

# A Study of Side Effects of Cosmetic Products

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**ABSTRACT:** *Cosmetic ingredients are emerging pollutants too. Their environmental monitoring is at a very early stage. However, it is known that they reach the environment in multiple ways, often through water, posing health risks to marine and freshwater ecosystems and to humans. Thus, in public health science, the term "cosmetovigilance" began to represent a kind of health surveillance where the aim is the safety of the cosmetic product for commercial purposes. This surveillance is very important to control potentially hazardous ingredients and can thus set our minds at ease on the products placed on the market. In recent years, the cosmetic industry has increased its use of preservatives, surfactants, perfumes, stains, and other ingredients in the creation of cosmetic goods. On the one hand, such chemicals improve the quality, properties, and shelf life of cosmetics; on the other hand, many of these substances are poisonous to humans, posing health concerns ranging from a moderate hypersensitivity reaction to anaphylactic shock or even death. As a result, the indiscriminate use of cosmetics might become a public health concern. There is more scope of future research in this field as there are large number of cosmetics products which are untouched from this perspective.*

**KEYWORDS:** *Chemical compounds, Cosmetics, Facial, Skin Care, Toxic.*

## 1. INTRODUCTION

Cosmetics were first used 6.000 years ago, and their use has since expanded all across the world. Such items were designed to beautify and perfume the body without altering the structure or function of the skin. Records show that cosmetics containing lead-rich black pigments (Kohl) were applied to the eye area in ancient Egypt. When lead comes into contact with the skin, it produces gaseous nitric oxide, which can activate the immune system by causing vasodilation and the activation of cytotoxic macrophages[1].

Cosmetics and skin care products are now widely used across the world, increasing the human body's exposure to the numerous chemical compounds that make up their formulations. It's difficult to quantify the frequency of aesthetic adverse effects since users who experience minor side effects are less likely to seek medical help. The health hazards associated with cosmetics usage are mostly related to exposure to a variety of chemical compounds. Its effects might range from a moderate hypersensitivity reaction to an anaphylactic reaction or even a life-threatening intoxication[2].

Cosmetics is derived from the Greek word "kosmeticos," which meaning "to beautify." Cosmetics have been around since the beginning of time and include items used for beauty or enhancement of look. People desire to appear well, and the notion of cosmetics dates back to the dawn of civilisation. The desire to beautify one's own body and seem attractive has been in the human species since the dawn of time. Women utilise a variety of cosmetic items, such as skin care, hair care, perfumes, dental hygiene, and nail care, that may include hazardous compounds that are damaging to their health. Cosmetics have been used to improve the appearance of humans for a long time. People are enticed to fake their looks as a remedy for their anxieties in a world preoccupied with beauty. The worldwide cosmetic business is estimated to be worth approximately \$20 billion dollars now. We are continuously enticed to use cosmetics and personal care items as consumers. However, these goods, which are meant to make us feel good and look good, have a dark side. Various harmful substances and hazardous compounds often used in cosmetics have been found to be present in quantities that exceed permissible limits. These substances can have significant side effects on the skin, as well as infiltrate the skin and other organs, causing cancer. Cosmetics have not only infiltrated the fashion world, but also play a significant part in everyday life. As a result, it is necessary to educate people about the numerous negative consequences of cosmetics and the chemicals used in cosmetics[3].

Cosmetics are items that are applied to the body with the goal of beautifying, cleaning, or improving one's look, as well as accentuating attractive traits. Toothpaste, shampoo, conditioners, mascara, after-shave lotion, style gel, creams, lotions, powders, fragrances, lipsticks, fingernail and toenail paint, eye and facial make-ups, hair wavers, hair colours, hair sprays, deodorants, and antiperspirants are all examples of cosmetics. The term "make up" is described as a cosmetic that generally refers to coloured materials that are used to change a person's look. Skin care products or cosmetics, according to one researcher, are combinations of synthetic or natural chemical compounds intended to improve the look or odour of the body. They are items that are meant to be rubbed, poured, sprinkled, sprayed on, or otherwise applied to the human body or any portion of

it with the purpose of boosting attractiveness, cleaning, beautifying, or modifying the look without harming the bodily structure or function[4].

### *1.1 Common Cosmetics Products and associated toxicities:*

#### *1.1.1 Skin Lightening agents:*

Hydroquinone (HQ), a skin lightening agent, has been identified as one of the most dangerous substances. Reports of ochronosis and possible mutagenicity have been discovered. Ochronosis is a rare HQ side effect, characterised by a gradual darkening of the region to which a cream containing high concentrations of HQ has been administered for many years. Hydroquinone is a hydroxyphenolic chemical that suppresses the manufacture of melanin by blocking the tyrosinase enzyme. It may also impede the creation or destruction of melanosomes, as well as DNA and RNA synthesis in melanocytes. Hydroquinone is now the most widely used depigmenting chemical, however it has been discovered to be extremely cytotoxic to melanocytes and perhaps mutagenic to mammalian cells. Exogenous ochronosis is caused by irritation, redness, and burning. Ochronosis can cause skin elasticity loss and slow wound healing, which is why it's illegal to buy it over-the-counter in the United States and many other countries. It was only permitted for tiny portions of skin and for the treatment of age spots and sun spots[5].

#### *1.1.2 Sunscreen products:*

Sunscreens can induce irritating, allergic, phototoxic, or photoallergic responses in certain people. Benzophenones are the most prevalent sensitizers. Photoallergic dermatitis can be caused by debenzoyl methanes, paraaminobenzoic acid (PABA), and cinnamates. The scent or other chemicals are responsible for the majority of allergy responses associated with deodorants/antiperspirants and perfumes. Fragrances can enter the body through the skin (adsorption), the lungs, the airways, ingestion, and routes straight from the nose to the brain, causing headaches, dizziness, tiredness, eye, nose, and throat irritation, amnesia, and other symptoms. When perfumes are sprayed or present in the air, they can induce airborne contact dermatitis. Coumarins and phethleugenol, which are often present in perfumes, are thought to be carcinogens, while phthalates are thought to be hormone disruptors[6].

#### *1.1.3 Shampoos:*

Shampoos and conditioners have relatively little contact time with the skin; they are solely administered to the hair and, as a result, have fewer side effects. The issue occurs, however, when they come into touch with the eyes when washing the hair. The most common side effect of shampoo is matting of the scalp hair, commonly known as hair tangling. Another aspect to consider is the shampoo's pH. The majority of shampoos have an alkaline pH, which promotes hair shaft swelling and potential damage. For chemically treated hair from permanent colouring or permanent waving, a shampoo with a neutral pH is the best option. A thorough analysis of verified data on the incidence of contact allergies to shampoo revealed that the danger was minimal. Sensitization is extremely rare because shampoos are diluted with water, have a brief contact period, and are washed off. Hydrogen peroxide solutions and ammonium persulfate, which are active components in hair bleaching products, can induce Types I and IV allergic contact responses[7].

### *1.2 The beginning of complications due to the use of cosmetics:*

Egyptians' use of coloured lead-based cosmetics has been described as the first indication of cosmetics usage and problems. Following that, rouges and lipsticks with a crimson tint were created, which were linked to mercury sulphide. When eaten by pregnant women, this chemical induced spontaneous miscarriage. Arsenic, which was employed by Greeks and Romans in chemical depilatory treatments, was another hazardous substance capable of inflicting harm to the organism.

The pharmaceutical companies began to invest in novel active principles and vehicles for the manufacturing of cosmetics as knowledge about the physiology of skin and its components advanced. As a result, new quality control tests in the manufacturing of such cosmetics must be updated in order to assure the safety of their usage. Several regulatory bodies are committed to the control and regulation of commercial operations, as well as the safety and quality control of cosmetics, all over the world. Although there are regulations and quality control tests that must be followed when making a cosmetic, these regulatory systems are ineffective, as the negative effects remain.

### *1.3 The cosmetic risk and the public health:*

The danger to one's appearance as well as the public's health As the usage of cosmetic goods grows, as does the population's exposure to the chemical components for longer periods of time and more often, the adverse

effects of these products become more common. Women and men all around the globe use a lot of cosmetic items in the quest for eternal youth, despite the potential health hazards.

Cosmetic compounds are also pollution precursors. Their environmental monitoring is still in its infancy. However, they are known to enter the environment through a variety of routes, including water, posing health hazards to marine and freshwater ecosystems as well as humans. As a result, the word "cosmetovigilance" came to be used in public health research to describe a type of health monitoring whose goal is to ensure the safety of cosmetic products used for commercial reasons. This surveillance is critical for controlling potentially dangerous chemicals and, as a result, putting our minds at ease about items on the market.

Several health monitoring organisations across the world have put limitations on the use of certain cosmetic compounds, which means that any ingredient that isn't on the list is authorised. Since a result, the business is continually employing new substances that are not included on the limitation list, as it is extremely innovative and always trying to enhance its goods. These components might be new allergies. Unlike pharmaceuticals, cosmetics do not have a particular agency to review their safety, no marketing authorisation with specified conditions, no risk-benefit analysis, and no assurance of consistency from batch to batch.

The health hazards connected with the use of cosmetic goods have emerged as a public health issue, with around 12% of users in the general population reporting negative effects from one or more cosmetic items in the previous nine years.

#### *1.4 Possible Health Complications Associated with the use of Cosmetics:*

Cosmetic goods have the potential to produce side effects because to the inclusion of various components in their composition, and the consequences might range from a minor hypersensitivity reaction to an allergic reaction or even fatal overdose.

Cosmetics can produce a wide range of negative responses. Type IV hypersensitivity, contact urticaria, photosensitization, pigmentary disorders, hair and nail damage, paronychia, acneiform eruptions, folliculitis, and aggravation of an existing dermatosis are all possible side effects. Cosmetic items can have negative side effects. Because of the ongoing aims to increase their biological activity and therapeutic efficacy, it is predicted that advances in cosmetic product safety, tolerance, and skin compatibility will not prevent side effects from growing in the future. The head and neck are the most commonly afflicted parts of the body by cosmetic-related adverse events, with irritating dermatitis being the most prevalent form of problem. The following are some of the health risks connected with the usage of cosmetics:

##### *a) Allergic reactions to cosmetics:*

Cosmetics-related allergic reactions account for a modest but considerable percentage of the problems connected with cosmetic usage. Allergic contact dermatitis is characterised by genuine delayed-type (type IV) hypersensitivity with eczematous dermatitis, accounting for 10% to 20% of all instances of contact dermatitis. Type IV hypersensitivity is a T-cell-mediated hypersensitivity reaction in which the offending allergen activates circulating or resident sensitised T cells, causing them to produce pro-inflammatory cytokines. Product composition, a concentration of potentially allergenic components, volume of product used, site application, skin barrier integrity, and frequency and duration of application are all variables that influence sensitization.

This clinical picture might range from moderate erythema and scaling with little itch to severely pruritic vesicular, bullous, indurated plaques. When a response is exposed repeatedly, initial sensitization is necessary for the reaction to expand.

##### *b) Irritant contact dermatitis:*

This is the most frequent sort of problem associated with the use of cosmetics, particularly those formulated with methylchloroisothiazolinonemethylisothiazolinone (MCI-MI). Over 57.000 irritants have been identified across the world, ranging from minor irritants to highly corrosive acids and bases. The majority of skin care and cosmetics-related facial issues are irritating contact dermatitis, which manifests as erythematous, burning, and pruritic skin that may develop microvesiculation and subsequently desquamation. The dermatitis is defined by damage to the stratum corneum that is not accompanied by an immune response. Papules and plaques are the most common symptoms of facial irritating dermatitis, which is caused by cosmetics. A "seborrheic-like dermatitis" with pink scaly plaques on the cheeks and chin is another typical symptom. Patients may develop urticarial or infiltrating plaques less often.

c) *Photoallergic dermatitis:*

After coming into touch with cosmetics and then being exposed to light, this sort of allergic response develops. Sunburn is the most common symptom of this response, which might be followed by hyperpigmentation and desquamation. Chemical compounds capable of absorbing radiation, particularly ultraviolet A, generate this reaction, which also lacks a clear immunological mechanism. Erythema, edoema, and vesiculation are some of the clinical symptoms. The scents methylcoumarin and musk ambrette, antibacterial agents, and para-aminobenzoic acid esters as sunscreens are the major causes of photoallergic dermatitis. Photoallergy is a rare acquired altered reactivity that is triggered by an immediate antibody or a delayed cell-mediated response.

d) *Facial stinging:*

A small percentage of individuals experience stinging or burning shortly after applying a cosmetic, which worsens over 5 to 10 minutes and then subsides after 15 minutes. This reaction happens even if the patient does not have allergic or irritating contact dermatitis to the chemical administered. Before employing such components, tests should be performed on the patient's skin. Face stinging is usually caused by chemicals including benzene, phenol, salicylic acid, resorcinol, and phosphoric acid.

e) *Redness:*

The instability in cutaneous pH is linked to the redness of the skin induced by cosmetic products, particularly soaps. Tallow and nut oil, or the fatty acids produced from these products, are used in modern soap in a 4:1 ratio. Because of this, the pH of these soaps is frequently alkalinized (pH 9-10), causing redness in the skin, which has a pH of 5.2-5.4. Such substances should ideally have a pH of neutral or slightly acidified. Another cause of redness is the use of moisturisers with a higher greasy content, which allows skin to warm up during the day.

## 2. LITERATURE REVIEW

Liubov Ben-Noun discussed medical effects of cosmetics in which she explained how Our outward appearance has a significant impact on our social interactions in everyday life. As a result, maintaining our appearance helps us to modify and defend ourselves, as well as transmit emotional disposition (such as sympathy or repulsion) and social information (i.e. values, status). However, certain body features or traits appear to have a greater impact on overall body image than others. For example, one of the best indicators of total physical beauty is facial attractiveness, which is one of the major variables promoting global self-esteem. As a result, make-up should have a significant impact on these variables[8].

Thaís Canuto Pereira et al. discussed Cosmetics and its Health Risks in which they discussed how Cosmetics are becoming more popular across the world, and the number of chemical compounds employed in their manufacturing is rising as well. Intoxication, allergic reactions, extended chemical exposure, adverse effects, and indiscriminate usage are all enhanced as a result. The goal of this study is to bring attention to the biological hazards that cosmetics might cause to human health due to the hazardous chemicals employed in their composition. The technique provided by Whittemore, R., and Knafl, K., 2005 is used to structure this integrative literature review. The primary hazardous chemical compounds found in cosmetic goods are linked to the potential health problems described in the scientific literature in this study. In recent years, the cosmetic industry has increased its use of preservatives, surfactants, perfumes, stains, and other ingredients in the creation of cosmetic goods. On the one hand, such chemicals improve the quality, properties, and shelf life of cosmetics; on the other hand, many of these substances are poisonous to humans, posing health concerns ranging from a moderate hypersensitivity reaction to anaphylactic shock or even death[9].

Alex L. Jones et al. discussed Facial Cosmetics and Attractiveness in which they discussed how Cosmetics are used by women for a number of reasons, including concern over face appearance, social standards, and public self-consciousness, as well as to seem more friendly and aggressive to others. Cosmetics improve social views that the wearer may want to change, with people seeming healthier and earning more, exhibiting higher competence, likeability, and trustworthiness, and appearing more prestigious and dominant. Others' behaviour is influenced by cosmetics, particularly males, who tip more and more frequently to servers wearing cosmetics and are more likely to approach wearers in the surroundings. The boost in attractiveness that cosmetics bestow on faces, which is now a well-documented impact, is most likely to blame for the influence of cosmetics on social perceptions[10].

### 3. DISCUSSION

The use of preservatives, surfactants, perfumes, stains, and other chemicals having preservative activity has risen as a result of today's innovation, research, and creation of new cosmetic goods. Such chemicals improve the quality, properties, and shelf life of cosmetic formulations; yet, frequent, prolonged, and indiscriminate exposure to many of these substances can be detrimental to human health. There are numerous agencies throughout the globe that govern the quality control, safety, and manufacture of cosmetic goods, and they are in charge of changing the standards and recommendations for the population's safe and healthy use of these products while reducing health hazards. However, there is no special institution that controls the cost-benefit analysis and assurance of safety in the use of hazardous chemicals in cosmetic goods. Several aspects related to these side effects of cosmetics have been discussed in this paper.

### 4. CONCLUSION

The hazardous chemicals often found in cosmetic formulations may pose a health concern, and recurring adverse effects have been linked to them. Despite the fact that the different structures for the regulation and quality control of cosmetics across the world are fairly complicated and extensive, they should be more stringent in the inclusion of new hazardous chemicals in the formulation of cosmetics to avoid harm to human health. It is important to apply an uniform cosmetovigilance throughout the world to stimulate improvements in the manufacturing, marketing, and usage of cosmetic goods by the general public. This public health approach is a legitimate way of getting information on the safety of cosmetic goods and their components, avoiding the dangers connected with cosmetic use from becoming a major public health issue.

According to scientific evidence, excessive levels of chemical preservatives, fragrances, and emulsifiers used in the production of cosmetic goods enhance side effects and health hazards via chemical and physical mechanisms. The health risks connected with cosmetic usage might range from a moderate hypersensitivity reaction to anaphylactic shock or even death from intoxication. In spite of clinical data presented in the literature, cancer is a problem linked with the use of cosmetics. Faced with the occurrence of side effects and the imminent occurrence of complications associated with the use of cosmetics, it is concluded that the quality control process in the manufacture of cosmetic products is ineffective in preventing health risks associated with the use of cosmetic products. There is more scope of future research in this field as there are large number of cosmetics products which are untouched from this perspective.

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