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FREQUENCY OF THE SYMPTOMS OF POLYCYSTIC OVARY SYNDROME AND PREMENSTRUAL SYNDROME, RELATED TO ACADEMIC STRESS IN MEDICAL STUDENTS OF A PRIVATE UNIVERSITY IN PERU

FRECUENCIA DE LA SINTOMATOLOGÍA DEL SÍNDROME DE OVARIO POLIQUÍSTICO Y EL SÍNDROME PREMENSTRUAL, RELACIONADO CON EL ESTRÉS ACADÉMICO EN ESTUDIANTES DE MEDICINA DE UNA UNIVERSIDAD PRIVADA DEL PERÚ

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ABSTRACT

Introduction: Polycystic ovarian syndrome and premenstrual syndrome are prevalent. Objective: to determine the frequency of the symptoms of polycystic ovarian syndrome and premenstrual syndrome and its relationship with stress in medical students. **Methods:** Cross-sectional analytical study. The study population was 322 medical students from the first to the sixth year, chosen for convenience from a private university in Trujillo. Using a google form, the "SPM" questionnaire, "the SISCO inventory of academic stress", and "the polycystic ovary questionnaire" were applied; prior informed knowledge, it had the approval of the Bioethics Committee of the university. **Results:** The SOP presented a high probability of 5.28%, a medium of 46.58% and a low of 48.13%.The frequency of PMS at the levels, mild, moderate and high were 47.52%, 25.47% and 4 04% respectively.The levels of stress were: mild, moderate and deep of 4.35%, 65.22% and 30.43%, respectively.A highly significant association was found between stress and SPM, stress and PCOS, p = 0.000915106 and p= 1.8589E-25 respectively. **Conclusions:** The frequency of PMS, the high probability of SOP and the stress levels were high and there is a significant association between stress, SPM and SOP.

Keywords: Polycystic ovary syndrome, premenstrual syndrome, stress, medical students. (Source: MESH-NLM)

RESUMEN

Introducción: El síndrome de ovario poliquístico y el síndrome premenstrual son prevalentes. Objetivo: determinar la frecuencia de la sintomatología del síndrome de ovario poliquístico y del síndrome pre menstrual y su relación con el estrés en estudiantes de medicina. **Métodos:** Estudio analítico transversal. La población de estudio fue de 322 estudiantes de medicina del primer al sexto año , elegidas por conveniencia de una universidad privada de Trujillo. Mediante un formulario de google se aplicó el cuestionario "SPM", "el inventario SISCO del Estrés académico", y "el cuestionario sobre ovario poliquístico"; previo conocimiento informado, tuvo la aprobación del Comité de Bioética de la universidad. **Resultados:** El SOP presentó una probabilidad alta de 5,28%, media de 46,58% y baja de 48,13%. La frecuencia del SPM en los niveles, leve, moderado y alto fueron de 47,52%, 25,47% y 4,04% respectivamente. Los niveles de estrés fueron: leve, moderado y profundo de 4,35%, 65,22% y 30,43%, respectivamente. Se encontró asociación altamente significativa entre el estrés y SPM; estrés y SOP; p= 0,000915106 y p= 1.8589E-25 respectivamente. **Conclusiones:** La frecuencia de SPM, la probabilidad alta de SOP y los niveles de estrés fueron altos y existe asociación significativa entre el estrés, SPM y SOP.

Palabras claves: Síndrome de ovario poliquístico, Síndrome premenstrual, estrés, estudiantes de medicina (Fuente: DeCS- BIREME)

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INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is one of the most common metabolic and endocrine disorders in premenopausal women, of a heterogeneous nature; It is defined by a combination of signs and symptoms of androgen excess and ovarian dysfunction in the absence of other specific diagnoses. It is suggested that its etiology may be a complex multigenic disorder with strong epigenetic and environmental influences, including diet and lifestyle factors. It is frequently associated with insulin resistance, obesity, central obesity, metabolic disorders, and cardiovascular risk factors[1]. It significantly impacts women's quality of life and frequently increases the risk of long-term health complications, such as subfertility, Type 2 Diabetes Mellitus (DM2), metabolic syndrome, and endometrial cancer[2].

Premenstrual syndrome can present physical, emotional, metabolic and behavioral symptoms[3]. The difficulties in the quality of life of many women, becomes affected due to the presence of symptoms in the time before the menstrual period[4]. In large part, it is due to the hormonal changes found in this phase. These symptoms include inflammation of the breasts, the appearance of acne, weight gain, pain or general discomfort (especially headaches), increased appetite, irritable behavior and depression, sudden mood swings, among others.

There are several studies where the level of stress and the symptoms of polycystic ovary and premenstrual syndrome are related. According to studies conducted by a university in the Peruvian highlands on obstetrics students, this symptomatology and its prevalence due to premenstrual syndrome was 70%. Related to academic stress, it showed a high prevalence of this in students, which was 85%. This stress, at high levels, came to be appreciated in 71.1% of women with premenstrual dysphoric disorder (PMDD); while, at low levels, it only had an appearance of 28.9%. With this, stress is considered a significant factor in premenstrual dysphoric disorder[5]. It is considered important to study at the level of a private university in Peru the frequency of polycystic ovary symptoms and premenstrual syndrome together with their relationship with stress, considering that it affects the quality of life of university students, this being our main objective.

METHODS

This a cross-sectional analytical study, the sampling technique was non-probabilistic for convenience among the 6 years of studies according to statistics. The population consisted of 2136 medical university students from the Antenor Orrego Private University (UPAO). The sample size was calculated using the formula for a qualitative variable from a single population[6]; the size was adjusted to the total number of students. Assuming an estimated p-proportion of 0.5 and an I-precision index of 0.05; the minimum number necessary was 273, however 322 students were considered.

$$N = \frac{Za2\,P(1-P)}{i^2}$$

The selection criteria used were:
Inclusion criteria: Students enrolled in the 2022 school year, in the first semester from April to August at the UPAO, regardless of their origin. Also, ages 17-32 and apparently healthy. Exclusion criteria: Students who do not participate, fail to complete the survey, suffer from a chronic illness, or use hormonal contraceptives.

The variables considered were:
Premenstrual syndrome (PMS), an independent variable, encompasses a variety of symptoms that appear during the luteal phase of the menstrual cycle[7], it is characterized by including physical, cognitive, affective, and behavioral symptoms that occur cyclically during the luteal phase of the menstrual cycle and are They resolve at the onset or during menstrual bleeding. It was operationalized through a survey extracted from the "SPM" 5 questionnaire. The indicators were no, mild, moderate and high according to the survey score.

Polycystic ovarian syndrome (PCOS), an independent variable defined as a condition characterized by the presence of ovaries with cysts of variable size (ultrasound report), accompanied by amenorrhea, hyperandrogenism, and obesity[8]. It was operationalized through a survey[9]. The indicators were low, medium and high according to the survey score. Academic stress level, dependent variable defined as activation, physiological, emotional, cognitive and behavioral reaction to stimuli and academic events. It

was operationalized through a survey of the second version of the SISCO Inventory for the study of academic stress [10]. The indicators were light, moderate and deep according to the survey score.

Procedures:

A survey was applied to find out the prevalence of both syndromes and their relationship with academic stress in students aged 17 to 32 at the UPAO. It was structured based on validated tests such as the validated "polycystic ovary questionnaire" [9], the "SPM" questionnaire [5] and the SISCO inventory of academic stress[10].

The survey consisted of three sections. However, the informed consent of the participant was previously requested. The first section, related to premenstrual syndrome, consisted of ten questions referring to manifestations in the days prior to menstruation. The second section, fifteen questions related to manifestations of stress during the academic cycle, which were divided into following subsections: physical reactions, psychological reactions and behavioral reactions. Finally, twelve questions were asked related to the manifestations of polycystic ovarian syndrome[9].

In the premenstrual syndrome test, 10 of the 24 questions were used as an abbreviated form of the "SPM" questionnaire [5]. Premenstrual syndrome was considered when at least two affirmative responses were present, as long as one was question 8 or 9. Of the total number of questions, 6 referred to somatic manifestations and 4 to psychological manifestations. Four levels were considered: Absence of premenstrual syndrome when they presented 0 to 1 symptoms, mild from 2 to 4 symptoms, moderate from 5 to 7 symptoms, and high from 8 to 10 symptoms [5]. In the stress test, 15 questions were considered with a Likert scale valued each from 1 to 5, and so that a mild level was considered when a percentage of 0 to 33% was reached when using the simple rule of three as stress. mild, from 34 to 66% moderate and profound 67 to 100% The aspects considered were physical reactions (sleep disturbances, chronic fatigue, headaches or migraines, digestion problems, scratching or biting nails, drowsiness), psychological reactions (restlessness, depression or sadness, anxiety or anguish and despair, concentration, aggressiveness or irritability) and behavioral reactions (conflicts or tendency to argue, isolation, reluctance to do homework, increase or decrease in food).

In the polycystic ovarian syndrome test, 12 questions were used where if the answer was negative, no points were assigned; but if it was affirmative, 1 point is assigned to it. Low probability was considered when the sum of the responses was from 0 to 4, medium probability from 5 to 8, and high probability from 9 to 12 points.

Statistic analysis

Frequency tables of the symptoms of PCOS, PMS and academic stress were established, and the association of academic stress with the symptoms of PCOS and PMS, the Chi2 test was applied with $p<0.05$ for statistical significance. The Statistical Program SPSS version 23 was used.

Ethical aspects

It was approved by the Bioethics Committee of the private Antenor Orrego University (Bioethics Committee Resolution No. 0265-2022-UPAO). Informed consent was requested from the participants. The confidentiality of the data was kept.

RESULTS

The study included a total of 322 female human medicine students from a private university, most of whom were in the first cycles. (Table 1)

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Table 1. Population of female medical students at a private university in Peru, 2022.

YEAR	NUMBER	PERCENTAGE	AVERAGE AGE
1	106	32.92	18
2	93	28.88	19
3	46	14.29	22
4	25	7.76	23
5	29	9.01	24
6	23	7.14	23
TOTAL	322	100	21

Considering four levels of presentation of the symptoms of premenstrual syndrome, the population studied had a high level of 4.04%, moderate 25.47%, and mild 47.52%; likewise with 0 or 1 symptom, 22.98%. 77.02% presented at least 2 or more symptoms. (Table 2)

Table 2. Frequency Of Pre Menstrual Syndrome In Medical Students Per Year Of Study At A Private University In Peru, 2022.

LEVEL	YEAR						
	1	2	3	4	5	6	TOTAL
NO	26(24,53%)	25(26,88%)	9(19,57%)	3(12,00%)	5(17,24%)	6(26,09%)	74 (22,98)
MILD	46(43,40%)	46(49,46%)	24(52,17%)	12(48,00%)	13(4,.83%)	12(52,17%)	153 (47,52%)
MODERATE	32(30,19%)	18(19,35%)	12(26,09%)	7(28,00%)	9(31,03%)	4(17,39%)	82 (25,47%)
HIGH	2(1,89%)	4(4,30%)	1(2,17%)	3(12,00%)	2(6,90%)	1(4,35%)	13 (4,04%)
TOTAL	106 (100%)	93(100%)	46(100%)	25(100%)	29(100%)	23(100%)	322 (100%)

Considering three levels of presentation of stress symptoms; 30.43% of the studied population had deep stress, 66.14% moderate and 3.41% mild. Likewise, deep stress was higher in the last years of the study. (Table 3)

Table 3. Frequency of the level of stress in female medical students per year of study at a private university in Peru, 2022.

STRESS LEVEL	YEAR						
	1	2	3	4	5	6	TOTAL
MILD	5(4,90%)	3(3,30%)	1(2,13%)	0(0%)	1(3.45%)	1(4,35%)	11(3,42%)
MODERATE	67(63,73%)	71(74,73%)	31(65,96%)	14(56%)	15(51,72%)	15(65,22%)	213 (66,15%)
DEEP	32(31,37%)	20(21,97%)	15(31,91%)	11(44%)	13(44,83%)	7(30,43%)	98 (30,43%)
TOTAL	104(100%)	94(100%)	47(100%)	25(100%)	29(100%)	23(100%)	322 (100%)

Considering three levels of probability of presentation of polycystic ovary syndrome; The population studied had a low level 48.13%, medium 46.58% and a high, 5.27%. There is an increase in the average cycles. (Table 4)

Table 4. Level of polycystic ovary syndrome according to year of study in female medicine students by year of study at a private university in Peru, 2022.

LEVEL	YEAR						
	1	2	3	4	5	6	TOTAL
LOW	57(53,77%)	53(56,99%)	19(41,3%)	8(32%)	9(31,03%)	8(34,78)	154(47,83%)
MEDIUM	46(43,4%)	37(39,13%)	23(39,14%)	13(39,15)	19(39,16%)	13(39,17%)	151(46,89%)
HIGH	3(2,83%)	3(3,26%)	4(3,27%)	4(3,28%)	1(3,29%)	2(3,30%)	17(5,28%)
TOTAL	106(100%)	93(100%)	46(100%)	25(100%)	29(100%)	23(100%)	322(100%)

A relationship between premenstrual syndrome and stress was studied, finding a highly significant association. (Table 5)

The relationship between polycystic ovary syndrome and stress was established, and a significant association was evidenced. (Table 5)

Table 5. Relationship between the level of academic stress, polycystic ovary syndrome and pre menstrual syndrome in female medical students at a private university in Peru, 2022.

STRESS LEVEL	PREMENSTRUAL SYNDROME			SYMPTOMS OF POLYCYSTIC OVARY			
	NO	LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
LOW	8(11,11%)	1(0,65%)	1(0,94%)	0	7(4,54%)	3(1,99%)	0
MEDIUM	60(83,33%)	92(87,62%)	52(49,06%)	5(12,82%)	114(74,03%)	88(58,28%)	7(41,18%)
HIGH	4(5,56%)	12(11,43%)	53(50%)	34(87,18%)	33(21,43%)	60(39,73%)	10(58,82%)
TOTAL	72(100%)	105(100%)	106(100%)	39(100%)	154(100%)	152(100%)	17(100%)

Premenstrual syndrome vs stress,p= 0,000915106

Polycystic ovary syndrome vs stress,p= 1.8589E-25

The most frequent symptoms of premenstrual syndrome were swelling of the abdomen and the appearance of acne or pimples on the face, neck, shoulders, or back, and the most frequent symptoms of polycystic ovary were hair loss and dysmenorrhea. (Table 6)

Table 6. Most frequent symptoms in premenstrual syndrome and polycystic ovary syndrome in medical students of a private university in Peru, 2022.

SYMPTOMS	FREQUENCY PMS
SWELLING OF ABDOMEN	160(49.7%)
APPEARANCE OF ACNE OR PIMPLES ON THE FACE, NECK, SHOULDERS OR BACK	159(49.4%)
CRY EASILY	145(45.0%)

GET ANGRY EASILY	145(45.0%)
WEIGHT GAIN	124(38.5%)
FEELING SAD ALL WEEK	128(33.5%)
HEADACHE	99(30.7%)
DIFFICULTY TO ATTEND CLASSES	89(27.6%)
PAIN IN THE BREASTS	53(16.5%)
FEELING OF HEAT AND NOT BEING ABLE TO BREATH	21(6.0%)
	SOP
HAIR LOSS	261(81.3%)
PELVIC PAIN DURING YOUR PERIOD	256(79.8%)
IRREGULAR MENSTRUES	205(63.9%)
MORE HAIR ON FACE, THIGHS AND NECK	129(40.3%)
IRREGULAR BLEEDING THAT STARTS AND STOPS INTERMITTENT	111(34.7%)
DARK SPOTS IN FOLDS SUCH AS THE NECK AND/OR ARMPITS	108(33.5%)
TAKE SOME HORMONAL REMEDY FOR OVARIAN PAIN	92(28.7%)
DARK PIGMENTATION ON EXPOSED PARTS OF THE ARM, NECK AND THIGHS	63(19.6%)
LESS THAN 8 MENSTRUAL PERIODS PER YEAR	56(17.4%)
HISTORY OF INFERTILITY IN YOUR FAMILY	63(19.6%)
DARK AND DISCOLORED SPOTS ON YOUR SKIN	56(17.4%)

DISCUSSION

The present study included 322 female students from a private university. The first two years constituted more than 50% of the population studied. The students participated freely giving their informed consent and the sample was completed for convenience. The main findings of this study were the presence of 2 or more symptoms considered premenstrual syndrome reached 77.02%, which is high. In 384 medical students from Pakistan [11], it was found that the frequency of premenstrual syndrome was 53%, the high level reaching 18.2% of the total women studied. In a meta-analysis, Direkvand indicates a worldwide prevalence of 47.8%, with 12% being lower in France and 98% higher in Iran 3. Of 340 Chilean medical students between 18 and 27 years of age, 55.9% presented Premenstrual syndrome according to the criteria used [12]. In Brazil, a prevalence of 64.2% was found in 84 university students [13]. The findings of this study agree with what was reported in the aforementioned studies.

The most frequent symptoms of premenstrual syndrome found in this study were swelling of the abdomen 49.7%, the appearance of acne or pimple on the face, neck, shoulders or back 49.4% and anger easily like crying easily 45%. In Pakistan [11], the most frequent symptoms varied according to the type, thus in the mild form they were general malaise 86.5%, back pain 75.7%, fatigue 62.1%; in moderate irritability 100%, anxiety 93%, depression 88% and general malaise 81.3% and in the severe form; anxiety 96.4%, stress 92.9%, depression 92.9% and fatigue 92.8%. In Chile, the main symptoms were fatigue and lack of energy in 64.7%, breast hypersensitivity, headache and swelling in 62.9% and anxiety, tension, overwhelm and collapse in 60.9% [12]. The symptoms of polycystic ovarian syndrome were considered in the low, medium and high probabilities. In the present study it was found that the probability of contracting PCOS was 5.28% high, 46.89% medium, and 47.83% low. In Arequipa, Peru; these values were higher, with a low probability of contracting PCOS of 52%, a

medium probability of 47%, and a high probability of 1% [9]. In China, a 10.01% prevalence of PCOS was reported [14]. In a meta-analysis with 154,599 participants, 16.37% being higher in students, 13.9% medical personnel, and 17.23% between 21 and 30 years of age. The highest prevalence was found in the Dominican Republic in patients who attended a gynecology-obstetrics and endocrinology consultation, with 33% [15]. In Nepal in 381 medical students the prevalence of PCOS was 9.18%[16].

The most common polycystic ovarian symptoms were hair loss with 81.3%, pelvic pain with 79.8% and irregular menses with 63.9%. Pramodh in UAE women reported that 6% reported having high androgen levels, 30.7% reported polymenorrhea, and 3.5% reported oligomenorrhea for menstrual cycle frequency. In addition, 12.4% of the students experienced abnormal bleeding (heavy/none) during menstruation and 24% reported excessive body hair. It was found that 4.3% of the students were taking medication for hyperglycemia and 75% of the students reported a family history of diabetes[17]. In Nepal the most frequent symptoms were hirsutism, prolonged menstruation, obesity or overweight[16].

The level of mild stress was found to be 3.42%, moderate 66.15% and deep 30.43%. When compared with the study of a Chilean university, it was evidenced that of all the students, 98.4% indicated that they had presented academic stress during the semester, there being a difference between genders since 96.24% of the women presented high levels of stress versus 88.57% in men[18]. Which was much larger than the present study. A Colombian university found a prevalence of 81.09% of academic stress in a sample of 238 students[19]. In an Ecuadorian university it was found that moderate stress was 25.8% and deep stress 68.8%[20]. In 1801 university students from 6 cities in Peru, of which 57.7% were women and their ages were between 18 and 54 years, 83% of students reported having experienced academic stress during the semester, with a greater presence of medium and medium high levels [21].

In the present study, a highly significant association was found between the level of academic stress and the presence of premenstrual syndrome. This is similar to what was reported by a private university in Trujillo, it was shown that there is a relationship between the level of stress as a risk factor for PMDD (premenstrual dysphoric disorder). The high level of stress in the students with PMDD was 71.1% and the low level of stress was 28.9% [22].

A highly significant association was found between stress levels and polycystic ovary syndrome, this is similar to the work published in Chile, which identified stress as prevalent in young women with PCOS, which is indirectly potentiated by the increase in testosterone via hypothalamic-pituitary-adrenal, contributing to the presence of hirsutism and other aesthetic implications [23].

Among the limitations of this study, it can be noted that the sampling was by convenience and not random.

CONCLUSION

Polycystic ovarian syndrome, according to our findings and our population in particular, is significantly related to academic stress. Likewise, premenstrual syndrome is significantly related to academic stress. The most frequent symptoms of PMS and PCOS are swelling of the abdomen and hair loss respectively.

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