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Study the Premature Greying of Hairs

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I. CHAPTER 1

INTRODUCTION

Premature graying of hair is an important cause of low self-esteem, often interfering with socio-cultural adjustment. The onset and progression of graying or canities correlate very closely with chronological aging, and occur in varying degrees in all individuals eventually, regardless of gender or race. Premature canities may occur alone as an autosomal dominant condition or in association with various autoimmune or premature aging syndrome. It needs to be differentiated from various genetic hypomelanotic hair disorders.

Reduction in melanogenically active melanocytes in the hair follicles with resultant pigment loss is central to the pathogenesis of graying. Defective melanosomal transfers to cortical keratinosomal and melanin incontinence due to melanocytes degeneration are also believed to contribute to this. The white color of canities is an optical effect; the reflection of incident light masks the intrinsic pale yellow color of hair keratin. Full range of color from normal to white can be seen both along individual hair and from hair to hair, and admixture of pigmented and white hair is believed to give the appearance of gray. Graying of hair is usually progressive and permanent.

FIG.1.Canities

Healthy hair is a sign of general well-being and youth. Unlike other animals, the function of hair in human beings is being debated. Nevertheless, hair serves as a great esthetic tool and means of nonverbal communication. Hair color and style can significantly alter the physical appearance of a person and thus alter his/her body image. As graying of hair is perceived as a sign of old age, premature graying of hair (PGH) can bear an adverse effect on the self-esteem of the individual.

Skin and hair contribute immensely in human communication. Hair length, color, and style play an important role in people′s physical appearance and self-perception. Human beings are unique amongst primates in having very thick, long, and highly pigmented scalp hair. This is likely to have provided one or more survival benefits to the humans during the process of evolution. Firstly, selective and avid binding of toxins and metals to melanin pigment aids in preventing the buildup of toxic metals from fish species which concentrate heavy metals, especially in human development along sea coasts and riverbanks. Secondly, reactive quinone intermediates generated during melanin synthesis possess potent antibacterial properties. Lastly, deep brown-black hair present in 90% of the world′s population protects against sunstroke, and its melanin aids very efficient and fast exchange of ion transport and efflux for adequate salt balance. However, the remaining 5-10% of world population mostly hailing from northern Europe do not have the environment-friendly brown-black hair, possibly due to mutations in the melanocortin-1 receptor (MC1R), a G-protein coupled receptor. Mutations in the MC1R gene are believed to have contributed to white blonde, yellow blonde, and auburn color of hair in individuals in the less sunny climates in northern Europe, while natural selection pressures possibly restrained this mutation in the sunny tropical areas.

FIG.2.Premature Greyed Hairs

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Graying of hair also called canities or achromotrichia occurs with normal aging. However, the age at which it occurs varies in different races. PGH is defined as graying of hair before the age of 20 years in Caucasians and before 30 years in Blacks. Definition of PGH with respect to the Asian population is lacking. The average age of the onset of graying in Caucasians is 34 ± 9.6 years, and in Blacks, it is 43.9 ± 10.3 years. A large study reported that 6%–23% of people have 50% gray hair by 50 years of age.

1.1Pigmentation of Hairs

Hair pigmentation is one of the most unique features in humans ranging from black, brown, and blonde to red. The color of human hair is due to pigment melanin produced by melanocytes which are neural crest derivatives. Human hair follicles contain two types of melanin as follows: eumelanin and pheomelanin. The diversity of hair color arises mostly from the quantity and ratio of black-brown eumelanin and reddish-brown pheomelanin. It has been hypothesized that the pH and cysteine level of melanosomes influences the phenotype of hair. As pH reduces, there is a progressive reduction in tyrosinase activity leading to increased pheomelanin and reddish or blonde hair. A mutation in melanocortin-1 receptor (MC1R) gene causes auburn or red color of hair. This mutation is seen usually in individuals of Northern Europe with less sun exposure. A study in 2012 showed a recessive mutation in tyrosinase-related protein 1 (TYRP1) in people with blonde hair.There are various differences between pigmentation in the skin and that of hair. Each melanocyte is associated with five keratinocytes in the hair bulb forming a "hair follicle-melanin unit." In contrast, each melanocyte in the skin is associated with 36 keratinocytes constituting an "epidermal-melanin unit." Unlike in the skin where pigment production is continuous, melanogenesis in the hair is closely associated with stages of the hair cycle. Hair is actively pigmented in the anagen phase and is "turned off" during the catagen phase and absent during telogen.Thepigmentary unit is a pear-shaped black structure at the tip of dermal papilla in pigmented hair. In gray hair, the pigmentary unit becomes fuzzy, the melanocytes become few and rounded, and lightly pigmented oligodendritic melanocytes become visible in the proximal hair bulb.Duringanagen, there is a marked reduction in the number of melanocytes in the hair follicles through autophagolysosomal degeneration leading to pigment loss. This is thought to be central in the pathogenesis of graying. Defective melanosomal transfer to cortical keratinocytes or melanin incontinence due to melanocyte degeneration contributes to graying. Degenerative changes within the hair follicle are associated with an increase in dendritic cells in the hair follicle. Eventually, there are no melanogenicmelanocytes in the hair bulb.

Considering the important role played by hair in social communication, premature hair graying or canities has significant adverse effects on the appearance, self-esteem, and socio-cultural acceptance of the affected individual. It is often viewed as a sign of old age and loss of health and vigor. Affected individuals are often subjected to social stigma, discrimination, and difficulties in marriage.

FIG.3.A 10-year old girl with premature canities

Definition

Canities, or hair graying, is a process of chronological aging and occurs regardless of gender or race. The age of graying varies with race and ethnicity. Hair is said to gray prematurely only if graying occurs before the age of 20 years in Whites, before 25 years in Asians, and before 30 years in Africans.

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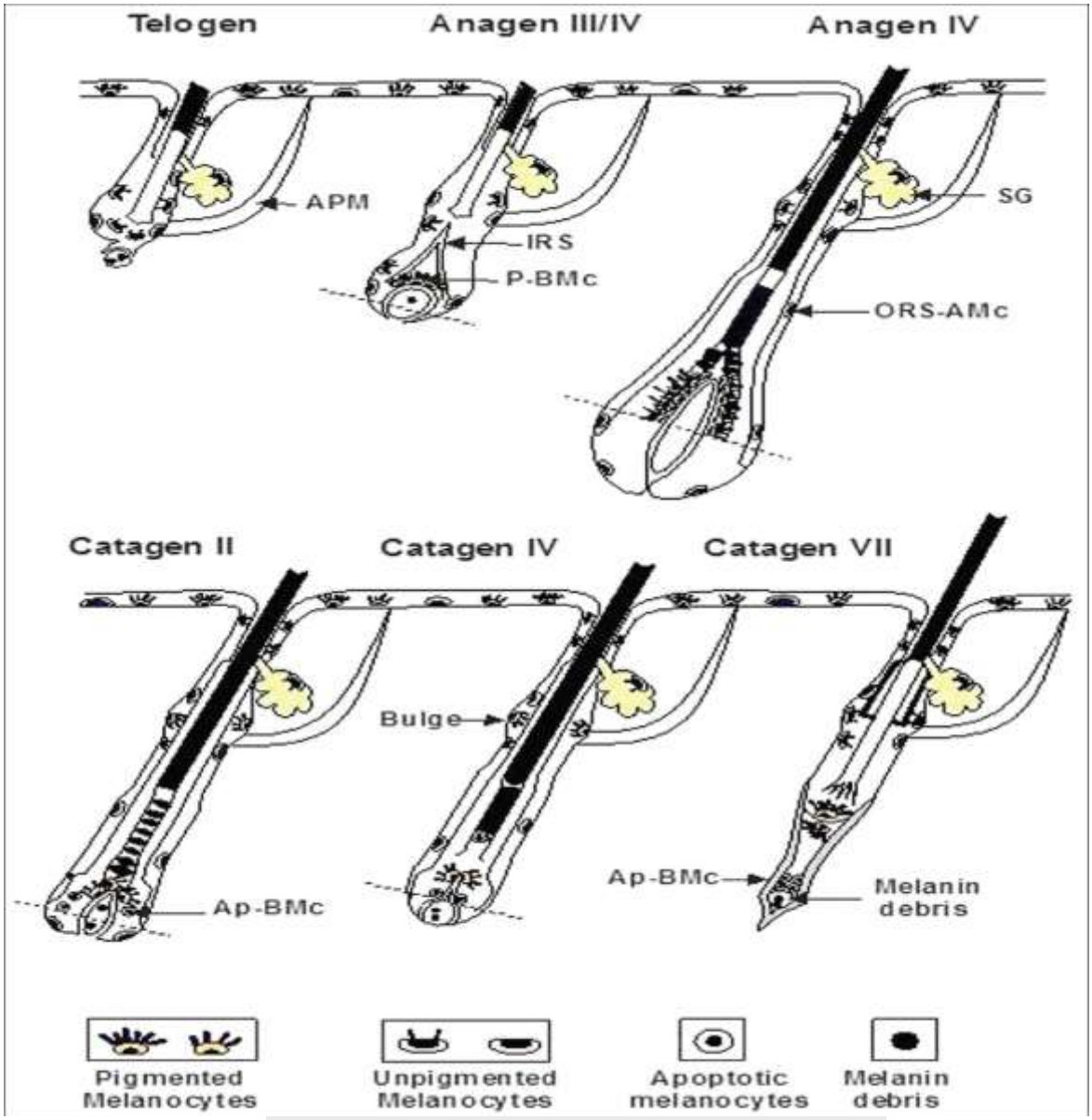

FIG.4. Melanocyte stem cells and their progeny during the hair cycle

Normal Hair Follicular Melanin Unit and Melanogenesis

The color of human hair depends on melanogenesis, the process of synthesis of melanin and its subsequent distribution from the melanocyte to keratinocyte. The process is thought to be regulated genetically at various levels. The human hair follicles contain two types of melanins: the black-brown pigment eumelanins mainly present in black and brown hair and the yellow or red pheomelanins in auburn and blonde hair.

Both epidermal and follicular melanocytes are derived from immature melanoblasts that migrate from the neural crest into the skin during embryogenesis. As the hair follicle develops, the progeny of melanoblasts which proliferate in the epidermis, known as transient-amplifying melanocytes, leave that compartment and move into the developing hair follicle. There, melanocytes may become or remain DOPA-oxidase-positive cells (i.e. express active tyrosinase) or remain DOPA-oxidase-negative cells (i.e. either fail to express tyrosinase or express an inactive tyrosinase) depending on the intrafollicular compartment in which they reside.

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FIG. 5. The mechanism of hair graying

Premature graying of hair, also known as premature canities or premature aging of hair, is a condition where the hair starts to turn gray before the age at which graying is considered normal, which is typically in one's mid-30s. Several factors can contribute to premature graying of hair, although it is often a combination of genetic, environmental, and lifestyle factors. Here are some common factors associated with premature graying.

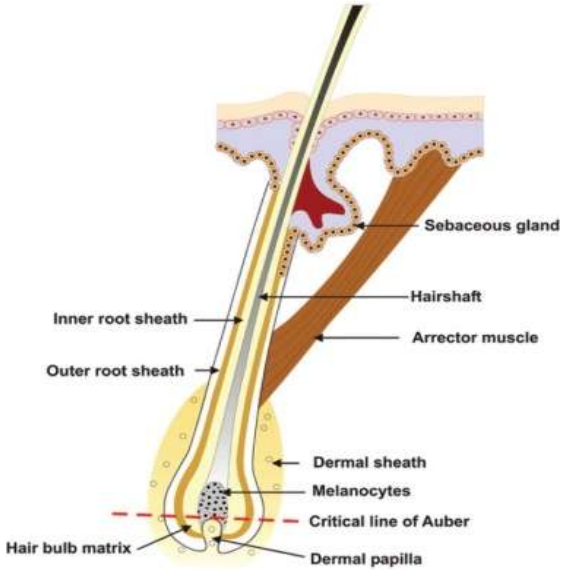

FIG. 6. Hair follicle structure

It's important to note that while there are various factors that can contribute to premature graying, there is limited scientific evidence to definitively prevent or reverse it. However, certain lifestyle changes and practices may help slow down the graying process or manage the condition:

Managing stress through relaxation techniques and stress-reduction strategies.A balanced diet with adequate intake of vitamins and minerals.

Avoiding smoking and limiting exposure to environmental toxins.

Treating underlying medical conditions or hormonal imbalances.

Hair dyes or other cosmetic options can be used to cover gray hair if desired.

If you are concerned about premature graying or believe it may be related to a medical condition, it's advisable to consult a healthcare professional or adermatologist for athorough evaluation and guidance. They can help determine the underlying cause and recommend appropriate treatment or management options.

FIG.7.Canities in women

FIG.8.Canities in men

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1.2 Causes of Premature Greying

1.Genetic Factors

Learn how your genes can play a role in premature greying and if it runs in your family.

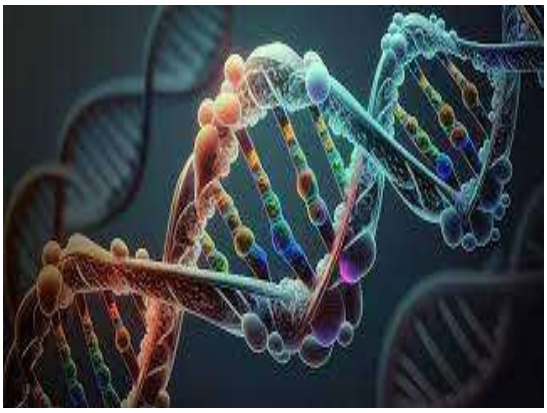

FIG.9.Geneti Factor

2.Stress and Lifestyl

Chronic stress can have various negative effects on your body, including prematuregraying of hair. High stress levels can lead to the depletion of melanin –producing.

FIG.10.Stress

3.Vitamin Deficiencies

Discover the impact of inadequate vitamin levels on hair pigmentation.

4.Age

As you age, your body produces less melanin, the pigment responsible for hair color. This natural aging process leads to gray hair, but it may occur prematurely in some individuals.

5.Nutritional Deficiencies

Inadequate intake of certain nutrients, such as vitamin B12, iron, and copper, can contribute to premature graying. A balanced diet is essential for maintaining healthy hair color.

FIG.11.Nutirition Deficient

6.SMOKING

Smoking has been linked to premature graying of hair. The harmful chemicals in cigarettes can damage hair follicles and reduce melanin production.

FIG.12.Smoking

7.EnvironmentalFactors

Exposure to pollution, toxins, and UV radiation can damage hair and reduce melanin production. Protecting your hair from environmental stressors can help delay premature graying.

8.Medical Conditions

Certain medical conditions, such as autoimmune diseases (like vitiligo and alopecia areata), thyroid disorders, and anemia, can cause premature graying of hair.

9.Medications

Some medications may contribute to premature graying. Consult your healthcare

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provider if you suspect that your medication is affecting your hair color.

10.Hair Care Products

Overuse of hair care products that contain harsh chemicals or heat styling tools can damage the hair shaft, leading to premature graying.

11.Hereditary Factors

Sometimes, the onset of premature graying is linked to specific genes. These genetic factors can influence when and how quickly your hair turns gray.

1.3 Medical Treatments for Premature Greying

Hair Dyes and Colorants

Learn about options for temporarily disguising or enhancing natural hair color.

Laser Therapy

Discover how innovative laser treatments can stimulate hair pigmentation.

Medications

Explore pharmaceutical approaches to address premature greying

FIG.13.Produts to be used

1.4 Effects of Premature Greying

Psychological Impact

Unveil the emotional and psychological effects of premature greying on individuals.

Social Implications

Examine society's perception and potential discrimination faced by those with premature greying.

Career Implications

Discover the impact of premature greying on professional opportunities and self-confidence

1.5 Prevention and Manegement

Health Lifestyle Choice

Learn about the importance of balance diet, exercise,and stress manegment in preventing premature greying .

Nutritional Supplements

Discover the role specific supplements in maintaining healthy pigmentation

Haircare Tips

Explore effective haircare practices to promote hair health and delay greying

1.6 Conclusion

Embracing Natural Greying

Encourage self-acceptance and embracing the beauty of natural greying.

Self-Acceptance and Confidence

Discuss building confidence regardless of hair pigmentation.

Seeking Professional Advice if Desired

Recommend seeking professional guidance for individuals desiring a change in hair pigmentation.

1.7 Herbal remedies for treatment of premature greying of hairs

1.Amla (Indian Gooseberry):

Amla is rich in antioxidants and vitamin C, which can help reduce oxidative stress and promote hair health. You can consume it in various forms, such as fresh amla fruit, amla juice, or amla powder.

2.Curry Leaves:

Curry leaves are believed to contain essential nutrients that can help darken hair and slow down premature graying. You can use them in your cooking or create an oil infusion to apply topically.

3.Bhringraj (Eclipta alba):

Bhringraj is an herb often used in Ayurvedic medicine for hair care. It is thought to help with hair pigment retention and overall hair health. You can find bhringraj oil or powder for topical application.

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4.Coconut Oil and Lemon Juice:

A mixture of coconut oil and lemon juice can help nourish hair and promote a healthier scalp. The vitamin C in lemon may help with melanin production. Apply this mixture to your hair and scalp, leave it for 30-60 minutes, and then rinse

5.Hibiscus

Hibiscus is a popular natural remedy often suggested for the treatment of white or gray hair.

6.Aloe Vera Gel

You can apply aloe vera gel directly from the plant or use a commercial aloe vera gel product. Apply it to your scalp and hair, leave it on for 30 minutes, and then wash it out with a mild shampoo.

7.Kalonji

Kalonjialso known as Nigella sativa or black seed, is a small flowering plant native to South Asia. The seeds of this plant are used for various culinary and medicinal purposes.

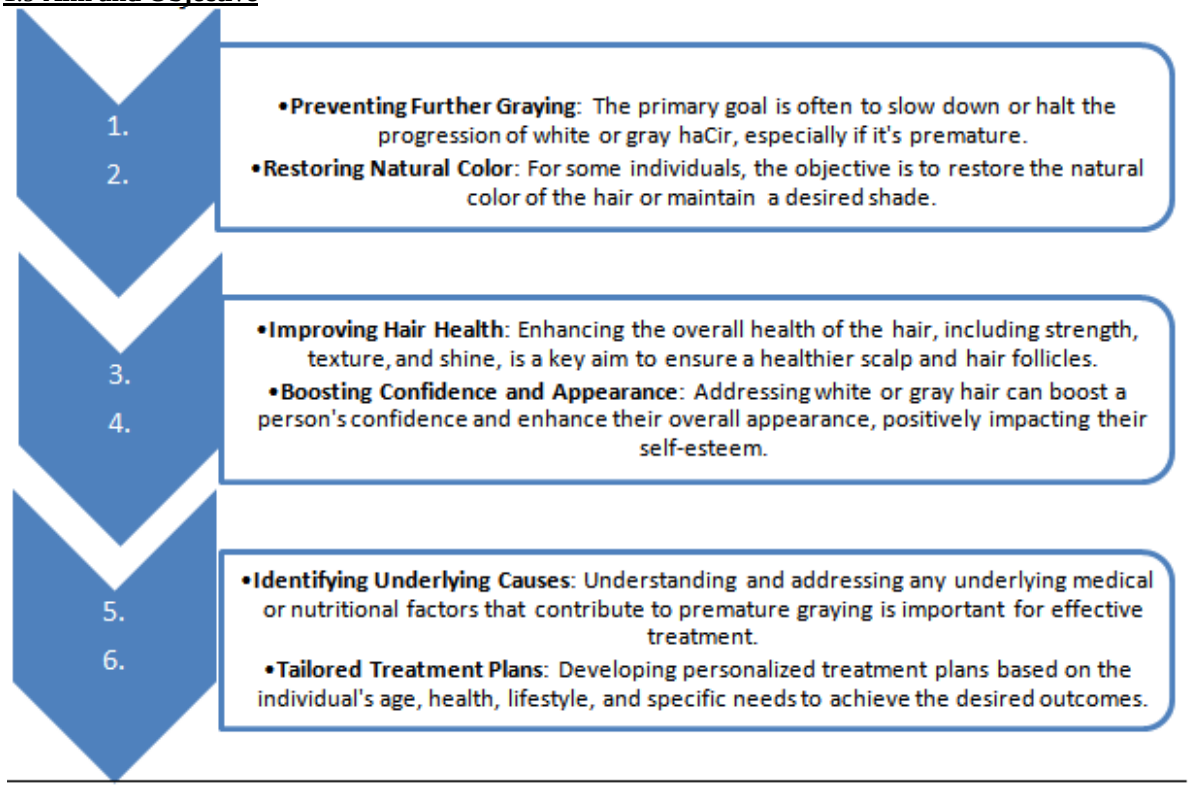
1.8 How to Prepare and Use Herbal Remedies

1. Amla, bhringraj, coconut oil,lemon,curry leave, aloevera,hibiscus,kalongi.

2. You can use herbal powders or make a paste by mixing with water, oil, or yogurt.

3. Apply and rinse ;Apply the paste or oil to your hair and leave it on for an hour before rinsing it off with water

1.9 **Aim and Objective**



II. CHAPTER 2

LITERATURE REVIWE

Anagha Bangalore Kumar, HumaShamim, UmashankarNagaraju- Graying of hair also called canities or achromotrichia occurs with normal aging. However, the age at which it occurs varies in different races. PGH is defined as graying of hair before the age of 20 years in Caucasians and before 30 years in Blacks. Definition of PGH with respect to the Asian population is lacking. The average age of the onset of graying in Caucasians is 34 ± 9.6 years, and in Blacks, it is 43.9 ± 10.3 years. A large population-based study reported that 6%–23% of people have 50% gray hair by 50 years of age.

Anagha Bangalore Kumar, Huma Shamim,[1] and UmashankarNagarajuInt J Trichology. 2018 Sep-Oct; 10(5): 198–203 doi: 10.4103/ijt.ijt_47_18

Br J Dermatol- To assess hair colour and greying in a large world sample of human subjects, and to revisit the validity of the 50/50/50 rule of thumb,

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which states that 'at age 50 years, 50% of the population has at least 50% grey hair'.

Panhard S, Lozano I, Loussouarn G. Greying of the human hair: A worldwide survey, revisiting the '50' rule of thumb. Br J Dermatol. 2012;167:865–73.

K Wakamatsu,-The skin pigment melanin is produced in melanocytes in highly specialized organelles known as melanosomes. Melanosomes are related to the organelles of the endosomal/lysosomal pathway and can have a low internal pH. In the present study we have shown that melanin synthesis in human pigment cell lysates is maximal at pH 6.8. We therefore investigated the role of intramelanosomal pH as a possible control mechanism for melanogenesis. To do this we examined the effect of neutralizing melanosomal pH on tyrosinase activity and melanogenesis in 11 human melanocyte cultures and in 3 melanoma lines.

K Wakamatsu, 2001 Aug 1;268(1):26-35. doi: 10.1006/excr.2001.5251

Bhushan Madke-Hair, rightly called the crown of the body, plays an instrumental role in maintaining a positive societal and self-perception of an individual. Gray hair is usually associated with physiological aging, and often seen as a sign of senescence. For this reason, graying of hair prematurely can adversely affect the self-esteem of young individuals, especially the ones with darker hair type due to easy visibility of gray hair because of high contrast, where few gray strands tend to be immediately noticeable.

Bhushan Madke

Review

Article2021:1;65doi:10.25259/CSDM_66_2021

Jawaharlal Nehru Medical College, DattaMeghe Institute of Medical Sciences, Wardha, Maharashtra, India.

III. CHAPTER3

RATIONALE OF PURPOSE STUDY

Understanding Aging: White or gray hair is often associated with the natural aging process. Studying white hair helps researchers and scientists better understand the physiological changes that occur as people age, both in the hair follicles and at a cellular level. This understanding can contribute to our overall knowledge of the aging process.

Medical and Genetic Research: White hair can be linked to various medical conditions, genetic factors, and syndromes. Investigating the genetic and medical aspects of white hair can help identify potential genetic markers, understand the underlying causes, and develop treatments or interventions for conditions associated with premature graying.

Psychological and Societal Implications: The presence of white hair can have psychological and societal implications. Research into how individuals perceive and are affected by white hair can help us understand self-esteem, self-image, and societal attitudes toward aging and appearance.

Hair Health and Care: White hair can be a sign of hair and scalp health.Researching the causes and effects of white hair can provide insights into maintaining overall hair health and preventing issues like hair loss, dryness, and premature graying.

Cosmetic and Personal Care Industry: The cosmetic and personal care industry is interested in developing products and treatments to address white hair and improve hair appearance. Studies on the effectiveness of various treatments, such as hair dyes and supplements, contribute to product development and consumer choices.

Cultural and Historical Significance: The presence of white hair has cultural and historical significance in various societies. Research in this area can help us understand how different cultures perceive and interpret white hair, as well as how this perception has evolved over time.

Treatment and Prevention: Research into the treatment and prevention of white hair is of interest to those looking for ways to maintain or restore their natural hair color. This includes exploring the effectiveness of topical applications, dietary changes, and lifestyle modifications

1.**Amla**

Amla, also known as Indian gooseberry, is a fruit that is highly valued in traditional Indian medicine, particularly Ayurveda, for its various health benefits. Here's some information about amla, including its species, botanical name, and its properties related to the treatment of white hairs:

BotanicalName:

Amla is scientifically known as **Phyllanthusemblicaor Emblicaofficinalis**

Species:

Amla belongs to the Phyllanthaceae family and is native to India. It is commonly found in various parts of the Indian subcontinent and Southeast Asia.

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FIG.14.Amla

Properties for the Treatment of White Hairs:

Amla is known for its potential benefits in preventing and treating white or premature graying of hair. While it may not completely reverse white hairs, it can help slow down the graying process. Here's how amla can be beneficial:

a. Antioxidant Properties: Amla is rich in antioxidants, especially vitamin C. These antioxidants help protect the hair follicles from damage caused by free radicals, which can contribute to premature graying.

b. Melanin Production: The pigmentation of hair is due to a pigment called melanin. Amla is believed to stimulate the production of melanin, which can help maintain the natural color of the hair.

c. Scalp Health: Amla has antibacterial and antifungal properties that can help maintain a healthy scalp. A healthy scalp is essential for maintaining the color and quality of hair.

d. Hair Strengthening: Amla is also rich in essential nutrients like vitamin C, iron, and other minerals. These nutrients can help strengthen the hair and make it less prone to breakage or damage, which can lead to white hairs.

e. Hair Conditioning: Amla can be used in various hair care products, such as oils and shampoos, to condition the hair and make it more manageable and less prone to graying.

f. Dietary Inclusion: Consuming amla as a part of your diet can provide these benefits internally. You can eat fresh amla, drink amla juice, or take amla supplements to

2.Bhringraj

Bhringraj, also known as Eclipta alba, is a plant that has been traditionally used in Ayurvedic and traditional medicine systems for various health and hair-related benefits. Here's some information about Bhringraj, including its species, botanical name, and properties related to the treatment of white hairs:

Botanical Name:

Bhringraj's botanical name is Ecliptaalba. It is also sometimes referred to as Ecliptaprostrata.

Species:

Bhringraj belongs to the family Asteraceae and is native to India, though it is also found in other parts of Asia, the Americas, and Africa

FIG.15.Bhringraj

Properties for the Treatment of White Hairs:

Bhringraj is known for its potential benefits in promoting hair health and addressing issues like premature graying. While scientific research on its effectiveness is somewhat limited, it has a long history of traditional use for hair care. Here are some properties and uses related to the treatment of white hairs:

a. **Melanin Production**: Bhringraj is believed to stimulate the production of melanin, the pigment responsible for hair color. By promoting melanin production, it may help maintain the natural color of the hair.

b. **Antioxidant Properties**: Bhringraj contains antioxidants that can protect hair follicles from oxidative stress, which is one of the factors contributing to premature graying.

c. **Hair Strengthening**: Regular use of Bhringraj in hair oils or hair masks is thought to strengthen the hair, reducing the likelihood of breakage and hair damage.

d. **Scalp Health**: A healthy scalp is essential for maintaining hair color. Bhringraj has antimicrobial properties that can help maintain scalp health.

e. **Hair Conditioning**: Bhringraj is often used as an ingredient in hair care products, and it can help

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condition the hair, making it smoother and more manageable.

f. **Dietary Inclusion**: Some people also consume Bhringraj as part of their diet to support hair health, although this is less common.

3.Curry Leaves

Curry leaves, scientifically known as Murrayakoenigii, are commonly used in Indian cuisine and have also been traditionally used in Ayurvedic and other traditional medicine systems. They are believed to have several properties that can be beneficial in the context of hair care, including the treatment of white or premature graying hair. Here is some information about curry leaves, including their species, botanical name, and properties:

Botanical Name and Species:

Botanical Name: Murrayakoenigii

Species:

Curry leaves belong to the Rutaceae family and are native to the Indian subcontinent. They are widely cultivated in many tropical and subtropical regions.

Properties for the Treatment of White Hairs:

Curry leaves are considered to be rich in nutrients and compounds that can benefit hair health and potentially help with the prevention of white hairs:

a. **Rich in Antioxidants**: Curry leaves are known to contain antioxidants such as vitamin C and various flavonoids. These antioxidants help protect hair follicles from damage caused by free radicals, which can contribute to premature graying.

b. **Melanin Production**: The pigment responsible for hair color is melanin. Some proponents of curry leaves suggest that they can stimulate melanin production, which may help maintain the natural color of the hair.

FIG.16. Curry Leaves

c. **Hair Strengthening**: Curry leaves are rich in essential nutrients like proteins, beta-carotene, and amino acids. These nutrients can help strengthen the hair, making it less prone to breakage and damage

d. **Scalp Health**: A healthy scalp is essential for maintaining hair color. Curry leaves contain antimicrobial properties that can contribute to scalp health and overall hair health.

e. **Hair Conditioning**: Curry leaves can be used in various hair care treatments to condition the hair, making it more manageable and smoother.

f. **Internal Use**: In addition to external applications, some traditional practices include consuming curry leaves as part of the diet, such as in curry dishes or as a tonic. This internal use is believed to offer additional hair and health benefits.

4.Coconut and Lemon

Coconut oil and lemon are two common natural ingredients that people often use for various hair treatments, including addressing issues like white or premature graying hair. Here's some information about both ingredients, including their species, botanical names, and properties in the context of treating white hairs:

Coconut Oil:

Botanical Name and Species:

Botanical Name: Cocosnucifera

Species:

Coconut oil is extracted from the fruit of the coconut palm, Cocosnucifera, and is widely available in tropical regions.

FIG.17.Coconut Oil

Properties for the Treatment of White Hairs:

Coconut oil is a popular choice for hair care due to its many beneficial properties:

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a. Hair Conditioning: Coconut oil is rich in fatty acids that can penetrate the hair shaft and provide deep conditioning. This helps in reducing hair damage and making the hair softer and smoother.
b. Scalp Health: A healthy scalp is essential for maintaining hair color. Coconut oil can help keep the scalp moisturized and prevent dryness and itchiness.
c. Preventing Protein Loss: Coconut oil has the ability to reduce protein loss in hair. This can help maintain the strength and integrity of the hair.
d. Antioxidant Properties: While it may not directly reverse white hairs, the antioxidants in coconut oil can help protect the hair from damage caused by free radicals, which can contribute to premature graying.

Lemon:
Botanical Name and Species:
Botanical Name: Citrus limon
Species:
Lemon is a citrus fruit belonging to the Rutaceae family.

FIG.18.Lemon Juice

Properties for the Treatment of White Hairs:
Lemon is known for its acidic properties and the following properties related to hair care:
a. Cleansing: Lemon juice can be used as a natural hair cleanser. It helps remove excess oil, dirt, and product buildup from the hair and scalp.
b. Scalp Health: A healthy scalp is essential for maintaining hair color. Lemon juice can help balance the pH of the scalp, creating a healthier environment for the hair to grow.
c. Lightening: Lemon juice is often used for its natural bleaching effect. It can gradually lighten the color of the hair, which may be useful for camouflaging white hairs by making them less noticeable.
Coconut Oil and Lemon Treatment for White Hairs:
A common hair care treatment combines coconut oil and lemon juice to potentially address white hairs. The mixture is applied to the hair and scalp and left on for a period of time before being washed off. This treatment is believed to offer the following benefits:
Deep Conditioning: Coconut oil provides deep conditioning to the hair, while lemon juice helps cleanse and maintain a healthy scalp.
Lightening Effect: The acidic nature of lemon juice may gradually lighten the hair, potentially making white hairs less conspicuous.

5.Hibiscus

Hibiscus, a vibrant and beautiful flower, is widely recognized for its potential benefits in promoting hair health and addressing issues like white or premature graying hair. Here's some information about hibiscus, including its species, botanical name, and properties in the context of treating white hairs:

Botanical Name:

Hibiscus rosa-sinensis (most commonly used species for medicinal and hair care purposes). However, there are several hundred species of hibiscus, and some others are used for different purposes.

Properties for the Treatment of White Hairs:

FIG.19.Hibiscus

Hibiscus has a long history of use in various cultures, especially in traditional Indian and African medicine, for its potential hair care benefits. Here are some properties and uses related to the treatment of white hairs:
Hair Darkening:Hibiscus flowers and leaves are believed to have natural darkening properties that

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can help maintain the natural color of the hair and reduce premature graying.

Strengthening: Hibiscus is rich in vitamins and minerals that are beneficial for hair health. It can strengthen the hair, reduce hair fall, and prevent breakage.

Antioxidant Properties: The flowers and leaves of hibiscus contain antioxidants that help protect the hair from oxidative stress and free radical damage, which can contribute to premature graying.

Scalp Health:A healthy scalp is essential for maintaining hair color. Hibiscus can help maintain a balanced and healthy scalp, which supports hair health.

Conditioning and Shine:Hibiscus can be used in various hair care products, such as shampoos and hair masks, to condition the hair, make it more manageable, and add shine.

Preventing Dandruff and Itchiness:Hibiscus has mild anti-dandruff and anti-itch properties, which contribute to overall scalp health

Using Hibiscus for White Hair Treatment:

Hibiscus can be used in various ways to promote hair health and potentially reduce the appearance of white hairs. Common methods include:

Hibiscus Oil:Infusing hibiscus flowers or leaves into a carrier oil (such as coconut or olive oil) and applying it to the hair and scalp.

Hibiscus Hair Masks:Preparing hair masks using hibiscus paste, which can be mixed with yogurt, aloe vera, or other natural ingredients for added benefits.

Hibiscus Shampoos and Conditioners:Commercial hair care products that contain hibiscus extract.

Hibiscus Tea or Supplements: Some people also consume hibiscus as a tea or in supplement form to promote overall hair health.

6.Kalonji

Kalonji, also known as Nigella sativa, is a versatile herb known for its various potential health benefits. While it has been used traditionally for a variety of purposes, there is limited scientific evidence regarding its efficacy in treating white hair. Nevertheless, here is some information about Kalonji and its properties:

Botanical Characteristics:

Plant Description:

Kalonji is an annual flowering plant that belongs to the Ranunculaceae family. It typically grows to a height of about 20-30 centimeters (8-12 inches) and features finely divided, pinnate leaves.

Fruit and Seeds: The plant produces small, inflated capsules that contain tiny, black seeds. These seeds are the most commonly used part of the plant in culinary and medicinal applications.

FIG. 20.Kalonji Flower & Seeds

Properties and Uses: Kalonji seeds are well-regarded for their potential health benefits, though they are not commonly associated with treating white hair. Some ofthe notable properties and uses of Kalonji seeds include:

Medicinal Properties: Kalonji seeds are known for their potential medicinal properties, which include being anti-inflammatory, antimicrobial, antioxidant, and immunomodulatory.

Digestive Health: Kalonji seeds are often used to promote digestive health. They can help alleviate symptoms of indigestion, bloating, and gas.

Respiratory Health: The seeds may be beneficial for respiratory conditions like asthma and bronchitis due to their potential anti-inflammatory and bronchodilatory effects.

Weight Management: Some studies suggest that Kalonji seeds may aid in weight loss and fat reduction.

Skin Health: Kalonji oil, derived from the seeds, is used topically for various skin conditions due to its antimicrobial and anti-inflammatory properties.

Antioxidant Properties: The seeds contain compounds like thymoquinone, which have antioxidant properties, helping to combat oxidative stress in the body.

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Fig.21.Kalonji

Anti-Diabetic Effects: Kalonji seeds have shown potential in reducing blood sugar levels and improving insulin sensitivity, which could be beneficial for individuals with diabetes.
Anti-Cancer Potential: Some studies have suggested that Kalonji seeds may have anti-cancer properties, although more research is needed in this area.
Antimicrobial Effects: Kalonji seeds have natural antimicrobial properties, which may help in fighting various infections.
Immune System Support: The seeds are believed to have immune-boosting properties, which can help enhance the body's natural defenses.

7.Aloevera

Aloe vera is a succulent plant known for its numerous health and beauty benefits, including its potential use in addressing various hair and scalp issues, such as white or premature graying hair. Here's some information about aloe vera, including its species, botanical name, and properties in the context of treating white hairs:

Botanical Name and Species:

Aloe barbadensis miller (Aloe vera is commonly referred to by this botanical name, although there are over 500 species of aloe).

Fig.22. Aloevera

Properties for the Treatment of White Hairs:

Aloe vera has been used for centuries in various cultures for its wide range of therapeutic properties. While it may not directly reverse white hairs, it can support overall hair health and potentially slow down the graying process. Here are someproperties and uses related to the treatment of white hairs:

Scalp Health:A healthy scalp is crucial for maintaining hair color. Aloe vera has soothing and moisturizing properties that can help prevent dryness and itchiness, contributing to overall scalp health.
Antioxidant Properties:Aloe vera contains antioxidants that protect the hair and scalp from damage caused by free radicals, which can contribute to premature graying.
Amino Acids and Proteins:Aloe vera contains amino acids and proteins that can strengthen the hair and make it less prone to damage and breakage.
Balancing pH:Aloe vera can help balance the pH of the scalp and hair, creating a healthier environment for hair growth.
Hydration:Aloe vera is a natural humectant, which means it can attract and retain moisture. This helps keep the hair and scalp hydrated.
Reducing Dandruff and Itchiness: Aloe vera has anti-inflammatory and antimicrobial properties, which can help alleviate dandruff and itchiness, further promoting scalp health.
Using Aloe Vera for White Hair Treatment:
Aloe vera can be used in various ways to promote hair health and potentially reduce the appearance of white hairs. Common methods include:
Aloe Vera Gel: Applying pure aloe vera gel directly to the scalp and hair. You can use fresh aloe vera gel from the plant or purchase commercial aloe vera gel products.
Aloe Vera Hair Masks: Creating hair masks by mixing aloe vera gel with other natural ingredients like yogurt, honey, or essential oils for added benefits.

IV. CHAPTER 5

5.1 Expected outcome of proposed work

This herbs will work on the white hairs , provide moisture,clean the dirt from the scalp,hair growth. This herbs are obtained naturaly and does not cause any harm to hairs .

White hairs- it will give color to the white hairs.

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Hair Growth – it also promotes the hairs growth and thicknesss of the hairs.
Moisture- provide hydration to the scalp.
And avoid the dandruff from scalp.
Clean dirt- remove dirt from the scalp and clean it .
It gives natural shine to hairs.
Also provide strength to hairs.
Conditionors the hairs.
Provids protein to build the good strength from root.

FIG.23.Herbal powder mixture

V. CHAPTER 6

EVALUATION

1.Physical Appearance: The physical appearance of the hair serum is evaluated
by observing its texture, color, and smell.

2.pH: The pH of the hair serum is determined using a digital pH meter, and it should be around 5-6, as the skin has an acidic pH of around 4-6

3.Homogeneity Test: The homogeneity of the hair serum is tested by applying it to a dry, clean object glass and then sealing it with a cover glass. The appearance is then observed for any coarse particles or homogeneity, and the serum is visually examined for lumps, flocculates, or aggregates

4.Viscosity: The viscosity of the hair serum is determined using a Brookfield Viscometer at 100rpm, and spindle type model S6, with 4.5 ml of the serum. The serum is placed in a big mouth container with the spindle dipped in it for .

5.Spreadability: The spreadability of the hair serum is measured by a parallel plate process, where one gram of hair serum is pressed between two horizontal plates of dimension 20×20 cm, and the spread diameter is measured after 1 min. The spreadability is calculated using the formula: S = M × L / T, where S= Spreadability, M= Weight in the pan, L= Length moved by the glass slide, and T= Time taken to separate the slides completely13

FIG.24.Hebal paste

6.Stability Test: The hair serum is kept for three months at two separate temperatures of 4±2°C and 30±2°C, with 65% RH. The pH and viscosity of the hair serum are then determined after three months and compared with the original pH and viscosity to evaluate its stability13.

7.Skin Sensitivity Test: The skin sensitivity test is an initial examination to detect any allergic reaction that may be caused by the hair serum. The test is performed by shaving hair on the right and left back and dividing it into six regions, each with a size of 4x4 cm in a rectangular shape with a distance of 1.5 cm between the squares. Each square is numbered 1-6

8. Before using a hair tonic and after shaving, no tonic is applied to square 1, representing the normal control. The skin is then observed for 30, 60, 120, and 240 minutes, as well as one, two, three, and four days. The conjunctiva, iris, and cornea scores are calculated to evaluate the skin

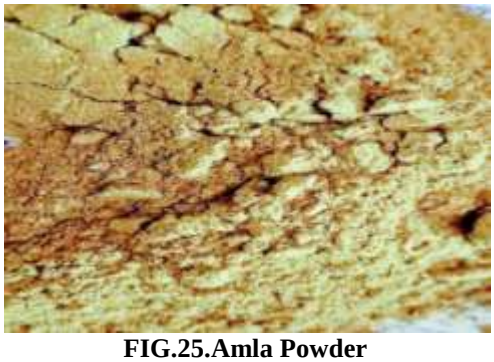

FIG.25.Amla Powder

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FIG.26.Crushed Hibiscus Petals

FIG.27.Bhringraj Powder

FIG.28.Kalonji

BEFORE AFTER

FIG.29.image showing result

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