

Purpose: To assess the relative contribution of exogenous and endogenous factors to alopecia in genetically identical females.

Methods: Female twins completed comprehensive questionnaires followed by standardized digital photography. Sputum samples were also obtained for salimetric analysis. Midline, temporal, and vertex hair loss were measured using Adobe© Photoshop©. Data analysis was performed to determine the relationship between hair loss measurements, genetics, sputum testosterone levels, and questionnaire items.

Results: A total of 84 females with a mean age of 53.90 (18–77), were available for analysis. The strongest predictor of midline hair loss was marital status ($F\ 16.751, p < 0.001$), with widows and divorcees having more hair loss than married or single females. Genetics was also a significant predictor ($4.155, p = 0.045$), while age was not. Increasing numbers of alcoholic beverages per week was also associated with increased midline hair loss ($F\ 6.605, p = 0.012$).

The strongest predictor of temporal hair loss was genetics ($F\ 23.112, p < 0.001$). Increasing number of pack years was associated with increasing temporal hair loss ($F\ 10.110, p = 0.002$). Females who consumed 2 alcoholic drinks per week had significantly less hair loss ($F\ 13.283, p = 0.001$). Those females who reported a history of medical skin conditions had an increased risk of temporal hair loss ($F\ 6.344, p = 0.014$).

Neither age nor genetics was a significant predictor of coronal hair loss. However, history of diabetes, CAD, PCOS, medical skin diseases, and current smokers had significantly more hair loss. Increasing BMI was also associated with significantly less coronal hair loss.

56 females (mean age 54.43) provided sputum samples for evaluation of testosterone levels. Neither age nor genetics were significant predictors of testosterone levels. Female testosterone levels were not associated with any of our hair loss measures.

Conclusions: In our cohort of identical female twins, there was a significant difference in the relative contribution of genetics and endogenous factors to hair loss based on anatomic location. The effects of alcohol consumption, smoking, and medical conditions may offer putative targets for therapeutic intervention. Coronal hair loss was associated with medical pathology and smoking but not age or genetics. The lack of association between testosterone levels and female alopecia supports an alternative biological mechanism to male hair loss.