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IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

**Assessment of Basotho women's perceptions of the health risks
associated with skin-lightening in Lesotho using the Health Belief
Model**

A Mini-Dissertation submitted to the Faculty of Health Sciences, University of Cape Town,
in partial fulfilment for Master of Public Health, Environmental Health Track, 2022

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Declaration

I, Ntseke Michael Makutoane (MKTNTS006) hereby declare that the work on which this dissertation is based on is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being or is to be submitted for another degree in this University of Cape Town (UCT) or any other university.

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Abstract

The practice of skin lightening has existed for centuries and is still prevalent today despite globally coordinated legal efforts to ban harmful skin-lightening agents in cosmetic items. Exposure to toxic compounds such as mercury, hydroquinone, and corticosteroids commonly found in skin-lightening products (SLPs) is associated with several adverse health risks such as adrenal disorders, hypertension, neurological problems, skin cancers, and skin atrophy. Despite the documented health risks, the practice of using highly hazardous products for skin-lightening is a global public health concern that is receiving little attention. These products are commonly and freely displayed for sale on the streets and are available over the counter in many countries, including Lesotho. The SLPs were primarily intended as medical treatments for hyperpigmentation and other skin problems, but they have since gained commercial use for skin lightening. Policy interventions such as public health campaigns, research, and community-based education necessitate execution to curb skin-lightening demand and practices. Research evidence is therefore needed to inform these activities. There are currently no published studies in Lesotho highlighting why Basotho women use SLPs to inform risk reduction interventions. Hence, the need for this research.

The research protocol (part A) articulates the justification and rationale of the study and describes the methodology utilized for recruitment, data collection, and analysis. It also includes a review of the literature on the history of skin lighteners, skin-lightening practice in Sub-Saharan Africa (SSA), women's motivation for skin lightening, current interventions to prohibit skin-lightening practices, and the health risks of mercury, hydroquinone, and corticosteroids in skin-lightening products. The protocol discusses ethical considerations to ensure the confidentiality of participants. The study was approved by the University of Cape Town's Health Sciences Faculty Research Ethics Committee and the Ministry of Health Ethics Clearance Committee in Lesotho. The Lesotho COVID-19 protocols were considered during the study.

The journal-ready article (part B) presents the study findings on the Basotho women's attitudes of the use of SLPs, perceptions of the perceived benefits of skin-lightening, knowledge of skin-lightening health risks, and interventions that have been effective in preventing the usage and importation of SLPs in low- and middle-income countries. The study

found that women have varying perceptions of the health risks and motivations for using SLPs. Sociodemographic factors such as age, marital status, skin tone classification, and education level had no significant role in women's decision to practice skin-lightening. Fifty-two percent of participating women, from all skin tone categories, claimed to have used SLPs. The most common motivations for using SLPs included a desire to acquire a lighter skin complexion, to remove facial blemishes, and to beautify themselves. Lack of regulations on SLPs, skin tone discrimination, and fixing the damage from overuse of SLPs were identified as perceived barriers in discouraging women from using SLPs. Regardless of whether participating women lightened their skin, about two-thirds rejected the notion that lighter skin is more attractive and increases a woman's chances of getting married. According to the study's key informants (government officials and a senior lecturer at the National University of Lesotho), the lack of national legislation on SLPs has mainly been attributed to the Lesotho Parliament's failure to domesticate the Minamata Convention on Mercury. The results of the study are intended to serve as a benchmark for future research on skin-lightening practices in Lesotho. Limitations of the study included the results' generalizability since non-randomised convenience sampling was used. Awareness-raising campaigns and the availability of legislation regulating hazardous chemicals in SLPs are needed interventions to control the usage of SLPs.

The appendices (part C) provide the informed consent for women, informed consent for key informants, questionnaire for women, interview guide for key informants, ethical clearance from the University of Cape Town's Health Sciences Faculty Research Ethics Committee, ethical clearance from the Ministry of Health Ethics Clearance Committee in Lesotho, a codebook, and publishing instructions for the Environmental Health Journal.

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PART A: RESEARCH PROTOCOL

Assessment of Basotho women's perceptions of the health risks associated with skin-lightening in Lesotho using the Health Belief Model

1. Introduction

1.1 Background

Since classical times, skin-lightening products (SLPs) have been applied by people on their bodies irrespective of countries' initiatives to regulate skin-lightening malpractice through banning skin-lightening agents in cosmetic products (Jacobs et al., 2016; Vijaya, 2019). SLPs in various forms are applied as cosmetics all around the world, but especially in Africa, Asia, and Caribbean countries (Dadzie & Petit, 2009; Lewis et al., 2012; Mahé et al., 2007; Petit et al., 2006), by both men and women (Peltzer et al., 2016). However, women are predominately the users of SLPs (Ajose, 2005; Olumide et al., 2008). Despite the documented health risks, the practice of using highly hazardous products for skin-lightening is a global public health concern that is receiving little attention (Street et al., 2014). The majority of these SLPs, which are globally available, contain toxic ingredients that can have serious negative health effects. Also, of concern is the accessibility of SLPs which are openly displayed for sale on the streets and accessible for purchase over the counter in countries in both the global North and South (Dlova et al., 2012; Gbetoh & Amyot, 2016; Lartey et al., 2017; Mahé et al., 2003). The global sale of SLPs on internet platforms also makes it easier to buy them anywhere in the world, regardless of whether they are restricted or prohibited in your country (WHO, 2019; Zero Mercury Working Group (ZMWG), 2019a; Geller, 2020).

Skin lightening was popularized among black Africans, Jews, and racially subordinate groups for the same reason that a lighter skin colour was often connected with social capital and the privilege of having a job in South Africa (Thomas, 2009). Hazardous active substances such as hydroquinone, mercury, and highly strong steroids have been discovered in most skin-lightening creams (Gbetoh & Amyot, 2016; Mahé et al., 2003). Research has revealed the associated negative health outcomes with exposures to these chemicals, such as adrenal

disorder, hypertension, neurological disorders (e.g., increased depression and anxiety), skin cancers, and psychosis (Keane et al., 2001; Raynaud et al., 2001; Sobngwi et al., 2003). As for the potent steroids, Mahé (2014) discovered that their extended use is also associated with skin atrophy, which has a likelihood of complicating surgical wounds.

The Minamata Convention on Mercury, to which Lesotho is a party to, recognises mercury as a toxic pollutant of global public health concern. It further bans mercury levels above 1 part per million (ppm) in products such as SLPs (UNEP, 2019). Most of these SLPs are known to be manufactured and illegally imported from the Middle East, Asia, the Caribbean and the USA (WHO, 2019). Skin lighteners were primarily meant to treat hyperpigmentation and other skin problems (Gbetoh & Amyot, 2016), but people have adopted a tendency to use them for other reasons, such as to lighten their skin to avoid being discriminated against dark skin colour, and to enhance their social status.

1.2 Problem Statement

Many SLPs containing chemical agents are marketed and used in several countries despite their ban on sale, exportation, and importation (Al-Saleh et al., 2003; Al-Saleh et al., 2005; Cheng, 2021; Lewis et al., 2009). In Lesotho, the ban has not been executed and SLPs are freely available on the internet, displayed for sale on the streets, in supermarkets and cosmetic shops. Part of the reasoning for using SLPs across many countries is the perception that lighter skin tone is superior to the darker one (Hamed et al., 2010), and the influence of historical racism (Rondilla & Spickard, 2007). Toxic additives to SLPs such as mercury, hydroquinone and corticosteroids have been documented to cause adverse impacts to health (Keane et al., 2001; Raynaud et al., 2001; Sobngwi et al., 2003). Women in Asian and African countries are using SLPs for different purposes, but mainly for elegance and beauty enhancement (Charles, 2009; Li et al., 2008; Malik, 2007; Thomas, 2012). Thus, the aim of the current study is to document the extent of use motivations and perceptions of Basotho women, focusing on the perceived benefits and health risks of skin-lightening, so that these can inform and guide where and what interventions are needed to mitigate the use of banned harmful cosmetics. In addition, the study aims to document sources and businesses selling SLPs, as well as to document policy-level government officials' perceptions as to the barriers to implementing legislation and other interventions to control SLPs in Lesotho.

1.3 Research Justification and Rationale

The practice of skin lightening appears to be prevalent in Lesotho based on anecdotal evidence and the researcher's observation. There are no published studies to understand why Basotho women use SLPs. Conversely, in South Africa, Lesotho's only neighbour, the prevalence of skin lightening by women ranges from 33% to 35% (Blay, 2011; Dlova et al., 2014). The research also shows that the practice also involves SLPs with toxic levels of mercury (above one ppm) (Maneli et al., 2016; ZWGM, 2018). An attempt to ban cosmetics with skin-lightening agents by the Medicine Regulatory Unit in the Ministry of Health (Lesotho) is pending, as confirmed by the chairperson during a telephone interview (Motaba, personal communication 2021, September 08). Quite a significant number of research studies in Africa have focused on the health effects of skin lightening on public health, but only a small number of them include women's perceptions and motivations towards the unsafe practice (Dlova et al., 2014; January et al., 2018; Kouotou et al., 2017; Kpanake et al., 2010; Lewis et al., 2011).

The intention of the proposed study's findings is to serve as a benchmark for future research on skin lightening practices in the country. Furthermore, knowing how women perceive the health risks of skin lightening would aid the government and its relevant stakeholders (public and private) in developing policy and risk communication strategies around this issue (Peltzer et al., 2016). Understanding the motivations as to why people use these products will provide information to Lesotho government ministries such as Health and Trade to develop targeted interventions for behavioural change. The current information gap is the motivation for conducting this study on skin lightening among Basotho women.

2. Literature Review

2.1 The History of Skin Lighteners

Skin lightening practice has existed through the ages and for thousands of years, with different products that were homemade or sold by retailers. However, it is hazy from literature and history books about the country of origin of this practice. Some authors claim that it started with the ancient Greeks, Romans, and Egyptians after discovering that the application of a mixture of honey and olive oil lightened the skin (Bogdanov, 2016; Iftekhhar & Zhitny, 2021). Others affirm that skin lightening practice existed as early as the sixteenth century during the Victorian era with the application of chalk dust and lead paint on the faces by the ancient Europeans as well as Asians (Blay, 2009a; Peiss, 1998). The whiteness of the skin was interpreted as the resemblance of purity, wealth, and royalty. Queen Elizabeth I herself indulged in the application of a mixture of white lead paint and vinegar, which was known as *ceruse*, to accomplish a smoother and pale-looking face (Little, 2016; Mueller, 2000). This is where the name '*Elizabethan ideal of beauty*' emanated. Unfortunately, the same practice was believed to have taken her life in the year 1603 (Mueller, 2000). Hair loss, skin damage, muscular paralysis, tooth decay, blindness, and rapid aging were all documented side effects of *ceruse* (Edwards et.al., 2003; Little, 2016; Stewart, 2017). *Ceruse* has also been linked to lead poisoning (Stewart, 2017).

In the nineteenth century, white women started using arsenic complexion wafers, and they also became highly promoted as a treatment for beauty (Johnston, 1886). According to Glenn (2008), white women had a perception that skin whiteness resembles nobility, and the perception was used as an advantage to promote sales of skin whitening products by beauty skin shops. Those products were either ineffective scam products or they produced the desired whitening effect due to toxic elements such as mercury and lead in them. As much as arsenic was known to be toxic to human health, consumers were manipulated to believe that taking the arsenic wafers in small amounts was safe and beauty is achieved when the product is used as directed (Zarrelli, 2015). According to Allen (2018), the product resulted in illnesses for white women who were using it. Furthermore, the *Indianapolis sentinel* reported in July 1880 that a young lady lost her sight after using arsenic wafers (Rance, 2009). Arsenic is a heavy metal that is detrimental to one's health because its accumulation from small doses

can cause chronic health effects such as cancer (Naujokas et al., 2013). In Asia, high class women used rice powder and white lead preparations for a complexion that resembled white jade or fresh lychee (Thomas, 2020a).

In many parts of the world, the lighter skin-tone politics have been evidently constructed from the history of white supremacy and the colonial institutions of slavery and segregation (Drake & Cayton, 1945; Myrdal, 1944; Russell et al., 1992). By the twentieth century, the global production of skin-lightening creams became the most popular cosmetics whereby consumers included women of all skin colours, that is, white, brown, and black (Thomas, 2020b). On the other hand, according to Thomas (2020b), many consumers with white skin in the 1920s and 1930s turned to tanning lotions after they became aware that sunbathing and performing physical outdoor activities were healthy.

In the late 1950s, during the African independence movement, skin lightening progressively became a norm and the most popular cosmetic practice within dark-skinned communities (Blay, 2009b; Miyamji, 2008). That might be one of the reasons why in the late 1960s, the trade in SLPs in South Africa was so strong, and skin lighteners ranked among the top four of common household products used by 60% of urban African women (National Development and Management Foundation, 1969). South Africa serves as a good point of reference in terms of the skin lightening history in comparison with other African countries, as well as countries on other continents. It has since been a country comprised of people of different skin colours as well as a variety of ideas to alter the complexion of the skin (Thomas, 2020a). Professor Lynn Thomas in her book articulates that lighter skin tone might possibly have significant value in social and political weight, and the prestige somehow promoted skin-lightening ideas to be vital in apartheid South Africa (Thomas, 2020a).

From the start of the twenty-first century, the practice of skin lightening reached its peak until the present, and SLPs were marketed worldwide, as people were eager to remove dark spots on their faces (Glenn, 2008). After the twentieth century, the commercialization of other three types of depigmenting agents deemed most effective were introduced into the market, namely, hydroquinone, corticosteroids, and mercury (and their derivatives). Nevertheless, the use of older or less effective products persisted, allowing for a diverse range of depigmenting agents to be available for application (Petit, 2019).

2.2 The Skin Lightening Practice in Sub-Saharan Africa

The application of cosmetics with a depigmenting effect on the skin is a common practice in Sub-Saharan African (SSA) countries. It is proven to have an impact on public health and well-being but lacks strong law enforcement. The literature shows that the common alterations are on the skin, and general complications are often reported, conceivably due to ignorance or lack of knowledge (Dlova et al., 2014, Mpengezi & Nzuzza, 2014). SSA countries such as Cote d'Ivoire, Ghana, Nigeria, Kenya, South Africa, Tanzania, and Zimbabwe have either banned or put restrictions on SLPs' ingredients such as mercury, hydroquinone, and potent corticosteroids. However, law enforcement is ineffective and undervalued by governments and law enforcement agencies. "Obtaining prevalence rates for skin lightening practices is challenging, but researchers have made progress in estimating rates in different parts of the world" (Street et al., 2014:53). Nevertheless, studies show that 25% to 95% of adult women in SSA countries are using SLPs containing banned chemical compounds regardless of skin lightening being a public health concern (Mahé et al., 1993; Ly et al., 2007; WHO, 2014; Wone et al., 2000).

The skin lightening practice has been around for centuries and is still prevalent today (Jacobs et al., 2016). According to Baxter (2000), Mali has more than 50% popularity amongst women, and Senegal (Dakar) has a female popularity of 67% (Mahé et al., 2003). According to dermatologists in Ghana, 30% of women use SLPs on a regular basis (McKinley, 2001). The prevalence amongst adult women (aged above 15 years) in the city of Lomé, Togo is almost 60% (Pitche, Kombate & Tchangai-Walla (2005), and 60% among Zambian women aged 30-39 according to Blay (2011). Moreover, it has been found that eight out of every 10 women in Cote d'Ivoire use SLPs regularly (Blay, 2011). According to Dlova et al. (2014), one in every three black South African women bleaches their skin. South Africa's regulations governing the sale of cosmetics containing hydroquinone, mercury and lead of 1983 requires the producers of SLPs to include labelling that warns consumers to use the products with a sunscreen, but that is not happening, according to Dlova et al. (2012) in their study. Similarly, Somalian women of childbearing age bleach their skin during pregnancy and breastfeeding, claiming that it removes dark spots formed during the pregnancy phase (Adawe & Oberg, 2013).

2.3 Women's Motivation for Skin Lightening

The documented negative health effects of skin lightening do not seem to deter people from using risky SLPs that are readily available over the counter at competitive prices. Different surveys showed that the majority of women who lighten their skin are aware that it is harmful to their health (Kouotou et al., 2017; Mahé et al., 2004). Nevertheless, women's key motivations and inspirations for using SLPs are diverse. According to studies conducted in Nigeria (Olumide et al., 2008) and Tanzania (Lewis et al., 2011), women had six principal motivations for skin lightening: (1) applying as a remedy to get rid of rashes, pimples, and other skin abnormalities; (2) desire for softer skin; (3) aspiration of having a white European facial appearance, which is deemed to be beautiful; (4) impressing peers; (5) pleasing a soul partner and/or enticing an opposite sex companion; and (6) to recover from the damage done by over-usage of skin lightening on the body.

Kombo (2021) argued that women who participate in beauty contests get peer pressured into lightening their skin, claiming it gives them a good chance of being chosen. Research identified that female students at Cameroon's universities were influenced to bleach their skin due to a desire for softer skin, a desire for a uniform skin tone on their faces and the rest of their bodies, and a desire to alter their dark skin colour to a lighter one (Kouotou et al., 2017). In another study, both female and male students have been identified as engaging in skin lightening to have a seductive appearance as well. This was validated in the literature by Kpanake et al. (2010), along with other motivations such as being eager to dictate other people's behaviour, boosting confidence, being fashionable and appearing successful in life. The desire to alter the skin tone to be lighter and to change the texture were women's top motivations for the practice of depigmenting their skin in two cities in Burkina Faso, as investigated and reported by Traore et al. (2005). The images of light-skinned celebrities in the mass media also influences skin lightening practices (Olusoji et al., 2019). It is a perceived notion among African women (and men) that higher social status is reflected through lighter skin, which is achieved through skin lightening practice (Dlova et al., 2014; Ly et al., 2007; Mahé et al., 2004; Pitche et al., 1998). In relation to use for health reasons, a cross-sectional survey undertaken in KwaZulu-Natal's (South Africa) two regional hospitals revealed that women's (African and Indian) motivation for using SLPs was primarily from the desire to self-treat skin disorders such as melasma and acne (Dlova et al., 2015). The focus of the study is

on women as they generally dominate men in the application of SLPs (Ajose, 2005; Olumide et al., 2008).

2.4 Mercury, Hydroquinone, and Corticosteroids in Skin-lightening Products

Many chemical compounds and heavy metals are contained in SLPs, but this study will only review mercury, hydroquinone, and corticosteroids as skin-lightening agents in cosmetics. These are key ingredients and are found in most SLPs that are used with the aim of inhibiting the production of melanin by skin cells (Gbetoh & Amyot, 2016).

2.4.1 Mercury

Mercury is one active ingredient commonly present in most skin-lightening creams and bathing soaps (WHO, 2019). Studies show that more than 40% of SLPs in the province of KwaZulu-Natal and the Western Cape in South Africa have mercury (Dlova et al., 2012; Maneli et al., 2016). On the other hand, some manufacturers of SLPs purposely do not disclose mercury as an ingredient in their products or oftentimes label inaccurate mercury levels (Maneli et al., 2016; ZMWG, 2019b). The mercurials (mercury and its derivatives) were known to be part of skin bleachers for some time (Olumide et al., 2008), but their toxicity took a while to be linked to skin impairments. Mercury's side effects are associated with its vapour, dermal absorption, the digestive tract, and excretion through the kidneys and colon. Contradicting hyperpigmentation, discolouration, and weak nails are some of the skin's side effects from acute exposure (Dadzie & Petit, 2009; Olumide et al., 2008). In addition, the toxicity of mercury caused by skin absorption can have acute health consequences such as gastric discomfort, dermatitis, and inflammation of lung tissues (acute pneumonitis) (Naidoo et al., 2016).

In terms of chronic complications, mercury has also been shown to be nephrotoxic after repeated absorption through the skin (Al-Saleh et al., 2004; Chan, 2011; Mahé et al., 2005), and is linked with adverse neurological health effects that also negatively affect infants and unborn babies (Dorea, 2016). Otto, et al., (1994) detected high levels of mercury in the blood and urine of children living with women who claimed to use mercury-added cosmetics, and this became a children's environmental health problem. Presence of mercury skin lightening

creams and soaps can also cause kidney damage and a reduction in the skin's resistance to microbial infections (IPCS, 2003; Ladizinski et al., 2011).

A significant proportion of skin-lightening creams around the world contain high levels of mercury, exceeding the national limit standards and provisions in the Minamata Convention on Mercury, according to a study by ZMWG (2018). The Convention was enforced on the 16th of August 2017 with the objective of safeguarding human health as well as the living environment from exposure to mercury as well as its derivatives. The Minamata Convention on Mercury, which Lesotho ratified on the 12 November 2014, outlines measures to control and regulate the production and trade of mercury in the countries party to the convention. The measures include setting limits on mercury in mercury-added products and industrial processes that involve the use of mercury or its compounds. The Convention set the limit of mercury in SLPs at one ppm (UNEP, 2019). Despite this, mercury levels higher than one ppm were found in SLPs in Southern Africa (South Africa), Asia (Pakistan, Japan, Bangladesh, India), South America (Mexico) and North America (United States of America) (Maneli et al., 2016; ZMWG, 2018) to produce a more whitening effect on the skin (Sun et al., 2017). As an ultimatum, starting in 2021, the manufacturing and trading of skin lightening cosmetics containing mercury above one ppm should have been banned by all parties to the Minamata Convention, with an exemption for those parties that applied for an exemption, to initiate the ban from 2025 (BRI, 2018; UNEP, 2019). California was recently the first US state to ban mercury and other harmful ingredients in cosmetics and personal care products (O'Boyle, 2020).

2.4.2 Hydroquinone

Hydroquinone is an ingredient that is mostly used in paints, dyes, and in photographic processes, but is also used as an active ingredient in SLPs. South Africa became the first country globally, to ban cosmetics with hydroquinone in 1990 (Dlova et al., 2015), followed by Japan and Europe in 2001 (Davids et al., 2016). However, it was allowed in prescriptions by dermatologists (Jablonski, 2012). Regardless of this restriction in South Africa, the skin lighteners market was not affected as anticipated. In contrast, the usage increased, which could be attributed to a massive development of local, informal settlements and their related markets, probably affected further by the opening of South Africa's borders to neighbouring

countries after 1994 (Davids et al., 2016). Other countries later joined in hydroquinone restrictions. For instance, Jordan in Western Asia, Ghana and Nigeria in Africa banned hydroquinone concentrations above 2% in cosmetics (Camarasa & Serra-Baldrich, 1994; Public Health Act, No. 851 of 2012, 2012). Nevertheless, the literature's link between long-term exposure to hydroquinone and skin disorders finally influenced its restriction in cosmetics in a number of countries across the globe (Knight, 2019).

Hydroquinone has both acute and chronic side effects when used in cosmetics. Camarasa & Serra-Baldrich (1994) linked hydroquinone-containing SLPs with chronic effects such as exogenous ochronosis (EO) and vitiligo. EO is a dermatologic condition clinically defined by blue-black discolouration as a result of lengthy use of hydroquinone-containing products. It is mostly present on sun-exposed areas like the cheeks, sides of the head, forehead and neck, where SLPs are applied. Vitiligo is a skin depigmentation condition caused by exposure to chemical and physical agents (Alam & Ghosh, 2015; Harris, 2017). It presents in different sizes and shapes that tend to spread over the course of the patient's life. On the same note, Dadzie & Petit (2009), Glazer et al. (2016) and Naidoo et al. (2016) asserted that the use of hydroquinone-containing SLPs is linked to skin elasticity loss, impaired wound healing, clouding of the normally clear lens of the eye (cataracts) and nail pigmentation. Many creams containing hydroquinone were promoted and advertised as remedies for skin disorders, but they often ended up causing new skin problems or exacerbation of already existing skin complications (Del Giudice & Yves, 2002). Irritating and allergic contact dermatitis are common acute side effects, especially at higher concentrations (Naidoo et al., 2016).

In 2006, the US Food and Drug Administration (FDA) proposed a ban on hydroquinone in the United States of America, citing reports of EO in humans, high hydroquinone absorption, and leukemia due to high doses over a long period of time (Levitt, 2007). Likewise, the Food and Drugs Authority Ghana (FDA) in 2016 also initiated a first step to try to completely ban cosmetic products with hydroquinone compounds in Ghana (Lartey et al., 2017). There are currently no regulations in Lesotho either prohibiting the sale of over-the-counter (OTC) cosmetics with skin-lightening agents or limiting their concentrations for medical purposes.

2.4.3 Corticosteroids

Corticosteroids are well-known for being very effective medications that are commonly applied to the skin to treat inflammatory conditions. They are used to treat skin problems like psoriasis (the condition whereby scales, and itchy dry spots emerge as skin cells stack up), dermatoses (skin lesions), and eczema (scaly and itchy inflammation of the skin) in dermatology. Corticosteroids constitute a list of active ingredients in cosmetics applied to lighten the skin, and they are most often misused in Africa in the form of creams and gels, according to researchers Mahé et al., (2003) and Wone et al., (2000). Olumide et al. (2008) also concur that corticosteroids have long been used as depigmenting agents available as OTC remedies. The World Health Organization categorizes topical corticosteroids into classes based on their strengths. Clobetasol, for example, is the most potent and belongs to class I, while hydrocortisone is the least potent and belongs to class VII (Levin & Maibach, 2002). The extended use of corticosteroids inhibits the epidermal production of melanin (Dadzie & Petit, 2009; Olumide et al., 2008), just like with mercury and hydroquinone-containing SLPs. This is achieved when the precursor hormone, propiocortin, is inhibited, thus inhibiting melanocyte stimulating synthesis.

Tanzania outlawed the production, sale, and distribution of almost 170 different SLPs in 2003, including those containing potent steroids (Lewis et al., 2011). In South Africa, potent topical steroids are prescription drugs that are prohibited from being sold by unlicensed people, but this is the opposite in reality, as they are sold by street vendors and foreign shops. Many countries have not banned the use of potent steroids in cosmetics products, and for them it is legal to import them from other countries.

In countries such as South Africa, Zimbabwe, Nigeria, Kenya and Senegal, where topical corticosteroids are available over the counter, there has been an increase in their use, which has resulted in many adverse side effects. Chronic acne (inflammatory skin condition that causes white and black heads or pimples when hair follicles become clogged with oil and dead skin cells), allergic contact dermatitis, and steroid induced rosacea (red papules on ruddy skin around the mouth, eyes, and ears) are some of the most frequent cutaneous disorders connected to corticosteroid-containing cosmetics (Ajose 2005; Lutz & el-Azhary, 1997; Mahé et al., 2003; Nnoruka & Okoye, 2006). In addition, skin conditions associated with long-term

use include vasoconstriction (narrowing of the blood vessels, resulting in an increase in blood pressure), vitiligo, striae (stretch marks), skin atrophy (skin thinning) and telangiectasia (also known as “spider veins”-small, dilated blood vessels visible on the skin) (Dadzie & Petit, 2009; Olumide et al., 2008). Glaucoma, bacterial and tinea incognita (fungal infections) are also linked to the misuse of corticosteroids (Glenn, 2008). Cushing's syndrome (a disorder that occurs when the body produces extra adrenaline over a long period of time), adrenal insufficiency, hypertension, diabetes, abnormal menstruation, and immune system suppression are among the systemic adverse health effects of using high-potent steroids (Dadzie & Petit, 2009; Ladizinski et al., 2011). Furthermore, the use of very strong corticosteroids for skin whitening during pregnancy was linked to reduced placentas and a higher rate of low-birth-weight new-borns, according to a Senegalese study (Mahé et al., 2007).

2.5 Interventions to Prohibit Skin Lightening Practice

The systematic and sustainable implementation of interventions on skin lightening as a public health problem is crucial in providing long-lasting remedial measures. That is, the implementation of individual or community interventions must be in line with government interventions for a smooth transition of enforcement strategies. The link between increasing usage of skin-lightening compounds and the escalation of adverse skin conditions being a global public health concern requires strict regulations that are mandatory (Naidoo et al., 2016). Therefore, the urgent need for prevention and control measures against manufacturing, importation, and sale of skin lighteners containing mercury, hydroquinone, and corticosteroids in concentrations that are detrimental cannot be overlooked.

Several African countries, including South Africa (in 1975 and 1990), Tanzania (in 2003), Cote d’Ivoire (in 2015), Nigeria (in 2005), Ghana (in 2012), and Kenya (in 1998 and 2000), initiated bans on skin-lightening agents in cosmetics (Lewis et.al., 2012; Thomas, 2020b; Thomas, 2020c; ZMWG, 2018). Nevertheless, the national bans as policy measures alone are not effective (Hall, 2010), as people are still able to access these products through porous national borders in African countries (Lartey et al., 2017; Lewis et al., 2012; ZMWG, 2018) and on online platforms. Other means of restricting the availability and application of dangerous skin

lighteners need to be considered as well. Affordable and illegal SLPs are understood to be an option for many low-and middle-income countries' (LMICs) citizens, including Basotho, who cannot afford to seek dermatology services. According to the authors, Brown-Glaude (2007), Dadzie & Petit (2009), and Hall (2010), public health campaigns, research, and community-based education necessitate execution to curb skin lightening practice. Governments need to work jointly with the media to discourage skin lightening and take legal action against individuals and businesses selling or distributing banned SLPs (Gul et al., 2014; LAW FOR ALL, 2021).

Many studies in Africa seem to recommend education as one of the key measures that could be effective if delivered appropriately to change the risky perceptions on SLPs (Brown-Glaude, 2007; Chisholm, 2002; Fokuo, 2009). For instance, the Tanzanian Food and Drug Authority (TFDA) invested in public education and risk communication strategies as added interventions after banning the production and trading of SLPs in 2003 (Lewis et al., 2012). These interventions were not only targeted to the public and consumers, but also at the producers and distributors of the SLPs themselves through seminars, public forums, mass media, brochures, books, and drug information bulletins (Lewis et al., 2009). Notwithstanding the TFDA's efforts, the restriction on the importation and sale of skin-lightening creams is rarely enforced, and these creams are nonetheless freely available and widely utilized on the black market. The initiative proved not to be adequately effective as the government still had to confiscate SLPs that were being illegally smuggled by merchants (Lewis et al., 2009). That means, in addition to substantial public education (Dlova & Ajose, 2014), governments need to invest more in enforcing the law at ports of entry and avail all necessary resources and engage in effective policing of black markets. Destigmatization of dark skin should be supported, according to Hall (2010), and additional studies acknowledging the validity of the reasons are needed to launch the actual change.

Dlova et al. (2014) in her study in Durban, South Africa, advocated public education campaigns to educate African and Indian women on the associated risks of applying SLPs. The findings show that a significant number of women lacked knowledge on the health risks of lightening their skin, and that contributed to the increase in skin lightening practice. The use of SLPs must be avoided and only be used when prescribed by dermatologists (Akortha et al., 2012), and this goes with responsibility, which needs to be instilled in patients so that they become

cautious on what they are using (Tenai, 2016). The classification of SLPs as cosmetics rather than pharmaceuticals is believed by Davids et al. (2016) and Mposo (2018) to sustain skin lightening practices. Additionally, inadequate laws or lack of regulations relating to the sale, labelling, advertising, and ingredient composition of cosmetics in countries like Lesotho promote the practice as well. As a result, skin-lightening cosmetics manufacturers see an opportunity to omit health warnings from their products' labelling.

Misbranding of some legal OTC SLPs with hydroquinone is common in some LMICs, with the risks associated with their use not being disclosed to consumers (Dlova et al., 2012; Williams, 1992). For instance, in South Africa, misbranding occurs regardless of the availability of legislation against it. Section 41 of South Africa's Consumer Protection Act (CPA) 68 of 2008 stipulates that product packaging and labelling must not confuse or mislead consumers. On the same note, section 2 (1) (a) of the South Africa's Foodstuffs, Cosmetics, and Disinfectants Act (FCDA) 54 of 1972, as amended by Act 39 of 2007, states that it is illegal to sell, manufacture, or import any cosmetic that contains or has been treated with a prohibited substance; that contains or has been treated with a substance greater than that permitted by regulation; or that does not comply with the regulations.

2.6 Theoretical Framework

2.6.1 Health Belief Model

The basis of any meaningful research project is its theoretical framework as it serves to support the researcher in framing the problem statement to be addressed and guide the analysis of the findings (Wacker, 1998). An informed selection of a dissertation framework is crucial and is based on the review of theories that aid in the justification and analysis of the findings related to the phenomenon being studied (Swanson & Chermack, 2013). In classic terms, the theoretical framework is made up of what experts have to say about the study aim, the problem to be studied, and possibly even suggestions on how to address the problem, as well as interpreting the results. The basic concept that risk perception affects behaviour is intuitively appealing and is at the heart of many health behaviour theories.

Health Behaviour Theories (HBTs) attempt to define, explain, predict, and finally assist in the modification of human behaviour (Brewer et al., 2007). The Health Belief Model (HBM) (Figure 1), as one of the HBTs, will guide this research due to its contextual relevance and profound manifestation of its robustness in behavioural change interventions (Chen et al., 2011; Ghasemi et al., 2020). HBM is one of the most widely used approaches in research and existed as early as the 1950s. The model was founded by Hochbaum, Kegels, and Rosenstock on the assumption that an individual will engage in safe practice if they: perceive that a negative health condition can be prevented; believe that taking the recommended action will prevent harm to health; and believe one has the capacity to implement the recommended health action (Glanz et al., 2008). HBM is comprised of key concepts that envision the rationale for people to act to avoid, test for, or to manage an illness; these include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Risk perception is proved to have been explicitly incorporated into HBM (Cooper et al., 2020; Ghasemi et al., 2020), which is well-studied and proven from the outset of health-related behaviours (Sheeran et al., 2017). In essence, HBM identifies people to practice good health behaviours through disclosing the negative health effects of a certain health behaviour (Becker, 1974).

The HBM specifies that health-related behaviour has high chances of being adopted if individuals perceive themselves to be vulnerable to a negative health outcome (perceived susceptibility) (Rosenstock, 1966). One of the key reasons for adopting a certain health behaviour, according to the HBM, is a perception of health risk. It is anticipated that if women can realize and consider themselves and their children to be at high risk from exposure when using cosmetics mixed with dangerous chemicals, they will discontinue skin lightening. Second, if individuals perceive negative health outcomes to be severe (perceived severity). If women become aware of the seriousness of the health effects of skin lightening, some of which are permanent, they may be influenced to consider stopping using skin-lightening creams. Third, if individuals comprehend the advantages of adopting a particular health behaviour or discontinuing an unhealthy behaviour (perceived benefits) (Hayden, 2013; Rosenstock, 1966).

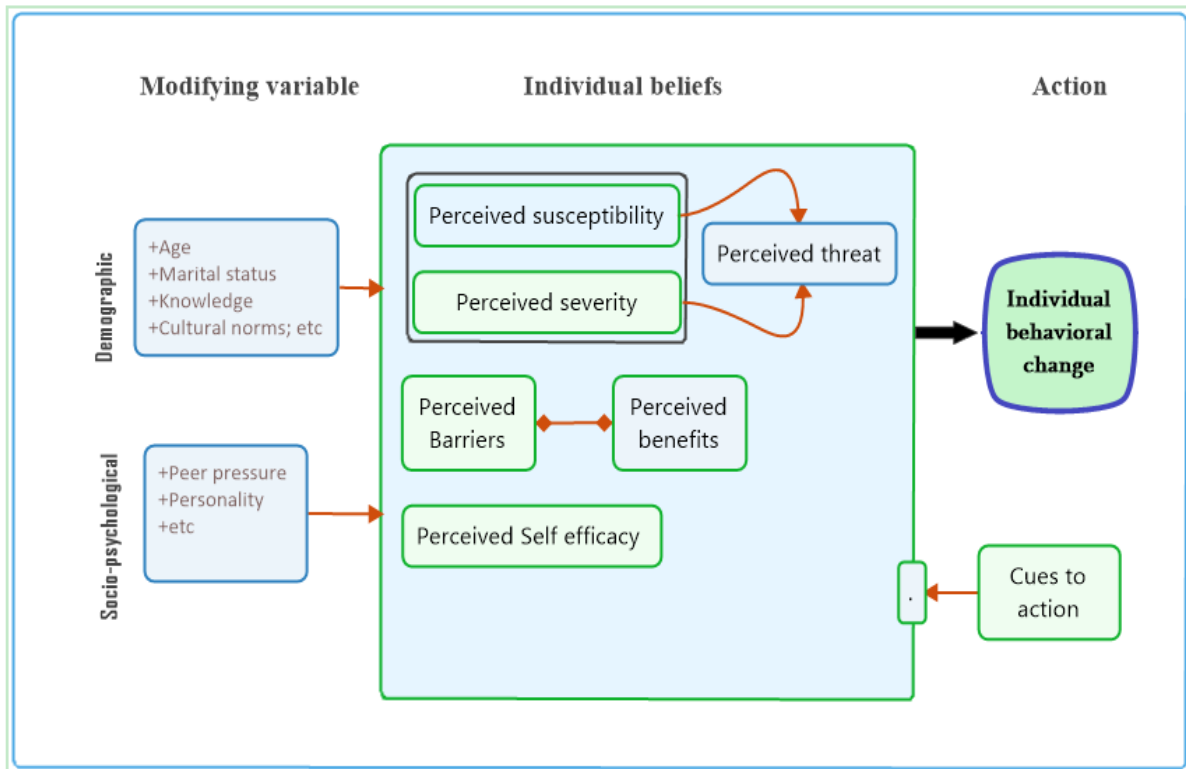


Figure 1. Health Belief Model (adapted from Glanz et al., 2008)

Fourth, if individuals perceive few obstacles or potential negative aspects in adopting a recommended good health behaviour (perceived barriers) (Becker, 1974; Rosenstock, 1966) If women are also aware of the barriers to stopping skin lightening, they may be able to weigh their effectiveness against perceptions that quitting will result in loss of self-esteem/confidence, skin darkening or social status loss. In this context, the availability of SLPs on the streets and over the counter may indirectly act as obstacles for women to stop skin bleaching. Fifth, if individuals are triggered towards the right health action (cues to action) (Becker, 1974) The stimuli to the skin-lightening cream applicants can trigger a change in health behaviour, and these cues can be internal or external. For instance, reading a pamphlet on the consequences of skin lightening, or experiencing skin irritation or discolouration after using SLPs, or having a friend who suffers from a related illness may persuade one to stop using SLPs. Sixth, if an individual perceives a significant confidence in their ability to adopt a particular health behaviour (self-efficacy) – an individual’s confidence level is needed to promote an action such as skin-lightening cessation.

This model is applicable for this study as it aligns with the objectives of the study. The first three constructs of the HBM, perceived susceptibility, perceived severity and perceived

benefits, are relevant to the first objective, which is on women's attitudes, perceptions and knowledge of negative health effects from skin bleaching. The third objective of exploring the barriers to the availability of health policy on SLPs can be addressed through the fourth construct, perceived barriers. The fifth construct, cues to action, is relevant to the second objective, which is identifying the applicable interventions (stimuli) to discourage skin lightening practice. HBM can be well incorporated into designing relevant interventions. Its constructs are appropriate for guiding short- and long-term interventions aimed at changing women's unsafe practice (skin-lightening). Therefore, knowing what motivates women to lighten their skin as well as their knowledge of health risks can inform implementation of relevant behavioural change interventions against those unsafe practices.

3. Purpose and Aim of the Study

3.1 Purpose of the Study

The purpose of the proposed study is to provide evidence for future research, the Lesotho government and relevant stakeholders to make informed regulatory decisions and conduct further research and interventions to protect Basotho women from exposures to harmful skin-lightening agents contained in cosmetics.

3.2 Research Aim

The aim of this research is to document Basotho women's motivations and perceptions on the perceived benefits and health risks of skin lightening practices in Lesotho and to identify what interventions are needed and where they are needed. Additionally, the research seeks to document the common places where SLPs are sold, and to find out the rationale for the lack of legislation and urgent regulatory action to regulate SLPs from policy-level government officials in Lesotho.

3.3 Research Objectives

The following objectives are aligned to address the aims of the study:

- 1.** To document Basotho women's attitudes, perceptions, and knowledge of the health risks of using SLPs.
- 2.** To identify interventions that could address women's attitudes, perceptions and motivations to reduce the negative health consequences associated with skin lightening.
- 3.** To explore the perceived barriers to the availability and implementation of regulatory action (informed by science) and national legislation that regulates skin-lightening cosmetics in Lesotho.

Objective	Data Required	Source/Data Collection Instrument
To document women's attitudes, perceptions, and knowledge of the health risks of using skin-lightening products.	<ul style="list-style-type: none"> ▪ Basotho women's attitudes of the use of SLPs. ▪ Basotho women's perceptions of the perceived benefits of skin lightening. ▪ Places where women buy SLPs. ▪ The reasons for using SLPs (e.g., desire for softer skin, lighter complexion etc) ▪ Knowledge on skin lightening health risks. 	<ul style="list-style-type: none"> ▪ Questionnaire (QN 13, 29 & 30) ▪ Questionnaire (QN 6-12) ▪ Questionnaire (QN 16 & 17) ▪ Questionnaire (QN 5) ▪ Questionnaire (QN 22 -28)
To identify interventions that could address women's attitudes, perceptions and motivations to reduce the negative health consequences associated with skin lightening.	<ul style="list-style-type: none"> ▪ Interventions in LMICs that have been effective in preventing the usage and importation of SLPs in low- and middle-income countries. 	<ul style="list-style-type: none"> ▪ Literature Review ▪ Examples of the impact of domestication of the Minamata Convention on Mercury in LMICs.
To explore the perceived barriers to the availability and implementation of regulatory action (informed by science) and national legislation that regulates skin-lightening cosmetics in Lesotho	<ul style="list-style-type: none"> ▪ Details of international treaties preventing the use of banned chemicals in cosmetics, their sale, their importation, as well as their enactment in Lesotho. ▪ Entities or organisations that are partners with the government regarding formulating legislation on SLPs. ▪ Challenges in developing, implementing and enforcing regulations on SLPs in Lesotho. 	<ul style="list-style-type: none"> ▪ Literature review. ▪ In-depth interviews with key informants from the Ministry of Health; the Ministry of Tourism, Environment and Culture; the Ministry of Trade and Industry; and the Ministry of Police and Public Safety.

3.4 Research Questions

Main Research Questions – How do women in Lesotho perceive the benefits and risks of skin-lightening? What interventions are needed to prevent the practice of skin lightening and to promote behavioural change?

Sub-Research Question 1 – What are the attitudes and perceptions of women and their knowledge of the health risks of skin lightening?

Sub-Research Question 2 – Which interventions in low-and middle-income countries have been effective in protecting public health from the health risks of skin lightening?

Sub-Research Question 3 – What are the perceived barriers to the availability and implementation of national laws to regulate skin-lightening products in Lesotho?

4. Research Methods

4.1 Study Design

The study will use mixed methods techniques in the collection of data and analysis for two different groups. That is, both quantitative and qualitative approach with women and a qualitative approach with key informants. To obtain rich and in-depth information about the reasons behind the lack of skin-lightening regulations in Lesotho, a qualitative approach is necessary (Holloway & Wheeler, 1996). The study design will be a cross-sectional survey in which data is collected from a large number of women at one time. Prior to the study, there will be a 1-day orientation session to familiarize the research assistant with the aim of the study, specific objectives, methodology, ensuring rigorousness, and the research instruments. The adherence to all ethical requirements will also be discussed and emphasized through training on how to implement the consent form.

4.2 Study Population and Sampling

4.2.1 Study Population and Study Site

Mokhotlong Government Hospital and Mapholaneng Clinic in Mokhotlong District, Lesotho, were selected as two public facilities from which women will be recruited to partake in the study through individual interviews. These health facilities were selected because they provide more healthcare services than other healthcare facilities in the district. Secondly, they are central to numerous villages and are known to also serve people from other healthcare facilities' catchment areas. The participants from different areas will make a diversified sample characterised by women of varying socioeconomic status, cultural beliefs and norms. Mokhotlong district was purposefully chosen for the study since it is closest to KwaZulu-Natal, South Africa, where lightening of skin is popular among women (Dlova et al., 2015). Also, a part of the Mokhotlong district population work in the province of KwaZulu-Natal as, for example, domestic workers, factory workers, sugar cane farm labourers and street vendors. The selection of the site for the current study is also motivated from observing many street vendors publicly displaying SLPs for sale in addition to other items.

The key informants for the study will be government officials from the relevant Government ministries for the regulation and control of cosmetics. That is, the Ministry of Health; the Ministry of Tourism, Environment and Culture; the Ministry of Trade and Industry, and the Ministry of Police and Public Safety. These ministries have a mandate for the enforcement of domestic and international laws and policies regarding the manufacturing, distribution, sale, importation, or exportation of cosmetics and the skin-lightening agents they contain.

4.2.2 Recruitment Strategy

4.2.2.1 Women

The first target population for the study is Basotho women aged 18 years and above. Those who are aged below 18 years are excluded since they are not adults. The study will be briefly introduced to the people in the waiting room during the pre-consultation health education sessions and on a one-on-one basis, with permission from the healthcare facility administrator. Women not showing signs of severe illnesses will be approached for

recruitment. The eligible women who are interested will be guided to an organized private room at the healthcare facility for further explanation of the study (including the informed consent process) and interviews. The interviews for interested women will start with those in the middle of the queue to the back, to try to avoid them losing their positions to see the healthcare provider. Other interested women who are ahead will be asked to come after getting their services. The women who are interested in taking part in the study but not ready at that time will be asked to voluntarily provide their cell phone numbers for the investigator to arrange an interview later, and they will be reimbursed for transport fare. The healthcare facility managers have agreed to provide the needed space for interviews upon the granting of UCT HREC ethics approval for this study.

The inclusion criteria for partaking in the study include: a) women being aged 18 years or more; b) women being willing to provide informed consent; and c) women being Lesotho national citizens who understand and can speak Sesotho or English. Participants will be women who have used skin-lightening creams and those who have not used them. In SSA countries, literature shows that the top users of skin-lightening cosmetics are adult females at a proportion of 26% to 67% (Dadzie & Petit, 2009), and the age at which they start skin lightening is mostly 18 years old (Adebajo, 2002; Dlova et al., 2014; January et al., 2018; Kpanake et al., 2010; Lartey et al., 2017). The eligible women will voluntarily be interviewed in private until a required number is reached at each healthcare facility. The estimated sample size will be 100, achieved using the sample size calculation formula: $n = p(1-p) z^2/d^2$ whereby p (anticipated prevalence) = 50.4%, d (desired precision) = 0.05 & z (critical value) = 1.96. This produced a sample size of 96 and it was rounded up to the nearest 10 to make it 100.

4.2.2.2 Key Informants

The second target group, which is key informants ($N=5$) from four government ministries, will be recruited through electronic mail. The investigator will send the invitations to the relevant respective offices with a detailed explanation of the study, and the follow up will be done through phone calls. One government official respondent will be recruited from the Department of Environmental Health in the Ministry of Health; one from the Medicine Regulatory Unit (Pharmaceuticals Department) in the Ministry of Health; one from the

Department of Environment in the Ministry of Environment; one from the Ministry of Trade and Industry; and one from the Ministry of Police and Public Safety.

This process of recruitment for both target groups (women and government officials) will only commence after the investigator has applied and obtained approval from the University of Cape Town's Health Sciences Faculty Research Ethics Committee, Lesotho's Ministry of Health Research and Ethics Committee, and permission from the authorities or government ministries where the key informants work.

4.2.3 Sampling Procedure

4.2.3.1 Women

During the weekdays when the healthcare facilities are fully operational, the convenience sampling approach will be utilized to find women aged at least 18 years to partake in the study. This approach is a non-probability sampling in which the members of the target population meeting the selection criteria are included for the purpose of the study based on their availability at a given time and having an interest in participating in the study, accessibility and reachable in terms of locality (Dornyei, 2007). The investigators will attempt to achieve diversification by visiting the healthcare facilities in all five weekdays of every week for four study weeks to allow representation of women from surrounding villages. It is worth stating that the investigator will have effortless access to both healthcare facilities by virtue of having worked with them for six years and building a good working relationship. Women who are identified as very sick by the nurse during the triage process will not be included. To acquire a balanced representation, equal number of women at Mokhotlong Government Hospital and Mapholaneng Clinic in Mokhotlong will be sampled.

4.2.3.2 Key Informants

Purposive sampling will be used to sample the key informants for the in-depth interviews as it allows pliability to change sampling strategies to accommodate any emerging circumstances (Ohman, 2005). This is a non-random probability sampling where the researcher identifies and selects the respondents on purpose to be part of the research on the virtue of their rich knowledge and experience of the phenomenon of interest, provided

they are willing to confer that kind of information (Bernard, 2002; Ritchie et al., 2013). A total of five key informants from four relevant government ministries will be selected to share their knowledge and experience on the issues of skin lightening and the lack of local regulations on SLPs in Lesotho. The intention is that more key informants could be sampled from each ministry, but the idea is to get representation from each by sampling the most senior government officials at the policy-making level, and who at least have five years working as government officials. The researcher regards five years as a fair number for officials to be experienced to provide deep insights on the topic. A snowball sampling will also be used to get other key informants until data saturation is reached. Data saturation is a point at which no new information is no longer obtained during data analysis (Saunders et al., 2018). The investigator has access to two senior government officers who are potential key informants. One at the Ministry of Health (in the Environmental Health Division) and the other at the Ministry of Tourism, Environment and Culture (in the Environment Department) who will assist identifying other key informants from other government ministries.

4.3 Data Collection

4.3.1 Women

The study women will voluntarily be interviewed using a standardized questionnaire (Annexure C) adapted from Hamed et al., (2010), which has been tested in research in other countries. Therefore, some questions will be added while some will be deleted or modified to align with the specific objectives of this study as well as the literature. However, two eligible women Village Health Workers (VHWs) at Mokhotlong Hospital and two at Mapholaneng Clinic will randomly be selected for a mini pilot study and then give comments in terms of how questions are asked and the length of the survey. All pilot subjects will need to provide informed consent to partake in the study, and they will be urged not to participate again in the main study. The questionnaire will then be revised if need be. The final questionnaires will then be administered face-to-face in a private room at the healthcare facility. The interviews will be undertaken in one month. The researcher opted for face-to-face to balance between women who are illiterate and those who are not, to enhance the validity of the responses. Face-to-face also enables the interviewer to control the interview session and keep the interviewee focused and on track (DeFranzo, 2014).

The questionnaire will be divided into sections with structured questions that is anticipated to take approximately 30 minutes for the interviewer to administer. The first section of the questionnaire will be demographic and family background; the second section, motives for using skin-lightening products; the third section, perceptions of pale complexion; the fourth section, perceived barriers to the recommended practice; the fifth section, skin lightening practice. For instance, the fifth section will include questions such as where women buy their skin-lightening products; how long they have been using skin-lightening products; and where on their bodies do women apply skin-lightening products. The sixth section will be beliefs and knowledge about the health risks of skin lightening. Part of the questionnaire will also include the respondent's identifier number, date and place of interview, as well as the name of the interviewer.

Most of the participant's first language will be Sesotho. Therefore, the researcher and the research assistant will translate the questionnaire from English to Sesotho, as well as the back translations after interviews. The interviews will both be conducted by the investigator and a female research assistant who is an MPH graduate from Makerere University in Uganda. Both have Sesotho as their first language; hence they will be able to fluently administer the questionnaires in Sesotho. Data will be collected through LimeSurvey using a tablet.

4.3.2 Key Informants

The key informants from the government ministries will either be interviewed face-to-face, over the telephone, or through video-conference (MS Teams, Zoom), depending on their preference and COVID-19 protocols at that time. These will be semi-structured interviews with open-ended questions on the obstacles that are preventing the government from formulating national legislation to regulate SLPs in the country. Individual interviews are advantageous in cases when respondents provide brief responses, allowing the researcher to prompt them for more or in-depth information and insights (Guest et al., 2013). The semi-structured interview guide (Annexure D) will be used to shape the interview sessions to capture the information in line with the research question. Each interview session is anticipated to take no more than 45 minutes and will be administered in Sesotho as the home language to enable participants to respond fluently. The interview guide, originally developed in English, will be translated into Sesotho by the researcher and the research assistant. For

rigour and validity, all the interview sessions will be audio recorded with the consent of the participants (Annexure B), and field notes will be taken to ensure that no vital information from the interview is missed (De Vos et al., 2011).

4.4 Data Management and Analysis

4.4.1 Quantitative Approach

The captured data will be stored online which is accessible with a password only available to the research team. If the researcher is unable to finish the study for any reason or the participant withdraws before completing, the partially filled surveys will be deleted. The women's responses will be captured via LimeSurvey, coded, and entered into the Statistical Package for the Social Sciences (SPSS), which will be utilized to perform descriptive analysis of the responses. SPSS provides flexibility in managing complex data analysis functions, and suits a mixed method approach (Einspruch, 2005). The cleaning of data will be performed after every week of data collection, and after importing the captured tables into SPSS. The coding will be done to define the variables and will consider questions that are binary, for instance, yes/no questions, as well as those that are multiple choice questions. The responses will be categorized for easy analysis and the demographic characteristics of the women will be described using descriptive statistics.

HBM as a theoretical framework will also be used to guide the analysis of the quantitative data as the responses from the women will be assessed with the constructs of the model. In addition to socio-demographic characteristics (age, level of education and skin tone), perceived susceptibility, perceived severity, perceived benefits, perceived barriers and cues to action will be included as variables for analysis. There will be at least one question for each construct, which will be measured with a 3-point Likert scale, that is, "agree" (3 points), "neutral" (2 points) and "disagree" (1 point). The sum of the scores of the items will be divided by the number of items in the scales to get the average scores on each construct. These scores will inform the justification for key interventions that are needed for better prevention of skin lightening.

4.4.2 Qualitative Approach

The fieldnotes, which will only be hard copies produced during the interviews will be safely kept in a locked cabinet in the researcher's office. While the rest of the digital data, such as transcripts, summary sheets, memos, and reflexive journals, will be saved in a OneDrive accessible with a password known to the research team only. In terms of analysing qualitative data from the key informants, thematic analysis (Braun & Clarke, 2006) with NVivo software will be utilized to make the data manageable due to its flexibility and good features in comparison to others (Azeem & Salfi, 2012). Braun & Clarke's (2006) 6-step framework will be used to guide the analysis. All the recorded audios will be translated and transcribed from Sesotho into English verbatim to reduce possible errors. The preliminary codes will be generated from the transcribed data to represent meaningful content, then the patterns from interpretive analysis of the codes are identified to generate different themes based on the HBM. The generated themes will be reviewed to produce a final list which is clear and identifiable between themes to help understand the data. Last but not least, a report will be produced to change the analysis into an interpretable piece of work by showing interesting extracts and examples in relation to the generated themes. The data analysis exercise will ensure that the process is trustworthy, and it is a complete representation of what the respondents shared (Guba & Lincoln, 1989). The researcher undertook a Qualitative Research Methods and Qualitative Data Analysis courses to acquire skills in qualitative research.

The researcher acknowledges that he conducted a literature review and has a general idea about the regulations of SLPs in different countries. On that account of reflexivity, the researcher will be cautious of his predetermined knowledge and experience and will only focus on the participants' responses for good data analysis (Given, 2008). Additionally, peer debriefing with the research assistant, who is a Makerere University MPH graduate, will be done by regularly discussing the coding results to improve credibility (Given, 2008). Also, the researcher will timely engage with a supervisor throughout the process of data analysis for credibility of the findings.

4.5 Research Procedures and Logistics

4.5.1 Time Schedule

Task	2021										2022	
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Protocol development												
Protocol review by ethics Boards												
Data collection												
Data cleaning and analysis												
1 st draft submission to a supervisor												
Submission of letter of intent to submit												
Journal article writing												
Final draft submission to a supervisor												
Final version submission												

4.5.2 Budget

Item	Amount (ZAR)	Comment
Transport to sites	3,700.00	Includes travel costs from Cape Town to Lesotho.
Stationery	800.00	Mostly, printing questionnaires for women.
Translation services	0.00	Translating questionnaires and informed consent forms from English to Sesotho, and back translation.
Transcription services	4,000.00	The research will source a local professional transcriptionist who will sign non-disclosure agreement.
Audio recorder	0.00	Mobile phone will be used where the key informant requested a face-to-face interview.
Research assistant incentive	1500.00	A colleague who is an MPH graduate at Makerere University.
Quantitative data collection tool	0.00	UCT provides LimeSurvey for free to students and staff.
Analysis software	0.00	SPSS is free for UCT registered students.
Airtime	500.00	Making phone calls and data for internet connectivity.
TOTAL AMOUNT	11, 000.00	

The study will partly be funded by the government of Lesotho through the National Manpower Development Secretariat (NMDS) up to a maximum of M4,000.00, which is provided upon formal request and approved by the supervisor. The researcher (student) will have to explore other means of getting the funding to cover the rest of the expenses.

4.6 Limitations

The recruitment of women from only two healthcare facilities could be a limitation to the study as the women who are not using those healthcare facilities yet meeting the selection criteria are missed. On the other hand, the study is prone to sampling bias as the subjects are conveniently sampled from a heterogenous study population. As much as the mixed methods approach is anticipated to have methodological triangulation, as both quantitative and qualitative methods will be used to address the study aim, lack of investigator triangulation might impact the rigour of the findings as the investigator will only be the one to analyse the data. Last but not least is the inability of the study to verify the responses from women for accuracy or truthfulness by virtue of the first data collection mechanism being a questionnaire.

5. Ethical Considerations

5.1 Description of Risks and Benefits

The study poses a minimal risk as some of the questions directed at the participants may trigger feelings of guilt. An enquiry regarding whether someone is lightening their skin while they are fully aware of the risks, for example, could be embarrassing for such a person. The researcher and research assistant will emphasize that only perceptions and practices are sought after and that opinions will be respected. The questions will be constructed in such a way that responders will feel free and provide honest answers as a result. The interviewer will also advise the participants to seek medical assistance from a competent medical practitioner (a list of names and contact details will be provided) if they become concerned about the long-term health implications of skin lightening or any other issues. The participants will be assured that the information acquired will be used solely for the purpose of the study and will be kept confidential and anonymous. Also, the participants will be made aware that there are no direct or material benefits for partaking in the study, except for transportation reimbursement for respondents whose interview sessions are scheduled on particular days.

5.2 Informed Consent Process

Prior to the interviews, each participant will be taken through an informed consent process in their language of choice between English and Sesotho (Annexure A for women and Annexure B for key informants). Everything the participants need to know about the research will be thoroughly explained. This includes outlining the benefits and risks of taking part in the study (De Vos et al., 2005). Participants will be allowed to ask all the relevant questions they have and receive honest clarification from the interviewer. The interview will only start after the participant has provided verbal consent, indicating that he or she understands the research's goal, is aware of his or her ethical rights, and finally agrees to be interviewed. Most importantly, ethical approval from the University of Cape Town's Health Sciences Faculty Research Ethics Committee and the Ministry of Health Ethics Clearance Committee in Lesotho will be obtained prior to conducting any research. The whole process is guided by the basic ethical principles of the Belmont Report (1979), the ethical guidelines and principles of the Declaration of Helsinki (World Medical Association, 2013) and the guiding ethical principles of health research in Lesotho.

5.3 Privacy and Confidentiality

The questionnaires for women will be administered by a female research assistant in a private and quiet room with minimal to no disruptions at the healthcare facility they have visited, as provided by the facility administrator. The key informants will be interviewed in the comfort of their offices or online and will politely be asked to inform their colleagues to spare time without disruptions for the rest of the sessions. No identifiers such as names will be captured for women as their responses will be captured anonymously. The names and positions of the key informants will also not be recorded on the audio recorder. Only the investigator and the research assistant will have their names and positions matched with the information captured in the field notes, and anonymity during the reporting of findings in journal articles will be maintained by using pseudonyms. The recorded interview clips and transcriptions will be stored on a password protected device and backed up on a password protected OneDrive (online). The investigator and the research assistant will be the only ones to have access to the storage of the data. The stored data will only be retained for 3 years after the publication of the research results and destroyed afterwards.

5.4 COVID-19 Protocols Consideration

Since the world is still in the pandemic of COVID-19, researchers are aware of the WHO technical guidance on COVID-19 as well as national COVID-19 protocols to adhere to. Researchers will follow all COVID-19 regulations, guidelines, and protocols to avoid posing any COVID-19 transmission risk to respondents engaging in face-to-face interviews. The interviewer will ensure that the provided rooms are well ventilated, and windows remain open throughout the interviews. Physical spacing of at least 1.5m will be allowed between the interviewer and the respondent. This includes avoiding shaking of hands or any physical contact. The researcher will ensure that the face masks are put on at all times and cover both the mouth and nose. The interviewer and respondents will be hand sanitized before and after every individual interview session and the contact surfaces like table tops, chairs, as well as interviewing equipment (e.g., pens, tablets, or audio-recorder) will be disinfected. The exchange of papers and pens between participants and researchers will not be allowed. A digital device (tablet) will be used to capture women's responses as well as the consent of women and key informants. Women and key informants interviewed face-to-face will receive

hard copies of their signed consent forms for their keeping, while key informants interviewed online will be send soft copies.

6. Dissemination of Findings

At the end of the study, a journal article will be prepared as per the requirement for the MPH mini dissertation at the University of Cape Town, and this will be submitted to an academic peer-reviewed journal for publication after examination of the thesis. The copies of the journal article will be shared via electronic mail with the Ministry of Health Research and Ethics Committee of Lesotho, the District Health Manager of Mokhotlong, interviewed government officials and the managers of two public healthcare facilities used as recruitment places.

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Part B: Journal Ready Article

Journal

Environmental Health Journal (author guidelines in Annexure H)

Assessment of Basotho women's perceptions of the health risks associated with skin-lightening in Lesotho using the Health Belief Model

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Abstract

Background: Despite initiatives to regulate harmful practices resulting in exposures to hazardous chemicals, the application of skin-lightening products (SLPs) continues globally. SLPs were intended for medical purposes but have since gained commercial use. This has resulted in consumers' increasing exposures to mercury, hydroquinone, and corticosteroids. These chemicals are associated with health risks that include neurological and skin disorders. In many countries, including Lesotho, SLPs are easily accessed on informal markets and over the counter. There are currently no published studies on why Basotho women use SLPs despite the health risks. Therefore, the study aim was to document Basotho women's motivations and perceptions on perceived benefits and skin-lightening health risks, and to identify potential health and safety interventions.

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20 **Methods:** In this mixed-methods cross-sectional survey, we conducted 105 face-to-face
21 interviews in January 2022. One hundred women were surveyed at two healthcare facilities
22 in Mokhotlong, Lesotho. Interviews were also conducted with five key informants from the
23 government and a local university. Descriptive statistics were utilized to run frequencies for
24 age, marital status, skin tone classification, and education level. A chi-squared and Mann-
25 Whitney U test were performed to determine statistical significance between these variables.
26 The qualitative data was analysed thematically, with themes derived from predetermined
27 codes based on the Health Belief Model and study objectives.

28 **Results:** Basotho women had varying perceived benefits of skin-lightening. Key perceptions
29 included that a fair complexion provides self-esteem, increases chances of getting married,
30 and that men consider women with a pale complexion more beautiful. The most common
31 motivations for skin-lightening included a desire for a pale complexion, to remove facial
32 blemishes, and for beautification. Age, marital status, skin tone, and education level had no
33 significance on women's decision to practice skin-lightening. The key informants have
34 attributed lack of regulations on SLPs to the Lesotho Parliament's failure to pass regulations.

35 **Conclusions:** Skin-lightening is prevalent among Basotho women and is motivated by a belief
36 that light skin enhances social advantages, beauty, self-esteem, and job opportunities. Such
37 motives seem to overrule the susceptibility to adverse health effects from using SLPs.
38 Awareness campaigns and the implementation of SLPs legislation are needed interventions
39 to control skin-lightening.

40 **Keywords:** Skin-lightening products, Interventions, Perceptions, Motivations, Mercury, Skin
41 atrophy, Public health, Women

42

43 **Background**

44 Despite the documented health risks, the practice of using highly hazardous products for skin-
45 lightening is a global public health concern that is receiving considerable attention. The
46 practice of lightening the skin with chemicals has been around for centuries and is still
47 prevalent today [1]. This is despite countries' efforts to ban skin-lightening agents in
48 cosmetics [2]. Skin-lightening products (SLPs) in various forms are applied by men and women
49 as cosmetics all around the world [3], but especially in African, Asian, and Caribbean countries
50 [4-7]. However, women are predominately users of SLPs [8, 9]. Skin lighteners were primarily
51 developed to treat hyperpigmentation and other skin problems [10], but from the late 1950's
52 people started using them for other reasons, such as to lighten their skin to avoid being
53 discriminated against for having a dark skin colour, and to enhance their social status [11].
54 The primary concern is that severe acute and chronic health hazards are linked to SLPs and
55 their easy accessibility. SLPs are openly sold on the streets and over the counter in countries
56 in both the global North and South [10-14]. The global sale of SLPs on internet platforms also
57 makes it easier to buy them anywhere in the world, regardless of whether they are restricted
58 or prohibited in the country of use [15, 16].

59 Skin-lightening was popularized among black Africans, Jews, and marginalized groups for the
60 reason that a lighter skin colour was often connected with social capital and the privilege of
61 having a job [17]. Hazardous active substances such as hydroquinone, mercury, topical
62 steroids have subsequently been discovered in most skin-lightening creams [10, 14]. Research
63 has revealed associated negative health outcomes with exposures to these chemicals, such
64 as adrenal disorder, hypertension, neurological disorders (e.g., increased depression and

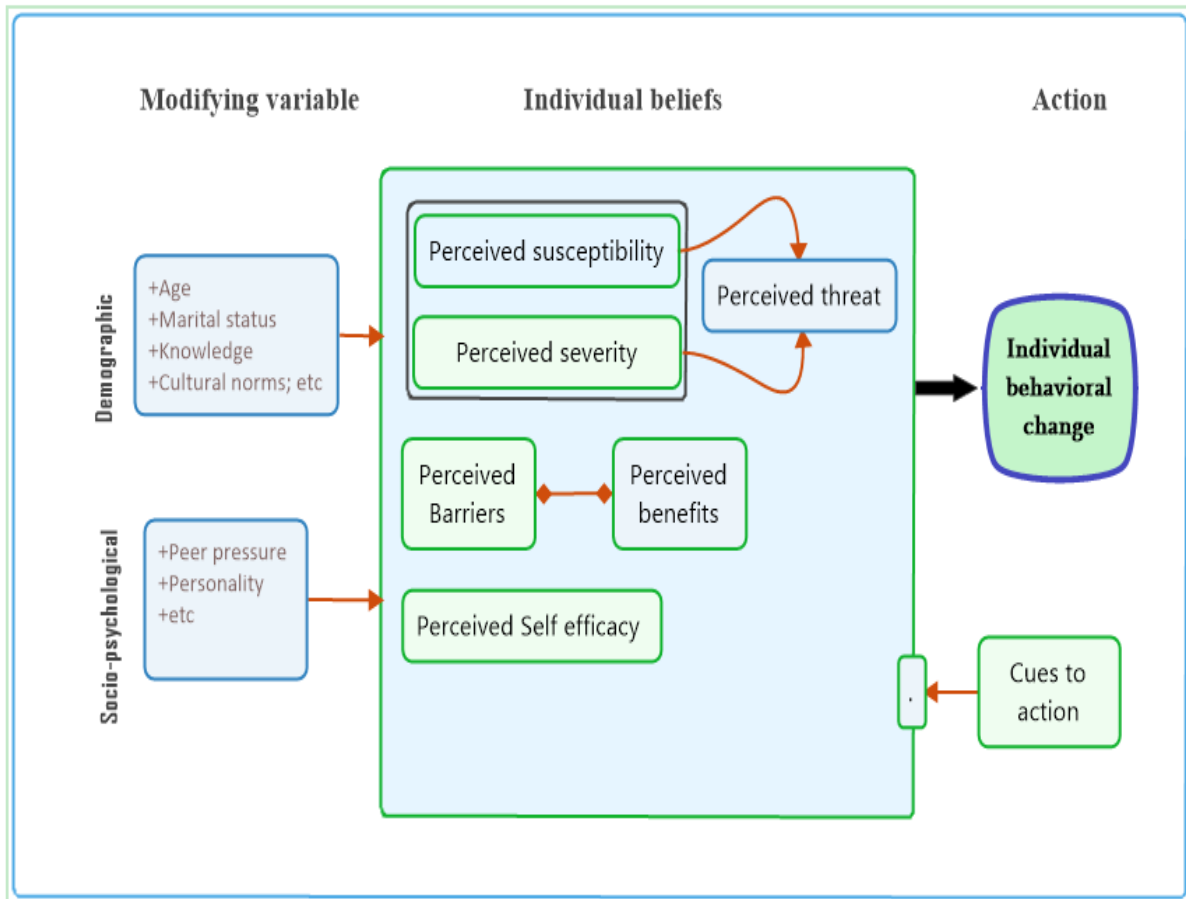
65 anxiety), skin cancers, and psychosis [18-20]. In 2014, Mahé [21] discovered that the extended
66 use of SLPs with potent steroids is associated with skin atrophy and steroid acne.

67 Research has also shown that skin-lightening practices involves products with toxic levels of
68 mercury (above one part per million (ppm)) [22, 23]. Mercury is one active ingredient
69 available in most skin-lightening creams and bathing soaps [15]. In 2016 [22] and 2019 [16],
70 laboratory tests in the United States of America (USA), United Kingdom (UK), Belgium,
71 Philippines, India, Bangladesh, Djibouti, Nigeria, Kenya, Cote d'Ivoire, and South Africa
72 revealed that some SLPs manufacturers purposely omitted labelling mercury as an ingredient
73 in their products. They oftentimes label false mercury levels in their products [24]. Yet, a
74 significant proportion of skin-lightening creams around the world contain high levels of
75 mercury above the national limit standards and the one ppm provision in the Minamata
76 Convention on Mercury [23, 25]. High levels (above 0.05 ppm) of mercury have also been
77 detected in children's blood and urine living with women using mercury-added cosmetics
78 [26]. Adverse neurological health effects have been detected in infants and unborn babies
79 [27]. Mercury has also been linked with nephrotoxicity following repeated skin absorption
80 [28-30].

81 To reduce mercury health risks, Lesotho ratified the Minamata Convention on Mercury on the
82 12 November 2014. The Convention set the limit of mercury in SLPs at one ppm [25]. As an
83 ultimatum, the manufacturing and trading of skin-lightening cosmetics containing mercury
84 above one ppm should have been banned from 2021 by all parties to the convention, except
85 for parties (including Lesotho) that applied for an exemption, and will initiate the ban from
86 2025 [25, 31]. Lesotho needed ample time to develop feasible and applicable strategies that
87 considered health, environmental, and socioeconomic factors to adopt and phase out

88 mercury-free products alternatives [32]. In terms of national legislation, there are currently
89 no regulations in Lesotho either prohibiting the sale of over-the-counter (OTC) cosmetics with
90 skin-lightening agents or limiting their concentrations for medical purposes. The sale and
91 importation of the SLPs has not been banned and street vendors, as well as foreigners' shops
92 sell them with no restrictions.

93 The Health Belief Model (HBM) (Fig. 1), as one of the health behaviour theories, guided this
94 research on perceptions and policy due to its contextual relevance and profound
95 manifestation of its robustness in behavioural change interventions [33, 34]. The model
96 aligned well with the aim of the study as it focused on behavioural change. The HBM is
97 comprised of key concepts that envision the rationale for people to act to avoid, test for, or
98 to manage an illness; these include perceived susceptibility, perceived severity, perceived
99 benefits, perceived barriers, cues to action, and self-efficacy. The model aligns with the three
100 objectives of this study. The first three constructs of the HBM, perceived susceptibility,
101 perceived severity and perceived benefits, are relevant to the first study objective, which was
102 on women's attitudes, perceptions and knowledge of negative health effects from skin
103 bleaching. The third study objective of exploring the barriers to the availability of health policy
104 on SLPs was analysed through the fourth HBM construct; that is, perceived barriers. The fifth
105 HBM construct, cues to action, is relevant to the second study objective, which focused on
106 the identification of applicable interventions (stimuli) to discourage skin-lightening practice.
107 The HBM can be well incorporated into designing relevant interventions which is the ultimate
108 goal for which the study findings will be used. Its constructs are appropriate for guiding short-
109 and long-term interventions aimed at changing women's unsafe practice of skin-lightening.



110
111

Figure 1. Health Belief Model (adapted from Glanz and others, 2008) [35]

112 In Lesotho, there are no studies showing the prevalence of skin-lightening by women.
 113 However, the Minamata Convention report provided an overview that the practice is
 114 prevalent [36]. There are no published studies highlighting why Basotho women use SLPs. In
 115 South Africa, Lesotho's only neighbour, the prevalence of skin-lightening among women
 116 ranges from 33% to 35% [37, 38]. Quite a significant number of research studies in Africa have
 117 focused on the health effects of skin-lightening on public health, but only a small number of
 118 them include women's perceptions and motivations towards the unsafe practice [38-42]. It is
 119 key to address these perceptions and attitudes to effectively reduce exposures to SLPs. The
 120 intention is that the findings of this study will serve as a benchmark for future research on
 121 skin-lightening practices in Lesotho.

122 Therefore, the aims of this study were to document Basotho women’s attitudes, perceptions,
123 and knowledge of the health risks of using SLPs, and to identify interventions for behavioural
124 change and risk communication strategies. Additionally, the intention was to explore the
125 perceived barriers to the availability and implementation of regulatory action (informed by
126 science) and national legislation that regulates skin-lightening cosmetics in Lesotho.
127 Understanding why Basotho women use SLPs and how they perceive skin-lightening health
128 risks should aid Lesotho’s government and its relevant stakeholders (public and private) in
129 developing policy.

130

131 **Methods**

132 **Study site and design**

133 This cross-sectional survey was conducted between January and February 2022 in the
134 Mokhotlong district of Lesotho, after ethics approval (Annexure E and F). Two target
135 populations, women and key informants, were chosen using convenience sampling and
136 purposive sampling, respectively. A sample of women was obtained by purposely selecting
137 Mokhotlong district (Fig. 2). Mokhotlong district, one of ten districts in Lesotho, was chosen
138 since it is closest to KwaZulu-Natal, South Africa, where skin-lightening is popular among
139 women [43]. Also, a part of the population of Mokhotlong work in South Africa, for example,
140 as domestic workers, factory workers, sugar cane farm labourers and street vendors. Two
141 health facilities from the selected district, namely Mokhotlong Government Hospital and
142 Mapholaneng Clinic, were chosen as study areas. Two facilities were identified as participants
143 from different areas were thought to provide a diversified sample characterised by women
144 with a range of cultural beliefs and norms.

145 At these facilities, participating women were conveniently interviewed by the researcher or a
146 trained field worker (Makerere University Master of Public Health graduate). Both
147 quantitative and qualitative methods were used to collect responses. We utilized a sequential
148 explanatory mixed-methods approach [75], interviewing 100 Basotho women. Quantitative
149 data collection preceded qualitative as the technique was predominantly quantitative and
150 had a larger focus. The qualitative content was required for complementarity.



151
152 **Figure 2.** The map of Lesotho districts showing the study location [74]

153 The second target population, key informants, were purposely selected and identified from
154 government ministries and an academic institution by virtue of their rich knowledge and
155 experience on the phenomenon being studied. The qualitative interview was used to collect
156 responses from five key informants from the Ministry of Health; the Ministry of Tourism,
157 Environment, and Culture; the Ministry of Trade and Industry; and the National University of

158 Lesotho. The key informants included four government officials at policy level and one senior
159 lecturer. All key informants' interviews were conducted in Sesotho by the researcher.

160 **Recruitment of the participants**

161 **Women**

162 The eligibility criteria for women included females aged at least 18 years, willing to provide
163 informed consent (see Annexure A), as well as able to understand and speak Sesotho or
164 English. Studies in Sub-Saharan Africa (SSA) revealed that the age at which women start skin-
165 lightening is mostly at 18 years old [13, 38, 39, 41, 44]. The researcher or research assistant
166 briefly explained the study to women in the waiting rooms of the Mokhotlong Government
167 Hospital and Mapholaneng Clinic during the routine pre-consultation health education
168 sessions run by these facilities, and on a one-on-one basis with women not showing any signs
169 of severe illnesses. Interested women were guided to an organized private room at the
170 healthcare facilities for further explanation of the study, to obtain informed consent and to
171 perform interviews. The estimated sample size of 100, was achieved using the sample size
172 calculation formula: $n = p(1-p) z^2/d^2$ whereby p (anticipated prevalence) = 50.4%, d (desired
173 precision) = 0.05 & z (critical value) = 1.96. An equal number of women (i.e., 50) were
174 interviewed at both healthcare facilities. Participants were recruited during weekdays when
175 the healthcare facilities were fully operational.

176 Since selection bias is often unavoidable [45], we tried to minimize it by obtaining a sample
177 from a defined population and by including as many participants as possible. The survey
178 questions for women were mixed together (i.e., sequential legitimation), so the analysis of
179 the collected responses was not affected by how they were collected [46]. From a qualitative
180 standpoint, the use of a theoretical framework and literature for analysis was considered to

181 ensure confirmability and dependability. For credibility, the findings of the study were
182 reviewed and confirmed by the student's (researcher) supervisors.

183 **Key Informants**

184 The first identified key informant was used to assist in finding other potential participants
185 (snowball sampling) until no new information was obtained during data analysis (data
186 saturation) [47]. This key informant was chosen because she was a Minamata Convention on
187 Mercury national focal point in Lesotho. The researcher sent the invitations through
188 electronic mail to the relevant respective offices with a detailed explanation of the study, and
189 the follow-up was done through phone calls. The researcher conducted face-to-face in-depth
190 interviews with one government official from the Department of Environmental Health in the
191 Ministry of Health; one from the Medicine Regulatory Unit (Pharmaceuticals Department) in
192 the Ministry of Health; one from the Department of Environment in the Ministry of Tourism,
193 Environment and Culture; one from the Ministry of Trade and Industry; and one senior
194 lecturer from the chemistry department at the National University of Lesotho. Prior to the
195 interviews, the key informants were taken through an informed consent process (see
196 Annexure B).

197 Since the qualitative approach is inherently subjective [48], the researcher used a reflexivity
198 process to minimize researcher bias. This was accomplished through self-recognition of
199 positionality [49] through writing reflexive notes and by self-acknowledgement that the
200 researcher conducted a literature review on the subject, which provided insights into skin-
201 lightening practice, perceived benefits, health risks and SLPs' use influences. The researcher
202 was cognizant that when asking questions and getting responses from the key informants,
203 there was a need to be neutral, putting aside personal views and insights and listening from

204 a researcher's standpoint. To establish the credibility of the findings, peer debriefing was
205 conducted with a colleague external to the study. A colleague of choice had taken the module
206 on qualitative research methods. The peer was engaged to review and assess the research
207 approach, transcripts of key informant interviews, and findings. Feedback was provided, and
208 some changes were made. Also, the co-authors were engaged during the process of data
209 analysis to review and assess the analysis of the data.

210 **Data collection**

211 **Women**

212 A standardized questionnaire (see Annexure C), adapted from the study of Hamed et al. [50],
213 was used to interview participating women. The use of a standardized questionnaire aided
214 with reducing information bias in the survey. The questionnaire was piloted on four female
215 village health workers (VHWs) serving the Mokhotlong Hospital catchment before being
216 administered for the main study. Minor changes were made to the questionnaire following
217 the study pilot. Women who participated in the study pilot did not partake in the main study.
218 The questionnaire was divided into six sections. The first section was demographic and family
219 background; the second, motives for using SLPs; the third, perceptions of pale complexion;
220 the fourth, perceived barriers to the recommended practice by dermatologists; and the fifth,
221 skin-lightening practice. For instance, the fifth section included questions such as where
222 women buy their SLPs; how long they have been using SLPs; and where on their bodies do
223 women apply SLPs. The sixth section deals with beliefs and knowledge on the health risks of
224 skin-lightening. A professional translator translated the questionnaire into Sesotho for ease
225 of administration and comprehension of the questions, and the researcher translated the
226 filled-out questionnaires back into English after the interviews. The researcher did not collect

227 any identifying information from the participants. A total of 100 questionnaires were
228 collected using the web-based LimeSurvey (LimeSurvey Development Team 2017) and paper-
229 based questionnaires as back up.

230 **Key informants**

231 All the key informants opted to be interviewed face-to-face in their offices and consented to
232 being audio recorded (see Annexure B for consent form). Interviews were recorded using two
233 smartphones as recording devices (switched on flight mode) and handwritten notes to ensure
234 that no important information was lost [51]. A semi-structured interview guide (Annexure D)
235 was utilized for the interviews. The interview sessions were administered in Sesotho as this
236 was the home language of the participants. All interviews with key informants took between
237 30 and 35 minutes. No incentives were provided for participating in the study, except for the
238 information sheets on skin-lightening health effects provided after the interviews.

239 **Data analysis**

240 **Women**

241 IBM SPSS Statistics 28.0.1.0 (IBM Corp 2021) was utilized to perform descriptive data analysis
242 and manual data analysis was performed to identify emerging themes from the qualitative
243 data. Regarding questions that gave qualitative data, such responses were collapsed in SPSS,
244 copied and pasted on a spreadsheet to establish the frequencies of the same responses on
245 variables of interest. A descriptive analysis described the sociodemographic information of
246 the sample as well as the women's skin-lightening practices. Statistical analysis tests were
247 performed using R 4.1.2 (R Core Team 2021). We calculated the median and interquartile
248 range (IQR) for age as the only continuous variable and then stratified into age groups.
249 Categorical variables were summarized using frequency tables with percentages. In terms of

250 inferential analysis, the chi-square test was used to check the differences between two
251 categorical variables with at least two groups, such as marital status (independent variable)
252 and SLPs usage (dependent variable). The Mann Whitney-U test was used to compare
253 differences between two independent groups (Yes and No) of a dependent variable (SLPs
254 usage) when the independent variable (age in years) is continuous, but not normally
255 distributed. The main researcher (NM) documented emerging themes from qualitative data,
256 based on the study objectives and the Health Belief Model's components.

257 **Key informants**

258 The NVivo 12 Pro (QRS International 2021) was used to perform a thematic analysis [52] of
259 qualitative data collected from the key informants. A deductive approach was used as the
260 researcher already had predetermined codes from the theoretical framework and study
261 objectives (see Annexure G). All recorded audio interviews were transcribed verbatim and
262 translated into English by hired and qualified transcriptionist. Braun and Clarke's [53] step-
263 by-step processes of qualitative data analysis were followed. That is: *1. Familiarization of*
264 *data:* All transcripts and field notes were read through to become acquainted with key
265 informants' responses while also observing some pattern emerging across the data. *2. Coding:*
266 The excerpts from the data matching or describing the predetermined codes were identified.
267 *3. Generating themes:* Seven themes were generated from the codes, and at this stage, some
268 of the codes were merged and renamed. *4. Reviewing themes:* The extracts were read again
269 to check their correspondence with the codes and themes. This was done to make sure our
270 themes portrayed accurate representations of the data. At this stage, some themes were
271 renamed, but none were merged. *5. Write up:* The findings and analysis of the data were

272 written up in this article. This was done to answer the specific objectives of the study and to
273 confirm some of the key informants' responses.

274

275 **Results**

276 **Women participants responses**

277 In our study, the median age of the participating women was 32.3 years. SLPs usage was
278 reported by 52.0% of the 100 women participants. As shown in Table 1, participating women
279 aged 25-34 used SLPs more than the other age groups combined (51.9%). There was no
280 significant difference in age between those who reported having used SLPs and those who
281 reported having never used them (p-value = 0.644). Almost 70.0% of the women who took
282 part in the study were married, as were 75.0% of those who used SLPs. Almost half of the
283 participants (47.0%) had self-described light brown skin complexion, whereas 13.0%
284 described themselves with black skin complexions. A statistically significant difference (χ^2
285 ($2df$) = 7.85, p-value = 0.020) was observed between SLPs usage and participants' highest level
286 of education, showing a positive moderate association (Cramer's V = 0.280). The use of SLPs
287 slightly increased as the education level increased from primary to secondary (57.1% vs.
288 59.6%), but significantly decreased as the education level increased from secondary to
289 tertiary (59.6% vs. 22.2%).

290 Of the 52 participating women who used SLPs, 53.8% had secondary school as their highest
291 education level. As illustrated in Table 2, half of the participants who reported to have used
292 SLPs had done so for one to five years, whereas 23.1% used them for over five years.
293 Additionally, 53.8% of the participating married women who used the SLPs reported using
294 them for at least a year but not beyond five years. Although none of the participants with

295 black skin tone used SLPs for longer than five years, 57.1% of them did so for one to five years.
 296 Of the participants who used SLPs, 59.6% spent less than US\$3.16 every month on buying
 297 them. Additionally, most participants (78.8%) who used SLPs applied them to their faces.

298

299 **Table 1** Sociodemographic descriptive statistics of women participants who used and have not used
 300 SLPs (N = 100)

Characteristics	Have you ever used skin-lightening products?		Total	p-value
	Yes (N = 52) n (%)	No (N = 48) n (%)		
Age in years ^a				*0.644
18-24	5 (9.6)	8 (16.7)	13	
25-34	27 (51.9)	20 (41.7)	47	
35-44	16 (30.8)	13 (27.1)	29	
45 upwards	4 (7.7)	7 (14.6)	11	
Marital status				**0.147
Single	10 (19.2)	17 (35.4)	27	
Married	39 (75)	30 (62.5)	69	
Separated	3 (5.8)	1 (2.1)	4	
Skin tone classification ^b				**0.566
Light	8 (15.4)	7 (14.6)	15	
Light brown	27 (51.9)	20 (41.7)	47	
Dark brown	10 (19.2)	15 (31.2)	25	
Black	7 (13.5)	6 (12.5)	13	
Highest level of education				**0.020
Tertiary	4 (7.7)	14 (29.2)	18	
Secondary	28 (53.8)	19 (39.6)	47	
Primary	20 (38.5)	15 (31.2)	35	

^a Median = 32.3, range = 18.7 – 79.4 and IQR = 11.5.

*Shapiro wilk-test used to determine the normality of age (years) distribution which suggested that the data was not normally distributed (p values = 1,352e⁻⁰⁶)

^b Participants self-identified their skin tone categories

*Mann Whitney-U test

**Chi-squared (X²) test

301

302 **Table 2** Demographic data by duration of skin-lightening practice among participating Basotho women
 303 (N = 52)

		Skin-lightening products usage duration			Total N = 52
		Less than a year n (%)	Between 1 and 5 years n (%)	Over 5 years n (%)	
Age in years	18-24	0 (0)	4 (80.0)	1 (20.0)	5
	25-34	9 (39.1)	11 (47.8)	3 (13.0)	23
	35-44	4 (20.0)	10 (50.0)	6 (30.0)	20
	45 upwards	1 (25.0)	1 (25.0)	2 (50.0)	4
Marital status	Single	4 (40.0)	4 (40.0)	2 (20.0)	10
	Separated	1 (33.3)	1 (33.3)	1 (33.3)	3
	Married	9 (23.1)	21 (53.8)	9 (23.1)	39
Skin tone classification	Light	2 (25.0)	4 (50.0)	2 (25.0)	8
	Light brown	6 (22.2)	13 (48.1)	8 (29.6)	27
	Dark brown	3 (30.0)	5 (50.0)	2 (20.0)	10
	Black	3 (42.9)	4 (57.1)	0 (0)	7
Highest level of education	Tertiary	2 (50.0)	1 (25.0)	1 (25.0)	4
	Secondary	8 (28.6)	16 (57.1)	4 (14.3)	28
	Primary	4 (20.0)	9 (45.0)	7 (35.0)	20
Monthly cost of skin-lightening products (Loti) ^c	Less than 50	10 (32.2)	13 (41.9)	8 (25.8)	31
	Between 50 and 70	2 (13.3)	9 (60)	4 (26.7)	15
	More than 70	2 (33.3)	4 (66.7)	0 (0)	6
Where skin- lightening products are applied	Only on the face	10 (24,4)	21 (51.2)	10 (24.4)	41
	On marks/pimples	2 (50.0)	2 (50.0)	0 (0)	4
	On the whole body	2 (33.3)	2 (33.3)	2 (33.3)	6
	Other (face, neck & hands)	0 (0)	1 (100)	0 (0)	1

^c The money is in Lesotho's currency (LSL). As at 13/09/2022, whereby 1.00 US\$ was equivalent to 17.37LSL

304 The three top motives for using SLPs by participating Basotho women (Table 3) were 1) to
 305 have a lighter skin complexion (31.0%), 2) to get rid of blackspots and pimples on their faces
 306 (26.2%), and 3) to look beautiful (12.2%). Similarly, participating women who were not using
 307 SLPs reported the same motives, pointing to why they thought other women used SLPs. In all
 308 three of the top motives for using SLPs, married women outnumbered single or separated
 309 women. That is, by 69.0% in the first top motive for using SLPs, 75.0% in the second and 60.7%
 310 in the third. The stratification based on marital status was chosen to see if the practice of skin-
 311 lightening is influenced by the same motives.

Table 3 The reported reasons for Basotho Women to use SLPs by marital status^d (N = 100)

Skin-lightening motives	Marital status			Total Answered Questions n (%)
	Single n (%)	Separated n (%)	Married n (%)	
To have a lighter skin complexion (European facial appearance)	18 (29.5)	4 (25)	49 (31.6)	71 (31.0)
To have a softer skin	4 (6.6)	3 (18.8)	3 (1.9)	10 (4.4)
To get rid of blackspots/pimples on my face	12 (19.7)	3 (18.8)	45 (29.0)	60 (26.2)
To look attractive to male companions	6 (9.8)	1 (6.6)	8 (5.2)	15 (6.6)
To recover from damage from over-usage of skin-lighteners on the body	4 (6.6)	4 (25)	4 (2.6)	10 (4.4)
To impress peers	4 (6.6)	1 (6.6)	10 (6.5)	15 (6.6)
To look beautiful	11 (18.0)	0 (0)	17 (11.6)	28 (12.2)
To have smooth skin	1 (1.6)	0 (0)	6 (3.9)	7 (3.1)
To remove/treat chloasma [†]	1 (1.6)	0 (0)	4 (2.6)	5 (2.2)
To reduce the oil in the skin	0 (0)	0 (0)	3 (1.9)	3 (1.3)
To look clean	0 (0)	0 (0)	2 (1.3)	2 (0.9)
To be pretty and charming	0 (0)	0 (0)	1 (0.7)	1 (0.4)
To boost self-esteem	0 (0)	0 (0)	1 (0.7)	1 (0.4)
Do not know	0 (0)	0 (0)	1 (0.7)	1 (0.4)

^d Respondents had the chance to select multiple responses and even to add more

[†] This is usually referred to as "the mask of pregnancy." It is a skin disorder characterized by discoloration of brownish patches on the face. It is known to occur evenly on both sides of the face or in other body areas exposed to the sun.

312 When asked, the three top places where the study participants bought SLPs (Fig. 3) were
 313 street vendors (37.3%), supermarkets (26.7%), and pharmacies (12.7%).



314 **Fig. 3** Places identified by participating Basotho women for buying skin-lightening products (N = 100)
 315

316 As shown in Table 4, almost an equal proportion of participants thought that lighter skin tone
317 provides women with higher self-esteem (58.0%) and believed that men consider women
318 with lighter skin tone more beautiful (55.0%). A higher proportion of the participating married
319 women (56.5%) believed men consider women with lighter skin tones more beautiful,
320 whereas only 48.1% of the participating single women believed that. Regardless of whether
321 they lightened their skin or not, participants disagreed with both the notions that lighter skin
322 is more attractive (69.0%) and that having a lighter skin tone increases a woman's likelihood
323 of getting married (63.0%). The participating women self-assessed and categorized their skin
324 tone between light, light brown, dark brown, and black. Participants could only select one
325 category. Those who did not believe that lighter skin is more attractive represented the
326 highest proportion in almost all the skin tone classifications (that is, 70.2% in light brown,
327 84.0% in dark brown, and 61.5% in black). The exception was in the light skin tone
328 classification, since those who believed skin tone was attractive and those who did not had
329 the same proportion (46.7%).

330 Additionally, among the 69 participating women who disagreed that a lighter skin complexion
331 is more beautiful than a dark skin complexion, 29.0% (20 women) still believed that having a
332 lighter skin tone would enhance one's chances of getting married (15 were married women).
333 Almost one-third (31.9%) of the participating married women believed that a lighter skin tone
334 enhances women's chances of getting married. Interestingly, 41.6% of the women who did
335 not use SLPs believed that men would consider women with a lighter skin tone to be more
336 beautiful and 45.8% believed lighter skin provides a woman with higher self-esteem.

337 **Table 4** Respondents perceptions of the benefits of skin-lightening (perceived benefits) by use and
 338 non-use (N = 100)

		Have you ever used skin-lightening products		Total (N = 100) n (%)
		Yes (N = 52) n (%)	No (N = 48) n (%)	
Do you think that a lighter skin tone is more beautiful?	Disagree	37 (71.2)	32 (66.7)	69 (69.0)
	Neutral	1 (1.9)	3 (6.3)	4 (4.0)
	Agree	14 (26.9)	13 (27.1)	27 (27.0)
Do you think that lighter skin tone provides women with higher self-esteem?	Disagree	13 (25)	22 (45.8)	35 (35.0)
	Neutral	3 (5.8)	4 (8.3)	7 (7.0)
	Agree	36 (69.2)	22 (45.8)	58 (58.0)
Do you think that lighter skin tone makes women look younger?	Disagree	43 (82.7)	31 (64.6)	74 (74.0)
	Neutral	0 (0)	6 (12.5)	6 (6.0)
	Agree	9 (17.3)	11 (22.9)	20 (20.0)
Do you believe that lighter skin tone implies that a woman belongs to a high social class?	Disagree	23 (44.2)	27 (56.3)	50 (50.0)
	Neutral	1 (1.9)	5 (10.4)	6 (6.0)
	Agree	28 (53.8)	16 (33.3)	44 (44.0)
Do you think that lighter skin tone helps a woman get a better job opportunity?	Disagree	21 (40.4)	29 (60.4)	50 (50.0)
	Neutral	7 (13.5)	5 (10.4)	12 (12.0)
	Agree	24 (46.2)	14 (29.2)	38 (38.0)
Do you believe that lighter skin tone increases a woman's chances of getting married?	Disagree	30 (57.7)	33 (68.8)	63 (63.0)
	Neutral	2 (3.8)	5 (10.4)	7 (7.0)
	Agree	20 (38.5)	10 (20.8)	30 (30.0)
Do you believe that men consider woman with lighter skin tone more beautiful?	Disagree	11 (21.2)	20 (41.7)	31 (31.0)
	Neutral	6 (11.5)	8 (16.7)	14 (14.0)
	Agree	35 (67.3)	20 (41.7)	55 (55.0)

339 The top three reported circumstances (perceived barriers) (Fig. 4) that may encourage women
 340 to use SLPs were: 1) skin tone discrimination by family and friends; 2) to recover from the
 341 damage from over-usage of skin lighteners on their bodies; and 3) lack of regulations on SLPs.
 342 Other circumstances included being too poor to afford skin problems specialist's services,
 343 post sickness that made the skin darker or damaged, peer pressure and feeling of being
 344 unloved by a companion due to dark skin complexion. Interestingly, 42 out of 100 participants
 345 (42.0%) did not know the circumstances encouraging Basotho women to apply SLPs on their
 346 bodies.

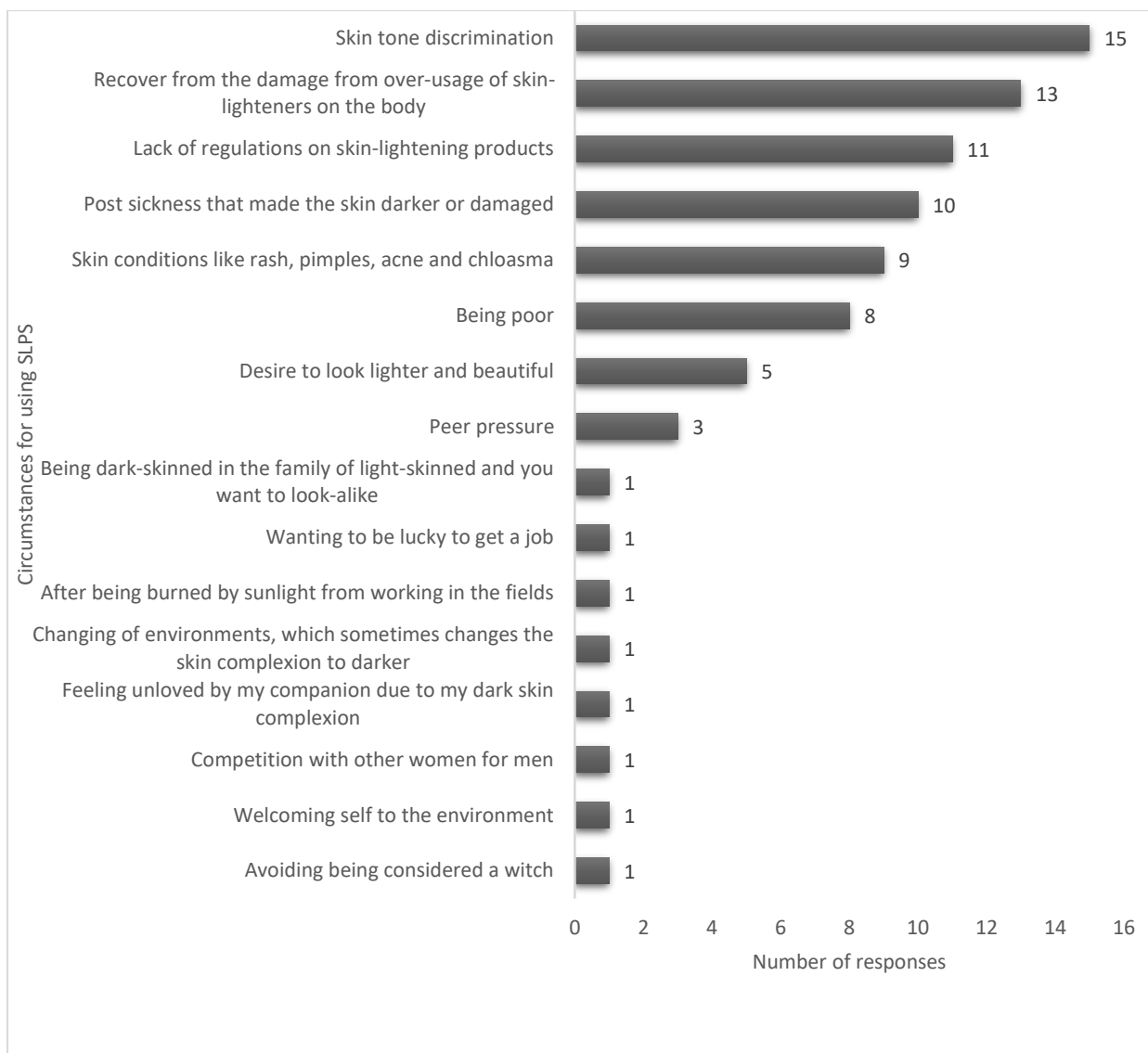


Fig. 4 Reported circumstances for using skin-lightening products ^e (N=100)

^e Respondents had the chance to select multiple responses and even to add more

347
 348
 349
 350 Two-thirds of the participants (69.0%) claimed to have heard something in the media on SLPs'
 351 usage, methods and their consequences (cues to action). Yet, over half (52.0%) were using or
 352 had used SLPs. However, there seems to be no statistical significance in the relationship
 353 between participating women who used SLPs and knowing about skin-lightening and its
 354 consequences ($p = 0.628$). Of the 52 women who reported using SLPs, 28.8% (15 women)
 355 reported that they never heard about skin-lightening health consequences. Importantly,
 356 90.0% of participants believed there are negative health effects from using SLPs. Three-
 357 quarters (77 women) of the respondents felt that those negative health effects could be

358 serious or life-threatening, and 53.2% of those women (41 women) had never used SLPs.
 359 (Table 5). Moreover, 62.0% (62 women) of the respondents were aware that health risks
 360 linked to skin-lightening are irreversible, and 51.6% of those women (32 women) had used
 361 SLPs. Additionally, 58.3% of women who believed SLPs health consequences are reversible
 362 (not permanent) had used them for less than a year.

363 **Table 5** Participating Basotho women’s perceived susceptibility and perceived severity of skin-
 364 lightening (N=100)

		Have you ever used skin-lightening products		Total N = 100 n (%)
		Yes (N = 52) n (%)	No (N = 48) n (%)	
Do you think using skin-lightening products have negative health effects?	Disagree	6 (11.5)	1 (2.1)	7 (7.0)
	Neutral	2 (3.8)	1 (2.1)	3 (3.0)
	Agree	44 (84.6)	46 (95.8)	90 (90.0)
Do you believe your body can eventually become accustomed to skin-lightening products, so it will be less likely to be damaged by them?	Disagree	34 (65.4)	34 (70.8)	68 (68.0)
	Neutral	4 (7.7)	4 (8.3)	8 (8.0)
	Agree	14 (26.9)	10 (20.8)	24 (24.0)
Do you think negative health effects caused by skin-lightening products can be serious or life threatening?	Disagree	8 (15.4)	4 (8.3)	12 (12.0)
	Neutral	8 (15.4)	3 (6.3)	11 (11.0)
	Agree	36 (69.2)	41 (85.4)	77 (77.0)
Do you think the damage caused by skin-lightening products is reversible?	Disagree	32 (61.5)	30 (62.5)	62 (62.0)
	Neutral	8 (15.4)	8 (16.7)	16 (16.0)
	Agree	12 (23.1)	10 (20.8)	22 (22.0)

365

366 **Descriptive data of the key informants**

367 A total of five key informants participated in the in-depth interviews. They were Basotho nationals—
 368 three males and two females. Their tenure in their positions at the time of the interviews ranged
 369 from 10 to 21 years.

370

371 **Key informants’ interview themes findings**

372 An overview of the seven themes generated from selected codes and excerpts in accordance
 373 with HBM and study objectives are presented in this section as findings from the analysis of

374 key informants' qualitative data. The codebook (Annexure G) shows all the excerpts and codes
375 that linked the themes in accordance with HBM and study objectives.

376 ***Theme one: Skin-lightening motives***

377 Key informants highlighted that Basotho women use SLPs for various reasons, but they felt
378 some motives are much more common than others. This included the desire to be beautiful,
379 to attain smooth skin, and to treat pimples and skin blemishes. The key informants shared
380 their views on the common motives of Basotho women to lighten their skin using products
381 that contain harmful chemicals. As one noted:

382 *"The reason is that these products [SLPs] do not only lighten the skin, but they also make*
383 *the skin smooth, so some people use them to become smooth. The light people [people with*
384 *naturally light skin in complexion] use them for that as well; to become smooth. They are*
385 *just used for cosmetic purposes, nothing more."* **(Health official key informant 1)**

386 Responding to whether women with naturally light skin complexions also use SLPs to
387 beautify themselves, a key informant who is an environment officer responded as follows:

388 *"Yes, because others are not using them to lighten their skin but to try and fix their skin*
389 *off pimples, and blemishes. At the end of it all, they all want to be beautiful."*
390 **(Environment official key informant 3)**

391 Another key informant viewed skin-lightening as an old practice that dates as far back as the
392 colonial era, when people were made to believe a white skin complexion was beautiful and
393 superior to a dark skin complexion:

394 *"...people tend to [use SLPs] these things under the guise of wanting to enhance their*
395 *beauty because it is the main reason for using these skin lightening products. I think it goes*
396 *all the way back to the colonial era where we were brainwashed, and the thinking mentality*
397 *is deeply engrained that if you are dark skinned you are not pretty and beautiful and that*
398 *one needs to be light skinned or be a 'yellow bone' to be appreciated and be considered as*
399 *beautiful."* **(Academic key informant 4)**

400 **Theme two: Barriers hindering the availability of SLPs regulations**

401 Key informants were asked to identify key barriers impeding the formulation and
402 implementation of SLPs regulations in Lesotho. Below is an illustration of key informants'
403 views on why legislation that would protect women from harmful SLPs are pending in
404 parliament:

405 *"The challenge might be, you will find that it takes a long time in Parliament until it closes.*
406 *By closing I mean, since the Parliament is in for five years only, it happens that you find the*
407 *five years goes by and the Bill is still in Parliament, when this happens the Bill is sent back*
408 *to the Ministry where it will go through the same steps again as if it is new. This is a*
409 *challenge."* **(Health official key informant 1)**

410 *"I may simplify it down to lack of awareness of the dangers of these products and because*
411 *of that we don't have any regulations against them."* **(Health official key informant 2)**

412 *"People who are elected to the parliament have no interest in passing laws. For instance,*
413 *here at our Ministry, we have about five Bills that are not being passed, and they go as far*
414 *back as 2006 (waste Bill and one for chemicals). We also have Bio- safety, Conservation*
415 *and what... We have five Bills that are pending approval by parliament."* **(Environment**
416 **official key informant 3)**

417 Key informants spoke on how the processes to finalize Bills are prolonged for years by
418 parliamentarians and how the failure to pass Bills discourages them as policy makers as a
419 result. An academic key informant indicated their views and feelings:

420 *"I don't know what the problem could be, but also the issue of when the Bill has been written*
421 *up and submitted to the parliament and then it takes five to ten years at the parliament and*
422 *not being processed can be very discouraging."* **(Academic key informant 4)**

423 **Theme three: Skin complexion**

424 According to two key informants in the study, women with naturally light skin complexions
425 were not an exception when it came to using SLPs. One key informant mentioned that he
426 was surprised to learn that women with light skin complexions also use SLPs:

427 *"The surprising thing I realised back when I was still in Mphahle's Hoek [one of the Lesotho's*
428 *districts] is that these products are not only used by the dark in complexion who want to*
429 *be lighter but also the light in complexion."* **(Health official key informant 1)**

430 **Theme four: Lack of access control**

431 All the key informants explained that accessing the SLPs in Lesotho is problematic as they are
432 imported and sold freely in the country due to the absence of regulations that control them.

433 For example:

434 *“...they enter the country illegally, but they are left to be sold freely in the country. This*
435 *happens because there are no laws or policies that regulate them from being imported into*
436 *the country.” (Environment official key informant 3)*

437 *“But then these ones that contain mercury are coming in newly and if you look at them,*
438 *they are mainly on the streets and in the shops owned by Chinese, Indian nationals etc. But*
439 *in the main retail shops you will not find them, this tells that they are not allowed but there*
440 *is no legislation that can control them. People are selling them, there is no tangible*
441 *legislation that can be referred to against the sale of these products.” (Academic key*
442 *informant 4)*

443 Additionally, a key informant who is a pharmacist by profession noted that other products
444 that are solely meant for treating skin problems become used for other purposes by
445 consumers:

446 *“What I can say is, these products [SLPs] are used as medication for skin problems, it is just*
447 *that people are misusing them. So, we can say these products are available at the hospital*
448 *but for treatment purposes not for the misuse we see with women. Since I joined the*
449 *government, I have been handling them [SLPs] for the treatment of patients.” (Health*
450 *official key informant 1)*

451 **Theme five: Skin-lightening health effects**

452 All the key informants responded to a question in which they were asked to provide opinions
453 on the use of SLPs by Basotho women. They provided insights into how they knew the health
454 effects were linked to the application of SLPs, such as:

455 *“This individual had been using them for a long time, her skin had become dry and so thin*
456 *that one could see the veins and [she] had stated complaining about sore bones.” (Health*
457 *official key informant 1)*

458 *“As long as they are available, people will continue to buy and use them. There will always*
459 *be damage for as long as they have access, but if they are made aware that what they are*

460 *doing is damaging not only to their skin but also to their entire health system, not even*
461 *their own, but also if they intend to have children and children that they may come in*
462 *contact with, that is, if they have skin-to-skin contact with a baby, they are likely to pass*
463 *these things to that said baby's skin and enter their system."* **(Academic key informant 4)**

464 *"As long as they are available, people will continue to buy and use them. There will always*
465 *be damage as long as they have access, but if they are made aware that what they are*
466 *doing is harmful not only to their skin but also to their entire health system, not just their*
467 *own, and if they intend to have children and children with whom they may come into*
468 *contact, that is, if they have skin-to-skin contact with a baby, they are likely to pass these*
469 *things to the baby's skin and enter their system."* **(Academic key informant 4).**

470 **Theme six: Minamata convention on mercury**

471 The key informants shared how being party to the Minamata convention on mercury is
472 moving in the right direction by looking at the activities that have already been conducted in
473 the country of Lesotho and how the country responded to the assigned tasks.

474 *"What we have done so far is to take inventory for sources of mercury in Lesotho, and we*
475 *have a report of the said inventory for the extend of mercury problem in the country. We*
476 *have already reviewed our legislation to see how we can accommodate control of mercury*
477 *and mercury containing products."* **(Health key informant 2)**

478 *"Data collection [in Lesotho] started after the Convention was signed [by Lesotho] and then*
479 *some of the resolutions in it led to the closure of the Philips Industrial Firm in the country*
480 *that was producing light bulbs. So, this means it has been a long time since the Convention*
481 *had been signed and has categories of terms that need to be followed including skin-*
482 *lightening products."* **(Academic key informant 4)**

483 **Theme seven: The need for other interventions**

484 In response to the question of which interventions should be implemented to protect women
485 against SLPs, the key informants expressed the interventions that could be implemented in
486 the absence of regulations as follows:

487 *"Educating people about these is a very important intervention because even if there is a*
488 *law against these products, if the people are not enlightened then they will still resort to*
489 *using them. But if they are equipped with the information, they will make informed*
490 *decisions."* **(Health key informant 1)**

491 *“It is simple, science has proved that these products contain dangerous chemicals, and we*
492 *have to make our people aware of the dangers of these products and that they need to be*
493 *banned.” (Health key informant 2)*

494 *“When there isn’t a law there isn’t much that can be done, a lot of awareness raising*
495 *activities and hope that people are listening.” (Environment official key informant 3)*

496

497 **Discussion**

498 **Skin-lightening prevalence**

499 This prevalence of skin-lightening in the present study (52.0%) is slightly higher than the
500 prevalence (50.3%) reported in Ghana [13], but surprisingly higher than South Africa’s
501 (prevalence of 33% to 35%) [37, 38]. This study demonstrated that many Basotho women
502 (over half of the study participants) utilized SLPs regardless of their skin complexion. The
503 findings that SLPs are used by women regardless of their skin colour (including light
504 complexion) concurred with the findings from other studies in African countries such as South
505 Africa, Ghana, and Zimbabwe [38, 53, 54]. A possible explanation may be because women
506 with fair complexions may want to maintain their complexions or treat skin blemishes,
507 whereas women with dark complexions may want to have a lighter complexion.

508 In this study, it was hypothesized that women using SLPs would be more prevalent in the 25–
509 34 age group than in other age groups. This was anticipated as women in this age group
510 consists of women in the early adulthood stage who have not yet been married and tend to
511 value physical beauty, which is believed to serve as a form of social capital [11]. Although
512 there was no significant correlation between age group and SLPs’ use, more SLPs users were
513 in the 25–34 age group, and this finding was consistent with findings from other studies [13,
514 38, 50, 55].

515 **Perceived benefits**

516 The use of SLPs among women can be motivated by beliefs, perceptions, and life
517 circumstances. In the present study, the participants' beliefs that light skin tone provides
518 women with higher self-esteem and that men consider women with lighter skin tones to be
519 more attractive appeared to be vital contributing factors to the use of SLPs. The previously
520 mentioned beliefs could be viewed as perceived benefits, but they promote the unhealthy
521 behaviour of skin-lightening [56, 57]. On the other hand, they present perceived barriers
522 because they could prevent individuals from resorting to healthy behaviours [58, 59].

523 An interesting finding was that of the participating women who used SLPs, three-quarters
524 were married; perhaps they felt a need to practice skin-lightening to keep their husbands and
525 save their marriages [60, 61]. It has been reported in other studies that married women tend
526 to lighten their complexions to please their husbands, based on the notion that men are
527 attracted to '*yellow bones*' (a slang term used in contemporary society for young women who
528 have a light complexion) [9, 42]. Social pressure appears to trigger women to use SLPs so that
529 they gain a perceived social value from being '*yellow bones,*' demonstrating the significance
530 of social influence on behavioural issues. Furthermore, married study women additionally
531 highlighted three key reasons for skin-lightening, that is, the desire to have a lighter skin
532 complexion, beautification, and the removal of blackspots and pimples on the face, which
533 appear to have been highly expressed as skin-lightening motives among women in the study.
534 Similar findings have been reported in other studies in African and Asian countries [9, 11, 38,
535 41, 54, 62]. The key informants in the study also confirmed these motives.

536 In this study, women in disagreement with the idea that lighter skin is more beautiful
537 dominated in almost all the skin-tone classifications. Forty-five participating women's

538 justification was that all natural skin tones are beautiful since beauty is not defined by light
539 skin tone; that dark skin is less prone to skin illnesses than lighter skin is, and it ages more
540 slowly. Nevertheless, 29.0% of those who opposed that notion believed having light skin could
541 boost their chances of getting married. This demonstrates how people can compromise their
542 health when they believe there are more social gains from perceived benefits compared to
543 the perceived susceptibility or severity of an unhealthy behaviour.

544 **Perceived barriers**

545 The most common perceived barriers to abstaining from using SLPs in this study were: skin
546 tone discrimination, fixing blemishes from overuse of SLPs, and a lack of regulations on
547 cosmetics with skin-lightening agents. The former topped the list of circumstances, as the
548 participating women thought it was highly possible but not necessarily that they had
549 experienced it. Previous studies reported the perceived barriers to engaging in health-
550 promoting behaviours as being: affordability (high costs); accessibility (convenience); lack of
551 knowledge on alternative healthy behaviours; and lack of short-term proof of health benefits
552 [63].

553 Our study results demonstrated the cruciality of identifying strategies for helping women
554 overcome perceived barriers when promoting health-related behaviours. As a
555 recommendation, the government of Lesotho needs to empower and capacitate its public
556 healthcare facilities to provide affordable skin care services. These will be cues to action to
557 indirectly discourage skin-lightening, since skin care services will be easily accessible. The
558 environmental health practitioners could also help in explaining the dangers of SLPs on
559 various platforms. On the same note, the key informants are policymakers and legislative
560 drafters, that means they are familiar with the obstacles and challenges facing legislative

561 processes in Parliament. They expressed how demoralizing it was to see their work go in vain
562 after spending long hours drafting bills that the parliament fails to enact while public health
563 continues to be jeopardized.

564 **Perceived susceptibility and severity**

565 One crucial aspect of this study is the participants' awareness and knowledge with respect to
566 the consequences of the skin-lightening even though this was not enough to discourage the
567 use of SLPs. In this study, the lack of statistical significance in the relationship between women
568 who used SLPs and their knowledge of the health consequences of skin-lightening ($p > 0.05$)
569 may imply that there was no statistical power (small sample size) to detect the significance,
570 or perhaps this indicated no relationship. Consistent with previous studies [7, 38, 50], the
571 participants were aware that the use of SLPs poses a health risk and can cause serious damage
572 to their bodies; unlike in Parvathi et al.'s study, where participants did not understand the
573 health risks linked to SLPs use [64]. Our study findings demonstrate that SLPs' users are not
574 underestimating skin-lightening health impacts, but that skin-lightening motivations,
575 influences, and circumstances outweigh their desired health behaviour. Additionally, the
576 messaging or health risk communication may have been limited to eliciting behavioural
577 changes based on risk communication platforms or the portrayers themselves. In light of the
578 documented health risk of skin-lightening [15, 65, 66], the high proportion of SLPs users in
579 Lesotho confirms the findings of Sagoe et al.'s meta-analysis study of 68 studies that skin-
580 lightening practice is a serious public health concern [67].

581 In contrast to other studies [4, 6, 9], almost 80% of the SLPs users in the present study applied
582 skin lighteners solely on their faces rather than on their entire bodies or just on dark spots.
583 Achieving a beauty ideal starts with the face, as it is the most exposed part of the body and a

584 first point of reference to check the skin's fairness. Corroborating the findings of previous
585 studies [43, 50], the face appeared to be the most common area for application, conveying
586 that those practicing skin-lightening are at risk of having skin conditions associated with the
587 application of SLPs on the face, such as exogenous ochronosis, acne, or dermatitis [22, 68].

588 In this study, use of SLPs was associated with education level (7.7% vs 53.8%: tertiary
589 education and secondary education, respectively), contrary to the findings of Hamed et al.
590 [50]. In our current study, the skin-lightening prevalence seems to decrease with a significant
591 increase in educational level. This could imply that people are not familiar with skin-lightening
592 at a primary level and are not even aware of its health impacts. Also, this could indicate an
593 inability to read and notice warning labels or information, or that there is none. Education
594 level and the use of SLPs, however, remain a contentious topic of discussion needing more
595 research as similar studies reported inconsistent findings [38, 50, 69]. People with higher
596 levels of education are more conscious of health issues and use their knowledge more
597 effectively to make informed decisions regarding their health [70]. The adverse health effects
598 of skin-lightening should be addressed in the curriculum as cues to action at the most basic
599 level of education. Focused education through public health campaigns targeted at
600 consumers is needed to discourage the use of SLPs. Similar campaigns were done in countries
601 such as Zambia, Côte d'Ivoire, Ghana, and Jamaica [71, 72].

602 As per the insights of the key informants in this study, the consequences of skin-lightening
603 have not gone unnoticed. The use of SLPs by Basotho women could be because they are not
604 seriously considering the negative effects of skin-lightening or because they do not associate
605 the health effects with the practice. However, it is concerning that there is evidence that
606 women are aware of the substantial health risks of using SLPs and do understand their serious

607 implications, but the prevalence of skin-lightening by participants is over half. This public
608 health concern necessitates substantial public education [73] and prompt formulation and
609 implementation of regulations. It is also equally important for Lesotho to strengthen its
610 borders against the importation of SLPs.

611 **Cues to action**

612 Our current study provided evidence that SLPs are easily imported from neighbouring South
613 Africa. However, it is also possible that they are imported from other countries, even though
614 there is no evidence to support this. Therefore, the lack of access control on SLPs importation
615 into Lesotho suggests that local consumers easily buy them from street markets and
616 supermarkets. The affordability (cheap products) and accessibility could have played a pivotal
617 role in skin-lightening prevalence, and this necessitates SLPs' phase-out or down strategies to
618 target the street markets as the main target places. Likewise, formal businesses need to be
619 subjected to stricter regulations and restrictions on SLPs with skin-lightening agents. To ease
620 its regulation and control, the informal sector needs to be legalized. Although it may be
621 difficult to license informal vendors and ensure enforcement in Lesotho because of the
622 relentless clashes between the informal sector and local authorities. For instance, evident
623 resistance and resilience behaviour by street vendors related to issues of street vending in
624 prohibited urban locations, such as specific streets, pavements, parking lots, the middle of
625 the road, and in front of retail shops [76].

626 To reduce the use of hazardous SLPs, the perceptions of women about these products need
627 to be addressed through policy briefs, presentations on local radio stations, national
628 television, and in parliament. The unavailability of regulations on SLPs needs to be supported
629 by other interventions to educate people on the associated health risks from the use of SLPs.

630 Agencies with an interest on public health such as the Lesotho Medical, Dental and Pharmacy
631 Council need to also advocate for the formulation of regulations and public policies to control
632 the sale of SLPs in the country.

633 **Minamata Convention on Mercury and SLPs**

634 This study justified why Lesotho became a party to the Minamata Convention on Mercury.
635 The domestication of the Convention could be influential towards the government's efforts
636 to ban mercury-added products, which include SLPs. The need for a ban is supported by
637 previous studies that found mercury as one of the key ingredients in the SLPs [10, 23]. Lesotho
638 is moving in the right direction as evidenced by a completed inventory report on mercury
639 sources in the country and the closure of a factory producing mercury-added products. These
640 encouraging initiatives indicate that consistent participation in the convention will benefit the
641 country and its citizens.

642 As our study was foundational, explorative studies are needed to find out more in-depth
643 information on the use of SLPs nationwide to further inform implementation of the Minamata
644 Convention on Mercury. These studies should focus on the skin-lightening motives and
645 perceptions of women in both rural and urban areas, include more participants countrywide,
646 and perform sample testing at the laboratory on SLPs to check the levels of harmful chemicals
647 such as mercury and hydroquinone. Future research may investigate whether women who
648 use SLPs believe their skin tone classification has changed after using such products, as well
649 as whether married women believe they attracted their husbands because their skin is lighter
650 than it was before using SLPs.

651 Lesotho, as a party to the Minamata Convention, is obliged to collaborate with relevant
652 intergovernmental and non-governmental organisations in providing education on the
653 negative consequences from the exposure to mercury compounds [25], which are also in SLPs.

654 **Limitations**

655 This study has some limitations that are beyond the researchers' capabilities. First, despite
656 the calculated sample size, less was sampled and women were recruited from only two public
657 healthcare facilities, and this is a limitation as it reduces the statistical power of the study.
658 The study had to be undertaken within the scope of MPH dissertation level and therefore had
659 a limited timeframe and budget for completion. As a result, our findings may not adequately
660 reflect the perceptions and motivations of women in other districts of Lesotho. Second, the
661 use of non-randomised convenience sampling to recruit women also limited the
662 generalizability of the findings. Also, the sample was not stratified in terms of equal number
663 of single, separated divorced or married participants, therefore potentially skewing the data
664 towards married women. Future studies should consider collecting adequate data to stratify
665 for marital status. Third, the study was prone to recall bias in the literature due to referring
666 to self-reported data from which study participants might have had poor recall of live events.
667 Fourth, the study was prone to sampling bias as the subjects were conveniently sampled from
668 a heterogeneous study population. Finally, the study lacks investigator triangulation since
669 only one investigator analysed the data due to the limited scope of the preliminary study.
670 However, this data is useful as pilot data to trigger future research and policy.

671

672 **Conclusion**

673 Based on the findings of the study, the use of SLPs is a common practice among Basotho
674 women and has the potential to cause serious harm to their health. This practice was
675 regardless of their age, skin tone, marital status, and educational background. The study
676 showed that there is some knowledge regarding the associated health risks of using SLPs, but
677 that did not appear to be a factor for discouraging use. The perceived benefits, which include
678 perceptions of beauty, self-esteem enhancement, and success in both personal and
679 professional endeavours (such as employment possibilities and marriage), serve to support
680 the use of SLPs. The availability of SLPs in street markets and at low prices may also have an
681 influence on their usage.

682 The findings, therefore, highlight and support an urgent need for local intervention initiatives.
683 This is to instill more knowledge and strengthen public awareness efforts targeted at SLPs'
684 consumers, distributors, and sellers about the negative health effects of engaging in skin-
685 lightening practices. It is a necessity for all relevant government ministries and stakeholders
686 to invest in extensive public education along with efficient policing of informal markets. The
687 study served as a foundation for future research in Lesotho to explore more into the topic of
688 SLPs and public health, as well as to support implementation of the international Minamata
689 Convention.

690 **Abbreviations**

691 IQR: Interquartile range; SLPs: Skin-lightening products; SSA: Sub-Saharan Africa; VHWs:
692 village health workers

693 **Declarations**

694 **Ethics approval and consent to participate**

695 The University of Cape Town's Health Sciences Faculty Research Ethics Committee (HREC REF:
696 759/2021) and the Ministry of Health Ethics Clearance Committee in Lesotho (REF: ID 168-
697 2021) both granted ethical clearance (Annexure E and F), and approval was obtained from the
698 health facilities' authorities as well. Participants were informed of the details of the study and
699 were included only after consenting to partake. Women provided verbal consent while the
700 key informants provided written and signed consent forms.

701 **Consent for publication**

702 Not applicable

703 **Availability of data and materials**

704 All data generated and analysed to support the conclusions of the current study is included in
705 this manuscript. Raw data and codebook for transcript analysis (supplementary material 1)
706 will be available from the corresponding author on reasonable request.

707 **Competing interests**

708 The authors declare that they have no competing interests.

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712 **Authors' contributions**

713 NM designed the study with supervision from HAR and RE. NM interviewed women in
714 Mokhotlong district and key informants in Maseru district; analysed and interpreted the data;
715 and drafted the manuscript. HAR and RE critically reviewed the manuscript. All authors
716 reviewed and approved the final manuscript.

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Part C: Appendices

Annexure A – Informed consent for women

Study title: Assessment of Basotho women’s perceptions of the health risks associated with skin-lightening in Lesotho using the Health Belief Model

Introduction

My name is Ntseke Makutoane. I am a Master of Public Health student in the Division of Environmental Health at the University of Cape Town. This research is part of the Master of Public Health Degree requirement. You are kindly invited to take part in this research project.

I am going to read you the important information about the study and then I will allow you to ask some questions if you need more clarity. This study has been approved by UCT’s Health Sciences Faculty Research and Ethics Committee as well as Lesotho’s Ministry of Health Research and Ethics Committee.

Why is this study being done?

In this study, we want to find out what Basotho women think about skin-lightening products. We also want to find out places where women buy skin-lightening products they use. The hope is that the findings of this study will help the government of Lesotho and other stakeholders to protect women from any harm linked to skin-lightening products.

Who can participate in the study?

To take part in this study, you must be a Mosotho woman aged 18 years or above. You must also not be classified as very sick by the nurse during the sorting of patients according to their health conditions.

What will be required of you should you decide to take part in this study?

Your participation in the study is to answer few questions from the questionnaire. The expected responses will be your opinions and they will not be viewed as correct or incorrect. Personal information such as date of birth, skin tone classification and highest level of education will also be collected. The interview should take approximately 30 minutes to complete.

What are the risks and discomfort of this study?

The researcher is not aware of any risks associated with participating in this study. You are free not to answer any questions you are not comfortable responding to. However, you will be helpful if you answer all the questions. If you are worried of being sick from using skin-lightening products, you will be referred to the doctor at Mokhotlong Hospital.

What are the benefits of participating in this study?

The findings from the study will be shared with the government of Lesotho to inform legislation on skin-lightening products restrictions in the country. You will be provided with a leaflet on health effects of using skin-lightening products after the study. If you have already experienced the health effects of skin-lightening, you will be provided with a list of names and contact details for medical practitioners you can consult.

What happens if you do not want to participate in this study?

Participating in this study is completely voluntary, and you are free not to answer any questions you are not comfortable with. You are also free to stop participating at any time without any penalty and allowed to ask for your responses to be taken out of the study if you wish.

Who will have access to the information collected in this study?

The information collected in this survey is confidential and only the research team will have access to it. The responses you give will be kept anonymous as unique codes will be used instead of your name or any identifying characteristics. All records will be destroyed or deleted after 3 years of secured storage.

Do you have any questions or need further clarification?

If you have questions or need further clarifications about the study, please contact the supervisor:

Prof. Andrea Rother

Division of Environmental Health
School of Public Health and Family Medicine
University of Cape Town
Tel: (+27) 21 404 7661 – Email: andrea.rother@uct.ac.za

If you feel a need to contact the Health Research Ethics Boards, their contact information is provided here:

Human Research Ethics Committee Chairperson

Prof Marc Blockman
University of Cape Town
Department of Medicine
Tel: (+27) 21 406 6338 – Email: Marc.Blockman@uct.ac.za

Lesotho's MOH Research and Ethics Committee

Dr Llang Maama-Maime
Ministry of Health
Tel: (+266) 2222 6317 – Email: rcumoh@gmail.com

Do you agree to be interviewed?

YES

NO

Annexure B – Informed consent for key informants

Study title: Assessment of Basotho women’s perceptions of the health risks associated with skin-lightening in Lesotho using the Health Belief Model

Introduction

My name is Ntseke Makutoane. I am a Master of Public Health student in the Division of Environmental Health at the University of Cape Town. This research is part of the Master of Public Health Degree requirement. You are kindly invited to take part in this research project.

This form contains information that will help you decide whether to participate in this study or not. Take time to read the entire form and let me know if you need more clarity or have any concerns. This study has been approved by both UCT’s Health Sciences Faculty Research and Ethics Committee, and Lesotho’s Ministry of Health Research and Ethics Committee.

Why is this study being done?

In this study, we want to seek the evidence to provide to the government of Lesotho and other stakeholders with information to safeguard women from exposure to dangerous skin-lightening agents contained in cosmetics. The hope is that the findings of this study will help the government of Lesotho and other stakeholders protect women from any harm linked to skin-lightening products.

Who can participate in the study?

To take part in this study, you must be a Lesotho government official/public servant at policy level. You must have worked in one of the following ministries for at least 5 years: Ministry of Health; Ministry of Tourism, Environment, and Culture; Ministry of Trade and Industry; or Ministry of Police and Public Safety.

What will be required of you should you decide to be a participant in this study?

Your participation in this study will be to respond to questions that will be asked by the investigator. The expected responses will be your opinions and they will not be viewed as correct or incorrect. You are allowed to freely answer in detail as much as you can. The questions will include details such as your position and role, and the department in the ministry you work for. The interview will be conducted at your convenient time. The interview will be audio-recorded with your permission and will take approximately 45 minutes to complete.

What are the risks and discomfort of this study?

The researcher is not aware of any risks associated with participating in this study.

What are the benefits of participating in this study?

There are no personal benefits from participating in this study. However, the findings of the study will be shared with your ministry/department in a journal article. The interview will be conducted at your convenient time.

What happens if you do not want to participate in this study?

Participating in this study is completely voluntary, and you are free not to answer any questions you are not comfortable with. However, you will be more helpful if you respond to all of the questions. You are also free to stop participating at any time without any penalty and allowed to ask for your responses to be taken out of the study if you wish.

Who will have access to the information collected in this study?

The information collected in this survey will be handled confidentially. Recorded audios will be listened to by the research team and a reputable transcriptionist, while the rest of the collected information will be accessible to the research team only. The responses you give will be kept anonymous as unique codes will be used instead of your name or any identifying characteristics during data analysis and reporting of the findings. All records will be destroyed or deleted after 3 years of secured storage.

Do you have any questions or need further clarification?

If you have questions or need more clarifications about the study, please contact the supervisor:

Prof. Andrea Rother

Division of Environmental Health

School of Public Health and Family Medicine

University of Cape Town

Tel: (+27) 21 404 7661 - Email: andrea.rother@uct.ac.za

If you feel a need to contact ethics committees, their contact information is provided here:

Human Research Ethics Committee Chairperson

Prof Marc Blockman

University of Cape Town

Department of Medicine

Tel: (+27) 21 406 6338 - Email: Marc.Blockman@uct.ac.za

Lesotho's MOH Research and Ethics Committee

Dr Llang Maama-Maime

Ministry of Health

Tel: (+266) 2222 6317- Email: rcumoh@gmail.com

Do you agree to be interviewed?

YES

NO

Do you agree for this interview to be recorded?

YES

NO

Signed (participant) _____ on the _____

Declared (investigator) _____ on the _____

Annexure C – Questionnaire for women

Research Title: Assessment of Basotho women's perceptions of the health risks associated with skin-lightening in Lesotho using the Health Belief Model

Date

D	D	M	M	Y	Y	Y	Y
---	---	---	---	---	---	---	---

Name of the Researcher

Participant Code Participant Cell No. (Optional)

Section A – Demographic and Family Background

1. What is your date of birth?

D	D	M	M	Y	Y	Y	Y
---	---	---	---	---	---	---	---

2. What is your relationship status?

- Single
- Separated
- Married
- Civil union
- Other

3. How do you classify your skin tone?

- Light
- Light brown
- Dark Brown
- Black

4. What is your highest level of education?

- Tertiary
- Secondary
- Primary
- Without education

Section B – Motives for using Skin-lightening Products

**Please select all that apply*

5. Please tell me why women are using skin-lightening products?

- To have a lighter skin complexion (European facial appearance)
- To have a softer skin
- To get rid of blackspots/pimples on my face
- To look attractive to male companions
- To recover from the damage from over-usage of skin-lighteners on the body

- To impress peers
- Other (specify) _____

Section C – Perceptions of Pale Complexion (Perceived Benefits)

This section consists of several 3 point-Likert scale questions. For each, you select whether you agree, neutral (i.e. neither agree nor disagree) or Disagree with the question and give reason(s) for your answer.

6. Do you think that a lighter skin tone is more beautiful?
 Agree Neutral Disagree
Reasons for your answer? _____

7. Do you think that lighter skin tone provides women with higher self-esteem?
 Agree Neutral Disagree
Reasons for your answer? _____

8. Do you think that lighter skin tone gives female a younger looking?
 Agree Neutral Disagree
Reasons for your answer? _____

9. Do you believe that lighter skin tone implies that a woman belongs to a high social class?
 Agree Neutral Disagree
Reasons for your answer? _____

10. Do you think that lighter skin tone helps a woman get a better job opportunity?
 Agree Neutral Disagree
Reasons for your answer? _____

11. Do you believe that lighter skin tone increases a woman's chances of getting married?
 Agree Neutral Disagree
Reasons for your answer? _____

12. Do you believe that men consider woman with lighter skin tone more beautiful?

- Agree Neutral Disagree

Reasons for your answer? _____

Section D – Perceived Barriers to the Recommended Practice

**Select all that apply.*

13. What circumstances do you think might encourage women to use skin-lightening products?

- Being poor
 Lack of regulations on skin-lightening products
 Racism/discrimination
 To recover from the damage from over-usage of skin-lighteners on the body
 Other (specify)_____

Section E – Skin-lightening Practice

14. Have you ever used skin-lightening products?

- Yes No

(If answered “yes”, skip to Question 17)

(If answered “No”, proceed to Question 15)

15. Do you know someone who has been using or used skin-lightening products?

- Yes No

16. Where do they buy those skin-lightening products?

**Select all that apply.*

- Supermarkets
 Pharmacy
 Cosmetic shop
 Street vendors
 Other (specify)_____

I do not know

(Then skip to Question 22)

17. Where do you buy the skin-lightening products you use?

**Select all that apply.*

- Supermarkets
 Pharmacy
 Cosmetic shops
 Street vendors
 Other (specify)_____

18. How long have you used skin-lightening products?
 Less than a year Between 1 and 5 years Over 5 years
19. How much do you spend on skin-lightening products each month (in LSL)?
 Less than 50 Between 50 and 70 More than 70
20. Where do you apply skin-lightening products?
 Only on the face Directly on the marks/pimples On the whole body
 Other (specify)_____
21. Who advised you to apply the skin-lightening products?
 Friend/relative
 Street vendor
 Social media
 Mass media
 Myself
 Other (specify)_____

Section F – Beliefs and Knowledge about the Health Risks of Skin-lightening

22. Have you heard, read or seen anything in the media about skin-lightening and its consequences?
 Yes No
23. Do you know someone who has experienced or is experiencing health problems because of using skin-lightening products?
 Yes No
24. Do you think using skin-lightening cosmetics have negative health effects?
 Agree Neutral Disagree
- (If answered “agree”, proceed to Question 25)*
(If answered “neutral” or “disagree” skip to Question 26)
25. Explain any negative health effects of using skin-lightening products you know.
- _____
- _____
- _____
26. Do you believe your body can eventually become accustomed to skin-lightening products, so it will be less likely to be damaged by skin-lightening products?
 Agree Neutral Disagree

27. Do you think negative health effects caused by skin-lightening products can be serious or life threatening?

- Agree Neutral Disagree

28. Do you think the damage caused by skin-lightening products is reversible?

- Agree Neutral Disagree

29. How would you feel if you have health effects associated with skin-lightening now?

- Unpleasant Nothing
 Worried Other (specify) _____

30. What impacts do you think damaged skin for skin-lightening could have on you?

- Unloved by companion Hinder ability to attend public events/meet people
 Loose friends Other (specify) _____

31. Apart from using skin-lightening products, do you know if there are other alternatives women use to lighten their skin? If yes explain.

32. How do think information about the dangers of skin-lightening should be shared with women and adolescent girls? And from who?

Thank you for taking your time to participate in this important study. Your opinions and comments are important and appreciated.

END OF THE SURVEY

Annexure D – Interview guide for key informants

Research Title: Assessment of Basotho women’s perceptions of the health risks associated with skin-lightening in Lesotho using the Health Belief Model

Date

Name of the Researcher

Section A - Interviewee Information

Name and surname

Ministry

Department

Position/Role

Participant Cell #

Participant email address

Section B – Introduction

Thank you for agreeing to take part in our study as a key informant, and for agreeing to participate in this interview. As previously stated, we are running research on the assessment of Basotho women’s health risk perceptions on the use of skin lighting products. As part of that, government officials from relevant ministries are identified as key informants to partake as well. Therefore, I would like to ask you some questions about your views and thoughts on possible barriers to the formulation of national legislation on skin-lightening products import and sale. Feel free to express yourself as frankly and truthfully as possible. There are no correct or incorrect responses.

Section C – Interview Questions

1. I would like to start by asking you to describe the role that is played by your ministry/department regarding skin-lightening products production/sale/importation.

Probes: How long have you worked in your ministry?

2. Studies show that there is a high prevalence of skin-lightening in Africa. In your personal capacity, why do you think Basotho women engage in the practice of skin-lightening?

3. What are your opinions regarding the issue of skin-lightening by Basotho women?

Probes: Do you think the practice contributes positively or negatively to the economy of the country? How?

4. Please explain the process of formulating the regulations in the country.

Probes: How is the involvement of the organisations in the process?
How is the involvement of the community in the process?

5. Could you please describe the reasons for the lack of legislation on skin-lightening products sales, importation, and distribution in the country.

Probes: Is there any attempt by your ministry/department to solve those barriers?

6. What interventions do you think could add to the enforcement of regulations/policies/treaties on skin-lightening products management in the country?

Probes: Provide examples of impact of domestication of the Minamata convention on mercury in Lesotho?

7. Do you have anything you would like to add, suggest or questions you would want to ask before we end the interview session?

Our interview has now come to an end. Thank you for the information you have shared and for the valuable time you have spared to take part in our study.

~~~~~**END OF THE GUIDE**~~~~~

**Annexure E – Ethical clearance from the University of Cape Town’s Health Sciences Faculty Research Ethics Committee**



**UNIVERSITY OF CAPE TOWN**  
**Faculty of Health Sciences**  
**Human Research Ethics Committee**



Room 45, E-52- Old Main Building  
Groote Schuur Hospital  
Observatory 7925  
Telephone (021) 406 6492  
Email: [hrec-enquiries@uct.ac.za](mailto:hrec-enquiries@uct.ac.za)

Website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms)

02 December 2021

**HREC REF: 759/2021**

**Prof A Rother**

Division of Environmental Health  
Falmouth Building-FHS  
Email: [andrea.rother@uct.ac.za](mailto:andrea.rother@uct.ac.za)  
Student: [MKTNTS006@myuct.ac.za](mailto:MKTNTS006@myuct.ac.za)

Dear Prof Rother

**PROJECT TITLE: ASSESSMENT OF BASOTHO WOMEN’S PERCEPTIONS OF THE HEALTH RISKS ASSOCIATED WITH SKIN-LIGHTENING IN LESOTHO USING THE HEALTH BELIEF MODEL-MASTERS CANDIDATE-MR NTSEKE MAKUTOANE**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study, subject to local HREC approval.

**This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19, dated 17 March 2020: 06 July 2020 & 01 July 2021.**

**Approval is granted for one year until the 30 December 2022.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms))

**The HREC acknowledge that the student: - Mr Ntseke Makutoane will also be involved in this study.**

**Please quote the HREC REF 759/2021 in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

HREC/REF 759/2021sa

Yours sincerely

Signed by candidate

**PROFESSOR M. BLOCKMAN**

**CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE**

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

NHREC-registration number: REC 210200-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DuH 2020), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

HREC/REF 759/2021se

**Annexure F – Ethical clearance from Ministry of Health Ethics Clearance Committee in Lesotho**



Ministry of Health  
P.O. Box 514  
Maseru 100

REF: ID 168 2021  
Date: December 29, 2021  
To  
**Mrr. Ntseke Michael Makotoane**  
MKTNTS006 (2020)  
Principal Investigator (PI)  
University of Cape Town

Category of Review:  
 Initial Review  
 Continuing Annual Review  
 Amendment/Modification  
 Reactivation  
 Serious Adverse Event  
 Other \_\_\_\_\_

Dear **Mr. Makotoane**

**RE: Assessment of Basotho Women's Perceptions of the Health Risks Associated with Skin-Lightening in Lesotho Using the Health Belief Model**

This is to inform you that the Ministry of Health Research and Ethics Committee reviewed and **APPROVED** the above named protocol and hereby authorizes you to conduct the study according to the activities and population specified in the protocol. Departure from the approved protocol will constitute a breach of this permission.

This approval includes review of the following attachments:

- Protocol
- Informed consent form:** Informed consent for women (English & Sesotho)
- Data Collection:** Questionnaire for Women (English & Sesotho), Interview Guide for Key Informants
- Participant materials:
- Other materials:** Letter of recommendation from University of Cape Town dated 28<sup>th</sup> October 2021 and CV\_ Ntseke Michael Makotoane.

This approval is **VALID** until December 29, 2022.

Please note that an annual report and request for renewal, if applicable, must be submitted at least 6 weeks before the expiry date. All serious adverse events associated with this study must be reported promptly to the MOH Research and Ethics Committee. Any modifications to the approved protocol or consent forms must be submitted to the committee prior to implementation of any changes.

We look forward to receiving your progress reports and a final report at the end of the study. If you have any questions, please contact the Research and Ethics Committee at [rc@moth@gmail.com](mailto:rc@moth@gmail.com) (or) 59037919/58800246.

Sincerely,

Signed by candidate

**DR. NYANE LETSIE**  
Director General Health Services

Signed by candidate

**DR. LIMPHO MAILE**  
Member of National Health Research  
Ethics Committee (NH REC)

## Annexure G – Codebook

| Theme                                                  | Code name              | Definition                                                                                                                                      | Reason to include it                                                                                                             |
|--------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Barriers hindering the availability of SLP regulations | Barriers               | Anything that stands against the progress of the processes or activities of skin-lightening products regulations.                               | This informs the specific objective 3 of the study.                                                                              |
| Skin-lightening motives                                | Smoothness as a motive | The desire to have smooth skin being an influence on women’s use of skin-lightening products.                                                   | This informs the specific objective 1 of the study.                                                                              |
|                                                        | Beauty as a motive     | The desire to be beautiful being an influence on women’s use of skin-lightening products.                                                       | This informs the specific objective 1 of the study.                                                                              |
| Need for other interventions                           | Education              | A method of conveying essential knowledge to people for them to grow and be able to make informed decisions towards a certain health behaviour. | This informs the specific objective 2 of the study.                                                                              |
|                                                        | Awareness              | Making people aware of specific knowledge with the goal of changing how people think or know skin-lightening and its consequences.              | This informs the specific objective 2 of the study.                                                                              |
| Lack of access control                                 | Control at borders     | Ability to allow or disallow what gets imported at the ports of entry.                                                                          | It helps to provide an insight into the status of skin-lightening control in the country.                                        |
|                                                        | Display for sale       | Putting a product in a place where it can be easily seen and bought.                                                                            | It helps to provide an insight into the status of skin-lightening control in the country.                                        |
|                                                        | Misuse                 | The wrong use of a product to achieve something that was not intended for.                                                                      | It helps to provide an insight into the status of skin-lightening control in the country.                                        |
| Skin-lightening health effects                         | Consequences           | Negative results from applying cosmetics with skin-lightening chemicals above international standards.                                          | It is important to know if the key informants are also knowledgeable in terms of the negative health effects of skin-lightening. |
| Minamata convention on mercury                         | Convention             | The naturalness of a woman’s skin in terms of colour and appearance.                                                                            | The complexion of the skin is what matters to women when defining facial beauty.                                                 |
| Skin complexion                                        | Complexion             | The naturalness of a woman’s skin in terms of colour and appearance.                                                                            | The complexion of the skin is what matters to women when defining facial beauty.                                                 |

## Annexure H – Environmental Health journal publishing instructions

Source: <https://ehjournal.biomedcentral.com/submission-guidelines/preparing-your-manuscript/research>

### Criteria

Research articles should report on original primary research.

The abstract must include the following separate sections: Background, Methods, Results, Conclusions.

In the main text, the Methods section should be placed after the Background. We strongly discourage the use of subheadings in the Results and Discussion section.

There is no formal word limit or restriction on the manuscript length for research articles, but we advise authors to keep their articles as concise as possible. Additional files which enhance the understanding of the manuscript but are not crucial components of the research article can be published where appropriate.

*Environmental Health* strongly encourages that all datasets on which the conclusions of the paper rely should be available to readers. We encourage authors to ensure that their datasets are either deposited in publicly available repositories (where available and appropriate) or presented in the main manuscript or additional supporting files whenever possible. Please see Springer Nature's [information on recommended repositories](#).

### Preparing your manuscript

Quick points:

- Use double line spacing
- Include line and page numbering
- Use SI units: Please ensure that all special characters used are embedded in the text, otherwise they will be lost during conversion to PDF
- Do not use page breaks in your manuscript

The information below details the section headings that you should include in your manuscript and what information should be within each section.

Please note that your manuscript must include a 'Declarations' section including all of the subheadings (please see below for more information).

## Title page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:
  - "A versus B in the treatment of C: a randomized controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
  - or for non-clinical or non-research studies a description of what the article reports
- list the full names and institutional addresses for all authors.
  - if a collaboration group should be listed as an author, please list the Group name as an author. If you would like the names of the individual members of the Group to be searchable through their individual PubMed records, please include this information in the "Acknowledgements" section in accordance with the instructions below.
- indicate the corresponding author.

## Abstract

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of randomized controlled trials should follow the [CONSORT](#) extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used
- **Results:** the main findings
- **Conclusions:** brief summary and potential implications
- **Trial registration:** If your article reports the results of a health care intervention on human participants, it must be registered in an appropriate registry and the registration number and date of registration should be stated in this section. If it was not registered prospectively (before enrollment of the first participant), you should include the words 'retrospectively registered'. See our [editorial policies](#) for more information on trial registration

## Keywords

Three to ten keywords representing the main content of the article.



## Background

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

## Methods

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials
- a clear description of all processes, interventions and comparisons. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses
- the type of statistical analysis used, including a power calculation if appropriate

## Results

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

## Discussion

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

## Conclusions

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

## List of abbreviations

If abbreviations are used in the text, they should be defined in the text at first use, and a list of abbreviations should be provided.

## Declarations

All manuscripts must contain the following sections under the heading 'Declarations':

- Ethics approval and consent to participate
- Consent for publication

- Availability of data and materials
- Competing interests
- Funding
- Authors' contributions
- Acknowledgements
- Authors' information (optional)

Please see below for details on the information to be included in these sections.

If any of the sections are not relevant to your manuscript, please include the heading and write 'Not applicable' for that section.

### Ethics approval and consent to participate

Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

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