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Research Article

Knowledge and Management of Gestational Diabetes by Medical Professionals in Abia State, Nigeria

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Abstract

Gestational diabetes mellitus (GDM) remains a major contributor to maternal and neonatal morbidity, yet gaps in knowledge and management among healthcare providers persist in low-resource settings. This study assessed the knowledge and management practices of medical professionals regarding GDM at Abia State University Teaching Hospital (ABSUTH), Aba, Nigeria. A mixed-method design was employed, integrating a descriptive cross-sectional survey with in-depth interviews (IDIs) and focus group discussions (FGDs). A total of 150 medical professionals, including physicians, resident doctors, and nurses/midwives, participated in the quantitative arm, while 28 professionals were purposively selected for the qualitative component. Data were analyzed using SPSS version 26.0 and NVivo, with statistical significance set at $p < 0.05$. Results revealed that while most participants demonstrated adequate knowledge of GDM risk factors (e.g., obesity 82.7%, family history of diabetes 82.7%), gaps persisted in diagnostic protocols, with only 76.0% correctly identifying oral glucose tolerance test as the gold standard.

Regarding clinical practice, 59.3% routinely screened all pregnant women with OGTT, while 27.3% relied mainly on random blood glucose. Management approaches favored lifestyle modifications (74.7%) and insulin therapy (49.3%), though metformin use remained low (18.7%). Identified barriers included lack of diagnostic kits (64.7%), high patient costs (59.3%), limited awareness among patients (70.0%), and shortage of specialists (52.0%). Chi-square analysis showed significant associations between knowledge and cadre ($p = 0.002$), years of experience ($p = 0.026$), and age group ($p = 0.049$). Qualitative findings highlighted inadequate institutional protocols and the need for capacity-building through workshops and patient education. In conclusion, although medical professionals demonstrated fair knowledge and moderate adherence to GDM management guidelines, systemic barriers and practice inconsistencies limit optimal care. Strengthening institutional protocols, subsidizing diagnostic tools, and continuous professional training are crucial to improving GDM outcomes in Nigeria.

Keywords: Gestational diabetes, Management, Medical professionals, Barriers, Maternal health

Introduction

Gestational diabetes mellitus (GDM), hyperglycaemia first recognized during pregnancy, is an increasingly important public-health problem worldwide, with consequences for both mother and child that can extend beyond the perinatal period [1]. GDM is associated with a higher risk of hypertensive disorders of pregnancy, caesarean birth, macrosomia and birth trauma, and it increases the mother's long-term risk of type 2 diabetes as well as the offspring's risk of obesity and metabolic disease. These maternal and neonatal sequelae highlight why detection and timely management of GDM are essential parts of antenatal care: good glycemic control in pregnancy reduces many of the short-term obstetric and neonatal risks and also creates an opportunity to counsel women about long-term cardiometabolic prevention [1].

Epidemiological data show that the burden of GDM is rising, particularly in low- and middle-income regions undergoing rapid demographic and lifestyle change. Recent systematic reviews and regional analyses suggest pooled prevalences in sub-Saharan Africa and in Nigeria that are substantially higher than older estimates, and prevalence fluctuates depending on diagnostic criteria used and the population studied [2,3]. Urbanization, increasing maternal age, rising body mass index and shifting diets and physical-activity patterns are commonly cited drivers of the upward trend, which places additional strain on already stretched maternal-health services. The evolving and sometimes divergent prevalence estimates underscore the importance of local data on detection, management practices, and provider knowledge to inform appropriate service responses.

Diagnosis of GDM depends heavily on which diagnostic criteria are applied, and global guidance has changed over the last decade. The World Health Organization's 2013 guidance and subsequent international discussions recommended the use of a 75-g oral glucose tolerance test (OGTT) with defined fasting and post-load thresholds, but different professional bodies and countries have adopted varying screening strategies (universal vs risk-based) and cutoffs, producing inconsistencies in reported prevalence and clinical practice [4]. This variability has direct implications for frontline clinicians: inconsistent screening policies, lack of uniform local protocols, or limited access to testing materials can result in missed diagnoses or delayed treatment, undermining efforts to mitigate GDM-related complications [5].

Management of GDM is a multidisciplinary and time-sensitive clinical process that typically begins with lifestyle modification (medical nutrition therapy and increased physical activity) and self-monitoring of blood glucose; when these measures fail to achieve glycemic targets, pharmacologic therapy, primarily insulin and, in many settings, metformin, is used. Contemporary standards of care produced by diabetes professional organizations emphasize individualized targets, frequent glucose monitoring, antenatal fetal surveillance tailored to glycemic control and appropriate delivery planning, as well as postpartum follow-up for glucose testing and prevention counselling because of the high risk of subsequent dysglycaemia [6]. These evidence-based recommendations require clinicians to have current knowledge of diagnostic thresholds, treatment thresholds, monitoring schedules and referral pathways in order to implement them effectively.

Despite the clarity of international guidance, studies from Nigeria and other low-resource settings point to important gaps in knowledge, screening practices, and management among antenatal care providers. Research assessing doctors, nurses and community health workers in various Nigerian settings has documented heterogeneous knowledge of GDM risk factors, diagnostic approaches and appropriate management steps, as well as inconsistent counselling delivered to pregnant women about prevention and postpartum follow-up [7]. These provider-level gaps can interact with system-level constraints, limited laboratory capacity for OGTTs, lack of point-of-care glucose meters, scarce dietetic support, and weak referral networks, to reduce the effectiveness of GDM programmes, increasing the risk of adverse outcomes that might otherwise be preventable.

Abia State, like other parts of southern Nigeria, is experiencing changing maternal-health needs in the context of urbanising populations and rising non-communicable disease burdens. The combination of higher local prevalence of GDM risk factors and documented provider knowledge and practice variability elsewhere in Nigeria [2,8] makes a focused assessment in Abia State both timely and necessary. Understanding what medical professionals in Abia State know about GDM, how they screen for and manage it, and what barriers they face is an essential first step to designing targeted training, standardized protocols and health-system investments (for testing, glucose monitoring and multidisciplinary care) that can reduce preventable perinatal morbidity and improve long-term maternal and child health outcomes. The proposed study will therefore address a critical gap by linking provider knowledge and reported clinical management with the practical constraints of service delivery in a defined Nigerian setting.

Materials And Methods

Study Design

This study employed a mixed-method design, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of the knowledge and management practices of medical professionals regarding gestational diabetes mellitus (GDM). The quantitative component utilized a descriptive cross-sectional survey, while the qualitative component employed in-depth interviews (IDIs) and focus group discussions (FGDs). The integration of both methods ensured triangulation of findings, thereby enhancing validity and reliability.

Study Area

The study was conducted at Abia State University Teaching Hospital (ABSUTH), Aba, Abia State, Nigeria. ABSUTH is a tertiary healthcare institution serving as a referral center for secondary and primary health facilities in Abia State and neighboring states. The hospital provides specialized services, including obstetrics and gynecology, internal medicine, pediatrics, family medicine, endocrinology, and public health. ABSUTH was selected because it serves as a training, research, and healthcare delivery hub where medical professionals are directly involved in antenatal care, diagnosis, and management of gestational diabetes.

Study Population

The study population comprised medical professionals working at ABSUTH who are directly or indirectly involved in the care of pregnant women. This included: Obstetricians and gynecologists, Family physicians, Internal medicine physicians, Endocrinologists, Resident doctors, Medical officers, Nurses and midwives attached to the obstetric and antenatal units. Only professionals with at least six months of clinical experience in maternal healthcare were included.

Inclusion and Exclusion Criteria

Inclusion Criteria: Medical doctors, nurses, and midwives directly involved in antenatal and obstetric care, available during the study period, and who consented to participate.

Exclusion Criteria: Professionals on extended leave (annual, study, or maternity leave), interns, and those not directly involved in maternal care.

Sample Size Determination

For the quantitative arm, sample size was calculated based on Cochran's formula for cross-sectional studies, following the methodology described by Akwuruoha et al. [9]:

$$n = \frac{Z^2(Pq)}{e^2}$$

The formula components are defined as follows:

- n represents the minimum required sample size.
- Z is set at 1.96, corresponding to a 95% confidence level.
- P denotes the estimated proportion of healthcare professionals with adequate knowledge and appropriate management of POI (assumed at 50% due to lack of prior data in the setting, to maximize sample size).
- e signifies the allowable margin of error, fixed at 5% (0.05).
- q = 1 - p

Substituting values:

P = 50% = 0.5

q = 1 – 0.5

= 0.5

$$n=\frac{(1.96)^2(0.5\times0.5)}{(0.05)^2}=384$$

Since the total number of eligible healthcare professionals in ABSUTH was less than 10,000, the finite population correction formula described by Ezirim et al. [10] was applied:

$$nf=\frac{n}{1+\frac{n-1}{N}}$$

Where N is the total population of eligible healthcare professionals in the hospital (estimated at 210).

$$nf=\frac{384}{1+\frac{383}{210}}=136$$

Allowing for a 10% non-response rate, the final sample size was 150 participants.

For the qualitative arm, purposive sampling was employed to select 15–20 participants for IDIs (covering different cadres of staff) and two FGDs with 6–8 participants per group until data saturation was reached.

Sampling Technique

A total population (census) sampling method was applied for the quantitative component to ensure representation across professional categories. For the qualitative component, purposive and snowball sampling techniques were used to select participants based on experience with GDM cases, years of practice, and department.

Data Collection Instruments

Quantitative Tool: A structured, self-administered questionnaire was developed based on previous studies and WHO guidelines on GDM. It comprised four sections:

- Sociodemographic and professional characteristics
- Knowledge of risk factors, diagnosis, complications, and management of GDM
- Reported clinical practices and adherence to guidelines
- Barriers to effective management of GDM

The questionnaire was pretested among 20 medical professionals in Rhema University Hospital Aba, for clarity, reliability, and validity.

Qualitative Tool: Semi-structured interview guides were developed for IDIs and FGDs. The guide explored:

- Perceptions of GDM and its importance in maternal health
- Experiences with screening, diagnosis, and management
- Challenges faced in clinical practice
- Suggestions for improving diagnosis and management protocols

Data Collection Procedure

Quantitative Data: Research assistants distributed and retrieved self-administered questionnaires during duty hours, ensuring minimal disruption of clinical activities. Confidentiality was maintained.

Qualitative Data: IDIs and FGDs were conducted in quiet offices within ABSUTH. Each session lasted between 45–60 minutes, was audio-recorded with consent, and complemented by field notes.

Validity and Reliability

Content validity of the questionnaire was ensured through expert review by specialists in obstetrics, endocrinology, and public health. Reliability was assessed using Cronbach's alpha, with a coefficient of ≥0.70 considered acceptable. For the qualitative arm, trustworthiness was enhanced by prolonged engagement, member checking, and triangulation across cadres.

Data Analysis

Quantitative Data: Data were coded and entered into SPSS version 26.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize variables. Bivariate analysis (Chi-square test) examined associations between knowledge and demographic/professional characteristics. Multivariate logistic regression identified independent predictors of adequate knowledge and good management practices. Significance was set at $p < 0.05$.

Qualitative Data: Audio recordings were transcribed verbatim. Data were analyzed using thematic content analysis. Codes were generated inductively and grouped into themes and subthemes. NVivo software was used to manage qualitative data.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of Abia State University Teaching Hospital (ABSUTH). Administrative approval was also secured from relevant hospital authorities. Participation was voluntary, and written informed consent was obtained from all participants. Confidentiality and anonymity were assured by removing personal identifiers. Participants could withdraw at any stage without penalty. Audio

files and transcripts were stored in password-protected devices accessible only to the research team.

Results

The study involved 150 healthcare professionals, with most participants aged 30–39 years (32.7%), slightly more females (54.7%) than males, and a predominance of resident doctors (21.3%), nurses/midwives (20.0%), and medical officers (16.0%). Over one-third (36.0%) had between 5–10 years of professional experience (Table 1).

Table 1: Sociodemographic and Professional Characteristics of Participants.

Variable	Frequency (n = 150)	Percentage (%)
Age group (years)		
20–29	34	22.67
30–39	49	32.67
40–49	41	27.33
≥50	26	17.33
Sex		
Male	68	45.33
Female	82	54.67
Cadre		
Obstetricians/Gynecologists	21	14
Family Physicians	18	12
Internal Medicine Physicians	16	10.67
Endocrinologists	9	6
Resident Doctors	32	21.33
Medical Officers	24	16
Nurses/Midwives	30	20
Years of experience		
<5 years	37	24.67
5–10 years	54	36
11–15 years	33	22
>15 years	26	17.33

Knowledge of gestational diabetes mellitus (GDM) was generally high, as the majority correctly identified obesity (82.7%) and family history of diabetes (82.7%) as risk factors, and recognized the oral glucose tolerance test (OGTT) as the standard diagnostic tool (76.0%). Furthermore, 74.0% acknowledged that untreated GDM increases the risk of stillbirth (Table 2).

Table 2: Knowledge of GDM Risk Factors and Diagnosis.

Item	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Obesity is a risk factor for GDM	5 (3.33)	9 (6.00)	12 (8.00)	58 (38.67)	66 (44.00)
Family history of diabetes predisposes to GDM	4 (2.67)	7 (4.67)	15 (10.00)	61 (40.67)	63 (42.00)
Oral glucose tolerance test (OGTT) is standard for diagnosis	8 (5.33)	10 (6.67)	18 (12.00)	64 (42.67)	50 (33.33)
Untreated GDM increases risk of stillbirth	6 (4.00)	11 (7.33)	22 (14.67)	65 (43.33)	46 (30.67)

In clinical practice, 59.3% reported routinely screening all pregnant women with OGTT, while 27.3% relied on random blood glucose, and 13.3% only screened high-risk women. Insulin was the most prescribed first-line therapy (49.3%), followed by metformin or oral hypoglycemics (18.7%). Lifestyle modification was widely recommended (74.7%), and referrals to endocrinologists were common (64.0%) (Table 3).

Table 3: Reported Clinical Practices in GDM Management.

Variable	Frequency (n)	Percentage (%)
Routinely screen all pregnant women with OGTT	89	59.33
Rely mainly on random blood glucose	41	27.33
Only screen high-risk women	20	13.33
Prescribe insulin as first-line therapy	74	49.33
Prescribe metformin/oral hypoglycemics	28	18.67
Recommend lifestyle modification (diet + exercise)	112	74.67
Refer to endocrinologist when diagnosed	96	64

Barriers to effective GDM management included limited patient awareness (70.0%), lack of diagnostic kits/reagents (64.7%), high testing costs (59.3%), and shortage of specialists (52.0%) (Table 4).

Table 4: Barriers to Effective GDM Management.

Barrier	Frequency (n)	Percentage (%)
Lack of diagnostic kits/reagents	97	64.67
High cost of testing for patients	89	59.33
Limited awareness among patients	105	70
Shortage of specialists (endocrinologists)	78	52
Inadequate institutional protocols	63	42

Statistical analysis revealed significant associations between

knowledge level and age group (p = 0.049), cadre (p = 0.002), profession (p = 0.012), and years of experience (p = 0.026), but not sex (Table 5). Correlation analysis showed that both age (r = 0.214, p = 0.021) and years of experience (r = 0.263, p = 0.012) were positively correlated with knowledge, while knowledge itself strongly correlated with practice (r = 0.482, p < 0.001) (Table 6).

Table 5: Chi-Square Analysis of Knowledge vs. Demographic/ Professional Variables.

Variable	χ^2	df	p-value
Age group vs. Knowledge level	7.84	3	0.049*
Sex vs. Knowledge level	2.91	1	0.088
Cadre vs. Knowledge level	21.37	6	0.002*
Profession vs. Knowledge level	14.72	5	0.012*
Years of experience vs. Knowledge level	9.26	3	0.026*

*Significant at p < 0.05.

Table 6: Correlation Analysis.

Variables	Knowledge Score (r)	Practice Score (r)	p-value
Age	0.214	0.187	0.021*
Years of experience	0.263	0.244	0.012*
Knowledge score	,	0.482	<0.001*

*Significant at p < 0.05.

Qualitative findings reinforced the quantitative results. Participants highlighted the importance of GDM in maternal health, challenges such as lack of resources and poor patient compliance, and reliance on lifestyle modification before pharmacological interventions. Suggested improvements included regular training workshops and patient education initiatives (Table 7).

Table 7: Thematic Analysis of IDIs and FGDs.

Theme	Sub-theme	Illustrative Quote
Perceptions of GDM	Importance in maternal health	"Gestational diabetes is often overlooked, but it can complicate pregnancy seriously if not checked early." (IDI, Obstetrician)
Challenges in Practice	Lack of resources	"Sometimes, we don't have glucose tolerance test kits, so we just use fasting blood sugar." (FGD, Nurse)
Management Approaches	Lifestyle vs. medication	"We usually start with diet and exercise, but most women find it hard to comply, so we quickly move to insulin." (IDI, Family Physician)
Suggestions for Improvement	Training and awareness	"If we had regular workshops and patient education programs, management would be much better." (FGD, Resident Doctor)

Discussion

In this study of 150 medical professionals in Abia State, Nigeria, a majority demonstrated sound knowledge of key risk factors and diagnostic tools for Gestational Diabetes Mellitus (GDM). Specifically, over 80% agreed or strongly agreed that obesity and family history of diabetes predispose to GDM, while about 76% recognized the Oral Glucose Tolerance Test (OGTT) as the diagnostic standard, and approximately 74% acknowledged the increased risk of stillbirth associated with untreated GDM. These finding align well with existing studies from Nigeria and Africa that have similarly observed good awareness of GDM risk factors among healthcare providers, though gaps often remain in the consistent application of best practices [7].

Clinical practices reflected a moderate level of adherence to recommended screening: 59.3% of respondents reported routinely screening all pregnant women with OGTT. This is substantially higher than reports from Jos, Nigeria, where only around 22% of providers used the 75g OGTT routinely, with most relying instead on fasting or random glucose tests [11]. Nevertheless, a noteworthy proportion (27.3%) in Abia State still relied on random blood glucose, and 13.3% screened only high-risk women, indicating ongoing deviations from universal screening protocols.

The management approach favoured lifestyle modification, diet and exercise, recommended by 74.7% of professionals, followed by insulin as first-line therapy (49.3%), metformin/oral hypoglycemics (18.7%), and referrals to endocrinologists (64%). The preference for lifestyle interventions before pharmacotherapy resonates with findings from multiple regions, including Africa and elsewhere, where dietary and lifestyle changes are universally advocated, with insulin and metformin following as pharmacologic options [12,13].

Barriers reported in this study mirrored structural challenges documented in Africa. Key constraints included lack of diagnostic kits or reagents (64.7%), high testing costs (59.3%), limited patient awareness (70%), shortage of specialists (52%), and inadequate institutional protocols (42%). Similar multidimensional barriers, logistics, financing, healthcare staffing, in-service training, and patient-level knowledge deficits were identified in a systematic review of GDM in Africa [14,15]. Additionally, globally, lack of consumables, weak referral and feedback systems, and transportation difficulties have been recognized as impediments to effective GDM care, emphasizing a convergence with the challenges highlighted by your respondents [16,17].

Statistical analysis in this study further revealed associations between knowledge and demographic/professional variables: age group (p = 0.049), cadre (p = 0.002), profession (p = 0.012), and years of experience (p = 0.026) were all significantly linked with knowledge levels. Correlational analysis also showed modest but significant positive relationships between age and both knowledge (r = 0.214, p = 0.021) and practice (r = 0.187), as well as years of

experience with both knowledge (r = 0.263, p = 0.012) and practice (r = 0.244). Importantly, knowledge score strongly correlated with practice score (r = 0.482, p < 0.001). These findings echo patterns in health professional behaviour more broadly, where greater experience and training often correlate with improved knowledge and clinical practice.

Thematic insights from in-depth interviews and focus group discussions captured front-line realities: GDM is seen as important yet often overlooked, resource constraints drive substitutions (e.g., fasting blood sugar instead of OGTT), patients struggle with lifestyle compliance, prompting earlier insulin use, and there's a strong call for ongoing training and patient education. These qualitative findings are consistent with barriers identified in settings such as South India, where resource deficits, manpower shortages, lack of protocols, and counseling time constraints similarly hamper effective GDM care [18].

Conclusion

The study concludes that while medical professionals at ABSUTH demonstrate moderate knowledge and adherence to standard GDM management practices, critical gaps persist due to systemic barriers. Strengthening institutional protocols, improving diagnostic access, and continuous professional education are essential for enhancing maternal and neonatal outcomes.

Acknowledgement

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Conflict of Interest

None.

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