

DETERMINING THE PREVALENCE AND SOCIO-DEMOGRAPHIC CORRELATES OF HIRSUTISM AMONG FEMALE RESIDENTS OF MUZAFFARABAD CITY, AJK

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ABSTRACT

Hirsutism is the presence of an excessive growth of the terminal hairs over the body surface of an individual usually among females in a male-like pattern. The primary objective of the study was to determine the prevalence of hirsutism among females of age group 15-49 years in the Muzaffarabad City, Azad Jammu and Kashmir, Pakistan. This was a descriptive cross-sectional study in which participants were selected randomly in the gynecological wards and beauty parlors of the Muzaffarabad region during the period from May to December 2016. The distribution of the body hair was recorded using modified Ferriman-Gallwey (mF-G) scoring system. The age of the participants ranged from 15-49 years. Mean age was 27.1 and standard deviation was 7.34 years. About 64.4 percent of the participants were married and 11.7 percent were obese. The common accompanying disorders were acne (36.4 percent), hypertrichosis (25.3 percent), family history of hirsutism (22.2 percent) and menstrual irregularity (68.5 percent). The prevalence of hirsutism among participants was 43.0 percent. The mean, median and mode of the total mF-G scores were 7.1, 7.0 and 5.0 respectively. The lower abdomen had the highest mean value of 1.38 while lower back had the lowest mean value of 0.25. All the nine variables had significant correlations with the total hirsutism scores however the lower abdomen score had the strongest correlation of 0.83. The 37.0 percent of the participants were from the mild category, 5.6 percent belonged to the moderate category and 0.6 percent belonged to the severe category of the hirsutism according to the mF-G scoring method.

Keywords: Hirsutism androgens, terminal hairs, Acne

INTRODUCTION

Hirsutism is the excessive growth of the dark, thick terminal hairs usually among females in the body areas which are androgen-dependent in a man-like pattern. These androgen-dependent areas include chin, chest, upper lip, breast, back, abdomen, buttocks and thighs (Rudha, Khalil & Abbas, 2017). The degree of hair growth which is

considered excessive may vary, depending on cultural interpretation and ethnic background. Hirsutism is a relatively common problem that can affect 5-10 percent of the women usually of the reproductive age group. Hirsutism is more common in Mediterranean, South Americans and Caucasians as compared to the Asians. The

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prevalence of hirsutism is 7 percent in the United States with an annual economic burden of about 600 million dollars (Somasundaram, Fernando & Kamaladasa, 2015). Hirsute women can have shattered confidence, insecurity about their interpersonal relationships, social phobia and severe psychological sequelae (Sharma, Mahajan, Jindal, Gupta, & Lath, 2012).

Hirsutism is mainly caused by the hair follicles because of exposure to increased level of the androgens. The presence of the substantial amount of the terminal hairs over the body surfaces such as sideburns, chin, lower face and neck indicates an excessive androgen level. Although hirsutism is considered as a purely aesthetic issue, its medical importance is highlighted by the increased prevalence of androgen excess disorders reported among hirsute women. Androgen excess disorders include polycystic ovary syndrome (PCOS), non-classic adrenal hyperplasia, the hyperandrogenic-insulin resistant-acanthosis, nigricans syndrome and androgen-secreting neoplasms (Pate, 2013). Virilization is a severe condition of the hirsutism, which may include male-like pattern balding, deepening of voice, clitoral enlargement and increased bulk of muscle (Hajieh, Mehrnoosh & Neda, 2013).

Hirsutism must be distinguished from the hypertrichosis, a condition which is regarded as an excessive hair growth in a general non-sexual pattern in women. It is autonomous of androgens and usually presents generalized or localized growth of the non-terminal hair (vellus-type) over the body surfaces. Hypertrichosis is usually caused by using drugs, hereditary factors, metabolic or other non-endocrine problems and it can also occur among individuals having some systemic disorder such as anorexia nervosa, tuberculosis, malnutrition, porphyria, juvenile dermatomyositis, hypothyroidism, or even paraneoplastic syndrome (Vulink & Bokkel, 2008).

Physical appearance plays a key role especially for females. They always try to adjust the physical appearance to the common standards, however there is found a wide gap between the beauty canons, which are promoting nowadays and the actual appearance of most of the individuals. Skin conditions such as hirsutism, hair loss or acne arising from a condition may significantly reduce the psychological and social functioning of an

individual. Perception and physical appearance of an individual is therefore inseparable from self-esteem, self-assessment and the self-confidence. Problems with the acceptance of an individual physical appearance can result in mental disorders and cause of the depressive mood. Physical appearance largely affects the adaption of an individual in the society (Krzysztof & Błazej, 2012).

Skin conditions such as hirsutism may significantly reduce the quality of life resulting in embarrassment and shame and negatively affecting self-assessment of a hirsute patient causing isolation and withdrawal. The most prevalent mental problems among the people suffering from the skin conditions included suicidal thoughts and tendencies, mood disorders, anxiety, obsessive and the paranoid conditions. Psycho-dermatological problems include disorders with both dermatological and psychological components present. Most of the hirsute females worry about the likelihood of having a problem, reduced fertility and suffering an alteration of the social acceptance. Hirsutism is also associated with imbalance of hormone or a hormone producing tumor (Schumacher, 2011).

MATERIALS AND METHODS

A descriptive cross sectional study was conducted from May to December 2022 in gynecological hospitals and beauty parlors of the Muzaffarabad. A total number of 162 women were examined randomly by visiting gynecological hospitals and beauty parlor centers of the Muzaffarabad City, Azad Jammu and Kashmir, Pakistan.

Assessment of Degree of the Hirsutism

The severity of the hirsutism was assessed by using the modified Ferriman-Gallwey (mF-G) scoring system. A score of 0 (in case of absence of the terminal hairs) through 4 (presence of high terminal hairs growth) was assigned in each of these body areas. According to the modified Ferriman-Gallwey scoring system (Ferriman and Gallwey, 1961). The severity of the hirsutism was considered as mild hirsute for the score of 8 to16, moderate for 17 to 25, and severe for more than

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Physical Examinations

The height, weight and a calculation of body mass index (BMI) was obtained. Normal range of the BMI was taken as 18 to 24.9 Kg/m². Females with

the BMI 25 to 29.9 were labeled as overweight and those females having 30 or more BMI were labeled as obese.

Table 1.1: Ferriman and Gallwey scoring system

| Site | Grade | Definition |
|---------------|-------|---|
| Upper lip | 1 | A few hairs at outer margin |
| | 2 | A small moustache at outer margins |
| | 3 | A moustache extending halfway form outer margin |
| | 4 | A moustache extending to midline |
| Chin | 1 | A few scattered hairs |
| | 2 | Scattered hairs with small concentrations |
| | 3 | Complete cover, light |
| | 4 | Complete cover, heavy |
| Chest | 1 | Circumoral hairs |
| | 2 | With midline hair in addition |
| | 3 | Fusion of these areas, with three-quarter cover |
| | 4 | Complete cover |
| Upper back | 1 | A few scattered hairs |
| | 2 | Rather more, still scattered |
| | 3 | Complete cover, light |
| | 4 | Complete cover, heavy |
| Lower back | 1 | A sacral tuft of hair |
| | 2 | With some lateral extension |
| | 3 | Three quarter cover |
| | 4 | Complete cover |
| Upper abdomen | 1 | A few midline hairs |
| | 2 | Rather more, still midline |
| | 3 | Half cover |
| | 4 | Full cover |
| Lower abdomen | 1 | A few midline hairs |
| | 2 | A midline streak of hair |
| | 3 | A midline band of hair |
| | 4 | An inverted V-shaped growth |
| Upper arm | 1 | Sparse growth < three quarters |
| | 2 | More than this: cover still incomplete |
| | 3 | Complete cover, light |
| | 4 | Complete cover, heavy |
| Thigh | 1 | Sparse growth < three quarters |
| | 2 | More than this: cover still incomplete |
| | 3 | Complete cover, light |
| | 4 | Complete cover, heavy |

RESULTS

The main purpose of the study was to determine the prevalence of hirsutism among females of age group of 15-49 years in the Muzaffarabad City, Azad Jammu and Kashmir, Pakistan. In total 176 females were initially included based on the

inclusion and exclusion criteria of the study. A total number of 162 females returned the questionnaire. However, 14 females were excluded from final data analysis due to incomplete questionnaire or psychiatric conditions. Therefore, the response rate for this study was about 92.0 percent.

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Body Mass Index (B.M.I)

The body mass index (B.M.I) was underweight in 1.9 percent of the participants, normal in 49.3 percent, overweight in 27.2 percent and obese in

11.7 percent of the participants. Mean value for B.M.I was 23.4 ± 4.1 . The minimum value was 8 and the maximum value was 45 (Table 1.2).

TABLE 1.2 : DISTRIBUTION OF THE WEIGHT CATEGORIES

| B.M.I | Weight status | Frequency (N) | Percentage (%) |
|-------------|---------------|---------------|----------------|
| Underweight | Below 18.5 | 3 | 1.9 |
| Normal | 18.5 - 24.9 | 96 | 49.3 |
| Overweight | 25.0 - 29.9 | 44 | 27.2 |
| Obese | Above 30 | 19 | 11.7 |

Table 1.3 shows the accompanying symptoms or conditions of the hirsutism in the study population. About 36.4 percent of the participants had acne vulgaris. None of the participant had used steroids prior to the study. Hypertrichosis was recorded in about 25.3 percent of the participants. A positive

family history of the hirsutism was obtained in 22.2 percent of the participants. Normal menstrual cycles were reported in 68.5 percent of the females while 31.5 percent of them had irregular menstrual cycles.

TABLE 1.3 : ACCOMPANYING CONDITIONS OR SYMPTOMS OF THE HIRSUTISM

| Variable | Frequency (N) | Percentage (%) |
|------------------------------------|---------------|----------------|
| Acne vulgaris | | |
| Yes | 59 | 36.4 |
| No | 103 | 63.6 |
| Hypertrichosis | | |
| Yes | 41 | 25.3 |
| No | 121 | 74.7 |
| Menstruation | | |
| Regular | 111 | 68.5 |
| Irregular | 51 | 31.5 |
| Family history of hirsutism | | |
| Positive | 36 | 22.2 |
| Negative | 126 | 77.8 |

Table 1.4 shows the findings of the examination for the presence of hirsutism based on the modified Ferriman-Gallwey protocol. At least, 19.1 percent of the participants were completely hairless at the nine objected parts. About 25.9 percent of the study participants had less than 10 terminal hairs particularly in the upper lip (23.5 percent), lower

abdomen (1.7 percent), thigh (12.3 percent), chin (6.8 percent), chest (4.9 percent) and only 0.6 percent on the chest, upper and lower back. More than 10 terminal hairs were seen in 11.1 percent and too much or countless terminal hairs were in only 7.4 percent of the participants.

TABLE 1.4: DISTRIBUTION OF THE TERMINAL HAIRS ACCORDING TO MODIFIED FERRIMAN-GALLWEY METHOD (N=162)

| Body parts | No Hairs | | Fair hairs | | < 10 terminal hairs | | > 10 terminal hairs | | Too much hairs | |
|------------|----------|------|------------|------|---------------------|------|---------------------|-----|----------------|-----|
| | N | % | N | % | N | % | N | % | N | % |
| Upper lip | 40 | 24.7 | 72 | 44.4 | 38 | 23.5 | 7 | 4.3 | 5 | 3.1 |
| Chin | 58 | 35.8 | 88 | 54.3 | 11 | 6.8 | 5 | 3.1 | 0 | 0.0 |
| Chest | 104 | 64.2 | 50 | 30.9 | 8 | 4.9 | 0 | 0.0 | 0 | 0.0 |

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| | | | | | | | | | | |
|---------------|-----|------|----|------|----|------|----|------|----|-----|
| Upper back | 115 | 71.0 | 46 | 28.4 | 1 | 0.6 | 0 | 0.0 | 0 | 0.0 |
| Lower back | 122 | 75.3 | 39 | 24.1 | 1 | 0.6 | 0 | 0.0 | 0 | 0.0 |
| Upper abdomen | 113 | 69.8 | 47 | 29.0 | 2 | 1.2 | 0 | 0.0 | 0 | 0.0 |
| Lower abdomen | 39 | 24.1 | 64 | 39.5 | 29 | 17.9 | 18 | 11.1 | 12 | 7.4 |
| Arm | 31* | 19.1 | 68 | 42.0 | 42 | 25.9 | 18 | 11.1 | 3 | 1.9 |
| Thigh | 60 | 37.0 | 78 | 48.1 | 20 | 12.3 | 3 | 1.9 | 1 | 0.6 |

The higher mean score was reported in the lower abdomen (1.38), followed by arm (1.35), upper lip (1.17), thigh (0.81) and chin (0.78). The lowest score was found in the chest, upper abdomen, upper and lower back, wherein the mean scores for

these body parts were below 0.40. Table 1.5 explains the mean values of the hirsutism scores of the nine body parts among females of age group of 15-49 years in the Muzaffarabad City.

TABLE 1.5: MEAN VALUES OF HIRsutISM SCORES OF THE NINE BODY AREAS

| Parameter | Mean | Median | Spearman correlation | P-value |
|---------------|------|--------|----------------------|---------|
| Upper lip | 1.17 | 1.0 | 0.70 | < 0.001 |
| Chin | 0.78 | 1.0 | 0.62 | < 0.001 |
| Chest | 0.41 | 0.0 | 0.58 | < 0.001 |
| Upper back | 0.30 | 0.0 | 0.48 | < 0.001 |
| Lower back | 0.25 | 0.0 | 0.52 | < 0.001 |
| Upper abdomen | 0.31 | 0.0 | 0.63 | < 0.001 |
| Lower abdomen | 1.38 | 1.0 | 0.83 | < 0.001 |
| Arm | 1.35 | 1.0 | 0.80 | < 0.001 |
| Thigh | 0.81 | 1.0 | 0.75 | < 0.001 |

Prevalence of Hirsutism

The total scores of the hirsutism in this study population based on the modified Ferriman-Gallwey method. The minimum value of modified Ferriman-Gallwey score (mF-G) was 1 and the maximum was 26. About 43.3 percent of the females had a score less than six and 56.7 percent of them had more than six score. If the scores are equal or more than eight are considered as hirsutism, 43.0 percent of the females were hirsute. Therefore, the prevalence of hirsutism among females of the age group of 15-49 years in the Muzaffarabad City with 95 percent the confidence

interval was 43.0 percent. The mean, median and the mode of the total scores were 7.1, 7.0 and 5.0 respectively.

The participants were classified into the following categories according to the degree of hirsutism including mild, (mF-G score of 8-16), moderate, (mF-G score of 17-24) and severe (mF-G score of 24-30). The 37.0 percent of the participants belonged to the moderate category of the hirsutism according to mF-G score, 5.6 percent of them belonged to the mild category and only 0.6 percent belonged to the severe category of the hirsutism as shown in the Table 1.6.

Table 1.6: STRATIFICATION OF THE PARTICIPANTS ACCORDING TO MF-G SCORE

| mF-G Grade | mF-G Score | Frequency (N) | Percentage (%) |
|------------|------------|---------------|----------------|
| Normal | 1-7 | 92 | 56.8 |
| Mild | 8-16 | 60 | 37.0 |
| Moderate | 17-24 | 9 | 5.6 |
| Severe | 25-30 | 1 | 0.6 |
| Total | | 162 | 100.0 |

Table 1.7 summarizes the results for the variables of characteristics of the participants, past medical history and accompanying conditions of hirsutism.

Age, marital status and body mass index were important predictors of hirsutism in the study ($p < 0.001$). The age group 15-26 had 8.4 percent

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the hirsutism, 27-38 had 79.4 percent and age group 39-49 had 81.3 percent of the hirsutism. There was statistically significant relationship between age and hirsutism. Similarly, 60.4 of the married and 10.4 percent of the unmarried participants had hirsutism with a statistically significant difference between these two variables. Regarding the BMI, 24.0 percent normal, 81.8 percent overweight and obese 57.9 percent had hirsutism.

About 72 (43.2) hirsute and 92 (56.8) non-hirsute participants were evaluated for the accompanying conditions indicating that 47.5 percent of the hirsute participants had suffered from the acne and among non-hirsute participants, 41.2 percent had not suffered from acne. There was found no statistically significant association between

hirsutism and the acne ($p=0.431$). The most common accompanying condition among hirsute and non-hirsute participants was found acne showing that about 36.4 percent of the participants had suffered from acne vulgaris. About 53.7 percent of the hirsute and 40.0 percent of the non-hirsute participants had hypertrichosis with no significant relationship ($p=0.128$). Thirty-four percent of the hirsute participants and 46.0 percent of non-hirsute participants had family history of the hirsutism ($p=0.215$). In study of the menstrual history of the participants, 48 percent hirsute and 41.8 percent non-hirsute participants had irregular history of menstruation. There was no significant relationship between prevalence of hirsutism and the menstrual irregularities in the participants ($p=0.465$).

Table 1.7: Accompanying symptoms in hirsute and non-hirsute participants

| Accompanying conditions of hirsutism | Yes | | No | | Total | | P-value |
|--------------------------------------|-----|------|----|-------|-------|------|---------|
| | N | % | N | % | N | % | |
| Age | | | | | | | |
| 15-26 years | 7 | 8.4 | 76 | 91.6 | 83 | 51.2 | 0.001 |
| 27-38 years | 50 | 79.4 | 13 | 20.6 | 63 | 38.9 | |
| 39-49 years | 13 | 81.3 | 3 | 18.8 | 16 | 9.9 | |
| Marital status | | | | | | | |
| Married | 64 | 60.4 | 42 | 39.6 | 106 | 65.4 | 0.001 |
| Unmarried | 6 | 10.7 | 50 | 89.3 | 56 | 34.6 | |
| B.M.I | | | | | | | |
| Underweight (below 18.5) | 0 | 0.0 | 3 | 100.0 | 3 | 1.9 | 0.001 |
| Normal (18.5-24.9) | 23 | 24.0 | 73 | 76.0 | 96 | 49.3 | |
| Overweight (25.0-29.9) | 36 | 81.8 | 6 | 18.2 | 44 | 27.2 | |
| Obese (above 30) | 11 | 57.9 | 8 | 42.1 | 19 | 11.7 | |
| Acne | | | | | | | |
| Yes | 28 | 47.5 | 31 | 52.5 | 59 | 36.4 | 0.431 |
| No | 42 | 41.2 | 60 | 58.2 | 103 | 63.6 | |
| Hypertrichosis | | | | | | | |
| Yes | 22 | 53.7 | 19 | 46.3 | 41 | 25.3 | 0.128 |
| No | 48 | 40.0 | 72 | 60.0 | 121 | 74.7 | |
| Menstruation | | | | | | | |
| Regular | 24 | 48.0 | 26 | 52.0 | 111 | 68.5 | 0.465 |
| Irregular | 46 | 41.8 | 64 | 58.2 | 51 | 31.5 | |
| Family history of hirsutism | | | | | | | |
| Positive | 12 | 34.3 | 23 | 65.7 | 36 | 22.2 | 0.215 |
| Negative | 58 | 46.0 | 68 | 54.0 | 126 | 77.8 | |

DISCUSSION

Hirsutism is a clinical problem which is commonly present among females. However, it must be differentiated from the hypertrichosis which is

mainly characterized by an excessive growth of hairs. It is not associated with excess levels of androgen compared to hirsutism and is generalized in nature. There have been proposed various

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methods to evaluate individuals suspected of hirsutism based on the visual assessment of type and growth of hairs. In 1961, Ferriman and Gallwey explained a protocol mainly based on the presence of hair growth in 11 androgen-sensitive areas and then in 1981, Hatch and colleagues suggested a method including scoring of the 9 out of 11 areas assessed by the Ferriman and Gallwey, excluding lower arms and legs. This method is usually termed as modified Ferriman and Gallwey (mF-G), is the most commonly used method for the assessment of hirsutism (Hatch et al., 1981).

The study population was divided into three main age groups based on mF-G scoring method. The first group was comprised about 51.2 percent of the participants, had a prevalence of hirsutism at 8.4 percent. The second group was comprised about 38.9 percent of the participants, had a prevalence of hirsutism at 79.4 percent. The third group was comprised 9.9 percent of the population, had a prevalence of hirsutism at 81.3 percent. The participants with prevalence of 79.4 percent and 81.3 percent might be named as “endangered group”. Hence, there is a need of urgent diagnostic steps and follow-up measures together with therapeutic methods if needed.

The mean value for B.M.I was 23.4 ± 4.1 in this study. The minimum value was 8 and the maximum value was 45. A trend towards obesity as hirsutism score was higher among overweight and obese as compared to normal or underweight participants.

The prevalence of acne was also determined in this study. It was reported that about 47.5 percent of the hirsute participants and 52.5 percent of the non-hirsute participants suffered from the acne. However, the difference was not statistically significant. Similarly, a study conducted in Spain (Peserico et al., 2010) found that 119 women were affected by the acne as compared to 35 healthy women without acne. Another study conducted among university students in Italy stated that about 46 participants had suffered from acne (Betti et al., 2009). The difference may stem from various factors such as age, sample size and considering the common source of both illnesses including hirsutism and acne.

In this study, about 48.0 percent of the hirsute participants and 52.0 percent of the non-hirsute participants had the menstrual disorders. The

difference between these two groups was however not statistically significant. A study conducted in Europe showed that among women who were affected by the menstrual disorders, the percentage of hirsutism was 92 percent (Adams, Polson & Franks, 2008). Likewise, a study conducted in Rasht reported that about 32 percent of the hirsute women had menstrual disorders (Jalali, 2004).

In this study, 53.7 percent of the hirsute participants and 46.3 percent of the non-hirsute participants had the hypertrichosis. The difference in the percentage of the hypertrichosis among both groups of hirsute and non-hirsute participants was not statistically significant. There was found little trace of the hypertrichosis in a review of many studies of hirsutism. A study conducted among European women analyzed that about 14 percent of the hirsute women had positive family history of the hirsutism (McKnight, 2002). In this study, about 34.3 percent of the hirsute participants had positive family history of the hirsutism and the difference was also not statistically significant.

In this study, the main contributor to the total body hirsutism scores and the highest mean score was found in the lower abdomen with a mean score of 1.38. The upper arm ranked the second among the 9 regions, with the mean score of 1.35, which is preceded by the upper lip. The finding was in comparison with a Turkish study reporting that the main contributor area to total body hirsutism scores was the lower abdomen with a highest mean score of 2.13 (Doner and Ekmekci., 2013). The finding from this study was the low impact areas such as upper back, lower back, chin and chest and less contributing effect to the total score of hirsutism, with a mean score ranged from 0.80-0.25, was like a study conducted in China where upper and lower back, chin, chest and upper abdomen had low mean scores (Li et al., 2012). The study also showed a significant relationship between hirsutism score and the participants means of the nine body areas.

In this study, the most affected area of the body was the lower abdomen, the upper lip, arm and thigh and the least one was chin, chest and upper and lower back. Hirsutism affects females differently. A variety of the body areas may be affected in different participants. This is because of variable sensitivity to the androgens found in hair follicles of various regions of the body. It is reported that certain skin areas are highly sensitive and serve as

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better indicators of the hirsutism. In comparison with the other studies, the most affected areas were the upper lip, lower abdomen and thighs.

Most of the participants (37.0 percent) in this study belonged to the mild category of hirsutism based on the total mF-G scores followed by the 5.6 percent to the moderate and 0.6 percent to the severe category of the hirsutism. This finding was comparable to a study conducted in India reporting that 32.5 percent of the participants had mild, 5.5 percent had moderate and 15 percent had severe hirsutism (Lilhare *et al.*, 2012). Similarly, another study conducted in Europe found these rates to be 39 percent, 45 percent, and 11 percent respectively (Adams *et al.*, 2008b). On the other hand, a study conducted in Iran reported that mild hirsutism was 65 percent, moderate hirsutism was 32.5 percent and the severe hirsutism was 2.5 percent according to the mF-G method (Ansarin *et al.*, 2007). A study conducted among Kashmiri women revealed that the prevalence of mild hirsutism was 10.1 percent and that of moderate hirsutism was 0.4 percent (Zargar *et al.*, 2012). The difference in the findings may be due to the limitation to consider all the possible androgenic areas and the subjective nature of the mF-G scores (Bode *et al.*, 2012).

In this study, about 90.0 percent of the participants had used treatment while 10.0 percent had not used any kind of treatment for their disease. A study conducted in Abbottabad, Pakistan reported that about 72.0 percent of participants had used treatment for their disease (Anjum *et al.*, 2016). The most commonly methods were physical practices including shaving, plucking and electrolyzing. The difference in the findings could be due to the cost, availability and to assess health care facilities in addition to personal preferences of the participants about their choice of the methods.

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