MERCURY'S POISONED GLOW

Comparison Report on Mercury:
Added Skin Lightening Creams - 2023

Environment and Social Development Organization - ESDO

Mercury's Poisoned Glow: Comparison Report on Mercury-added Skin Lightening Creams 2023

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The Environment and Social Development Organization - ESDO is an action research non-profit and non-government organization in Bangladesh. It is an environmental action research group dedicated to a toxic-free, zero-waste planet. This entails fighting pollution and building regenerative solutions in cities through local campaigns, shifts in policy and finance, research and communication initiatives, and movement building. ESDO has been working relentlessly to ensure biological diversity since its establishment in 1990. It is the pioneer organization that launched the anti-polythene campaign in 1990, which resulted in a complete ban on polythene shopping bags throughout Bangladesh in 2002.

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We applaud the efforts of these stakeholders for their valuable contributions, which have helped in accurately assessing the country's genuine status. Their expertise and insights have enriched the study and provided a comprehensive understanding of the situation at hand.

Executive Summary

The Environment and Social Development Organization – ESDO conducted an investigation into the sale of skin-whitening cosmetics containing mercury in Bangladesh. This study aimed to support the implementation of the Minamata Convention on Mercury, which was ratified by the Government of Bangladesh on 18 April 2023. The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury.

In Bangladesh, there is a significant issue with skin creams that contain dangerously high levels of mercury. The study's primary goal was to examine the mercury content in skin-lightening creams available in both physical markets and online platforms in Bangladesh and assess their popularity for skin whitening. The findings of the study, conducted in various years from 2017 to 2023, consistently revealed that all samples of skin lightening creams had exceedingly high levels of mercury. In 2017 and 2018, mercury levels were measured at 16,000 ppm, with a maximum concentration of 131,567 ppm found in 2019. In 2021, the papaya whitening and freckle elimination package contained the highest amount of mercury at 24,000 ppm, and in 2022, Due whitening creams contained 43,700 ppm of mercury.

These skin creams, which contain mercury, steroids, and hydroquinone, have been identified as harmful by experts because these toxic substances can damage the skin. The study identified several common brands with significantly higher levels of mercury, including Goree, Due, Chadni, Parley Herbal, New Face Whitening Cream, Papaya, and Noor Herbal Beauty Cream. These creams are primarily imported from Pakistan, Thailand, and China. The production and sale of these products by dishonest businessmen are also observed in local products.

According to a 2021 survey of dermatologists, Korean and Chinese skin creams have become very popular among the people of Bangladesh. Regular use of skin-bleaching or skin-lightening creams and soaps containing mercury can lead to skin issues such as rashes, discoloration, and blotching. Long-term exposure to mercury can result in serious health consequences, affecting various bodily systems including the skin, eyes, lungs, kidneys, digestive system, immune system, and nervous system. Babies exposed to mercury in the womb can have brain damage, mental retardation, hearing and vision problems.

Although the Bangladesh Standard and Testing Institute (BSTI) has banned 17 skin-lightening creams with high mercury levels and established a standard limiting mercury content to <1ppm(Guideline for Cosmetic Products in Bangladesh, BDS 1382, 2019), the study found that all these banned creams are still available in the market and online. The market lacks proper monitoring, allowing these creams to be illegally imported from various countries. Some are even produced locally without following proper production standards. These creams remain popular among women who desire fairer skin, leading to the production and sale of these products by dishonest businessmen.

1. Introduction

Beauty is the word, the aspiration of the people of the world and they are hankering after it; Bangladesh people are not exceptional. Naturally all the people, especially the woman will be looking for this. Therefore, cosmetics are their choice for the nourishment of their skin, especially their faces. The so-called fairness creams of different brands, which are in plenty/largely and easily available in every corner of the markets of Bangladesh are not good for health. Lighter/fair skin being an important element in the matchmaking culture, many young people, especially women, use skin-lightening cremes containing mercury and also apply them to children in the hope of raising their chances for career and marriage.

Beauty is often perceived and portrayed in various ways in different cultures and societies. Sadly, many people associate fairness or lighter skin tones with beauty, and this perception can lead to the use of skin-lightening creams and other products.

However, it is important to recognize that beauty comes in diverse forms, and it is not limited to any specific skin color or appearance. Beauty should be celebrated in its various manifestations, including different skin tones, features, and characteristics.

Using skin-lightening creams to achieve a fairer complexion can have potential risks and side effects. Many of these products contain ingredients like mercury, hydroquinone, and steroids that can be harmful to the skin and overall health. Prolonged use of such products can lead to skin damage, uneven pigmentation, skin thinning, and other adverse effects.

Promoting self-acceptance, embracing diversity, and educating individuals about the potential risks associated with skin-lightening products are essential steps toward redefining beauty standards. Encouraging positive body image and self-esteem can help individuals appreciate their unique features and foster a more inclusive and accepting society.

The process of utilizing chemicals to lighten or provide an even skin tone by lowering the melanin concentration in the skin is known as skin whitening, also known as skin lightening and skin bleaching. While some compounds are hazardous or have

dubious safety records, others have been demonstrated to be helpful in skin whitening. This includes mercury compounds, which can have negative effects on the kidneys and the nervous system[1].

The use of skin-lightening creams and soaps is prevalent around the globe. Skin whitening is a type of cosmetic treatment in which chemical materials are used to lighten the skin tone by lowering melanin levels. Melanin, a type of pigment produced by melanocyte cells, is responsible for a person's skin color as well as it protects the skin from UV rays. Skin-lightening formulations can cause a variety of direct and indirect skin disorders, as well as other serious health effects, depending on the active ingredients. Mercury is used in cosmetics as a skin-lightening agent and preservative. Cosmetics with mercury are often marketed as skin-lightening creams and anti-aging treatments that remove age spots, freckles, blemishes and wrinkles. Adolescents sometimes use these products as acne treatments.

Mercury is frequently used as an active ingredient in skin-lightening products, and the Minamata Convention on Mercury is the only heavy metal that has been addressed on a global level. Mercury is highly toxic and is a hazard to users of skin-lightening products as well as to their families because the home environment can also become contaminated. Mercury in cosmetics is released to the environment as products are rinsed off, and mercury can also evaporate from the products and contaminate indoor air. In addition, it can be transformed by bacteria into organic forms that accumulate in living organisms and bio-magnify in ecosystem food webs. Because of this, and the high toxicity of mercury, the international community in 2010 initiated negotiations on a global mercury treaty to ban and regulate the use of mercury. The negotiations were finalized in 2013 with the adoption of the Minamata Convention on Mercury, which entered into force on 16 August 2017. Article 4 of the Minamata Convention addresses “mercury-added products.” The manufacture, import and export of products listed in Annex A of the Minamata Convention,

[1] https://en.wikipedia.org/wiki/Skin_whitening

including cosmetics with more than 1 part per million (1ppm) mercury, will be banned after 2020.

According to the World Health Organization (WHO), kidney damage is the most significant health effect of inorganic mercury found in skin-lightening products, followed by skin rashes, skin discoloration, and scarring. Anxiety, depression, or psychosis, as well as peripheral neuropathy, are possible side effects.

The implementation of mercury abatement measures and the subsequent reduction in mercury pollution would bring about significant health and environmental benefits in the long run. These measures can help prevent or minimize the adverse effects of mercury exposure on human health, including kidney damage, skin disorders, and neurological symptoms. Furthermore, it can contribute to the achievement of the Sustainable Development Goals (SDGs) that are mentioned, including Goal 3 (Good Health and Well-being), Goal 4 (Quality Education), Goal 5 (Gender Equality), Goal 6 (Clean Water and Sanitation), Goal 7 (Affordable and Clean Energy), Goal 10 (Reduced Inequalities), Goal 11 (Sustainable Cities and Communities), Goal 12 (Responsible Consumption and Production), Goal 14 (Life Below Water), and Goal 15 (Life on Land).

On 18 April 2023, Bangladesh deposited its instrument of ratification successfully, becoming as a result the 141st party to the Minamata Convention on Mercury. Ratification of the Convention will allow Bangladesh to have access to financial technical support provided by the Mechanisms of the Convention to implement mercury abatement measures[2]. As a consequence of ratification, the Government will include mercury priorities in the national planning process and allocate the budget accordingly which will bring about health and environmental benefits in the long run, as well as contribute to the Sustainable Development Goals (SDGs); specifically, 3, 4, 5, 6, 7, 10, 11, 12, 14 and 15[3].

In 2017 and 2018, the Zero Mercury Working Group (ZMWG) conducted an international survey collecting and then analyzing 338 skin-lightening products from 22 countries. 34 creams (10% of the samples) had mercury concentrations ranging from 93 to 16,353 parts per million (ppm). In some countries the percentage of sampled creams exceeding the 1 ppm limit for mercury was especially high, peaking at 63% in Thailand. Follow-up investigations in 2018 showed that several creams, including some previously identified with especially high mercury content, were still available

[2] https://mercuryconvention.org/en/news/bangladesh-becomes-141st-party-minamata-convention
[3] https://mercuryconvention.org/en/documents/minamata-convention-initial-assessments-bangladesh

from internet sales platforms, despite already being targeted in national alert or detention lists. In addition, in 2019, ZMWG compiled a listing of additional products already identified by governments as high mercury and also targeted those brands for testing. High mercury and often illegal skin-lightening creams were still widely available and offered for sale by multiple internet marketers around the globe [4]. In 2022, ESDO participated in the sampling of ZMWG and collected 13 (2 night and day creams) creams from different online platforms. Among them, 2 products are already banned in Bangladesh, but still they are available on online platforms. From the market research, it was found out that maximum banned creams are available in shops and they are openly selling these products. The objective of this report is to determine the concentration of toxic mercury in Bangladeshi skin lightening creams, as well as to explore the health risks associated with mercury contamination of skin lightening creams.

2. Objectives of the Study

- To find out the country's situation of availability of mercury-added skin-lightening cream
- To assess the mercury content of skin-lightening creams
- To know more about the health and environmental consequences of using skin-lightening creams containing mercury.
- To create a sense of awareness among the people on the adverse effects of these mercury-added skin-lightening creams by publishing the results.

3. Methods and Methodology

3.1. Sample Collection

To study the mercury concentration in skin creams, skin-lightening creams were purchased from various local physical stores and online shops in Bangladesh. The study is carried out from 2017 to till date. In 2017, as well as a follow-up study is conducted in 2018, 2019, 2021 and 2022. In 2017, 2018, 2019, 2021 and 2022 mercury concentrations were determined in 5, 10, 15, 6 and 15 skin cream samples, respectively. Samles were purchased in 2017 and 2018 from Chak Bazar, Town Hall Market, New Market, Mohammadpur Krishi Market, and other locations. A large number of creams were collected in 2019 from both online and offline sources. The samples were purchased via Daraz, Kablewala, and several social media outlets. In the years 2022-

[4] https://eeb.org/library/mercury-added-skin-lightening-creams-available-inexpensive-and-toxic https://eeb.org/library/dangerous-mercury-laden-and-often-illegal-skin-lightening-products-readily-available-for-online-purchase//

2023, the study team solely obtained samples from the internet market. After the assessment of the mercury concentration, the team sent a public action letter (Annex-III) to the online marketplaces Daraz and Kablewala. They eliminated several mercury-added skin-lightening products from their platforms after collaborating with them from the very beginning. However, certain creams remained on their sites.

Table 1: List of skin-lightening creams purchased in 2017, 2018, 2019, 2021 and 2022- 2023

2017	2018	2019	2021	2022-2023
New Face Whitening Cream	Goree Beauty Cream with Lycopene	Chandni Whitening Cream	Collagen Deep Cleansing whitening cream	Collagen Plus Vit E (Day Cream) Beauty & Anti Aging Cream
Noor Herbal Beauty Cream	Due Beauty Cream	Due Whitening Beauty Cream	Whitening Intense Anti-aging Care Green Tea	Arché Pearl Beauty Cream
Lata Herbal Skin Bright Cream	Huayenong - Bird's Nest Cosmetology	Face Fresh	Papaya Whitening and Freckle-eliminating Cream	Green Tea seven-day - Whitening Anti-Freckle Cream
Chandni Whitening Cream	Golden Pearl Beauty Cream	Faiza Beauty Cream	4K Plus Whitening Night Cream 5X	Jiaoli Whitening Night Cream
White Pearl Plus Cleanser Cream	Faiza Beauty Cream	Golden Pearl Beauty Cream	POND'S vanishing cream	Lata Herbal Skin Bright Cream
-	Egg White and Cherry 7 Days Specific Eliminating Freckle Whitening Cream	Goree Day and Night Whitening Cream	Fem Creme Bleach Gold	Pop Popular Facial Cream
-	Green Tea Whitening Anti-freckle Cream	Goree Whitening Beauty Anti-ageing spots pimples	Garnier Skin Naturals Bright Complete Night	Kim Pure Natural Pearl Collagen Cream

		removing Cream		
-	Temulawak New Beauty White Cream (Night Cream)	Jiaoli Miraculous Cream set	Party Queen Face cream	Papaya Whitening & Freckle-Eliminating package
-	Hoor! Whitening Cream	Kim Whitening Ginseng and Pearl Cream	Aloe vera and Goats milk Whitening cream	
-	Jiaulihuic Hunsu Jioli Miraculous Day and Night Cream	Kim Whitening Pearl and Snow Lotus Cream	Joy Revivify White Expert Brightening Serum Cream	Sandal Whitening Beauty Cream
-	-	Parley Herbal Whitening Cream	Aitubri Spot and Fariness Cream	Golden Pearl Beauty Cream
-	-	POP Popular Facial Cream Whitening Acne Pimple	Lata Herbal Skin Bright Cream	Stillman's Skin Bleach Cream
-	-	Sandal Whitening Beauty Cream		Egg White and Cherry 7 Days Specific Eliminating Freckle Whitening Cream
-	-	Stillman's Skin Bleach Cream		Due Beauty Cream
-	-	Temulawak Beauty Whitening Cream		-

3.2. Sample Analysis

The sample analyzed in this research was based on a literature review as well as relevant work and experiences of civil society organizations. Jerome J405 and X-Ray Fluorescence (XRF) were used for screening the collected samples for mercury content. Samples with more than 1ppm of mercury were further analyzed by accredited laboratories, for more accurate mercury readings, according to standardized test methods. In addition, the skin-lightening samples were digested with nitric acid before chemical analysis. The determination of mercury was assessed with atomic absorption spectrometry.

The direct combustion/trapping atomic absorption (AA) method on a Milestone DMA 80 was used for the analysis of total mercury in the Biodiversity Research Institute Laboratory (BRI).

Cold Vapor Atomic Absorption Spectroscopy and Hydride Atomic Absorption Spectroscopy, two analytical methods were used for the determination of enthalpy and quality assurance and control systems (QACS) of cream samples. The laboratories were accredited in the USA, Cote D Ivoire and Greece, respectively.

Image: Jerome J405 and X-Ray Fluorescence (XRF) Analyze

4. Results and Discussion

4.1. Mercury Concentration Comparison (2017- 2023)

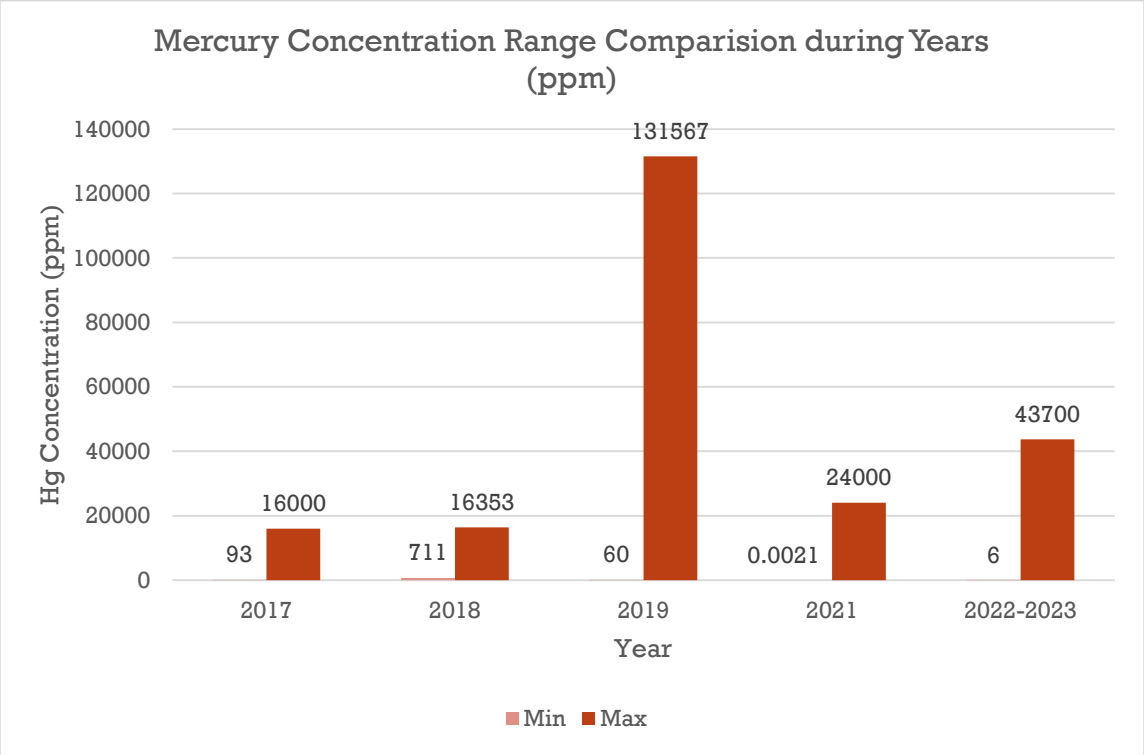

Figure 1: Mercury Concentration range in SLP (2017 to 2023)

The data set provides a comprehensive picture of the concentration of mercury over the span of several years. In 2017, mercury concentrations ranged from 93 ppm as the lowest recorded level to 16,000 ppm as the highest, indicating a substantial variation. The following year, in 2018, concentrations showed a range between 711 ppm and 16,535 ppm, highlighting fluctuations across different areas or periods. The year 2019 saw the widest variation, with concentrations spanning from 60 ppm to a surprisingly high 131,567 ppm, underscoring the need for careful environmental management. By 2021, the range was from a mere 0.0021 ppm to a significant 24,000 ppm, which may reflect changes in monitoring or regulatory efforts. The most recent data, covering the years 2022-2023, demonstrated a range of 6 ppm to 43,700 ppm, emphasizing the importance of sustained monitoring and action to address potential environmental and health risks associated with mercury.

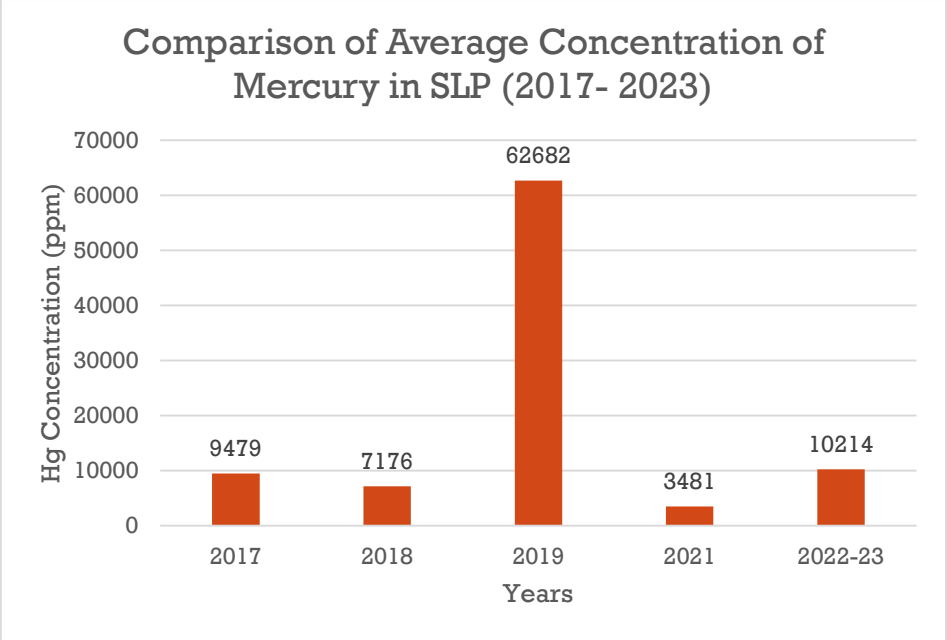

Figure 2: Average Mercury Concentration in SLP (2017 to 2023)

The average concentration of mercury in skin lightening creams displayed notable variations over the years, reflecting potential concerns about product safety and regulation. In 2017, the average concentration was measured at 9,479 ppm, and in 2018, it decreased to 7,176 ppm. However, 2019 stood out with a remarkably high average concentration of 62,682 ppm, which raises significant concerns about consumer health and the need for stricter regulations. The subsequent drop in 2021 to 3,481 ppm might indicate initial efforts to address the issue, while the increase in 2022-2023 to 10,214 ppm suggests ongoing challenges in maintaining consistent product safety.

4.2 Mercury contents in the sample skin creams of 2017

Mercury concentrations in skin-lightening creams ranged from 6 to 35 ug/m^3 in air, as determined by Jerome screening. Lata Herbal Skin Bright Cream 35 ug/m^3 and Chandni Whitening Cream 30 ug/m^3 had the highest mercury concentrations, respectively. XRF-Hg testing, on the other hand, revealed that New Face Whitening Cream had the highest mercury concentration, ranging from 8,943 to 25,519 ppm. Furthermore, enthalpy analytical cold vapor atomic absorption spectroscopy revealed

(figure 1) that skin cream samples contained toxic inorganic mercury levels far exceeding the WHO's recommended limit of 1 ppm.

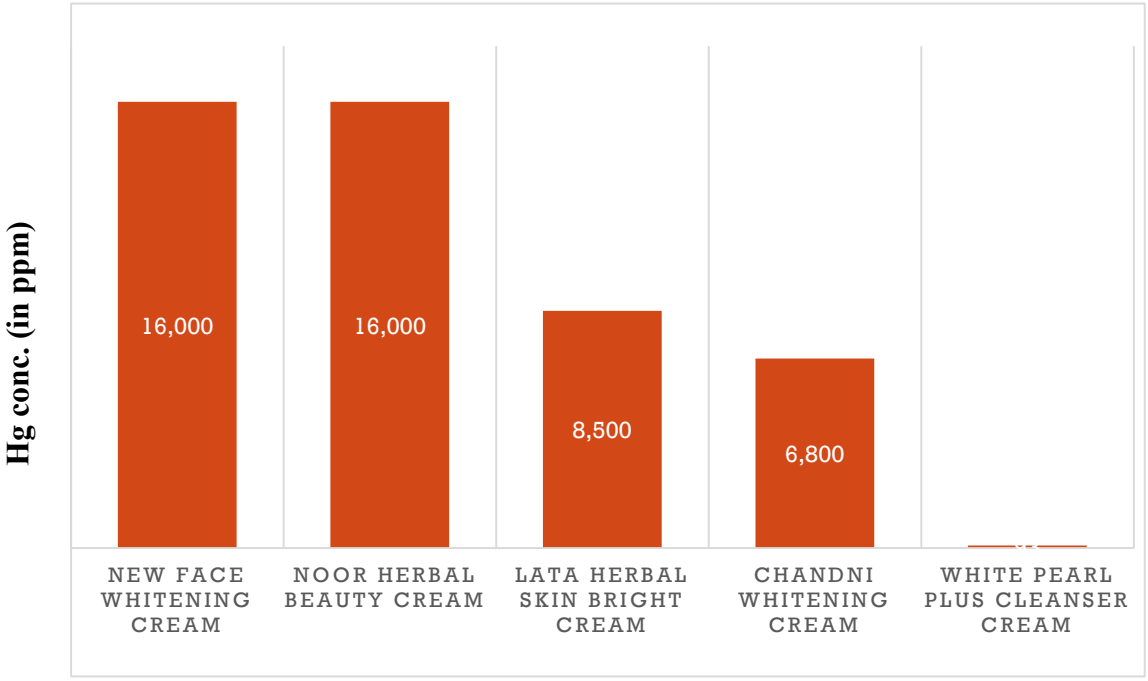

Figure 3: Skin creams containing mercury concentration according to Lab analysis (in 2017)

4.3 Mercury contents in the sample skin creams of 2018

All ten skin-lightening cream samples had mercury concentrations exceeding 1ppm, ranging from 10,567±107 to 732±9 ppm, with the highest concentrations of mercury being found in Golden Pearl Beauty Cream (10,567±107) and Goree Beauty Cream with Lycopene (9,356±62). The results of the cold vapor atomic absorption spectroscopy study are shown in the following figure (2).

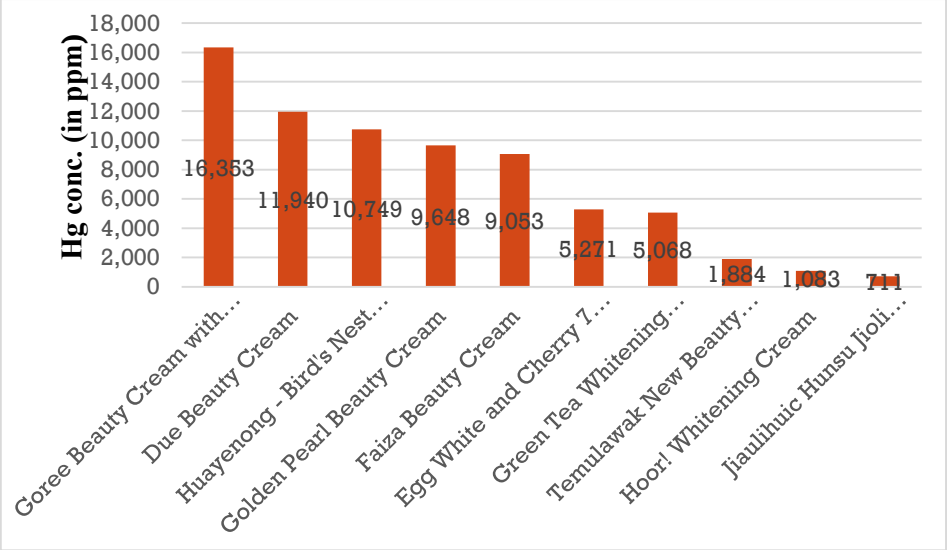

Figure 4: Skin creams containing mercury concentration according to Lab analysis (in 2018)

4.4 Follow-up study in 2019

According to a follow-up study in 2019, mercury was still present as an active ingredient in the formulation of skin-lightening cream samples. The study's outcome is depicted in the figure (3) below.

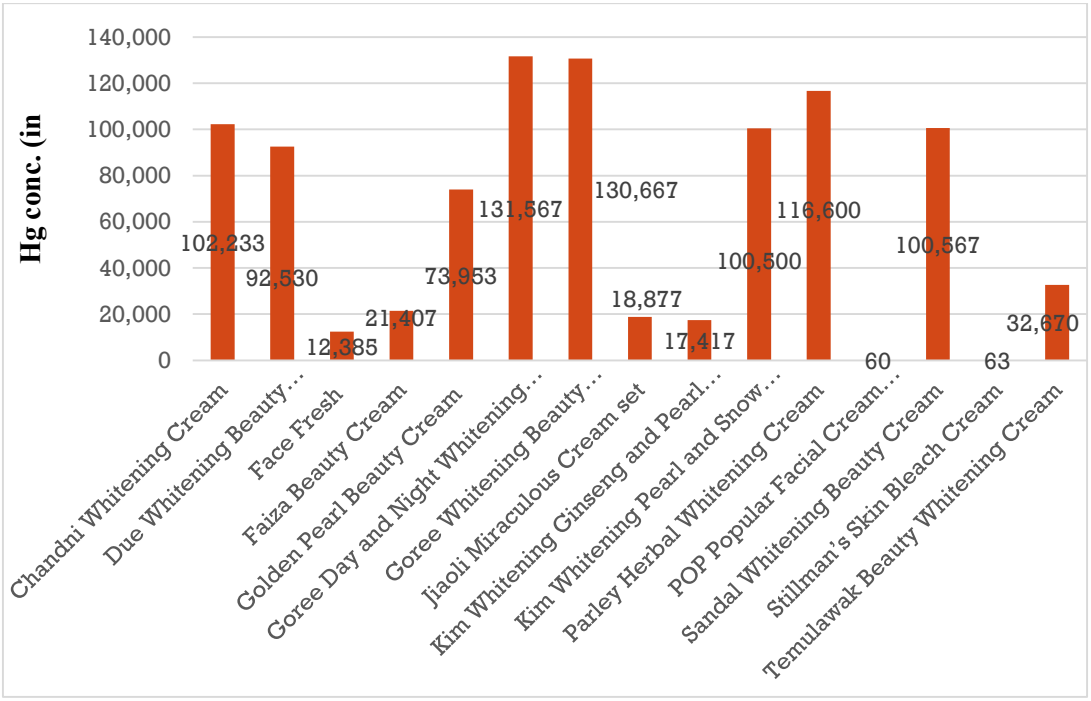

Figure 5: Skin creams containing mercury concentration according to Lab analysis (in 2019)

Based on the results, it was found that Goree, Chadni, Parley Herbal, New Face Whitening Cream, Noor Herbal Beauty Cream were the creams that contain significantly higher level of mercury concentrations.

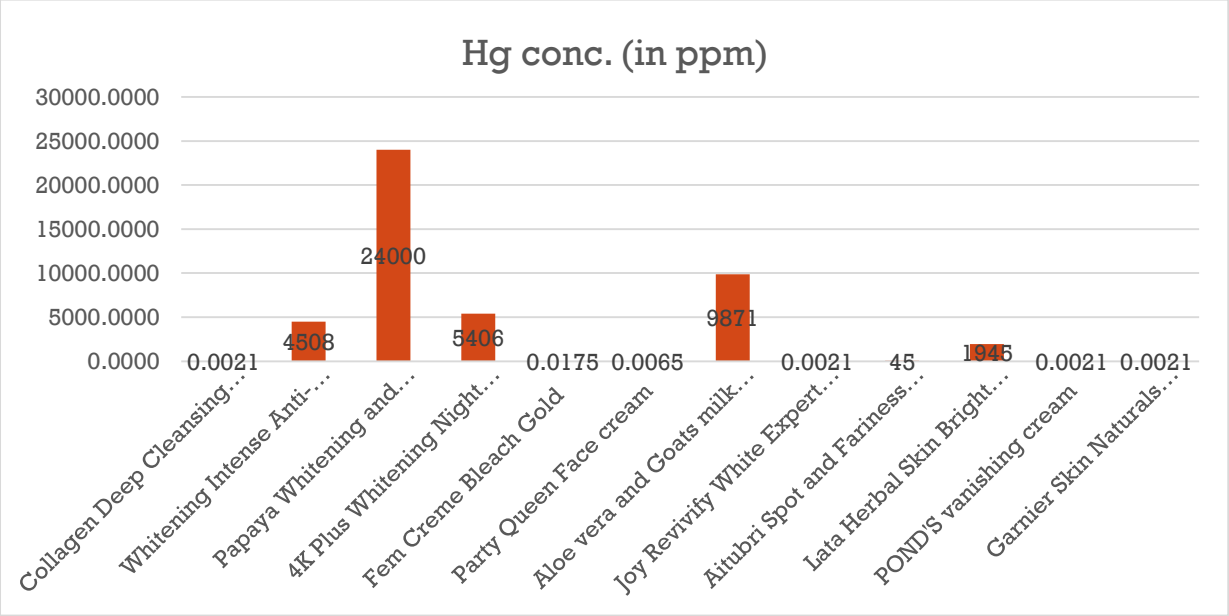

Figure 6: Skin creams containing mercury concentration according to XRF reading (in 2021)

4.5 Follow-up study in 2021

In 2021, ESDO conducted a study in which 14 skin whitening creams were purchased from various online platforms, including daraz and kablewala. Subsequent laboratory analysis revealed the presence of mercury (Hg) in some of the samples. Out of the 12 creams tested, 6 exceeded the permissible level of mercury.

The Papaya Whitening and Freckle-eliminating Cream exhibited the highest concentration of mercury among the tested creams. Additionally, the Collagen Deep Cleansing Whitening Cream, Fem Creme Bleach Gold, Party Queen Face Cream, Joy Revivify White Expert Brightening Serum Cream, POND'S Vanishing Cream, and Garnier Skin Naturals Bright Complete Night Cream were found to contain mercury below 1ppm.

It is important to note that the presence of mercury in these products raises concerns regarding their safety and potential health risks. ESDO's findings emphasize the need for increased awareness and regulation to ensure the availability of safe and non-toxic cosmetics in the market.

4.6 Follow-up study in 2022

ESDO conducted a study in 2022 as well, where 15 skin whitening creams were purchased from several internet platforms, including daraz and kablewala. Following laboratory analysis, it was discovered that all the samples contained mercury (Hg) at a high level. Due whitening creams have the maximum mercury level i.e., 43700 ppm. On the other hand, Egg White & Cherry whitening creams have 6.4 ppm mercury content.

As a part of a follow-up study for the last five (05) years, it is seen that all the mercury-containing creams are available in all markets of Bangladesh even in online platforms. Although BSTI sets a limit for mercury, all the creams are in a high level of mercury. The creams are popular here for skin whitening.

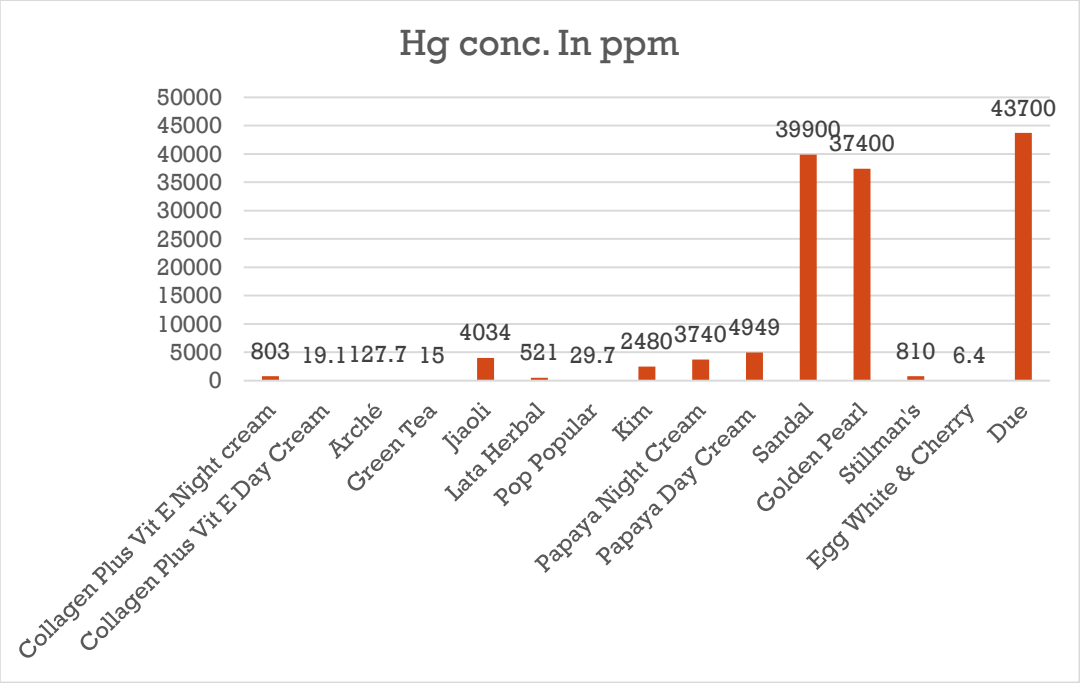

Figure 7: Skin creams containing mercury concentration according to XRF reading (in 2022)

4.7 Sources of Skin-lightning Products Containing Mercury

According to the study of Mercury Added Skin Lightening Creams, 2019, the preponderance of the creams with excessive mercury appear to be manufactured in Pakistan and Thailand, followed by China. Based on the information from the packaging, most of the high-mercury products were manufactured in Asia, especially in Pakistan (62%), Thailand (19%) and China (12%). China is a major producer of counterfeit products, including cosmetics, and that these products sometimes contain

harmful chemicals.[5] Roughly 3% of the high-mercury products had no information about the country of origin on the packaging, and 32% had no batch number. Such missing information could also indicate that a product is counterfeit, as suggested by Cosmetics Europe.[6] Again according to Minamata Initial Assessment (MIA) 2019, Mercury is released in Bangladesh from a number of sources. About 4% of mercury is present in products like thermometers, paint, cosmetics, lighting, and batteries (1,258 kg Hg/y)[7].

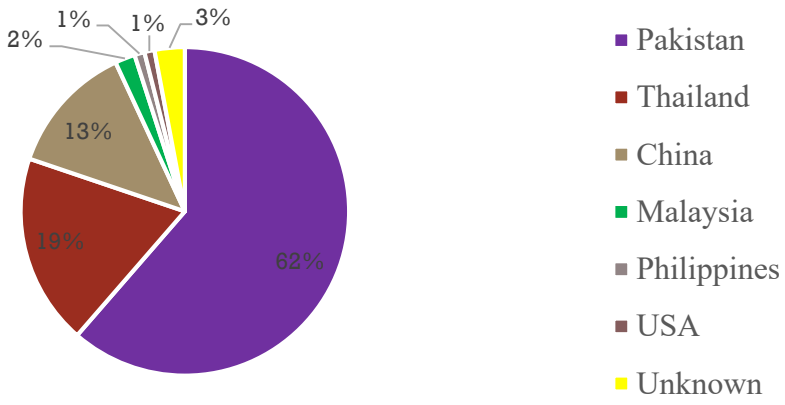

Figure 8: Countries manufacturing high-mercury (>1ppm) skin-lightening creams. [8]

4.8 Online and Offline Market Assessment

The promotion and popularity of skin-lightening creams, especially through social media marketing and influencer endorsements, raise several ethical, social, and health-related concerns. The promotion of skin-lightening products perpetuates harmful beauty standards that suggest lighter skin is more desirable. This can reinforce colorism and contribute to low self-esteem and psychological distress among individuals who feel pressure to conform to these standards. Influencers and companies promoting these products need to consider the ethical implications of endorsing products that can potentially harm their followers' health and well-being.

[5] https://www.sciencedirect.com/science/article/abs/pii/S0190962200759159
[6] https://www.unep.org/resources/report/global-mercury-assessment-2013-sources-emissions-releases-and-environmental
[7] https://mercuryconvention.org/sites/default/files/documents/minamata_initial_assessment/Bangladesh-MIA-2019.pdf
[8] https://eeb.org/library/mercury-added-skin-lightening-creams-available-inexpensive-and-toxic/

Their influence can lead impressionable audiences, especially teenagers, to believe that using these products is necessary for social acceptance or success. Although BSTI has banned several skin-lightening creams containing certain harmful ingredients, these products can still be found in illegal markets, online platforms, offline or physical market and through informal channels, making enforcement challenging. Consumers need to be well-informed about the potential risks associated with these products. They should be encouraged to critically evaluate the claims made by influencers and companies and to prioritize their health and well-being over societal pressures.

4.9 Mercury as an active ingredient in skin-lightening Creams and Health Concerns

Mercury has the ability to inactivate a key enzyme responsible for melanin production, hence its skin-lightening effect.

Table 2: List of some inorganic mercury compounds that have been used in skin-lightening products (WHO 2011)

Mercury compound name	Chemical formula
Mercury (I) chloride, also called calomel, or mercurous chloride	Hg_2Cl_2
Mercury (II) chloride, also called mercuric chloride	$HgCl_2$
Mercury (II) iodide, also called red mercury, or mercury diiodide, or mercuric iodide	HgI_2
Mercury (I) oxide, also called mercurous oxide	Hg_2O
Mercury (II) amidochloride, also called mercuric amidochloride, or ammoniated mercury	$HgNH_2Cl$

The application of mercury salts to the skin may in the short-term cause sensitization in up to 13% of users. Acute contact dermatitis, with symptoms like mild swelling, blistering, scaling and irritation may follow.[9] Long-term use frequently leads to a brown, gray or blue-black discoloration of the skin. Lethal doses of inorganic mercury can be absorbed through the skin, and up to 10% of inorganic mercury ingested may be absorbed via the digestive system.

Accidental ingestion of skin-lightening products applied around the mouth, hand-to-mouth transfer of inorganic mercury compounds from the hands, or through food prepared by the user of skin-lightening products, cannot be excluded. In the latter case, the whole family of the user of skin-lightening products can be posed at risk. Children might touch cloths or towels that are contaminated with a mercury-containing cosmetic, or they might simply touch a person's face or kiss their cheek, by that they can get exposed to mercury directly.

Furthermore, though largely unexplored, potential exposure route for mercury from skin-lightening products is the inhalation of elemental mercury formed when mercury salts are chemically reduced. For example, UV-light has shown to catalyze reduction of mercury in mercuric chloride to elemental mercury. It is not known whether this could happen in the skin when the skin-lightening product is exposed to sunlight, or on clothing or other surfaces contaminated by inorganic mercury. High temperatures also enhance the reduction of inorganic to elemental mercury, and even take place at room temperature.[10]

Particularly alarming is the evidence that use of inorganic mercury in skin-lighteners during pregnancy may place the unborn fetus at risk for neurological, kidney and dermatological disorders, cataracts and anemia. It is not unlikely that a breastfeeding child could ingest inorganic mercury applied to the skin of the breasts while breastfeeding. It should also be noted that mercury can be transferred to the child through breast milk. A research revealed that 69% of the pregnant women in their study used skin-lighteners while pregnancy[11]. In a Somali community in the USA, all interviewed women were found to be applied skin-lightening creams to the body twice a day during pregnancy and when breastfeeding.[12]

[9] https://www.sciencedirect.com/science/article/abs/pii/S0190962200759159
[10] https://www.mdpi.com/1660-4601/12/9/10943
[11] https://academic.oup.com/trstmh/article-abstract/101/2/183/1849902
[12]https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=527e8489c900e115b0373c372bf8c758328d47c7

After absorption into the body, inorganic mercury is potentially distributed to all the organs. The liver and kidneys readily accumulate inorganic mercury.[13] Kidney damage is a sign of systemic mercury poisoning, with symptoms that range from mild to severe, including eventual death from acute kidney failure. Hyper salivation, a metallic taste in the mouth, sores and swelling of the gums, abdominal pain, and nausea are disorders that may also be signs of systemic inorganic mercury poisoning, or acute poisoning from accidental ingestion.[14] Because of poor solubility in fat, only a small percentage of inorganic mercury crosses the blood-brain barriery into the central nervous system (CNS), but prolonged exposure combined with slow elimination of mercury by the body will eventually result in accumulation in the CNS, and neurotoxicity. A number of neuro-psychological manifestations, such as tremors, depression, anxiety and paranoid delusions may develop over time, and are sometimes irreversible, even if the mercury exposure terminates.

Symptoms of mercury poisoning are slow and insidious and may be mistaken to have other causes, not least since patients may be reluctant to admit their use of skin-lightening products, because of the stigma surrounding this complexion-altering behavior. The stigma is also the reason why existing estimates of the prevalence of skin-lightening in various parts of the world have most likely been underestimated.

Onset and severity of health effects are associated with different exposure factors, such as the mercury concentration in the product, product compounds with varying solubility, skin characteristics, time length of exposures and other factors, all affecting mercury distribution in the body. Thus, mercury poisoning symptoms do not follow a standard pattern, posing an additional challenge for appropriate diagnosis. The renal system may be critically affected following inorganic mercury exposure. Several cases have been reported of decreased renal function after prolonged use (between 2 months and 18 years) of products containing ammoniated mercury. Nephrotic syndrome has also been reported in users averaging 13 months of use, with a certain degree of remission after use is discontinued.

Mercury also has serious effects in the environment. Mercury is a unique metal in the sense that it can be both liquid and gaseous at room temperature, which makes it prone to long-range atmospheric transport and thus a pollutant of global distribution.

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[13]https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Risher%2C+J.%2C+World+Health+Organization.%2C+United+Nations+Environment+Programme.%2C+International+Labour+Organisation.%2C+Inter-Organization+Programme+for+the+Sound+Management+of+Chemicals.%2C+%26+International+Program+on+Chemical+Safety.+%282003%29.+Elemental+mercury+and+inorganic+mercury+compounds%E2%80%AF%3A+human+health+aspects.+World+Health+Organization.&btnG=

[14] https://www.sciencedirect.com/science/article/abs/pii/S0190962200759159

Furthermore, it can be transformed by bacteria into organic forms that accumulate in the fatty tissue of living organisms and bio-magnify in food webs in the ecosystems. Although cosmetics are not considered a key source of mercury to the environment, their production and use contribute to the overall environmental burden. For example, mercury from these products may eventually end up in wastewater when users of these creams wash their skin, or in municipal waste when creams are discarded.

4.9.1. Health Concerns

SLPs containing mercury compounds have been shown to present significant health risks,[15] especially to pregnant women and those who may be exposed indirectly, including nursing babies and young children.[16] Mercury in SLPs can readily enter the body via absorption through the skin, inhalation, or orally[17]. Dermal absorption occurs with each application; inhalation occurs when mercury vapor off-gases and ingestion occurs post-application as a result of normal hand-to-mouth behavior, such as eating or preparing food.

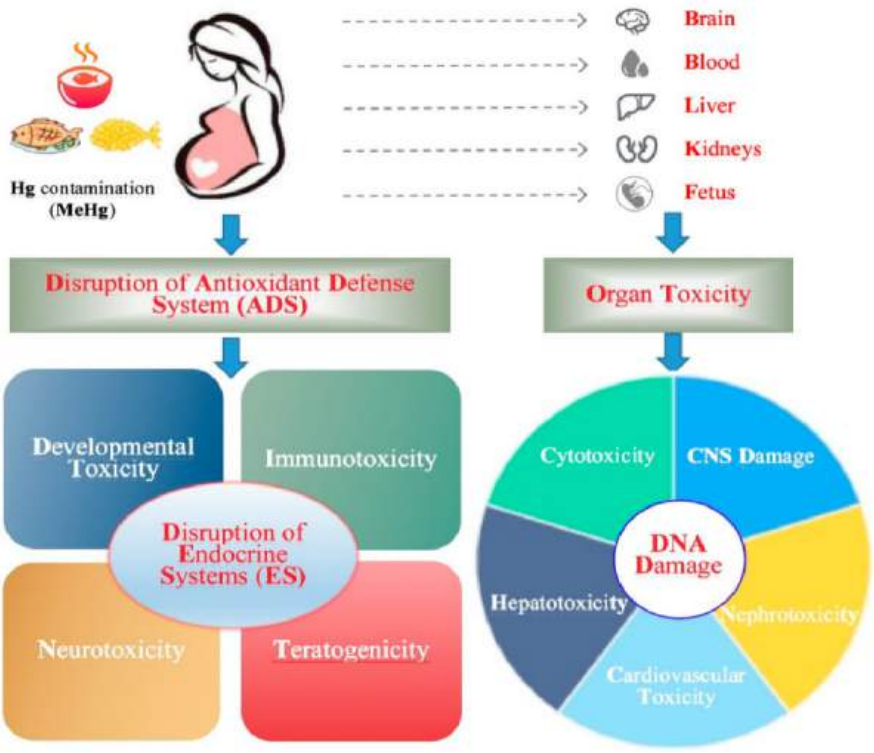

Image: Health Effects of Mercury in Women

[15] Goeckermann WH (1922). Peculiar discoloration of skin. Journal of the American Medical Association 79, 605-607.; Aberer W (1991). Topical mercury should be banned – dangerously outmoded, but still popular. Journal of the American Academy of Dermatology 24, 1550-151; Boyd AS, Seger D, Vannucci S, Langley M, Abraham JL & King LE (2000). Mercury exposure and cutaneous disease. Journal of the American Academy of Dermatology 43, 81-90.

[16] https://www.fda.gov/consumers/consumer-updates/mercury-poisoning-linked-skin-products

[17] https://www.fda.gov/cosmetics/guidanceregulation/lawsregulations/ ucm127406.htm

Regular use of mercury-added SLPs reduce the skin's resistance to bacterial and fungal infections and can lead to rashes, skin discoloration and blotching. Chronic exposure to mercury at very low levels can cause neurological and kidney impairment. Long-term exposure may also damage the eyes, lungs, kidneys, digestive, immune and nervous systems. An adult's use of SLPs containing mercury can also expose other family members, such as through close contact,[18] and may even require decontamination of the house.[19]

Symptoms associated with SLP exposure are not unique to mercury, so it may be difficult to diagnose the source without identifying SLPs as a possible cause, and then testing suspect products.[20] Persons who apply these SLPs have observed elevated mercury levels in their urine. Once the exposure source was identified and SLP use stopped, kidney functions gradually returned to normal. Unfortunately, users are often not likely to be seen by a doctor before a severe disease develops.[21]

5. Policy and Regulatory Framework Analysis

Bangladesh is now under an international obligation not to allow the mining of mercury in its territory and disallow the export of mercury, except for the circumstances permitted in the Convention. Concerning Article 4 (Mercury-added products), Bangladesh needs to align the import policy order with the Hazardous Waste and Ship-breaking Rules, 2011 to ban the import of prohibited items under the Basel Convention and Annex A part 1 products. This will prevent the entities from opening a Letter of Credit (LC) to import such items and NBR Customs Department to monitor and regulate imports. This also extends to the manufacturing process of products that include mercury or mercury compounds. Further, Article 8(3) of the Convention obliges Bangladesh to take measures to control emissions and if required, prepare a national plan setting out the measures to be taken to control emissions and its expected targets, goals, and outcomes. To ensure effective implementation of and compliance with the Minamata Convention through coordinated actions from institutions and stakeholders in the country, it is important to identify the relevant Government ministries, agencies, and institutions as well as non-government institutions, private sector stakeholders, and their respective roles and responsibilities.

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[18] Rakete S, Asenbauer E, Böhm S, Leiz S, Peters J, Nowak D & Böse-O'Reilly S (2021). Mercury poisoning of a 4-year-old child by indirect contact to a mercury-containing facial cream: A case report. SAGE Open Medical Case Reports 9, 1-5. https://doi.org/10.1177/2050313X211025227; Bender TJ (2012). Mercury exposure among household users and nonusers of skin-lightening creams produced in Mexico – California and Virginia 2010. Morbidity and Mortality Weekly Report 61, 33-38.

[19] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4586653/

[20] https://repository.usfca.edu/capstone/1246

[21] https://www.publichealth.com.ng/list-of-mercury-containing-soaps-and-creams/

Bangladesh has a wide range of laws and regulations related to environmental protection and natural resource conservation. Under the Bangladesh Environmental Conservation Act (ECA), 1995 Director General (DG) of the Department of Environment (DoE) has the responsibility of identifying different types and causes of environmental degradation and pollution; instigating investigation and research regarding environmental conservation, development, and pollution; and power to close down the activities considered harmful to human life and environment.

The Environment Convention Rules (ECR) 2023, by repealing the Environmental Conservation Rules 1997 is the first set of rules, promulgated under the ECA 1995 which provide the DG a discretionary authority to grant 'Environmental Clearance' to an applicant. Any proponent planning to set up or operate an industrial project is required to obtain an "Environmental Clearance Certificate" from the DoE. In the case of existing industries, the Environmental Management Plan (EMP) should include feasible mitigation measures to control mercury emissions to the air and releases to land and water. The ECR 1997 also sets standards for emissions of mercury for industrial projects. Compliance with these standards is critical for renewing an environmental clearance certificate.

Hazardous Waste and Ship-breaking Waste Management Rules, 2011 identifies certain mercury compounds as 'hazardous chemicals' (Mercuric chloride, Mercuric Oxide, Mercury Acetate, Mercury fulminate, Mercury methyl chloride) under Schedule-4. Article 12 directs the industries to maintain a hazardous material safety data sheet and if hazardous materials are imported, the industry is directed the maintain records of its amount according to schedule 9 of the Rules under Article 14(7).

The Bangladesh Standards and Testing Institution Ordinance, 1985 was promulgated for the adoption of standards related to materials, commodities, and products in the market and provisions to secure their compliance. BSTI is entrusted with the responsibility of formulation of national Standards for industrial, food, and chemical products keeping in view the regional and international standards. The operation of BSTI has significant implications for mercury management as it sets standards of allowable mercury content (as well as testing protocols of mercury) in different mercury-added products in the market.

The Consumer Rights Protection Act, of 2009 has provisions for the protection of the rights of the consumers and the prevention of anti-consumer rights practices. Article 29 of this act states that if any goods are proven to be particularly harmful to human health, the Government, on the recommendation of the Director General of the Directorate of Consumer Rights Protection, may issue directions for stopping the

production, import, marketing, sale, display for sale, distribution, transportation for commercial purpose or commercial use of those goods completely all over the country or in any specific area. Mercury-containing skin whitening creams can be a candidate for banning sale and manufacture under this Act.

Under the National Environment Policy 2013, the MoEFCC acts as the guide and custodian for the conservation and development of the environment and, in the pursuit of that goal, to ensure through appropriate laws and regulations that natural resources, including land, air, water, and forests, are exploited and managed in an environmentally sustainable manner. Under the Policy, the MoEFCC is empowered to manage and control the impact of chemical substances like mercury following specific laws and regulations in coordination with the relevant authorities. Thus, it can play a vital role in banning mercury-related products in Bangladesh.

The National Board of Revenue (NBR) is the apex authority for tax administration in Bangladesh. NBR is responsible for the formulation and continuous re-appraisal of tax policies and tax laws, and negotiating tax treaties with foreign governments. It is responsible for the inspection of all chemical imports, and record-keeping of volumes and quantities imported into Bangladesh. It keeps a database of all legally imported products including mercury and mercury compounds. Their database can be shared with relevant agencies to keep track of all the mercury/mercury compounds used within the country. Awareness for mercury exposure, educational, and prevention programs can be conducted under National Health Policy 2011.

The Basel Convention is an international legal instrument of regulation related to hazardous waste. The Convention applies to the transboundary movement of mercury and mercury compounds as they are defined as hazardous wastes. Since Bangladesh is a Party to the Convention, it imposes substantive obligations on Bangladesh to prevent the movement and disposal of mercury in contravention of the Convention.

6. Conclusion and Recommendations

The research from 2017 to 2022-2023 clearly demonstrates that high-mercury skin-lightening creams are widely and consistently available in both physical and online stores in Bangladesh. In the meantime, the number of internet purchases continues to rise around the world. As a result of this situation, implementation and enforcement become extremely crucial. Mercury is a global threat to health and the environment worldwide. The Government of Bangladesh has the intention of actively proceeding towards the ratification of the Minamata Convention on Mercury and has undertaken

the Minamata Initial Assessment[22]. With the Minamata Convention's provisions on cosmetics soon to enter into force, a range of measures are emerging to end mercury use in these products and to reduce the health risks of skin lighteners.

Efforts to control often illegally imported cosmetics and track down manufacturers and distributors of high mercury-containing cosmetics in Bangladesh must be scaled up as sales increasingly shift to the informal economy or illegal markets.

- As most cosmetics are imported, reinforced border controls can help reduce the entry of hazardous products into the market, while identifying the responsible importers.
- Governments at all levels should develop continuously updated listings of illegal products, as well as contribute to a global listing, posted prominently on the websites of UN agencies and Interpol, in coordination with the Minamata Convention Secretariat.
- To discourage unregulated products from entering a country, all cosmetics should be labeled consistent with national regulations, which should require an accurate and complete list of the ingredients as well as current information on the manufacturer, including the address and country of production.
- Retailers, including physical stores, e-shops and internet websites should be obliged to remove hazardous or illegal products from sale.
- Local ordinances could play an effective role in raising awareness and promoting measures that can protect consumers while galvanizing and reinforcing collaboration between local, state, county and national authorities.
- There is a clear and ongoing need for more effective public outreach and communication concerning the risks of toxic cosmetics and consumer rights.
- Encouraging the acceptance of one's natural skin tone and promoting self-confidence can help counter the narrative that lighter skin is more attractive. Promoting diversity and celebrating all skin colors can contribute to a healthier and more inclusive society.
- Social media platforms should play a role in monitoring and regulating the promotion of harmful products.
- Educational campaigns, workshops, and initiatives can help raise awareness about the risks associated with skin-lightening products. Teaching individuals to appreciate their natural appearance and providing them with accurate information can help shift societal attitudes.

[22] https://mercuryconvention.org/sites/default/files/documents/minamata_initial_assessment/Bangladesh-MIA-2019.pdf

MERCURY'S POISONED GLOW

COMPARISON REPORT ON MERCURY ADDED SKIN LIGHTENING CREAMS: 2023

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"BEAUTY IS A GLOW THAT RADIATES FROM THE HEART, NOT A MASK THAT COVERS THE FACE"

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