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Prevalence of Gestational Diabetes in Hospitals in the City of Lubumbashi in the Democratic Republic of Congo: Case of the Jason Sendwe General Reference Hospital in 2015 to 2019

Kikunda Ghislain[a*], André N. Kaseba[b], Cyrille M. Kabongo[c], Aly Antoine Kamano[d], Salif Traoré [e], Muse K. Eulethère[f], Mashini Ngongo Ghislain[g]

[a]*Email: andrekaseba86@gmail.com*

Abstract

Gestational diabetes is defined as a carbohydrate tolerance disorder leading to hyperglycaemia of varying severity, occurring or first diagnosed during pregnancy, regardless of the treatment required and the course of the postpartum period. Its prevalence has been estimated at between 2.2% and 8.8% of pregnancies, depending on the populations studied and the screening criteria used. We determined the prevalence of gestational diabetes at the Jason Sendwe General Referral Hospital. A descriptive cross-sectional study was carried out from January 2015 to December 2019 at Sendwe Hospital. It concerned 48 pregnant women from 24 weeks of pregnancy. The diagnosis of gestational diabetes was made by blood glucose obtained with the O'Sullivan test or by fasting blood glucose. The prevalence of gestational diabetes was 2.15%. Modifiable and non-modifiable factors associated with gestational diabetes in this study are age ≥ 35 years, parity, history of macrosomia, and history of type 2 diabetes in the surrogates of the pregnancies. The prevalence rate remains high and shows that gestational diabetes is a public health problem in the city of Lubumbashi. The O'Sullivan test is a valid alternative for its good detection. We found that age, especially after 35 years is the major determinant of gestational diabetes in the population living in Lubumbashi.

Keywords: Prevalence; gestational diabetes; General Reference Hospital; Lubumbashi; DRC.

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* Corresponding author.

1. Introduction

Gestational diabetes is defined as a carbohydrate tolerance disorder resulting in hyperglycemia of varying severity beginning or for the first time during pregnancy [1]. It is associated with increased maternal and fetal morbidity which can be reduced by early management[2]. Diabetes completes 2-5% of all pregnancies, with 90% of cases represented by Gestational Diabetes (GD)[3]. In 2019 the worldwide prevalence of GDM was estimated between 2 to 6% and these figures tended to increase over time due to certain changes in the dietary habits of patients, the increase in the average maternal age during pregnancies as well as as an increase in body mass index (BMI) [4]. In Africa, several studies affirm that statistics on the frequency of this pathology are difficult to obtain for several reasons including the lack of materials, the lack of training in the field of statistics and others [5.6]. The main risk factors are overweight, age, ethnicity, first degree family history of type 2 diabetes, obstetrical history of GDM or macrosomia, polycystic ovary syndrome [7]. Uncontrolled hyperglycemia is a well-known source of maternal and fetal complications, whether short or long term [8]. It is in this context that the National College of French Obstetrician Gynecologists (CNGOF) and the French-speaking Diabetes Society (SFD) published in 2010 recommendations concerning screening for gestational diabetes [9]. The experts have the choice of screening targeted at women at risk with a determination of fasting glycaemia in the first trimester and, in the event of negativity, hyperglycaemia induced orally by ingestion of 75 g of glucose (OGTT) between 24 and 28 weeks of amenorrhea (SA). Fasting glycaemia in the first trimester has also been proposed to detect diabetes prior to unrecognized pregnancy (glycaemia ≥ 1.26 g/l), but also to define the concept of DG discovered early in the event of glycaemia in the first quarter between 0.92 and 1.26 g/l [6].

2. Methods

Type and setting of study

A cross-sectional descriptive study, carried out from January 2015 to December 2019 at Sendwe Hospital in Lubumbashi in the Democratic Republic of Congo.

Study population and data sources

The target population is all pregnant women who attended prenatal consultations at Sendwe Hospital and who were diagnosed with gestational diabetes between 2015 and 2019. The data was taken from the curative consultation registers of the Gyneco-Obstetrics department in Pavilion VI and on the medical records of pregnant women. The scope of comprehensive data collection was from January 01, 2015 to December 31, 2019.

Sample size

We used a quantitative approach in this analysis. Only data from pregnant women having been recorded during the study period, i.e. 48 pregnant women, according to the inclusion and exclusion criteria below were included in this study: Inclusion criteria: all pregnant women in whom the calculation ofage gestational been done, pregnant with the result of glycemia obtained with the O'Sullivan test or by fasting glycemia; pregnant

havingfollow-up care during the study period. Non-inclusion criteria: all pregnant whose information was incomplete on the medical records and those detected outside the study period.

Statistical analyzes

The statistical analyzes were carried out using the Stata software in its 16th version and Microsoft Excel 2018 and we used the usual statistics to describe the population and calculate different frequencies.

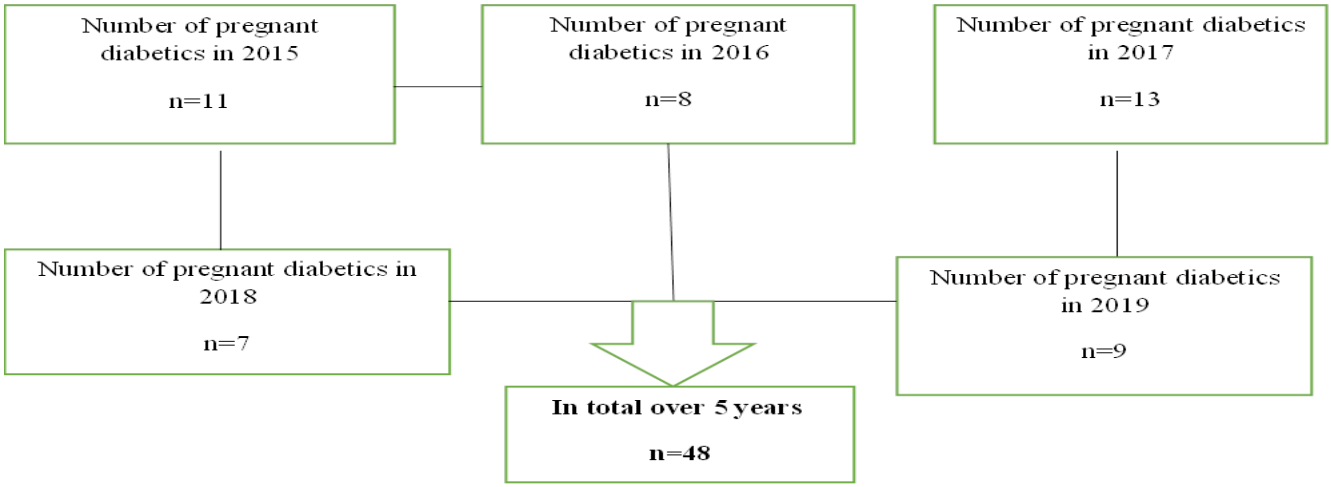

Figure 1: Sample Flow Diagram**.**

Study variables

The following variables were included in the data analysis, among others: age, history of type 2 diabetes, history of macrosomia, diagnostic test, treatment, fetal outcome.

3. Results

Sociodemographic characteristics of the populations studied

Table I: Distribution of pregnant women according to age groups.

Age(years)	Workforce(n)	Frequency (%)
25-29	7	14.58
30-34	7	14.58
35-39	26	54.17
40-45	8	16.67
Total	**48**	**100**

This table I shows the extreme ages which are 25 and 45 years old, GDM is observed in 54.17% of cases in pregnant women aged 35 to 39 years old.

Overall prevalence of gestational diabetes

We have 48 pregnant women among 2232 cases diagnosed with gestational diabetes during our study period, representing a prevalence rate of 2.15%.

Table II: Distribution of pregnant women according to parity.

Parity	Workforce(n)	Frequency (%)
5	36	75
<5	12	25
Total	**48**	**100**

The distribution of pregnant women according to parity shows a clear predominance of 75% among those with a parity greater than or equal to 5.

The distribution of pregnant women according to the history of type 2 diabetes shows a clear predominance among those with diabetic heredity (Figure 2).

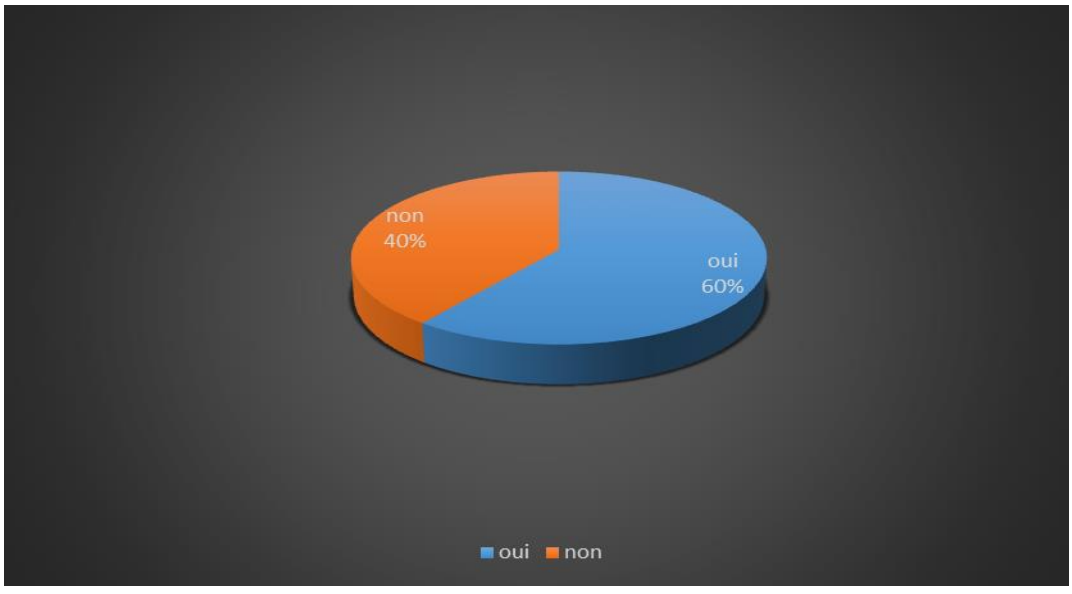

Figure 2: Distribution of pregnant women according to history of type 2 diabetes.

The distribution of pregnant women according to the history of macrosomia shows a predominant pattern among those with a history of macrosomia, i.e. 56% (Figure 3).

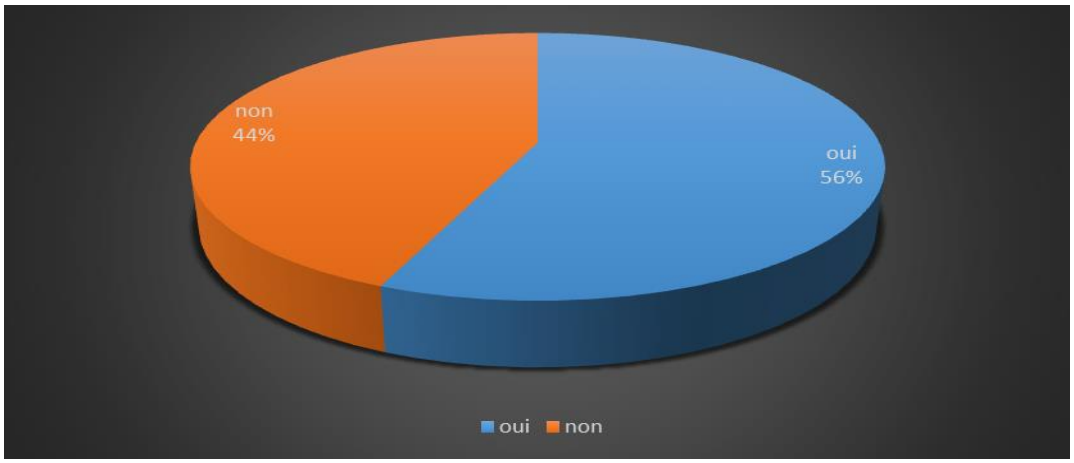

Figure 3: Distribution of pregnant women according to history of macrosomia.

Table III: Distribution of pregnant women according to diagnostic test.

Diagnostic tests	Workforce(n)	Frequency (%)
By fasting blood glucose	11	22.92
By O'sullivan's test	37	77.08
Total	**48**	**100**

This table shows a predominance of 77.08% among those interpreted by O'sullivan's test.

Table IV: Distribution of pregnant women according to the treatment received.

Treatments	Workforce(n)	Frequency (%)
Any	5	10.42
Insulin and Hygieno-dietary Measures	9	18.75
insulin therapy	19	39.58
Hygieno-dietary measures	15	31.25
Total	**48**	**100**

This table shows a 39.58% predominance of insulin therapy as the type of treatment administered.

Table V: Distribution of newborns according to their outcomes.

Categories	Workforce(n)	Frequency (%)
Eutrophic	9	18.75
Macrosome	33	68.75
Premature	6	12.50
Total	48	100

From this table, a 68.75% predominance of macrosomes is retained.

4. Discussion

Sociodemographic variables of pregnant women

The majority of pregnant women were between 35 and 39 years old, i.e. 54.17%. The average age was 36 years with the extremes of 25 years and 42 years. This result is approximate to that found in the study reported by Lydia and his colleagues in 2018[10] who found an average age of 35 years against Kamelia Amazian and his colleagues in Morocco in 2018 [6] found an average age of 28 years. Our finding in this study is that the result is superior to that of Kamelia A. and his colleagues, the explanation for our results would be the late detection of this pathology in our environment.

Prevalences

The results of our study estimate an overall prevalence of GDM at 2.15% among all women screened in Lubumbashi hospitals in the DRC from 2015 to 2019. However, previous studies show that the prevalence of GDM is difficult to determine with accuracy and is highly variable from study to study [11]. In Metropolitan France in 2012, the study by N. Regnault and his colleagues had estimated the prevalence of GDM at 8% [12]. The same year, the study by Anne Yambergue and his colleagues who found a prevalence between 2 and 6% [13], while Bouyoucef and his colleagues in 2015 estimated a prevalence in their study at 14% [14]; In Senegal, a study conducted between 2013 and 2014 in Dakar by A. Leye and his colleagues found a hospital prevalence of GDM at 30.1% [15]. Our results are lower than those of the latter probably because of our small study sample, the overall prevalence of diabetes in the DRC and also the screening method we used.

Studies show that several risk factors explain GDM in women, including being overweight with a BMI ≥ 25 kg/m2 before pregnancy, age ≥ 35 years, first degree family history of diabetes type 2 (siblings and parents] and

personal history of gestational diabetes or macrosomia [16]. In our study, with regard to the family history of diabetes, the majority of pregnant women, ie 60%, had a family history of diabetes; this result corroborates with that of Lydia and his colleagues in 2018 who found in his study a family history of diabetes at 66.66% [10]on the other hand, the study carried out by Adrien D and his colleagues 2019 [17]found 10.3%; our results are superior to those of the latter. This difference could be explained probably because of the increase in the rate of diabetes mellitus observed in the developing country in recent years from 2012 to 2019 [18].

Regarding the history of macrosomia, the result of our study shows that the majority of pregnant women, i.e. 56%, had a history of macrosomia, this result is higher than those found by Adrian D and his colleagues 2019 [17] who had estimated 25.7% and Kamelia Amazian and his colleagues in Morocco in 2018 [6]who found 14%. With regard to parity, the result showed a majority, ie 75%, of GD in pregnant women with a parity greater than or equal to 5. This result is approximately equal to that of Mimouni Zerguini and his colleagues in 2019 [19] who found a multiparity greater than or equal to 5 years at 69.3%, as well as that of Addi and his colleagues in 2011 [20] who found in their study 68.6% of multiparous greater than or equal to 5. Regarding the diagnostic test, the majority of pregnant 77.08% were started with the O'sullivan test. This result agrees with those of Lydia and M. Janin and his colleagues in 2018 who found a majority with the O'sullivan test [1.10]. This result surely corroborates because the O'sullivan test is the most recommended. With regard to management, the majority of pregnant women, ie 39.58%, received insulin as treatment, this result corroborates with that of Lesire and his colleagues in 2019 [21] who found the majority, ie 38% of pregnant women undergoing insulin therapy and that of Sebai and his colleagues in 2017 who found a use of insulin at 40% for the management [22]. Our results certainly support this because insulin is the most widely used and effective treatment. With regard to the fetal outcome, the result of our study showed a majority, i.e. 68.75%, of macrosomia. This result is higher than that ofLydia and his colleagues in 2018 [10] who had found the majority or 53% of macrosomia. On the other hand, the study on the DG conducted in 2016 in France [23.24] found 21.8% macrosomia. Our result is higher than that of this study, certainly because of the non-compliance with therapeutic regimens observed in our environment.

Study limitations

Despite the methodological rigor used in the primary data collection and secondary data analysis, this study has a number of limitations. First, the data used for analysis in this study come from a cross-sectional survey which generally has its limitations. Therefore we cannot conclude thata causal imputation to the various factors found to have a GDM. Secondlythe sample collection and analysis techniques used may have errors that influence the results and may therefore be subject to bias. Thirdly we would have liked to calculate the body mass index but for fear of having inaccurate values this was not done, moreover our study is confronted with a lack of certain parameters on the sheets such as: height and weight . However, these limitations do not affect the validity of the results of this study, because it was conducted with methodological rigor serving to minimize other possible biases.

5. Conclusion

At the end of our study on the prevalence of gestational diabetes in Jason Sendwe General Reference Hospital, the overall prevalence of GDM remains non-negligible. The most found age group was 35 to 39 years. Ensuring that all pregnant women have access to quality screening throughout pregnancy is essential to ending preventable maternal deaths related to GDM. Our results suggest that quality improvement strategies at the facility levelJason referenceSendwe are needed to impact the entire continuum of care. There is a need for multifaceted interventions taking into account the determinants of GDM which is a living problem in Lubumbashi.

Abbreviations: CNGOF: National College of French Obstetrician Gynecologists; **CEO:**Gestational Diabetes,**OGTT:**Post-prandial hyperglycemia, **BMI:** Body Mass Index, HGR: General Reference Hospital, WHO: World Health Organization, DRC: Democratic Republic of Congo, SA: Amenorrhea Week, SFD: French Diabetes Society.

5. Thanks

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6. Corresponding author

andrekaseba86@gmail.com

7. Author contributions

Study design and tools: ANK, CK, GK, analysis and interpretation: ANK, AAK, RD, MKE, MNG, manuscript: all. All authors have read.

8. Ethical approval and consent to participate

Ethical approval was obtained from the entire core team who provided written informed consent before participating.

9. Competing interests

The authors declare that they have no competing interests.

10. Author Details

1 Faculty of Medicine, University of Lubumbashi, Democratic Republic of Congo

2 School of Public Health, University of Lubumbashi, Democratic Republic of Congo

3 Ministry of Health and Public Hygiene, Conakry, Republic of Guinea

4 Ministry of Health, Ouagadougou, Burkina Faso

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