Prevalence of Anxiety and Depression among PCOS Patients Seen in a Tertiary Government Hospital Using the Hospital Anxiety and Depression Scale – English/Pilipino Version (HADS/HADS-P)

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ABSTRACT

Background. PCOS is a common gynecologic disorder and recent studies have found that they are more prone in developing depression and anxiety compared to the general population. The Hospital Anxiety and Depression Scale (HADS) is a popular and simple self-administered instrument reliable for detecting states of anxiety and depression. Using this simple screening tool, it may lead to the identification of such mental disorders that may warrant timely psychiatric referral.

Objectives. The study aims to determine the prevalence of anxiety and depression among PCOS patients using the HADS-P questionnaire and to determine the association between depression and anxiety and disease characteristics.

Methods. Convenience sampling was done to recruit PCOS patients >18 years old in Philippine General Hospital. Cross-sectional design was used for the prevalence of depression and anxiety, while nested case control design for the evaluation of the predictors of depression and anxiety. The HADS-P, a self-administered rating scale with independent subscales for anxiety and depression, was administered to the participants after securing consent. A cut–off score of >8 points on either of the depression and anxiety subscale was used to determine their respective prevalence. Logistic regression analysis was used to determine the association of clinical variables with anxiety or depression.

Results. A total of 253 patients with PCOS were recruited. On the basis of a HADS-P score of >8.0 per category, the prevalence of PCOS patients who were suggestive to have anxiety was 46.25% (n: 117, 95% CI: 39.98-52.60%), while 9.09% (n: 23, 95% CI: 5.85-13.33%) of them were suggestive to have depression. Crude logistic regression identified presence of depression, infertility, impaired glucose tolerance, and prominent acne as predictors of anxiety; whereas low parity, hirsutism, and presence of anxiety were predictors of depression. Adjusted logistic regression identified only presence of depression and infertility were significant predictors of anxiety (n: 116, LR χ^2 (5): 15.46, p<0.01); while presence of anxiety increased the odds of depression by 2- to 13-fold, it was not statistically significant (n: 116, LR χ^2 (5): 9.79, p: 0.08)

Conclusion. There is a high prevalence of anxiety and depression among PCOS patients. The factors that were seen to be significantly associated with the development of anxiety were the presence of depression, impaired glucose tolerance, infertility and prominent acne, while for the development of depression were the presence of anxiety, hirsutism, and low parity. Screening for anxiety and depression is of paramount importance and physicians should be vigilant for the need of possible psychiatric intervention.

Keywords: polycystic ovarian syndrome, HADS, depression, anxiety

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INTRODUCTION

Polycystic ovarian syndrome (PCOS) is a common gynecologic disorder among women of reproductive age, affecting approximately 5%–10% of women worldwide.[1] Based on the local statistics of National Institutes of Health (NIH), it affects about 8-11% of women in the reproductive age group.[2] For the past year, our institution had seen 124 new patients and 432 follow-up patients in our outpatient department. PCOS is usually diagnosed using the Rotterdam criteria wherein 2 out of the 3 criteria must be satisfied: 1) Amenorrhea or oligomenorrhea, 2) Hyperandrogenism, 3) Sonographic findings of polycystic ovaries. As gynecologists, we have only focused our treatment of these patients based on its tangible pathologies like anovulation, infertility, and long-term complications such as cardio-metabolic diseases and malignancies. Given the vast research on the physiology of PCOS and its severe health implications, it is surprising that relatively few investigators have explored psychological aspects of PCOS.[3] Many of our patients are experiencing strong emotional responses to the syndrome, struggling with self-perceptions of abnormality and difference that we might have been undermining. Recent studies have found that PCOS patients are more prone in developing depression and anxiety compared to the general population. Farrell and Antoni described that patients with PCOS experience mood dysfunction and psychiatric problems to a greater degree than women without PCOS.[4] The distress they experienced were due to challenges to their feminine identity, such as changes in physical appearance and problems in fertility. In a qualitative study on the subjective experience of PCOS, women described a feeling of being robbed of their self-concept, essence of being feminine, and attractive, thus making PCOS, the "thief of womanhood".[5] One way to easily screen depression and anxiety in the general population, is to use a self-report questionnaire, like HADS/HADS-P used in this study.

HADS/ HADS-P Questionnaire

The Hospital Anxiety and Depression Scale, or HADS, is a popular and simple self-administered instrument, which is highly consistent in detecting anxiety and depression for use in medical practice. It can evaluate anxiety and depression in all kinds of patients and even in the general population, and can be used, both during the course of disease and in response to medical and psychological interventions. It excludes somatic symptoms, therefore avoiding potential confounding of somatic symptoms.[6]

HADS is a 14-item, self-administered rating scale with independent subscales for anxiety and depression. Each item was answered on a four-point (0–3) response category and possible scores range from 0 to 21 for anxiety and 0 to 21 for depression. Scores on each scale can be interpreted in ranges: normal (0-7 points), suggestive of presence of either anxiety or depression (>8 points), and probable presence of

the mood disorder (>11 points). With a HADS score of >8, the sensitivity and specificity of the HADS were most often found to be in the range of 70% to 90%. The variation was probably a result of differences in "gold standard" instruments and HADS translations used. Compared to Beck inventories, which give good measurement of severity of depressive symptoms, HADS has been found to be valid for screening purposes.[6]

HADS-P ("P" for Pilipino, or the national language in the Philippines) is the validated Filipino language version of HADS. De Guzman validated the HADS for Filipinos among 710 medically ill in-patients at the University of the Philippines – Philippine General Hospital, with the objective of determining the prevalence of anxiety and depression and to define an optimal cut-off score for Filipinos. In their study, a HADS score >8 had a sensitivity of 91%, specificity of 59%, and a PPV of 61% for detecting anxiety or depression; while a HADS-P of >11 had a sensitivity of 75%, specificity of 70%, and PPV of 75%. It was then concluded that this tool could serve as a guide for clinicians towards the diagnosis of depression and anxiety.[6]

This study aims to determine the prevalence of depression and anxiety among PCOS patients and to identify which factors of the disease contribute to the development of the mental disorder. Knowing such factors will help us clinicians determine which symptom of PCOS patients should serve as a warning sign of a possibility of either anxiety or depression. Identifying the presence of such mental disorder through a simple screening tool may help lead to a proper psychiatric referral, enabling us to be holistic in our approach to patients.

OBJECTIVES

General Objective

To determine the prevalence of anxiety and depression among PCOS patients seen in a tertiary government hospital using the HADS/HADS-P questionnaire.

Specific Objectives

1. To describe the demographic, socioeconomic, psycho-social profile of PCOS patients in a tertiary government hospital.
2. Under the assumption that the HADS-P score >8 points has a sensitivity and specificity of 91% and 59%, respectively, we aim to determine the association between depression and anxiety and the variables listed below among patients with PCOS:
   a. Anovulation (manifested as irregular menses or oligomenorrhea and infertility)
   b. Hyperandrogenism (manifested as hirsutism and acne)
   c. Insulin resistance (manifested as increase in body weight, impaired glucose tolerance, dyslipidemia or presence of cardiovascular or metabolic comorbidities)

MATERIALS AND METHODS

This study was conducted at the Outpatient Department of the Department of Obstetrics and Gynecology in Philippine General Hospital. Cross-sectional design was used to determine the prevalence of depression and anxiety, while nested case control design for the evaluation of the predictors of depression and anxiety. It included diagnosed PCOS patients using the Rotterdam criteria, ages 18 years old and above with informed consent to participate. Patients that were excluded in the study were the following: previously diagnosed with depression, anxiety, and other mental disorders, intake of anti-psychotic, anti-anxiety, anti-depressants, stimulants or mood stabilizers medications, incapable of comprehending English or Filipino (Tagalog), and with severe debilitating medical or neurologic illness that will inhibit the patient from answering the questionnaire by herself. Two hundred fifty (250) women with polycystic ovarian syndrome were selected for participation in the study – 190 old patients and 60 new patients. Convenience sampling was used in recruiting the participants.

Data Collection

A Patient Data Form (Appendix 1) was used to collect information regarding demographic, socio-economic and PCOS-related variables of the subjects, which was accomplished by the investigator and the research assistant. PCOS-related variables that were extracted from the participants, were symptoms of anovulation, hyperandrogenism, and insulin resistance. For symptoms of anovulation, history of oligomenorrhea, irregular menses, and problems with fertility were asked. For symptoms of hyperandrogenism, Modified Ferriman Gallway score and Global Acne Grading system were obtained by the investigator to get an objective parameter of the participant's androgenic symptoms. While for symptoms of insulin resistance, body mass index, 75-gram oral glucose tolerance test (OGTT), lipid profile, and presence of cardiovascular/metabolic comorbidities were indirect measures for insulin insensitivity.

After filling up the patient data form, HADS/HADS-P questionnaire (Appendix 2) was handed to the participants for them to answer. The version given to them depended on the subject's preference, either English or Tagalog. The questionnaires were then individually analyzed and scored accordingly. Total interview and answering time was around 15-30 minutes. In this study, the suggestive presence of anxiety or depression was determined by a HADS-P score of >8 points for each arm (i.e., >8 points for questions pertaining to anxiety and >8 points for questions pertaining to depression). While a score of 11 or higher indicates a probable presence of the particular mental disorder. However, HADS is known to have high false positive result, so for those who will score >8, the primary investigator did a brief semi-structured diagnostic to further explore the factors involved, persistence of psychiatric symptoms, and severity of the mental disorder experienced by the participant. Those who will admit persistent disturbance in everyday living with alteration in their social function were advised referral to psychiatry with their permission, and they were endorsed to their primary physician.

Statistical Analysis

After the investigators extracted the data, all the information was manually entered into an electronic spreadsheet file, and data processing and analysis was then carried out using the program Stata 13.

Descriptive statistics was used to describe the baseline characteristics of the population in terms of significant variables such as mean and standard deviation for the variables of age, duration of disease, and laboratory parameters such as fasting blood sugar, 75 grams OGTT result, cholesterol, triglycerides, low density lipoprotein, and high density lipoprotein levels. The median and range were used to describe the gravidity and parity of the patients, while the frequency and percentage were performed for the categorical variables such as civil status, educational attainment, occupational status, presence of co-morbidities, history of contraceptive use, the Modified Ferriman-Gallwey score, and the Global Acne Grading System score.

An arbitrary cut-off of eight (8) and above was used to denote presence of anxiety and depression. A series of independent samples t-test with Welch's correction and chi-square tests of association were performed to determine differences in the presence of these clinic-demographic characteristics across the presence of notable anxiety and/or depression among women with PCOS.

To determine the predictors for anxiety and depression, the subjects were grouped according to presence or absence of anxiety/depression and logistic regression was done to determine the clinico-demographic variables that might be the predisposing/risk factors to these mental health disorders. Crude odds ratios and adjusted odds ratios were computed, with the latter performed due to consideration of possible confounders found in the literature using the forward variable selection. A cut-off for the change in the estimation criterion of more than or equal to 10% was used for inclusion in the final model, otherwise these variables were considered as a non-significant confounder.

The level of significance for all sets of analysis was set at p-value less than 0.05 using two-tailed comparisons.

Ethical Considerations

This study was conducted upon the approval of the UP Manila Research Ethics Board. Only the information stated in the Patient Data Form was obtained from the participants. Objectives of the study were explained thoroughly and confidentiality was assured. A consent form to participate in the study was given for the participants to sign. The primary investigator financed the cost of this study. The result of the

HADS-P was relayed to the participant and will suggest psychiatric referral if warranted.

RESULTS

Prevalence of Anxiety and Depression among PCOS patients

Total of 253 PCOS patients were included in the study, from April to October 2019, whose age ranges from 18 to 49 years old. Majority of patients were <30 years old, single, able to reach college level, unemployed, and with stable psychological support system. Among the participants, 21.27 to 32.87% (n: 64, 26.78%) had problems with infertility while 77.61% (n: 104, CI: 69.61-84.36%) were dyslipidemic. Based on this study, the prevalence of PCOS patients who were suggestive to have anxiety was 46.25% (n: 117, 95% CI: 39.98-52.60%), while 9.09% (n: 23, 95% CI: 5.85-13.33%) of them were suggestive to have depression, based on their HADS-P score of >8 each on either subset. On the other hand, the prevalence of PCOS patients who had a high probability of mental disorder was 25.30% for anxiety (n: 64, 95% CI: 20.06-31.12%), and 4.35% for depression (n: 11, 95% CI: 2.19-7.65%), based on their HADS-P score of >11 each on either arm (Table 1). Ten participants warranted and willingly accepted psychiatric referral and they were those that scored >11 on either anxiety or depression on HADS-P, and none of them scored >8.

For those participants who were found to have anxiety (HADS-P >8), they were more likely to have impaired glucose tolerance (t: -2.40, df: 69.70, p: 0.02) and infertility (z: 3.68, p: 0.06), but only impaired glucose tolerance was noted to have statistical significance. While those patients who were found to have depression (HADS-P >8), most of them were associated with low parity (z: 1.88, p: 0.06) and a high score (>8) at the Modified Ferriman Gallaway scoring system (χ^2: 2.36, p: 0.12) (Table 1). Though both were not statistically significant, its clinical significance should not be overlooked.

Table 1. Baseline Characteristics of the Study Population across Anxiety Rating

Characteristics	Overall	Anxiety Rating		p-value	Depression Rating		p-value
		without	with		without	with	
Number (Percentage)		136 (53.75%)	117 (46.25%)		230 (90.91%)	23 (9.09%)	
Age in years	28 ± 6.83	29 ± 6.91	27 ± 6.69	0.12	28 ± 6.81	26 ± 6.87	0.18
18-30	155 (61.26%)	80 (58.82%)	75 (64.10%)		141 (61.30%)	14 (60.87%)	
31-40	91 (35.97%)	50 (36.76%)	41 (35.04%)	0.22	82 (35.65%)	9 (39.13%)	0.91
More than 40	7 (2.77%)	6 (4.41%)	1 (0.85%)		7 (3.04%)	-	
Gravidity	0 (0-6)	0 (0-6)	0 (0-6)	0.25	0 (0-6)	0 (0-5)	0.13
Parity	0 (0-5)	0 (0-5)	0 (0-5)	0.17	0 (0-5)	0 (0-2)	0.06
Civil Status							
Single	169 (66.80%)	87 (63.97%)	82 (70.09%)		153 (66.52%)	16 (69.57%)	
Married/Common-Law	83 (32.81%)	48 (35.29%)	35 (29.91%)	0.38	76 (33.04%)	7 (30.43%)	0.92
Separated	1 (0.40%)	1 (0.74%)	-		1 (0.43%)	-	
Educational Attainment							
Elementary	5 (1.98%)	4 (2.94%)	1 (0.85%)		5 (2.17%)	-	
High school	86 (33.99%)	48 (35.29%)	38 (32.48%)	0.47	80 (34.78%)	6 (26.09%)	0.69
Vocational	21 (8.30%)	13 (9.56%)	8 (6.84%)		18 (7.83%)	3 (13.04%)	
College	141 (55.73%)	71 (52.21%)	70 (59.83%)		127 (55.22%)	14 (60.87%)	
Occupational Status							
Professional	36 (14.34%)	17 (12.59%)	19 (16.38%)		33 (14.47%)	3 (13.04%)	
Skilled	67 (26.69%)	41 (30.37%)	26 (22.41%)	0.32	61 (26.75%)	6 (26.09%)	0.98
Unemployed	148 (58.96%)	77 (57.04%)	71 (61.21%)		134 (58.77%)	14 (60.87%)	
Time since diagnosis	3 ± 3.66	3 ± 3.97	2 ± 3.24	0.26	3 ± 3.59	3 ± 4.37	0.94
Psychological support							
Husband/Partner	80 (32.26%)	43 (32.58%)	37 (31.90%)		73 (32.30%)	7 (31.82%)	
Parents/Sibling	143 (57.66%)	77 (58.33%)	66 (56.90%)	0.86	131 (57.96%)	12 (54.55%)	0.80
Friends	25 (10.08%)	12 (9.09%)	13 (11.21%)		22 (9.73%)	3 (13.64%)	
Symptoms of anovulation							
Intake of OCPs	121 (92.37%)	67 (90.54%)	54 (94.74%)	0.37	110 (93.22%)	11 (84.62%)	0.26
Irregular menstruation	130 (51.79%)	72 (52.94%)	58 (50.43%)	0.69	116 (50.88%)	14 (60.87%)	0.36
Infertility	64 (26.78%)	28 (21.71%)	36 (32.73%)	0.06	58 (26.73%)	6 (27.27%)	0.57
Years of Infertility	6 ± 3.80	6 ± 4.14	6 ± 3.55	0.66	6 ± 3.84	6 ± 3.67	0.80
Needed Therapy	14 (5.86%)	8 (6.20%)	6 (5.45%)	0.81	13 (5.99%)	1 (4.55%)	0.62

Table 1. Baseline Characteristics of the Study Population across Anxiety Rating (continued)

Characteristics	Overall	Anxiety Rating		p-value	Depression Rating		p-value
		without	with		without	with	
Symptoms of Hyper-androgenism							
Modified Ferriman-Gallwey							
<8	223 (88.14%)	122 (89.71%)	101 (86.32%)	0.44	205 (89.13%)	18 (78.26%)	0.12
≥8	30 (11.86%)	14 (10.29%)	16 (13.68%)		25 (10.87%)	5 (21.74%)	
Global Acne Grading System							
None	67 (26.59%)	38 (28.15%)	29 (24.79%)		60 (26.20%)	7 (30.43%)	
Mild	158 (62.70%)	87 (64.44%)	71 (60.68%)		146 (63.76%)	12 (52.17%)	
Moderate	21 (8.33%)	7 (5.19%)	14 (11.97%)	0.14	18 (7.86%)	3 (13.04%)	0.38
Severe	4 (1.59%)	1 (0.74%)	3 (2.56%)		3 (1.31%)	1 (4.35%)	
Very Severe	2 (0.79%)	2 (1.48%)	-		2 (0.87%)	-	
Symptoms of Insulin Resistance							
FBS	89.70 ± 22.27	89.75 ± 22.23	89.63 ± 22.53	0.98	90.15 ± 23.13	85.65 ± 12.07	0.27
Elevated	15 (10.14%)	9 (10.71%)	6 (9.38%)	0.79	14 (10.45%)	1 (7.14%)	0.57
1st hour OGTT	150.59 ± 45.68	140.03 ± 34.17	162.08 ± 53.62	0.02*	148.93 ± 47.32	162.26 ± 30.91	0.21
Elevated	12 (10.43%)	4 (6.35%)	8 (15.38%)	0.10	12 (11.76%)	-	0.36
2nd hour OGTT	129.59 ± 43.58	119.48 ± 29.54	140.79 ± 53.27	0.02*	128.91 ± 44.89	134.36 ± 34.00	0.62
Elevated	8 (6.90%)	2 (3.13%)	6 (11.54%)	0.14	8 (7.77%)	-	0.37
Total Cholesterol	130.47 ± 8.04	127.11 ± 57.53	134.62 ± 58.97	0.49	130.34 ± 58.00	131.73 ± 61.23	0.94
Elevated	26 (19.40%)	15 (19.48%)	11 (19.30%)	0.99	23 (18.85%)	3 (25%)	0.61
Triglycerides	73.14 ± 70.67	73.21 ± 72.94	73.05 ± 68.42	0.99	74.73 ± 72.56	58.07 ± 49.24	0.33
Elevated	16 (11.94%)	9 (11.69%)	7 (12.28%)	0.56	15 (12.30%)	1 (8.33%)	0.57
LDL	79.19 ± 39.72	75.72 ± 36.59	83.54 ± 39.84	0.29	78.08 ± 38.87	89.62 ± 47.89	0.45
Elevated	35 (26.12%)	19 (24.68%)	16 (28.07%)	0.69	32 (26.23%)	3 (25%)	0.43
HDL	35.60 ± 19.45	35.98 ± 22.18	35.13 ± 15.57	0.81	35.64 ± 19.93	35.28 ± 14.86	0.94
Below Normal	72 (53.73%)	41 (53.25%)	31 (54.39%)	0.52	65 (53.28%)	7 (58.33%)	0.77
Dyslipidemia	104 (77.61%)	58 (75.32%)	46 (80.70%)	0.53	94 (77.05%)	10 (83.33%)	0.15
Body mass index							
Underweight	9 (3.16%)	4 (2.94%)	4 (3.42%)		8 (3.48%)	-	
Normal	125 (49.41%)	68 (50%)	57 (48.72%)	0.99	115 (50%)	10 (43.48%)	0.84
Overweight	82 (32.41%)	43 (31.62%)	39 (33.33%)		73 (31.74%)	9 (39.13%)	
Obese	38 (15.02%)	21 (15.44%)	17 (14.53%)		34 (14.78%)	4 (17.39%)	
Presence of Co-morbidities							
Hypertension	24 (9.49%)	13 (9.56%)	11 (9.40%)	0.97	21 (9.13%)	3 (13.04%)	0.46
Diabetes mellitus	16 (6.32%)	7 (5.15%)	9 (7.69%)	0.41	14 (6.09%)	2 (8.70%)	0.65
Breast problems	2 (0.79%)	1 (0.74%)	1 (0.85%)	0.71	2 (0.87%)	-	0.83
Bronchial asthma	12 (4.74%)	8 (5.88%)	4 (3.42%)	0.77	11 (4.78%)	1 (4.35%)	0.70
Others	19 (7.51%)	8 (5.88%)	11 (9.03%)	0.34	18 (7.83%)	1 (4.35%)	0.55

Predictors of Anxiety on Logistic Regression

This study showed a significant percentage of PCOS patients having more anxiety than depression. Based on crude logistic regression, some of the variables noted to be associated with anxiety were the following: presence of depression (HADS-P >8) with 5 times increased odds and was statistically significant; and infertility and prominent acne (moderate to severe rating on the Global Acne Grading System), both of which had 2 times increased odds, but were not found to be statistically significant (Table 2).

However, when the variables were computed based on adjusted logistic regression models, anxiety was increased 7 times among those with depression (HADS-P >8), while it increased 3 times among those with infertility. This model was statistically significant (n: 116, LR χ² (5): 15.46, p<0.01) and explained about 9.79% of the variability of the level of anxiety among the study participants (Table 3).

Predictors of Depression on Logistic Regression

Having anxiety (HADS-P >8) was noted to increase the odds of depression by 2- to 13-fold based on crude logistic regression (Table 2). The same variable was also noted on the adjusted logistic regression models for depression, wherein anxiety was associated with a 7-fold increased probability

Table 2. Crude Logistic Regression for Likelihood of HADS-P >8 across Select Variables

Predictors	Odds of Anxiety (95% CI)	p-value	Odds of Depression (95% CI)	p-value
Age >30 years old	0.80 (0.48-1.33)	0.39	1.02 (0.42-2.45)	0.97
Without a partner	1.28 (0.75-2.17)	0.36	1.13 (0.45-2.86)	0.80
Lower educational attainment	0.81 (0.48-1.35)	0.42	0.60 (0.23-1.59)	0.31
Unemployed	1.19 (0.72-1.97)	0.50	1.08 (0.45-2.59)	0.87
Psychological support				
Husband/Partner	1.00		1.00	
Parents/Siblings	1.00 (0.58-1.72)	0.99	0.96 (0.36-2.53)	0.93
Friends	1.26 (0.51-3.09)	0.62	1.42 (0.34-5.97)	0.63
Time since diagnosis	0.96 (0.90-1.03)	0.27	1.00 (0.89-1.13)	0.93
Symptoms of anovulation				
Intake of OCPs	1.88 (0.46-7.62)	0.38	0.40 (0.08-2.12)	0.28
Irregular menstruation	0.90 (0.55-1.49)	0.69	1.50 (0.63-3.61)	0.36
Infertility	1.75 (0.98-3.13)	0.06	1.03 (0.38-2.75)	0.96
MFG Score ≥8	1.38 (0.64-2.96)	0.41	2.28 (0.78-6.67)	0.13
Global Acne Grading System				
None	1.00		1.00	
Mild	1.07 (0.60-1.90)	0.82	0.70 (0.26-1.88)	0.48
Moderate-Very Severe	2.23 (0.89-1.90)	0.09	1.49 (0.40-5.58)	0.55
Body mass index				
Normal	1.00		1.00	
Underweight	1.19 (0.29-4.98)	0.81	-	
Overweight	1.08 (0.62-1.89)	0.78	1.42 (0.55-3.66)	0.47
Obese	0.97 (0.47-2.00)	0.93	1.35 (0.40-4.59)	0.63
Laboratory Parameters				
Elevated FBS	0.86 (0.29-2.56)	0.79	0.66 (0.08-5.43)	0.70
Elevated 1st hour OGTT	2.68 (0.76-9.47)	0.13	-	
Elevated 2nd hour OGTT	4.04 (0.78-20.95)	0.10	-	
Elevated Total Cholesterol	0.99 (0.42-2.35)	0.98	1.43 (0.36-5.72)	0.61
Elevated Triglyceride	1.06 (0.37-3.03)	0.92	0.65 (0.08-5.39)	0.69
Elevated LDL	1.19 (0.55-2.59)	0.66	0.94 (0.24-3.68)	0.93
Low Levels of HDL	1.05 (0.53-2.08)	0.90	1.23 (0.37-4.08)	0.74
Insulin Resistance	1.06 (0.39-2.85)	0.91	0.53 (0.07-4.31)	0.55
Dyslipidemia	1.37 (0.59-3.16)	0.46	1.49 (0.31-7.20)	0.62
with Depression	4.76 (1.70-13.27)	<0.01*		
with Anxiety			4.76 (1.70-13.27)	<0.01*

Table 3. Adjusted Logistic Regression for Likelihood of HADS-P >8 across Select Variables

Predictors	Odds Ratios (95% CI)	p-value
Anxiety		
with Depression	6.96 (1.40-34.70)	0.02*
Infertility	2.85 (1.05-7.76)	0.04*
with a Partner (Married/Live-in)	2.03 (0.78-5.36)	0.15
Dyslipidemia	1.19 (0.46-3.09)	0.72
Depression		
with Anxiety	7.19 (1.44-35.78)	0.02*
Infertility	1.27 (0.23-7.09)	0.78
with a Partner (Married/Live-in)	2.67 (0.39-18.09)	0.32
Dyslipidemia	1.36 (0.25-7.35)	0.72

of depression. However, it was not statistically significant due to skewed distribution of participants with a depressed score (HADS-P >8) (n: 116, LR χ^2 (5): 9.79, p: 0.08) yet it explained 13.46% of the variability in the level of depression (Table 3). Increasing the number of participants could help reveal its statistical significance.

When the participants with anxiety or depression (HADS-P of >8) were further asked the reasons of their symptoms, most of them attributed them to the chronicity of PCOS, difficulty in conceiving, alteration of self-image brought about by hyperandrogenism, and the uncertainty of time when it will be cured.

DISCUSSION

Prevalence Studies

In 2004, over 4.5 million cases of depression were reported in the Philippines, according to the Department of Health (DOH). With suicide cases of over 2,000 cases from 2000 to 2012 in the Philippines, as recorded by the WHO. Unfortunately, majority of those who died were between 15 to 29 years old.[7,8] The prevalence of major depression is higher in women than in men; in 2010 its global annual prevalence was 5.5% and 3.2%, respectively, with a 20% lifetime prevalence.[9,10] The average onset of first depressive episode occurs in the mid 20's. Another study done by Perlas et al. found that the overall prevalence of psychiatric disorders among medically ill patients in the Philippines is higher (48%), compared to foreign literature.[11] Most common of which was depression, followed by anxiety disorders.[12] But among PCOS patients of this study, anxiety (46.25%) prevailed more than depression (9.09%).

Women with mood disorder describe their presenting problems as "sleep disturbances" or "fatigue", therefore the diagnosis may be missed.[4] Thus, it is important to examine PCOS patients thoroughly, not only physically but also psychologically, looking for clues that may point out to depression or anxiety. In a study done by Mansson et al. in 2008, they found out that there was a significantly higher rate of suicide attempts in the PCOS group compared to controls, 14% of the PCOS women in this study had attempted suicide, stresses the gravity of the psychological problem experienced by such patients.[13] Depressed patients can spend 20% of their lives in depressive episodes, and these episodes recur in 75%–80% of these cases. But it is known that with adequate treatment, 50%–70% of patients with depression recover completely.[4] This emphasizes the importance of diagnosing and addressing mental disorders promptly and not to disregard it as a natural psychological reaction to PCOS.[13]

Association of Anxiety and Depression in PCOS

Studies done by Weber et al., in 2000 showed that high testosterone levels have previously been linked to depression, leading to speculation that depression is the result of an overstimulation of the adrenal glands.[14] Although a biological explanation for a link between depression and PCOS is plausible, it is also possible that psychosocial variables influence this relationship[3] and body dissatisfaction may play an important role. The likelihood of depression and anxiety is increased due to appearance-related consequences of the syndrome that fuel harsh self-perceptions of attractiveness, in addition to the frustration of having a chronic condition with risk of future health complications.[3] In this study, the factors that were seen significant in causing anxiety among PCOS patients were presence of depression, impaired glucose tolerance, and infertility. Even if not statistically significant, having prominent acne might have a clinical significance on the development of anxiety among these patients. The factors noted to be associated with depression in this study were the presence of anxiety, low parity, and hirsutism. Though all were not statistically significant, having these symptoms should open an opportunity to the physician to further explore its influence on the well-being of the patient.

On the other hand, recent studies have shown the potential impact of anxiety on testosterone levels. This study had shown that almost half of the participants reported significant anxiety (46.25%). Stress brought about by anxiety activates the adrenal glands via the hypothalamic – pituitary – adrenal axis (HPA)[15] and that women produce roughly 25% of the testosterone from their adrenal glands.[16] Activation of the adrenal glands will therefore increase visceral fat, inflammation[17] and testosterone levels, thus exacerbating the symptoms of PCOS. There is already evidence that women with PCOS show a stronger HPA response to a stressor than healthy women.[18,19]

Applicability of Data for the Primary Physician

Given the results of this study, screening for psychiatric morbidity, specifically for anxiety and depression, must be incorporated in our routine assessment of PCOS patients. We are in the time and age where mental disorders are on the rise, hence management of patients now comprises physical, medical and psychological aspects of their illness. Understanding the effect of their symptoms from the patient's perspective is paramount to understanding the medical management of PCOS. Hence, proper patient education includes self-esteem and self-consciousness as additional areas that need to be addressed in our routine treatment plans.[20]

Evidence now suggests that behavioral and psychological interventions are now part of the adjunctive treatment for PCOS. Addressing depression and other mental disorders via psychotherapy versus pharmacology is potentially more cost-effective and longer-lasting. Attempting to alleviate emotional disturbances might result in improved physiological processes with the result of improving insulin resistance, HPA axis functioning, obesity, and hyperandrogenism. Several stress management interventions like cognitive behavioral therapy and relaxation can also be advocated.[17]

To our knowledge, this study is the first in the local setting to explore the psychiatric aspect of PCOS patients. Using the HADS-P questionnaire, a significant percentage of our participants have shown the increased prevalence of anxiety (46.25%) and depression (9.09%) among PCOS patients. Hence, they are a target population that should be routinely screened and adequately treated for depressive and anxiety disorders.[4] Although a cut-off of >8 points used in this study is only suggestive of the possibility of anxiety or depression, this was used due to its higher sensitivity (>90%). This allows the physician to diagnose early a possibility of a mental disorder among PCOS patients, as to initiate proper and prompt psychiatric referrals for holistic care. With

regard to the factors associated with the development of these mood disorders, we found that presence of depression, impaired glucose tolerance, infertility and prominent acne were associated with anxiety, while the presence of anxiety, hirsutism, and low parity were associated with depression.

Limitations of the Study

As this is a self-administered questionnaire, there is some drawback regarding the patient's literacy and ability to read. One should also keep in mind that the gold standard for a definitive diagnosis of a mood disorder is still a structured clinical interview by a psychiatrist based on DSM criteria. But identifying the prevalence of anxiety and depression through a simple screening tool may lead to a proper psychiatric referral. This will help physicians consider the impact of the psychological component of the PCOS and identify additional points of care for our patients.

Another limitation of this study is the lack of long-term follow-up. Development of prospective studies can be done so that these patients can be followed up over time to determine the association of anxiety and/or depression with adverse outcomes of PCOS. Another limitation is the lack of control group, which will help further strengthen the association of anxiety and depression among PCOS patients, if its prevalence will be low in the control group.

CONCLUSION

In this study, a significant percentage of PCOS patients were seen to be suffering from anxiety and depression with a prevalence of 46.25% and 9.09%, respectively. The factors that were seen to be significantly associated with the development of anxiety were the presence of depression, impaired glucose tolerance, infertility, and prominent acne, while for the development of depression were the presence of anxiety, hirsutism, and low parity. Screening for emotional disorders is of paramount importance to provide holistic care for this vulnerable population. HADS/HADS-P questionnaire is a reliable screening tool that can be used due its high sensitivity (>90%). Physicians should be vigilant for the possible need for psychological intervention, especially now that mental disorders are given utmost importance.

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APPENDICES

Appendix 1. Patient Data Form

TITLE OF STUDY: Prevalence of anxiety and depression among PCOS patients seen in a tertiary government hospital using the hospital anxiety and depression scale-english/pilipino version (HADS/HADS-P)

DEMOGRAPHIC DATA:

Subject Study No.	
Date	
Age/Gravidity/Parity	
Civil status	
Address	
Contact number	
Highest educational attainment	
Occupation	
Diagnosis	
Co-morbidities	
Psychological support	
Time since diagnosis	

SYMPTOMS OF AMENORRHEA:

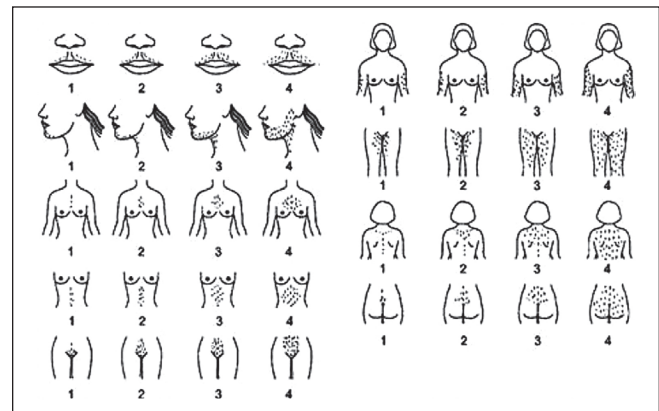| Menarche	Interval	Duration	Amount	Symptoms

LMP:
PMP:
Medications taken:
For how long medications are taken:
Side effects from medications:

SYMPTOMS OF INFERTILITY:
Difficulty in conceiving?:
For how long?:
Factors associated with infertility:
Medications or procedures taken to conceive?:

SYMPTOMS OF HYPERANDROGENISM:
Modified Ferriman Gallaway score:

Do you shave?:
How often?:
Serum testosterone (if available):
Global Acne Grading System score:

Location	Factor x Grade (0-4) = Local score 1: comedones, 2: papules, 3: pustules, 4: nodules	
Forehead	2	0 = None
Right cheek	2	1-18 = Mild
Left cheek	2	19-30 = Moderate
Nose	1	31-38 = Severe
Chin	1	>39 = Very severe
Chest and upper back	3	

SYMPTOMS OF INSULIN INSENSITIVITY:

BMI	
FBS	
1st hour OGTT	
2nd hour OGTT	
Cholesterol	
Triglycerides	
LDL	
HDL	

Appendix 2. Hospital Anxiety and Depression Scale – Pilipino Version (HADS-P)

Mga Direksyon sa Pagsagot:
Alam ng mga doktor na may mahalagang papel ang damdamin natin sa maraming sakit. Kung alam ng iyong doktor ang inyong nararamdaman, mas matutulungan niya kayo. Ang palatanungang ito ay ginawa para tulungan ka ng inyong doktor na malaman ang inyong nararamdaman.
Basahin ang bawa't tanong at i-tsek (✓) ang kahon ng katugmang sagot na pinakamalapit sa inyong nararamdaman sa nakaraang linggo.
Huwag masyadong magtagal sa pagsagot; ang inyong unang reaksyon ay mas malamang na tama kaysa mas matagal na pinag-isipang sagot.
Isang sagot lamang ang i-tsek ( ) sa bawat tanong.

A	1.	**Naliligalig at punong-puno na ako:**	D	2.	**Pakiramdam ko parang pinapabagal ako:**
3		Mas madalas kaysa hindi	3		Halos lagi-lagi
2		Madalas	2		Napakadalas
1		Paminsan-minsan	1		Minsan
0		Hinding-hindi	0		Hinding-hindi
D	3.	**Ikinasasaya ko pa rin ang mga bagay na dati ko nang ikinasasaya:**	A	4.	**Para akong natatakot na may nararamdamang sobrang nerbiyos:**
0		Katulad din ng dati	0		Hinding-hindi
1		Hindi na kasingdalas	1		Paminsan-minsan
2		Konti lang	2		Medyo madalas
3		Halos hindi na	3		Madalas na madalas
A	5.	**Para akong natatakot na may mangyayaring masama:**	D	6.	**Nawalan na ako ng interes sa aking hitsura:**
3		Lagi-lagi at medyo lang	3		Talaga
2		Palagi pero di-gaanong malala	2		Hindi ako nangangalaga ng dapat
1		Konti, pero 'di ako nag-aalala	1		Pwedeng hindi ako mag-alaga ng nararapat
0		Hinding-hindi	0		Pinapangalagaan ko pa rin ito katulad ng dati
D	7.	**Kaya ko pang tumawa at mapansin ang nakakatuwang bahagi sa mga bagay-bagay:**	A	8.	**Hindi ako mapakali na parang gusto kong may pinagkakaabalahan:**
0		Lagi-lagi tulad ng dati	3		Talagang madalas
1		Mas madalang na ng konti kaysa dati	2		Medyo madalas
2		Hindi na katulad ng dati	1		Di naman gaano
3		Hinding-hindi	0		Hinding-hindi
A	9.	**Pag-aalala ang nasa isip ko:**	D	10.	**Masaya akong umaasa sa bagay-bagay:**
3		Madalas na madalas	0		Kasingdalas ng nakagawian ko
2		Madalas	1		'Di-kasingdalas ng nakagawian ko
1		Di gaanong madalas	2		Mas madalang kaysa nakagawian ko
0		Konting-konti	3		Halos hindi na
D	11.	**Masaya ang aking pakiramdam:**	A	12.	**Bigla akong nakakaramdam ng pagkasindak:**
3		Hindi kailanman	3		Madalas na madalas
2		Madalang	2		Medyo madalas
1		Paminsan-minsan	1		'Di-gaanong madalas
0		Kadalasan	0		Hinding-hindi
A	13.	**Kaya kong umupo nang kumportable at mag-relaks:**	D	14.	**Kaya kong maaliw sa isang magandang libro o programa sa radio o TV:**
0		Palagi			
1		Madalas	0		Madalas
2		Madalang	1		Paminsan-minsan
3		Hinding-hindi	2		Madalang
			3		Madalang na madalang

Pakitiyak lang kung nasagutan ninyo ang lahat ng tanong. Maraming salamat po!

Komentaryo:

PARA SA OSPITAL:
D _____
A _____
Total _____