# Innovations

## Prevalence and grading of Hirsutism in females; A Systematic Review

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***Abstract : Introduction:*** *Hirsutism is the presence of terminal (coarse) hairs in females in a male-like pattern, affecting 5–15% of women surveyed. It is extremely distressing, especially in young women undergoing the upheaval, both psychosocial and emotional, of adulthood. Hirsutism is usually associated with or a sign of an underlying endocrine disorder. It can also be an isolated condition, referred to as idiopathic hirsutism.[1]This systematic review intends to study prevalence and grading of hirsutism in females.* ***Materials and Methods:*** *The researcher did a thorough study of the previous research literature from journals, research articles, theses and dissertations of their findings. Twenty-one research studies were selected and the sampling technique was the purposive sampling technique. A focus synthesis was used for analyzing the extracted data and publication bias was assessed using the Quadal tool, .***Result and Discussion:*** *After reviewing the previous research literature, it was found that several hirsutism scores for women have been proposed based on visual assessment of hair type and growth. Out of these methods, the modified Ferriman-Gallwey score (mFG) proposed by Hatch et al. is considered as the gold standard for the evaluation of hirsutism.,[2]***Conclusion:*** *This systematic review highlights the prevalence and grading of hirsutism in females.*

***Keywords:*** *Prevalence; Hirsutism; Grading; Females; Ferriman Gallway Score.*

**Introduction:** Hair follicles cover the entire body, and different types of hair are found in different sites. Androgens affect some areas of the human body and increase hair growth rate and also the thickness of terminal hairs. Androgens are also involved in sebum production and may cause this to be excessive. In some women excessive hair growth may occur on the arms, legs, abdomen, breasts and back such that it constitutes the problem of hirsutism. This may also be associated with acne, which may occur not only on the face but on the chest and back.[3]

Hirsutism is defined as the overgrowth of male-type terminal hair in the androgen-sensitive areas of women. [4]The methods used for the clinical evaluation of hirsutism include photographic evaluation, microscopic measurements of hair diameters, and computer-based measurement of photographed hair.[6] However, grading of hair growth according to the modified Ferriman Gallwey (mFG) scale is a simpler and widely used standard method based on a visual scoring system. [5]

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.[3] Therefore, the body examination of patients presenting with excessive hair growth, acne, androgenetic alopecia, and menstrual irregularities should not be neglected to detect hirsutism.

Considering all these criteria, the investigator wanted to know the prevalence and grading of hirsutism in females. Hence, the present study is an attempt to find prevalence and grade hirsutism in females.

**Objectives:**
1. to determine the prevalence of hirsutism in females
2. to grade and assess the severity of hirsutism in females

**Methods:** For this systematic review researcher searched Medline, Embase, Web of knowledge, Scopus, Cinahl, PubMed, Google Scholar, 3ie, trial registers and forward and backward citations of studies publishes. Several relevant journals were searched including Journal of Pakistan Association of Dermatologists, International Journal of Research in Dermatology, Iranian Red Crescent Medical Journal, Journal of Reproductive Biology and Endocrinology, Pakistan Journal of Medical Research, European Journal of Obstetrics & Gynecology and Reproductive Biology, Journal of obesity management, Sri Lanka Journal of Diabetes, Endocrinology and Metabolism etc. The quality of the evidence was assessed with Cochrane risk of bias tool. The study is registered on PROSPERO number:CRD42023462762.

**Exclusion Criteria:** Case studies and dissertation abstracts were excluded. Studies that involved participants with other anomalies or medical conditions were excluded.

**Inclusion Criteria:**

- Studies related to prevalence and grading of hirsutism were included from 2009 to till now
- Randomized control trial, Longitudinal studies with and without control Cross sectional investigations and Retrospective studies with and without control were considered suitable for inclusion.
- No limitation regarding the age of the subjects was imposed.
- All methods of measurement were considered suitable including questionnaire (validated and invalidated), Interviews (Unstructured, semi-structured & Structured) observation and clinical assessment.

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**Methodology of the Study:**

- Population: The population for the present study accorded all the research studies conducted on prevalence and grading of hirsutism in females.
- Sample size: The sample for the present study was considered 21 research studies conducted in India as well as Abroad Countries.
- Sampling technique: The study followed on Purposive sampling technique to collect all the relevant research studies available in the concern of the researcher.
- Nature of the data: Data were Quantitative in nature.
- Data analysis: A focus synthesis was used for analyzing the extracted data and publication bias was assessed using a quadal tool.
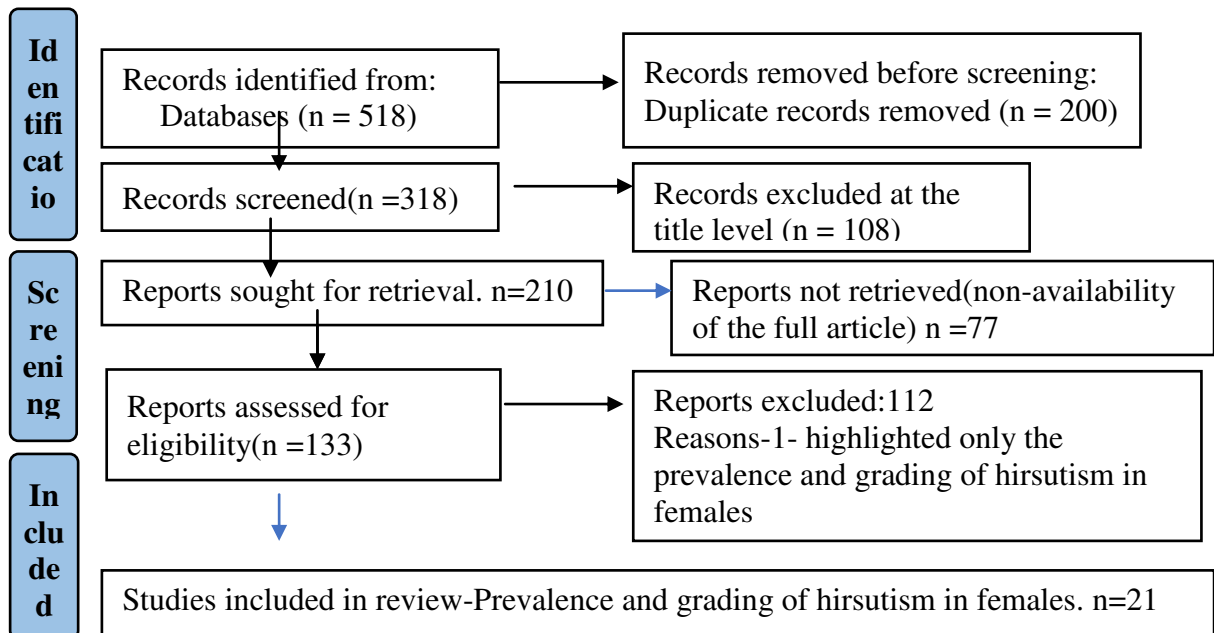
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**Procedure:**



**Fig: 1** PRISMA flowchart depicting the study selection process.[7]

**Result and discussion:**

All the selected 21 literature provided information regarding the prevalence and grading of hirsutism in females. The results of critically reviewed articles are synthesized and presented under the following headings. Figure: 1 describes the process of study selection.

1. **Review on prevalence of hirsutism in females:**

MT Noorbala, P Kefaie revealed that nine hundred high school girls (mean age of 17.26 and range of 15-19 years) were evaluated for prevalence of hirsutism and other hyper-androgenic syndromes and 10.8% suffered from hirsutism. The most prevalent accompanying disorders were acne (42.7% vs 38.4%), hypertrichosis (42% vs 18.3%), first degree relatives' family history of hirsutism (25.5% vs. 7%), and menstrual irregularity (14.6% vs. 10.2%), respectively.[8]

Similarly, a descriptive cross-sectional study has conducted by N P Somasundaram, Fernando, S Kamaladasa and Amarawardena identified that, the prevalence of hirsutism was 56.5% (CI from 45.96 to 67.04) among their study population and lower limb score had the highest mean value of 1.80 while Lip score had the lowest mean value of 0.31. All the 09 variables had statistically significant correlations with the total score while ''lower abdomen score'' had the strongest correlation of 0.82.[2]

R.S. Zreik. R.S and Mona P. Nasrallah conducted a study on prevalence and etiologic factors of Hirsutism in adolescents in 2014. They revealed that, prevalence of hirsutism among the 2378 patients of 9.8%. Mean FGS score of the 233 cases identified as hirsutism was 10.86±3.6. Mean FGS score in the remaining 2145 cases was 2.08±2.1. Mean FGS was higher in the cases with hirsutism and the difference was highly significant ($P$=0.00).[10]

In parallel, a study was conducted by Helen B. Chin, Erica E. Marsh, Janet E. Hall, and Donna D. Baird found that, among 1556 women thirty-seven percent reported being bothered by excess hair, and 10% met the mFG criterion for hirsutism. History of severe facial acne was positively associated with hirsutism (prevalence ratio: 1.90; 95% confidence interval [CI]: 1.30–2.76), as was physician-diagnosed PCOS (2.22, 95% CI: 1.30–3.81). Women with irregular menstrual cycles were also more likely to report hirsutism (1.78, 95% CI: 1.00–3.18).Results were similar using mFG ≥11 and attenuated using mFG ≥4.[11]

The most common prevalent hirsute areas are

- face and chin
- upper lip
- lower limb
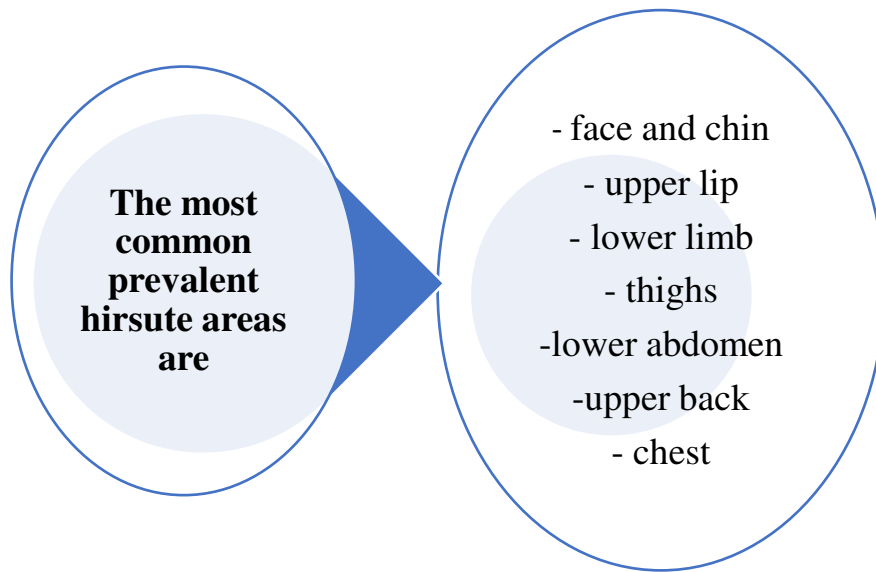- thighs
-lower abdomen
-upper back
- chest

Fig: 2 – common prevalent hirsute areas

**Common causes of hirsutism**

- Obesity
- Menstrual irregularities
- Family history
- Polycystic ovarian syndrome
- Hyperprolactinemia
- Idiopathic hirsutism
- Thyroid imbalance

Fig: 3- Causes of hirsutism

## 2. Review on grading of hirsutism in females:

Filiz Cebeci Kahraman and Sevil Savaş Erdoğan conducted a study on Grading of hirsutism: a practical approach to the modified Ferriman-Gallwey scoring system. This study included 227 patients who were diagnosed with hirsutism and had mFG scores of ≥ 8. Hair distribution and hair growth intensity of nine different body

regions in the mFG score were examined. The result revealed that, terminal hair was present on the chin in 97.4% (n = 221), thighs in 96.5% (n = 219), upper lip in 94.7% (n = 215), and lower abdomen in 92.1% (n = 205), and this was significantly higher compared with the remaining five regions (p < 0.001 for each comparison). Terminal hair growth scored as ≥ 1 was found in 89% of the patients (n = 202) for the combination of the chin, thighs, and upper lip, and in 87.2% (n =198) for the combination of the chin, thighs, and lower abdomen. When the chin and thighs were evaluated together, 75.3% (n = 171) of the patients had ≥ 2 terminal hair growth.[12]

Similarly, another study in Grading of hirsutism based on the Ferriman-Gallwey scoring system in Kosovar women showed, positive family history of hirsutism was present in 63.7%, 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.[13]

Ma. Karen Celine C. Ilagan , Elizabeth Paz-Pacheco , Darwin Z. Totesora , Lyra Ruth Clemente-Chua and Jundelle Romulo K. Jalique conducted a prospective cross-sectional study among 128 Filipino women and were divided into two groups: a polycystic ovary syndrome (PCOS) group (n=28) and a non-PCOS group (n=100). The result showed that, using a cut-off score of 7, a higher proportion of hirsute women (mFG score ≥7) was observed in the PCOS group versus the non-PCOS group (17.9% vs. 5.0%, P=0.025) and mFG score was generally low in both the PCOS and non-PCOS groups, the former exhibited a higher mean score than the latter (4.3±3.0 vs. 2.0±2.2, P<0.001).[14]

Xiao-miao Zhao , Ren-min Ni , Jia Huang, Li-li Huang, Shang-ming Du, Meng-jun Ma, Dan-yu Lin and Dong-zi Yang conducted a cross-sectional study on 2988 women at age of 20-45 years from 16 communities of two urban and two rural regions in Guangdong province from June 2008 to July 2009 using the modified Ferriman and Gallwey (mFG) scoring system. The result revealed that, 149 women (5%) with mFG≥7,314 women (10.5%) with ≥5,747 women with mFG≥2 and the value of hirsutism of mFG were 6 in group of 20- years, 5 in group of 26- years, 4 in groups of 31- years, 36- years and 41-45 years.[15]

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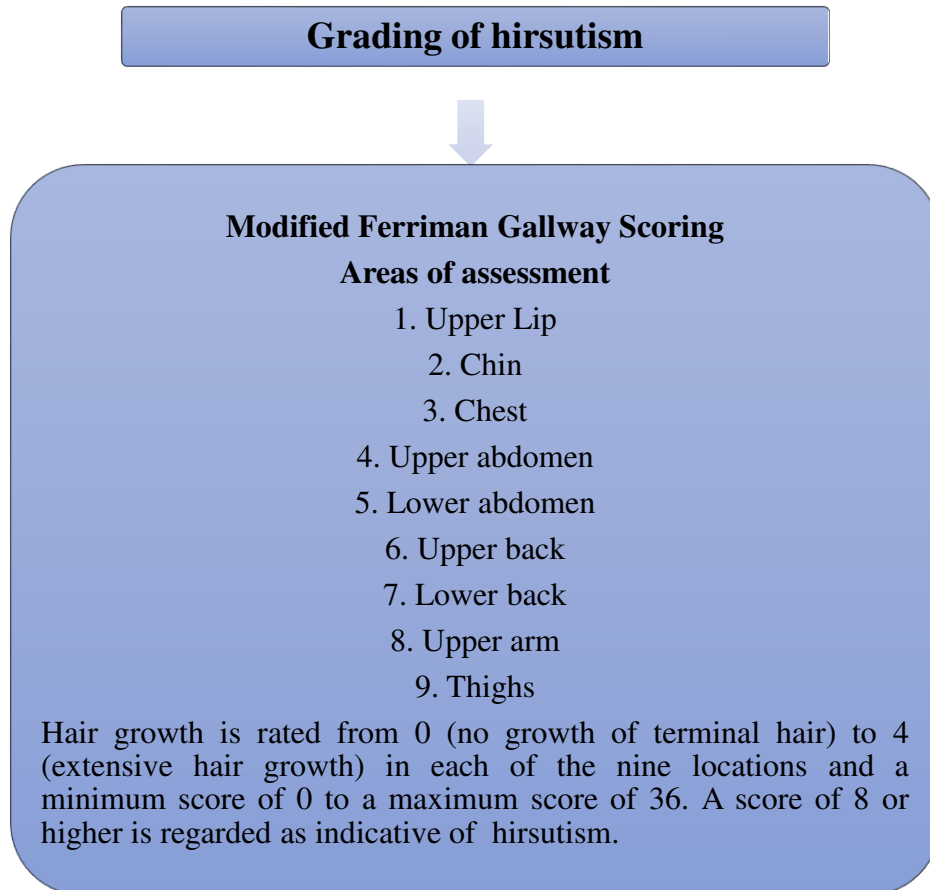
**Grading of hirsutism**

**Modified Ferriman Gallway Scoring**
**Areas of assessment**
1. Upper Lip
2. Chin
3. Chest
4. Upper abdomen
5. Lower abdomen
6. Upper back
7. Lower back
8. Upper arm
9. Thighs

Hair growth is rated from 0 (no growth of terminal hair) to 4 (extensive hair growth) in each of the nine locations and a minimum score of 0 to a maximum score of 36. A score of 8 or higher is regarded as indicative of hirsutism.

Fig: 4- Method of Grading hirsutism

**Conclusion:**

Hirsutism is a common condition characterized by presence of excessive terminal hair among females in androgen dependent areas. It causes physical and psychological wellbeing of women and are negatively influenced. Hence it becomes necessary for investigations to be carried out to determine the probability of underlying diseases. Clinical diagnosis of hirsutism is relatively subjective, based on visual scale on which the degree of excess terminal hair growth is scored. Visual methods of determining the severity of hirsutism usually follow those originally described by Ferriman and Gallwey.

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