

Provision of Pre-pregnancy Care for Women with Pre-existing Diabetes in Lagos, Nigeria: An Exploratory Qualitative Study

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Abstract: Background: The rising prevalence of diabetes mellitus and its adverse effects on pregnancy outcomes have made pre-pregnancy care (PPC) a critical component of diabetes management among women of reproductive age. Diabetes poses significant risks during pregnancy, but PPC provides an opportunity to prevent complications. Despite these benefits, Nigerian women of childbearing-age living with diabetes still miss out on these advantages due to poorly defined and imperfect integration of PPC into the country's healthcare system by Health Birth professionals (HBPs). Therefore, their understanding of PPC and the integration of PPC into routine diabetes management practices for childbearing women is essential. The study, therefore, aims to explore HBPs' provision of PPC for women with pre-existing diabetes in Lagos, Nigeria. **Methodology:** A qualitative exploratory research design was conducted at two tertiary health institutions in Lagos. A total of 20 participants were purposively selected among doctors and nurse/midwives. The data collected through in-depth semi-structured interviews were transcribed verbatim and analyzed thematically. The trustworthiness of this study was established following the criteria of trustworthiness (credibility, dependability, transferability, and conformability), authenticity was added based on the research worldview. **Result:** Five themes and eleven subthemes emerged from the analysis. The main themes were clinical importance of PPC for women with diabetes, pregnancy-intention screening for diabetic women, PPC as standard care practice for women with diabetes, raising awareness of PPC, and the enablers of PPC provision. **Conclusion:** The study emphasized the clinical significance of PPC for women with diabetes; the need for pregnancy-intention screening among diabetic women; the need to make PPC a standard of care for women with diabetes; the importance of raising awareness; and the enablers of PPC. The study highlighted the significance of PPC and the factors that would facilitate its integration PPC into Nigeria's healthcare system. The provision of PPC for women of childbearing potential living with diabetes, as it is key to improving obstetric outcomes and reducing the risks associated with diabetes in pregnancy. It would also be beneficial for leaders at various levels of healthcare institutions to seek the necessary regulatory approvals from the Nigerian government to establish PPC.

Keywords: Diabetes Mellitus, Health Birth Professionals, Pre-pregnancy Care, Provision, Women

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1. Introduction

Globally, women with pre-existing diabetes mellitus (DM), especially pregnant women, face challenges caused by poor glucose control during pregnancy. Uncontrolled diabetes has been linked to adverse pregnancy outcomes, such as congenital anomalies [1,

2] prematurity, large for gestational age, spontaneous abortion, small for gestational age, neonatal admission to intensive care units, perinatal infant death, and caesarean delivery [2, 3, 4]. The recommendation is that all women of childbearing age with DM should receive preconception care (PCC) about the congenital anomalies and other pregnancy-related complications associated with uncontrolled maternal diabetes, as well as information on effective contraception and targeted glycated haemoglobin (A1c) for diabetic women aiming to conceive [5]. This advice includes maintaining a preconception A1c level below 6.5% to reduce the risk associated with diabetes in pregnancy [5]. In a similar vein, the provision of PPC for mothers with pre-existing diabetes has been proven to be effective in improving a significant portion of maternal and offspring complications related to pre-existing diabetes [6]. Additionally, PPC provides women with the opportunity to screen for any personal health conditions that may impede the successful pregnancy outcomes [7]. Findings of a review on PPC suggested that women with chronic medical issues and poor obstetric history should be encouraged to attend the scheduled clinical appointments for early interventions for better pregnancy outcomes [8]. Also, another study mentioned that investing in the preconception health of women, particularly those with chronic medical conditions, helps reduce complications related to pregnancy [9]. All these empirical studies have demonstrated the vital role of PPC in mitigating the unfavorable outcomes of pregnancy. But in the Nigerian context, PPC remains unstructured within the country's health delivery system, leaving many doubts about the quality of care and efficiency of providers [10, 11].

Empirical studies and several international guidelines on PPC and diabetes have highlighted the clinical importance of PPC for women with diabetes. [12] reported that glucose optimization, risk factors identification, and reduction were identified as benefits linked to PPC provision. These associated benefits of PPC for women with diabetes promote favourable pregnancy outcomes. In addition, PPC offers women with diabetes who are planning to become pregnant the opportunity to be on periconception folate use, a crucial aspect of PPC services. According to Perera *et al* [13], a high dose of folic acid, equivalent to 5mg daily, has been the routinely recommended dose for this population group. This daily dose of folate supplement taken by women for at least 3 months before conception till 12 weeks of gestation prevents babies born to women with diabetes from having neural tube anomalies. Furthermore, attending a PPC clinic by women with diabetes lowers their HbA1c throughout all trimesters of pregnancy [14]. PPC, being one of the essential components of obstetric care, provides comprehensive support on pregnancy planning to women with diabetes prior to conception. Yamamoto *et al* [15] mentioned that women who participated in the PPC programme were well-prepared for pregnancy, as many achieved their targeted HbA1c and took folic acid supplementation before conception. Likewise, majority of women with diabetes were found to be on highly effective methods of contraception during their postpartum period [16]. Guided by these empirical studies, PPC is tailored to address women's needs during pregnancy and promote their health. This is because PPC services entail preventive measures, including biomedical, behavioral, and social health interventions, aimed at identifying and addressing risk factors to women's health that could harm pregnancy outcomes [17]. Therefore, the provision of PPC for the group of women with pre-existing diabetes, chronic medical conditions, or previous pregnancy complications has been indicated to be essential [18].

Screening for pregnancy intention for women with diabetes by the Health Birth Professionals (HBPs) aims at the optimization of glucose levels and reducing maternal and fetal complications, promoting prompt interventions and the overall well-being of women. HBPs play a vital role in ensuring that women's health is optimal and that

diabetes is well-controlled before conception. They also ensure that women have a good pregnancy journey and achieve the best possible outcomes. Therefore, pregnancy-intention screening is a duty of HBPs, which should be a routine practice integrated into diabetes care for reproductive-aged women. HBPs are to engage women with diabetes in discussions about pregnancy intention at any of their meetings with prospective pregnant women during a clinic visit. A one-key question, “would you like to become pregnant in the next year” was identified as a screening method for pregnancy intention to ensure that women are at their best health for pregnancy [19]. Also, screening for pregnancy intention for individuals with diabetes has been advocated to commence early in the puberty age to prevent unintended pregnancy and unfavorable outcomes [20]. Additionally, disseminating information on pregnancy intentions and preparation could begin in the academic setting through school health services, emphasizing that health comes before pregnancy and providing clear information through social movement creation [21]. Social media spaces and academic environments play a crucial role in disseminating health information about screening for pregnancy intention, as reported in a study by [22]. The study mentioned that Preconception and Diabetes Information (PADI), an innovative app, provides information and knowledge on pregnancy planning and risk, and helps improve understanding of diabetes before pregnancy. Digitalizing health information through social networks is a valuable tool for educating women about maintaining good health before pregnancy, as this influences their health during pregnancy [23].

Standardized PPC in clinical practice for women with diabetes requires a comprehensive approach that combines various interconnected factors. Literature has established that these factors include healthcare providers, the healthcare system, and patient-related factors in the PPC standardization. Asafa *et al* [12] reported that healthcare providers expressed their readiness to deliver PPC for women with diabetes. They said that PPC provision is an essential component of optimal diabetes management for women with diabetes. However, providers delivered these services to women with diabetes opportunistically [24]. This is mainly attributed to insufficient training, gaps in up-to-date diabetes management, and limited numbers of endocrinologists [25, 26]. The standardization of PPC requires continuous professional training and an increase in the number of endocrinologists [27]. A full incorporation of a comprehensive approach to diabetes care and reproductive health into medical fellowship programs, bridging the gap in PPC training for doctors [28].

Furthermore, a women-related factor was identified in a study by Abedini *et al* [29]. The findings revealed that women perceived PPC as unnecessary. Additionally, reproductive-aged women with diabetes failed to recognize the importance of PPC and pregnancy planning, despite well-documented findings. Therefore, adequate knowledge and awareness are recommended to close the gap in standardizing this as a key component of obstetric care [30]. A multi-method study on the implementation, system, and clinical factors of the PPC pathway in the UK identified a care pathway within the healthcare system that determines what women need at different stages of their reproductive cycle and the accessibility of resources. The study also highlighted decision-support tools for health providers to assess risk for women as a testable protocol for PPC implementation in primary care [31]. Timely referral of patients with complex medical, obstetric, and gynecological histories is essential for standardizing PPC across the country's health system [32].

Literature revealed that unawareness of the availability of PPC was reported as one of the reasons for the non-attendance of PPC clinics among Australian diabetic mothers [33]. The study found that about half of the participants were unsure about the types of

diabetes-specific PPC services available in their locality. They recommended sensitization and publicity of pre-pregnancy awareness among women with diabetes [33]. This finding is similar to a study conducted in Nigeria. The study's findings showed low awareness (20.6%) of preconception care (PCC) among participants [34]. The authors recommended raising awareness of PCC, making the care available, and integrating PCC into maternal health care services to provide better feto-maternal. According to Clark *et al* [35], urgent attention is required to raise awareness about the concept of preconception and interconception health among reproductive-age rural women both inside and outside the healthcare system, as generally, preconception or interconception period is not recognized as a period to address health or behavioural issues that may impede pregnancy. Innovative strategies such as the use of social media platforms and local ambassadors are tools for providing PCC awareness among prospective couples in order to raise awareness about PCC and enhance the transmission of information to target people living in remote areas [27]. Furthermore, Funnell *et al* [36] alleged that information about awareness of PCC using internet search provides women with more preconception health information needed for both before and after pregnancy [36]. Similarly, mails from care providers, information leaflets, and letters from municipal health services and peer health educators, were indicated as an effective strategy for promoting PCC uptake in the Netherlands [37]. Additionally, teaching PCC in schools would help raise awareness and reach a broader population [27]. Also, adopting an approach such as patient-facing educational materials at the clinic waiting area demonstrates a regular reminder of delivering preconception counselling to reproductive-age women [38].

Factors that facilitate the provision of PPC include the regular and uninterrupted supply of medical consumables to HBPs at diabetes clinics, which would significantly improve diabetes care, reduce the burden of diabetes treatment on patients, and enhance patients' compliance. This would significantly improve self-efficacy among HBP [39]. A study's findings on care providers' perception of challenges and opportunities for service improvement at a diabetes management clinic in Oman revealed that adding more structures in healthcare settings would assist healthcare professionals (HCPs) in providing appropriate care for diabetic women and make work more efficient [40]. In order to provide the best possible PPC care, it is essential to have a diverse and collaborative team, as reported in a study [41]. A multi-disciplinary team of experts in medicine, obstetrics, gynaecology, endocrinology, and related areas is required to enable the PPC delivery. The study's findings further stated that this multidisciplinary approach adds value to preconception assessment and improves pregnancy outcomes among women, including those with metabolic disorders [41].

Previous studies in Nigeria have assessed PPC uptake using quantitative methods. However, empirical research on PPC in women with diabetes in Nigeria is limited. Previous study by Asafa *et al* [12] investigated the perception of PPC within a tertiary hospital setting. It concluded that there is a need to expand data collection to other teaching hospitals in Lagos. Improving HBPs' understanding and uptake of PPC at a state-owned tertiary hospital could generate more reliable and comprehensive data since they serve as referral centers for a variety of women with chronic diseases. Women with pre-existing diabetes could be missing out on this opportunity of PPC due to a lack of a well-structured system of PPC in the country's healthcare system. The lack of a policy of PPC for this population would continue to hinder the successful outcomes of pregnancy. To achieve the best health outcome for mothers and their newborns, HBPs working in these tertiary institutions could offer valuable insights into the provision of PPC. Additionally, the factors that enable initiating discussions about PPC with women with diabetes should be prioritized. Therefore, it is critically important to understand HBPs'

perceptions regarding PPC provision for women of childbearing age living with diabetes in Lagos, Nigeria. This was done by exploring the HBPs definition of PPC for women with diabetes; the HBPs approach to pregnancy intention screening; the optimal glucose level before conception, and factors that facilitate the establishing PPC as a standard practice for women with diabetes.

2. Materials and Methods

2.1. Philosophical framework, Research design, and setting

The constructivist paradigm underpins this study. This research worldwide assumes that reality is not based on objectivity but is instead construed by diverse opinions [42]. This paradigm is appropriate for this study as it provides multiple perspectives on the understudied phenomenon from the participants' point of view.

An exploratory qualitative design was employed in this study to examine HBPs' perceptions of providing PPC to Nigerian women with DM who plan to get pregnant, as well as strategies for establishing PPC as a standard practice in obstetrics care within the healthcare system. This design is suitable for providing meaningful, in-depth insights into the phenomenon of interest and addressing the research questions about how and why PPC is provided. The exploratory qualitative approach gathers comprehensive, detailed information about the studied phenomenon and allows a researcher to investigate a topic that has received limited attention [43]. Data were purposively collected from two groups of HBPs to obtain rich information.

2.2. Study Settings

Lagos State, the most populous city in West Africa, with an estimated population of 20 million, has two foremost tertiary health institutions – Lagos University Teaching Hospital (LUTH) a Federal Government-owned hospital and Lagos State University Teaching Hospital (LASUTH) a State-owned health institution upgraded to a teaching hospital in 2001 [44,45]. The two facilities play critical role in specialized health delivery [46]. LUTH is one of the largest tertiary hospitals in Nigeria, offering a range of medical services across 60 departments with 1000 bed spaces. On the other hand, LASUTH is in the heart of Lagos, Ikeja, and is affiliated with Lagos State College of Medicine (LASUCOM). The hospital has grown into a modern health facility, well-equipped with technology to provide comprehensive healthcare services in emergency care, maternal and child health, surgery, and specialized clinics. It has a 750-bed hospital capacity for admission [45].

The study's participants were nurse-midwives and medical doctors from obstetrics, gynecology, and endocrinology departments working in these two health facilities. A non-probability purposive sampling technique was used to recruit participants for this study. Purposive sampling involves selecting individuals or groups with specific experience or knowledge relevant to the phenomenon under study [47]. A total of twenty (20) participants were involved, eight (8) from LUTH and twelve (12) from LASUTH, based on data saturation.

2.3. Data collection

Data collection for this study was conducted through a semi-structured interview. According to [48], interview is a suitable method of data collection for an exploratory study. Therefore, the researchers chose this method to gather in-depth information from participants. The principal investigator (PI) developed the interview guides and conducted the interviews after reviewing relevant literature on the phenomenon, and the co-investigators confirmed that the guides would explore HBPs' perceptions of providing

PPC to women with pre-existing diabetes. The interview guide served as a guide for formulating Interview questions. Kvale [49] mentioned that an interview guide shows the study topic and the interview sequence during the interview [49]. Each interview session commenced by informing the participant of the study's objective and obtaining their consent. Additionally, attempts were made to build a rapport between the participants and the interviewer. The main interview questions asked were stated thus: "Can you please share with me your understanding of pre-pregnancy care (PPC)" (What does the term pre-pregnancy care mean to you? What is it all about?) "Please tell me how you assess a woman's plans for pregnancy to ensure her blood glucose level is at a normal range before she conceives" and "share with me factors that would contribute to the establishment of PPC as a standard practice for women diagnosed with diabetes". Further probing on the questions was provided to generate a rich description. The interview session took place on the hospital premises, specifically in the doctor's lounge and the nurse's restroom (quiet areas where participants work), to ensure the confidentiality and privacy of participants and their information. The interview was conducted in a face-to-face meeting at a time convenient for them. It is noteworthy that the interviews were conducted in English, the official language for communication in Nigeria. The average interview session duration varied from 45 to 60 minutes per participant. All interviews were audio-recorded and reflective in nature, with field notes taken during each session. Data collection and transcription were carried out simultaneously for analysis purposes and securely stored in a password-protected file, utilizing pseudonyms to ensure data confidentiality.

2.4. Data analysis

The data analysis for this study was guided by a thematic analysis approach, which consisted of six phases [50,51]. This analytical method commenced with a verbatim transcription of recorded data. The audio recordings were meticulously listened to while reading the transcripts to ensure the transcripts' clarity and identify emerging themes in the dataset. The PI transcribed the data verbatim and rechecked with the original data to ensure no data was missed and to confirm consistency. After transcription, data coding and analysis were done manually to have a hands-on feel and be close to the data without interference from the machine [52]. Specific interview segments containing essential words in the dataset that could answer the research question were coded accordingly, forming the basis of the data analysis. Color coding was used to highlight excerpts with similar ideas. A codebook was then created containing the initial code alongside the participants' pseudonyms for tracking. PI carefully reread the dataset to identify salient excerpts and assigned suitable codes. Segments with similar meanings received the same code, which were later clustered to form categories. Notably, some codes were created directly from participants' own words [in-vivo coding] [53], while others were developed through an inductive coding process [50,51]. Also, the investigators organized the data into thematic analysis as described by Braun and Clarke. Thus, the six phases of the analysis are described:

1. **Familiarization with the data by reading through it several times to gain a clear understanding of the data.** Re-reading the data set, reflective diaries, and daily notes provide clear insights into data connectivity and clarifies doubtful statements.
2. **Producing initial codes from the data set.** Keywords and statement form participants' responses were identified and coded. These coded excerpts served as evidence to support the research question. The same color was used to indicate excerpts with similar ideas, and in turn, the same colors

- representing related ideas were grouped into broader categories (subthemes).
3. **Searching for themes by sorting out different codes to form themes.** Following the coding phrase, related categories were clustered and organized, which were later synthesized into overarching themes
 4. **Reviewing and refining themes.** The preliminary themes were redefined and reviewed to further condense the data, marking the fourth phase of the analysis.
 5. **Defining and naming themes.** In defining themes, related themes were combined, with some retained as independent and others eliminated due to redundancy after a thorough review by the research team.
 6. **Producing a report.** In the reporting phase, the research team reviewed the generated themes and provided excerpts from data in a concise, coherent, and logical manner.

Furthermore, the quality of the study was guided by the consolidated criteria for reporting qualitative research (COREQ) checklist [54], as outlined in Table 1.

Table 1. COREQ (COnsolidated criteria for REporting Qualitative research) -32 ITEM checklist

No	Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity			
Personal Characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	Page 9
2.	Credentials	What were the researcher's credentials? E.g PhD, MD	Page 12
3.	Occupation	What was their occupation at the time of the study?	Page 12
4.	Gender	Was the researcher male or female?	Page 0
5.	Experience and training	What experience or training did the researcher have?	Page 12
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Page 9
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? E.g Personal goals, reason for doing the research	Page 9
8.	Interviewer characteristics	What characteristics were reported about the interviewer?	Page 9
Domain 2: Study design			
Theoretical framework			
9.	Methodological Orientation and Theory	What methodological orientation underpins the study stated? eg grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 8
Participant selection			
10.	Sampling	How were the participants selected? E.g, purposive, convenience, consecutive snowball	Page 9
11.	Method of approach	How were the participant approached? E.g, face-to-face, telephone, mail, email	Page 9 and 10
12.	Sample size	How many participants were in the study?	Page 9
13.	Non-participation	How many people refused to participate or dropped out? Reasons	Page 0
Setting			
14.	Setting of data collection	Where was the data collected? Eg, home, clinic, workplace	Page 8
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Page 10

16.	Description of sample	What are the important characteristics of the sample? E.g demographic data, date	Page 14
Data collection			
17.	Interview guide	Were questions, prompts guides provided by the author? Was it pilot tested?	Page 9
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Page 9
19.	Audio/visual recording	Did the researcher use audio or visual recording to collect the data?	Page 10
20.	Field notes	Were field notes made during and / or after the interview or focus group?	Page 10
21.	Duration	What was the duration of the interview or focus group?	Page 10
22.	Data saturation	Was data saturation discussed	Page 10
23.	Transcripts returned	Were transcripts returned to participants for comment and / or correction?	Page 0
Domain 3: Analysis and finding			
Data analysis			
24.	Number of data coders	How many coders coded the data?	Page 11
25.	Description of data coding tree	Did author provider a description of the coding tree?	Page 11
26.	Derivation of themes	Were themes identified in advance or derived from the data?	Page 11
27.	Software	What software, if applicable, was used to manage the data?	Page 11
28.	Participant checking	Did participants provide feedback on the findings?	Page 0
Reporting			
29.	Quotations presented	Were participants quotations presented to illustrate the themes/ findings? Was each quotation identified?	Result Page 15 to 21
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	Result Page 15 to 21
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Result and Discussion Page 21 to 23
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Result and Discussion Page 21 to 23

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International journal for quality in health care. 2007;19(6):349–57.

2.5. Trustworthiness

Initially, the researchers developed a comprehensive study protocol that outlined the aims, methodology, data collection and analysis methods, and reporting procedures. Using this plan, all data gathered, processes, and research activities were thoroughly documented and securely stored to maintain confidentiality and privacy. The trustworthiness of this study was established following the criteria of trustworthiness provided by Lincoln *et al* [55]. This entails credibility, dependability, transferability, and conformability. Additionally, authenticity was added based on the research worldview, as identified by Guba *et al* [56]. Credibility confirms that the research findings are authentic, derived from participants' original data, and truly reflect their perceptions [55]. The credibility of this study was achieved by prolonged engagement [57]. The PI, a PhD holder with prior experience in qualitative research, maintained the study's credibility by ensuring prolonged engagement throughout data collection to build rapport and obtain rich data. This approach helped gather detailed data from participants by asking

questions about the phenomenon under study and probing further into the context to develop a deeper understanding of their views. Besides, other research teams were PhD holders in the Nursing and medical professions and possessed adequate academic and sound qualitative research backgrounds. This helped in maximizing the credibility of the study's findings. Dependability means the stability of data over time. Dependability was ensured through an inquiry audit of the details of the study procedures and analysis [55]. A comprehensive explanation of all steps involved in the research process, including design, research conduct, data collection, and analysis, was thoroughly provided to ensure the study's dependability. Transferability is related to the extent to which the study's results can be transferred or generalized to other settings or contexts [55]. Transferability was achieved through a thick description of participants, study procedures, and data collection. Thus, the findings of this study might apply to health birth professionals (HBPs) with similar criteria practicing in other settings. The research teams held regular discussions and briefings during data analysis to reach a consensus on emerging codes and categories. This enabled the study's conformability. Additionally, two independent inter-raters (experts in the field of study) confirmed this study's results, meeting the criterion of conformability. The study's findings about a particular phenomenon could be established using an inter-rater check [58]. This Inter-rater reliability check is presented in Table 2. Authenticity refers to the degree to which all participants' diverse views are explained fairly and originally [42]. This study ensures that participants' feelings are clearly reported based on their opinions on the topic.

Table 2. Inter-rater reliability check.

Research question 1: How do HBPs define PPC for women with diabetes?								
Interview question	Themes	Subthemes	Verbal Support/ Participants	Rater 1		Rater 2		Comment
				Agree	Disagree	Agree	Disagree	
Can you please share with me your understanding of pre-pregnancy care?	Clinical importance of PPC for women with diabetes	Safe motherhood	"...pre-pregnancy care is that care you give to a woman who is intending to get pregnant you know to achieve you know safe motherhood, the complication free pregnancy..." Nurse P13	√		√		nil
			"The standard is for every woman trying to get pregnant, the glucose control must be optimal in terms of the fasting plasma glucose, random plasma glucose and the HbA1C, all women aspiring or emm desirous of getting pregnant must be well controlled before they achieve pregnancy..." Doctor P3	√		√		nil

2.6. Ethical considerations

Before the interview session with the study participants, ethical clearances were obtained from the Health Research Ethics Committee of the two health institutions, ADM/DCST/HREC/APP/3504 and LREC:06/10/1358, respectively, and all necessary hospital permissions from the institutions. All protocols outlined in the Helsinki Declaration regarding voluntary participation, confidentiality, and anonymity were strictly followed during data collection and the reporting of the study's findings.

3. Results

Twenty (20) health birth professionals (HBPs) participated in the study. Eight (8) were from the Federal Teaching Hospital, and twelve (12) were from the State Teaching Hospital, comprising 6 nurse-midwives and 14 medical doctors from various professional positions in the departments of obstetrics, gynecology, and endocrinology. The participants' demographic characteristics was presented in [Table 3](#).

Table 3. Participants' Demographic Characteristics

Professional	Characteristics	Category	Number
Doctor [n = 14]	Setting	LUTH	6
		LASUTH	8
	Gender	Male	9
		Female	5
	Qualification	MBBS	11
		MBBS +	3
	Cadre	Consultant	5
		Senior Registrar	7
		Junior Registrar	2
	Years in Service	<10	1
		10 – 20	13
Nurses [n = 6]	Setting	LUTH	2
		LASUTH	4
	Gender	Male	0
		Female	6
	Qualification	RN, RM	2
		RN, RM, BNSc +	4
	Cadre	CNO	3
		ADNS	3
	Years in Service	26 – 39	4
		30 +	2

The Perception of Health Birth Professionals on the Provision of Pre-pregnancy Care

Five themes and eleven subthemes were generated from the data. The five main themes were *Clinical importance of pre-pregnancy care (PPC) for women with diabetes*, *Pregnancy-intention Screening for diabetic women*, *PPC as a standard care practice for women with diabetes*, *Raising Awareness of PPC*, and *The Enablers of Pre-pregnancy Care*. The summary of the emerged themes and subthemes is presented in [Table 4](#).

Table 4. Summary of the emerged themes and subthemes

Themes	Subthemes
Clinical importance of PPC for women with diabetes	Safe motherhood
	Glucose optimization
	Enhance folic acid intake.
Pregnancy-intention Screening for diabetic women	Screening for pregnancy
PPC as a standard care practice for women with diabetes	Universal protocol of service
Raising Awareness of PPC	Public enlightenment
	Use social media space for awareness

The Enablers of Pre-pregnancy Care.	Additional health facilities Funding to sustain the PPC provision Training of health workers More employment of specialists
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Theme 1: Clinical importance of PPC for women with diabetes

Participants stated that pre-pregnancy care services are essential for all childbearing women with diabetes. These include safe motherhood, ensuring optimal glucose levels, and enhancing folic acid intake.

Subthemes 1.1: Safe Motherhood

Participants reported that the provision of pre-pregnancy care for diabetic childbearing women is about pregnancy planning, which would promote safe motherhood. Childbearing women with diabetes must be adequately prepared for pregnancy due to their medical condition. The preparation for pregnancy involves establishing that the woman is placed on an effective family planning method until blood glucose is controlled and her condition is optimal for pregnancy.

"...pre-pregnancy care is that care you give to a who is intending to get pregnant you know to achieve you know safe motherhood, the complication free pregnancy..."
Nurse P13

Participants also mentioned that pre-pregnancy care provides women with the opportunity of counselling a woman to cease behavioural habits such as alcohol drinking and smoking that could affect pregnancy or worse their health condition before pregnancy.

"...activities, smoking, alcohol that can affect their pregnancy, and as well even worsen their prognosis in terms of diabetic care, do you understand? So, you try and counsel them against all that, so that they can put a stop to it..." **Doctor P16**

Subthemes 1.2: Glucose Optimization

All the participants mentioned that pre-pregnancy care services also involve performing investigative tests, including random plasma glucose, fasting plasma glucose, and HbA1c, for glucose monitoring of childbearing women who are aspiring to pregnancy. Glycaemic levels must be normal before a woman conceives. This establishes what the international standard on pre-pregnancy care for diabetic childbearing women recommends.

"...the standard is for very woman trying to get pregnant, the glucose control must be optimal in terms of the fasting plasma glucose, random plasma glucose and the HbA1C, all women aspiring or emm desirous of getting pregnant must be well control before they achieve pregnancy..." **Doctor P3**

Subthemes 1.3: Enhance Folic Acid Intake.

Participants stressed that one of the benefits of pre-pregnancy care is promoting daily folic acid intake. Consumption of folate by diabetic childbearing women for a minimum of 3 months before conception assists in minimising the risk related to a congenital anomaly.

"...you want them to be on emm at least folic acid three months prior, prior conception so that emm congenital anomaly to be eradicated to the barest minimum..." Doctor P15

Theme 2: Pregnancy-intention Screening for diabetic women.

Participants stated that women with diabetes need to take proactive measures for their health when planning for pregnancy. They emphasized the importance of maintaining good health through regular check-up and periodic screening before conceiving.

"...every woman in a childbearing age who present at any private facility or any facility at all should be offered screening for diabetes or the risk for diabetes be assessed in that kind of woman whether she is aspiring to get pregnant or not , so that take us to the concept of screening and when people present we can they need to be checked routinely..." Doctor P3

Another participant said that

"...it is still at the clinic level so that mean that all doctors that come in contact with patient that has diabetes this is something that should be on their mind you understand finding out about their obstetric and gynea and their reproductive life...the onus is still on the people that are providing the health care because these people are coming to us," Nurse P11

Theme 3: PPC as a standard care practice for women with diabetes.

Participants emphasized that PPC services are essential for promoting maternal health and preventing pregnancy complications and should be made mandatory as a standard protocol across all levels of the healthcare system. Consequently, all women of reproductive age with diabetes should be routinely offered PPC during hospital visits, rather than only as an option.

the need for them to ensure that there is emm care before they get pregnant, adequate care before they get pregnant, and adequate care during pregnancy so, and then there should be protocol, ..., so there should be like emm general standard protocol in the, for the country that should be used or adapted in all healthcare institution, whether primary, secondary or tertiary, and then the ...should also be strengthened to help in the care of this patient..."Doctor P9

Theme 4: Raising Awareness of PPC

Participants unanimously agreed that raising awareness is the best way to inform the public about the PCC. They said that creating awareness is key. This awareness will enhance better understanding of the initiative can be achieved through public enlightenment, health outreach on reproductive issues.

"...there is a need for the populace to know, emm widen the publicity for them to know the preconception care clinic and what is entails..." Nurse P15

Another participant mentioned that

I appreciate our social media, all over the place that, at least somehow, someway, people still get some information there...all you need do is, take the necessary precaution, and do the necessary things you are supposed to do... **Doctor P8**

Another participant stated that

"...our community, health centres, our general hospitals, the bales (traditional leaders), if they are involve and these health educators go around you know they will gather them in the town hall and inform them..." **Doctor P14**

Another participant said that

"so it goes outside the hospital, it goes outside the hospital we must reach out to them in their localities, in the language they understand okay and we can do that by organising emm them at the town hall meeting, giving them this education in the language they understand we can use the mass media both electronic and print, we can have jingles on radio"...It has to be repetitive repetitive, we have to go there on the radio, the jingle. The jingle must be repetitive continually until its sinks into them..." **Doctor P3**

Theme 5: The Enablers of Pre-pregnancy Care.

Participants highlighted the resources needed to support PPC delivery. Key resources include additional health facilities, funding to ensure the service's sustainability, training for health workers to improve their skills in delivering comprehensive care, and more specialized health personnel, especially nurses. Participants stated that all these are essential for facilitating PPC delivery.

"...structure has to be in place, we need to have a place, a room where such is done, maintain prepare venue for such..so that environment I think is needed is conducive environment, you know emm avenue where such can be done..." **Doctor P18**

Another participant mentioned that

"...funding should be made available on the part of the government, for example through the health insurance, health insurance scheme to cover for the care..." **Doctor P9**

"...important education, regular training of emm care givers, not just at the, primary, at the tertiary level, right from the primary health institution to the general hospital which is our secondary health care institution, and then regular training. Updating of knowledge in the tertiary health care institution, emm that is very necessary..." **Doctor P9**

Another participant stated that

"...we need more we need specialists nurses ...nurses that are diabetes is their core view, yes because it will go a long way..." **Nurse P11**

4. Discussion

This paper examines HBPs' insights for the provision of pre-pregnancy care (PPC) for Nigerian women of childbearing age living with diabetes.

This study's findings revealed that PPC is a recognized aspect of obstetric care that supports safe motherhood. This service is comprehensive in ensuring the mother's health is optimal before conception takes place, promotes healthy behaviors, and offers contraception advice to diabetic women before pregnancy. This finding aligned with the [17], which emphasized the importance of PPC for women with diabetes.

This study found that women with diabetes should be screened for pregnancy intentions by initiating an open conversation during their clinic visits. The participants mentioned that health providers should initiate discussion about pregnancy with women to ensure that both their health and the unborn child are protected from diabetes-related complications. This finding is in line with the report of [19] on a one-key question, "would you like to become pregnant in the next year?" and at the same time discussing reproductive intention with women with diabetes promotes the idea that pregnancy requires careful planning to reduce unintended pregnancies and improve pregnancy outcomes [59].

A standardized care system spanning the entire country's healthcare system was mentioned in this study's findings. Participants agreed that PPC should be routinely provided to all women with diabetes as a core component of obstetric care, using a unified standard protocol across all levels of the healthcare system. This approach allows HBPs to ensure that high-quality and consistent care is delivered to all women with diabetes, addressing their specific needs and safeguarding both women's and their fetuses' health. The study's findings support the position of the National Institute for Health and Care Excellence (NICE). According to NICE [60], a structured approach to preconception care is recommended, including targeted levels for HbA1c, safe diabetes medications, folic acid use, and health literacy as part of standard practice provided by healthcare professionals.

Participants emphasized that women with diabetes need to learn about the new initiative through various communication channels. These include using social media platforms, community health outreach, and distribution of pamphlets and flyers with information about PPC services. This finding confirms the report of [27] who stated that the use of social media platforms raises PCC awareness among prospective couples, helping information to reach people living in remote areas [27]. Additionally, information about awareness of PCC through internet search provides women with more preconception health information needed before and after pregnancy [36]. Therefore, the easiest, most convenient, accessible, and time-friendly way to get information on pregnancy planning and preconception health for childbearing-aged women is through social media [23]. Likewise, educational materials about PPC and pregnancy planning can be provided to reproductive-aged women with diabetes outside the clinical settings [38].

This study provided valuable insight into another factor that could facilitate the provision of PPC. All participants agreed on the need to increase the number of health workers specializing in diabetes and obstetrics nationwide. A shortage of diabetes experts hampers the quality of care; therefore, the Nigerian Government needs to employ more diabetes and obstetrics specialists. This is necessary to provide quality care for childbearing women with diabetes. Shortage of health professionals hinders the quality of diabetes care [61,39]. Furthermore, this study's findings indicated that constructing physical buildings with multiple rooms to accommodate patients and providing a conducive working environment for healthcare professionals are additional factors that facilitate the provision of PPC and improve operational efficiency. This is consistent with a report of a study conducted by [62].

In addition, the study's results highlighted healthcare worker training as a key facilitator of PPC delivery. This aligns with a qualitative study in India, which found that updated medical training on PPC guidelines for healthcare professionals is necessary to improve the provision of PPC service [25]. The findings of this study also highlighted funding as another crucial resource for providing PPC. The study stated that the government should allocate funds to support childbearing women with diabetes. This finding is consistent with research by [63] that revealed the national action plan on diabetes care subsidy, including prevention and treatment.

5. Limitations and Strengths

The study's limitations were acknowledged. Study's participants were mainly nurse-midwives and medical doctors from two tertiary hospitals, LUTH and LASUTH. Future studies could incorporate health administrators who are in charge of endocrine, obstetrics and gynecology departments and women with diabetes who have experienced childbirth. The inclusion of these individuals could probably generate more data. Furthermore, this study was conducted in Lagos State, one of six states in the country's geopolitical zones. More findings could have been obtained from other states if they were included.

However, the study included an adequate number of HBPs with two main areas involved in managing reproductive-aged individuals with diabetes, along with core professionals to gather rich data that strengthen the rigor of the study's findings. Another strength of the study lies in the research design, which was appropriately chosen to explore the conceptual idea of the prosperous provision of PPC to mitigate unfavourable diabetes-related complications. The provision of PPC assists in achieving the Sustainable Development Goals [SDGs] 3, 5, and 10, which aim to ensure healthy lives and promote well-being for all, achieve gender equality, and reduce inequalities, respectively.

6. Conclusion

The study highlighted the significance of Pre-pregnancy Care (PPC) and the factors that would facilitate its integration PPC into Nigeria's healthcare system. PPC is an intervention that addresses the adverse effects of diabetes-related pregnancy complications. Therefore, it is crucial to proactively incorporate it into existing diabetes care for pregnant women to align with global best practices, as evidenced by the perspectives of health birth professionals (HBPs) interviewed during the research. The study emphasized the clinical significance of PPC for women with diabetes, the need for pregnancy-intention screening among diabetic women, making PPC a standard of care for women with diabetes, raising awareness, and the enablers of PPC. However, acknowledging the limitations of this study for HBPs, future research could aim to include childbearing women with diabetes to determine whether additional insights into PPC can be gained beyond those reported in the current study. Undoubtedly, this research adds to the existing literature on healthcare professionals' perception and strategies of establishing PPC for childbearing women with diabetes in Nigeria. This study's findings underscore the importance of providing PPC for women of childbearing potential living with diabetes, as it is key to improving obstetric outcomes and reducing the risks associated with diabetes in pregnancy. It would also be beneficial for leaders at various levels of healthcare institutions to seek the necessary regulatory approvals from the Nigerian government to establish PPC.

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Conflict of Interest

None of the authors has any conflict of interest

Abbreviations

PPC: Pre-Pregnancy Care; PCC: Preconception Care; HBP: Health Birth Professionals; DM: Diabetes Mellitus; LUTH: Lagos University Teaching Hospital; LASUTH: Lagos State University Teaching Hospital; LASUCOM: Lagos State College of Medicine; PADI: Preconception and Diabetes Information; NICE: National Institute for Health and Care Excellence; SDGs: Sustainable Development Goals; MBBS: Bachelor of Medicine and Bachelor of Surgery; MBBS +: Additional qualification to MBBS; RN: Registered Nurse; RM: Registered Midwives; BNSc: Bachelor of Nursing Sciences; BNSc+: Additional qualification to BNSc; CNO: Chief Nursing Officer; ADNS: Assistant Director of Nursing Services.

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