >7 (Normal). Detailed distribution of subjects based on APGAR score is displayed in **table III**.

Table III: Distribution of subjects based on Apgar score.

APGAR range	1 min (number of subjects)	1 min (%)	5 min (number of subjects)	5 min (%)
Normal (>7)	90	69.23	130	100
Mild Asphyxia (4-6)	40	30.77	0	0
Grand Total	130	100	130	100

Assessment of knowledge of disease in subjects with Gestational Diabetes Mellitus (Table IV).

The Knowledge possessed by the subject is a representation of their understanding about the disease and it greatly shows their approach to disease condition and its management.

The following questions were administered to the subjects:

Question K1: Do You Know normal level of Random Blood Sugar

Question K2: What are the known Risk factors for GDM?

Question K3: GDM is a risk factor for future type 2 DM?

Question K4: Do you know the name of the drug you are taking for your GDM?

Question K5: What are the long-term health consequences for the child born to GDM mothers?

Table IV: Distribution of response received for assessment of knowledge.

Response	K1		K2		K3		K4		K5	
	n	%	n	%	n	%	n	%	n	%
Correct answer	74	56.92	74	56.92	54	41.54	118	87.69	70	53.85
Incorrect answer	56	43.07	56	43.07	76	58.46	16	12.31	60	46.15

Assessment of Attitude in Subjects with Gestational Diabetes Mellitus

The attitude of the subject towards the disease and its management was assessed using Likert scale. Question A1: Regular checking of Glucose is important.

Out of 130 subjects of **Question A1** (58.46%, 76) strongly agreed and 36 (27.69%) agreed Regular checking of Glucose in Important, where as 1.53%, 2 disagreed and 16 (12.30%) had a neutral feeling. The graphical representation shown above specifies that majority of the subject had a positive attitude and part of the study population had a neutral or had mixed feeling.

In **Question A2**, 74 (58.46%) strongly agreed and 36 (27.69%) subjects agreed that Regular medications will improve the disease condition, while 18 (13.84%) had a neutral opinion, which means they were unaware that medication could improve the disease condition. Above graphical representation indicates that most of the subjects with GDM were aware that the regular medications does improve the disease conditions, which explains majority of the study population had a positive attitude towards the disease.

In **Question A3**, 78 (60%) strongly agreed and 48 (36.92%) agreed that sweet/sugar reduction/restriction could control GDM, while 4 (3.08%) had a neutral opinion or were unaware that medication could improve the disease condition. The graphical representation from figure above indicates that most of the study population were aware that sugar/sweet restriction/reduction help control GDM to certain extent, showing majority of the subjects had a positive attitude towards the disease.

In **Question A4**, majority of the study population disagreed 52 (40%) and 40 (30.77%) strongly disagreed that GDM should not be treated in pregnancy due to fear of risk to the baby and 34 (26.15%) had neutral response while very few subjects strongly agreed and agreed 2 (1.53%) that GDM should not be treated in pregnancy due to feat of the risk to the baby. According to the study population it is seen that majority of them had a negative attitude towards the disease condition and very few of them had positive attitude.

In **Question A5**, majority (27.69%, 36) disagreed and 32 (24.62%) strongly disagreed that emotional stress does not have any role in causing GDM, while 22 (16.92%) strongly agreed and 16 (12.31%) agreed that emotional

stress does not have any role in causing GDM. The graphical representation from table below indicated that most of the subject were not sure that emotional Stress does have a role in causing GDM 28 (21.54%). This shows a mixed attitude towards the disease condition.

In **Question A6**, 46 (35.38%) and 40 (30.76%) strongly disagreed and disagreed that they take OTC medications during pregnancy, while only few 12 (9.23%) agreed and 6 (4.62%) strongly agreed that they take OTC medications during pregnancy and is safe to take, whereas 26 (20%) were neutral. The graphical representation above shows that most of the subjects were aware that OTC medications should not be taken during pregnancy. This shows that majority of the study population had positive attitude towards the disease and the medications they were taking. **table V.**

Table V: Distribution of subject's response to Question.

Distribution of subject's response to Question A1		
Response	Number of subjects	Percentage (%)
Strongly disagree	0	0
Disagree	2	1.53
Neutral	16	12.31
Agree	36	27.69
Strongly agree	74	58.46
Distribution of subject's response to Question A2		
Strongly disagree	0	0
Disagree	0	0
Neutral	18	13.85
Agree	36	27.69
Strongly agree	76	58.46
Distribution of subject's response to Question A3		
Strongly disagree	0	0
Disagree	0	0
Neutral	4	3.08
Agree	48	36.92
Strongly agree	78	60
Distribution of subject's response to Question A4		
Strongly disagree	40	30.77
Disagree	52	40
Neutral	34	26.15
Agree	2	1.53
Strongly agree	2	1.53
Distribution of subject's response to Question A5		
Strongly disagree	32	24.62
Disagree	36	27.69
Neutral	28	21.54
Agree	16	12.31
Strongly agree	22	16.92
Distribution of subject's response to Question A6		
Strongly disagree	46	35.38
Disagree	40	30.76
Neutral	26	20
Agree	12	9.23
Strongly agree	6	4.62

Table VI: Distribution of practice in subjects with hypertensive disorders of pregnancy.

Response	P1		P2		P3		P4	
	n	%	n	%	n	%	n	%
Yes	100	76.92	122	93.85	118	89.23	128	98.46
No	30	23.08	8	6.15	14	10.77	2	1.53

Table VII: Distribution of response received for assessment of Nutrition.

Response	NAQ1		NAQ 2		NAQ 3		NAQ 4		NAQ 5	
	n	%	n	%	n	%	n	%	n	%
Correct answer	112	86.15	98	75.38	104	80	120	92.31	100	76.92
Incorrect answer	18	13.85	32	24.62	26	20	10	7.69	30	23.08

Assessment of Practice in subjects with Gestational Diabetes Mellitus. (Table VI)

Knowledge of correct practice and its application is important for higher therapeutic outcomes. The following questions were administered:

Question P1: Do You do Regular follow up and Glucose monitoring?

Question P2: I make sure the drugs that has been prescribed to me is safe to me and baby

Question P3: I am following the instructions provided regarding proper medicine Use

Question P4: Are you avoiding extra added sugar/ sweet?

Question P1: Out of 130 Subjects, majority 100 (76.92%) did regular follow up and Glucose monitoring Question P2: Almost all of the subjects 122 (93.85%) made sure the drugs that has been prescribed to them during pregnancy Is safe to them as well as to the baby.

Question P3: Most of the subjects 118 (89.23%) followed the instruction provided to them regarding proper use of medicines prescribed

Question P4 : Almost all of the subjects 128 (98.46%) avoided extra added sugar in their daily food intake Detailed.

Using statistical analysis a positive correlation was observed between Knowledge and attitude ($r=0.07$) with p value 0.355497776 (>0.05) which was statistically significant, a positive correlation was observed between Knowledge and practice ($r=0.075$) with p value 0.057924406 (>0.05) which was statistically significant ,and a weak positive correlation was observed between attitude and practice ($r=0.002$) with p value 0.00000004(<0.05) which was statistically insignificant. Subjects were administered the Self-designed Nutrition Assessment Questionnaire (NAQ) to assess the knowledge. The Questionnaire contained 5 questions which were developed as a tool to know their knowledge on Nutrition intake during GDM.

The following Questions were administered to the Subjects:

Question NAQ 1: Which diet plan should you be following to control GDM?

Question NAQ 2: What are the food sources of Iron?

Question NAQ 3: What all supplements should be taken during Pregnancy?

Question NAQ 4: What all foods you should avoid during 1 st trimester?

Question NAQ 5: What is the food Source of calcium? **Table VII**

NAQ1: Most of the subjects 112 (86.15%) were aware of the diet plan they should be following to control GDM

NAQ 2: 98 (75.38%) of the subjects knew the food sources of Iron

NAQ 3: Most of the subjects 104(80%) were knowledgeable about the supplements that should be taken during pregnancy

NAQ 4 :120 (92.31%) had good idea about what food to avoid during the 1 st trimester

NAQ 5 : More than half of the subjects 100 (76.92%) knew the food sources of Calcium.

Assessment of Nutrition Practice in Subjects with Gestational diabetes Mellitus. (Table VIII)

Appropriate practice and its implementation is crucial for better therapeutic outcomes. The following questions were administered

Question NP1: How often do you eat Fruits?

Question NP 2: How often do you drink any carbonated beverages?

Question NP 3: How often do you eat from outside?

Question NP 4: How often do you take Vitamin Supplements?

Question NP 5: How often do you consume packaged snacks, cakes, pastries or sugars/sweetened drinks?

Question NP1: Out of 130 subjects 54 (41.54%) ate fruits oncea day and 48 (36.92%) had 2 or more times per day, while 6 (4.61%) never had ate fruits during their gestation period. The graphical representation above indicates that most of the subjects either had fruits 2 or more times per day or at least once a day. This showed that majority of the study population has a positive nutrition practice and very few have negative practice.

In Question NP2, more than majority (76.92%, 100) Never drunk any carbonated beverages whereas 28 (21.54%) did once a week during pregnancy and GDM condition.

Table VIII: Distribution of subject's response to Question NP.

Distribution of subject's response to Question NP1		
Response	Number of subjects	Percentage (%)
Never	6	4.61
Once a day	54	41.54
2 or more times per day	48	36.92
1 time per week	22	16.92
Distribution of subject's response to Question NP2		
Never	100	76.92
Once a week	28	21.54
2 or more times per day	0	0
Often	2	1.53
Distribution of subject's response to Question NP3		
Never	60	46.15
Once a week	60	46.15
More than twice a week	6	4.62
Often	4	3.08
Distribution of subject's response to Question NP4		
Never	0	0
Everyday	102	78.46
Once in a while	14	10.77
Often	8	6.15
Distribution of subject's response to Question NP5		
Never	62	47.69
Everyday	0	0
Once in a while	64	49.23
Often	4	3.08

The Graphical representation above indicates that most of the study population were aware of the consequences of drinking carbonated beverages during pregnancy and especially in case of GDM which shows a positive practice towards the disease condition.

In Question NP3, there is an equal proportion of subjects Never 60(46.15%) and Once a week 60 (46.15%) eating from outside whereas only few subjects to mention eat more than twice a week 6 (4.62%) and often 4 (3.08%) from outside during GDM conditions. The graphically representation above shows a positive practice of subjects towards the disease condition

In Question NP4 ,102 (78.46%) subjects out of 130 total study population takes Vitamin Supplements Every day and very few took Once in a while (14,10.77%) or Often (8,6.15%). The graphical representation above shows a positive practice of study population towards the disease condition.

In Question NP5 ,64 (49.23%) subject's out of 130 subjects consume packaged snacks and other sweetened/ sugared products Once in a while, whereas 62 (47.69%) subjects mentioned that they Never consumed any packaged snacks or other sweetened products. The graphical representation indicates majority of the study population had Positive practice towards the disease condition. Detailed Explanation is presented in **table VIII**

Assessment of Pregnancy Anxiety scale in Subjects with Gestational Diabetes Mellitus.

The following Questions were administered:

Question PAS 1: I feel relaxed about the health of my baby

Question PAS 2: I feel nervous thinking about the pain of childbirth

Question PAS 3: I feel worried that I won't get my figure back after my baby is born

Question PAS 4: I feel secure that people I know care about me and will help me

Question PAS 5: I feel concerned about losing control during labor

Question PAS 6: I Feel nervous that my baby will have a deformity or a disease

Question PAS 7: I feel confident that the doctors and midwives will take good care of me

Question PAS 8: I feel Secure knowing that my husband finds me sexually attractive

Question PAS 9: I feel worried that I don't have enough support People living near me

Question PAS 10: I feel Satisfied with my Husband's Involvement in Pregnancy

Question PAS 11: I feel secure knowing my husband support me

Question PAS 12: I feel Confident that my baby will be born healthy

Question PAS 13: I feel uncertain about the physical changes occurring in my body

Question PAS 14: I feel Scared about Feeling Helpless during Labour?

Anxiety during pregnancy was assessed and the data showed that 104 (80%) were anxious about their baby's health, 104 (80%) were also anxious about labour pain, 90 (69%) were anxious about their physical appearance after delivery,32 (24.6%) were anxious about the amount of support they will be receiving from their family and 16 (12%) were anxious about their marital life. Detailed distribution is presented in **table IX**.

A total number of 830 drugs were prescribed to the 130 subjects admitted to the Obstetrics and Gynecology department of ESIC-PGIMS, Bengaluru. The largest class of medications prescribed were Analgesics 316 (38%), followed by Antibiotics 306 (37%), Anti-Diabetic drugs 122 (14%), Thyroid medications 38 (5%), Anti-Hypertensive drugs 36 (4%) and Anti-Fungal drugs 14 (2%). Detailed distribution is given in **table IX**.

Table IX: Distribution of drugs used by respondents based on pharmacological classification.

Class of drugs	Number of drugs prescribed	Percentage (%)
Anti-Diabetic drugs	122	14%
Antibiotics	306	37%
Analgesics	316	38%
Anti-Hypertensive drugs	34	4%
Thyroid medications	38	5%
Anti-Fungal drugs	14	2%

Discussion

According to Dudhwadkar R et al,¹⁸ pregnancy complicated with GDM, has adverse maternal and fetal outcomes, whose results show incidence of pre-eclampsia (26%), hypothyroidism (6%) and Polyhydramnios (20%) in GDM patients, which can complicate the course of pregnancy and has adverse effects on maternal and fetal outcomes. In another study conducted by Odar E et al,¹⁹ similar results were found which stated that the mothers with GDM were four times more likely to have hypertensive disorders and nine times more likely to have vaginal candidiasis. Thus, all five studies indicate that women with GDM are at increased risk of Adverse Obstetric outcomes.

Jaundice was the most commonly seen fetal complication in our study which is very similar to the study done by Singla, M. et al²⁰ where as in a study done by Shukla et al¹⁷, Macrosomia was the most commonly observed complication. According to a study done by IRC Barbosa et al,²¹ fetal deaths were the commonly occurring complication. Where as in our study, NICU admission followed by Respiratory distress were also seen as the second most common complication. NICU admission in our study was due to Low birth weight and low APGAR score. Birth weight >3.5kg and <2.5kg was seen in 4.62% while 90.76% had weight between 2.5-3.5kg. In a study done by Singla, M et al,²⁰ 67% of the subjects had birth weight >2.5kg and 6.1% had weight less than 1.5Kg. The Apgar score >7 at 1 and 5 minutes occurred in 69.23% and 100% respectively in neonates of Gestational Diabetes Mellitus mothers, Apgar score of 4-6 at 1 and 5 minutes occurred in 30.77%. Nevertheless, there was a considerable improvement in the Apgar scores of neonates at 5 minutes and this could ascribe a more effective neonatal resuscitation from appropriate care during the change to the uterine life. According to the study by Crowther, C. A et al²², significantly low 1-minute Apgar score in babies is consistent. The above findings suggest that there should be a proper preparation for neonatal resuscitation at the time of childbirth in pregnancies complicated with GDM.

Chi square test (χ^2) was done to assess between low Apgar score and NICU admission, the result was seen as statistically significant. Fisher's exact probability test was done to find out the association between Low Birth weight and NICU admission, which is not significant at 5% level of significance.

The study conducted by Crowther AC et al²², concluded that treatment of GDM (which include dietary advice, blood glucose monitoring and insulin or metformin therapy) reduces serious perinatal morbidity and may also improve women's health related QOL which is comparable to our study results which concludes the same on the basis of KAP of women treated for GDM

and their positive response on satisfaction regarding treatment provided for GDM that helped subjects in achieving reduced adverse perinatal outcomes.

Among the responses received for Question K1 of KAP Questionnaire which checks whether the subject knows the normal level of Random blood sugar levels, (56.92%) of the respondents knew the normal level. In Question K2 which checks the awareness of patient about risk factors for GDM, (56.92%) were aware of it. In Question K3 which checks whether the patient know that GDM is a risk factor for future Type 2 DM, (41.54%) knew the correct response. In Question K4, which determines whether the patient knows the name of the antidiabetic drug they are taking, most of the subjects (87.69%) knew the name of antidiabetic drug they were taking. In Question K5, which determines whether the patient know the long-term health consequences of the child born to GDM mother, (53.85%) knew the consequences. Majority subjects had good knowledge about GDM whereas, remaining lack the knowledge of GDM, which may alter the attitude and practice towards disease management. Clinical activities such as patient counselling, medication review and pharmaceutical care program helps to increase the subject's knowledge about the disease condition. It was found out that most of the subjects had a positive attitude towards the disease condition and treatment given. Majority (76.92%) of the subjects had regular practice of checking their blood sugar levels, (93.85%) tried to find out whether the medicines taken by them (OTC or prescribed) is safe during pregnancy, (89.23%) followed the instructions regarding proper medicine use and (98.46%) reduced sugar/sweet intake as advised by the doctor. Our study results show, Good Knowledge Attitude and Practice towards disease condition, which is contrary to a study done by Odar E et al,¹⁹, whose study results show only a small proportion of rural antenatal women (17.5%) had good knowledge about GDM.

According to data collected in our study, about nutrition assessment, majority of the subjects (86.15%) knew that diabetic diet should be followed to control GDM, (75.38%) subjects knew the food sources of iron, (80%) subjects knew the supplements that should be taken during pregnancy, most of them (92.31%) knew the fruits which should be avoided during pregnancy and (76.92%) knew the food sources of calcium. And according to the data obtained from Nutrition Practice Questionnaire, most of them (41.54%) ate fruits once a day, (36.92%) twice a day, (16.92%) once in a week and few of them (4.61%) never ate fruits during pregnancy. During pregnancy most of them (76.92%) never drank carbonated beverages. (46.15%) never ate food from outside, equal number of subjects (46.15%) ate once in week and few (7.7%) subjects had more often from outside. Most of them (78.46%) took vitamin supplements (including folic acid, calcium and iron supplements) every day as prescribed. Half of the subjects (49.23%) had packaged snacks

once in a while and (47.69%) of them never had. In our study, the results of Nutrition Knowledge assessment and Nutrition practice questionnaires, shows a positive Nutrition practice and assessment towards the disease condition where the knowledge on importance of right nutrition was provided. These results are comparable to the study conducted by Khushpreet K et al,²³ that concludes that, Nutrition counselling significantly improved the fetal outcome and KAP score of GDM.

Conclusion

Gestational Diabetes Mellitus associated with Pregnancy include maternal and fetal outcomes such as Macrosomia, Hyperbilirubinemia, NICU admission, Shoulder dystocia, polyhydramnios, premature birth, etc. Prior diagnosis, role of diet and correct treatment options and regular checkups plays a very important role in the prevention of Gestational Diabetes Mellitus. Low Apgar score and Low birth weight are the major complications for NICU admission.

Maternal distress was the most common maternal complication and Jaundice and respiratory distress is the most common fetal complications.

Assessment of knowledge Attitude and practice showed that majority of the subjects had good knowledge, a positive attitude and good practice regarding the disease

condition and its management. Knowledge and attitude were found to be dependent.

Majority of the subjects had an adequate knowledge, Attitude and practice towards the intake of diet to follow during Gestational Diabetes Mellitus.

Assessment of physical activity showed that majority of the subjects had Poor physical activity which has an increased risk of Gestational diabetes Mellitus.

Pregnancy anxiety scale were assessed based on how anxious subject is about the health of the baby, labor pain, physical appearance after delivery, support received during gestation period and lastly about the marital life. According to the study, majority of the subjects were anxious about the baby's health and very less anxious about marital life.

830 drugs were prescribed to all the subjects. Most prescribed medication was Analgesic followed by antibiotics, anti-diabetic drugs, thyroid medication, anti-hypertensive drugs and few anti- fungal drugs as well.

Conflict of Interest

The author declare that he have no conflict of interest.

References

1. World Health Organization. Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy. World Health Organization; 2013.
2. Wang Z, Kanguru L, Hussein J, Fitzmaurice A, Ritchie K. Incidence of adverse outcomes associated with gestational diabetes mellitus in low-and middle-income countries. *International Journal of Gynecology & Obstetrics*. 2013 Apr 1;121(1):14-9.
3. Roglic G. Diabetes in women: the global perspective. *International Journal of Gynecology & Obstetrics*. 2009 Mar 1;104:S11-3.
4. Yogev Y, Xenakis EM, Langer O. The association between preeclampsia and the severity of gestational diabetes: the impact of glycemic control. *American journal of obstetrics and gynecology*. 2004 Nov 1;191(5):1655-60.
5. Wakwoya EB, Fita FU. Adverse maternal outcome and its association with gestational diabetes among women who gave birth in selected public hospitals in Eastern Ethiopia. *Tropical Journal of Obstetrics and Gynaecology*. 2018 Oct 10;35(1):58-62.
6. Jensen DM, Sørensen B, Feilberg-Jørgensen N, Westergaard JG, Beck-Nielsen H. Maternal and perinatal outcomes in 143 Danish women with gestational diabetes mellitus and 143 controls with a similar risk profile. *Diabetic medicine*. 2000 Apr;17(4):281-6.
7. Abu-Heija AT, Al-Bash M, Mathew M. Gestational and pregestational diabetes mellitus in Omani women: comparison of obstetric and perinatal outcomes. *Sultan Qaboos University Medical Journal*. 2015 Nov;15(4):e496.
8. Gascho CL, Leandro DM, Silva TR, Silva JC. Predictors of cesarean delivery in pregnant women with gestational diabetes mellitus. *Revista Brasileira de Ginecologia e Obstetrícia*. 2017;39:60-5.
9. American Diabetes Association. Erratum. Classification and diagnosis of diabetes. Sec. 2. In *Standards of Medical Care in Diabetes-2016*. *Diabetes Care* 2016; 39 (Suppl. 1): S13-S22. *Diabetes care*. 2016 Sep 1;39(9):1653.
10. Seaquist ER, Anderson J, Childs B, Cryer P, Dagogo-Jack S, Fish L, Heller SR, Rodriguez H, Rosenzweig J, Vigersky R. Hypoglycemia and diabetes: a report of a workgroup of the American Diabetes Association and the Endocrine Society. *The Journal of Clinical Endocrinology & Metabolism*. 2013 May 1;98(5):1845-59.
11. Lee ET, Howard BV, Savage PJ, Cowan LD, Fabsitz RR, Oopik AJ, Yeh J, Go O, Robbins DC, Welty TK. Diabetes and impaired glucose tolerance in three American Indian populations aged 45-74 years: the Strong Heart Study. *Diabetes care*. 1995 May 1;18(5):599-610.

12. Dempsey JC, Butler CL, Sorensen TK, Lee IM, Thompson ML, Miller RS, Frederick IO, Williams MA. A case-control study of maternal recreational physical activity and risk of gestational diabetes mellitus. *Diabetes research and clinical practice*. 2004 Nov 1;66(2):203-15.
13. Imam A. *Current Status of Diabetes in Palestine: Epidemiology, Management, and Healthcare System*. Cham, Switzerland: Springer. 2019.
14. Toft JH, Bleskestad IH, Skadberg Ø, Gøransson LG, Økland I. Glycated albumin in pregnancy: lc-ms/ms-based reference interval in healthy, nulliparous scandinavian women and its diagnostic accuracy in gestational diabetes mellitus. *Scandinavian Journal of Clinical and Laboratory Investigation*. 2022 Feb 9:1-9.
15. Hillier TA, Pedula KL, Ogasawara KK, Vesco KK, Oshiro CE, Lubarsky SL, Van Marter J. A pragmatic, randomized clinical trial of gestational diabetes screening. *New England Journal of Medicine*. 2021 Mar 11;384(10):895-904.
16. Kelley KW, Carroll DG, Meyer A. A review of current treatment strategies for gestational diabetes mellitus. *Drugs in context*. 2015;4.
17. Shukla A, Burute S, Meena A. Maternal and fetal outcome in gestational diabetes-A retrospective study. *Int J Appl Res*. 2017;3(9):305-9.
18. Dudhwadkar AR, Fonseca MN. Maternal and fetal outcome in gestational diabetes mellitus. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2016 Oct 1;5(10):3317-22.
19. Odar E, Wandabwa J, Kiondo P. Maternal and fetal outcome of gestational diabetes mellitus in Mulago Hospital, Uganda. *African Health Sciences*. 2004 Nov 10;4(1):9-14.
20. Singla M, Ahuja A, Juneja SK. Maternal and foetal outcomes in gestational diabetes mellitus. *Journal of Evolution of Medical and Dental Sciences*. 2016 Oct 20;5(84):6239-42.
21. Barbosa IR, Silva WB, Cerqueira GS, Novo NF, Almeida FA, Novo JL. Maternal and fetal outcome in women with hypertensive disorders of pregnancy: the impact of prenatal care. *Therapeutic advances in cardiovascular disease*. 2015 Aug;9(4):140-6.
22. Crowther CA. Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) Trial Group. Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. *N Engl J Med*. 2005;352:2477-86.
23. Khushpreet S, Rajesh K, Bilawal S, Manoj S, Ravdeep S, Verma HK. Impact of specialized goat training programme on knowledge level and adoption. *Indian Veterinary Journal*. 2018;95(3):30-2.