Research Article

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Factors Associated with Polycystic Ovary Syndrome at Yaounde Gynecological Obstetrics and Pediatric Hospital (HGOPY)

Ngo Um Meka Esther[1 2*], Foumane Pascal[1 2], Essiben félix[1 3], Fonkou Madjomo Arielle[4], Sobngwi Eugène[1 5] and Mboudou Emile[1 6]

[1]Department of Obstetrics and Gynecology, Faculty of Medicine and Biomedical Sciences (FMBS), University of Yaoundé I, Yaoundé, Cameroon.

[2]Department of Obstetrics and Gynecology, Yaoundé Gyneco-Obstetric and Pediatric Hospital, Yaoundé, Cameroon.

[3]Department of Obstetrics and Gynecology, Yaoundé Central Hospital, Yaoundé, Cameroon.

[4]Higher Institute of Health, Université des Montagnes, Bangangté, Cameroon.

[5]Department of endocrinology, Yaoundé Central Hospital, Yaoundé, Cameroon.

[6]Department of Obstetrics and Gynecology, Douala Gyneco-Obstetric and Pediatric Hospital, Cameroon.

[*]Corresponding author
Ngo Um Meka Esther, Department of Obstetrics and Gynecology, Faculty of Medicine and Biomedical Sciences (FMBS), University of Yaoundé I, Yaoundé, Cameroon, E-mail: estherum@yahoo.fr.

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Abstract

Introduction: *Polycystic ovary syndrome is a poorly understood condition in our environment. The aim of our study was to identify the factors associated with the polycystic ovary syndrome observed in women of reproductive age at the Gyneco- obstetric and Pediatric Hospital of Yaounde.*

Method: *The aim of our study was to identify the factors associated with Polycystic Ovarian Syndrome (PCOS) observed in women of reproductive age at the Yaoundé Gyneco- Obstetric and Pediatric Hospital (YGOPH). This was a case-control study. We compared on the basis of the Rotterdam criteria (Case), with 184 women PCOS-free (controls). The data was entered and analyzed using SPSS software version 20.0 and Epi Info 3.5.4. The error threshold was set at 5%.*

Result: *The factors associated with polycystic ovary syndrome in univariate analysis were: age under30 (OR: 5.69, CI: 2.71 - 11.94) a family history of polycystic ovary syndrome (OR5.69; CI: 2.71 - 11.94), irregular menstruation (OR 2.60, IC: 1,33 - 5.05), diabetes (OR: 2.69, IC: 1.36-5.29) infertility (OR: 2.68 IC: 1.38 - 5.20); The personal history of peri-pubertal obesity (OR:10.09, IC (4.83 - 21.06)); Have more than three meals per day (OR, 5.37, CI: (1.56 - 18.47)); Frequent consumption of fried foods (OR, 3.24, IC (1.55 - 6.76)); Consume tea regularly (OR: 4.54, IC (1.51-13.68)); And major obesity (OR: 4.20; IC: (2.26 -10.74)). After linear regression, the factors that remained significant were age below 30 years (OR: 5.70, CI: 2.17-15.00); the personal history of peripubertal obesity (OR: 4.68, CI: 1.79-12.20) and consumption of more than three meals per day (OR: 6.06 CI: 1.16 - 31.64).*

Conclusion: *Factors associated with PCOS at HGOPY are age of less than 30 years, history of obesity, and consumption of more than three meals per day.*

Introduction

Polycystic ovary syndrome (PCOS), also known as Stein-Leventhal syndrome, is one of the most common endocrine disorders in women of reproductive age, mainly responsible for infertility. It is poorly known due to the heterogeneity of its symptoms and is commonly under diagnosed because these symptoms seem not to be interrelated.

Its definition is based by several criteria, among which, those of the National Institutes of Health (NIH) of 1990, those of Rotterdam of 2003 [1]. and those of the Androgen Excess and PCOS Society of 2006 (AE-PCOS)]. However, the Rotterdam consensus in this study defines it as the association of oligomenorrhea with chronic anovulation, clinical and / or biological signs of hyperandrogenism and polycystic ovaries on ultrasound [1]. Two of the three criteria are enough for diagnosis.

Polycystic ovary syndrome is found in about 20% of women of childbearing age in a pelvic ultrasound examination, but less than 10% of them have the symptoms. Its prevalence varies from 6 to 14.3% in Europe and the USA [2]. While in sub-Saharan Africa it is 3% in Côte d'Ivoire, 21% in South Africa and 22% in the Democratic Republic of Congo [3-5]. In Cameroon, data on its prevalence are little known. It is one of the main endocrine pathologies responsible for infertility. Thus, multiple factors have been identified, notably genetic and environmental factors (food and lifestyle), and thus made it possible to build the college of scientists on the possible etiologies of this syndrom [6]. But the contribution of each of these factors to the occurrence and determinism of polycystic ovary syndrome remains little known in our countries.

Polycystic ovary syndrome is a public health problem. It has many consequences that can be ardiovascular (diabetes, high blood pressure) and psychosocial. It can be the source of stigma affecting the identity of women, mental health and quality of life [7]. The psychosocial aspect of this condition should also be taken into consideration. Aesthetically, hirsutism, acne and other skin problems can lead to mental disorders in some cases.

In view of the numerous health consequences and the low availability of major data in our environment, a better knowledge of the factors associated with this condition would improve its understanding and guide its diagnosis and management. Thus, this research was focused on the identification of the associated factors in women of childbearing age in Yaoundé showing polycystic ovary syndrom in order to understand the characteristics of these patients in their socio-demographic, clinical and anthropometrical profile compared to those who did not have this pathology.

Methodology

This was a case-control study. The Gynecology and Obstetrics department of the Yaoundé Gyneco Obstetric and Pediatric Hospital (YGOPH) is the framework of our study. It took place over 12 months, from November 2015 to November 2016.The sample population was of women of reproductive age received in consultation who, according to the Rotterdam criteria of 2003, had polycystic ovary syndrome and women who accepted to participate in the study after free and informed consent [8].

These Rotterdam criteria include

1. Oligo and / or chronic anovulation.
2. Clinical signs (hirsutism, acne, alopecia) and / or biochemical hyperandrogenism (elevation of testosterone or androstenedione).
3. Polycystic ovaries with no other etiology. Ultrasound signs: number of follicles ≥ 12 per ovary measuring 2-9 mm or ovarian volume greater than 10 ml (two of the three criteria required).

The case group consisted of patients with polycystic ovary syndrome according to the Rotterdam criteria of 2003 cited above. The control group included patients without polycystic ovary syndrome.We excluded pregnant women, postmenopausal women, women on hormone therapy and women who refused to participate in the study. The cases were chosen in a non-probabilistic and non-consecutive manner and for each case included, the four other patients received were considered as controls.

In order to ensure that the size of our sample is required for statistical analysis, the minimum size of the sample was calculated from the Schlesselman formulaAccording to Frank S, the prevalence of polycystic ovary syndrome is estimated to be 10% on average, and therefore those with no syndrome in the same population were estimated at 90% The minimum size required for this study was 15 for the case group and 60 for the control group [9]. The authorizations were obtained from the university and hospital authorities.

After obtaining the informed consent of the patient, a questionnaire was presented to the patient so that she participates in the survey through a face-to-face interview. Then she had the physical exam and had to present the results of her ultrasound of at least three months. After each case, the other four patients received were considered as controls and subjected to the same procedure.

The variables studied were:

Socio-demographic variables: age in years, marital status, ethnicity, occupation, level of education;

- **Personal background**:
  - **Neonatal**: birth weight, notion of infection at birth, notion of macrosomia.
  - **Medical**: personal history of diabetes, obesity, puberty, epilepsy, valproic acid intake, infertility.
  - Gynecological: menarches, duration of menstruation, duration of the cycle, pregnancy, parity, number of miscarriages
  - **Environmental**: mode of feeding by looking for the number of meals, frequency of consumption of green vegetables, fruits, processed starches, fried foods, cans, alcohol, tobacco, and tea. And the concept of regular physical activity.
- **Family history**: a family history of PCOS, a family history of irregular menstruation, a family history of diabetes, and a family history of infertility.
- **Clinical and anthropometric variables**: acne, hirsutism, alopecia, acanthosis nigricans; Weight, height, body mass index (BMI), waist circumference, hip size / hip circumference, abdominal circumference, and fasting blood glucose.

Data from the study were captured and analyzed using SPSS software version 20.0 and Epi Info 3.5.4. The tables were compiled using Microsoft Office Excel and Word 2013. The comparison of the variables was carried out using Chi square and Fischer tests. The error threshold α was set at 5% as statistically significant

for each variable studied. The association between the variables and the disease was based on the Odd Ratio expressed with its 95% confidence interval. Multivariate analysis was performed to eliminate confounding factorsDuring the study, 240 patients were eligible. But only 230 were considered including 46 cases and 184 controls that will be the subject of our analysis, a ratio of 1 case for 4 controls. Spaniomenorrhoea was the most common reason for consultation (54.35%), followed by oligomenorrhea (30.43%) and amenorrhea (10.87%). On physical examination acne was the most found at 67.39% followed by hirsutism at 54.35% **(Table 1)**.

Table 1:Clinical and paraclinical profile of women with PCOS

Variables		Numbers	Frequence (%)
Reason of consultation	Spaniomenorrhea	39	54.35
	Oligomenorrhea	14	30.43
	Amenorrhea	5	10.87
	Desir of pregnancy	2	4.34
Clinical Signs	Acne	31	67.39
	Hirsutism	25	54.35
	pelvic pains	12	26.09
	Acanthosis nigricans	4	8.70

The most common age at diagnosis of polycystic ovary syndrome was less than 30 years (OR: 5.69 (2.71 to 11.94) P = 0.000), with an average of 26 years **(Table 2)**.

The highest proportion of patients with polycystic ovary syndrome (45.7%) was single. There was no association between marital status and the presence of polycystic ovary syndrom. The personal history of peri-pubertal obesity predisposed to the onset of polycystic ovary syndrome. The presence of a parent with polycystic ovary syndrom, irregular menstruation, diabetes and infertility increased the risk of this disease occurring in the offspring.

Table 2:Variables Statistically Associated with PCOS

Variables	**Case N= 46 n(%)**	**Controls N= 184 n(%)**	**OR (IC at 95%)**	**P**
Age (years) < 30	35(76.1)	66(35.9)	5.69 (2.71-11.94)	**0.000**
Single	21(45.7)	89(48.4)	0.90 (0.47-1.71)	0.435
Personnal history : péri-pubertal obesity	33(71.7)	37(20.1)	**10.09 (4.83-21.06)**	**0.000**
Family history : Polycystic ovary syndrom	6(13.0)	0(0)	---	**0.000**
Family history : Irregular menstruation	22(47.8)	48(26.1)	**2.60 (1.33-5.05)**	**0.004**
Family history : Diabetes	20(43.5)	41(22.3)	**2.69 (1.36-5.29)**	**0.004**
Family history : Infertility	23(50.0)	50(27.2)	**2.68 (1.38-5.20)**	**0.003**

Having more than three meals a day exposed to the occurrence of Polycystic Ovarian Syndrom in women frequent consumption of fried foods triples the risk of developing polycystic ovary syndrome. The study also found that consuming tea frequently multiply by five the occurrence of polycystic ovary syndrome.

Although the majority of women have abdominal obesity (52.2%), we have not found an association with the occurrence of polycystic ovary syndrom. However, grade 2 and 3 obesity was a predisposing factor for polycystic ovary syndrom **(Table 3)**.

Table 3: Lifestyle of the study population

Variables		Case N= 46 n (%)	controls N=184 n (%)	OR (CI at 95%)	P
Number of meals per day	≤ 3	21(45.7)	100(54.3)	0.71 (0.37-1.35)	0.186
	> 3	6(13.0)	5(2.7)	5.37 (1.56-18.47)	0.010
Consumption of fried food per week	< 3	7(15.2)	28(15.2)	1(0.41-2.46)	0.578
	≥ 3	16(34.8)	26(14.1)	3.24(1.55-6.76)	0.002
Consumption of tea per week	< 3	7(15.2)	28(15.2)	1 (0.41-2.46)	0.578
	≥ 3	7(15.2)	7(3.8)	4.54 (1.51-13.68)	0.009
Obesity grade 2 and 3		16(34.8)	18(9.8)	4.20 (2.26-10.74)	0.000

After logistic regression, the factors associated with PCOS found in women were: age under 30, the personal history of peri-pubertal obesity and the consumption of more than three meals a day.

The age group most represented in our study was less than 30 years with an average age of 26 years emmanuellaDoh and al. In 2016 in Cameroon found a similar result [10]. Li and al in 2013 in China found that polycystic ovary syndrome occurs in women of very young age ($p < 0.05$) [11]. Ethnic, racial and even geographical differences could explain this slight difference. The young age can be explained by the fact that after puberty, the persistence of physiological hyperandrogenism will be responsible for the menstrual irregularity and other symptoms expressed at this young age [12].

The personal history of peri-pubertal obesity was strongly associated with polycystic ovary syndrome in our study, with a risk multiplied by 10.09. For several authors, the prevalences of peri-pubertal obesity and polycystic ovary syndrome would increase in parallel with adolescents [13, 14]. In the latter, hyperandrogenism is secondary to the insulin resistance observed during this period. This suggests that these girls are indeed at risk of developing the pathology later in their lives. As for eating habits, having more than three meals a day and frequently consuming fried foods multiplied the risk of developing this disease by 5.37 and 3.24 respectively. Mbuyamba and al in 2014 in the Democratic Republic of Congo and Shishegar F and al in 2016 found that having four meals a day and consuming foods rich in lipids were associated with the occurrence of this pathology. Indeed, having such a diet contributes to the development of the obesity that is incriminated in the occurrence of this pathology [15,16].

In addition, frequent consumption of tea was significant in the study for 15.2% of cases. However, Bao Shan and al in China in 2015 associated the occasional consumption of tea with this pathology [17]. Polycystic ovary syndrome is a complex genetic disease. We found in this study that having a parent having had this condition was strongly associated with its occurrence in the offspring. Emmanuella Doh and al in 2016 in Cameroon found that 21.4% of cases had a family history of PCOS [10]. Dunaif and al in 2016 show chromosome 11p14.1 as being common to European women with this pathology and appearing in their genealogical tree [18]. Trimèche and al in 2004 also highlighted the high incidence of PCOS in the relatives and mentioned the major role of the genetic component in the genesis of this syndrome [19]. In addition, Chen and al. in 2011 establish a familial connection with this syndrome and identify a particular genome related to this syndrome [20]. Hence the hereditary character highlighted. This could explain our results. This suggests that extensive studies should be conducted to detect the specific genes involved in the occurrence of this condition.

Having a parent with irregular menstruation contributed to the development of this pathology. Several authors find a similar result [17, 18]. The latter justified this by the fact that having a first-degree relative with irregular menstruation in her reproductive life contributed to an increased risk of developing this syndrome later in the girl (OR = 2.557) [21].

A familial history of diabetes was associated with polycystic ovary syndrome in the study. Bao Shan and al in 2015 identified it in 14.4% of cases, as did Emmanuella Doh and al in 35.71% of cases [10,17]. Roe and al in 2013 also found that this family history poses a significantly high risk of developing this pathology [22]. In addition, a family history of diabetes mellitus could influence the metabolic profile of the young girl and contribute to the onset of this pathology as described by Diamanti-Kandarakis and al [6].

The family history of infertility appears in the study as associated with this syndrome. Diamanti-Kandarakis and al in Europe in 1999 revealed a family predisposition for infertility in these women [4]. Tian and al in 2014 later reinforces it in the relationship of sterility between mother and daughter (OR = 8.598); which confirms the role of heredity in polycystic ovary syndrome [23].

Grade 2 and 3 obesity was strongly associated with this condition in the study [OR = 4.20 (2.26-10.74)]. Emmanuella Doh and al in Cameroon in 2016 report an insulin resistance in African women suffering from this pathology [10]. For the latter, obesity is a factor that aggravates insulin resistance, and the latter believes in parallel with the increase in adiposity [10]. Moreover, Legro RS in 2007 assumes the peripheral aromatization of androgens in obese women as being involved in this condition [24]. Thus, greater attention should be given to reducing excess adiposity as it will improve insulin sensitivity[10]. For Randeva and al, obesity is not the causative factor, but morbidity associated with the syndrome [25]. Therefore, the causal relationship between obesity and polycystic ovary syndrome is still discussed until now [26]. In view of this, obesity requires special attention from clinicians.

The frequent patterns of consultation were spaniomenorrhea followed by oligomenorrhea, amenorrhea and desire for conception. In 2014, the French Society of Endocrinology (SFE) reported spaniomenorrhea, primary amenorrhoea and secondary amenorrhea as the most common reasons [27]. While for Emmanuella Doh and al in 2016 in Cameroon, amenorrhea, spaniomenorrhea and infertility were the most encountered. [10]. on physical examination, the signs frequently encountered in the study were acne, hirsutism, acanthosis nigricans and pelvic pain. Emmanuella Doh and al in 2016 in Cameroon found hirsutism, pelvic pain and overweight [10]. The echographic characteristics of PCOS reported that most of our patients had both ovaries affected by dystrophy (80.43%); 89.13% more than 12 microcysts per ovary and an average ovarian volume of 17.21 ml, similar to those of Mbuyamba and and al in 2014 [15].

Conclusion

We found that the factors associated with polycystic ovary syndrome are: age under 30, personal history of peri-pubertal obesity, consumption of more than three meals per day.

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