Original paper

Grading of hirsutism based on the Ferriman-Gallwey scoring system in Kosovar women

Besa Gacaferri Lumezi[1], Violeta Lokaj Berisha[1], Hatixhe Latifi Pupovci[1], Afërdita Goçi[2], Ardiana Baloku Hajrushi[1]

[1]Department of Physiology and Immunology, Medical Faculty, University of Prishtina, Prishtina, Kosovo
[2]Child and Adolescent Mental Health Center, University Clinical Center of Kosovo, Prishtina, Kosovo

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Abstract

Introduction: Hirsutism is defined as excess terminal hair that commonly appears in a male pattern in women.

Aim: To examine severity and distribution of hirsutism with Ferriman-Gallwey visual scoring system in hirsute women in Kosovo.

Material and methods: This prospective study included 160 women, 135 with hirsutism and 25 as a control group. The Ferriman-Gallwey score is used to evaluate hirsutism. The examiner scored the subjects on a scale of 0–4 for terminal hair growth on eleven different body areas according to the Ferriman-Gallwey scoring system. An Ferriman-Gallwey score of 8 or more was considered diagnostic of hirsutism. A thorough physical examination with specific emphasis on signs of virilization (including frontal baldness, loss of female body contours, increased muscularity, acne, clitoromegaly, and atrophy of breast) was done in all patients.

Results: The positive family history of hirsutism was present in 63.7%. In 51.1% of women with hirsutism, the menstrual cycle was regular, 25.2% had oligomenorrhea, 13.3% amenorrhea, 7.4% dysmenorrhea, 1.5% polymenorrhea and 1.5% oligomenorrhea and dysmenorrhea. The age group with the highest scoring comprised women under 20 years and 20–29 years group with an average value of 23.9 and 24.8, respectively. In our study population, 40% of the patients had an Ferriman-Gallwey score of 3 for the upper lip and 47% of patients had an Ferriman-Gallwey score of 3 for the chin.

Conclusions: The Ferriman-Gallwey scoring system has a great significance and value to establish the diagnosis of hirsutism and is an acceptable screening method.

Key words: hirsutism, Ferriman-Gallwey score, Kosovar women.

Introduction

Hirsutism is defined as excess terminal hair that commonly appears in a male pattern in women.

Hirsutism is divided into androgen- and non-androgen-induced types. Polycystic ovarian syndrome (PCOS) is the most common cause of hyperandrogenic hirsutism, and idiopathic hirsutism is the most common cause of non-androgen-induced hirsutism. Both idiopathic hirsutism and PCOS account for 95% of hirsutism [1]. Because increased androgen levels may also lead to pilosebaceous responses, such as acne, excessive sebum secretion, or diffuse or localized loss of hair, a dermatologic examination is mandatory [2, 3].

Hirsutism can cause a lot of psychological problems. The affected women may suffer from anxiety and depression. The presence of hirsutism is one of the more important predictors of a lower quality of life among women with PCOS [4]. Unfortunately, many women with hirsutism and some practitioners, still believe this abnormality to be primarily a cosmetic disturbance. Many women consequently frequently seek help first from a beautician, cosmetologist in preference to a physician [5].

The spectrum of hirsutism varies from mild to severe. To quantify hirsutism, different methods are available for the assessment of hair growth in women. Ferriman and Gallwey introduced a scoring system in 1961 incorporating eleven androgen dependent sites such as the lip, chin, chest, upper abdomen, lower abdomen, upper arm, forearm, thigh, lower leg, upper back, and lower back [6].

This scoring system evaluates eleven different body parts, with scores ranging from zero (no excessive terminal hair growth visible) to four (extensive hair growth visible) for each body part evaluated. A maximum score of 36 is possible, but a score of ≥ 8 typically indicates hirsutism, as defined by the 95th percentile of data initially collected by Ferriman [7]. This scoring system has limita-

Address for correspondence: Besa Gacaferri Lumezi MSc, PhD, Department of Physiology and Immunology, Medical Faculty, University of Prishtina, Bulevardi i Deshmoreve p.n., 10 000 Prishtina, Kosovo, phone: +37 744186036, e-mail: besa_gacaferri@yahoo.com
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tions because of the somewhat subjective nature of the assessments and the difficulty of evaluating women who have cosmetically removed their hair [2].

Aim

The aim of this prospective study was to examine severity and distribution of hirsutism with Ferriman-Gallwey visual scoring in hirsute women in Kosovo.

Material and methods

In this diagnostic study we selected 160 women, 135 with hirsutism and 25 as a control group, age 14–46 years. We excluded premenarchal girls, postmenarchal women, women with corticoid therapy and oral contraceptives, pregnant women or women who after initial evaluation did not come for blood sampling.

A detailed history was taken (marital status, infertility, age of hirsutism onset, duration of hirsutism, progression of hirsutism, age at menarche, menstrual irregularities, presence of deepening of the voice, increased muscle mass, androgen alopecia, galactorrhea, decreased breast size, emotional and mental state, other disorders).

Height, weight and a calculation of body mass index (BMI) was obtained. The normal range of BMI was taken as 18–24.9 kg/m^2. Women with BMI of 25–29.9 kg/m^2 were labeled overweight and those having 30 kg/m^2 or more were diagnosed as obese.

Examination for clinical evidence of acne, alopecia, acanthosis nigricans and other sings of virilism was performed.

Visual methods to determine the degree of hirsutism, as originally described by Ferriman and Gallwey, were used. As previously mentioned, the density of terminal hairs at 11 different body sites (the lip, chin, chest, upper abdomen, lower abdomen, upper arm, forearm, thigh, lower leg, upper back, and lower back) were scored from 0 to 4, and the total score was calculated. A single examiner (BGL) performed the scoring assessment of each patient. An Ferriman-Gallwey score of 8 or more was considered diagnostic of hirsutism. A thorough physical examination with specific emphasis on signs of virilization (including frontal baldness, loss of female body contours, increased muscularity, acne, clitoromegaly, and atrophy of breast) was done in all women.

Statistical analysis

The collected data were analyzed using statistic packet InStat 3. Numerical data were presented as an index of structure, arithmetic mean, standard deviation, minimal value and maximal value. To test the hypothesis between the groups, t-test, Mann-Whitney test, a χ^2-test, one-way ANOVA, Kruskal Wallis test and Fisher exact test were conducted with a significant level of $p < 0.05$.

Results

The family history of hirsutism was present in 63.7%. In 51.1% of women with hirsutism, the menstrual cycle was regular, 25.2% had oligomenorrhea, 13.3% amenorrhea, 7.4% dysmenorrhea, 1.5% polymenorrhea and 1.5% oligomenorrhea and dysmenorrhea. With the increasing age, the menstrual cycle has been more commonly regular.

The average BMI of women included in the study was 23.6 ±4.6 kg/m^2 (range: 10.2–40.1 kg/m^2). The median BMI value of women with hirsutism was 23.7 ±4.9 kg/m^2 (range: 10.2–40.1 kg/m^2). The average BMI of the women in the control group was 23.2 ±2.6 kg/m^2 (range: 18.7–28.5 kg/m^2). With the Mann-Whitney test we did not find any significant statistical difference between the average BMI values of women by groups ($p > 0.05$).

The women with hirsutism have been assessed on the chin according to Ferriman-Gallwey score, where score 0 (complete lack of terminal hairs) was present in 16.3% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 9.6%, score 2 (more than minimal terminal hairs) in 13.3%, score 3 (not too large hairs) in 40.7% and score 4 (presence of terminal hairs) in 20% of women with hirsutism. As the age increased, the degree of scoring increased from 1.7 in age under

Table 1. Ferriman-Gallwey score on the chin

Chin	Age group [years]								Total	
	< 20		20–29		30–39		40+			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
0	8	38.1	11	14.7	2	6.3	1	14.3	22	16.3
1	3	14.3	8	10.7	2	6.3	–	–	13	9.6
2	1	4.8	6	8.0	10	31.3	1	14.3	18	13.3
3	6	28.6	32	42.7	13	40.6	4	57.1	55	40.7
4	3	14.3	18	24.0	5	15.6	1	14.3	27	20.0
Total	21	100.0	75	100.0	32	100.0	7	100.0	135	100.0
Mean score	1.7		2.5		2.5		2.6		2.4	

Figure 1. Score 3 in the upper and lower abdomen

20 years to 2.6 in 40+ years, and mean scoring for the total number of women was 2.4 (Table 1).

The women with hirsutism have been assessed on the upper lip according to Ferriman-Gallwey score, where score 0 (complete lack of terminal hairs) was present in 3.7% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 14.8%, score 2 (more than minimal terminal hairs) in 37.8%, score 3 (not too large hairs) in 40.0% and score 4 (presence of terminal hairs) in 3.7% of women with hirsutism. As the age increased, the degree of scoring increased from 1.9 in age under 20 years to 2.4 in 30–39 years, and mean scoring for the total number of women was 2.3.

Assessment of the chest according to Ferriman-Gallwey score was done, where score 0 (complete lack of terminal hairs) was present in 5.9% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 23.0%, score 2 (more than minimal terminal hairs) in 40.0%, score 3 (not too large hairs) in 28.1% (Figure 1) and score 4 (presence of terminal hairs) in 3.0% of women with hirsutism. The mean score for the total number of women was 2.0.

The women with hirsutism have been assessed on the legs according to Ferriman-Gallwey score, where score 0 (complete lack of terminal hairs) was present in 0% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 0%, score 2 (more than minimal terminal hairs) in 4.4%, score 3 (not too large hairs) in 32.6% and score 4 (presence of terminal hairs) in 63% of women with hirsutism, with an average score 3.6 for all women involved in research.

The women with hirsutism have been assessed on the buttocks according to Ferriman-Gallwey score, where score 0 (complete lack of terminal hairs) was present in 0% of women with hirsutism, score 1 (minimal presence

Figure 2. Score 3 on the chest

of terminal hairs) in 11.9%, score 2 (more than minimal terminal hairs) in 29.6%, score 3 (not too large hairs) in 39.3% and score 4 (presence of terminal hairs) in 10.3% of women with hirsutism. The mean scoring for the total number of women was 2.7.

Assessment of the arm according to Ferriman-Gallwey score was done, where score 0 (complete lack of terminal hairs) was present in 0% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 8.9%, score 2 (more than minimal terminal hairs) in 30.4%, score 3 (not too large hairs) in 40.0% and score 4 (presence of terminal hairs) in 20.7% of women with hirsutism. The mean score for the total number of women was 2.7.

The women with hirsutism, have been assessed on the forearms according to Ferriman-Gallwey score, where score 0 (complete lack of terminal hairs) was present in 0% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 51.1%, score 2 (more than minimal terminal hairs) in 25.2%, score 3 (not too large hairs) in 10.4% and score 4 (presence of terminal hairs) (Figure 2) in 3.0% of women with hirsutism. The mean scoring for the total number of women was 1.4.

On the upper back, score 0 was present in 44.4% of women, score 1 in 27.4%, score 2 in 15.6%, score 3 in 8.9% and score 4 in 3.7%. The mean score for the total number of women was 1.0.

On the lower back, score 0 was present in 37.9%, score 1 in 31.9%, score 2 in 17%, score 3 in 9.6% and score 4 in 3.7%. The mean score was 1.1.

The women with hirsutism have been assessed on the upper abdomen according to Ferriman-Gallwey score, where score 0 (complete lack of terminal hairs) was present in 5.2% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 23.7%, score 2 (more than minimal terminal hairs) (Figure 2) in 34.8%, score 3 (not too large hairs) in 30.4% and score 4 (presence of terminal hairs) in 5.9% of women with hirsutism. The mean scoring for the total number of women was 2.1.

Figure 3. Score 4: presence of terminal hairs typically observed in men

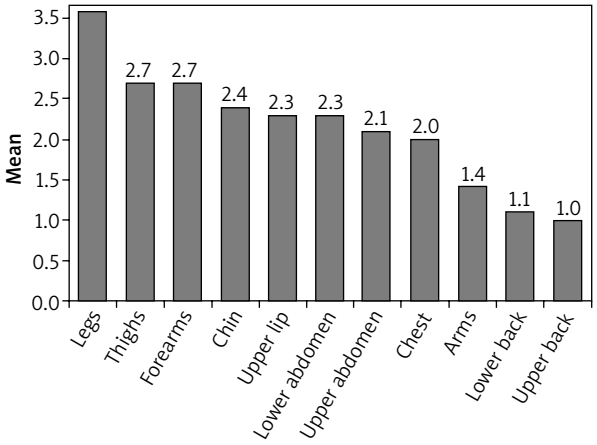

Figure 4. The range of average scoring in different parts of the body

Assessment of the lower abdomen according to Ferriman-Gallwey score was done, where score 0 (complete lack of terminal hairs) was present in 1.5% of women with hirsutism, score 1 (minimal presence of terminal hairs) in 19.3%, score 2 (more than minimal terminal hairs) in 35.6%, score 3 (not too large hairs) (Figure 3) in 36.3% and score 4 (presence of terminal hairs) in 7.4% of women with hirsutism. The mean score for the total number of women was 2.3.

The age group with highest overall scoring were women under 20 years and 20–29 years age group with average values of 23.9 and 24.8 (Table 2), respectively. In our study population, 40% of the patients had an Ferriman-Gallwey score of 3 for the upper lip and 47% of patients had an Ferriman-Gallwey score of 3 for the chin. The range of average scoring in different parts of the body was: 3.6 on the feet, 2.7 on the thighs and arms, 2.4 on the chin, 2.3 on the upper lip, 2.3 on the lower abdomen, 2.1 on the upper abdomen, 2.0 on the chest, 1.4 on the upper arm, 1.1 on the lower back and 1.0 on the upper back (Figure 4).

Discussion

A thorough history and physical examination are essential to evaluate women with hirsutism and to determine which patients need additional diagnostic testing. Family history is important; 50 percent of women with hirsutism have a positive family history of the disorder [7].

Chhabra *et al*. in their study found that 42.5% of women had a positive family history [8] while Ahmad *et al.* found the positive family history only in 25.7% of cases [9]. Ghalib *et al.* have observed that 24.1% of females with hirsutism had a positive family history [10]. Hirsutism was more common in patients with a higher BMI. The increased frequency of hirsutism in overweight women could be explained by increased insulin resistance and more androgen production by adipose tissue. We found that 8.1% of women were obese. The prevalence of obesity was lower than in other studies [11, 12].

Oligoovulation is an unusual and irregular ovulation (usually defined as a 36-day cycle or less than 8 cycles a year). Anovulation is the lack of ovulation when ovula-

Table 2. The overall scoring by Ferriman-Gallwey score

The overall scoring	Age group [years]								Total	
	< 20		20–29		30–39		40+			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
10–14	4	19.0	4	5.3	2	6.3	1	14.3	11	8.1
15–19	3	14.3	14	18.7	14	43.8	3	42.9	34	25.2
20–24	4	19.0	23	30.7	9	28.1	1	14.3	37	27.4
25–29	4	19.0	14	18.7	5	15.6	2	28.6	25	18.5
30–34	3	14.3	12	16.0	2	6.3	–	–	17	12.6
35–39	3	14.3	8	10.7	–	–	–	–	11	8.1
Total	21	100.0	75	100.0	32	100.0	7	100.0	135	100.0
Mean score	23.9		24.8		20.6		19.6		23.4	

tion is expected (postmenopausal and premenopausal women). Anovulation is manifested as irregular menstrual periods when there is variability at intervals, duration and bleeding.

In our study, more than half of menstruating women had a regular menstrual cycle (51.1%), 25.2% had oligomenorrhea and 13.3%. had amenorrhea. Oligoovulation was mostly expressed in women with PCOS, (25 women or 67.6%). Among the etiologic groups there was no significant difference. Unlike our work, Azziz *et al.*'s work showed a significant difference between etiologic groups in terms of oligoovulation, where over 90% of women had ovulatory dysfunction, of which 85% had oligomenorrhea, more than in our work [13, 14].

Ferriman-Gallwey scale is a method of evaluating hirsutism in females. This method was originally published in 1961 by D. Ferriman and JD Gallwey in the *Journal of Clinical Endocrinology* [6]. The method was modified in 2001, including 19 areas, with 10 additional fields: sideburn, the neck, the inside of the thighs, perianal region, forearm, foot, thumb and toes of the foot [14].

Evaluation of women with hirsutism traditionally involves examining the entire body, which many patients and doctors consider invasive [15]. Knochenhauer *et al*. have decided to evaluate the chin and abdomen based on their clinical experience [16].

In our study we used Ferriman-Gallwey scale in 11 androgen-sensitive areas. According to standard deviation, Ferriman-Gallwey scale has been changed in most women with PCOS (26.7 ±7.2), then in congenital adrenal hyperplasia, and least in all of women with idiopathic hirsutism (20.4 ±4.8). In his study, Atallah *et al.* found that Ferriman-Gallwey scale for women with PCOS was 20.1 ±7.8 (139) while for idiopathic hirsutism 16.6 ±6 [17]. Our values are higher, because women with PCOS and idiopathic hirsutism had a higher degree of hirsutism than in Atallah *et al.*'s study. The overall average scoring was 23.4, significantly higher than hirsutism in Azziz study which was 10.5 ±4.1. The highest total scoring was found in women < 20 years and 20–29 years, on average 23.9 and 24.8, respectively.

This scoring system has limitations because of the somewhat subjective nature of the assessments and the difficulty of evaluating women who have cosmetically removed their hair [2].

Conclusions

Hirsutism causes psychological and social problems in women, so it is important to diagnose and treat. Family history is important; 50 percent of women with hirsutism have a positive family history of the disorder. History of menarche, menstrual cycle regularity, and first symptoms of hirsutism are very important for predicting its course and treatment. The Ferriman-Gallwey scoring system was found to be clinically useful. The feet, thighs, arms and chin were observed to have the highest score of androgen-sensitive area of the body. The Ferriman-Gallwey scoring system has a great significance and value to establish the diagnosis of hirsutism and is an acceptable screening method.

Conflict of interest

The authors declare no conflict of interest.

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