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Original Research Article

A questionnaire-based survey among Indian dermatologists regarding the management of androgenetic alopecia with a novel formulation containing alcohol-free minoxidil, procapil and finasteride

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ABSTRACT

Background: Androgenetic alopecia (AGA) is a common condition affecting all age groups. Topical minoxidil and finasteride are approved treatments for AGA. The study assessed dermatologists' perceptions of AGA prevalence and opinions regarding minoxidil including combinations, dihydrotestosterone (DHT) blockers and peptides in AGA management.

Methods: The survey was conducted among 245 dermatologists across India, with experience in AGA management. It comprised 32 questions on patient demographics of AGA, treatment strategies and patient compliance with topical minoxidil. Responses from participating dermatologists were analysed and reported using descriptive statistics.

Results: According to 51.4% of dermatologists, AGA prevalence ranged from 30%-40%. Topical minoxidil + finasteride solution with oral nutritional supplements was preferred by 49.3% of dermatologists for treating AGA in men. Around 50.6% dermatologists preferred 5% minoxidil topical solution for treating female patients. About 79.4% agreed or strongly agreed that topical, alcohol-free minoxidil would be better than topical, alcohol-based minoxidil for AGA. According to 51.0% of dermatologists, AGA can be managed more effectively and safely with topical, alcohol-free minoxidil + procapil + finasteride than with topical alcohol-based minoxidil + finasteride. Approximately 55% and 45% of dermatologists rated alcohol-free minoxidil + procapil + finasteride as 'good' and 'excellent' for treating AGA, respectively. Alcohol-free minoxidil + procapil + finasteride was better tolerated than conventional alcohol-based minoxidil + finasteride by ~62.0% of dermatologists. Patient adherence to alcohol-free minoxidil + procapil + finasteride was rated as 'good' by ~64.0% of dermatologists.

Conclusions: Dermatologists preferred alcohol-free minoxidil with procapil and finasteride over conventional alcohol-based formulations in AGA management.

Keywords: Androgenetic alopecia, Minoxidil, Adherence, Finasteride, Procapil, Efficacy

INTRODUCTION

Androgenetic alopecia (AGA), also known as pattern alopecia, is a very common disorder, which affects both genders, with males more commonly affected than females.[1] AGA has a significant psychological impact on patients, regardless of age or stage of baldness.[1] In Indian settings, a prevalence of 58% in males aged 30-50 years has been reported for AGA, with its incidence gradually increasing with age. Epidemiological data specific to women appears to be limited.[1] According to available evidence, minoxidil and finasteride are approved drugs

used to treat hair loss.[1] The cornerstone of therapy for AGA continues to be minoxidil.[1] Topical minoxidil solutions in concentrations of 2 percent and 5 percent have demonstrated effectiveness in preventing the progression and improving the condition of AGA in male patients. Although the 5 percent concentration is more efficacious and considered the standard formulation, it might irritate because of its higher propylene glycol content; therefore, other solvents such as butylene glycol might be useful.[2]

Minoxidil stimulates prostaglandin and vascular endothelial growth factor (VEGF) synthesis, which promotes hair growth by shortening the telogen phase and allowing hair follicles to enter the anagen phase.[3] Minoxidil sulphate, a metabolite of minoxidil, induces the opening of sarcolemma K_{ATP} channels, which contribute to the antihypertensive effect and might stimulate hair growth to some extent. Other effects of minoxidil include stimulation of cell proliferation, suppression of collagen synthesis and activation of growth factor synthesis. However, their relevance to hair follicle biology is unclear.[4]

Moreover, minoxidil has limitations such as poor skin penetration and water solubility, leading to the development of ethanol-based topical formulations, which might cause dermatitis, irritation, pruritus, erythema, scaling and skin dryness.[3] To overcome this issue, new topical aqueous formulations have been developed. These formulations are devoid of prime irritants propylene glycol and alcohol, which are present in commercial solutions of minoxidil.[5]

A study reported that butylene glycol is safer than propylene glycol and also highlighted that topical formulations of minoxidil containing propylene and butylene glycol were used as solvents. Nine of the 11 patients showed positive patch tests to propylene glycol and only one of the 11 reacted to its alternative butylene glycol.[6]

Finasteride blocks the synthesis of DHT by inhibiting the 5-alpha reductase enzyme and is an effective anti-hair loss agent approved by the food and drug administration and is widely used for treating male and female pattern hair loss.[7]

Topical formulation of finasteride shows a potent action in reversing the progressive miniaturisation of hair follicles associated with AGA, by influencing the proliferation and apoptosis of dermal papilla cells.[5]

Studies have reported that the combination of minoxidil 2% and finasteride 1 mg is more effective than finasteride or minoxidil monotherapy.

Similarly, combining hair transplant with finasteride treatment is also considered more potent than hair transplant alone.[2]

Procapil is a potent anti-hair loss compound that targets the three factors that cause hair loss, namely, the conversion of testosterone to DHT, inadequate blood perfusion and failing anchorage of the hair in the dermal papilla. It contains a peptide called biotinyl-GHK, a matrikine, oleanolic acid, a 5-reductase inhibitor and apigenin. Thus, it can act as an adjuvant to the combination of minoxidil and finasteride in the treatment of hair loss.[8]

Assessing the preferences and insights of dermatologists through a market research survey becomes imperative due to the multiple treatment options available such as minoxidil, finasteride and peptides. Hence, this survey was designed to explore the perspectives of dermatologists regarding the prevalence, management of AGA and potential benefits of a novel topical formulation of alcohol-free minoxidil and finasteride.

The key objectives were to understand dermatologists' perceptions regarding the effectiveness and clinical role of minoxidil, peptides and minoxidil combined with topical finasteride in AGA management. Additionally, the survey aimed to explore patient adherence to prescribed treatments.

METHODS

Survey design

The present study is a research article based on a pan-India survey, which was conducted from May 2022 to June 2022 among 245 dermatologists who had experience managing patients with AGA and were practising across different regions in India.

Since this survey did not entail any intervention on the subject, ethical clearance by an external ethics review board was not necessary in compliance with local legislation and national requirements.

The confidentiality and identity of participating dermatologists were preserved throughout the survey and data processing. Written informed consent was obtained from all the participants before the start of the survey.

Survey questionnaire

The survey questionnaire (Table 1) consisted of three sections comprising 32 questions: 1) Understanding the clinical profile of patients with AGA; 2) management of AGA; and 3) patient compliance with topical minoxidil-based formulations.

Data analysis

The responses were collected from 245 dermatologists who took part in the survey from across the country. Responses were summarised and analysed using descriptive statistics.

Table 1: Survey questionnaire.

Q. no.	Questionnaire				
	Section 1. Patient profiling of AGA				
1	In your clinical practice, what is the prevalence of AGA?				
	a) 10%-20%	b) 20%-30%	c) 30%-40%	d) 40-50%	e) >50%
2	In your clinical practice, in which age group is AGA common?				
	a) 10-20 years	b) 20–30 years	c) 30-40 years	d) 50 years and above	
3	In your clinical practice, in which gender is AGA more common?				
	Males		Females		
4	In your clinical practice, what are the common causes of AGA? (one or more options can be selected)				
	a) Family history	b) Hormones	c) Stress	d) Nutrition	
5	Q5. Do you agree that AGA can cause psychosocial impairment?				
	a) Strongly agree	b) Agree	c) Somewhat agree	d) Disagree	
	Section 2: Treatment strategy for AGA				
6	What is your preferred choice of treatment for AGA in men? (one or more options can be selected)				
	Topical minoxidil as monotherapy	Topical minoxidil + oral finasteride or oral dutasteride	Topical minoxidil + oral nutritional supplements	Minoxidil + finasteride topical solution with the oral nutritional supplements	
7	What is your preferred choice of medical treatment for AGA in women? (one or more options can be selected)				
	Topical minoxidil	Low-dose oral minoxidil	Topical minoxidil + oral nutritional supplements	Cyproterone acetate	Spironolactone
8	What percentage of patients are reluctant to use oral finasteride?				
	0%-25%	26%-50%	51%-75%	75%-100%	
9	What % of topical minoxidil do you prefer to use in male patients? (one or more options can be selected)				
	2%	5%	10%		
10	What % of topical minoxidil do you prefer to use in female patients? (one or more options can be selected)				
	2%		5%		
11	What is your preferred choice of solvent in topical minoxidil with finasteride formulation?				
	Propylene glycol	Butylene glycol	Others		
12	Do you agree that topical alcohol-free minoxidil will be more beneficial in treating AGA than topical alcohol-based minoxidil?				
	Strongly agree	Agree	Somewhat agree	Disagree	
13	Do you agree that topical alcohol-free minoxidil in combination with procapil can be more efficacious and safer in management of AGA compared to plain topical alcohol-based minoxidil?				
	Strongly agree	Agree	Somewhat agree	Disagree	
14	Do you agree that topical alcohol-free minoxidil in combination with procapil and finasteride can be more efficacious and safer in the management of AGA compared to alcohol-based topical minoxidil and finasteride combination?				
	Strongly agree	Agree	Somewhat agree	Disagree	
15	How do you rate the effectiveness of topical alcohol-free minoxidil fortified with procapil and finasteride in patients with AGA?				
	Excellent	Good	Poor		
16	What is the preferred dosing frequency of topical alcohol-free minoxidil in combination with procapil and finasteride for male pattern hair loss?				
	Once daily		Twice daily		
17	How long should topical alcohol-free minoxidil fortified with procapil and finasteride formulation be continued in the management of AGA?				
	2-3 months	3-6 months	>6 months		

Continued.

Q. no	Questionnaire			
	Section 2: Treatment strategy for AGA			
18	How soon do you see the visible effects of topical alcohol-free minoxidil in combination with procapil and finasteride?			
	2-3 months	3-6 months	>6 months	
19	Do you prefer to use topical alcohol-free minoxidil in combination with finasteride for maintenance after treatment with oral minoxidil in AGA?			
	Yes	No	Maybe	
20	Do you agree that topical alcohol-free minoxidil fortified with procapil and finasteride appears to have results equivalent to oral finasteride in AGA?			
	Strongly agree	Agree	Somewhat agree	Disagree
21	Do you agree that nutritional supplements play a role in the management of AGA as an adjuvant therapy?			
	Strongly agree	Agree	Somewhat agree	Disagree
22	Do you agree that natural DHT inhibitors can be a safe and efficacious option as an adjuvant in the management of AGA along with topical alcohol-free minoxidil fortified with procapil and finasteride?			
	Strongly agree	Agree	Somewhat agree	Disagree
23	Do you prefer to use any of the below options in AGA management? (one or more options can be selected)			
	a) Melatonin	b) Vitamins	c) Aminexil	
	d) Tretinoin	e) Natural extracts	f) Others	
24	How often do you use topical alcohol-free minoxidil with the procapil and finasteride along with PRP, LLLT, MNRF and the mesotherapy, etc. or pre- or post-procedure in hair transplant?			
	Regularly	Occasionally	Never	
25	Q25. How often do you see non-responders with topical alcohol-free minoxidil fortified with procapil and finasteride?			
	Regularly	Occasionally	Never	
	Section 3: Patient compliance with topical minoxidil			
26	What is the percentage of patients who adhere to conventional topical alcohol-based minoxidil with finasteride treatment on a regular basis?			
	20%-40%	40%-60%	60%-80%	80%-100%
27	Literature suggests that conventional topical alcohol-based minoxidil leads to local side effects. Do you agree this affects patient compliance?			
	Strongly agree	Agree	Somewhat agree	Disagree
28	Do you agree that topical alcohol-free minoxidil with procapil and finasteride is better tolerated than conventional alcohol-based minoxidil with finasteride?			
	Strongly agree	Agree	Somewhat agree	Disagree
29	Among the reasons mentioned below, which are the ones that can affect patient compliance with the treatment with topical minoxidil? (one or more options can be selected)			
	a) Forgetting to apply the topical solution	b) Burden of multiple medications	c) Stop using topical solution once they start seeing the results	Adverse event due to formulation
30	Based on clinical practice how will you rate the adherence of topical alcohol-free minoxidil in combination with procapil and finasteride in your patients?			
	Excellent	Good	Poor	
31	What form of topical minoxidil in combination with finasteride is preferred by patients?			
	Solution	Lotion	Foam	Spray
32	What is the pack size of topical alcohol-free minoxidil in combination with procapil and finasteride solution preferred by patients?			
	60 mL	90 mL	120 mL	

*PRP: Platelet-rich plasma; LLLT: Low-level laser therapy; MNRF: Microneedling radiofrequency

RESULTS

Profiles of patients with AGA

In clinical practice, majority (51.4%, 126/245) of the participating dermatologists reported that AGA was more commonly seen in the age group of 30-40 years, whereas 47.0% (115/245) of dermatologists reported that AGA was more prevalent in the age group of 20-30 years. Three dermatologists (1.2%) reported cases of AGA in the age group > 50 years, whereas only one dermatologist reported the presence of AGA in the age group of 10-20 years (Figure 1).

Males were commonly affected by this condition according to 98% (240/245) dermatologists. Common causes of AGA were family history according to 22.4% (55/245) dermatologists, followed by a combination of family history and hormones according to 15.1% dermatologists (37/245). The majority of the dermatologists (61.6% [151/245]) strongly agreed that AGA can cause psychosocial impairment.

Treatment strategies for the management of AGA

Analysis on the preferred choice for the treatment of AGA in men suggest that around 49.30% (150/304) of dermatologists' responses favoured a topical solution containing minoxidil + finasteride, along with oral nutritional supplements, followed by topical minoxidil + oral finasteride or oral dutasteride, which received 33.60% (102/304) of dermatologists' responses. Additionally, 15.5% of respondents preferred a regimen of topical minoxidil with oral nutritional supplements, while only 1.6% selected topical minoxidil as a standalone treatment, (Figure 2).

For women with AGA, a response from 67.18% (217/323) of dermatologists favoured topical minoxidil + oral nutritional supplements, followed by topical minoxidil, which received 14.55% (47/323) of dermatologists' response, and spironolactone, which received 10.84% (35/323) of dermatologists' response. Only 4.33% (14/323) favoured low-dose oral minoxidil and only 3.1% (10/323) favoured cyproterone acetate. Additionally, 44% (107/245) of dermatologists reported that only 0%–25% of their patients were reluctant to use oral finasteride, whereas 30% (73/245) reported 26%-50% reluctance, 21% (51/245) reported 51%–75% reluctance and only 5% (14/245) reported 75%–100% reluctance.

As a treatment approach for AGA in men, most of the dermatologists (76.6% [230/300]) prescribed only 5% minoxidil, whereas 22.6% (68/300) prescribed 10% minoxidil and only 0.7% (2/300) prescribed 2% minoxidil. For women patients, most of the dermatologists (50.6% [124/245]) preferred 5% minoxidil topical solution, whereas 31.0% (76/245) preferred 2% minoxidil topical solution and 18.4% (45/245) preferred both 2% and 5% solutions. The majority of dermatologists (65% [159/245]) preferred propylene glycol as the solvent in topical minoxidil with finasteride formulation, whereas only 13% (33/245) preferred butylene glycol, and the remaining 22% (53/245) preferred other options.

Out of 245 dermatologists, 112 (45.7%) agreed and 81 (33.1%) strongly agreed that applying topical alcohol-free minoxidil to treat AGA would be preferable to applying topical alcohol-based minoxidil, whereas 17.1% (42/245) of the dermatologists partially agreed and 4.1% (10/245) disagreed. A significant majority of dermatologists, 137 (55.9%) 'agreed' and 71 (29.0%) 'strongly agreed' that topical alcohol-free minoxidil combined with procapil could be more efficacious and safer in the management of AGA than topical alcohol-based minoxidil.

The majority of the dermatologists (51.0% [125/245]) agreed and 31.4% (77/245) strongly agreed that topical alcohol-free minoxidil combined with procapil and finasteride was more efficacious and safer in the management of AGA than topical alcohol-based minoxidil and finasteride. The remaining 13.5% (33/245) of dermatologists somewhat agreed, whereas only 4.1% (10/245) disagreed (Figure 3).

Around 55.1% of dermatologists rated the effectiveness of topical alcohol-free minoxidil fortified with procapil and finasteride as 'good,' whereas 44.9% of dermatologists rated it as 'excellent' for treating patients with AGA, and only 0.4% of dermatologists rated it as poor. Twice daily dosing frequency of topical alcohol-free minoxidil in combination with procapil and finasteride was preferred for male pattern hair loss by 59.2% (145/245) dermatologists. According to 168 (68.6%) dermatologists, the topical alcohol-free minoxidil formulation enhanced with procapil and finasteride should be used for >6 months. 51% of dermatologists reported that it takes 3–6 months for topical alcohol-free minoxidil, in combination with procapil and finasteride, to show a visual effect. 43% of dermatologists reported this duration as 2-3 months, whereas only 6% reported it to be longer than 6 months. The majority (69.0% [169/245] of the dermatologists 'agreed' that they preferred to prescribe topical alcohol-free minoxidil in combination with finasteride for maintenance after treatment with oral minoxidil in patients with AGA, whereas 22% (54/245) were unsure and 9% (22/245) did not agree. A total of 87 (35.5%) dermatologists agreed and 11.8% (29/245) strongly agreed that topical alcohol-free minoxidil fortified with procapil and finasteride showed results equivalent to oral finasteride in patients with AGA. In comparison, percentage of dermatologists 33.9% (83/245) partially agreed and 18.8% (46/245) disagreed. A majority, 78.4% of the dermatologists (192/245) agreed that nutritional supplements can be used as adjuvant therapy in the management of AGA. 20.4% (50/245) of the

dermatologists partially agreed, whereas only 1.2% (3/245) disagreed. A majority, 78.4% of the dermatologists (192/245) agreed that natural DHT inhibitors can be a safe and efficacious option as an adjuvant in the management of AGA along with topical alcohol-free minoxidil fortified with procapil and finasteride. 18.4% (45/245) of the dermatologists partially agreed, whereas only 3.2% (8/245) disagreed. For treating AGA, the maximum and similar preferences were given to vitamins, melatonin and aminexil by 25.3% (143/566), 22.6% (128/566) and 19.6% (111/566) of dermatologists, respectively. 15.9% (90/566) of dermatologists preferred natural extracts, 11.4% (65/566) chose tretinoin, whereas only 5.12% (29/566) preferred other options besides mentioned ingredients. 62.1% (152/245) of dermatologists regularly use topical alcohol-free minoxidil with procapil and finasteride, either in conjunction with procedures such as platelet-rich plasma (PRP), LLLT, microneedling radiofrequency (MNRF), mesotherapy, or as a pre- or post-procedure in hair transplant, whereas 33.8% (83/245) use it occasionally and only 4.1% do not use it. The majority of dermatologists (80.8% [81/245]) reported occasionally encountering non-responders with topical alcohol-free minoxidil fortified with procapil and finasteride, whereas 11.8% (29/245) reported regular encounters and only 7.4% (18/245) reported no encounters.

Patient compliance with topical minoxidil and its combinations

Although 130 (53.1%) dermatologists stated that 40%–60% of their patients adhered to the conventional topical regimen of alcohol-based minoxidil + finasteride, a majority of the dermatologists (62.4% [153/245]) 'agreed' that conventional topical alcohol-based minoxidil leads to local side effects and affects patient compliance. Furthermore, a significant number of dermatologists (90.2% [221/245]) 'agreed' or 'strongly agreed' that topical alcohol-free minoxidil with procapil and finasteride is better tolerated than conventional alcohol-based minoxidil with finasteride. According to dermatologists, there are two common reasons for non-compliance with topical minoxidil treatment in AGA patients-30.1% (150/499) reported that patients tend to forget to apply the solution and 30.3% (151/499) reported that patients discontinued use upon seeing results. Additionally, 18% (90/499) of dermatologists reported the burden of multiple medications as a reason for non-compliance, whereas 21.6% (108/499) reported that patients discontinued treatment due to experiencing adverse events.

The majority of the dermatologists (64.1% [157/245]) rated the adherence of patients to topical alcohol-free minoxidil in combination with procapil and finasteride as 'good', whereas 35.1% (86/245) rated it as 'excellent' and only 0.4% (1/245) rated it as 'poor'. Around 84 (34.3%), 68 (27.8%), 65 (26.5%) and 65 (26.5%) dermatologists preferred solution, lotion, foam and spray forms of topical minoxidil in combination with finasteride, respectively. The pack size of 60 mL of topical alcohol-free minoxidil in combination with procapil and finasteride solution was preferred by the majority of dermatologists (66.5% [163/245]). In comparison, 90 mL and 120 mL pack sizes were preferred by 22.0% (54/245) and 11.0% (27/245) dermatologists, respectively.

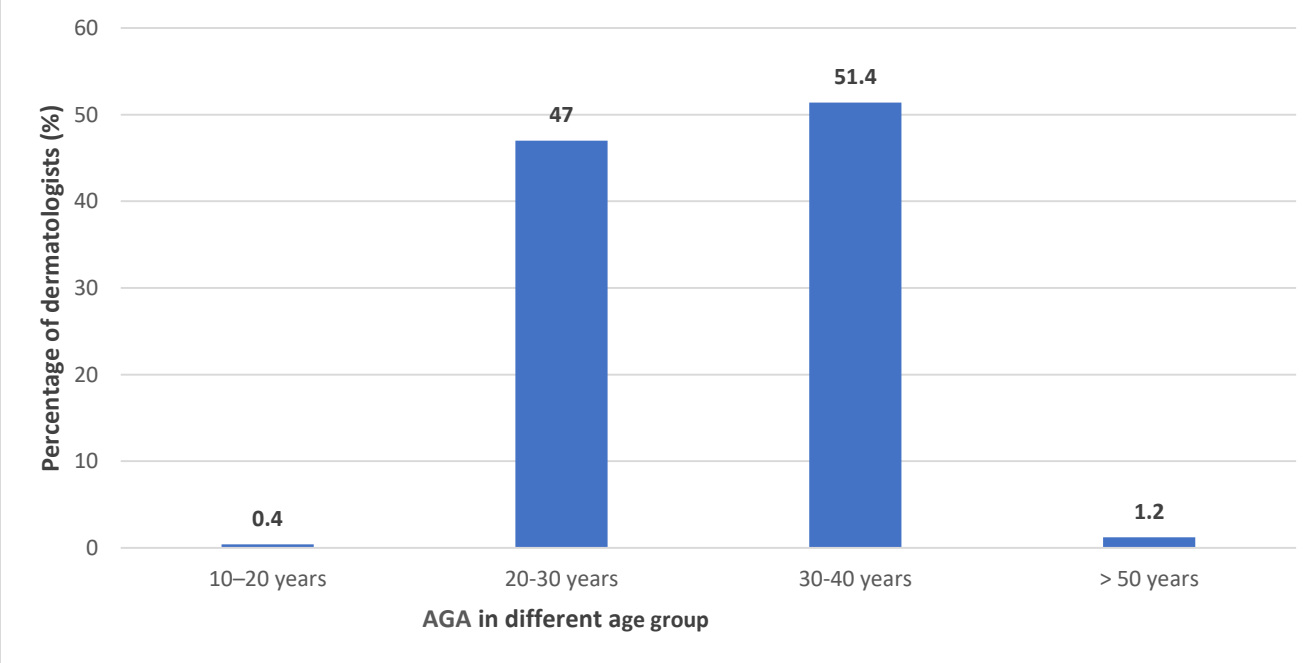

Figure 1: Prevalence ranges of AGA.

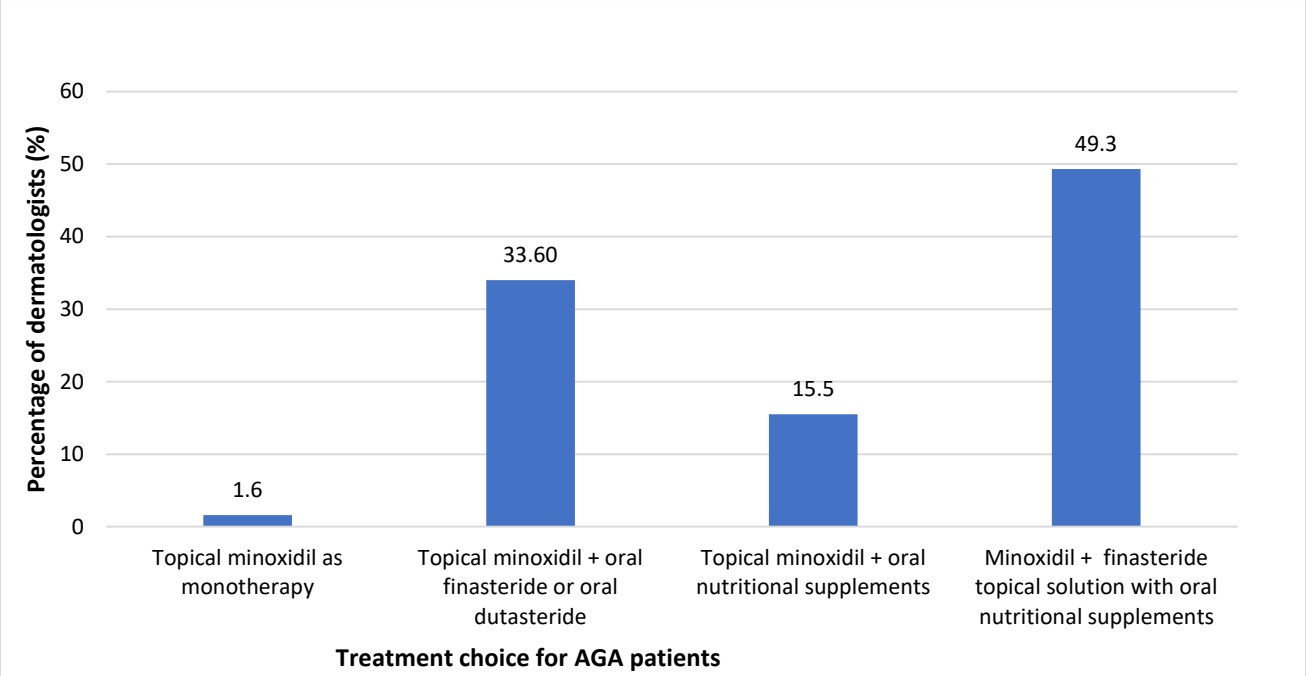

Figure 2: Preferred choice of treatment for patients with AGA.

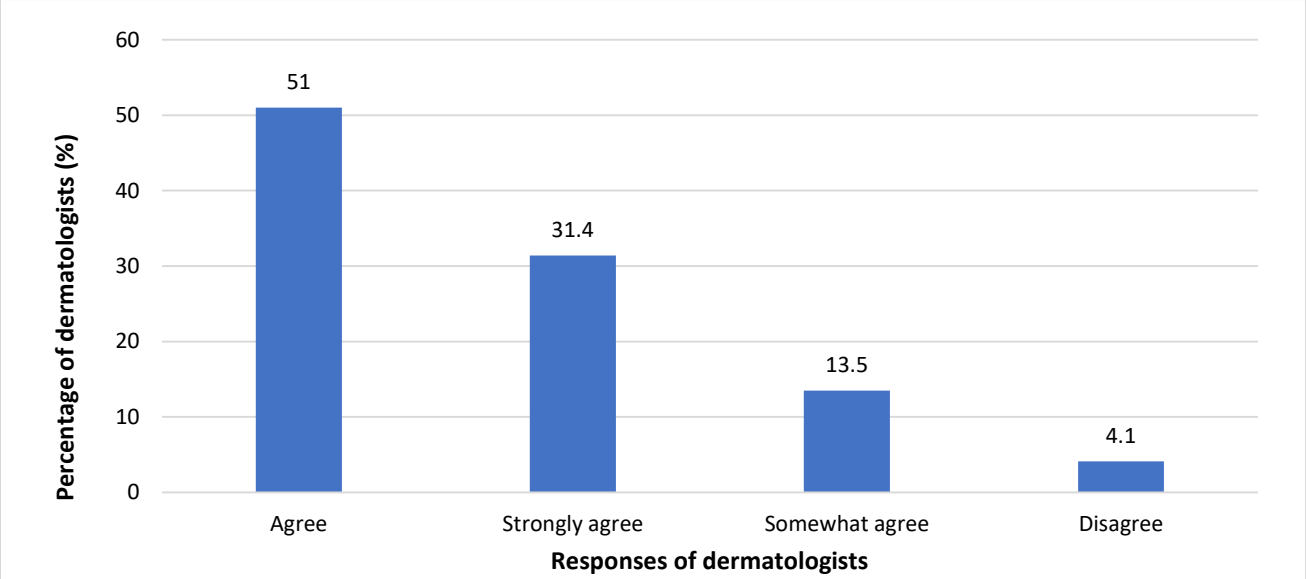

Figure 3: Dermatologists' agreement on better tolerability of topical alcohol-free minoxidil with procapil and finasteride versus conventional alcohol-based minoxidil with finasteride.

DISCUSSION

This survey aimed at comprehending the dermatologists' perceptions of the occurrence of AGA and the effectiveness of minoxidil including combinations, DHT blockers and peptides in AGA management. The dermatologists reported the prevalence rate of AGA as 30%-40% in this survey which was similar to the rate reported in a multicentre study of 37.7%.[9] In a study conducted by Sakhiya et al it was found that AGA prevalence was 79% among men and 21% among women attending the dermatology outpatient clinic.[10] The current survey findings are consistent with those of Sakhiya et al as many dermatologists shared the opinion that AGA is more commonly observed in males, and they identified a family history of AGA as a primary cause.[10] In the current survey, dermatologists have reported the maximum prevalence of AGA in the age group of 20-40 years, which is analogous to the results observed in the study done by Shankar et al reported 58% of the AGA cases in the male population belonging to the age group of 30-50 years old.[11] In a cross-sectional study, Adamowicz et al found that AGA, particularly in younger males, had a detrimental effect on emotional health and

social functioning.[12] The results of our survey align with this finding as the majority of the dermatologists opined that AGA was linked to psychosocial impairment.

In a double-blind, randomised controlled trial by Sarkar et al conducted in patients with AGA treated with 5% minoxidil novel alcohol-free topical solution and 5% alcohol-based minoxidil topical solution for 30 days, the mean hydration was significantly higher (p=0.001) in patients treated with 5% minoxidil novel formulation topical solution (9.74) compared to those treated with alcohol-based formulation (3.28). Moreover, the alcohol-free formulation was more tolerable than the alcohol-based formulation.[13] In a position paper by Udare et al patients with alopecia were reported to benefit from topical minoxidil free of alcohol. The position paper further concluded that using a minoxidil formulation with little or no alcohol enhances hydration and lessens dryness, redness and itching of the scalp. In contrast, using an alcohol-based formulation for 15-30 days in males with AGA, exacerbated the dryness and redness of the scalp. As a result, the alcohol-free minoxidil formulation may be better and safer than alcohol-based formulations in the treatment of AGA, particularly following hair process treatments.[14,15] This is consistent with the current survey results, in which most dermatologists reported that conventional topical alcohol-based minoxidil leads to local side effects. In contrast to conventional formulations for treating AGA, which commonly use propylene glycol, the alcohol-free topical minoxidil formulation has butylene glycol as the preferred solvent. Evidence suggests that the occasional reports of adverse events such as contact dermatitis and exacerbation of seborrhoeic dermatitis, which had greater incidence at higher concentrations of minoxidil were due to the presence of propylene glycol, a major allergen (observed in 81.8% of the patients) and not minoxidil itself.[16-18] The results of this survey were similar to the literature findings and denoted that the majority of the dermatologists (n=153) agreed that conventional topical alcohol-based minoxidil led to local side effects. Therefore, to treat AGA in men sensitive to propylene glycol, solvents such as butylene glycol or glycerine must be used with minoxidil.[16,18] In the context of propylene glycol sensitivity, Thuangtong et al have shown that a 5% minoxidil milky lotion containing butylene glycol may be an effective alternative treatment for people sensitive to propylene glycol.[16] Topical minoxidil and oral finasteride are FDA-approved treatments. A 2% solution and a 5% solution as well as a 5% foam formulation of minoxidil are approved for males, whereas a 2% solution and a 5% foam formulation of minoxidil are approved for women. Applying the 5% topical solution twice daily has been demonstrated to be more effective than the 2% solution in men.[19] This is in accordance with the present survey results, which showed that the majority of dermatologists prescribed 5% minoxidil for men with AGA. However, in females with AGA, many studies have demonstrated that 5% topical minoxidil is superior or equivalent to 2% topical minoxidil solution.[20-22] These results are consistent with the findings of the current survey, in which majority of dermatologists opined that 5% topical minoxidil is a preferred option for females with AGA.

In a study by Rai et al the therapeutic effectiveness of 5% topical minoxidil and 0.1% finasteride was compared to that of 5% topical minoxidil combined with 1 mg oral finasteride in patients with AGA. 83% of patients exhibited significant improvement in hair density ($p<0.05$) when treated with a combination of topical 5% minoxidil and topical 0.1% finasteride. In contrast, the group receiving topical 5% minoxidil and oral finasteride 1 mg showed a lower improvement rate of 65%.[23] Another study by Datta et al in patients with AGA compared the established treatment of topical minoxidil and oral finasteride with a novel fixed-dose topical combination of minoxidil and finasteride. The new topical therapy was easy to administer, had fewer side effects, was better tolerated and was more potent than the topical minoxidil and oral finasteride regimen.[7] The results of the current survey were in accordance with the literature, where the majority of dermatologists preferred prescribing topical minoxidil and finasteride solution along with oral nutritional supplements in AGA. For females, majority of the surveyed dermatologists chose a combination of topical minoxidil with oral supplements as the preferred treatment followed by other options such as spironolactone. A review by Nestor et al on-treatment options for AGA highlighted that topical minoxidil is the only FDA-approved treatment for male and female patients suffering from patterned hair loss. Nutraceuticals can also yield beneficial results when used as a monotherapy or adjuvant therapy for treating AGA in females. Another popularly used treatment for female patterned hair loss involves spironolactone due to its anti-androgenic properties.[24]

In a study by Karaca et al men with AGA treated with procapil and other active ingredients showed a significantly better clinical recovery in terms of hair growth.[25] According to the majority of dermatologists (n=137) who responded to the survey, topical alcohol-free minoxidil combined with procapil can be more effective and safer in treating AGA than plain topical alcohol-based minoxidil. The current survey demonstrates better tolerance with alcohol-free minoxidil with procapil and finasteride as compared to conventional alcohol-based minoxidil with finasteride. Thus, non-responders to this therapy are encountered occasionally as reported by most dermatologists. It is necessary to use topical alcohol-free minoxidil fortified with procapil and finasteride for >6 months to observe beneficial outcomes in AGA. These results are analogous to those observed in a study by Patwardhan et al. In this study, visible and beneficial outcomes were observed in patients with AGA by the end of 6 months by using an alcohol-free, procapil-based 5% minoxidil formulation.[26] Topical peptides aid in enhancing the efficacy of minoxidil; procapil and capixyl lead to the inhibition of 5-α reductase. A combination of minoxidil and peptides can

be employed in cases where minoxidil monotherapy needs to be avoided. Also, combining minoxidil and peptides such as procapil leads to better patient satisfaction in comparison to minoxidil monotherapy.[27]

In a review by Singh et al the response usually requires at least 4 months of continuous therapy with a minoxidil topical solution; however, treatment should be continued for up to a year before designating the condition as unresponsive.[28] A study by Shadi et al reported that in patients with AGA, minoxidil should be used for at least 12 months to assess the treatment efficacy and improve compliance. They also observed a positive relationship between the duration of topical minoxidil use and patient-reported efficacy ($p<0.001$).[29] In the current survey findings, most dermatologists 'agreed' that the topical alcohol-free minoxidil formulation enhanced with procapil and finasteride should be used for >6 months. The majority of dermatologists 'agreed' that topical alcohol-free minoxidil with procapil and finasteride was reported to be better tolerated with good adherence than conventional alcohol-based minoxidil with finasteride formulations. Also, the majority of dermatologists preferred using topical alcohol-free minoxidil in combination with finasteride as a maintenance therapy and reported that a maximum of 40%–60% of their patients adhere to the conventional topical alcohol-based minoxidil with finasteride treatment regularly. A study conducted by Sheikh *et al.* revealed that a topical solution formulation containing a combination of minoxidil and finasteride exhibited substantially better outcomes in terms of hair growth than minoxidil monotherapy.[30] The current S3 Guidelines state that there are no evidence-based recommendations for miscellaneous products such as natural DHT blockers, but their use as a supportive strategy can be considered within an individually tailored management approach, at the discretion of the treating dermatologist and the patients.[31] However, most of the surveyed dermatologists agreed that natural DHT inhibitors can be a safe and efficacious option as an adjuvant in the management of AGA along with topical alcohol-free minoxidil fortified with procapil and finasteride.[32] In the survey, dermatologists reported that their patients prefer the solution and spray form of the topical minoxidil and finasteride formulation followed by the lotion and foam form. Additionally, patient counselling is also essential to enhance adherence to topical minoxidil. Patients must be well informed about the expected level and timing of response before receiving the medication to prevent any disappointment.[29] Patients should be counselled thoroughly regarding the need for long-term use of minoxidil to attain the desired cosmetic result and psychosocial well-being, as the clinical response often takes 4-6 months of treatment to become significantly noticeable.[29]

Limitations

As a cross-sectional, questionnaire-based survey, this study provides valuable real-world insights into current dermatological practices related to AGA management across India. Although based on self-reported perceptions rather than patient outcomes, the design enabled wide regional participation and captured diverse clinical perspectives. The survey responses primarily reflect participants' practice patterns and may not represent the entire dermatology community in India. Future studies with larger samples and objective data could further strengthen these findings.

CONCLUSION

In conclusion, AGA is a widespread condition that affects both men and women; however, it is more prevalent in men. Regardless of age or stage of baldness, AGA has a substantial psychological impact. The findings of the current survey shed light on dermatologists' perspectives, revealing trends in AGA management strategies. The survey also emphasises the significance of patient compliance, highlighting the requirement for continued therapy in order to attain desired outcomes. This survey also shows how the AGA treatment landscape is changing, with dermatologists preferring novel formulations in AGA treatment that prioritise improved tolerability with better patient adherence and efficacy.

The majority of dermatologists reported that topical, alcohol-free minoxidil is more efficacious than topical, alcohol-based minoxidil for treating AGA. The topical, alcohol-free minoxidil + procapil + finasteride formulation is preferred over the topical alcohol-based minoxidil + finasteride combination for managing AGA, due to its better efficacy, safety, tolerance and improved patient adherence The topical alcohol-free minoxidil in combination with finasteride, was favoured by majority of the dermatologists as a maintenance therapy. Evidence also suggested that the alcohol-free minoxidil formulation provides significantly better hydration, and is safer and more effective than alcohol-based formulations, particularly following hair treatments.

Many dermatologists routinely use topical alcohol-free minoxidil with procapil and finasteride, either in conjunction with procedures such as PRP, LLLT, MNRF, mesotherapy or as a pre- or post-procedure in hair transplant. Additionally, topical alcohol-free minoxidil fortified with procapil and finasteride can be combined with adjuvant treatment options such as natural DHT inhibitors for the efficacious treatment of AGA.

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