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A Review on Potential Health Risk and Side Effect from Prolong Use of Lip Care Product

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Abstract: *This review examines the potential health risks and side effects associated with lip care products, including exposure to toxic metals and chemicals, and highlights the need for consumer awareness and safer alternatives. Lip care products, including balms, glosses, and treatments, are widely used for maintaining lip hydration and enhancing appearance. Studies have identified the presence of heavy metals like lead, cadmium, and chromium in various lip products have been linked to various health issues, including reproductive problems and neurotoxicity. Long-term use of lip care products can lead to potential side effects, including exposure to toxic heavy metals, hormonal disruption, and skin issues. In addition to heavy metals, certain lip care products their potential links to breast cancer. This review explores the risks associated with prolonged lip care product use and emphasizes the importance of choosing safer, natural alternatives.*

The use of lip care products contributes to environmental pollution through packaging waste, chemical contaminants, and microplastics, posing hazards to ecosystems and wildlife, and highlighting the need for eco-friendly alternatives and sustainable practices in the cosmetics industry.

Keywords: Toxic metals, Heavy metals, Lead, Cadmium, Chromium, Health issues

I. INTRODUCTION

Lip care products are cosmetic product used for coloring and enhancing the appearance of lips. These are external preparation used to prevent drying, chapping, dullness, and beautification of lips. Lip care products are designed to protect, moisturize, treat, and enhance the lips. Since lips lack sebaceous (oil) glands and have thinner skin, they are prone to dryness, cracking, and environmental damage. These products play a crucial role in maintaining lip health and aesthetics.

Lip care products such as lip balms, glosses, and ointments are commonly used to relieve and prevent dry, chapped lips. While these products can provide short-term comfort and protection, their prolonged or excessive use may lead to unintended side effects and health risks. One concern is the phenomenon of "lip balm dependency," where frequent application can interfere with the lips' natural ability to retain moisture, potentially creating a cycle of dryness and overuse.[1] Additionally, many lip care products contain allergens or irritants, including fragrances, flavorings, and preservatives, which may cause contact dermatitis or allergic reactions in sensitive individuals.[2]

Some formulations also include ingredients such as phenol, menthol, and salicylic acid, which can initially soothe but may cause irritation and dryness with continuous use [3]. Moreover, prolonged exposure to allergens such as fragrances, lanolin, or preservatives commonly found in lip care products may increase the risk of allergic contact cheilitis, an inflammatory condition of the lips [2]. Another concern involves endocrine-disrupting chemicals, such as certain chemical sunscreens (e.g., oxybenzone), which are sometimes included in lip products for UV protection. Long-term exposure to these substances has raised safety concerns, particularly regarding hormonal balance and reproductive health [3].

Types of lip care products:

1. Lip Balm
2. Lip Oils

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3. Lip Mask
4. Lip Screu
5. Lip Gloss
6. Lip Serum
7. Lipstick

Figure No.1 lip care products

Chemicals used in lip care products:

Heavy Metals	Health Impact
Lead	Anemia.
Cadmium	Cardiovascular damage, diabetes hypertension and congnitive impairement.
Chromium	Skin ulcer, skin readness and skin edema
Mercury	Neurological disease - Minamata disease
Arsenic	Skin irritation, Lungs and Gastrointestinal ulcer.
Phthalates	Gestiational diabeties.
Parabens	Breast cancer.
Mineral Oils(If not refind0	Cancer.
Retinyl palmitate	Genitic abnormality.
Bisphenol -A	Polycytic ovarian syndrome.

Table 01: Various heavy metal types and their health impact.[5,6,7]

Health Impacts of Heavy Metals and other Constituents of Lip Care Cosmetics:

Lead:

According to recent findings on the presence of lead (Pb) in lipsticks, the possible level of Pb exposure is dangerous under normal use. Pb contamination in lipsticks might come from contaminated dust, Pb solder, leaded paint in production equipment, using natural Pb containing substances or under conditions that could introduce Pb into the ingredients. According to the research studies, it is known that Pb enters the body through the gastrointestinal tract and lungs, it destroys red blood cells and reduces their oxygen-carrying capacity to necessary tissues, resulting in anaemia.[8-10]

Cadmium:

Through research it is widely acknowledged that in the cosmetics Industry, Cd is used in colour pigments. It can be used in a variety of cosmetics, although it is most commonly found in lipstick, polluted air, cigarettes, and contaminated food. Even at modest levels of Cd, the cardiovascular system may get damaged. Its exposure is also linked to diabetes

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and hypertension. [12] It has been shown to reduce gonadotropin binding, altering the activity of steroidogenic enzymes.[11] Furthermore, a synergistic impact between Pb, Cd, As, and Hg might result in cognitive impairment.

Chromium:

Cr levels were found to be highest in lipstick and eyeliner samples. [13] Even in extremely small amounts, chromium is toxic in nature. Its nature is genotoxic and hepatotoxic. [11]Contact with certain chromium compounds also has been linked to the development of skin ulcers. It has also been recorded for those who are extremely sensitive to chromium redness and skin edema.[14]

Mercury:

The majority of Hg enters through the vapours of amalgam dental fillings, while seafood products constitute one of As and Hg's most important sources. Mercury exposure can result in kidney damage, immunological decline, psychosis, anxiety, depression, and rashes on the skin.

Arsenic:

Arsenic impurities may be present in the raw material or detected during the manufacturing process in cosmetics.[10] Despite the fact that these are very small doses and there is no warning notice on the packaging, customers should be aware of the potential danger. Long-term arsenic exposure may cause skin irritation, circulatory and peripheral nervous system issues, as well as an increased risk of lung, gastrointestinal, and urinary tract cancer.

Phthalates:

The endocrine system, which generates hormones, can be harmed by phthalates. Exposure to phthalates may cause developmental, neurological, and reproductive harm. According to two recent Harvard researchers, phthalates may raise the risk of miscarriage and gestational diabetes in pregnant women. The National Research Council claimed in a 2008 risk assessment report that they have been linked to reproductive and genital Malformations, reduced sperm count, disturbed hormones, and infertility in several animal studies. The CDC's (Centre for Disease Controls) National Biomonitoring Program identified DEP (Diethyl Phthalate) metabolites in 2,540 samples and DBP (Dibutyl Phthalate) metabolites in 99 percent of them. DEP metabolites were found in higher concentrations in non-Hispanic blacks, possibly as a result of their frequent and continuous use of items marketed primarily to girls and women of colour.[32-37]

Parabens:

Preservatives such as parabens are commonly used in cosmetics and can easily permeate the skin. These are notorious for producing psychological effects.[17]coughing, irritation on skin vomiting, and diarrhoea. Parabens have been researched for their potential to cause breast cancer due to their ability to Mimic Oestrogen in the body y. However, a 2019 research of breast cancer survivors in Iran indicated that the amount of parabens taken increased the risk, particularly in those with hereditary breast cancer.

Mineral Oils:

Mineral Oils, which are commonly included in Lipsticks, Clog skin pores and cause a variety of long-term negative effects,but Mineral oils, when highly purified, have no negative consequences. However, if the petroleum is not highly refined, it may include carcinogenic polycyclic aromatic hydrocarbons (PAHs). This indicates that it may raise the risk of cancer. B. Chuberre et al., 2019 in the article entitled "Mineral oils and waxes in cosmetics: an overview" mainly based on the current European regulations and the safety profile of these compounds says that mineral Oils are authorised to be used in cosmetics in Europe only if they meet strict Purity standards for PAHs. These rules and safety criteria ensure that Mineral Oils are refined to remove any Potentially Cancer-Causing Chemicals and to limit the amount of PAHs.

Retinyl Palmitate:

This is a synthetic version of vitamin A that is harmful to pregnant women and may cause other reproductive issues.When retinol compounds are exposed to UV radiation, they break down and form harmful radicals that can damage DNA and cause genetic abnormalities, which may lead to cancer.[21-26] Dyes-Many lipsticks contain synthetic colours derived from Aluminium or Petroleum. Our bodies store these colours in organs and fatty tissues. One of the Petroleum products tilized coal tar is known to be Carcinogenic. Heavy Metals may even be present in some of the

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colours. Although some of them have not been approved for use as food colourants' they may be used in cosmetics. [26]

Bisphenol-A:

In the study published (in cosmeticobs) in 2010 "Bisphenol A: a risk through food", BPA was identified in nearly 95% of lipstick containers, including those that claimed to be organic and chemical-free, and the chemical easily penetrates into the actual lipstick that is applied to the lips and causes infertility and cancer. A class of man-made organic chemicals known as bisphenols is used to make plastics, epoxy resins, and personal care items like lipstick, face cosmetics, and nail polish. Although bisphenols' health impacts have received a lot of attention, recent examples between these chemicals and reproductive health suggest that more study needs to be done on them.[27,28] Apoptosis, DNA damage, disruption of cell-to-cell communication, mitochondrial damage, disruption of tight junctions, and slowed proliferation are just a few of the effects that Bisphenols, particularly Bisphenol A, F, and S, have been shown to have on testicular cells. These effects pose a threat to the health of male reproductive organs. Additionally, because bisphenols interact agonistically or antagonistically with hormone receptors, they change the activities of organs and cells. [28] BPA is an endocrine disruptor that has been linked to fertility problems, birth defects, and cancer. It can also affect males who are kissed by lipstick users, resulting in a "Castrated kiss" in which the affected male absorbs BPA into his bloodstream, affecting his fertility and reproductive organs.[29] The female gamete appears to be particularly vulnerable to BPA exposure, which has been related to an increased risk of Breast Cancer as well as the role of Polycystic ovary syndrome.[21] The second most prevalent cancer to cause mortality in women worldwide and the fifth most common cause of Cancer death worldwide is breast cancer.[30]

Preservatives which are used in lipsticks cause cancer:

The preservatives which are used in lipsticks are parabens and formaldehyde that are known carcinogens. Lipsticks that utilize these preservatives cause the irritation of the eyes and skin. The mineral oils which are used in the lipsticks blocks the skin pores and are responsible for the harmful effects.

Environmental Impacts:

Lip care products can significantly impact the environment, primarily due to their packaging, ingredients, and production processes. Some key concerns include:

Packaging Waste:

Lip balms often come in small plastic tubes that contribute to plastic waste and pollution. Many of these tubes are not recyclable, adding to landfill waste.

Chemical Pollution:

Certain ingredients like parabens, triclosan, and 1, 4-dioxane can harm aquatic ecosystems and human health. These chemicals can enter waterways through wastewater treatment plants and accumulate in the environment.

Microplastics:

Some lip care products contain microplastics, which can contribute to plastic pollution in oceans and waterways, harming aquatic life.

Unsustainable Sourcing:

Ingredients like petroleum-based products and certain oils can have negative environmental impacts due to drilling and mining processes.

Bioaccumulation:

Some lip care product ingredients can bio accumulate in the environment, posing risks to human health and ecosystems. Some specific environmental impacts of lip care product ingredients are:

Parabens:

1. Can cause DNA damage and endocrine disruption
2. Have been linked to reproductive disorders and cancer risks
3. Can accumulate in aquatic ecosystems and affect marine life

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Triclosan:

1. Can persist in the environment and accumulate in sediments
2. Has been detected in surface water and aquatic systems worldwide
3. Can exert toxic effects on algae and disrupt endocrine systems in fish

Side effects:

1. Allergic reactions:

Some lip products can cause allergic reactions, such as redness, itching, or swelling, especially if you have sensitive skin or allergies to certain ingredients [31]

2. Skin irritation:

Certain ingredients in lip products, such as fragrances or dyes, can cause skin irritation, dryness, or chapping [32]

3. Dependence on products:

Over-reliance on lip products can lead to decreased natural lip function and increased sensitivity [33]

4. Contamination and toxicity:

Some lip products, especially those containing petroleum-based ingredients, can potentially contaminate the body and interfere with hormone levels or contain carcinogenic substances [34]

Precautions and Tips for safe use:

1. Choosing safe lip care products :

1. Read labels carefully: Check for potential allergens, irritants, or harsh chemicals.
2. Look for natural ingredients: Opt for products with natural, nourishing ingredients that moisturize and protect lips.
3. Avoid harsh chemicals: Steer clear of products containing parabens, phthalates, or other potentially hazardous chemicals.
4. Choose lead-free products: Opt for lip care products that are labeled as lead-free or have low levels of heavy metals.
5. Consider fragrance-free options: If you have sensitive skin, fragrance-free products may be a better choice.
6. Check expiration dates: Ensure products are within their recommended shelf life.
7. Research the brand: Look into the brand's reputation, ingredients, and manufacturing processes.

2. Avoidance of allergic reactions and irritation:

1. Patch test: Apply a small amount to a discrete area of skin (e.g., behind the ear or on the wrist) to check for any adverse reactions.
2. Read labels carefully: Check for potential allergens, irritants, or harsh chemicals.
3. Start with a small amount: When trying a new product, start with a small amount to gauge your skin's reaction.
4. Monitor your skin: Pay attention to any changes or reactions, and discontinue use if you experience any issues.
5. Consult a dermatologist: If you have sensitive skin or concerns, consult a dermatologist for personalized advice.

The ideal requirements for the good lip care products are:

1. It should impact a gloss to lips which would last long.
2. It should able to maintain the intensity of colour.
3. It should be non-irritant and non-toxic.
4. It should possess good thixotropic property.
5. It should not be gritty.
6. It should physically and chemically stable.
7. The stick should possess even firmness and should maintain its strength at varying temperature up to 55°C.
8. It should possess required plasticity throughout the storage period [35,36]

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II. CONCLUSION

Lip care products like balms and lipsticks are widely used for their aesthetic and protective benefits, they can pose health risks due to certain ingredients. Substances such as parabens, phthalates, and chemical sunscreens like oxybenzone have been linked to hormone disruption and other health concerns. Additionally, ingredients like menthol and phenol, often added for a cooling sensation, can lead to increased dryness and irritation with prolonged use. To minimize these risks, consumers are advised to choose products with natural, non-irritating ingredients and to be cautious of formulations containing potential allergens or harmful chemicals. Regularly reviewing product labels and staying informed about ingredient safety can help ensure healthier choices in lip care

The use of lip care products contributes to environmental degradation through packaging waste, chemical pollution, and microplastics, posing risks to ecosystems and wildlife. Sustainable practices and eco-friendly alternatives are essential to mitigate these impacts.

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