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Epidemiology of Diabetes among people with infertility issues in Delta North, Delta State Nigeria: Study methodology

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Abstract

This study adopts a descriptive cross -sectional analytic design to investigate the epidemiology of diabetes mellitus (DM) among individuals with infertility attending fertility clinics in Delta North, Delta State.

Data will be collected using appropriate structured questionnaires and analysed using appropriate descriptive, inferential statistical methods. The essence of the study is to provide evidence that will contribute to improved understanding, prevention and management of DM among individuals with infertility.

The study objectives are to determine the prevalence of DM, identify the determinants of infertility, examine the sociodemographic characteristics of the study participants and determine the correlation between DM and the determinants of infertility among participants of the study

Keywords: Diabetes mellitus, infertility, research methods

Introduction

Diabetes is a chronic disease marked with persistent hyperglycemia in which if not controlled reduces life expectancy (Ezzatvar, 2025). Diabetes mellitus is a complex metabolic disorder characterized by prolonged hyperglycemia (Banday 2020). It is a public health problem affecting millions of people worldwide (Al-Lawati, 2017). Inadequate glycemic control erupt complication like subfertility which mostly is due to hormonal disruption, nerves damage and blood vessels destruction (Zaimi, 2024).

Objective: To study the prevalence of diabetes among people with infertility issues in Delta North, Delta state, Nigeria. Specific objectives include

1. To determine the prevalence of diabetes mellitus among those with infertility issues attending fertility clinics.
2. To identify determinants of infertility among couples attending fertility clinics in Delta North area, Delta state.
3. To determine the correlation between diabetes mellitus and determinants of infertility among the study participants
4. To determine the socio-demographic variables among those with infertility issues.

Research Question

1. What is the prevalence of diabetes mellitus among those with infertility issues attending fertility clinics?
2. What are the determinants of infertility among couples attending fertility clinics in Delta North area, Delta state?
3. Is there any correlation between diabetes mellitus and determinants of infertility among the study participants?
4. What are the socio-demographic variables among those with infertility issues?

Research Hypotheses – Null hypotheses (HO)

1. There is low prevalence of diabetes mellitus among those with infertility issues attending fertility clinics.
2. There is no correlation between diabetes mellitus and determinants of infertility among the study participants.

Background information

Diabetes is a public health problem, which is due to persistent elevation of blood glucose level, can lead to health complication and can be associated with changes occurring in blood vessels lifestyle factors (Omolaoye, 2018). Diabetes has been considered one of the diseases that pose health threat to the public due to its prevalence (WHO, 2024). The persistent eviction of blood glucose level causes lots of harm to the human body. According to a study, an andrological education, and its effect found out that diabetic patient showed a higher risk of becoming infertile (Conderelli,2018)

Diabetes is a global public health problem with high mobility and mortality, this is due to its systemic complication (Lotti, 2023). DM is a chronic metabolic disease, the prevalence is gradually increasing; there are currently more than 500 million people living with diabetes mellitus worldwide according to international Diabetes federation and there is a growing awareness of the relationship between unhealthy lifestyle, unhealthy diet sedentary life and infertility (Grazian, 2024).

Diabetes mellitus is considered in the differential diagnosis of menstrual abnormalities and infertility (Livshits, 2009). In women, during the reproductive age, there has been relationship between diabetes and menstrual abnormalities like oligomenorrhea and secondary amenorrhea (Livshits, 2009). The complex pathophysiological changes caused by diabetes may cause male infertility by inducing hypothalamic-pituitary- gonadal axis dysfunction, spermatogenesis disorder, maturation disorder, testicular interstitial cell damage and erectile dysfunction (Huang, 2024). The main cause of infertility in couple of reproductive age with diabetes mellitus (DM) are caused by chronic hyperglycemic which trigger pathological condition that leads to disorder in the reproductive system (Anna,2023). Approximately one in six people of reproductive age worldwide will experience infertility during their life time according to WHO (WHO, 2024). Infertility affects the birth rate and most time cause a breakdown in family relationship; occurs in 10-15% of all marriage worldwide, 55-60% of cause in female; 40- 45% cases in male and chronic hyperglycemia leads to the development of complication of diabetes example decrease infertility, affects other organs and systems leading to deterioration of the quality life (Anna,2023). Diabetes is a complex metabolic disorder characterized by prolonged hyperglycemia (Glazer, 2017). In a study, register record base, male factor infertility was

associated with a higher prevalence of DM among men with insulin resistance, obesity, diabetes mellitus, hyperinsulinemia, correlate with polycystic ovary syndrome (PCOS) thereby contribute to the complication which leads to subfertility (Prosperi, 2025)

The study protocol

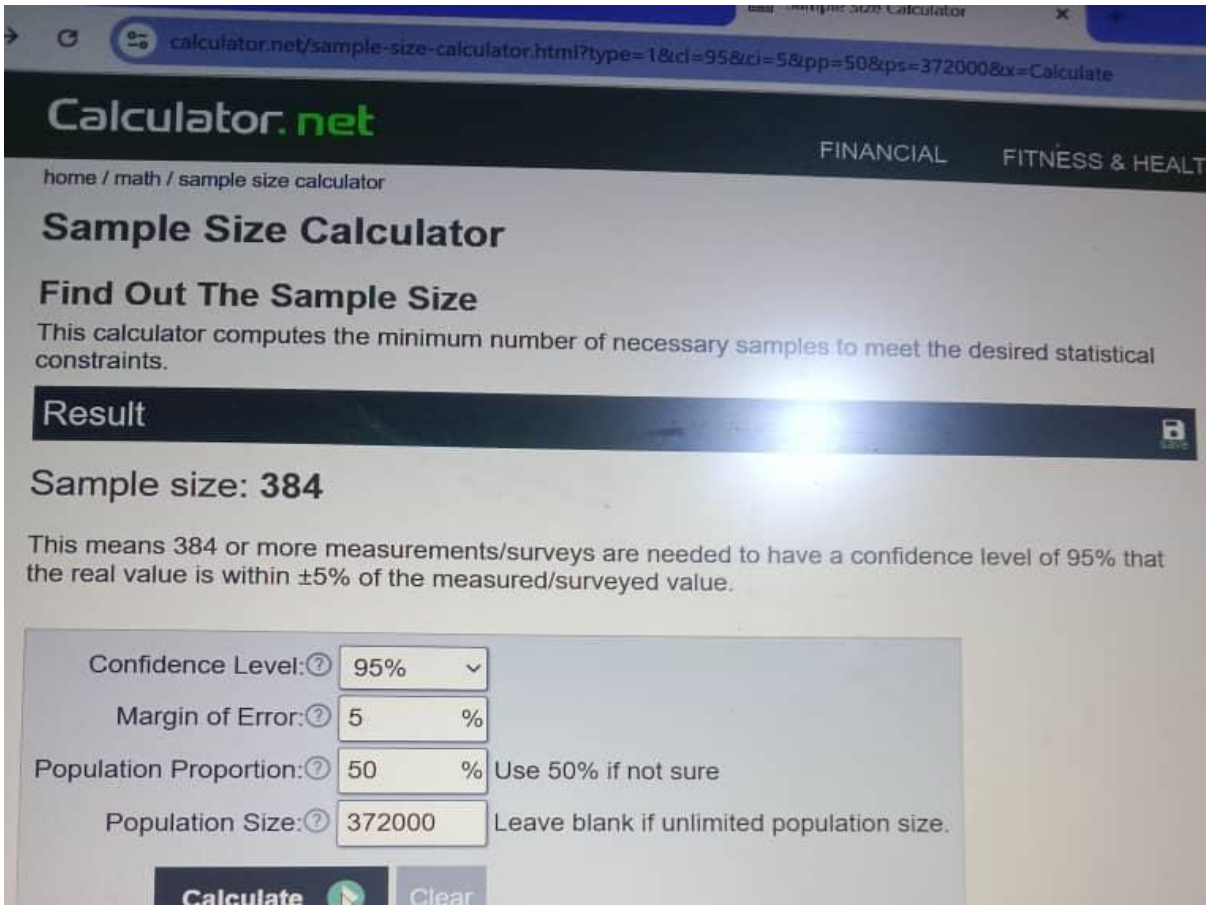
Study Design: The study was designed to be cross - sectional analytical and descriptive method in nature. Cross- sectional will be used to estimate the prevalence of the condition. This study approach was adopted from (Wang,2020).

Study Area: The study area is Delta North senatorial area in Delta State. Delta state is one of the states in south-south region of Nigeria, was created 2th August 1991.It has 25 local government area, an oil producing state. Delta state shares boundary with Bayelsa state to the south, Ondo state to the north West and Anambra state in the east and Edo state to the north. The state has a total land area of approximately 17,698 square kilometers. The capital of Delta state is Asaba; other important cities in the state are Warri, Ughelli, Agbor and Sapele. It has diverse ethnic group which include Urhobo, itsekiri, Isoko, Ijaw, Igbo. All these ethnic groups have its own language and culture. Delta State consist of three senatorial area Delta north, Delta central, Delta south senatorial districts. Delta North consists of nine LGA, they are oshimili south, oshimili North, Aniocha South, Aniocha North, Ika south, Ika North East, Ndokwa West, Ndokwa East, and Ukwani Local Government Area (LGA) in Delta state. Delta state has invested much in education, many more universities has been instituted, in addition to the old one.

Study Population: The population of study involves individual that attends fertility clinics in health facilities in Delta North, Delta state, Nigeria. The reason of choosing these population is because it will help to ascertain to what extent the complication of diabetes can expose one to infertility.

Sample Size Determination: The sample size is calculated by using Raosoft .it is a tool used by researchers to determine sample size. Raosoft calculator is used in survey research to determine the number of participants needed to achieve a desired level of accuracy (McCrum-Gardener 2010)

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Ethical Considerations and approval: This study ethical standards like informed consent, confidentiality, ensuring anonymity, avoidance of data fabrication, plagiarism will be observed.

Four core principle to be maintained are- Beneficence (must work in the best interest of participant), non-maleficence (avoid action that could cause physical, psychological or social harm), Autonomy (respondent have a right to participate in the study or not to), Justice (equality in treatment of all participant) (Artal, 2017). Ethical approval will be collected from Novena University, hospital management board and tertiary health facilities to enable effective data collection.

Inclusion criteria: The inclusion criteria include individuals of reproductive age 15 to 49 having fertility issues who are residents in the study area and are willing to participate. It is the key feature of the target population.

Exclusion criteria: These include individuals below and above reproductive ages, those that are unwilling to participate and pregnant women. It also includes features of the potential study

participant, who meet the inclusion criteria but present with additional characteristic that could interfere with success of the study e.g. those that can provide inaccurate data (Patino 2018) ***Sampling procedure/ techniques***: There are two main type of sampling method probability sampling, each has equal chance of being selected and non-probability in which the selection is not random (Spolarich A et al 2023). In this study systemic sampling will be used.

Instrument for data collection: The instrument for data collection will be on structured questionnaires with the title epidemiology of DM among people with infertility issues in Delta North Senatorial District. Close-ended questions and Likert scale will be used.

Reliability and validity: This data collection method was adopted from peer-reviewed published works (Alfahhad, 2024), he used questionnaire to obtain information on the prevalence and associated risks factors of infertility among patients with infertility. The peer-review publication constitute evidence of being reliable and validated.

The data/variables: Section A will be on demographic variable including Age, sex, duration of marriage, educational level, marital status and occupation. Section B will be on questions to determine prevalence of DM among people with infertility issues. The survey questionnaires will be used in the health facilities in Delta North, Delta state, Nigeria. Qualitative and quantitative data will be collected through the use questionnaires among individuals with infertility to gain a deeper understanding and elucidate the prevalence of DM and infertility.

Specific Objectives

1. To determine the prevalence of diabetes mellitus among those with infertility issues attending fertility clinics.
2. To identify determinants of infertility among couples attending fertility clinics in Delta North area, Delta state.
3. To determine the correlation between diabetes mellitus and determinants of infertility among the study participants
4. To determine the socio-demographic variables among those with infertility issues

Data collection Procedure: The procedures for the collection of data in this study will be administration of questionnaires by the researcher to the respondent. Explanation will be offered and the questionnaire will be collected after few hours.

Method of statistical data analysis: Information from questionnaires will be used to determine the prevalence of DM among people with infertility in Delta North, Delta state. The data will be analyzed using statistical methods. Descriptive statistics will be used to summarize the characteristics of the study population; while inferential statistics will be used to examine the relationship between DM and infertility (Table 1).

Table 1: Specific research objectives and proposed statistical methods

	Specific objectives	Data section	Statistics
1	To determine the prevalence of DM among couples with infertility attending fertility clinics	B	Descriptive
2	To identify determinants of infertility among couples attending fertility clinics in Delta North	C	Inferential
3	To determine the correlation between DM and determinants of infertility among the study participants	C	
4	To determine the sociodemographic variables among individuals with infertility issues	A	Descriptive

Conclusion

Diabetes is a chronic health problem with increased morbidity and mortality if not well managed. Its complication destroys organs and system due to damage to the blood vessel and nerves. Adequate control of the blood glucose level reduces diabetic complication and increases fertility. Again, since DM affects human reproductive system, it is necessary that people are informed about the risk factor which contribute to infertility.

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