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The effect of using whitening creams that contain mercury in the community

O efeito do uso de cremes clareadores que contêm mercúrio na comunidade

El efecto del uso de cremas blanqueadoras que contienen mercurio en la comunidad

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Abstract

This research aimed to determine the effects of mercury use in whitening creams for the general public. This research used descriptive-qualitative approach, the method that used in this research is literature study which implemented by recording the previous findings regarding to the variables of conflict. WHO states that more than 90 creams from 15 countries have detectable mercury concentrations below 1 ppm. Thirty-four creams (10% of the sample) was found that have high mercury levels, that is, above 1 ppm, in four of the 13 samples from Indonesia, overall, mercury concentrations in this particular product ranged from 93 ppm to over 16,000 ppm. Long-term adverse effects of using mercury cream on health.

Keywords: Health effects; Cosmetics; Mercury; Whitening cream.

Resumo

Esta pesquisa teve como objetivo determinar os efeitos do uso de mercúrio em cremes clareadores para o público em geral. Esta pesquisa utilizou abordagem descritivo-qualitativa, o método utilizado nesta pesquisa é o estudo da literatura que se implementa registrando os achados anteriores quanto às variáveis de conflito. A OMS afirma que mais de 90 cremes de 15 países têm concentrações detectáveis de mercúrio abaixo de 1 ppm. Verificou-se que 34 cremes (10% da amostra) tinham altos níveis de mercúrio, ou seja, acima de 1 ppm, em quatro das 13 amostras da Indonésia, no geral, as concentrações de mercúrio neste produto específico variaram de 93 ppm a mais de 16.000 ppm. Efeitos adversos de longo prazo do uso de creme de mercúrio na saúde.

Palavras-chave: Efeitos na saúde; Cosméticos; Mercúrio; Creme clareador.

Resumen

Esta investigación tuvo como objetivo determinar los efectos del uso de mercurio en cremas blanqueadoras para el público en general. En esta investigación se utilizó un enfoque descriptivo-cualitativo, el método que se utilizó en esta investigación es el estudio de la literatura que se implementó registrando los hallazgos previos sobre las variables de conflicto. La OMS afirma que más de 90 cremas de 15 países tienen concentraciones de mercurio detectables por debajo de 1 ppm. Se encontraron treinta y cuatro cremas (10% de la muestra) que tienen altos niveles de mercurio, es decir, por encima de 1 ppm, en cuatro de las 13 muestras de Indonesia, en general, las concentraciones de mercurio en este producto en particular oscilaron entre 93 ppm y más de 16.000 ppm. Efectos adversos a largo plazo del uso de crema de mercurio en la salud.

Palabras clave: Efectos en la salud; Productos cosméticos; Mercurio; Crema blanqueadora.

1. Introduction

Advertising and marketing perpetuate the prejudice that lighter skin tones are preferable by media-promoted beauty ideals over darker skin tones (World Health Organization (WHO), 2011). Mercury is typically added to the whitening product because it can create a lighter skin tone impact. Nevertheless, to enhance the lightening effects, many cosmetics contain mercury up to 1000 ppm (Sun et al., 2017). Elementary mercury occurs in three forms: elemental, organic and inorganic. Mercury chloride or ammonia mercury,

mercuric chloride, and mercuric chloride or calomel is mercury salts, especially the type of mercury (Hamann et al., 2014).

Fitri F Ramli pointed out that mercury is a harmful agent widely used in the product of lightening cream. The use of mercury is particularly important as it can create a dramatic whitening effect when used in very large quantities. Mercury levels in skin lightening products should be below one part per million, according to the WHO (ppm). While, the strict regulations in many countries include more than thousand of permissible levels of mercury, many whitening items. According to the researcher have been conducted in US, nearly half of mercury goods have very high mercury levels, above 10.000 ppm. The whitening product is manufactured in many countries including England, Mexico, Lebanon, Taiwan, Indonesia, China, Japanese, Thailand, Philippines, and Jamaica, both online and physical stores such as beauty shops, stores, and the flea market, family, friends who contributed to the availability and widespread use of skin lightening products (Ramli, 2020).

International Agency for Research on Cancer explained that Methylmercury (MeHg) compounds classified as 2 B groups and the inorganic mercury (iHg) compound as Group 3. Related to the work carried out by workers in chlor alkali plants and the nuclear weapons industry as well as dental practitioners in professions involving possible exposure to mercury (Hg) vapors, 9 an increased incidence or mortality of cancer has been identified by epidemiological studies. Similarly, several epidemiological studies have examined the work of Hg exposure in relation to the risk of skin cancer (Rhee et al., 2020).

Thomas Y.k. Chan stated that Inorganic mercury exists in the form of mercury (or Hg2+) and 2 Mercury (or Hg2). Historically, the whitening effects and anti freckles, salt such as in the cosmetic formulas. However, since mercury is absorbed by the skin especially if the stratum corneum is hydrated, the use of this cosmetic product can result in mercury poisoning. Although, the population still has access to illicit cosmetic product, there are still occasional cases of outbreaks of inorganic mercury poisoning (Chan, 2011).

In order to brighten the skin, this non-commercial is used; freckles are faded, blemishes and age spots; and acne treatment. In general, the product comes in a plastic container that does not have a label or handmade label. These cases of poisoning involve some children and babies who are not using the cream but are exposed to mercury through contact with members of family who are using the substance. The cream containing the highest mercury level, up to 210.000 parts per million (ppm) or 21 percent. It is illegal to market skin cream products containing 1 ppm or more of mercury in the US (Health Alert, 2019).

The variety of human toxicity based on the form of mercury, the dosage and the level of exposure. The target organ for mercury vapor inhalation is mainly the brain. The lining of the bowels and kidneys is weakened by mercury salt and mercury, while methyl mercury is widely spread across the body. Toxicity varies by dose: acute, high mercury vapor exposure causes serious pneumonitis, which can be fatal in extreme cases (Bernhoft, 2012).

Zero Mercury Working Groups Mercury is regarded as harmful and a danger to human health by international intelligentsia. Using whitening and brightening cream or soap that frequently contains mercury can cause rashes, discoloration of the skin and patches. Long-term exposure, including damage to the skin, eyes, lungs, kidneys, digestive system, immune system, and nerves, may have significant health effects. From 3 of the 22 countries in which sampling was conducted. 7 countries has high mercury samples have been detected, only four have a legal provision that forbids cream with mercury greater than 1 ppm (Zero Mercury Working Group (ZMWG), 2018).

Many individuals using whitening and brightening cream, some people know trigger effect of long-term use of mercury some people does not knows, the researcher chooses to review this subject. The purpose of this study was to understand the impact of using mercury for the whitening cream product that used by the general public.

2. Methodology

This research used descriptive-qualitative method, the method that used in this research is literature study which implemented by recording the previous findings on the variables of conflict, mutation and passion, then incorporates current findings and analyze these findings coherently and explicitly (Sugiyono, 2009).

In this research, secondary data collected from several previous literatures was used. It sources for gathering data from books and previous academic papers. The method of data analysis used in this article is a technique of qualitative descriptive analysis; this technique was chosen to describe employee morale related issues that are then reviewed to produce specific feedback to improve an organization’s productivity.

3. Result and Discussion

Beauty standard that promotes lighter skin tones for darker skin tones through newspapers, ads and marketing. Mercury is the general but harmful element that mercury salt

eats melamine, which results in a lighter skin tone, used in the cream and soap of the whitening product. The Minamata mercury convention sets limits 1 mg/kg (1 ppm) for a whitening product, but many cosmetics contain mercury levels higher than that number. This article includes an overview on patients exposed to mercury-containing cosmetic products and a brief review of the assessment of these patients.

Carsten R. Hamann found out that 60 percent of the whitening product's global mercury in the whitening product contains mercury over 1000 ppm. In particular, 3.3% of whitening items purchased in the US found mercury containing up to 1000 ppm (Hamann et al., 2014). The whitening product is used worldwide, but it is widely spread in many African, Asian, and Caribbean countries. The whitening product used by women and men.

The whitening substance includes mercury accessible through Internet sales, online promotion on social media platforms, and cellular sales. According to the Food and Drug Administration of the United States (FDA), this substance is mostly manufactured overseas and often sold illegally in small markets and informal. In other countries, customers often purchase them and bring them back to their countries. The global crisis that is estimated to only produce wore with demand is skyrocketing toxic trade from the whitening product that added mercury illegally.

Mercury is a natural, but harmful ingredient that is used in whitening cream and soap. Promoted by the media, advertisement and marketing, beauty stereotypes intensify the bias that lighter skin tones are preferable over darker skin tones. Mercury salt prevents the production of melamine, giving rise to a lighter skin tone. The whole mercury-containing substance is cream. While collected in several countries, some cream is duplicate, showing prevalence company selling on several continents.

According to Carsten R. Hamann stated that from 549 products that tested, 6,0% (n=33) contain mercury above 1000 ppm. In particular, 45% of the samples contain mercury up to 10.000 ppm. Overall, mercury was found in 6.1% of store-bought products versus 5.8% of products purchased online. As much as 70% of mercury-containing products are purchased in stores compared to 30% purchased online (Hamann et al., 2014).

Whitening product of 34 creams (10% from sample) founded has the high mercury levels, which is above 1 ppm. In total, 338 samples were analysed from 22 countries of which 34 in 7 (10% of the sample). The overall percentage of 10% covering several countries at the same time is marginally higher than other literature findings where sampling is, but relatively small compared to studies focused on one country where the percentage of cream exceeding 1 ppm of mercury frequently ranges from 20% to 60% (Zero Mercury Working Group, 2010).

The Health and Human Services Agency of the State of California reported that not only in Asia and the Middle East, but in California, the Health and Human Service Agency of the State of California reported that many cream seen in California are light colored and turn dark gray / green after prolonged light exposure. Face creams are sold to family and friends in nearly all situations, and teens also use them to treat acne (Health Alert, 2019).

A new study related with whitening cream in Kamboja found 16% from cream that contains 20 until 35.000 ppm mercury. In Mexico, 25 other studies show that 6 out of 16 (37%) whitening product contain mercury in the range 878 to 36,000 ppm. In 7 of 22 countries, the highest sample of mercury was found. From 7 countries, 4 countries have the requirements that forbid contain mercury more than 1 ppm. The concentration of mercury in the special product ranges from 93 ppm until up to 16.000 ppm (Hamann et al., 2014).

Robin A Bernhoft claimed that in the atmosphere, the element mercury settles in the water, where microorganism-changed mercury becomes organic mercury, which is consumed by the smaller that the larger fish end up consumption. Coal burning and mining involve human sources of atmospheric mercury (mercury and gold in particular). A large amount of mercury can be concentrated in their network by sea food (e.g. tuna, swordfish or shark) (Bernhoft, 2012).

Mercuric chloride solution 0,1% was applied for 2 hours in the skin, 7 mercury migrated through the transcellular and intercellular pathways through the stratum corneum. While the 0,01 – 0,2 % mercuric chloride solution was applied to healthy volunteers' forearm skin, the rate at which mercury was absorbed through the skin increased with concentration. Dilute preparations have a degree of mercury absorption and rate improvement with formation of glycerol in actual rather than real. The absorption frequency of Dermal also varies with the integrity of the skin and the solubility of vehicle lipids in cosmetic products (Chan, 2011).

WHO reported that there are measurable mercury concentrations below 1 pp for more than 90 creams from 15 countries. Twelve creams had mercury levels above the Milestone DMA-80 instruments' full detection capability. Mercury-containing whitening goods are manufactured in several countries and territories (World Health Organization (WHO), 2011).

Mercury sample analysis findings were reported and mercury samples above 1 ppm (Zero Mercury Working Group (ZMWG), 2018). Mercury also can be found in cosmetics such as mascara, and eye makeup cleaning product, which is used as a preservative. There are two types of mercury in cosmetics: inorganic and organic. Inorganic Mercury is used for

cream and soap whitening. The inorganic mercury compound is used in eye cosmetics, including cream products as a cosmetic preservative.

Health Effects

Melanocytes are an important components in the skin pigmentation system through their ability to produce and distribute melanin. Skin pigmentation are involve melanocytes, melanosomes, melanin, tyrosinase enzymes and the process of melanogenesis. Melanocytes are cells that can synthesize the enzyme tyrosinase, this enzyme when combined in melanosomes, can begin the synthesis and deposit of melanin besides producing several cytokines including IL-1 (Interleukin-1), IL-6 (Interleukin-6) and TNF-α (Tumor Necrotic Factor-alpha) which works to inhibit the process of melanogenesis by decreasing the activity of the tyrosinase enzyme and proliferation of melanocytes. Melanin is a pigment which produced by melanocytes from polymerization and oxidation in the process of melanogenesis and its formation requires the presence of the enzyme tyrosinase. The process of melanogenesis produces the pigments eumelanin and feomelanin. Eumelanin and feomelanin are both tyrosine derivatives through several stages.

Tyrosine undergoes the oxidation process to become 3,4-dihydroxy-phenylalanine (DOPA) by the activity of the tyrosinase enzyme and then oxidized again to form dopaquinone. After this stage, melanogenesis pathway is divided into two parts, namely eumelanogenesis and pheomelanogenesis. In the eumelanogenesis pathway, dopakuinone compounds undergo oxidation to form leuko-dopaque (cyclodopa) which also rapidly changes to dopaid form. Subsequently, dopaque changed its shape into 5.6 dihydroxyindol and 5.6 dihydroxyindol 2 carboxylic acids. At the final stage of the formation from eumelanin pigments, whether it is more influenced by polymerization of the compound 5,6 dihydroxyindol or 5,6 dihydroxyindol 2 carboxylic acid is controversial. In the feomelanogenesis pathway, addition of sulfhydryl groups (cysteine or glutathione) to dopakuinone compounds will cause rapid non-enzymatic reactions in melanocyte metabolism to form cysteineildopa compounds. Then this compound undergoes oxidation to become benzotizinilalanin until the stage of formation from feomelanin pigment.

Although the melanin produced in skin melanocytes provides protection from UV radiation, excessive accumulation of melanin can cause cosmetic defects such as melasma, to reduces abnormal accumulations of melanin, the use of skin lightening products has been prevalent among women around the world. Active ingredients are known to be effective to

lighten the skin, among others, various corticosteroids, hydroquinone, and mercury. Mercury exists mainly in three forms: inorganic, organic and metallic. Inorganic mercury compounds, including mercuric chloride, mercuric chloride, and mercuric oxide, have been used in skin lightening products since ancient times. This compound occurs in the form of mercuric (Hg II) or mercurous (Hg I) and has a toxic effect on humans. It has been found that the use of skin lightening products is one of the causes of mercury toxicity. More specifically, the use of skin lightening products containing inorganic mercury can cause central nervous system, gastrointestinal and renal system toxicity. Therefore, the sale of skin lightening products containing inorganic mercury is prohibited in many countries. Mercury can replace copper which is required for tyrosinase activity, thereby deactivating enzymes and producing a skin-lightening effect.

According to Gui Fang Sun, Side effect from mercury-containing creams by mercury ion replacement of the enzyme tyrosinase anion, which inhibit the production of melanin and produces whitening and anti-freckle effects. Chronic mercury toxicity will result in the long-term use of goods that do not fulfill these criteria. Chronic mercury toxicity will result in the long-term use of goods that do not fulfill these criteria. The key symptoms observed in a specific group of patients are pain, kidney damage, and neuropsychiatric symptoms (Sun et al., 2017).

Otherwise, other study reported an inadequate response to treatment. Additional studies have found a rise in blood and urine mercury by about 1500 and more than 120 times the reference values, respectively. The Rapid deterioration of the 47-year-old Hispanic-American patients' neurological symptoms within 2 weeks after initial presentations and hospitalized. Surprisingly, they also detected elevated blood levels of methylmercury, the ingredient not typically used in skin whitening products.

Fitri Fareez Ramli stated that, girls who have been exposed to toxic methylmercury for 17 months produce mercury at a level of 27,000 ppm for 4-5 months. Mercury exposure may lead to mercury poisoning by inhaling mercury vapors, skin-to-skin contact with mothers and grandmothers, skin-to-skin contaminated household products, and unintentional ingestion of mercury that adheres to contaminated surfaces. This patient received DMSA chelation therapy for more than a month. The patient's condition improved, though residual neurological deficits were still reported at 7 months after admission during the follow up period (Ramli, 2020).

According to the World Health Organization, much of exposure to human mercury metal originated from mercury vapor that escapes from amalgam filling at a rate of 2 to 28 micrograms per facet surface per day about 80 percent is absorbed. Mercury is spilled from

less common sources of mercury vapor, and there are indications on Idiopathic Thrombocytopenic Purpura that it was caused by spilled mercury aspiration (resulting in large acute exposure to mercury vapors) (Bernhoft, 2012).

One of the reported cases identified was a 34 years old Chinese woman suffering from nephrotic syndrome, a disease characterized by high levels of urine protein. The level of mercury in the woman's blood and urine returns to normal after nine months of not using whitening cream.

The bad effects of using mercury cream in the long term on health include kidney damage, skin rashes, skin discoloration, and scar. Skin decreased resistance to bacterial and fungal infections, anxiety, and depression. Psychosis, Peripheral Neuropathy, Nervousness, Irritability, Tremors, Weakness, Fatigue, Memory loss, Death, and so on (My miracolo, 2019).

4. Conclusion

The long term bad effects of using mercury cream on health include kidney damage, skin rashes, skin discoloration, and scar tissue, decreased skin resistance to bacterial and fungal infections, anxiety, and depression. Those explanations, when buying products containing mercury, people can sort or think again and be more careful in buying cosmetic products to avoid the bad effects that will occur.

It can direct doctors to further examine some of these surveys and tests, by eliminating the cause of the disease, and by beginning care immediately. It has been shown that early detection provides a strong prognosis. Since the product is readily available, public awareness and knowledge of chronic mercury poisoning due to skin lightening products containing mercury is very significant.

The researcher suggests this manuscript could improve the knowledge for other researcher that will analyze with similar object. The researcher hope for further researcher could improve the manuscript with the clear methodology and hope for all people in the world be aware with cosmetic product that contain mercury ingredients that make a negative effect in their skin.

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