

Safe skincare in pregnancy: dilemma of modern pregnant mothers

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Abstract

Skincare routines have become an undeniable and part of modern women's lives. As the quest for flawless, ageless skin continues, cosmeceuticals have gained popularity as the cutting-edge fusion of cosmetics and pharmaceuticals. Cosmeceuticals serve as the bridge between traditional cosmetics and medically potent skincare products. They have a lower concentration of active components targeted to offer solutions to various skincare concerns. They are available as over-the-counter (OTC) products. Many modern women are regular consumers of multiple cosmeceuticals. Pregnant women experience physiological changes in their skin during pregnancy, which they may find aesthetically unappealing and seek remedies. They may inquire about skin care tips to maintain their appearance and judicious and safe usage of skincare products when they come for routine periconceptional counselling or consultations during pregnancy. This article provides detailed information on skin care for pregnant women and the safety profile of commonly used cosmeceuticals during pregnancy.

Key words: Pregnancy, Skincare products, Cosmeceuticals, Sunscreen, Moisturisers, Depigmenting agents, Acne-related products, Antiageing products, Nail and Hair care products, Personal care products, Makeup products

Introduction

All pregnant women often experience physiological skin changes. These alterations relate to adaptation in hormones, vascular, metabolism, and immunologic changes during pregnancy. A descriptive study divulged that 91.1 per cent of pregnant women developed skin lesions associated with pregnancy. 67.2 per cent of pregnant women stated that the skin changes have been affecting their confidence and health⁴. Many pregnant mothers are reluctant to use

oral medications during their pregnancy due to concerns regarding the safety profile of such medicines. Pregnant women often ask physicians about the safety of prescribed topical and systemic drugs during pregnancy. In a study by Marie et al. in the US, more than half the women (55%) considered cosmetics risky during pregnancy¹⁸. However, they are more vulnerable to OTC products as they consider them generally safe. A study revealed that the average number of cosmetic products used daily in France is 20 for pregnant women¹⁸.

Cosmetics and cosmeceuticals are two words used in medical literature indifferently. Cosmeceuticals are topical cosmetic pharmaceutical hybrids designed to enhance beauty through ingredients that provide additional health-related functions or benefits. They are applied topically as cosmetics but contain ingredients that alter the skin's biological function. The Food, Drug, and Cosmetic Act defines cosmetics as articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness, or altering the appearance^{1,2}. The term cosmeceutical has no meaning under the law. While the Federal Food, Drug, and Cosmetic Act (FD & C Act) does not recognise the term "cosmeceutical", the cosmetic industry uses this word to refer to cosmetic products with medicinal or drug-like benefits.

The cosmeceuticals in the Western market are well-regulated by laws. It has been mandatory to list the complete composition of all cosmetic products on their packaging and the ingredients present¹⁸. Clinical trials and systematic reviews concerning the safety profile of skincare products in pregnancy are inadequate due to ethical issues. The Food and Drug Administration of the United States of America

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(US FDA) has classified five categories (A, B, C, D, X) to describe the potency of a drug for inducing congenital malformations during pregnancy³. However, most of the cosmetics are not categorised under FDA drug classes. Therefore, it is essential to have comprehensive information regarding the effectiveness and safety.

Physiological changes of skin in pregnancy

Skin changes are multifactorial in pregnancy. They result from elevated levels of estrogen, progesterone, prolactin, and β -HCG, changes in protein, lipid, and carbohydrate metabolism, and alterations in adaptive immunity⁶. Common cutaneous changes in pregnancy are changes in pigmentation, hair, nails, glands, connective tissues, and blood vessels⁷. Hyperpigmentation is the most common skin change, affecting up to 90% of pregnant women of darker skin types. Melasma is commonly found during pregnancy (up to 70%)^{5,9}. Hirsutism occurs frequently on the face. Nail changes during pregnancy include subungual hyperkeratosis, distal onycholysis, transverse grooving, and fragile nails. They are due to estrogen, increasing peripheral blood circulation, and stimulating nail growth. It leads to matrix dysfunction, slower keratin maturation, and nail fragility⁶. The activity of the eccrine and sebaceous glands increases during pregnancy, except the apocrine glands. Acne vulgaris may worsen during pregnancy and postpartum⁸. Striae distensae occur in 63 to 90% of pregnant women during the sixth and seventh months of gestation, manifesting as multiple atrophic pink lines on the mammary, abdomen, gluteal, and femoral region⁷. It is due to hormonal activity, genetics, physical strain on the skin, and weight gain during pregnancy⁷. Many vascular changes occur due to the elevation of estrogen. Telogen effluvium is common in postpartum^{7,8}.

Sunscreen

Photoprotection is a crucial step in maintaining healthy, youthful-looking skin. It is a prerequisite to acquire high UVA protection to prevent skin cancer and photoaging¹⁰. Pregnant mothers are worried about physiological hyperpigmentation. Melasma is a worrisome facial pigmentation that can occur in pregnancy⁸. Mothers are advised to limit their time in the sun, especially between 10 a.m. and 2 p.m., when the sun's rays are most intense. They should be encouraged to wear clothing to cover skin exposed to the sun, such as long-sleeved shirts, pants, sunglasses, and broad-brimmed hats. Physicians should encourage pregnant women to use sunscreen when exposed to excessive sun and always avoid

sunburn. Chemical and physical are two groups of sunscreens available in the market. Chemical sunscreens are para-aminobenzoic acid and its derivatives. Physical agents that act as barriers include metal-containing compounds such as zinc, titanium, and bismuth^{13,14}. Research on sunscreen in pregnancy is limited and requires more attention. Early findings have highlighted the association between Hirschsprung disease and oxybenzone¹¹. Pregnant women should avoid chemical sunscreens in the pre-conceptual period and during pregnancy. The US Food and Drug Administration advocates 25% zinc oxide sunscreen.

Pregnant women should protect themselves from the sun while still getting enough vitamin D. Vitamin D deficiency is thought to be prevalent among pregnant women, particularly in dark skin tone women with limited sun exposure and during winter and is associated with an increased risk of pre-eclampsia, gestational diabetes mellitus, preterm birth, and other tissue-specific conditions. Pregnant women should be encouraged to receive adequate nutrition via a healthy balanced diet and ensure sufficient sun exposure¹².

Moisturisers

Moisturisers smooth out the age lines and brighten delicate skin. Moisturisers usually incorporate emollients to smoothen the skin, and humectants such as urea, glycolic acid, lactic acid and hyaluronic acid help skin cells absorb and retain moisture in the skin, reducing the trans epidermal water loss¹. Moisturiser ingredients, safe to use during pregnancy, include AHA, ammonium lactate, organic silica, phospholipid, cholesterol, fatty acid, propylene glycol, glycerin, and sorbitol¹⁶. Ceramides, pseudo ceramides, essential fatty acids and squalenes are popular additives nowadays. In addition, vitamin E can be used as an emollient since its antioxidant activity can prevent trans epidermal water loss (TEWL)¹⁷. Pregnant women should be encouraged to use a fragrance-free moisturiser regularly to reduce skin dryness and pruritus and to increase overall quality of life. Occlusive moisturisers containing hydrocarbons, petrolatum, paraffin and mineral oils, acting as physical blockers, are best avoided due to potential allergenicity, acne and miliaria¹. Moisturisers should be applied in abundance on moist skin, preferably after a bath, in the direction of hair with gentle rubbing. The choice of the right moisturiser is a matter of trial and error.

Stretchmarks are unavoidable during the latter part of pregnancy. Pregnant women should regularly

apply a thick, fragrance-free emollient over areas prone to stretch marks. Many cosmetic products for stretch marks, such as hyaluronic acid, panthenol, allantoin, elastin, and collagen, are available in the market¹⁷. Hyaluronic acid is a glycosaminoglycan polysaccharide that retains water in the skin. It is considered safe during pregnancy. Polymer and nanotechnology facilitate absorption. Panthenol is considered safe. Topical use of combination creams containing hydroxypropylsilane C, rosehip oil, Centella asiatica triterpenes, and vitamin E are a promising treatment option in pregnancy. Tretion cream can be used in postnatal period¹⁸.

Depigmenting agents

Hydroquinone is the most used agent in depigmenting or whitening OTC products. Various combinations of hydroquinone, Kojic acid, tretinoin, topical steroids and α and β -hydroxy acids are available in the open market. Hydroquinone has high systemic absorption. The FDA categorises hydroquinone as class C. Pregnant mothers should avoid or use cautiously hydroquinone-containing skin preparations during the pregnancy. Azelaic acid, a tyrosinase inhibitor, is preferred during pregnancy and has a US FDA category B classification. It is used with caution on small areas of the skin. Alpha hydroxy acid (AHA), classified as category B by the US FDA, is considered safe for use at concentrations of up to 10%¹⁷.

Acne related products

Topical salicylic acid and glycolic acid are the main ingredients of most acne-related OTC skin care products¹⁷. They serve as keratolytic agents. Studies have reported that congenital malformations are associated with systemic salicylic acid and high-dose glycolic acid. However, there is no evidence of an increased risk of congenital malformations in salicylic acid topical use²². Pregnant women may use them in small amounts in smaller areas and rinse them off. US FDA has not classified glycolic acid in any category, but it is considered safe during pregnancy due to its minimal absorption. Retinoids are a group of chemical compounds derived from Vitamin A. Adapalene and tretinoin are classified as category C. Tazarotene and isotretinoin are classified as category X by the US FDA. Two prospective studies of tretinoin usage during the first trimester on pregnant women reported neither congenital malformation nor evidence of retinoid embryopathy. Use of topical retinoids during pregnancy should be minimised as there is a possibility of systemic absorption of retinoids causing congenital malformations during pregnancy. Tretinoin is a retinoid commonly used in

anti-wrinkle/anti-ageing creams and products to treat acne. There are some reports of congenital malformations with the use of Vitamin A-related products during pregnancy. Therefore, retinoids should not be used by pregnant women, even though some authors advocate only to avoid in the first trimester. Benzoyl peroxide, FDA Category C, is a commonly used drug to treat acne. It is minimally absorbed systemically. Pregnant women can use it in limited areas²².

Anti-ageing product

OTC products for antiaging and skin rejuvenation contain various retinoids that exfoliate superficial skin, reducing fine wrinkles and boosting collagen production. They are not safe during pregnancy. Some commonly used antioxidants are vitamins C and E, lipoic acid, and ubiquinone. It is safe to use antioxidants during pregnancy¹⁷. Lipoic acid is a superficial chemical peeling agent. It is considered safe in pregnancy in concentrations of 0.5-5%¹⁶. Topical Resveratrol and other plant-based antioxidants, such as Ferulic acid, are safe for pregnant women. Oral Resveratrol might affect the fetus¹⁶.

Nail and Hair care products

Women must consume enough protein, vitamins, and minerals to maintain good health during pregnancy. Inadequate nutrients can lead to changes in nails and hair. Pregnant women should consume proper nutrients, multivitamins, and minerals.

Permanent hair colour products usually contain phenylenediamine, 3-aminophenol, resorcinol, toluene-2,5-diaminesulphate, sodium sulfite, oleic acid, sodium hydroxide, ammonium hydroxide, propylene glycol, and isopropyl alcohol¹. Animal studies have shown an increased risk of low birth weight and miscarriage in pregnant mothers exposed to very high doses. Though these chemicals result in poor systemic absorption, the Organization of Teratology Information Service (OTIS) recommends postponing hair dyeing until the second trimester. Plant-derived dyes such as henna are likely to be safe in pregnancy. Hair straighteners or relaxers, bleaching agents, and permanent dyes usually contain sodium hydroxide, guanidine hydroxide, ammonium thioglycolate, ammonium hydroxide, petroleum, and hydrogen peroxide. Rosenberg et al. also revealed no association between preterm deliveries and the use of hair relaxers during pregnancy in 5,944 Black women²³. Pregnant women may receive 3 to 4 treatments during pregnancy.

Thioglycolic acid, with a concentration of less than 5% and pH of 7-12, is a hair-depilatory product approved during pregnancy. Pregnant hairdressers and nail salon workers are exposed to chemicals multiple times. It is essential to minimise chemical exposure by general occupational health and safety measures²¹. Pregnant women's nails often become fragile. They should use hypoallergenic nail cleansers and polishes. Nail polishes may contain phthalates that are absorbed systemically. Pregnant women should avoid the use of leave-on phthalates-containing products such as nail polishes during pregnancy to minimise the risk of fetal exposure²³.

Personal care products

Parabens are a group of chemicals commonly used as preservatives in cosmetics and personal care products such as moisturisers, deodorants, shower gels, body creams and hair products. They have antibacterial and fungicidal properties. Phthalates are ingredients of many cosmetics and personal care products such as nail polishes, fragrances, soaps, shampoos, hair-care products (hair sprays, gels and mousses), body lotion and body creams. It can enter the human body via food, plastics, medicines, water and air. Parabens, Phthalates and triclosans are the three endocrine disruptive chemicals (EDC) widely used in beauty and personal care products³⁰. These are synthetic chemicals that adversely affect the endocrine organs of the body. EDCs can cross the placenta and affect the baby. Parabens have estrogenic and anti-androgenic properties. They may cause genital organ abnormalities in male fetuses (due to anti-androgenic activity), recurrent miscarriage, and low birth weight babies²⁵.

Phthalate exposure is associated with preterm birth and congenital abnormalities of genital organs in the male foetus due to the anti-androgenic effect, neurotoxicity, and thyroid dysfunction both in the mother and the baby. Triclosan is an antimicrobial agent, banned in antiseptic solutions and washes due to safety concerns, and found in many personal care products such as toothpaste and body lotions. Studies on animals have shown that triclosan exposure during pregnancy can cause hypothyroidism in the mother and the fetus and low birth weight babies²⁴.

Makeup products

Mercury is a main ingredient in many eye products, such as eye shadow and eyeliners. Up to 65 parts per million (ppm) of mercury is allowed in cosmetics only as a preservative in eye area products by the FDA.

Lead is found in different lip products like lipsticks and lip glosses. FDA recommends that levels of 10 ppm for lead as an impurity. Arsenic and cadmium are also in some cosmetics. The FDA limits the amount of heavy metals as colour additives in cosmetics. The FDA recommends that the levels not exceed 3 ppm for arsenic, 20 ppm for lead and 1 ppm for mercury. Exposure to heavy metals may result in low birth-weight babies, miscarriages, stillbirths and congenital neural malformations^{24,25}. Whether it can happen in pregnancy with permissible levels of heavy metals is debatable. Pregnant mothers should avoid repeated and heavy use of such products²⁶.

Conclusion

Health authorities should lay laws for manufacturers to strictly follow the regulations for safe usage and allow only permitted levels of chemicals in their products. The medical fraternity should educate the public about the safety of products. Products containing harmful chemicals should be avoided or used cautiously during pregnancy unless further safety information is obtained via research. Pregnant women should be vigilant in choosing skincare products to minimise the risks and hazards of foetal exposure to many chemicals. They should be encouraged to use products judiciously by reducing the frequency, avoiding leave-on products or under-occlusion, and using quality products with safer ingredients.

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