
Association of premature hair graying with family history, smoking, and obesity: A cross-sectional study

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Background: Many researchers have been concerned about the association of hair graying with systemic diseases. However, the common factors associated with hair graying and systemic diseases have not been elucidated.

Objective: This study aimed to identify risk factors for premature hair graying (PHG) in young men.

Methods: We conducted a cross-sectional study using questionnaires in young men. After a pilot study that included 1069 men, we surveyed 6390 men younger than 30 years about their gray hair status and various socioclinical characteristics.

Results: The age of participants in the main survey was 20.2 ± 1.3 years (mean \pm SD). Of the 6390 participants, 1618 (25.3%) presented with PHG. Family history of PHG (odds ratio [OR], 12.82), obesity (OR, 2.61), and >5 pack-years history of smoking (OR, 1.61) were significantly associated with PHG. In the multivariate analysis, family history of PHG (OR, 2.63) and obesity (OR, 2.22) correlated with the severity of PHG.

Limitations: Owing to the use of questionnaires, the possibility of recall bias exists. Women were not evaluated in this study.

Conclusion: Smoking, family history of PHG, and obesity are important factors associated with PHG. (J Am Acad Dermatol 2015;72:321-7.)

Key words: body mass index; gray hair; obesity; premature hair graying; smoking.

Hair graying is one of the natural aging processes.¹ Although it is generally not a medical problem, it greatly concerns many people for aesthetic reasons.² Premature hair graying (PHG) is especially important as a cause of low self-esteem, often impeding social life in young people.³ Moreover, because of the strong association between aging and hair graying, many researchers have been concerned that PHG is a predictor of some severe systemic disease. Several studies evaluated the association of PHG with osteopenia or coronary artery disease.⁴⁻⁶ However, the common factors

Abbreviations used:

BEPsi-K:	modified Korean translated Brief Encounter Psychosocial Instrument
BMI:	body mass index
CI:	confidence interval
OR:	odds ratio
PHG:	premature hair graying

associated with hair graying and systemic diseases have not been elucidated. In a previous investigation, we noted that sex and smoking were associated

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with PHG.⁷ However, many other socioclinical characteristics were not examined, and further study was needed.

In this study, we aimed to identify the risk factors for PHG in healthy young Korean men. Koreans are suitable candidates for epidemiologic studies of hair graying because gray hair is distinctive against their original near-black hair color. We consider hair graying before the age of 30 years to represent PHG because it was found that in most Koreans, hair graying begins after age 30 years.⁷ Various socioclinical characteristics were surveyed using questionnaires, and their associations with hair graying were assessed.

METHODS

Study design and population

We conducted 2 cross-sectional studies using questionnaires. The first was designed as a pilot study. After the pilot study, we modified the questionnaire. The participants of both surveys were recruited at the 306 Supplementary Battalion in Uijungbu, Korea. The 306 Supplementary Battalion is one of the Korean military units into which citizens are conscripted. To participate, subjects had to be younger than 30 years, healthy enough to engage in military service, and agree to participate in this study. The exclusion criteria were refusal to participate in the study, hypopigmentary disorder, and alopecia (except androgenetic alopecia). This study was approved by the institutional review board of Seoul National University Hospital. To avoid the potential for coercion, we heeded institutional review board advice and emphasized to subjects that there would be no penalty for declining to participate.

Questionnaire details

Participants were asked about the presence of gray hair. The number of gray hairs was self-reported as follows: 0, less than 10, 10 to 100, and more than 100. The collected data included age, sex, height, body weight, the presence of a medical problem including scalp diseases and alopecia, the presence of a family history of PHG, lifestyle behaviors (drinking, smoking, exercise, and diet), educational background, scholarly achievements, occupation, and Fitzpatrick skin type. In our study, participants with a

smoking history of more than 5 pack-years were regarded as smokers. Obesity was categorized according to the World Health Organization (WHO) classification as follows: underweight, BMI < 18.5 kg/m²; normal weight, 18.5 kg/m² ≤ BMI < 25 kg/m²; overweight, 25 kg/m² ≤ BMI < 30 kg/m²; obese, BMI ≥ 30 kg/m².⁸ Emotional

stress was evaluated using the modified Korean translated Brief Encounter Psychosocial Instrument (BEPsi-K). BEPSI-K scores range from 0 to 5, with scores higher than 2.8 indicating high stress, scores between 1.6 and 2.8 indicating moderate stress, and scores lower than 1.6 indicating low stress.⁹

CAPSULE SUMMARY

- The risk factors for premature hair graying are not well known.
- In the current study, family history, obesity, and smoking were associated with premature hair graying, whereas family history and obesity correlated with its severity.
- This study yields clues to the pathophysiology of hair graying.

Evaluation of the survey's validity

To evaluate the survey's validity, we compared the grade of gray hairs from the subject's self-report with the investigator's examination in 100 subjects.

Statistical analysis

Unanswered questionnaire items were regarded as missing values. At first, we performed a univariate logistic regression analysis. We also analyzed ordinal categorical variables using the Cochran-Armitage trend test. Factors with associations at the *P* less than .10 significance level in these analyses were then entered into a multivariate logistic regression analysis to identify risk factors for PHG. *P* values less than .05 were considered significant.

To identify factors associated with the severity of PHG, an ordinal logistic regression analysis was performed. Factors with associations at the *P* less than .10 significance level in the univariate ordinal logistic regression were analyzed together by multivariate ordinal logistic regression. *P* values less than .05 were considered significant. The analyses were performed using a software package (SPSS Statistics 21.0, IBM Corp, Armonk, NY).

RESULTS

Pilot study

In the pilot study, 1104 questionnaires were returned, and 1069 were analyzed after excluding 35 by the predefined exclusion criteria. In the multivariate binary logistic regression analysis, BMI (odds ratio [OR], 1.04; 95% confidence interval [CI], 1.00-1.08) (*P* = .041), family history of PHG (OR, 9.11; CI, 5.64-14.69) (*P* < .001), and emotional stress

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