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The Cut Off of Ferriman Gallwey Score for PCOS in Asia and the Degree of Hyperandrogenism Indicator

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Abstract

Objective: To determine the distribution of the Ferriman–Gallwey score in Asia and to study any association between hirsutism and endocrine markers, and also to find the cut off of F-G score.

Background: Hirsutism is the most widely used clinical diagnostic criterion for hyperandrogenism, it is present in approximately 70% of PCOS women. Using the Ferriman- Gallwey (F-G) scoring systems for evaluation of hirsutism, the degrees of hyperandrogenism from different regions are distinct and have different cut off.

Material and methods: A descriptive cross-sectional study was carried out at Dr. Cipto Mangunkusumo General Hospital Jakarta in 2015. Reproductive age women who commits with PCOS criteria were included in the study. Clinical data was taken by interview, physical examination and US examination. Patient's blood was taken for FTI, and testosterone.

Results: The data indicated that 32.4% PCOS woman shows clinical signs of hyperandrogenism, with the minimum score of hirsutism 2 and based on laboratory findings 34.3% subjects show high FTI and testosterone level. However not all patient with high androgen level have a high score of hirsutism.

Conclusion: Clinical and laboratory finding of hyperandrogenism have a correlation to determine the score of Ferriman–Gallwey (F-G). The cut off is lower than European and west countries.

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1. Introduction

Polycystic ovary syndrome (PCOS) is one of the most common endocrinopathies, affecting between 6% and 7% of reproductive-age women. Although not always clinically evident, hyperandrogenism is most commonly manifested in several cutaneous symptoms, namely hirsutism, acne, and alopecia [1-3].

Hirsutism, the development of terminal hair in female pattern distribution, has been documented in up to approximately 70% of patients with PCOS. It is well known that

androgens have significant effects on hair follicle development and growth, stimulating hair growth via conversion of vellus to terminal hair types.

The relationship of androgens to hirsutism is not completely understood, however, earlier studies have not demonstrated clear correlations between androgen levels and presence of hirsutism. Although some studies have shown hirsutism to correlate with free testosterone (FT), others have documented that in women with mild hirsutism, only 50% had elevated FT; in women with modestly elevated FT (twofold increase), 33% of women had no hirsutism at all, 27% had moderate, and 40% had mild. In another study of over 300 PCOS patients, of those who had evidence of hyperandrogenemia, 63% had clinical hirsutism; of those who were hirsute, 68% were hyperandrogenemic [4-7].

Because hirsutism is so prevalent among PCOS patients and carries with it an often extensive quality of life impact, it is important to attempt to ascertain hormonal correlations and, therefore, possible causations of its severity in order to choose and develop the most efficacious treatment options [6, 8-11].

There were any other factors that could increase the Testosterone level, such as obesity. It reported from literature that obese, those with and without PCOS, have significantly higher total T levels than non-obese women. Furthermore, obese women with PCOS presented significantly lower LH-to-FSH ratios than non-obese women with PCOS. PCOS and obesity are common and complex disorders that are affected by genetic and environmental factors. Understanding the link between obesity and PCOS might provide significant information for the diagnosis and treatment of PCOS. This study did not explained directly about the impact of obesity in PCOS, but obesity could be explained as one of the factors to cause hyperandrogenism in women. However, Tsan Hon Liou et all, explained that It is interesting to note that the percentage of hirsutism and/or acne in obese women with PCOS was significantly less than in non-obese women (OR, 0.6; 95% CI, 0.4–0.9) [12].

2. Materials and Methods

This Cross-sectional study was conducted from January 2014 to January 2016. The study population comprised 30 women with PCOS with hirsutism and menstrual irregularity. Women with PCOS were recruited from the Gynaecologic Endocrinology Clinic at Yasmin, Cipto Mangunkusumo Referral hospital. The Ethics Committee of University approved this study.

Visual methods to determine the degree of hirsutism, as originally described by Ferriman and Gallwey, were performed. As previously mentioned, the densities of terminal hairs at 11 different body sites were scored from 0 to 4, and total score was calculated. A single examiner performed the scoring assessment on each patient. In particular, polycystic ovary syndrome (PCOS) was diagnosed in hirsute patients.

Data were collected, editing and verified, it was analyzed using SPSS program. To see the predictive value, cut off and sensitivity and specificity of free testosterone level

Variabel	r	p-value
FG score and FTI	0.077;	0.68

Table 1: Correlation FG Score and FTI.

Variabel	r	p-value
FG score and Testosterone	0.32	0.079

Table 2: Correlation FG Score and Testosterone.

and FG score, we were using Receiver Operating Curve (ROC). Pearson's correlation coefficient was calculated to quantify the strength of the linear relationship between FG score and the other variables with statistical significance (P values) calculated using the t-distribution.

Institutional review board approval was obtained, and all patients and controls gave written consent. All subjects were considered to be sedentary, and were not dieting or receiving any medications. No subject received hormonal medications for at least 3 months before the study.

3. Results

A total of 30 patients met inclusion criteria. From all participants showed that the range of the BMI was 19- 38, as we know tha BMI > 24.9 was classified as Overweight – Obesity. The average level of FTI was 7.21 (95% CI: 4.93-9.48), median 4.61. (Table 1) Average of testosterone level was 36.61 (95% CI: 30.45-42.78) median 35.27. FG score, with average score 3.32 (Ci: 2.11-4.53), median 2. (Table 2)

Participants was > 24.9 (73%). Positive correlation was seen between FG score and FTI, increasing FG scores correlated with an increase in FTI (Correlation coefficient R 0.077; P 0.68). Moreover, FG score also correlate with Testosterone level, with positive correlation (Correlation coefficient R 0.32 ; p 0.079) . Increase the level of testosterone will follow with an increase of FG score.

From the ROC of FG score and FTI was 54.1% (95%CI: 32.7%-75.5%,p>0,05) and a sensitivity 63% with specificity 57% for a cut off of FG score ≥ 5 and FTI ≥ 4.70. This diagnostic value was weak, with the ROC curve below 50%.

Additionally, The FG score and Testosterone ROC was 25.8% (95% CI 19.4%-61.1%,p>0.05), sensitivity 38% and specificity 39%, with the cut off of ≥ 30.7 for testosterone in FG Score > 5.

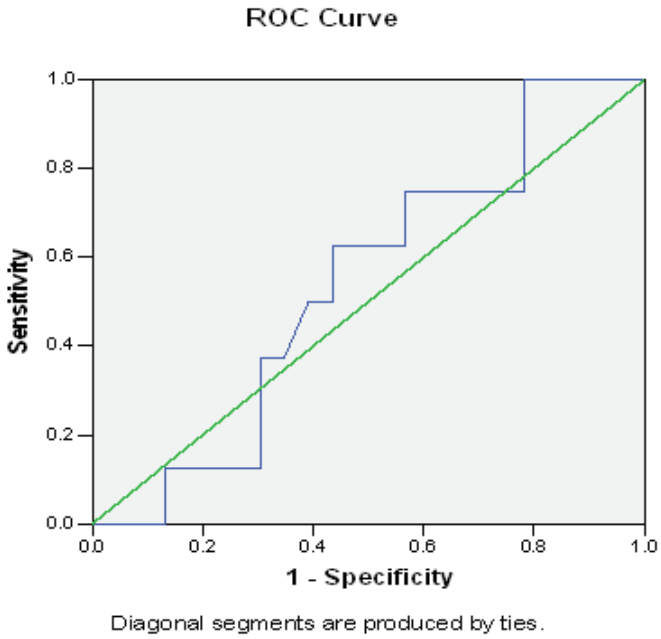

Figure 1: ROC of FG score and FTI.

4. Discussion

We conclude that androgen levels play a significant role in the severity of hirsutism in patients with PCOS. PCOS is the most common endocrine disorder and causes anovulation among women of reproductive-age. PCOS has a clinical spectrum including irregular menses (amenorrhea or oligomenorrhea), signs of androgen excess (hirsutism, acne, and alopecia), infertility, increased insulin resistance, and often-varying degrees of obesity. Of these characteristics, only 5–10% of women show the typical signs of PCOS [3, 7, 11].

Hirsutism is a common disorder among women with PCOS. It is defined as an excessive growth of androgen-dependent hair on women and is the most common clinical manifestation of androgen excessive syndrome with a proportion of 50–80% [10]. Hirsutism is a clinical and undesirable condition in reproductive-age women that is associated with androgen excess. The prevalence of hirsutism in patients with PCOS depends on the ethnic factors and is 40–92% in the US and Europe; however, prevalence is higher in nations with darker skin individuals and lower in Japanese and Asian females [4]. Coskun et al. reported that females in the Mediterranean region of Turkey have a higher density of body hair and they found that 87% of cases had hirsutism in their study. Al-Ruhaily et al. reported hirsutism in 82% of patients with PCOS. In our study, the ratio of hirsute patients with PCOS was 74%. The high ratio of hirsutism in our study was similar to that of other reports from the Mediterranean region and Turkey [10].

Early identification of hyper androgenic women is of great importance. Hirsutism, one of the most important signs of hyperandrogenism, has great value in the diagnosis of hyperandrogenism.

Although the F-G system was simplified, it was difficult to use in the clinical evaluation of hair growth due to various problems. One of the main issues with the F-G system is the cut-off value, which varies in different racial groups. Because of the close relationship of body hirsute with race, genetics and some other population factors, it is very difficult to evaluate hirsutism with universal scoring criteria. Indeed, various studies have suggested different cut-off values for the F-G scoring system in different racial groups. For example, a score of 6 was suggested for Japanese women, 3 for Thai women, 8 for Caucasian women and 10 for Turkish women. In Chinese women, there have been two studies about the cut-off value of the F-G score.

Testosterone circulates in plasma non specifically bound to albumin and specifically bound to sex hormone binding globulin (SHBG); a small fraction is unbound as free testosterone. Testosterone is subject to variation in time and to direct and indirect hormonal changes influencing the menstrual cycle. While hirsutism has been correlated with increased levels of serum androgens, free testosterone has been reported to have a stronger correlation with clinical diagnosis. One study demonstrated that total hair score among hirsute women was most strongly predicted by free testosterone and androstenedione [8, 9, 13, 14].

PCOS is considered to be not only a reproductive endocrinopathy but also a metabolic disorder. Obesity is a prominent feature of PCOS, occurring in 40%–50% of those patients. The effect of obesity on the diagnosis and clinical presentations of PCOS-related syndromes is an important issue.

In this study, the results explained that there was positive correlation between the Free testosterone and Testosterone level, however it still statistically insignificant. The cut off in this population was ≥ 5, it means that the testosterone level was ≥ 30.7. and > 4.70 for Free testosterone index.

With this results showed that the population in Indonesia have a lower level of F-G score compared with other countries. It strengthens with the results of the research in Asian country. They also have a lower level, as explain in previous paragraph. The populations in this study need to be extended and the numbers need to be increases. Even the result was in statistically significant, this study give the picture of hirsutism in Indonesia population and could predict the level of Testosterone and Free testosterone index. It helped to predict the possibility of high androgen level in this study and it could manage earlier. In this study, most of PCOS patient was overweight and obese, however we could not conclude is there any relation that picturing the population about the impact to hirsutism.

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References

[1] R. Li, J. Qiao, D. Yang, S. Li, S. Lu, X. Wu, and Z. Wei, Epidemiology of hirsutism among women of reproductive age in the community: A simplified scoring system, *European Journal of Obstetrics Gynecology and Reproductive Biology*, **163**, no. 2, 165–169, (2012).

[2] J. J. Espinós, J. Calaf, J. Estadella, and M. A. Checa, Hirsutism scoring in polycystic ovary syndrome: Concordance between clinicians' and patients' self-scoring, *Fertility and Sterility*, **94**, no. 7, 2815–2816, (2010).

[3] D. Dewailly, S. Hieronimus, P. Mirakian, and J.-N. Hugues, Polycystic ovary syndrome (PCOS), *Annales d'Endocrinologie*, **71**, no. 1, 8–13, (2010).

[4] M. M. Al-Khawajah and M. A. Fouda Neel, Women with clinically significant hirsutism always have detectable endocrinological abnormalities, *Journal of the European Academy of Dermatology and Venereology*, **9**, no. 3, 226–231, (1997).

[5] H. Cook, K. Brennan, and R. Azziz, Reanalyzing the modified Ferriman-Gallwey score: Is there a simpler method for assessing the extent of hirsutism? *Fertility and Sterility*, **96**, no. 5, 1266–e1, (2011).

[6] S. P. Hertweck, J. L. Yoost, M. E. McClure, Y. Siow, G. N. Brock, K. A. Wintergerst, and M. E. Fallat, Ferriman-Gallwey Scores, Serum Androgen and Mullerian Inhibiting Substance Levels in Hirstute Adolescent Girls, *Journal of Pediatric and Adolescent Gynecology*, **25**, no. 5, 300–304, (2012).

[7] T. Kale-Gurbuz, S. E. Akhan, E. Bastu, A. Telci, A. C. Iyibozkurt, and S. Topuz, Adiponectin, Leptin and Ghrelin Levels in Obese Adolescent Girls with Polycystic Ovary Syndrome, *Journal of Pediatric and Adolescent Gynecology*, **26**, no. 1, 27–30, (2013).

[8] CB. Winters S, *Testosterone synthesis, transport and metabolism*, Humana press, transport and metabolism, 2003.

[9] E. Yasmin, A. H. Balen, and J. H. Barth, The association of body mass index and biochemical hyperandrogenaemia in women with and without polycystic ovary syndrome, *European Journal of Obstetrics Gynecology and Reproductive Biology*, **166**, no. 2, 173–177, (2013).

[10] E. T. Wang, C.-N. Kao, K. Shinkai, L. Pasch, M. I. Cedars, and H. G. Huddleston, Phenotypic comparison of Caucasian and Asian women with polycystic ovary syndrome: A cross-sectional study, *Fertility and Sterility*, **100**, no. 1, 214–218, (2013).

[11] A. M. Matsumoto and W. J. Bremner, Editorial: Serum Testosterone Assays - Accuracy Matters, *Journal of Clinical Endocrinology and Metabolism*, **89**, no. 2, 520–524, (2004).

[12] T.-H. Liou, J.-H. Yang, C.-H. Hsieh, C.-Y. Lee, C.-S. Hsu, and M.-I. Hsu, Clinical and biochemical presentations of polycystic ovary syndrome among obese and nonobese women, *Fertility and Sterility*, **92**, no. 6, 1960–1965, (2009).

[13] X. Zhao, J. Zhong, Y. Mo, X. Chen, Y. Chen, and D. Yang, Association of biochemical hyperandrogenism with type 2 diabetes and obesity in Chinese women with polycystic ovary syndrome, *International Journal of Gynecology and Obstetrics*, **108**, no. 2, 148–151, (2010).

[14] M. Landay, A. Huang, and R. Azziz, Degree of hyperinsulinemia, independent of androgen levels, is an important determinant of the severity of hirsutism in PCOS, *Fertility and Sterility*, **92**, no. 2, 643–647, (2009).