

(RESEARCH ARTICLE)



Hair Loss (Alopecia) Treatment using rosemary oil, peppermint oil, amla oil and saw palmetto: A students' survey

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Abstract

This paper reviews common herbs for preventing hair loss (alopecia) and surveys pharmacy students' knowledge and opinions on the subject. The literature review revealed that the herbs reviewed are scientifically proven to enhance hair growth and prevent loss. Rosemary oil, derived from *Rosmarinus officinalis*, is valued in traditional medicine for various benefits including its anti-inflammatory and antioxidant properties, and notably, its ability to promote hair growth similar to minoxidil. Peppermint oil, known for its main component menthol, enhances blood flow to the scalp, thereby stimulating hair regrowth and strengthening hair. Amla oil, from the Indian gooseberry, is rich in antioxidants and inhibits the 5 α -reductase enzyme, playing a role in preventing hair loss and promoting hair growth. Lastly, saw palmetto, used for its ability to prevent hair loss by inhibiting the conversion of testosterone to DHT, has shown promising results in improving hair density and reducing hair loss. Each of these oils offers unique benefits for hair health and growth, supported by various studies demonstrating their efficacy. The other goal of this research is to conduct a survey which was conducted among Howard University first-year professional pharmacy students. Thirty-nine participants completed the demographic questionnaire section. Thirty-four respondents answered 5 knowledge-based questions, while 33 to 34 completed the 5 opinion-based statements. The questions and statements were related to treatment of hair loss (alopecia) using natural remedies: rosemary oil, peppermint oil, amla oil, and saw palmetto. The knowledge-based questions were answered correctly by an average of 60% of the participants. The opinion-based questions were received with a positive response with at least 80% of participants agreeing or strongly agreeing with the statements regarding the potential benefits of the herbal remedies in hair thinning. There was minimal disagreement of potential benefits, ranging from 0 to 15% percent which indicates a more positive response towards the potential benefits of herbal remedies for hair loss.

Keywords: Rosemary Oil; Peppermint Oil; Amla Oil; Saw Palmetto, Survey; First-year pharmacy students

1. Introduction

Thinning hair, formally known as androgenic alopecia and commonly referred to as male and female pattern baldness, is a gradual loss of hair over an extended period. It occurs when the density of the hair gradually decreases, becomes more brittle and thus falls out. Pattern hair loss in both men and women can begin as soon as after puberty. In men, hair thinning typically affects the central scalp, including the mid frontal, temporal and vertex regions. However, in women, the hair thins in two different distribution patterns: thinning across the central scalp and along the midline part [1].

Androgenetic alopecia affects about 50 million men and 30 million women in the United States. It can have many negative psychological effects. Losing hair can cause intense emotional suffering and leads to personal, social, and work-related problems [2].

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1.1 Herbs Used

1.1.1 Rosemary Oil

Rosemary (*Rosmarinus officinalis*) is a woody perennial native to the Mediterranean region, where it has been consistently used as food and medicine. In traditional systems of medicine, it has been used as anti-flatulent, anti-asthma, diaphoretic, emmenagogue, memory-enhancing, sedative, analgesic, anti-rheumatic and digestive agent. As an herbal remedy, rosemary oil has uses ranging from antioxidant to anti-inflammatory [3]. Rosemary has also been shown to improve cognitive functions [4]. Rosemary dietary supplementation attenuated cardiac remodeling by improving energy metabolism and decreasing oxidative stress. It also improved diastolic function and reduced hypertrophy after MI [5]. Recently, rosemary has been used to promote hair growth and could potentially prevent hair loss.

In a study conducted in 2015, researchers compared the effects of minoxidil, a commercially available medication indicated for hair loss, and rosemary oil over a period of 6 months. Both experimental groups showed an increase in hair count after 6 months, yet the two groups did not have a distinct difference in the amount of hair grown [6]. This shows that the effects of rosemary oil on hair growth are fairly like that of minoxidil and it is effective in promoting hair growth.

1.1.2 Peppermint Oil

Peppermint oil is derived from the peppermint plant, a cross between water mint and spearmint, and is prevalent in both Europe and North America. Menthol, the main ingredient in peppermint oil, causes a cooling sensation once applied to the scalp and has been shown to cause an increase in blood flow to the scalp. This increase in blood flow stimulates regrowth and follicle depth, thicker, and stronger hair strands [7].

A study conducted in 2014 investigated the effects of peppermint oil on hair growth by comparing randomized controlled groups with 4 different topical applications: saline, jojoba oil, minoxidil and peppermint oil. The study revealed that peppermint oil showed the most prominent hair growth effects such as an increase in dermal thickness, follicle number and follicle depth [8].

1.1.3 Amla oil

Amla oil is derived from the fruit of the Indian gooseberry tree, *Phyllanthus emblica*. Amla contains a multitude of antioxidants such as emblicanin, phyllantine, quercetin, gallic acid, ellagic acid and high concentration of various minerals and amino acids which promote a healthy scalp, strengthen hair follicles, and stimulate healthy new growth.

A 2012 study revealed that amla is a potent inhibitor of 5 α -reductase enzyme which is responsible for reducing testosterone to dihydrotestosterone (DHT) which can lead to hair loss [9]. By being a strong inhibitor of this enzyme, amla oil may be valuable in preventing hair loss. In another study conducted in 2009, amla showed significant hair growth at a 7% concentration, and the growth was observed in 8 to 9 days [10].

1.1.4 Saw Palmetto

Saw palmetto, botanically referred to as *Serenoa repens*, is a shrub-like palm native to the southeastern United States. Saw palmetto inhibits the conversion of testosterone to its more potent metabolite DHT, and reduced levels of DHT can prevent hair loss [11].

In a 2003 study, researchers tested the effectiveness of saw palmetto in hair growth by giving patients suffering with hair loss saw palmetto lotion and capsules to use over a period of six months, and observed the effects. Results showed that within the first four weeks, patients reported a reduction in the amount of their daily hair loss and after 3 months of consistent daily treatment, 91% of patients reported improvement in hair density [12]. This suggests that saw palmetto is effective both in preventing hair loss and promoting hair regrowth.

1.2 Health Care Professionals' Knowledge and Opinions

There are no published studies on health professionals' opinions and knowledge regarding the effectiveness of rosemary oil, peppermint oil, amla oil, and saw palmetto in treating thinning hair. However, an article published in 2016 provided an extensive list of natural products including rosemary oil, peppermint oil, and amla oil, that have potential hair growth promoting activity [13].

1.3 Literature Gap, Study Objectives and Impact

Though the literature touches on the potential health benefits of herbal and natural remedies for thinning hair, there are no studies which deal with health professionals' knowledge or opinions on the topic of the use of herbal remedies for thinning hair. Thus, the objective of this study was to conduct a survey of knowledge and opinions Howard University First-Year pharmacy students on the use of herbal remedies for thinning hair. The study provided more valuable and detailed information on the efficacy of herbal remedies and therefore will have an impact on the education of pharmacy students on the application of alternative medicine in hair loss.

2. Methods

This survey was initiated as part of a Drug Information course, a 2-credit-hour class for first-year professional pharmacy students. The students received comprehensive instruction on research methodology and survey administration. A Likert scale was used to score responses for the five opinion-based statements: 4=strongly agree; 3=agree; 2=disagree; 1=strongly disagree. The knowledge-based data was derived from answers to five questions. Mean, standard deviation, and variance were computed for each of the responses and for the cumulative response. The findings were shared with the students. Subsequently, they were required to integrate these results into their research papers, contributing specifically to the discussion, conclusion, and abstract sections.

3. Results

3.1 Demographics

The data in Table 1 contains information regarding the survey participants' gender, age distribution and geographical backgrounds. There was a total of 39 survey participants, 10 (25.64%) being male and 29 (74.36%) being female. Regarding age, 20 (51.28%) participants are between the ages of 18 and 24, 15 (38.46%) participants are between the ages of 24 and 30, 3 (7.69%) participants are between the ages of 30 and 40 and 1 (2.56%) participant is above the age of 40. Pertaining to the state where the participants previously lived before joining the Howard University Pharmacy Program, the data portrays a diverse background with 6 (15.79%) participants residing in Washington, DC, 15 (39.47%) in Maryland, 1 (2.63%) in Virginia and the remaining 16 (42.11%) in other states (Table 1).

Table 1 Demographic data of participants ($n=39$; $n=38$ for states the participants lived in)

Demographics		<i>n</i> (%)
Gender	Male	10 (25.64)
	Female	29 (74.36)
Age (Years)	18-24	20 (51.28)
	24-30	15 (38.46)
	30-40	3 (7.69)
	Above 40	1 (2.56)
State participants lived in prior to starting Howard University College of Pharmacy	Washington, D.C.	6 (15.79)
	Maryland	15 (39.47)
	Virginia	1 (26.3)
	Other States	16 (42.11)

3.2 Participants' work and educational background:

Among the 39 survey participants, the data in Table 2 provides insight into their work and educational backgrounds prior to joining Howard University Pharmacy program. Regarding work experience, 2 (5.13%) participants have never worked, 12 (30.77%) participants have 1 to 2 years of experience, 9 (23.08%) participants have 3 to 4 years of experience, and 16 (41.03%) participants have 5 or more years of experience. For the participants with work experience, 20 (54.05%) participants had pharmacy related work, 9 (24.32%) participants had non-pharmacy, but health related work and 8 (21.62%) participants worked outside of the health sector.

Concerning the participants' highest education level, 4 (10.26%) participants had pre-pharmacy or some college level coursework; 2 (5.13%) participants had an associate degree, 26 (66.67%) had either a BSc or BA degree and 7 (17.95%) had a MSc degree (Table 2).

Table 2 Work and educational background of the participants

Questions	Responses	n (%)
How many years have you had a paying job before joining the Pharmacy program at Howard University?	Never worked	2 (5.1)
	1-2 years	12 (30.8)
	3-4 years	9 (23.1)
	5 or more	16 (41.0)
What kind of work have you had?	Pharmacy Related work	20 (54.1)
	Non-Pharmacy but other health related work	9 (24.3)
	Non-Health Related	8 (21.6)
What is the highest educational level you have achieved before joining the pharmacy program at Howard University?	Pre-Pharmacy or some college work	4 (10.3)
	Associate degree	2 (5.1)
	BSc or BA	26 (66.7)
	MSc	7 (17.9)
	PhD or another Doctoral Degree	0 (0.0)

3.3 Knowledge-Based Questions

Table 2 of the survey shows that on average, about 61% of respondents correctly answered questions on the knowledge part, indicating a moderate overall understanding. The highest scores were recorded for question 1, where 94.1% of participants correctly identified the medicinal properties of rosemary oil, highlighting its benefits for hair and scalp health, cardiovascular health, and in managing nervous disorders due to its anti-inflammatory and antioxidant properties. In contrast, question 4 on the physiological properties of amla oil received the lowest score, with only 23.5% answering correctly, showing a significant gap in knowledge about its protective effects on hair follicles and its role in promoting hair growth by inhibiting the 5 α -reductase enzyme.

Questions 2 and 5 performed better, reflecting a relatively good understanding of the effects of peppermint and saw palmetto oils. Peppermint oil, known for its menthol content, was recognized by 67.65% of respondents for its effectiveness in enhancing blood flow to the scalp, which can increase the thickness of the scalp and the number of hair follicles. Similarly, 85.3% acknowledged saw palmetto's anti-inflammatory properties and its roles as an expectorant and antiseptic, in addition to its primary use in hair loss prevention by inhibiting DHT.

However, misconceptions about amla oil were evident, as only 32.4% of participants recognized its protective properties for hair. Additionally, the survey clarified that amla oil does not contain Vitamin D, correcting a common misconception.

Table 3 Results of Knowledge-Based Questions ($n = 34$)

Question	Correct Answer	True (n)	False (n)	Participants with correct answers: n (%)	Mean correct answer rate, out of 1 (\pm SD)	Variance
Rosemary has many medicinal properties including hair and scalp issues, cardiovascular effects, and nervous disorders	True	32	2	32 (94.12)	0.9411 \pm 0.2388	0.0570
Peppermint oil can cause increased thickness in the scalp and increased number of hair follicles	True	23	11	23 (67.65)	0.6765 \pm 0.4678	0.2189
Amla oil has no protective effect on the hair follicles and only causes rapid hair growth.	False	23	11	11 (32.35)	0.3235 \pm 0.4678	0.2189
Amla is enriched with Vitamin D	False	26	8	8 (23.53)	0.2353 \pm 0.4242	0.1799
Saw palmetto is used for hair care as well as for inflammation, an expectorant and antiseptic	True	29	5	29 (85.29)	0.8529 \pm 0.3542	0.1254
Average				60.99	0.6099\pm0.3906	0.1600

Table 4 below presents a summary of data for the opinion-based questions. As shown, the majority respondents were in positive agreement with the herbal remedies' effectiveness in reducing hair thinning and promoting hair growth.

More than 90% of respondents agreed or strongly agreed that amla oil is effective in reversing male pattern baldness and that amla oil's high vitamin C content contributes to its protective effect on the hair follicles. About 84% of respondents believed that rosemary oil is an effective herbal remedy for promoting hair growth, while over 82% of respondents agreed with the statement that peppermint oil's menthol component contributes to its hair growth effects. The percentage of participants that disagreed or strongly disagreed with the statements was drastically lower, with a range of only 5.9% to 17.6%, indicating that most of the respondents believe these herbal remedies are indeed beneficial in treating hair thinning.

Table 4 Opinion-based Questions ($n = 34$ for 1, 2 & 5; $n = 33$ for 3 & 4)*

Statement	SA (n, %)	A (n, %)	DA (n, %)	SDA (n, %)	Mean LK \pm SD	Variance
I believe that amla oil is an effective herbal oil in reversing male pattern baldness	16 (47.1)	16 (47.1)	2 (5.9)	0 (0.0)	3.4118 \pm 0.6089	0.3708
I believe Amla oil's high vitamin C content heavily contributes to its protective effect on the hair follicles.	14 (41.2)	17 (50.0)	3 (8.8)	0 (0.0)	3.3235 \pm 0.6382	0.4073
I believe rosemary oil is an effective herbal oil in promoting hair growth	14 (42.4)	14 (42.4)	5 (15.2)	0 (0.0)	3.2727 \pm 0.7191	0.5170
Saw palmetto's anti-inflammatory properties attributes to a reduction in hair loss	11 (33.3)	17 (51.5)	3 (9.1)	2 (6.1)	3.1212 \pm 0.8199	0.6723
I believe the menthol in peppermint oil contributes to its hair growth effects.	18 (52.9)	10 (29.4)	5 (14.7)	1 (2.9)	3.3235 \pm 0.8428	0.7103
Average	43.4%	44.1%	10.7%	1.8%	3.2905 \pm0.7258	0.5356

*SA= Strongly agree; A=Agree; DA=Disagree; SDA=Strongly disagree; LK=Likert Score; SD=Standard deviation

4. Discussion

This paper had dual objectives: firstly, to review the literature on herbal treatments for alopecia, and secondly, to survey pharmacy students about their knowledge and views on this topic. It could be summarized that the reviewed literature confirms the efficacy of several herbal oils in promoting hair growth and preventing hair loss, supported by scientific evidence. Rosemary oil is noted for its anti-inflammatory and antioxidant properties, which contribute to its effectiveness in enhancing hair growth, comparable to minoxidil. Peppermint oil, with menthol as its active ingredient, improves blood circulation to the scalp, which aids in hair regrowth and strengthening. Amla oil, derived from the Indian gooseberry, is rich in antioxidants and effectively inhibits the 5 α -reductase enzyme, thus promoting hair growth and preventing hair loss. Similarly, Saw Palmetto is effective in preventing hair loss by inhibiting the conversion of testosterone to DHT, and it has been shown to improve hair density. Each of these oils demonstrates unique and beneficial properties for hair health, as evidenced by various studies.

In the knowledge-based set of five questions, the standard deviation (SD) is 0.39 indicates that the correctness percentages are relatively close to the mean. The cumulative low variance of 0.16 implies the correctness percentage is very close to the mean, thus the responses are relatively consistent across all questions. These statistics depict a high mean correctness percentage and low variability.

A review of the mean, standard deviation and variance of the opinion statements reveals close agreement with the statements. The overall average agreement rate of 3.2905 on the Likert score shows opinions are almost unanimous either strongly agreeing or just agreeing with the statements made. The least agreement was observed on saw palmetto at a Likert score of 3.1212, while the highest agreement rate was reflected in a score of 3.4118 on the statement that amla oil's high vitamin C content heavily contributes to its protective effect on the hair follicles.

The total standard deviation of 0.7258 for the Likert score and the total mean variance of 0.5356 show agreement across all five statements, indicating that the participants all had relatively similar opinions on the statements.

5. Conclusion

The literature review conducted for this survey indicated favorable outcomes regarding the effectiveness of the herbs studied. Additionally, the survey results showed that about 61% of the participants correctly answered the knowledge-based questions. Whereas the opinion-based statements were received with a positive response with at least 80% of participants agreeing or strongly agreeing on the potential benefits of the herbal remedies in hair thinning. There was minimal disagreement of potential benefits, ranging from 0 to 15% percent which indicates a more positive response towards the potential benefits of herbal remedies for hair loss.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest.

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