

Hair fall due to air pollutants and increased atmospheric temperature

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ABSTRACT

Background: Hair loss is a common problem in men and women. Correct diagnosis of hair disorders is complex and requires evaluation of clinical presentation, history, physical examination, and laboratory tests. The current study includes hair fall due to air pollutants and dust particles that clog in the hair and be the major common cause of hair fall. There are evidences that dandruff is also one of the major common cause of hair fall. The current study tells about people who live in the urban areas are more affected with hair fall than those who live in the rural areas. People who sweat a lot have also increased tendency of hair fall due to dust and minute dust particles that open up the clogs and causes hair fall. **Methodology:** The study was a cross-sectional study. The subjects were 100 individuals with 18–25 years of age in an urban area of Kancheepuram district. The mode of data collection was online. The individuals were oriented on the data of knowledge; attitude, motivation, and valid questionnaire were collected from the individuals. **Results:** Among 100 individuals, 93.2% have hair fall and 6.8% does not have hair fall. Moreover, among 93.2% who have hair fall, 48.9% have continuous hair fall and 18% have occasional hair fall and 30.8% vary seasonally. Moreover, the major cause for the hair fall is because they live in a highly polluted area that is 63.9% of them. **Conclusion:** The major cause of hair fall is air pollutants and dust particles that clog in the scalp and get sticks to it and causes hair fall.

KEY WORDS: Abnormalities, Alopecia, Hair fall, Hair shaft

INTRODUCTION

There is worldwide awareness of respiratory diseases, sinus problems, and allergies caused by air pollution. Now, we have evidence that this can also occur in indoor environments.^[1] The skin and hair form the first barrier exposed to pollution. Large suspended particles, small airborne particles, and smoke and gaseous pollution settle on the scalp and hair, causing irritation and damage.^[2] The fact was noticed when Industrial Toxicology Research Center, Lucknow, published a study with reference to effects on human hair in 1994.^[3] Hair loss due to pollution can coexist or mimic androgenic alopecia just like diffuse unpatterned hair loss, diffuse alopecia areata, early critical alopecia, or chronic telogen effluvium can mimic androgenic alopecia.^[4] The current study shows that the amount of pollutants even indoor can also affect the hair shaft and cause hair fall. There is an increased tendency

of association of hair fall and dandruff. Pretending dandruff also to be the one of the major causes of hair fall.

METHODOLOGY

The current cross-sectional study taking 100 individuals and the study area consisting of people of urban area of Kancheepuram district. The current study population includes young adults in the age group of 18–5 years. A questionnaire was prepared regarding hair fall and the responses have been recorded. The current study yields the prevalence of hair fall due to air pollutants. The data collected were analyzed statistically by SPSS version 17.0.^[5]

RESULTS

Among 100 individuals, 93.2% have hair fall and 6.8% does not have hair fall.

Moreover, among 93.2% who have hair fall, 48.9% have continuous hair fall and 18% have occasional hair fall and 30.8% vary seasonally.

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Moreover, the major cause for the hair fall is because they live in Chennai which seems to be one of the highly polluted metro cities in Indian that is 63.9% of them. There is an association of dandruff and hair fall, causing dandruff to be major criteria for hair fall. According to the survey has collected that the prevalence of hair fall due to dandruff is high comparatively.^[6]

Table 1 shows that the people who sweat a lot have 8.90 times higher rate of hair fall than people who sweat less comparatively. Sweating is associated with the hair fall. There is a positive association of sweating with hair fall.

The frequency of people having dandruff has 1.98 times higher rate of hair fall than people who do not have dandruff [Table 2].

DISCUSSION

The prevalence of hair fall is 93.2% and people who do not have hair fall is 6.8% [Figure 1]. The hair fall is continuous for 48.9% of people and not continuous for 18% of people and varies seasonally for 30.8% people [Figure 2]. People who are frequently exposing outside have a higher rate of hair fall than people who do not

Table 1: Association of sweat and hair fall

People having hair fall	Percent	People who sweat a lot	Percent
Yes	93.2	Yes	60.2
No	6.8	No	39.1
Total	100	Total	100

Odds ratio: 8.90

Table 2: Association of dandruff and hair fall

People having dandruff (%)	People having hair fall (%)
Yes	93.2
No	6.8
Total	100

Odds ratio : 1.98

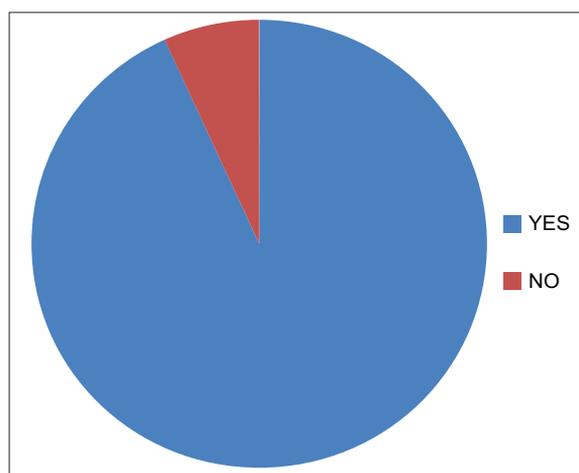


Figure 1: Prevalence of hair fall

due to clogging of air pollutants [Figure 3]. The hair fall is a normal physiological condition that exists among all humankind. However, the hair fall rate increases in urban areas^[7] and the amount of hair fall is high in urban areas like one of the highly polluted metro cities in Chennai.^[4] The air pollutants consist of minute dust particles that have proved to cause hair fall by clogging inside the hair and causing hair fall.^[8] There is an association of dandruff and hair fall. People who have dandruff have 1.98 times higher rate of hair fall than people who do not have hair fall. Moreover, people who sweat a lot have also shown a higher amount of hair fall. People who sweat a lot have 8.9 times higher rate of hair fall than people who do not sweat more. Misery noted that exposure to pollution causes redness, irritation faster exfoliation of outer layers of the scalp, exposing sensitive inner layers, causing more sensitivity, leading to further scaling, and even psoriasis on prolonged exposure.^[5] Patients complain of dandruff not responding to standard treatments.^[1] Irritation due to pollution which on continued exposure, perpetuates excessive seborrhea, and oily scalp with continued exposure to pollutants, hair follicles suffer unabated low-grade inflammation leading to fibrosis and permanent hair loss.^[2] Microscopic changes of signs of inflammation and accumulation of phagocytes are reported to be seen on scalp biopsy from effects of pollution.^[9]

WHO Criteria for Pollution Levels

- WHO recommended the highest particle matter (PM) should be 100 ng/m³. The average PM in Mumbai varies from 238 ng/m³ to 643 ng/m³. Chennai levels of PM vary 398 ng/m³–760 ng/m³, being highest during Diwali fireworks and winter smog. Rising levels of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ammonia (NH₃), and other gases are between 11% and 48%; these can adhere to the hair shafts causing damage, the levels can be 3–5 times higher during winter smog and Diwali.^[8]

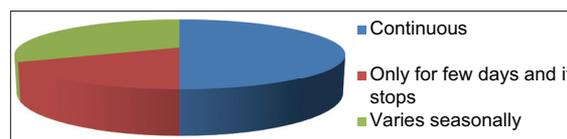


Figure 2: Frequency of hair fall

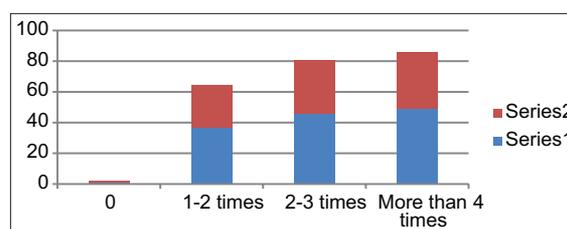


Figure 3: Frequency of exposing outside

Hair as a Marker of Pollution

- Human hair has long been used as a biological marker for assessment of environmental pollutants, toxins, drug abuse, and exposure to pesticides in farmers. Areas of mining and construction activity show a higher concentration of PM. The concentration of mercury, zinc, lead, and heavy metals can be determined from the air, dust, and hair of the residents living around mining areas, indicating these as a cause of hair damage.^[10]

CONCLUSION

Pollution is on the rise all over the world and more so in Indian metros in one of the highly polluted cities like Chennai. Air pollution can contribute to scalp irritation, redness, itching, excessive sebum secretion, dandruff, pain in the hair roots, and hair loss. The combination is defined as sensitive scalp syndrome. The condition can mimic or overlap androgenic alopecia. The possibility should be suspected to be discovered. Use of antioxidants, frequent scalp wash with mild shampoos, use of special EDTA shampoos, and use of coconut oil or hair serum are the remedies that can protect the hair from environmental damage.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital.

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