

ASSOCIATION OF SMOKING WITH BALDNESS AND GRAYING OF HAIR AMONG MALE ADULTS

CHAUDHRY M.A.,¹ ASHRAF T.,² ZEESHAN N.,³ HANIF A.,⁴ KHAN M.A.⁵ AND GHAZANFAR I.⁶

^{1,2,5,6}Department of Community Medicine, CMH Lahore Medical College, ³CMH, Department of ⁴Biostatistics PGMI Gulab Devi Hospital, Lahore – Pakistan

ABSTRACT

Background and Objectives: Smoking is a global health problem responsible for significant diseases that may lead to morbidity as well as mortality. Smoking has also been associated with gray hair and baldness in recent studies. Very limited data is available regarding association of smoking or tobacco use with premature graying of hair in our community, therefore, this study was designed to see any potential effect of smoking on graying of hair and baldness.

Methods: This analytical cross sectional study was conducted on 398 male subjects keeping prevalence of premature gray hair as 50.2% and 5% error. Non-Probability convenient sampling was used to collect data. The volunteer subjects were briefed about the purpose of research and questionnaire. After collection of data, it was entered and analyzed in SPSS version 20. Mean and Standard deviation were used to mention age, whereas, frequency and percentages were reported for qualitative variables. Chi Square test was used to see association between graying of hair and baldness, with smoking and other potential risk factors.

Results: The mean age of males was 36.50 ± 12.11 years with minimum and maximum ages of 17.00 and 72.00 years respectively. Out of total 398 subjects, 317 (79.6%) had gray hair among whom 172 (54.3%) reported that the onset of gray hair was at less than 30 years of age. There were 209 (52.5%) males who reported baldness and among them the onset of baldness in 99 (52.0%) subjects was at less than 30 years of age. A statistically significant association was found between baldness and smoking (p -value < 0.001). Also, a significant association was found of baldness with family history of gray hair (p -value = 0.007), with family history of baldness (p -value < 0.001), thyroid disease (p -value = 0.043), and vitiligo (p -value = 0.041). However, gray hairs were not associated with any of these risk factors.

Conclusion: Our study concludes that premature hair graying and baldness has become quite common in our population. Though smoking has significant contribution in baldness, some other factors such as family history of gray hair and baldness, thyroid disease and vitiligo cannot be ignored as they also have significant association with baldness but not with gray hair.

Keywords: Baldness, Hair loss, Hair graying, Smoking, Tobacco.

INTRODUCTION

The role of skin and hair color is imperative in establishing our physical appearance as well as sexual and social interactions in society. Hair graying is a feature characteristically attributed to age. The rate at which an individual's hair turns gray relies upon hereditary qualities like genetic factors. Untimely hair graying has additionally been related with immune system issues, such as vitiligo (e.g. pernicious anemia, immune system thyroid malady) and a few uncommon disorders with premature aging (e.g. Werner's disorder).¹ Literature has also indicated that age is related with increased hair graying in people.¹

It has been reported that there is a significant association of smoking with gray hair in both genders

i.e. men and women as well as amongst smoking and male baldness.^{2,3} Baldness or hair loss were reported to have a highly significant association with smoking (p -value < 0.0001) in one study while another study also concluded that tobacco smoking has been associated with adverse effects on the skin, which may potentially cause graying of hair.⁴

It is still not known how tobacco influences hair to turn gray or what mechanism leads to baldness.⁵ The color of hair mainly relies on the presence or absence of the melanin pigment. This pigment is found in special organelles called melanosomes, and its production is caused by melanocytes. There is actually a complex biochemical process involved called melanogenesis which is controlled by enzyme tyrosinase. Common

observation suggests that gray hair follicle is short of melanocytes than usual pigmented hair. So there is less incorporation of melanocytes in keratinocytes.

In another condition melanocytes may be present in maximal quantities but because of its inability to be transferred to keratinocytes, gray hair production increases.⁵

A person having premature hair graying or baldness/hair loss have severe complications and effects on the physical appearance, self-esteem, and socio-cultural acceptance of the affected person.^{6,7} As people mostly view it as a sign of old age and malnourishment, influenced people are frequently subjected to social disgrace, separation, and troubles in marriage.⁸ Very limited data is available regarding association of smoking or tobacco use with premature graying of hair. Therefore, this study was designed to see any potential effect of smoking on graying of hair and baldness. Therefore the objectives of this study are i) to see frequency of gray hair and baldness in male population of Lahore ii) to see association of smoking with graying of hair and baldness among males.

PARTICIPANT AND METHODS

This analytical cross sectional study was conducted for a period of one month July 2017 to August 2017 in community of Lahore. A sample of 398 was selected keeping assumed prevalence of premature gray hair as 50.0% and 5% error. Non-Probability convenient sampling was used to collect data. The volunteer subjects were briefed about the purpose of research and questionnaire. They all agreed (100% response rate) and were handed over the questionnaire to fill it and then the data were entered and analyzed using SPSS version 20. Mean and Standard deviation was used to mention age, whereas, frequency and percentages were reported for qualitative variables. Chi Square test was used to see association between graying of hair and baldness, with smoking and other potential risk factors.

RESULTS

The mean age of subjects was 36.50 ± 12.11 years with minimum and maximum ages of 17.00 and 72.00 years respectively. Out of total 398 subjects, 317 (79.6%) had gray hair and 81 (20.4%) did not have gray hair. Among the 317 males with gray hair, 172 (54.3%) reported that the onset of gray hair was at less than 30 years of age, 139 (43.8%) had the onset of gray hair at equal or greater than 30 years of age and 6 (1.9%) did not respond to the age at onset of graying of hair. There were 209 (52.5%) males who reported baldness and among them the onset of baldness in 99 (52.0%) subjects was at less than 30 years of age, and 91 (48.0%) had the onset of gray hair at equal or greater than 30 years of age (**Table 1**).

Among all, 239 (60.1%) were smokers, among them majority 139 (58.2%) started smoking in 20-30

Table 1: Characteristics of Subjects.

<i>Do you have some percentage of gray hair in your head or beard?</i>	
Yes	317 (79.6%)
No	81 (20.4%)
Total	398 (100%)
<i>If yes, age at onset of gray hair</i>	
Less than equal to 30 years	172 (54.3%)
Greater than 30 years	139 (43.8%)
NA	6 (1.9%)
Total	317 (100%)
<i>Baldness</i>	
Yes	189 (47.5%)
No	209 (52.5%)
Total	398 (100%)
<i>If yes, Age at onset of baldness</i>	
Less than equal to 30 years	98 (51.9%)
Greater than 30 years	90 (47.6%)
NA	1 (0.5%)
Total	189 (100%)
<i>Smoking</i>	
Yes	239 (60.1%)
No	159 (39.9%)
Total	398 (100%)
<i>If yes, Age at onset</i>	
Below 20 years	85 (35.6%)
20-30 years	139 (58.2%)
After 30 years	13 (5.4%)
NA	2 (0.8%)
Total	239 (100%)
<i>Cigarettes per day</i>	
1 – 5	49 (20.5%)
6 – 9	132 (55.2%)
More than 20	57 (23.8%)
NA	1 (0.4%)
Total	239 (100%)

years of age, 85 (35.6%) started smoking when they were younger than 20 years of age, and 15 (6.2%) started smoking after 30 years of age. Among these smokers, 132 (55.2%) smoked 6-9 cigarettes per day, 58 (24.2%) smoked 20 or more cigarettes per day and 49 (20.5%) smoked 1-5 cigarettes per day (**Table 1**).

A statistically significant association was found between baldness and smoking (p-value < 0.001). Also, a significant association was found of baldness

with family history of gray hair (p-value = 0.007), with family history of baldness (p-value < 0.001), thyroid disease (p-value = 0.043), and vitiligo (p-value = 0.041). Contrarily, graying of hair was not associated with smoking (p-value = 0.238), and also no association was found with previous history of gray hair (p-value = 0.592), family history of baldness (p-value = 0.728), thyroid disease (p-value = 0.315) and vitiligo (p-value = 0.491) (**Table 2**).

Table 2: Association of Baldness and Gray Hair with Risk Factors.

Risk Factor		Baldness		p-value	Gray Hair		p-value
		Yes	No		Yes	No	
Smoking	Yes	139 (73.5%)	100 (47.8%)	0.000*	195 (61.5%)	44 (54.3%)	0.238
	No	50 (26.5%)	109 (52.2%)		122 (38.5%)	37 (45.7%)	
	Total	189 (100%)	209 (100%)		317 (100%)	81 (100%)	
Family history of gray hair	Yes	114 (60.3%)	98 (46.9%)	0.007*	171 (53.9%)	41 (50.6%)	0.592
	No	75 (39.7%)	111 (53.1%)		146 (46.1%)	40 (49.4%)	
	Total	189 (100%)	209 (100%)		317 (100%)	81 (100%)	
Family history of baldness	Yes	116 (61.4%)	59 (28.2%)	0.000*	138 (43.5%)	37 (45.7%)	0.728
	No	73 (38.6%)	150 (71.8%)		179 (56.5%)	44 (54.3%)	
	Total	189 (100%)	209 (100%)		317 (100%)	81 (100%)	
Thyroid Disease	Yes	19 (10.1%)	10 (4.8%)	0.043*	21 (6.6%)	8 (9.9%)	0.315
	No	170 (89.9%)	199 (95.2%)		296 (93.4%)	73 (90.1%)	
	Total	189 (100%)	209 (100%)		317 (100%)	81 (100%)	
Vitiligo	Yes	11 (5.8%)	4 (1.9%)	0.041*	13 (4.1%)	2 (2.5%)	0.491
	No	178 (94.2%)	205 (98.1%)		304 (95.9%)	79 (97.5%)	
	Total	189 (100%)	209 (100%)		317 (100%)	81 (100%)	

DISCUSSION

Other than being the most preventable reason for morbidities and an imperative reason for death globally, tobacco smoking has been related with other adverse impacts on the skin.⁹ Premature hair graying due to smoking has caused a stir in medical community encouraging researchers to explore further aspects in this regard. However, very few studies have so far established an association between smoking and baldness and all those studies are observational. ⁹People who smoke have facial changes like those seen in premature aging. Though less established in our country, smoking, gray hair and facial features have also been reported as risk factors of other diseases especially related to heart.¹⁰ However, not many studies have focused on the potential role of smoking on graying of hair and baldness which gave us the rationale to conduct this study.

In this study, the mean age of males was 36.50 ± 12.11 years with minimum and maximum ages of 17.00 and 72.00 years respectively. Out of total 398 subjects, 317 (79.6%) had gray hair among whom 172 (54.3%) reported that the onset of gray hair was at less than 30 years of age. There were 209 (52.5%) males who reported baldness and among them the onset of baldness in 99 (52.0%) subjects was at less than 30 years of age. One Indian study was conducted on 120 patients and were classified into four groups (group I, II, III, IV) on the basis of the form of tobacco use (smoking or chewing). In this study mean age of smokers was 48.166 ± 13.901, of chewers was 33.566 ± 11.542, of smokers and chewers was 33.33 ± 11.7 and of control group was 34.9 ± 10.456.¹ The mean ages in all groups were very close to our finding, except smokers.

They also reported that it was observed that a positive and significant correlation was present between

age and mean percent individuals with graying of hair in smokers, chewers, and smokers + chewers, respectively (p-values < 0.05). In the control group, correlation between age and mean percent in individuals with graying of hair was weak, positive, and non-significant at a 5% level of significance.¹

Furthermore in this study, a statistically significant association was found between baldness and smoking (p-value < 0.001), family history of gray hair (p-value = 0.007), with family history of baldness (p-value < 0.001), thyroid disease (p-value = 0.043), and vitiligo (p-value = 0.041). Contrarily, graying of hair was not associated with smoking (p-value=0.238), and also no association was found with previous history of gray hair (p-value = 0.592), family history of baldness (p-value = 0.728), thyroid disease (p-value = 0.315) and vitiligo (p-value = 0.491).

One Population-based, cross-sectional study evaluated the association between smoking and hair loss (AndroGenetic Alopecia, AGA) on 740 subjects aged 40 to 91 years participated in the survey. After controlling for age and family history, statistically significant positive associations were noted between moderate or severe AGA and smoking status (OR, 1.77), current cigarette smoking of 20 cigarettes or more per day (OR, 2.34) and smoking intensity (OR, 1.78). Also, risk for moderate or severe AGA increased for family history of first-degree and second-degree relatives, as well as for paternal relatives.¹¹

Another study conducted on 522 males and 480 women reported that 51.5% subjects with gray hair were in their thirties with overall onset of hair graying at 41.6 ± 13.1 years. Additionally, multivariate analysis showed that risk of hair graying for smokers increased 14.9% each year with smoking as a significant (p-value < 0.001) contributor, and OR for smokers was 1.99 compared to non-smokers (p-value = 0.008).¹²

Hence, as proved by literature, smoking along with other hazardous effects on human health leads to various cutaneous manifestations as well. Premature hair graying and baldness are also included in some of these effects.¹³ The role of dermatologist is hence important for counseling of patients presenting with these problems to quit smoking and other means of tobacco.¹⁴ Further researches is recommended to explore the etiology and understand mechanism of hair loss or graying due to smoking.

This study **concludes** that premature hair graying and baldness has become quite common in our population. Though smoking has significant contribution in baldness, some other factors such as family history of gray hair and baldness, thyroid disease and vitiligo cannot be ignored as they also have significant association with baldness but not with gray hair.

Authors' Contribution

MAC: Concept of study protocol development. TA: Stu-

dy design and questionnaire development. NZ: Methodology and literature search. AH: Statistical analysis. MAK: Manuscript preparation. IG: Review of manuscript and finalizing draft.

Conflict of Interest: None.

ACKNOWLEDGMENTS

The authors are thankful to their institutions and the study participants for their support and cooperation.

REFERENCES

1. Sabharwal R, Gupta A, Moon N, Mahendra A, Sargaiyan V, Subudhi S, et al. Association between use of tobacco and age on graying of hair. *Nigerian J Surg.* 2014; 20 (2): 83-6.
2. Davis EM, Peck JD, Peck BM, Kaplan HB. Associations between early alcohol and tobacco use and prolonged time to puberty in boys. *Child: Care, Health Develop.* 2015; 41 (3): 459-66.
3. Aggarwal A, Srivastava S, Agarwal M, Dwivedi S. Premature graying of hair: An independent risk marker for coronary artery disease in smokers-A retrospective case control study. *Ethiop J Health Sci.* 2015; 25 (2): 123-8.
4. Zayed AA, Shahait AD, Ayoub MN, Yousef A-M. Smokers' hair: Does smoking cause premature hair graying? *Indian Dermatol Online J* 2013; 4 (2): 90.
5. Monfrecola G, Riccio G, Savarese C, Posteraro G, Proccini E. The acute effect of smoking on cutaneous microcirculation blood flow in habitual smokers and non-smokers. *Dermatol.* 1998; 197 (2): 115-8.
6. Commo S, Gaillard O, Bernard B. Human hair greying is linked to a specific depletion of hair follicle melanocytes affecting both the bulb and the outer root sheath. *British J Dermatol.* 2004; 150 (3): 435-43.
7. Williamson D, Gonzalez M, Finlay A. The effect of hair loss on quality of life. *J Europ Acad Dermatol Venereol.* 2001; 15 (2): 137-9.
8. Cash TF, Price VH, Savin RC. Psychological effects of androgenetic alopecia on women: comparisons with balding men and with female control subjects. *J Am Acad Dermatol.* 1993; 29 (4): 568-75.
9. Pandhi D, Khanna D. Premature graying of hair. *Indian J Dermatol, Venereol Leprol.* 2013; 79 (5): 641.
10. Trüeb RM. Association between smoking and hair loss: another opportunity for health education against smoking? *Dermatol.* 2003; 206 (3): 189-91.
11. Mosley J, Gibbs A. Premature grey hair and hair loss among smokers: a new opportunity for health education? *British Med J.* 1996; 313 (7072): 1616-7.
12. Su L-H, Chen TH-H. Association of androgenetic alopecia with smoking and its prevalence among Asian men: a community-based survey. *Arch Dermatol.* 2007; 143 (11): 1401-6.
13. Jo SJ, Paik SH, Choi JW, Lee JH, Cho S, Kim KH, et al. Hair graying pattern depends on gender, onset age and smoking habits. *Acta Dermato Venereol.* 2012; 92 (2): 160-1.
14. Freiman A, Bird G, Metelitsa AI, Barankin B, Lauzon GJ. Cutaneous effects of smoking. *J Cutaneous Med Surg.* 2004; 8 (6): 415-23.