**COSMETICS AND THEIR RELATED ADVERSE IMPLICATIONS**

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**Abstract**

The Greek word "kosmeticos," which meaning to embellish, is where the word "cosmetics" originates. Since ancient times, cosmetics have been defined as substances intended to enhance or beautify look . Every day, we apply cosmetics to our skin, faces, and hair, and their applications are growing all over the world. Cosmetology is the category that includes substances used for aesthetic purposes. Women use a variety of beauty products, particularly those related to skincare, hair, fragrances, oral hygiene, and nails, which may contain toxic chemicals that are bad for your health. These goods are used to maintain personal hygiene or to improve beauty. Different Cosmetics have long been known to improve a person's physical appearance. People are persuaded to fake their appearance as away to deal with their insecurities in a society that is fixated on beauty. Ponents can be found in cosmetic goods. The estimated value of cosmetic industry today is around 20 billion dollar globally. As a consumer, we are constantly attracted in using beauty and personal care products. But these products, which are supposed to make us feel healthy and look beautiful, have a deep dark side. Various toxic ingredients and hazardous chemicals used in cosmetics are incorporated in beyond acceptable limits. These substances have the potential to penetrate the skin and other organs, leading to carcinogenicity and major adverse effects on the skin. Not only have cosmetics permeated the fashion industry, but they are now widely used in daily life. Therefore, educating people about the various negative effects of cosmetics and the chemicals used in them becomes crucial.

Keywords

Health, Skin, Dangers, Cosmetics and Substances, and Heavy Metals

# Introduction

Maintaining personal hygiene and sanitizing one's surroundings is crucial for preventing illnesses and diseases that may arise from leading an unhealthy lifestyle.

As a result, maintaining the health of the skin as well as cleaning it are all included in skin hygiene. Cosmetics are substances applied to the body to enhance beauty, have a cleansing effect, or simply to make the human body look better and more appealing. The largest organ in humans is the skin. It serves as the body's physical barrier of defense and carries out numerous vital tasks required for survival. For centuries, body adornment has been a practice shared by men and women, and it has been linked to different forms of skin and body care. The hair is an integrated system with unique physical and chemical characteristics, much like the skin.

It is an intricate structure made up of various morphological elements that serve as aunit. Hair's physical appearance, including its length, color, shape, and texture, can be completely altered, allowing us to completely alter our hair's physical characteristics. We use a variety of cosmetic preparations on a daily basis to preserve or improve the health of our skin and hair. Certain popular cosmetics have toxicities linked to them due to things like peer pressure, advertising, and social acceptance; influence the majority of women's skincare product selections. After conducting research, Robertson et al. concluded that women who wear makeup experience some kind of self-doubt and are feeling uneasy and insecure about them. Cosmetic products are used extensively throughout the world, increasing the amount of chemicals that are exposed to the human body. Because users who experience fewer side effects do not require medical advice, it is challenging to specify the incidence of cosmetic side effects. Numerous chemical additives have harmful effects on human health, ranging from mild hypersensitivity to potentially fatal or life-threatening intoxication.Consequently, the use of cosmeceuticals has lately grown in importance as a public health concern. According to the United Nations Environmental Program, there are roughly 70,000 synthetic chemicals in use worldwide, and 1000 new chemicals are added every year7.The cosmetics industry has seen tremendous innovation over the last 20 years, leading to broad range of products used to hydrate and protect skin as well as fight inflammation and age signs. Additionally, consumers are attempting to conform to the new social norms by becoming more self-conscious about how they look.

# Historical significance of Cosmetics

The Science of cosmetology is believed to have originated in ancient world in countries like Egypt and India, but the earliest records of cosmetic substances and their application dates back to Circa 2500 and 1550 B.C, to the Indus valley civilization. An old remedy for cracked lips is found in history. Cracked lips, besides being painful, spoil the beauty of the face. The rind of Bel fruit (Aegle marmelos Corr.) is powdered and mixed in woman’s milk and the paste thus prepared is applied to the cracked lips. In ten days, the cracks will stop cracking and heal. Superfluous hair was viewed as a source of shame and a to get rid of it, a lot of depilatory agents were suggested. The dried fruits of Pimpali (Piper longum Linn.) and Aavalakatti (Emblica officinalis Gaertn.) were used. The mixture was submerged in Nivadunga's milky latex (Cactus: Euphorbia nivulia Ham.) After applying this compound to the desired location, it was discovered that the hairs there fell out.

# Common Cosmetics Products and associated toxicities

A number of factors, including social acceptance, peer pressure, and advertisements, affect the skincare products that most women choose to use. Robertson et al. carried out research and came to a conclusion that women who wear makeup tend to be nervous, insecure, and lack confidence in themselves. Cosmetic products include a variety of toxic or hazardous chemicals that can have a negative impact on the skin. Cosmetic producers use natural ingredients like cane sugar, shea butter, and rose extract in addition to synthetic ones because the latter are less expensive, more sustainable, and safer for the consumer. Cosmetics, nail polish, and other skincare products stay on the skin for extended periods of time and can have negative effects like allergic responses. Moisturizers, especially when applied in high concentrations, make the skin more hygroscopic. It may irritate skin and exfoliate it.

# 1. Agents for Skin Lightening

Hydroquinone (HQ), a skin-lightening agent, is one of the most dangerous substances. Reports have been located.of mutagenicity and possible ochronosis. One uncommon side effect of HQ is

ochronesis, which manifests as a long-lasting, progressive darkening of the area where the cream containing high concentrations of HQ is applied. A hydroxyphenolic substance called hydroquinone prevents the synthesis of melanin by blocking the tyrosinase enzyme. It may also work by interfering with through the production or breakdown of melanosomes and by preventing melanocytes from synthesizing DNA and RNA. Nowadays, hydroquinone is the most widely used depigmenting agent; however, research has shown that it is highly cytotoxic to melanocytes and may be mutagenic to mammalian cells. It results in burning, redness, and irritation in addition to exogenous ochronosis. Ochronosis can cause the skin to become less elastic and have compromised wound healing, which has led to the United States and many other countries banning its over-the-counter use. It was only permitted to treat small areas of skin and conditions like sun or age spots.

# : 2. Henna in Black

Pphenylenediamine (PPD) and red henna are combined to create black henna, which is used for short "black henna tattoos."Because of the presence of chemicals, black henna tattoos are stains of p-phenylenediamine (PPD), which can be added to the henna paste in the form of commercial hair dye. Henna is mixed with PPD to strengthen and darken the color, hasten the dyeing and drying process (to just 30 min), and improve the design pattern of the tattoo, as well as to extend its longevity Blisters, surface oozing, swelling, and erythromatous rashes on the skin are among the negative effects of PPD. Studies on the immediate allergic reactions from henna dye use have been conducted, and reports have been issued. There have been numerous instances of sneezing, runny nose, coughing, and shortness of breath rather than skin reactions. Some reports have shown that black henna tattoos can cause localized hypertrichosis without cau sing allergic reactions.Early in the 1980s, Sudan reported numerous cases of black powder toxici ty from body painting; some of these cases were later determined to be fatal.

Within hours of the dye mix being applied to the skin, there is massive edema of the face, li**ps,** gl ottis, pharynx, neck, and bronchi. In some cases, this causes respiratory obstruction, necessitating an emergency tracheotomy.On the second day, it was discovered that the symptoms had progres sed to anuria and acute renal failure.

# Products for sunscreen

The modern sunscreens that are used can trigger allergic, phototoxic, irritant, or photoallergic reactions. The most typical Benzophenones are sensitizers. Photoallergic dermatitis may be brought on by debenzoyl methanes, cinnamates, and paraaminobenzoic acid (PABA). The fragrance or other ingredients in deodorant/antiperspirant and fragrances are mostly to blame for allergic reactions. Fragrances can be ingested, enter the body through the skin (adsorption), lungs, airways, or pathways that go straight from the nose to the brain. Headaches, lightheadedness, exhaustion, swollen eyes, nose, and throat, among other symptoms. Fragrances that are sprayed or otherwise present in the air when used have the potential to cause airborne contact dermatitis. Most commonly found in fragrances, coumarins and phethleugenol are suspected carcinogens, and phthalates are suspected hormone disruptors.

# Shampoos:

Shampoos and conditioners are applied solely to the hair, and as such, have very little contact with the skin resulting in fewer negative consequences. But when they get in your eyes while washing your hair, that's when they come in contact with eye. The most frequent side effect of shampooing is hair tangling, also known as matting of the scalp. An additional element to be The shampoo's pH is taken into account. Due to the alkaline pH of most shampoos, hair shaft swelling occurs, increasing the risk of damage to the hair. The best shampoo for chemically treated hair, whether from permanent dyeing or permanent waving, is one with a neutral pH. Their low risk was revealed by a critical evaluation of validated data on the frequency of contact allergies to shampoo. Considering that water dilutes shampoos, have a Sensitization risk is extremely unlikely because of the brief contact time and easy rinse off. Ammonium persulfate and hydrogen peroxide solutions, two active ingredients in hair bleaching products, can result in Types I and IV allergic contact reactions.

# Health hazards associated with chemicals used in formulation of Cosmetics

1. **BHA & BHT**

Closely related synthetic compounds called BHA (butylated hydroxyl anisole) and BHT (butylated hydroxyl toluene) are utilized as preservatives in a variety of products, including moisturizers and lipsticks ,makeup. The skin may react allergicly to BHA and BHT. The International Agency for Research on Cancer has identified BHA as a potential human carcinogen. BHA has also been listed as a Category I priority substance by the European Commission on Endocrine Disruption due to evidence that it interferes with the action of hormones. In some cases, BHT might promote tumor growth. There is little evidence to support the theory that high doses of BHT could have negative effects on reproduction by mimicking estrogen, the main sex hormone in women, and inhibiting the expression of male sex hormones.

# Coal Tar Dyes

Many different chemicals derived from petroleum make up coal tar. Coal tar-derived colors are primarily used in cosmetics and are typically designated with a five-digit Color Index (CI) number. Many hair dyes contain p-phenylenediamine, a common coal tar dye. Darker hair dyes contain more phenylenediamine than lighter ones. P-phenylenediamine adverse reactions include blisters, swelling, erythromatous rash, stinging sensations, and surface oozing. Numerous reports of severe allergic reactions, including anaphylaxis, following the use of henna dyes have been discovered in the literature. Instead of skin reactions from henna dye use, the majority of cases present with sneezing, runny nose, coughing, and shortness of breath. The primary worry regarding specific coal tar colors—whether made from coal tar or synthetically—is that they may be carcinogenic. Coal tar has also been linked to cancer. Some of these colors are mixed with aluminum substrate, and others may be found to be tainted with trace amounts of heavy metals. Numerous heavy metals and compounds containing aluminum have the potential to harm the brain. Some of the colors used to make these dyes are used in lipstick and other cosmetics that can be consumed even though they are not permitted as food additives. It has been determined that P-phenylenediamine causes cancer. It is known that women who use hair dyes, particularly over an extended period of time, are more likely to develop non-Hodgkin's lymphoma, a type of lymphatic cancer. Because it may have long-term negative (chronic) effects in the aquatic

environment, the European Union has classified p-phenylenediamine as toxic (whether by contact, inhalation, or ingestion) and as very toxic to aquatic organisms.

# DEA (Cocamide DEA and Lauramide DEA)

Ingredients related to DEA (diethanolamine) are used as a pH adjuster to lower the acidity of other ingredients or to make cosmetics smooth or sudsy. They can be discovered in cleansers, soaps, and shampoos.Cosmetic nitrites and DEA combine to generate nitrosamines. Nitrites can exist as contaminants or are occasionally added to products as anticorrosive agents. When cosmetics are exposed to air, certain chemicals used as preservatives can break down and release nitrites. High doses of DEA-related substances have been demonstrated in lab experiments to cause liver cancers as well as precancerous changes in the skin and thyroid. Additionally, these substances may irritate the skin and eyes mildly to moderately. It is discovered that cocamide DEA poses a risk to the environment due to itsaquatic species may experience acute toxicity and bioaccumulation. In June 2012, cocamide-DEA was added to the list of carcinogenic toxicants. Typically, the material is utilized as a foaming agent in formulas for hair color, household cleaning, soaps, shampoos, and cosmetics. As a surfactant, cocamide DEA facilitates the lathering and foaming of soaps and shampoos. A surfactant that is overly strong may remove the natural oils from your body, leaving your skin parched. Should this innate defense against microorganisms and other environmenta. If certain elements are absent, your skin may become dry and irritated. Moreover, your skin becomes more vulnerable to infection. Strong surfactants such as betaines (typically cocamidopropyl betaine) and sulfates (commonly sodium laureth sulfate and sodium lauryl sulfate) can also result in dry skin. In addition to causing skin dryness, which is undoubtedly unpleasant, Cocamide DEA has been linked to much more significant and protracted health hazards. Cocamide DEA can combine with preservatives to create extremely harmful substances known as nitrosamines.

# Parabens

Preservatives are used to shield cosmetics from microbial contamination. Parabens are the most widely used preservative in cosmetics. Parabens are present in between 75 and 90 percent of cosmetics, though usually in very small amounts. Endocrine disruption is the theory behind parabens' easy skin penetration and potential interference with hormone function. They imitate

the main female sex hormone, oestrogens. They might also obstruct a man's ability to reproduce. Numerous studies show that methylparaben applied topically combines with other chemicals to cause increased DNA damage and aging of the skin. Parabens are also present in some foods, including barley, strawberries, carrots, onions, currents, and vanilla. When consumed, parabens in food are metabolized and lose some of their potent estrogenic effects. Conversely, parabens in cosmetics avoid the metabolic process and reach the bloodstream and bodily organs undamaged when applied topically and absorbed by the body. It has been found that the daily exposure of women to parabens from cosmetics is 50 mg.They are linked to a number of harmful health outcomes, including neurotoxicity and cancer.

# Perfumes

The purpose of perfume is to add a pleasant scent to the human body, animals, food, objects, and living spaces. It is a mixture of essential oils or aromatic compounds and solvents. It is typically found in liquid form and is applied to the body to give it a pleasing aroma. Cosmetics also contain perfumes. Fragrances are made from about 3,000 different chemicals. One of the primary ingredients in colognes, deodorants, and perfumes is fragrance. Perfumes are present in almost all cosmetic products. These products may contain fragrance ingredients in the form of masking agents that keep the brain from detecting their odor, even though they are advertised as "fragrance-free" or "unscented." Numerous fragrance ingredients that are not listed are irritating and can trigger symptoms of allergies, severe headaches, and asthma. In children, perfume may even be a contributing factor in the development of asthma. It is listed as the second most typical reason for allergies in individuals.

# Polyethylene Glycols (PEGs)

Petroleum-based substances known as polyethylene glycols (PEGs) are frequently used in creams as thickeners, solvents, softeners, and moisture-carriers. It is possible for PEGs to become contaminated with measurable levels of 1, 4-dioxane during production. It is discovered that this 1, 4-dioxane is carcinogenic. Long after being washed down the shower drain, it can still be found in the environment because it degrades slowly. When applied to broken skin, PEGs can irritate the skin and cause systemic toxicity. They also exhibit some evidence of genotoxicity.

# Petroleum

In many moisturizers, petrolatum serves as a barrier to hold moisture in the skin. It adds a glossy finish to hair care products. Another name for it is mineral oil jelly. It is possible to find polycyclic aromatic hydrocarbons (PAHs) contaminated petroleum. Numerous studies have revealed a possible link between long-term exposure to PAHs and cancer. Because of this, the European Union limits the use of petrolatum in cosmetics and classifies it as a carcinogen. Petrolatum's PAHs may also irritate skin and trigger allergies.

# Siloxane

Siloxanes are silicone-based compounds that add softness and smoothness to a variety of cosmetic products. They improve the spreadability of deodorant creams and hasten the drying time of hair products. The most common applications for them are in face treatments and moisturizers. Two siloxanes that are frequently used and toxic are cyclotetrasiloxane and cyclopentasiloxane. It's possible for them to bioaccumulate in aquatic life. Endocrine disruptors include cyclotetrasiloxane, which interferes with or mone function in humans and may be a reproductive toxin, potentially reducing fertility.

# Health risk associated with heavy metals

Cosmetics that are frequently used by women have been found to contain heavy metals. Reviewing the detrimental effects of heavy metals in a variety of cosmetics products, such as face makeup, books. It is well known that heavy metals can accumulate in the body over time and result in a number of health issues. Heavy metals in cosmetics have been linked to a number of health risks, including cancer, neurological issues, skeletal and blood abnormalities, immune system issues, reproductive and developmental disorders, headaches, nausea and diarrhoea, and lung damage. In addition, they could result in hair loss, brittle hair, and contact dermatitis. While some heavy metals are respiratory toxins, others disrupt hormones. The body can absorb them through the broken or ingest them**.**

# 1. Cadmium

The environment naturally contains cadmium. Although it is present in practically all adult tissues, cadmium, which is present in body and hair creams, is absorbed into the body through dermal contact and stored in the kidney and liver. Its compounds are classified as known human carcinogens by the US Department of Health and Human Services, and the IARC states that it is carcinogenic to humans. High levels can cause extreme stomach discomfort, vomiting, and diarrhea; prolonged exposure to lower levels can cause kidney damage, bone deformities, and weaken bones that are prone to breaking**.**

# 2 . Lead

Lead can be present in lipsticks as an impurity due to the use of potentially lead-containing pigments or contaminated raw materials. Lead comes into daily contact with the skin, and it has been discovered that some of it is absorbed through the skin. Increased blood-lead levels in women and children have been linked to the use of leaded eye powders (such as Kohl and Surma). It can easily cross the placenta and enter the fetus's brain, putting pregnant women and small children at higher risk. It can also be stored in bones and given to babies through the breast milk of nursing mothers. It has been discovered that exposure to lead can result in miscarriages, hormonal changes, decreased fertility in both men and women, irregular menstruation, and delayed puberty .

# Nickel

In nature, nickel is abundant. Everyone is exposed to small amounts of it through food, air, soil, household dust, and products that come into contact with their skin, such as cosmetics. Depending on the exposure route and type, high levels of nickel exposure can have detrimental effects on health. Metallic nickel and its alloys have been categorized as potentially carcinogenic to humans, even though some forms of nickel are deemed "toxic" due to their carcinogenic properties. Additionally, nickel allergies exist and can result in severe contact dermatitis. There has been a report of the first case of eye shadow-induced nickel allergy; exposure to even 1 ppm of nickel may exacerbate preexisting allergies**.**

# Mercury

Mercury is a common ingredient present in skin-lightening soaps and creams. It is also found in various other cosmetics, such as eye make-up, cleansing products and mascara. Skin-lightening soaps and creams are widely used in certain African and Asian countries. Mercury salts works by inhibiting the formation of melanin, thus making the skin lighter in tone. Mercury is found in cosmetics two forms viz. inorganic and organic. Inorganic mercury (e.g. ammoniated mercury) is used as skin-lightening agents in soaps and creams. Organic mercury compounds (ethyl mercury and phenyl mercuric salts) are used as preservatives in cosmetics like eye make-ups, cleansing products and mascara. The main adverse effect associated with inorganic mercury contained in skin lightening soaps and creams is kidney damage. In addition to causing skin rashes, discoloration, and scarring, mercury exposure from skin-lightening products can also lower the skin's defenses against bacterial and fungal infections. Peripheral neuropathy and anxiety, depression, or psychosis are additional adverse effects. Eventually, soaps, creams, and other cosmetic products release mercury into the wastewater. Following its release into the environment, the mercury undergoes methylation and enters the food chain as the extremely hazardous methyl mercury found in fish. Methyl mercury is transferred to the foetus when pregnant women eat fish that contains it, which can cause neurodevelopmental abnormalities in the offspring.

# Conclusion

The cosmetic products' frequent adverse effects are linked to the toxic ingredients that are frequently included in their formulations, which may pose health risks. Despite the fact that the different frameworks for the Global cosmetics regulation and quality control are quite intricate and extensive; however, in order to prevent harm to human health, more care should be taken when adding new compounds with toxic potential to cosmetic formulations. Global cosmeto- vigilance must be implemented in order to promote advancements in the production, promotion, and public use of cosmetic products. This public health approach is a legitimate way to learn about the safety of cosmetics and their ingredients, preventing the potential hazards of cosmetic use from becoming serious. Therefore, strict cosmeto-vigilance programs are crucial everywhere in the world to prevent harm to human health. These programs include the Monitoring the public's use of cosmetic products, their potential negative effects, and advancements in their manufacture, marketing, and use should be done. Researchers from academic institutions, consulting firms, governments, and cosmetic companies should continue their work to inform the public about the negative aspects of cosmetics and any health risks they may pose.

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# Appeendix

**“COSMETICS AND THEIR RELATED ADVERSE IMPLICATIONS’’**

The Greek word "kosmeticos," which meaning to embellish, is where the word "cosmetics" originates. Since ancient times, cosmetics have been defined as substances intended to enhance or beautify look .Every day, we apply cosmetics to our skin, faces, and hair, and their applications are growing all over the world. Cosmetology is the category that includes substances used for aesthetic purposes. Women use a variety of beauty products, particularly those related to skincare, hair, fragrances, oral hygiene, and nails, which may contain toxic chemicals that are bad for your health. These goods are used to maintain personal hygiene or to improve beauty. Different Cosmetics have long been known to improve a person's physical appearance. People are persuaded to fake their appearance as away to deal with their insecurities in a society that is fixated on beauty. ponents can be found in cosmetic goods. The estimated value of cosmetic industry today is around 20 billion dollar globally. As a consumer, we are constantly attracted in using beauty and personal care products. But these products, which are supposed to make us feel healthy and look beautiful, have a deep dark side. Various toxic ingredients and hazardous chemicals used in cosmetics are incorporated in beyond acceptable limits. These substances have the potential to penetrate the skin and other organs, leading to carcinogenicity and major adverse effects on the skin. Not only have cosmetics permeated the fashion industry, but they are now widely used in daily life. Therefore, educating people about the various negative effects of cosmetics and the chemicals used in them becomes crucial.

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