

Psychosocial Impairment as a Possible Cause of Sexual Dysfunction among Young Men with Mild Androgenetic Alopecia: A Cross-sectional Crowdsourcing Web-based Study

Alejandro Molina-Leyva¹, Isabel Caparros-del Moral², Pilar Gomez-Avivar¹, Mercedes Alcalde-Alonso¹, Jose Juan Jimenez-Moleon³

¹Department of Dermatology, Complejo Hospitalario Torrecárdenas, Almería, Spain; ²Unit of Psychiatry, Hospital de Huercal Overa, Almería, Spain; ³Department of Preventive Medicine and Public Health, Instituto de Investigación Biosanitaria ibs, Granada, Hospital Universitario de Granada/Universidad de Granada, Spain

Corresponding author:

Alejandro Molina-Leyva, MD
Departamento de Dermatología
Hospital Torrecárdenas. Paraje de Torrecárdenas S/N
04009. Almería
Spain
alejandromolinaleyva@gmail.com

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ABSTRACT Finasteride 1 mg, one of the main treatments for male androgenetic alopecia (MAGA), may produce sexual dysfunction, but young men with MAGA could experience high psychosocial impairment because of changes in body image. Dissatisfaction with body image has been linked to an increase in problems with sexual function. To date no study has considered the possible effect of psychological impairment on sexual function of men with MAGA. Aim of our study was to explore the effect of psychosocial impairment produced by hair loss on the sexual function of men with MAGA. Patients and methods: Cross-sectional design. In total, 190 men with MAGA ranging 18-40 years old were recruited from an Internet online community. Participants completed an online survey comprising the SKINDEX-29 and the Massachusetts General Hospital Sex Functioning Questionnaire. Individuals with MAGA and moderate to severe psychosocial impairment had a higher risk of sexual dysfunction – adjusted odds ratio 2.1 (1.2-4.0; $P=0.02$) – compared with subjects with mild to absent impairment. Sexual desire and sexual arousal were the most affected elements of sexual response, but an increase in erectile dysfunction and reduced global satisfaction were also reported. We present the first study exploring the influence of MAGA psychosocial impairment on sexual function. Men between 18 and 40 years of age with moderate to severe MAGA psychosocial morbidity were found to have an increased risk of sexual dysfunction. Assessment of psychological morbidity and sexual function could be critical in patients with MAGA, particularly when considering treatment with finasteride.

KEY WORDS: androgenetic alopecia; male; psychological sexual dysfunction; psychosocial aspects; cross-sectional study

INTRODUCTION

Male androgenetic alopecia (MAGA) is the main cause of alopecia in men. Its frequency increases

with age and affects up to 80% of Caucasian males over their lifetime (1). Hair is an important element of

body image and identity (2,3). Even partial hair loss can lead to psychological disorders and have a negative impact on quality of life, especially in young individuals (4-7). Studies of its psychological effects have shown that subjects with MAGA feel less physically attractive and sexually desirable than normal-haired individuals (2,8). Dissatisfaction with body image has been linked, in turn, to an increase in problems with sexual function (9). Thus, subjects with MAGA could present increased problems with sexual function because of the change in their physical appearance.

Finasteride is the most effective available treatment for MAGA, at the level of evidence 1 and with the highest strength of recommendation in present guidelines (1). But it is associated with an increased risk of sexual dysfunction that can last after treatment discontinuation (10). Still, to date no study in the field of sexual dysfunction and MAGA has considered the possible effect of psychological impairment on sexual function (11,12). The objective of this study is to explore the effect of psychosocial impairment due to hair loss in the sexual function of men with MAGA.

PATIENTS AND METHODS

Patients

We performed a cross-sectional study between February 1, 2013 and May 1, 2013 using an online survey. The online survey was hosted in one of the biggest Spanish online communities for patients with alopecia, "recuperarpelo.com". It has over 25 000 users and over 360 000 discussion topics. After contacting the administrative team of www.recuperarpelo.com, a discussion topic was published in the forum, explaining in detail the characteristics and intended use of the data of study. Users over 18 years with a MAGA diagnosis were invited to complete an online survey. The ethics committee of the Hospital Universitario of Granada approved this study. Inclusion criteria were age between 18 and 40 and Spanish nationality. Exclusion criteria were female sex, treatment for any psychiatric, nervous system, or peripheral vascular disorders, heart or kidney disease, and history of surgical or radiation treatment for prostate cancer.

Main outcome measures

Our main variables of interest were the presence or absence of sexual dysfunction and psychosocial impairment secondary to MAGA. For this reason, the Massachusetts General Hospital-Sexual Functioning Questionnaire (MGH-SFQ) was chosen to assess sexual function (13). The MGH-SFQ is a self-administered questionnaire designed to detect problems with sexual function and has been validated in a Spanish pop-

ulation (14). Five items address the different phases of the sexual cycle: desire, arousal, orgasm, erection, and global sexual satisfaction. Each of these is scored from 0 (completely reduced) to 4 (normal). High scores indicate better sexual functioning. Scores under 4 in a particular item of the questionnaire are indicative of dysfunction regarding that element of the sexual response. A score under 4 in at least one item of the MGH-SFQ was considered sexual dysfunction.

The functional scale of Skindex-29, with the modification for alopecia suggested by Sung-Hyub Han *et al.*, was used to assess the psychosocial impact of MAGA (15,16). Skindex-29 is a self-administered questionnaire, likewise validated in a Spanish population, designed to measure the impact of dermatological disorders on the quality of life (17). It contains three scales: "symptoms" referring to discomfort and physical limitations, "emotions" or feelings of depression, anger, shame, and fear, and "functioning", which refers to cognitive or social impairment stemming from the psychosocial dimension. We worked with the "functioning" scale – our main variable of interest – that we referred to as "psychosocial impairment". Each item is assessed using a Likert scale of 0 (never) to 4 (all the time). The scale scores are transformed to a linear scale of 100, in which 0 represents no impact on health related quality of life (HRQOL) and 100 maximum impact on HRQOL (16). Various methods have been proposed to categorize the results of Skindex-29 (18,19). We opted to use that of Prinsen *et al.*, according to which results ≥ 32 on the "functioning" scale are indicative of moderate to severe psychosocial impairment ($r=0.79$, sensitivity 0.83, specificity 0.88, area under the curve 0.91) (19).

MAGA severity was self-reported by patients in view of a diagram depicting the Hamilton-Norwood scale provided within the online survey (20). Sociodemographic and MAGA treatment data were also collected.

Statistical analysis

Descriptive statistics were performed to explore the characteristics of the subjects. Continuous data were expressed as mean and standard deviation (SD). Nominal data were expressed as absolute and relative frequencies. Normality of the variables was checked by means of the Kolmogorov-Smirnov test. The Mann-Whitney Test was used for bivariate comparisons. The χ^2 test or Fisher's Exact Test were used for nominal data when necessary. The main variables were the presence of impaired sexual function (MGH-SFQ under 4 in one item) and moderate to severe psychosocial morbidity (Skindex-29 functioning scale equal to or higher than 32) (15,20). Odds ratios (OR) with 95% confidence intervals were calculated to estimate the strength of association between the

Table 1. Sociodemographic and clinical characteristics of study participants

	Total N=190	Sexual dysfunction N=78	No sexual dysfunction N=112	P
Age (years)	26.3 (5.4)	26.5 (5.2)	26.1 (5.5)	0.6
Educational level				0.5
Secondary	28 (14.7)	13 (16.7)	15 (13.4)	
Academic	162 (85.0)	65 (83.3)	97 (86.6)	
Employment status				0.6
Student	81 (42.6)	33 (42.3)	48 (42.9)	
Employed	85 (44.7)	33 (42.3)	52 (46.4)	
Unemployed	24 (12.6)	12 (15.4)	12 (10.7)	
Place of residence				0.2
Urban	165 (86.8)	65 (83.3)	100 (89.3)	
Rural	25 (13.2)	13 (16.7)	12 (10.7)	
MAGA severity				0.2
I	108 (56.8)	50 (64.1)	58 (51.8)	
II	42 (22.1)	15 (19.2)	27 (24.1)	
III≤	40 (21.1)	13 (16.7)	27 (24.1)	
Age of onset (years)	19.5 (3.5)	19.0 (3.1)	19.9 (3.6)	0.03
Finasteride 1mg	74 (38.9)	34 (43.6)	40 (35.7)	0.3
Consulted a dermatologist	152 (80.0)	65 (83.3)	87 (77.7)	0.3

Data are expressed as mean (standard deviation) and as number (percentage) Sexual dysfunction: score less than 4 in at least one item of the Massachusetts General Hospital Functioning Questionnaire. *P* values are referred to the comparison of individuals with moderate to severe psychological impairment vs. individuals with mild to absent psychological impairment.

identified variables. Significance was set at $P < 0.05$. Models of logistic regression were computed by to explore the factors associated with sexual dysfunction. Epidemiological and statistical criteria were used to model variable selection (21,22). The effect of each exploratory variable in the model and its significance were studied: if the variable improved the model fit and adequacy (based on likelihood ratio criteria and significance of the parameter) it was kept; otherwise, the variable was excluded. Different models were fitted with respect to the factors related to sexual dysfunction and psychosocial morbidity. The model was checked for pair-wise interaction between covariates, and interactions with age were also considered. Potential confounding covariates were studied using a change of significance of the parameters in the model or a change of 30% of its value (23). The goodness of fit of the model was assessed using the Hosmer-Lemeshow test. Analyses were performed using the Stata statistical software (version 11.0).

RESULTS

Participants and socio-demographic features

Between February 1, 2013 and May 1, 2013, 203

individuals completed the online survey. Nine participants under treatment for anxiety and four participants under treatment for depression were excluded. Therefore, analysis involved 190 Spanish subjects with MAGA, aged 18-40. Table 1 and Table 2 summarize and compare the sociodemographic and clinical characteristics of the participants. Most subjects showed early stages of MAGA, with 78.9% (150/190) reporting I-II severity on the Hamilton-Norwood scale. It is also remarkable that 80.0% (152/190) of these individuals had consulted at least one dermatologist because of MAGA.

Main outcomes

Skindex-29 results showed that 58.4% (111/190) of subjects had moderate to severe functional impairment (that is, psychosocial impairment), with a mean score of 43.1/100 (28.8), and a median of 43.7/100 (16.6-66.7) (25th-75th percentile). Subjects with moderate to severe psychosocial impairment had consulted a dermatologist because of MAGA 2.3 times more frequently than subjects with mild to absent psychosocial impairment OR 2.3 (CI 95% 1.1-4.9; $P=0.02$).

Results of the MGH-SFQ showed that 41.0% (78/190) of subjects had alterations in some element

Table 2. Frequencies of sexual dysfunction according to the Massachusetts General Hospital Sex Functioning Questionnaire (MGH-SFQ)

	Total N=190	Moderate to severe psychological impairment N=111	Mild to absent psychological impairment N=79	P
Sexual dysfunction	78 (41.0)	54 (48.6)	24 (30.4)	0.01
Desire	47 (24.7)	36 (32.4)	11 (13.9)	0.004
Excitement	47 (24.7)	36 (32.4)	11 (13.9)	0.006
Erection	36 (18.9)	26 (23.4)	9 (12.6)	0.06
Orgasm	33 (17.4)	19 (17.1)	14 (17.7)	0.7
Global sexual satisfaction	56 (29.5)	38 (34.2)	18 (22.8)	0.09

Data are expressed as number (percentage). Moderate to severe psychosocial impairment: SKINDEX-29 functioning scale ≥ 32 . Mild to absent psychosocial impairment: SKINDEX-29 functioning scale < 32 . Sexual dysfunction: score less than 4 in at least one item of the Massachusetts General Hospital Functioning Questionnaire. P values are referred to the comparison of individuals with moderate to severe psychological impairment vs. individuals with mild to absent psychological impairment

of sexual response (Table 2). Those with moderate to severe psychosocial impairment due to MAGA experienced decreased sexual desire, sexual arousal, erectile dysfunction, and diminished global sexual satisfaction more frequently.

Multivariate analyses

A multivariable model of logistic regression was built. Multivariate analysis showed that age OR 1.1 (CI 95% 1.0-1.2; $P=0.02$), age of onset of MAGA 0.8 (CI 95% 0.7-0.9; $P=0.001$), and psychosocial impairment 2.3 (CI 95% 1.2-4.5; $P=0.02$) were independent risk factors of sexual dysfunction in individuals with MAGA (Figure 1). Similar multivariable models were built for each element of sexual response (Figure 2). Presence of moderate to severe psychosocial impairment implied an independent and significantly higher risk of presenting decreased sexual desire, OR 3.3 (CI 95% 1.5-8.0; $P=0.003$) and decreased sexual arousal OR 3.3 (CI 95% 1.5-7.9; $P=0.02$) and a non-significant increase in erectile dysfunction OR 2.2 (CI 95% 0.9-5.4; $P=0.06$) and diminished global sexual satisfaction OR 1.8 (CI 95% 0.9-4.0; $P=0.08$).

DISCUSSION

Key results

The results of our study indicate that individuals with MAGA, between 18-40 years of age, with moderate to severe psychosocial impairment (functional scale Skindex-29 ≥ 32) may have an increased risk of impaired sexual function as compared with subjects with MAGA with mild or no psychosocial distress. This risk is significantly increased in relation to sexual desire and arousal, and not significantly related to erectile function and global sexual satisfaction.

Sexual self-consciousness

MAGA can impair social interactions of individuals, decreasing self-esteem and increasing public self-consciousness (2). Public self-consciousness refers to a personality predisposition in which the subject focuses his attention on observable physical aspects of oneself in social interactions (24). Individuals with MAGA with increased public self-consciousness could feel less attractive and sexually desirable (2). A similar perception known as sexual self-consciousness has also been described, in which individuals that give undue weight to their body image experience an increased risk of sexual dysfunction, especially related

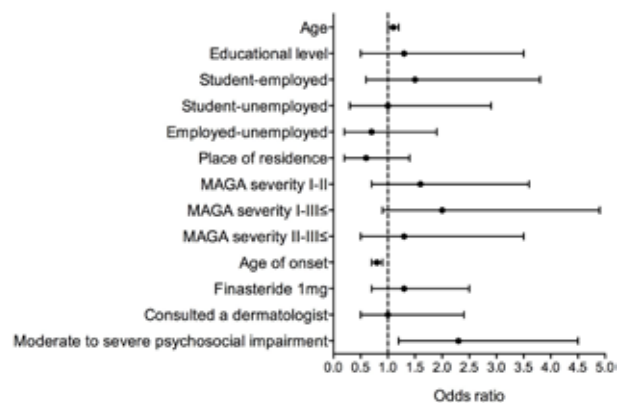


Figure 1. Multivariate logistic regression analysis of potential factors linked to sexual dysfunction in men with MAGA. (MAGA severity: Hamilton-Norwood scale. Moderate to severe psychosocial impairment: SKINDEX-29 functioning scale ≥ 32 . Variables included in the model: age, educational level, employment status, place of residence, MAGA severity, age of onset, finasteride 1 mg, consulted a dermatologist, moderate to severe psychosocial impairment.)

to sexual desire and global sexual satisfaction, and probably related to erectile function as well (9,25-28). Individuals with high levels of sexual self-consciousness experience anxiety about their physical appearance during sexual activity; the fact that they have difficulty relaxing and focusing on sex eventually leads to problems with sexual function (9).

Our group of subjects with MAGA with moderate to severe psychosocial impairment includes individuals experiencing high public self-consciousness, which implies heightened body awareness during social interactions (public self-consciousness) and also during sexual activity (sexual self-consciousness) that could lead to an increase in sexual dysfunctions (2,9). Our results showed an independent and significant association between psychological impairment and decreased sexual desire and arousal, which agrees with the hypothesis of sexual self-consciousness. The correlation between earlier MAGA onset and sexual dysfunction also supports this hypothesis. Young individuals prone to placing more importance on physical appearance would be more insecure regarding changes in body appearance and hence more vulnerable to psychological consequences (26).

Finasteride

According to the available scientific evidence, we observed an increase (non-significant) in alterations of the different elements of sexual response associated with the use of finasteride 1 mg (10). Finasteride 1 mg prescribing information states: "The most common adverse reactions, reported in $\geq 1\%$ of patients treated with finasteride 1 mg and greater than in patients treated with placebo are: decreased libido, erectile dysfunction and ejaculation disorder" (10).

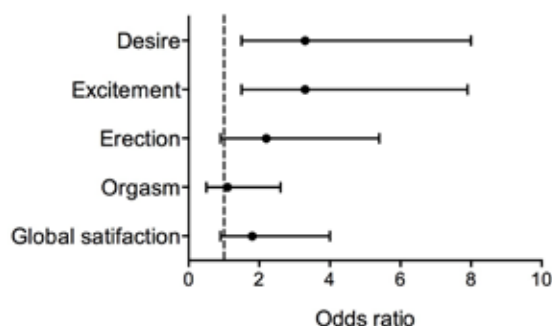


Figure 2. Multivariate logistic regression analysis exploring the effect of moderate to severe psychosocial impairment in dysfunctions of the different phases of human sexual response in men with MAGA. (Variables included in the model: age, educational level, employment status, place of residence, MAGA severity (Hamilton-Norwood scale), age of onset, finasteride 1 mg, consulted a dermatologist.)

Decreased sexual desire (libido) and arousal are the more frequent sexual dysfunctions associated with the use of finasteride (29,30). Our results showed that psychosocial impairment was significantly associated with a decreased sexual desire and arousal, independently from the use of finasteride 1 mg (Figure 2). No other study to date in the field of sexual dysfunction and finasteride has considered the potential impact of psychological variables in this relationship. Could psychological impairment confound the relationship between finasteride and sexual dysfunction in men with MAGA? We therefore believe that conducting further studies including variables for assessing psychological impact is a high priority.

Generalizability

Regarding to the external validity of our sample, we want to emphasize that nearly 80% of the participants of our study had consulted at least one dermatologist regarding their MAGA. The fact that these individuals participated in an online community for alopecia suggests they are more concerned about the impact of alopecia on their everyday life. Seeking dermatological care for MAGA is factor associated with greater psychosocial impairment (2,3,15). In our interpretation, users of an alopecia Internet community may share a profile – young, Internet user, concerned about the MAGA – and be more likely to consult a dermatologist more readily than a sample of the general population.

Limitations

We acknowledge some methodological limitations in our study that should be considered when interpreting the results: 1) Sample size is limited. A larger sample could make some borderline associations, like psychosocial impairment and erectile dysfunction, significant. 2) The recruitment of patients through an online survey may have resulted in a differential selection bias, as participants could have a greater awareness of MAGA and its impact (3). For the purposes of our study, however, the method of sample selection was very suitable in that online recruitment led us to a large sample of individuals with intense MAGA-related psychological impact. 3) Non-Spanish subjects were not included because cultural differences can influence psychological constructs of MAGA and sexual function, thereby limiting the external validity of results (22,31,32). 4) Subjects over 40 years of age were not included in the analysis, which limits the external validity of our results. Still, we believe that the population aged 18-40 is the most important age group in terms of willingness

to find treatment and concern about quality of life impact regarding MAGA (2,21,22,32,33). Finasteride clinical trials have been performed with individuals in this age range (10). 5) The diagnosis and degree of MAGA were not reported by a dermatologist, yet the self-reported diagnosis of MAGA, as in our study, has proven valid for diagnosis and disease severity assessment (3,20,34). 6) Due to the cross-sectional design of the study, assumptions and sense of causal relations should be taken with caution.

Considering these limitations, we believe the results of this study should serve as a wake-up call to the dermatology community to reconsider the importance of psychosocial impairment in patients with MAGA in view of its potential impact on sexual function. Primarily, though finasteride is the most effective and widespread treatment for MAGA to date, it is associated with changes in sexual function (1,10-12). Thus, identification of subjects with MAGA with a high-risk profile of sexual dysfunction could have important therapeutic implications.

CONCLUSION

In conclusion, we present the results of the first study investigating the influence of psychosocial impairment produced by MAGA on male sexual function. Men between 18 and 40 years of age with moderate to severe MAGA and psychosocial impairment (functional scale Skindex-29 \geq 32) have an increased risk of sexual dysfunction, particularly in terms of desire and arousal. Therefore, we encourage the inclusion of instruments to assess psychological morbidity and sexual function in general practice. In the case of initiating therapy with finasteride or in the presence of sexual adverse effects during treatment, this could be especially important. Future studies should explore the association between sexual dysfunction and inhibitors of 5-alpha reductase.

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