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Hidden Killers for Women: Mercury, Steroids and Hydroquinone in Skin Whitening and Bleach Creams

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ABSTRACT

Women more often try to whiten their skin and as a consequence poison their bodies. A survey was performed to study the awareness in people, particularly women, about hazards caused by skin lightening creams and bleach creams due to the presence of chemical agents like mercury, steroids and hydroquinone. The Pakistan Council for Scientific and Industrial Research (PCSIR) mentioned that many dangerous chemicals inclusive steroid and mercury ipecac were being used in face whitening creams that might lead to skin diseases inclusive skin cancer and black spots on the skin. The only skin bleaching chemical recognized by the FDA is hydroquinone but, any skin bleaching cream with over 2% may cause severe side effects. The aim of the study was to examine the awareness as well as misuse of skin whitening products along with other steroidal drugs. It is the matter of fact that fairness creams contain potentially harmful steroids, to attain fair complexion. A sample size of 200 women was distributed with questionnaires. Almost 82% of women between ages 16 to 40 are unaware of the deleterious effects caused by skin whitening, fairness and bleach creams available across the country and only 18% women were aware of harmful effects. For the same purpose, we also visited different parlors and dermatologists. From the facts and figures obtained we conclude that FDA must reinvestigate the skin whitening and bleaching products containing banned amount of mercury, high dose steroids and hydroquinone above 2% and steroidal drugs like Betnovate must be dispensed after counseling by pharmacists and health practitioners.

Keywords: Skin Whitening, Bleach Creams, Steroids, Mercury, Hydroquinone

INTRODUCTION

The outermost skin layer (the epidermis) [1] provides the first line of defense against pathogens. It contains melanin produced by pigment cells called melanocytes through a series of oxidative reactions involving the amino acid tyrosine and the enzyme tyrosinase, in the basal layer of the epidermis [2, 3].

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Its type, amount and distribution pattern in the surrounding keratinocytes, determines the actual color of the skin [4]. The history of skin bleaching can be traced to the Elizabethan age [5]. During the late nineteenth and early twentieth century, skin bleaching products and procedures became increasingly popular in African and American communities across the United States [6] and around the globe, in part through US media images [7, 8]

among young, unmarried and educated women [9-11]. The benefits of light skin are widespread around the globe, particularly in countries formerly colonized by Europe or with a significant U.S. presence [12-15]. This may be a reflection of the perceived social advantages (e.g. better job and marital prospects) associated with lighter skin colors in some communities [16-19]. In past, synthetic products were not available and people used natural products like mint leaves, almond, honey, lemon, potato and orange peel. In dermatological practice, depigmenting agents are used by many dermatologists successfully and routinely to treat disorders of hyper pigmentation (e.g. melasma and post-inflammatory hyper pigmentation), which commonly occur in individuals with pigmented skin or as a fashion trend which aims to reduce normal melanin pigment in the skin [20-23]. Bleaching agents are used for bleaching/fading the various marks and act to block the formation of the skin pigment melanin.[24] They include hydroquinone, potent steroids, mercury-containing agents, kojic acid, alpha hydroxyl acids and plant-derived products (some of which may contain arbutin) [25]. Hydroquinone is an effective skin lightening agent [4, 22, 23]. Lightening effect is most likely caused by melanocyte destruction, decreased melanosome formation, altered melanosome structure, increased melanosome degradation, and destruction of membranous organelles [26]. It blocks the synthesis of melanin by inhibiting the tyrosinase enzyme [27-30]. Mercury-containing agents are also misused as depigmenting agents [31]. In the inorganic form especially mercuric iodide, it is used as a constituent of skin lightening creams, soaps, an antiseptic in creams and ointments [32]. They cause inhibition of melanin formation as mercury salts compete with copper in tyrosinase. Topical corticosteroids are anti-inflammatory agents used to treat many inflammatory disorders and are also a popular coetaneous depigmenting agent misused during skin lightening/bleaching. The depigmenting effect occurs due to vasoconstriction

occurring in the coetaneous vessels, which results in the impression of an immediate reduction in pigmentation of the skin. Long-term effects are also mediated via their inhibitory effects on epidermic melanogenesis [25]. Side effects associated with misuse of hydroquinone range from acute effects, such as contact dermatitis (irritant and/or allergic), with associated post inflammatory hyperpigmentation, and chronic effects (nail plate pigmentation, 'fish odour syndrome', conjunctival melanosis and exogenous ochronosis) [29-35]. Since January 1, 2001 hydroquinone use has been forbidden in the EU as an ingredient [36]. In March 2010, California Department of Public Health (CDPH) investigated for elevated blood mercury levels in some individuals and they were found using unlabelled skin whitening creams. Frequent exposure to Mercury can result in irreversible renal and central nervous system damage or death as well (37). Topical steroids are divided into four classes in British National Formulary (BNF), while the American system classifies them into seven classes, with class 1 corresponding to the very potent, super potent or ultrahigh potency e.g., clobetasol propionate, and prolonged usage (>3 weeks) most commonly result in local side effects, these side effects occur particularly on areas of skin such as the face or flexures, perioral acne; masking of infections, particularly dermatophyte infections as well as adrenal suppression. The patients who utilized 90 g of 0.05% clobetasol propionate and 120 g of Betnovate-N monthly for durations of 1-13.5 years are reported to produce systemic complications such as diabetes mellitus and hypertension, (also t. incognito, acne vulgaris, pityriasis versicolor, facial hypertrichosis, striae, etc.) were diagnosed [38-39]. The general knowledge of women about the risks of using skin whitening and bleaching agents must be evaluated and the side-effects of such products should be observed to control this habit. The aims of this study were to estimate the prevalence of skin whitening and bleaching Creams among women, the

problems they were facing with their skin, trend of switching to different products, to assess the misuse of skin whitening and bleaching products and to examine attitudes towards this issue.

METHODOLOGY

A cross-sectional survey was conducted on women belonging to different areas of Karachi. Data were collected between March and May of 2012 from students, working women and house wives. A specially designed questionnaire was used for data collection. Apart from the information regarding localities where those women lived in and their professional status, the questionnaire extracted detailed information regarding their skin type and complaints, and the frequency of using skin whitening and bleaching creams. They were asked an open ended question to include the names of whitening and bleaching products they use. The women were also asked if they were satisfied with the products they used and if they ever tried a beautician’s formula cream. The questionnaire finally requested information about the awareness of the agents present in skin whitening and bleaching creams and the hazardous effects of these products.

Data Analysis: We have used pie charts and graphical representation for statistical analysis of data obtained.

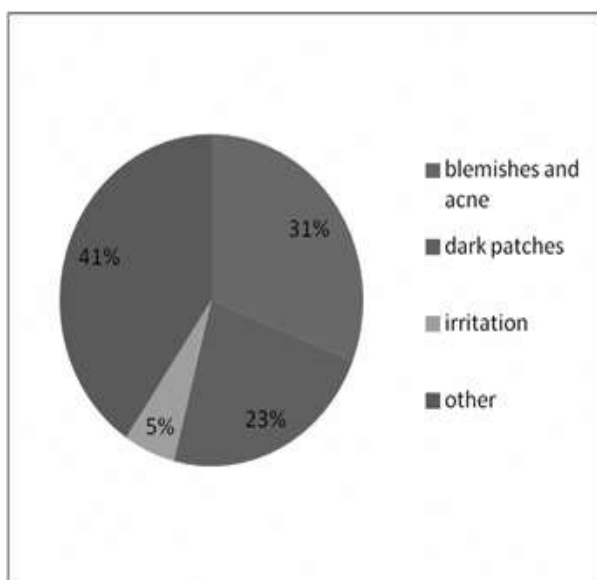


Figure 1: Skin problems

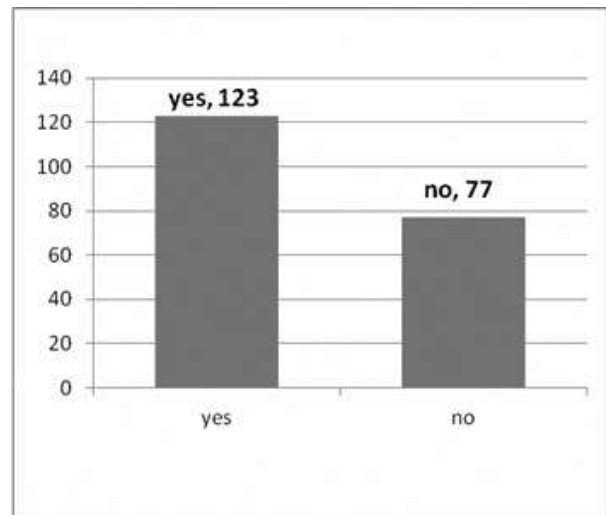


Figure 2: Prevalence of skin whitening and bleach cream

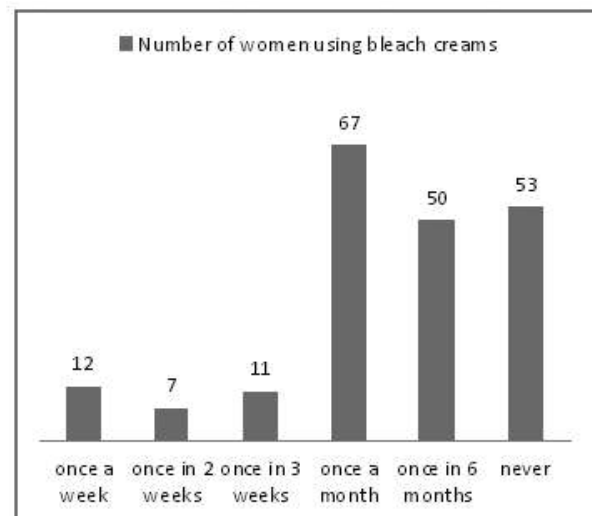


Figure 3: Frequency of bleach cream usage

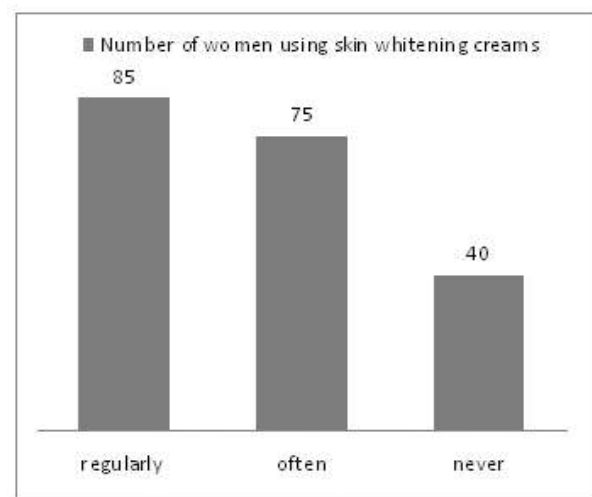


Figure 4: Frequency of skin whitening cream usage

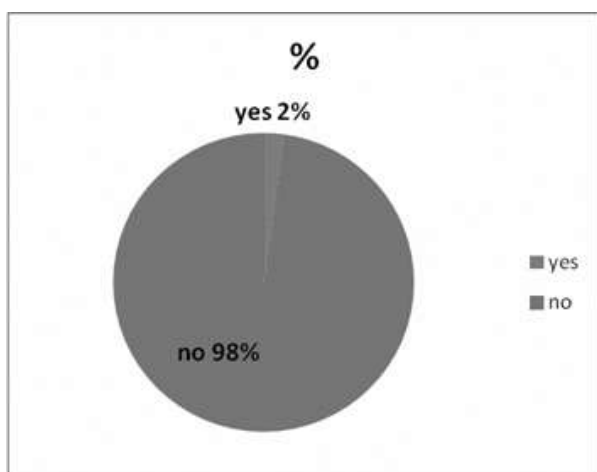


Figure 5: Awareness of the ingredients present in skin whitening and bleach creams

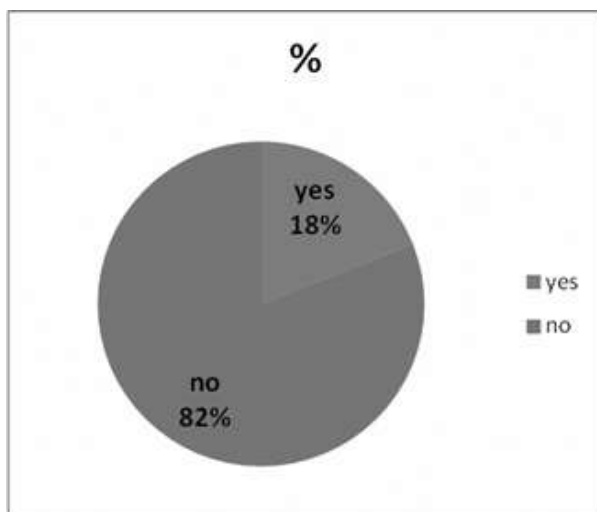


Figure 6: Awareness of the deleterious effects caused by skin whitening and bleach creams

RESULTS

All the questionnaires distributed among 200 women aging between 16 to 40 years and belonging to different areas of Karachi, were returned which showed active participation of the women in the study (100%). Out of 200, 47% (94/200) were students, 28% (56/200) working Women and 25% (50/200) were housewives. Most of the women 35% (70/200) had oily skin type, 30% (60/200) had normal skin, and 16% (33/200) had sensitive skin while 19% (37/200) had dry skin.

Skin Problems: The survey showed that 31%

(62/200) of women were suffering from blemishes and acne, 23% (46/200) indicated presence of dark patches and uneven skin tone, 5% (11/200) had irritation problems while 41% (81/200) had other dermatological problems (fig 1).

Prevalence of Skin Whitening and Bleaching Creams:

Of the participating women 61% (123/200) were users of skin whitening and beach creams, while 39% (77/200) were not (fig 2). The frequency of using bleach cream was found as 6% (12/200) women apply it once a week, 3.5% (7/200) apply once in 2 weeks, 5.5% (11/200) apply once in 3 weeks, 33.5% (67/200) apply once in a month , 25% (50/200) apply once in 6 months whereas 26.5% (53/200) women never used it (fig 3). The frequency of skin whitening cream usage varied from 42.5% (85/200) women using these products on regular basis, 37.5% (75/200) women used it quite often while 20% (40/200) agreed they never used such creams (fig 4)

Awareness: About 2% (4/200) of respondents reported that they were aware of the ingredients present in skin whitening and bleach creams while 98% (196/200) did not have any idea of it (fig 5). The deleterious effects of these products were believed to be known by only 18% (36/200) of the respondents whereas 82% (164/200) were unaware that agents present in skin whitening and bleaching products could harm their skin (fig 6).

DISCUSSION

The results of the survey indicate that the use of skin whitening and bleaching creams is very common among the women belonging to different areas of Karachi. It was expected that more educated women, knowing the risks of bleaching products, would avoid their use. It was also expected that the use of bleaching products would be most prevalent among participants in their teens to late 20s. The results of our study contradicted our expectations; women in Karachi use bleaching products extensively regardless of age and educational level. In the survey, 61% (123/200) of the participants were current users of

skin whitening and bleach creams. The tendency of switching to different products is also common which indicates that consistent use of a single product has not satisfied the consumers. The survey showed that 31% (62/200) of women were suffering from blemishes and acne which might be associated with oily skin type due to humid weather, polluted environment, increased fat intake and other improper dietary habits etc. The other most common problem found was presence of dark patches and uneven skin tone 23% (46/200). Most of the women suffering from uneven skin tone do not realize that bleaching certain parts of body can worsen the circumstances by sun exposure within 24 hours of bleaching. Lack of sunscreen use may also be an additive risk in the development of such side effects because bleaching agents increase the susceptibility of skin to UV radiations. 5% (11/200) had irritation problems on skin which can be the consequence of pollution. While 41% (81/200) had other dermatological problems which might be due to any autoimmune disease, fungal infections etc. Bleaching or skin lightening creams or ointments have their worldwide use either to reduce localized dark patches (e.g. melasma or post inflammatory hyper pigmentation) or as a fashion trend to decrease normal melanin number in the skin. They are composed of variety of ingredients which are still unidentified [40]. The harms of these agents are dependent on the type of ingredient being applied to the skin, the concentration, on the applied area, and duration of use. In the survey it was noticed that 61 % women were indulged in regular use of skin whitening creams which shows society's pressure to attain a fair light skin color. Skin color is given preference over feelings for the person. It seems the majority of local men are more attracted to lighter skinned beauties. Regular usage of whitening products indicates the risk that affordable, low standard and cheap products are in demand. Some women 37.5% (75/200) were found to use skin lightening creams often. Probable reason for this would be that they are aware of the harms but are compelled to lighten their skin by any means. And another reason can be poverty, unable to buy even cheap products or the unaffordable prices of

quality ones. Skin bleaching is also a common phenomenon and many women were found practicing skin bleaching and using whitening creams simultaneously. 73.5% (147/200) women using bleach creams chronically which many fold increases the risks of adverse effects of bleaching agents.

Though Hydroquinone is an effective skin lightening agent, yet its damaging effects on long term use makes it unavailable in some parts of the world. It is recommended over the counter in the concentration of 2%, but in some countries, dermatologists recommend it up to 4% as well. If used on daily basis, then it is suggested not to use it for more than 6 months. Common effects seen with its use are mild burning of the skin, itching feeling and irritation while pigmentation of portions or whole of the areas around ears, toes, buttocks and finger joints is observed on long term use of hydroquinone. A no. of evidences are present, also overlooked by the dermatologists, general practitioners, and plastic surgeons which show that long term effects of hydroquinone lead to carcinogenesis. The carcinogenicity of benzene is due to its metabolites. i.e hydroquinone and p-benzoquinone, covalently bonded with DNA and the induction of DNA oxidation via redox cycling, which generates reactive oxygen species.

Steroid creams also bleach skin color. They reduce the quantity and action of melanocytes by initially blanching the skin due to vasoconstriction and then delaying the skin cell turnover. People widely use products containing betamethasone valerate, fluocinonide and clobetasol propionate in order to achieve skin lightening side effect. Steroid corticosteroids have long term side effects out of which Cushing's disease in which cortisol is overproduced due to the malfunction of the adrenal glands is the most serious. Increased appetite and weight gain, fat deposition in chest, face, upper back, and stomach, swelling, delaying healing of wounds, osteoporosis, cataracts, acne, muscle weakness, thinning of the skin are some other side effects.

In skin lightening creams, labeling of mercury is done as “mercurous chloride,” “calomel,” “mercuric,” “mercurio,” or “mercury.” FDA has investigated that more than 35 products contain unacceptable levels of mercury, “Stillman’s skin bleach cream” is one of them. “Exposure to mercury can have serious health consequences,” says Charles Lee, M.D., a senior medical advisor at FDA. Mercury vapors can be inhaled by the people into their bodies due to which FDA prohibits the use of mercury in drugs or in cosmetics, except under specified conditions, which are not met by these products. [41]. Long term use of mercury containing skin bleaching cream can cause poisoning and also accumulation of mercury in the body cells leading to neurological and kidney damage and psychiatric disorders, due to which its long term use is strictly prohibited. In addition, it can lead to severe birth defects. Skin lightening products reduce the amount of melanin which makes the body more vulnerable to UV rays and thus to skin cancer and ageing. Hydroquinone and mercury cause skin to be hyper-sensitive to sun rays. Products with very high levels of mercury contamination look grey or cream colored [42]. The amount or concentration of mercury in a product may be labelled on the packaging or in the ingredient list and following names can be looked for the presence of mercury in the product: mercury, Hg, mercuric iodide, mercurous chloride, ammoniated mercury, amide chloride of mercury, quicksilver, cinnabaris (mercury sulfide), hydrargyri oxydum rubrum (mercury oxide), mercury iodide or “poison”; its presence in the product can also be detected if the labeling includes the directions to avoid contact with silver, gold, rubber, aluminium and jewellery. However, the problem is that majority of the companies which sell products containing mercury, do not include it as an ingredient in the label [43, 44]. Its use is allowed by The United States Food and Drug Administration only at concentrations at or below 65 mg/kg in eye area cosmetics and if it is to be used in other cosmetics then the concentration must be less than 1 mg/kg. The presence of mercury must be unavoidable under good manufacturing practice [45]. The products with high levels of

mercury, hydroquinone and steroids are being sold in the shops and online, also these products are marketed through TV advertisements. The USFDA advices that consumers should beware of unlabelled products or if no ingredients are listed. It is required by Federal law that ingredients be listed on the label of any cosmetic or drug. Products which are not labeled in English should not be used unless English labeling is also provided. Public awareness needs to be raised regarding the types of products and the specific products that contain mercury, hydroquinone and steroids and the risks associated with exposure to these agents and people should also be informed of other substances that are hazardous and can be used as an alternative in the products that do not contain mercury for skin lightening effects. [46] During our visit to different parlors we came to learn that women were trying to attain fair complexion by any means regardless of the fact that skin is not an experimental object. A famous “FORMULA FIVE” cream consisting of Stillman’s bleach cream, Fair n lovely, Gypsy, Arche Pearl cream, Betnovate N and vitamin D or E capsule was very popular and guaranteed to make skin white. However when we got dermatologist’s reviews, cases had been reported that this mixture ruined skin texture and it could be predicted that cumulative effect of this steroids, hydroquinone and mercury containing mixture would be horrible. Women often try to get desired results within days or a week that’s why these products are readily becoming popular. Talking to some shopkeepers it was found that substandard, cheap and beautician’s formula products are sold frequently and are in demand by local people and small parlors to flourish their businesses. We also obtained public opinion regarding the topic. Not only women, men have also become indulged in the trend of urging for fair complexion. Society being influenced by west has made it difficult for women as well as men to stay confident with dark skin tone. Marital prospects as well as better jobs advantage only fair, up-to-date women and men. Also, dark people are forced to suffer from inferiority complex. Education of the public on the risks of skin whitening and bleaching products use is clearly imperative and

would mitigate the side-effects of their use. Health education programs should target women through various media options including leaflets, television and radio. The sales and marketing of bleaching products must be controlled, which could be done by imposing fines and penalties on the marketers of such products. FDA must reinvestigate the skin whitening and bleaching products containing banned amount of mercury, high dose steroids and hydroquinone above 2%. And steroidal drugs like Betnovate and Dermovate must be dispensed after counseling by pharmacists and health practitioners.

CONCLUSION

The results of this survey reveal that the use of skin lightening and topical bleaching agents is very common among women in Karachi. Numerous women of different age, class and professional status are seeking lighter complexions and are consequently using such products excessively, which could cause several health problems. It is important to control the use of skin whitening and bleaching products and to educate women about the dangers associated with this practice. Increased awareness should reduce the abuse of these agents.

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