Original Article
IASR Journal of Medical and Pharmaceutical Science
Website: https://iasrpublication.com/ijmps
ISSN(*online*): 2582-9343

Epidemio-clinical Profile of Gestational Diabetes in two Reference Hospitals of Yaoundé, Cameroon

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A B S T R A C T
Gestational diabetes (GDM) is defined by the World Health Organization (WHO) as any degree of glucose intolerance, beginning or diagnosed during pregnancy for the first time. The global prevalence of GDM is reported to be as high as 20%. This is why we initiated the present study. The main objective of this survey was to investigate the Epidemiological profile of women with GDM in two referral hospitals of Yaoundé, Cameroon. This was an observational study with descriptive longitudinal historical design, conducted at the Yaoundé Central Hospital (YCH) and the Yaoundé Gynaeco-Obstétric and Pediatric Hospital (YGOPH). The Study period was from January 2018 to January 2020 and the duration of the investigation was 7 months. Data was analyzed using SPSS software (Statistical package for the social Sciences) version 20. A total of 34 pregnant women with GDM were identified out of 652. The overall prevalence of GDM was 5.2%. The Mean age of these women was 31.8±4.4 years. Most women were multiparous(15: 44.0%).Majority (21: 61.6%) were followed by both gynecologist and endocrinologist. Known cardiovascular risk factors found were mainly smoking (34: 100%), low sports practice (20:58%)and family history of diabetes (21: 61.1%), with first degree predominance 17 (80.5%).The first antenatal consultation (ANC) in average was at 12±2.5 weeks. Most women were symptomatic with cardinal syndrome comprising polyuria (32: 94.2%), polydipsia (22: 64.1%) and polyphagia (21: 61.6%). Majority (25: 73.3%) were managed with Insulin.GDM is prevalent and a major public health problem in our milieu. There is need for systematic screening to prevent adverse perinatal outcomes.

Keywords: *Gestational diabetes; Epidemiological profile; Yaoundé .*

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INTRODUCTION
Gestational diabetes mellitus(GDM) is defined by World Health Organization (WHO) as any degree of glucose intolerance recognized for the first time during pregnancy[1]. GDM is one of the most frequent complications during pregnancy[2]. A report published by International Diabetes Federation (IDF) states that one in seven births might be affected by GDM[3]. The Prevalence of GDM varies in different populations and is highly dependent on the screening and diagnosis strategies used. Gestational diabetes is prevalent, affecting about 16.4-20% women globally[4-6]. The rising of both maternal age and rate of overweight/obesity leads to an escalating number of GDM cases [7,8]. In a recent study it was concluded that the pooled prevalence of gestational diabetes in Africa was around 13.6% with the highest prevalence being in Central Africa and representing more than 20.4% of the total population[9]. Earlier studies carried out in Cameroon by Sobngwi et *al*. in 2010in six regions of Cameroon reported a 5 to 17% prevalence of GDM [10].

Gestational Diabetes Mellitus is associated with increased maternal and fetal morbidity, of which: pregnancy induced hypertension, preeclampsia, premature rupture of membranes, postpartum hemorrhage, increased risk of caesarean delivery and related complications[11-14]. Moreover perinatal mortality rates are as well increased among women with GDM[15]. On the other hand, fetal hypoglycemia and macrosomia are the most common adverse infant outcomes of GDM. Nevertheless, Infant macrosomia increases the risk of shoulder dystocia, clavicle fractures and brachial plexus injury and increases the rate of admissions to the neonatal intensive care unit [15, 16].Babies born to women with GDM have a greater risk of developing respiratory distress syndrome [15, 16].

Accumulating evidence links GDM with later emergence of obesity, type-2 diabetes and metabolic syndrome in the woman and her offspring, which are all known risk factors for cardiovascular disease. However, it is well recognized that lifestyle changes can reduce the risks of these adverse outcomes [17]. A number of studies have shown that women diagnosed early in pregnancy develop less complications. Several authors have proposed clinical risk-prediction scores

based on risk factors available early in pregnancy to identify women at high risk of developing GDM, and this can be made easier by epidemiological investigation[18, 19]. There is a paucity of Information on the epidemiological profile of women with GDM in our context. To the best of our knowledge, no earlier study in Cameroon had been consecrated to the epidemiological profile of women with GDM. This justifying the present survey.

METHODOLOGY

We carried outan observational study with a descriptive longitudinal historical design at the YCH and YGOPH, which are two reference, referral and university teaching hospitals in Cameroon. The study period was 2 years from January2018 to January 2020, and the duration of the study was 7 months (from November 2020 to June 2021). Data on socio demographic, clinical and therapeutic characteristics were collected from the files of women with gestational diabetes using a data collection sheet. Absolute and relative frequencies were calculated for qualitative variables. Parameters of central tendency and dispersion were determined for quantitative variables. These data were analyzed using Statistical package for the social Sciences(SPSS) software version 20.

RESULTS

A total of 34 pregnant women with gestational diabetes were identified out of 652 in both hospitals. We observed a 5.2% prevalence of GDM in CHY and YGOPH during the study period. The recruited women had as age range within 24-40 years with mean age of women with GDM being31.8±4.4 years with a median of 32(28;35) years. The region of origin of most women was the Center (18: 52.5%), followed by women from the west region (8: 23.5%). The majority of these women (21: 61.9%) were married. Secondary level of school education was the most common(20: 58.3%). The most represented profession was self-employment9 (41.2%) as summarized in Table I.

Table I: Socio demographic characteristics1

Variables	Women who had GDM(**N**=34)	
	n	%
Place of recruitment		
YGOPH	15	44.2
YCH	19	55.8
Age(ans)		
Extreme	Min=24; Max=40	
Mean	31,8±4,4	
Marital Status		
Married	21	61.9
Single	6	17.9
Divorced	2	5.9
Cohabitation	4	11.8
Widow	1	2.5
Level Of Education		
Primary	3	8.4
Secondary	20	58.3
University	11	32.3
Profession		
Student	3	8.8
Housewife	8	23.5
Self-employed	14	41.2
Employed	9	26.5
Religion		
Christian faith	32	94.1
Muslim	2	5.9
Residence		
Urban	34	100.0

Rural	0	0.0

The majority of the women with GDM were multiparous (15: 44.0%). Most of them had Body Mass Index (BMI) before pregnancy, falling in Grade II obesity as classified by WHO(39.4%). The mean Gestational Age (GA) at 1st Antenatal Consultation(ANC) was 12±2.5 weeks. The mean GA at delivery was 37.7 ±1.8. A great percentage (27: 79.2%) of women with GDM conducted their ANC at a 1stcategoryhospital, and were being followed by both gynecologist and endocrinologist (21: 61.6%).The details of women reproductive characteristics of GDM are given in table II and III.

Table I: Reproductive characteristics 1

Variables	Women who had GDM(N=34)	
	N	%
Type of Parity		
Primiparous	5	14.0
Pauciparous	6	17.6
Multiparity	15	44.0
Grand multip	8	23.4
Type of Gestation		
Singleton	34	100
Multiple	0	0.0
BMI Before		
18.5-24.9	5	15.5
25-29.9	12	36.5
30-34.9	9	27.5
35-39.9	5	39.4
≥40	3	9.1
BMI at first ANC		
18.5-24.5	0	
25-29.9	14	41.8
30-34.9	9	26.5
35-39.9	6	17.5
≥40	5	14.2
Past adverse Obstetrical Conditions		
Past History of GDM	1	2.9
Preeclampsia	6	15.6
Miscarriage	1	2.5
Others	4	11.5
None	22	64.5
History of a big Baby(3000-4000grams)		
Yes	19	55.8
No	15	44.2
History of Macrosomic Baby ≥4000grams		
Yes	14	41.8
No	20	58.2

Table III: Reproductive characteristics 2

	Women who had GDM(N=34)	
	n	**%**
Health Care facility where ANC was conducted		
Category 1 hospital	27	79.2
Category 2 Hospital	4	11.6
Category 3 Hospital	3	8.2
Was OGGT test done at 24-28 weeks		
Yes	34	100
No	0	0.0
Glycosuria on diagnosis		

Yes	33	97.6
No	1	2.4
Who followed up the pregnancy		
Gynecologist	12	35.0
Both(Endocrinologist and gynecologist)	21	61.6
Nurse	1	2.4
Age of Menarchy		
Extreme(min, Max)	Mix=10;max=16	
Mean(ET)	13(1,45)	
Abnormal Bleeding		
Menometrrhagia	1	2.4
None	33	97.6
Method of Contraception		
Implant	2	5.8
IUD	1	2.4
Pills	7	20.9
Condoms	4	11.6
None	20	58.3
Pathology in pregnancy		
Malaria	17	50.0
UTI	5	14.1
None	9	26.7
Others	3	8.2

Pastand family history enquiry revealed majority of women with GDM presented known cardiovascular risk factors such as smoking (34: 100%), low sports practice (20:58%) and family antecedents of diabetes (21: 61.1%), with first degree predominance (17: 80.5%). This is shown in table IV and V.

Table III: Past history characteristics 1

Variables	**Women who had GDM(N=34)**	
	n	**%**
Past History		
Diabetes		
Yes	0	0.0
No	34	100
HTN		
Yes	4	11.6
No	30	88.4
Alcohol		
Yes	1	2.4
No	33	97.6
Smoking		
Yes	34	100
No	0	0.0
Physical activity before pregnancy at least thrice a week		
Yes	14	41.8
No	20	58.2
Consumption of Vegetables		

Yes	32	94.2
No	2	5.8
Consumption of Fruits		
Yes	33	97.6
No	1	2.4
Excessive Consumption of sugar		
Yes	11	32.5
No	23	67.5

Table III:Family history characteristics

Variables	**Women who had GDM(N=34)**	
	n	**%**
Family History		
Are they diabetics in the family		
Yes	21	61.6
No	13	38.4
If Yes which family member		
1st degree relative	17	80.5
2nd degree relative	4	19.5
What type		
Type 1	14	41.7
Type 2	20	58.3
Family History of GDM		
Yes	0	0.0
No	34	100
Family History of HTN		
Yes	8	23.3
No	26	76.7

The Clinical characteristics showed33(88.3 %) women with GDM were symptomatic with cardinal syndrome comprisingpolyphagia (21: 61.6%), polydipsia(22: 64.1%), and polyuria (32: 94.2%) being the most frequent. The majority of the women 25(73.3%) were managed using insulin as an antidiabetic drug.

Table IV: Clinical characteristics.

Variables	**Women who had GDM(N=34)**	
	n	**%**
Symptoms		
Polyphagia		
Yes	21	61.6
No	13	38.4
Polydipsia		
Yes	22	64.1
No	12	35.9
Polyuria		
Yes	32	94.2
No	2	5.8
No signs and symptoms		
Yes	4	11.7

No	33	88.3
Antidiabetic Drug		
Insulin	25	73.3
Oral antidiabetic	1	2.4
Dietary Measures	7	20.9
None	1	2.4

In this survey 20 (58.3%) of women gave birth at term and 14 (41.7%) gave birth prematurely. The incidence of macrosomia in babies from women with GDM was 13 (38.4%) with Birth weight ≥ 4000g. This was followed by9(26.7%) being big babies with birth weight ranging within 3500-4000g above normal birth weights (2500-3000g). Pertaining to neonatal complications, 12 (35.9%) of the babies from mothers with GDM were hypoglycaemic (Glucose ≤ 40mg/dl). This was closely followed by 8 (23.52%) which were affected by neonatal infection.

DISCUSSION

The prevalence of GDM is said to vary from one geographic region to another. This is worth mentioning as diagnostic criteria used by most studies are not similar[20]. In effect, the overall prevalence of GDM in our surveywas 5.2%. This is similar to results from meta-analysis carried out in Europe which reported a continental prevalence as low as 5.4%compared to global estimation which is around 20% [21]. Such reduced prevalence in Europe could however be justified by high health care standards with accent on preventive medicine through population information, communication and education. On the other hand, a systematic review in Africa from studies carried out in six different countries reported prevalence of GDM ranging from 0 to 13.9% [22].Discrepancies in values recorded in the African continent may reflect differences in level of development between countries. This with consequent repercussion on living standards including life style, diet, poverty, and health care accessibility which may be appropriate in some countries and not in others [22]. Sobgwi et al in Cameroon conducted a survey on a wider population compared to ours. They reported a prevalence of GDM varying from 5-17% in 2010, within which our result falls[23]. This similarity may be due to identical population-based and context-related specificities. In facts, such findings may be reliable as no great prevalence variability occurred with changing sample sizes. However, Egbe et al reported a prevalence of 20% in a study carried out in three hospitals in the southwest region of Cameroon, butthis with marked differences of diagnostic approach and sample size[24].

There could exist an indirect association between advanced maternal age, multiparity and diabetes. In effect, in obstetrics, it is known that multiparity is a risk factor for the delivery of big babies and macrosomia. This is in turn a risk factors for the onset of diabetes in mothers. The fact that the majority of women with GDM were multiparous (44.0%) may be considered as corroborating with the said principle [25].Women recruited in our survey, presented well known cardiovascular risk factors such as smoking (100%), low sports practice (58%), obesity and family history of diabetes (61.1%) with first degree predominance (80.5%) which are predisposing. Most women were symptomatic with cardinal syndrome comprising polyuria (94.2%), polydipsia (64.1%) and polyphagia (61.6%) which are consistent with the clinical presentation of diabetes mellitus. Majority (73.3%) were managed with Insulin. Age maturity, level of education, and reduced occupational stress due to self-employment might have accounted for the prompt diagnosis, early, regular, specialized follow-up and management of women in order to reduce perinatal complications[26-31].

As a matter of fact, among women who had gestational diabetes in this survey, the majority (64.1%) gave birth through caesarean section This result is similar to those reported by ethridge et al in 2014 wherein 77.0% of women with GDM delivered through Caesaresn section[32]. More so a similar study conducted by stby muche et al in 2018 in ethiopia revealed a 67% incidence of caesarean delivery in such women [33].This is partly due to the fact that GDM increases the risk of perinatal complications among which macrosomia with dystocia, birth injury, vaginal lesions, pelvic related complications, neonatal infections, as well as metabolic disorders[34-39]. This therefore indicates the need for proper assessment of infants from mothers with GDM as early as during the few hours following delivery [40-42]. Women should also be continuously monitored and reassured to prevent complications due to stress-bound strenuous delivery process and/or caesarean section [43-45].

The retrospective nature of our survey implied we could not exercise control over the accuracy with which information concerning patients were collected and recorded. Issues related with thenon-systematic screening for GDM in our context, the absence glycated hemoglobin sampling and other important laboratory records necessary for disease prognosis were limitations to our investigations.

CONCLUSION

From the results obtained in this survey, it can be deduced that GDM is prevalent among women in our milieu, especially with characteristics such as advanced maternal age, multiparity, reduced sport practice, smoking and family history of diabetes. Such women are often symptomatic on admission with cardinal syndrome and polyuria at the front line of the clinical presentation. Their adequate management depends upon their availability and ability to understand the necessity for them of being regularly followed-up. This enables to reduce perinatal complications and permits prompt interventions with insulin therapy and later on caesarean delivery in case of necessity. However, reducing cardiovascular risk factors might be necessary for primary prevention, while elaborated complementary investigations seem necessary to improve the management, and the prevention.

Funding
Private.

Conflict of Interest
The authors declare that they have o competing interest.

Ethical Approval
the study was approved by the Institutional Ethics Committee.

Acknowledgements
Hospitals authorities, all collaborators to this project.

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