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EDUCATIONAL ATTAINMENT AND SKIN LIGHTDENING: COMPARING THE PRACTICE AMONG UNIVERSITY EDUCATED AND LESS EDUCATED ADULTS IN ACCRA, GHANA

BY

EUNICE KESEWA BAFFOE DADZIE

(11366257)

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DECLARATION

I, Eunice Kesewa Baffoe Dadzie declare that this work results from my own investigation under the supervision of Dr Serwaa Akoto Bawuah. Recognition is duly given to referenced literature and no part of this work is submitted to any other institution for any other degree.

…….. ……

Eunice Kesewa Baffoe Dadzie

(Student)

Date: 26-11-2024

Dr. Serwaa Akoto Bawua

(Supervisor)

Date: 26-11-2024

DEDICATION

This piece is dedicated to God and my mother, Mrs. Hagar Annobil-Dadzie and siblings; Joshua N.L. Lartey, Emmanuella N.L. Lartey and Annabel N.L Lartey.

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ABSTRACT

Background: Skin-lightening practices, driven by socio-cultural, economic, and media influences, were widespread in many parts of the world, including Ghana. These practices involved the use of various products or treatments to achieve a lighter skin tone, often tied to perceived beauty standards, social status, and media representation. In Ghana, particularly in Accra, skin-lightening spanned diverse educational levels, with different motivations and health implications for university-educated and less-educated adults. Studies suggested a rising prevalence of skin-lightening in the region, posing significant public health risks, including skin damage, psychological effects, and potential systemic health issues. Understanding the prevalence and associated factors was crucial for designing effective public health interventions and regulatory policies.

Aims/Objectives: This study aimed to determine the prevalence of skin-lightening practices among university-educated and less-educated adults in Accra, Ghana. It also sought to explore the associated health risks, attitudes, and motivations, while hypothesizing that educational level significantly influenced knowledge, risk perception, and behavior related to skin-lightening practices.

Methods: The study adopted a quantitative, cross-sectional design conducted at the University of Ghana, Legon campus, and Madina La Nkwantanang. A structured questionnaire was used to collect data from a stratified random sample of 355 participants (84 from Legon and 271 from Madina). The questionnaire assessed demographic characteristics, knowledge of skin-lightening risks, perceived benefits, attitudes, and motivations. The sample distribution was intentionally weighted towards Madina to reflect the larger population of less-educated adults in the community. Validation of the questionnaire was conducted through a pilot study. Data analysis was performed using Stata software, employing descriptive and inferential statistics to identify patterns and control for potential confounders. Ethical approval was obtained from

the NOGUCHI Memorial Institute for Medical Research, and all participants provided informed consent.

Conclusion: This study yielded insights into the prevalence and factors driving skin-lightening practices in Accra. It highlighted disparities in attitudes and risk perceptions between different educational groups. The findings are anticipated to inform targeted public health strategies, such as education campaigns addressing misconceptions and risk perceptions, and regulatory policies aimed at controlling harmful skin-lightening products. By emphasizing risk perception and health implications, the study sought to promote safer practices and reduce the prevalence of skin-lightening in Ghana.

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LIST OF ABBREVIATIONS

BDD	Body Dysmorphic Disorder
DOPA	Dihydroxyphenylalanine
EU	European Union
FDA	Food and Drugs Authority
HPA	Hypothalamic-Pituitary-Adrenal
IARC	International Agency for Research on Cancer
OTC	Over the counter
POMC	Pro-opiomelanocortin
SL	Skin Lightening
SLP	Skin Lightening Product/Practice
UG	University of Ghana
UK	United Kingdom
USA	United State of America
UV	Ultraviolet
WHO	World Health Organisation
α- MSH	α- Melanocyte-Stimulating-Hormone

CHAPTER ONE

INTRODUCTION

1.1 Background

Skin color is primarily determined by the amount of melanin, a pigment produced by specialized cells called melanocytes. Melanin is the primary determinant of skin color in humans and exists in various forms, including eumelanin, which gives the skin shades; brown and black, and pheomelanin which gives skin shades between yellow to red (Terranova & Tamburri, 2021). Individuals with darker skin tones typically have higher quantities of melanin, particularly eumelanin, which is an effective absorber of ultraviolet (UV) radiation and protects the skin from sun damage (Thawabteh et al., 2023).

However, melanin production can be influenced by various factors, such as sunlight exposure, hormones, skin damage, and certain chemicals, which can lead to changes in skin complexion (Brenner & Hearing, 2008) When exposed to ultraviolet radiation (UV), the skin increases melanin synthesis as a protective mechanism, leading to the darkening of the skin, or a tan (Brenner & Hearing, 2008) However, this increased melanin accumulation helps protect the DNA of epidermal cells from UV ray damage and the breakdown of folic acid (Biga et al., 2019)

Recently, there has been an increasing desire among individuals with darker skin to lighten their skin tone, often as a response to perceived skin damage or societal pressures (Dlova et al., 2014). Skin lightening (SL) is a cosmetic procedure aimed at reducing melanin concentration to achieve a lighter skin tone. This practice, commonly referred to as bleaching, involves the use of topical and sometimes systemic chemicals (Sommerlad, 2022). Various products,

including soaps, lotions, creams, and scrubs, are utilized to alter skin complexion (Asumah et al., 2022).

The motivation for skin lightening is rooted in complex historical, economic, sociocultural, and psychological factors. Historically, the practice can be traced back to the early 20th century, where it was adopted by African Americans as a means of coping with the legacy of slavery and racism (Azibo, 2011; Dorman, 2011).

In an article about the history of skin bleaching in Ghana by Dr. Edmund Delle stated that Ghanaian ladies began the practice shortly after World War II, SL users utilized Asepso and Neko as skin-whitening soaps in the late 1940s (Dorkenoo, 1990 ; Arthur, 2002). Skin bleaching soap use died out by the end of 1980, having been prevalent from 1957 until that year. Many skin-whitening creams were introduced to the Ghanaian market at the beginning of the 1990s, eventually replacing bleaching soaps. By the end of the 20th century, skin-whitening soaps had become obsolete, and skin-whitening creams were the mainstay of the multimillion-dollar bleaching industry in terms of cosmetics and products. Among other factors, these included the need to gain some social acceptance among peers and the attraction of potential suitors.

Today, skin lightening is prevalent worldwide, with a reported 27.7% prevalence and significant usage in regions such as the Caribbean, Asia, and Africa (Sommerlad, 2022). In Africa, the persistence of colonial beauty standards has perpetuated the belief that fair skin is synonymous with success and beauty, leading to high rates of skin bleaching among women (Lewis et al., 2011; Julien, N. 2014).

In West Africa, skin-lightening practices are strikingly widespread, with consistently high prevalence reported across multiple countries. Nigeria, for instance, records the highest prevalence globally, with over three-quarters of women reportedly using such products, while

similarly high rates have been observed in Senegal and Mali (Amodu et al., 2018; WHO, 2018; Blay, 2011; Baxter, 2000). In Ghana, although the overall prevalence is comparatively lower, studies still indicate that skin-lightening is common, with rates ranging from 26.3% in the general population to 40.9% among female university students (Agyemang-Duah et al., 2019; Asumah et al., 2022). Taken together, these findings highlight not only the pervasiveness of skin-lightening practices across the region but also important variations across populations and settings. They suggest that while the practice cuts across diverse demographic groups, younger women and students may represent particularly high-risk subgroups, underscoring the need for more targeted public health interventions.

Advertising in Africa has played a crucial role in promoting fair skin as desirable and associated with higher social and economic advantages (Lewis et al., 2011). This perception contributes to the widespread use of skin lightening products, despite their potential adverse effects. Prolonged use of products containing hydroquinone, mercury salts, and other harmful chemicals can lead to severe health issues, including skin atrophy, cancer, and systemic complications such as hypertension and glaucoma (Dlova et al., 2014).

Given that skin lightening is an individual choice, influenced by various sociocultural factors, this study aims to investigate the prevalence and associated factors of skin lightening among educated and uneducated adults in Accra, Ghana. Understanding these factors is crucial for developing targeted interventions to address the health risks associated with skin lightening practices.

1.2 Problem Statement

The widespread use of skin lightening (SL) products has become a major global public health concern, exposing consumers to health risks and posing challenges for dermatologists. A common challenge arises when individuals mistakenly use products marketed as “skin

brighteners" but which contain harmful skin lightening agents. While skin brightening is intended to enhance the skin's natural radiance without altering pigmentation using ingredients such as vitamin C, niacinamide, and alpha hydroxy acids (Bains, 2021), skin lightening specifically reduces melanin to achieve a lighter complexion. Misuse of these products can cause irreversible skin damage, creating difficulties for dermatologists in treatment (Kundu, 2023).

The motivations for SL are multifaceted, shaped by historical, cultural, economic, and psychological factors. Some individuals use SL to treat dermatological conditions such as acne or hyperpigmentation, but the majority engage in the practice for cosmetic purposes, often without medical supervision (Manoj et al., 2024). The health risks are well documented. For example, the Food and Drugs Authority (FDA) warns against hydroquinone-containing products due to risks of exogenous ochronosis, swelling, and rashes, while the World Health Organization (WHO, 2023) highlights additional risks such as delayed wound healing and impaired skin regeneration.

Beyond medical risks, SL carries significant socio-cultural and psychological implications. The preference for lighter skin in many societies can be traced to colonial histories, where fair complexion was associated with privilege and higher social status (Agyemang-Duah et al., 2019). These perceptions continue to influence beauty standards, leading many women and increasingly men to adopt SL practices in pursuit of social acceptance, peer approval, or enhanced attractiveness.

In Ghana, approximately 41% of the population is reported to use SL products (Agyemang-Duah et al., 2019). Motivations include perceptions of being "too dark," social pressures, and the belief that lighter skin is fashionable or conveys superiority (Adu-Gyamfi, 2017). Although topical products such as soaps and creams remain common, alternative methods, including chemical peels, laser treatments, cosmelan therapy, and glutathione injections, are increasingly popular. These procedures, however, carry risks such as renal failure, blood poisoning, infections, and organ damage if improperly administered (Gotter, 2023). Even chemicals marketed as "safer alternatives," such as kojic acid or azelaic acid, may be harmful at high concentrations (Owolabi et al., 2020).

Across Africa, prevalence rates remain alarmingly high, ranging from 25% in Mali to 77% in Nigeria, with intermediate rates in Senegal (50%), South Africa (32%), Ghana (39%), and

Congo-Brazzaville (66%) (Agyemang-Duah et al., 2019). These figures underscore the urgency of addressing SL as both a public health and socio-cultural issue. Although SL is widely practiced and carries significant health and social risks, regulatory and public health responses remain limited. In Ghana, loopholes in regulatory enforcement allow manufacturers to submit safe products for approval, only to later introduce unsafe versions containing mercury, hydroquinone, or corticosteroids (Adu-Gyamfi, 2017). This undermines consumer safety and erodes trust in regulatory bodies.

Addressing the SL phenomenon requires a comprehensive and multi-sectoral approach. First, policymakers must strengthen regulatory frameworks to restrict the importation, marketing, and distribution of harmful products. Second, consumer awareness campaigns are needed to educate the public on the risks of SL and promote safe skin care alternatives. Third, expanding access to affordable dermatological services can provide treatment for skin conditions without resorting to bleaching. Fourth, interventions must address socio-cultural drivers by promoting inclusive beauty standards that celebrate diverse skin tones.

The effectiveness of these interventions depends on balancing costs and implementation challenges. Regulatory enforcement, for instance, requires sustained investment in market surveillance, which may strain limited public health budgets. Public education campaigns must overcome entrenched beauty ideals and aggressive marketing by cosmetic companies. Moreover, promoting alternatives such as dermatological care may be hindered by high costs and limited availability in low-resource settings. Without addressing these economic and cultural barriers, interventions may achieve only limited impact.

The use of SL products represents a complex intersection of health, culture, and economics. In Ghana and across Africa, high prevalence rates highlight the urgent need for coordinated public health action. By combining regulatory enforcement, education, improved dermatological services, and cultural transformation, policymakers can work towards mitigating the harmful consequences of SL practices.

1.3 Justification of the study

Skin lightening (SL), also referred to as skin bleaching, is the deliberate reduction of melanin in the skin through the use of chemical products or dermatological procedures to achieve a lighter complexion. It must be distinguished from skin brightening, which aims to restore skin radiance without altering pigmentation and generally employs safer ingredients such as vitamin C or niacinamide (Bains, 2021). The misuse of SL products (SLPs) has become a global phenomenon, raising significant public health concerns. Despite well-documented risks including ochronosis, hypertension, kidney damage, and skin cancer SL remains widespread, largely due to misinformation, aggressive marketing, and limited regulatory enforcement (Tesfamariam et al., 2023; Kundu, 2023).

The global SL industry was valued at over $8.6 billion in 2020 and is projected to reach $16 billion by 2030 (Grand View Research, 2021). Prevalence rates remain high across regions: more than 60% of women in India use SL products; up to 40% of women in Jordan report SL use; and in the Caribbean, countries such as Jamaica and the Dominican Republic show widespread practices (WHO, 2018; Charles, 2003). Africa records some of the world's highest rates, with 77% of Nigerian women, 50% of Senegalese women, and approximately 39–41% of Ghanaian women reported as users (Agyemang-Duah et al., 2019; WHO, 2018). These statistics highlight the urgency of understanding SL not only as a dermatological issue but as a complex socio-economic and cultural phenomenon.

In Ghana, SL is increasingly prevalent, making it important to investigate factors influencing its persistence. Education is particularly significant because it is closely linked with socio-economic status and health literacy (Agyekum & Boateng, 2018; Sarpong & Amoah, 2020). Individuals with higher educational attainment are expected to have greater access to information, improved critical thinking, and better awareness of health risks. However, the practice persists among both educated and less-educated groups, suggesting nuanced motivations that require further study. Investigating these differences will provide insights into how education influences motivations, risk perception, and usage patterns of SL.

The financial burden of SL is twofold: consumers spend heavily on products and procedures, while public health systems bear the cost of treating complications such as organ damage, skin cancer, and infections. These costs far exceed the investment required for preventive

interventions. Public health strategies such as regulation, consumer education, and the provision of affordable dermatological care are comparatively cost-effective, reducing both long-term health expenditures and productivity losses linked to SL-related morbidity.

The persistence of SL in Ghana and globally underscores the need for a deeper understanding of how education influences its practice. This study argues that educational attainment plays a dual role: while it may increase health awareness, it can also perpetuate cosmetic trends through exposure to globalized beauty standards. By examining the prevalence, motivations, and risk perceptions of SL among educated and less-educated adults in Accra, this study aims to inform targeted interventions that address both the health and socio-cultural dimensions of the practice.

1.4 Research Questions

1. what is the association between socio-demographic factors and prevalence of skin lightening in Accra, Ghana
2. What is the level of knowledge, perception and attitudes associated with Skin Lightening practices in Accra, Ghana?
3. What is the association between sociodemographic factors and knowledge on prevalence of skin lightening practices in Accra, Ghana?

1.4.1 Study Objectives

1.4.2 Main Objective

To assess the prevalence of skin lightening practices and its associated factors among educated and uneducated adults in Accra, Ghana

1.4.3 Specific Objectives

1. To determine the association between socio-demographic factors and prevalence of skin lightening in Accra, Ghana

2. To evaluate the level of knowledge, perception and attitudes regarding skin lightening practices among both educated and uneducated adults in Accra.
3. To examine the associations between sociodemographic factors and knowledge on the prevalence of skin lightening practices in Accra, Ghana.

1.5 Theoretical Framework

This study will explore two theories in understanding the behavior surrounding skin lightening among university educated and less educated. The Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) offer a framework for understanding the complex interplay of factors influencing skin lightening practices. The HBM theory suggests that individual's decisions about health-related behaviors are influenced by their perceptions of susceptibility, severity, benefits, barriers, and cues to action (Rosenstock, 1974). Additionally, the TPB theory posits that behavior is driven by behavioral intentions, which are influenced by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991).

1.6 Conceptual framework

This framework suggests that skin lightening practices involve a complex interplay of demographic, socioeconomic, sociocultural norms, risk perception; individual perceptions of benefits and risks and other factors such as media influences and proliferation of skin lightening products on the market. These factors influence an outcome; prevalence of skin lightening, which is the main variable that this study seeks to investigate. It measures the degree to which skin lightening is practiced among both educated and uneducated adults. The independent variables such as educational status, demographic factors, socioeconomic factors, sociocultural

factors, media influences, risk perception, market factors and psychological and emotional factors directly influence the outcome (dependent variable) in several ways.

Educational status

Dapaah & Donkor (2021) purported that people with secondary education and higher are often able to make informed decision concerning their health, because they are more knowledgeable and have greater awareness of risks associated with skin lightening. Educational attainment shapes individuals' perception of risks and perceived control over their health decisions. This aligns with HBM's constructs of perceived barriers and TPB's constructs of attitudes and perceived behavioral control. However, they may still continue in the practice due to entrenched social norms. Meanwhile, uneducated individuals, particularly those who have no formal education or little basic education may not be privy to information about the health risk of skin lightening practices (Nana-Dabie & Minta, 2022).

Demographic factors

Comparatively, Osei & Ofori (2018); Sarpong & Osei suggest that younger adults and women are more susceptible to practice skin lightening more, because of their need to conform to societal beauty norms. Married individuals may also portray a different habit towards SL practices, as compared to unmarried individuals. These variables, according to the HBM model impact subjective norms and perceived susceptibility, thereby influencing intentions towards skin lightening.

Socioeconomic factors

Factors such as one's income level and employment status have an ability to influence the habit of skin lightening and what type of product they will use. According to Baffoe & Kwarteng (2020) individuals that earn higher income can afford more expensive products that are associated with good quality and for that matter be less harmful compared to cheaper ones. A

person's socioeconomic status (SES) can affect their ability to access and afford high-quality skin lightening products. Also, people with higher SES may have better access to information about the potential risks and benefits of these products, and therefore may be able to afford more expensive, potentially safer, products. On the other hand, people with lower SES may be more likely to use cheaper, less regulated products that may be more harmful. Additionally, lower SES individuals may face more barriers to accessing healthcare and information about skin lightening products, which can further limit their ability to make informed decisions about their skin health.

Sociocultural factors

On the other hand, socio-cultural factors such as colonial beauty standards that equate lighter skin with beauty and success may be one reason perpetuating the skin lightening practice. Also, deep-seated cultural norms that equate lighter skin with beauty and success can influence people's decision to engage in the practice. According to the HBM, Sociocultural norms may serve as cues to action, reinforcing subjective norms and the perceived benefits of lighter skin tones. Acheampong & Asiedu, (2019) also suggest that skin lightening practices within a community can influence to a large extent, individual's decision to engage in the practice.

Media influences

Media portrayals of fair skin as ideal further encourages individuals to practice skin lightening. The constant bombardment of skin care products, using fair skinned individuals in advertisement can influence how the consumers of these products perceive the benefits of skin lightening. Also, celebrity endorsements for SLssPs and engagement on social media platforms can influence consumer decisions to patronize such products (Owusu & Quaye, 2021; Kissi & Osei-Bonsu, 2020). This is in line with the HBM model that suggests that media representations

serve as cues to action, reinforcing subjective norms and the perceived benefits of lighter skin tones.

Risk perception

Furthermore, the perception of risk, balancing perceived severity and benefits, can drive skin lightening behaviors, despite awareness of potential health risks. The desire to achieve these goals can be a driving force for users of SLPs. A person's perception of health risks associated with the practice can influence SL habit. Although individuals may be aware of potential health risks such as skin atrophy, cancers, hypertension and more, their perceptions of benefits may outweigh the risks, thereby influencing their skin lightening decisions, however.

Market Factors

Additionally, the proliferation of SLPs on the market can invariably influence the practice. This is because the product is readily available to consumers (Arhin & Osei, 2022). Also, Sefah and Boakye (2020) postulated that products that are readily available are more likely to be patronized more. Also, market availability of skin lightening products and regulatory factors influence perceived control and barriers, while psychological factors, such as self-esteem, shape attitudes and intentions towards skin lightening practices. This intricate interplay of variables underscores the complex decision-making processes underlying skin lightening behaviors.

Psychological and Emotional factors

Some researchers suggest that people with a negative body image tend to have low self-esteem, and are more likely to practice skin lightening than those with a positive body image and self-esteem.

Regulatory factors

The presence of government regulations governing the production, importation and marketing of SLPs. and strict enforcements of safety standards can ensure that SLPs imported and sold on the market are of high quality and less harmful to consumers. Also, it will influence and guide how consumers use them (Amoako & Addai, 2022; Nkrumah & Mensah, 2020).

Relationship between independent variables

An individual's educational status will affect their level of knowledge about the use and effect of SLPs. Also, this will influence their risk perception of the practice, hence influencing their consumption of it. Also, a person's educational status can have an impact on their employment status, and hence, their skin lightening behavior.

Demographic factors such as age and gender can interact with socio-economic factors to influence the types and frequency of use of SLPs. For instance, younger and educated, higher-income women may use more expensive and quality skin care products and methods, while those who are not may rely on inexpensive methods of lightening their skin.

Furthermore, there is a relationship between socio-cultural factors and media influences that affect the prevalence of skin lightening. Cultural beliefs and norms surrounding light skin can be reinforced by media exposure. Celebrity endorsements of SLPs and media advertisements subtly promote lighter skin as ideal. This indirectly influences individuals to practice SL.

A study by Ankomah & Aikins, (2019); Kwarteng & Opoku, (2019) postulate that an individual's awareness of the risk of SL may influence them not to patronize SLPs. However, the perceived benefits and their self-esteem and body image may drive them otherwise to use.

The proliferation of SLPs on the market influence media advertisement and vice versa, hence indirectly encouraging the consumption of these products. Also, the affordability of these products by people of different socioeconomic groups influences their ability to purchase and use.

Lastly, government regulations and enforcement of safety standards will have an influence on the availability of SLPs on the market. The safety regulations, if enforced can lower the risks of harmful SLPs on the market. This can, to a large extent control the availability and hence the use of SLPs altogether.

In conclusion, understanding these factors and how they interplay to inform one's skin lightening decision is crucial to promoting healthy skin care practices and challenging unrealistic beauty standards.

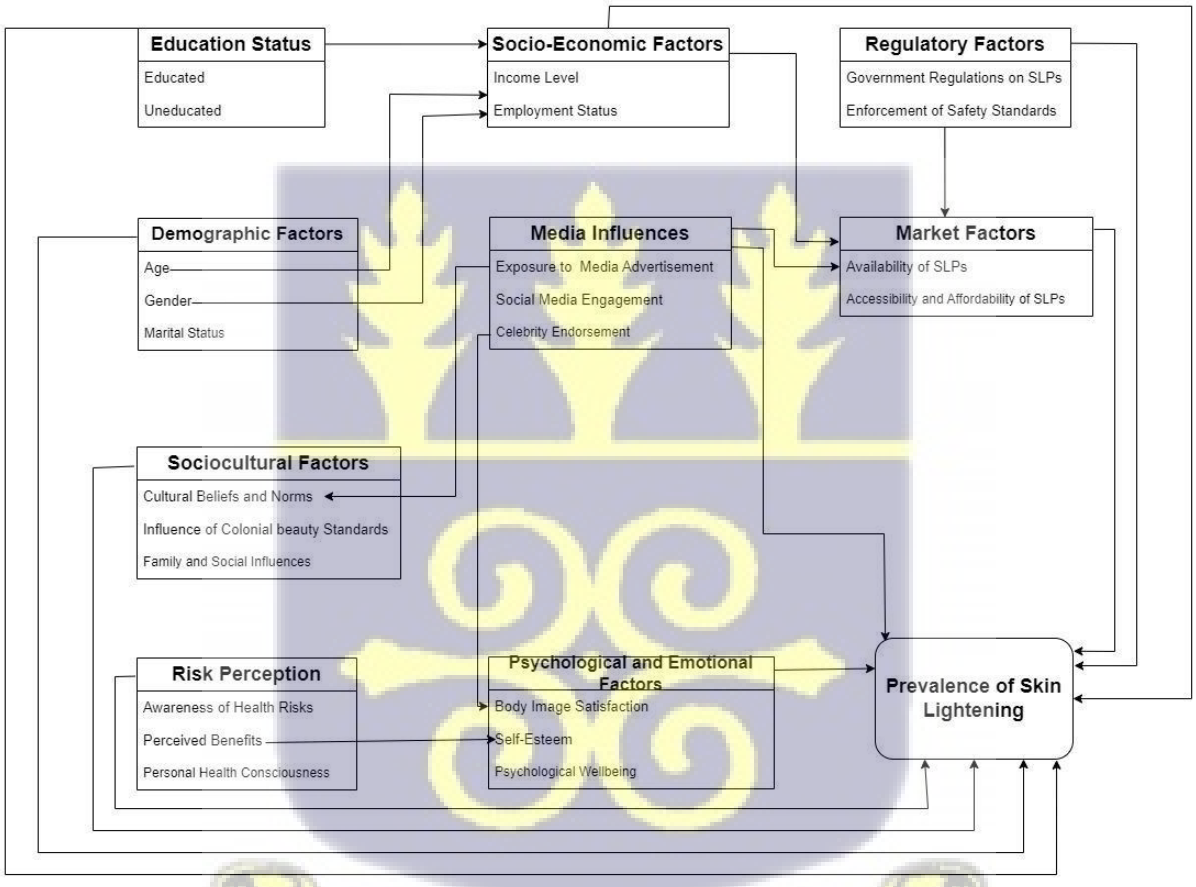


Figure 1: Conceptual framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Skin lightening, described by Asumah et al., (2022) is the use of topical ointments, gel, soaps, household chemicals and other creams to depigment one's complexion. Commercial skin-lightening products are available for use as cosmetics to achieve a lighter complexion. In a clinical setting, they are also utilized to treat hyper pigmentary conditions like solar lentigo, melasma, and café au lait spots. All of this aim to inhibit the natural formation of melanin, and many of the widely used drugs are recognized as competitive inhibitors of tyrosinase, which is an essential enzyme in the process of melanogenesis. The pigment-producing cells known as melanocytes are positioned in the epidermis, the skin's outermost layer, and are responsible for manufacturing melanin, that gives the skin its different shades of dark. Tyrosinase is the primary enzyme involved in melanogenesis which is activated when the skin is exposed to UV radiation from sunlight (Varghese, 2021). Melanogenesis and skin pigmentation are the most significant photoprotective factors against UV radiation damage from the sun and skin photo carcinogenesis.

During melanogenesis, melanocytes use their extended dendrites to transfer the melanin pigments produced by melanosomes into nearby keratinocytes in the epidermal layer; Tyrosinase related proteins TRP1, TRP2, and L-DOPA (L-3,4-dihydroxyphenylalanine) are examples of related proteins.

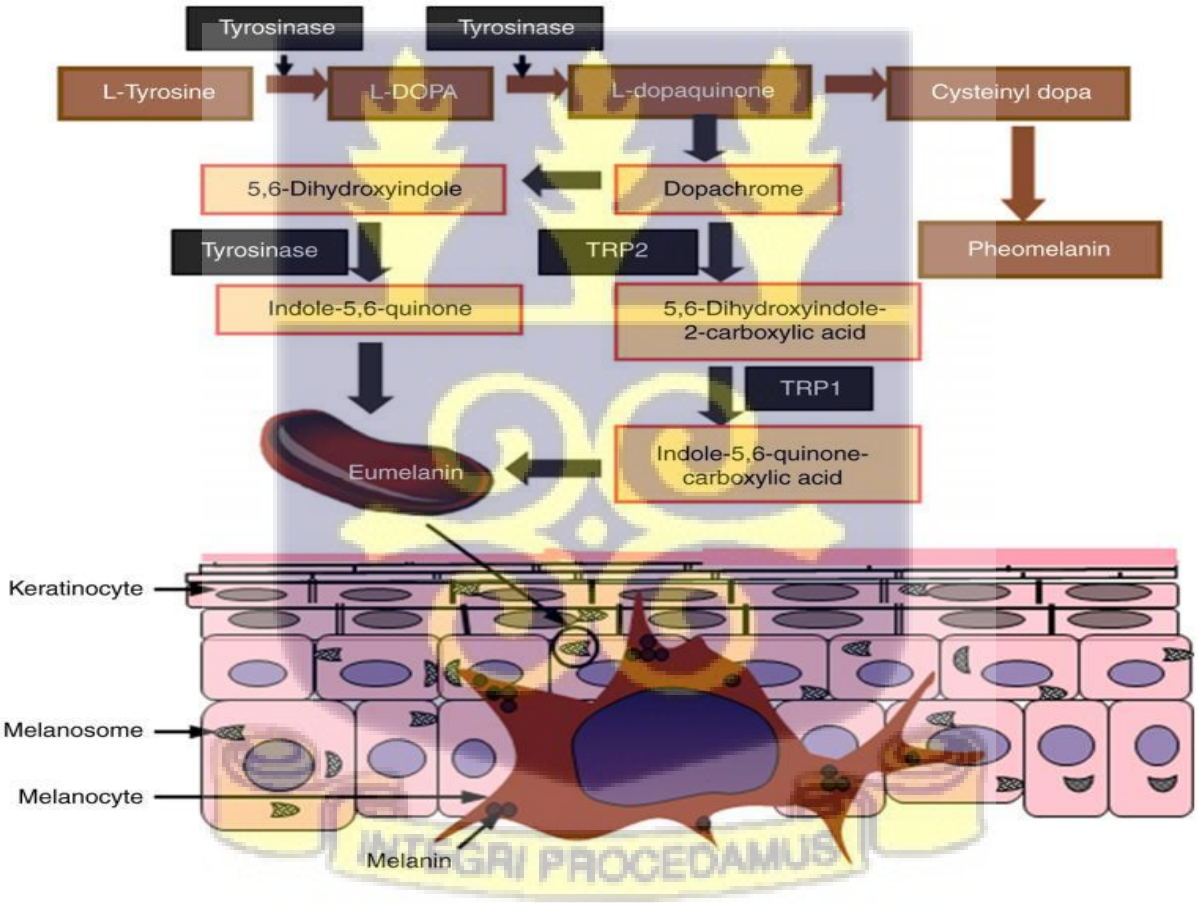


Figure 2: Melanogenesis

There is a misconception that skin lightening has the same meaning with other words such as whitening, brightening. However, there is a slight difference between the terms. By using substances such tyrosinase inhibitors, which lower melanin production in certain locations, skin brightening aims to equalize skin tone by reducing the appearance of dark patches, blemishes, and hyperpigmentation (Pollock et al., 2021). It's a safer and more successful method than skin whitening or bleaching because the goal is to balance out and brighten the complexion without significantly changing the natural colour of the skin. Skin brightening is a rejuvenation procedure that eliminates pigmentations on the skin and brings back its natural brightness. It can be accomplished with a variety of treatments, including lotions, peels, and lasers, which are effective and commonly used around the world. On the other hand, skin whitening or bleaching attempts to significantly lighten the skin's overall tone, frequently going beyond and beyond natural. It makes use of harsh chemicals like mercury, hydroquinone, and steroids that can harm melanocytes, the cells that produce pigment in the skin. This can result in serious adverse effects like mercury poisoning, thinning skin, and increased sensitivity to sunlight (Bernhoft et al., 2012). Although skin whitening is often promoted as a stand-alone treatment, it is a very dangerous procedure that need to be avoided.

need to be avoided.

skin brightening is also another skin treatment practice used to get rid of dead skin cells that make the skin look lifeless and flat, it aims to eradicate dullness and restore skin vitality. Antioxidants, vitamins, and exfoliants found in brightening creams invigorate the skin, leaving it feeling renewed and glowing. give the skin a youthful glow (Caldwell A. & Millar H., 2022).

Rather than changing the colour of the skin, the aim of skin brightening is to enhance the natural skin tone and give it a healthy glow. (Sparavigna et al., 2015).

Despite the advantages involved in using some skin products for brightening the skin, which may seemingly be less harmful compared to whitening or lightening the skin, excessive use could still cause major cosmetic and dermatological issue for people (Samaneh Z. et al., (2019). The producers of such products use tyrosinase inhibitors as depigmentation agents, for the purpose of skin de-browning, but Samaneh Z. et al., (2019) however mentioned that very few inhibitors are qualified for clinical use and skin-lightening agents. For this reason, it is advisable for consumers to consult a dermatologist for proper prescription of skin products that can help treat their skin issues without any adverse effect.

According to research, the practice of skin lightening is growing steadily among people of all genders, ages, socio-economic status and religious affiliations in black communities. It has become common for African men and women to chemically alter their skin complexion for several reasons. Africa and Asia are becoming popular for this practice, with Africa recording a prevalence of about 27.1%. According to the World Health Organisation (2011), 40% of women all over the world engage in skin bleaching of some sort, with 77% of women in Nigeria, 59% in Togo, 52% in Dakar and 67% in Senegal use skin lightening products. South Africa recorded 35%, while Ghana recorded 30% in a recent study done by Yayehrad et al., (2023). The report recently recorded a 75% prevalence for Nigeria, hence, making Nigeria a popular African country known for this practice.

Although both genders engaged in the practice, it was seemingly prevalent amongst women because historically, skin lightening has been associated with them, as they are especially likely to be judged according to their appearance, have less capital than men and experience worse body image as compared to men (Jesutofunmi et al., 2023). A comparative study in Lagos State in 2022 reported that 77.3% of traders use skin lightening products. The study according to Asumah at al., (2022) hypothesized that the university medical students would record less

patronage of this practice due to their knowledge of its adverse effects. However, despite their knowledge about the side effects, a number of them (48%) continued to patronize it.

Due to the aggravated nature of and obsession with the practice, despite known harmful repercussions, many African countries such as South Africa, Rwanda, Cote D'ivoire, Tanzania, Kenya and Ghana have put certain restrictions and consumption (Yayehrad et al., 2023). However, the practice continues to be on the rise, even among younger children.

Fair skin idealism is the main reason cited for the cause of skin lightening practices. According to the international journal of surgery, lately, skin lightening has gone beyond the use of topical agents such as creams, lotions and soaps to the use of injections and pills (Jesutofunmi et al., 2023). There is misinformation that pervades social media, driving the notion that fair skin color is better and more attractive than dark skin. This is, as an influence of colorism, which has roots traced down to history. Daftary et al., (2023) defined colorism as a system of inequality that gives preferential advantages to lighter skinned individuals. During the slave trade era, it was recounted that mixed race and white children of slave owners and the enslaved were given preferential rights, deemed smarter and regarded as more civilized (Daftary et al., 2023). Colonialism helped propagate Eurocentric beauty norms in many African countries.

The long-lasting effect of colourism is still evident today and perpetuated by the media. This notion is driven by the advertisements aired by these cosmetic companies and media houses to help sell these products. The advertisements further indirectly portray fair skin as the means to achieve benefits such as societal prestige and certain benefits, without further educating the public on the potential some chemicals in these products may cause. Further studies by Daftary et al., (2023) revealed that discriminating against the black skin colour does not only push people to alter their skin colour but also has detrimental effects on their mental and physical wellbeing. Some such effects recorded in a study included high blood pressure, cholesterol,

waist circumference and negative self-esteem among Pakistani women (Hargrove & T.W, 2019).

Also, the inability to totally combat this practice, despite its known effect has been attributed to the proliferation of cosmetic companies and local merchants. Several studies reveal that the skin lightening industry is becoming one of the fast-growing industries and is estimated to reach about USD 31.2 billion by 2024 (Jesutofunmi et al., 2023). Due to this, these SL products are easily accessible and relatively cheaper. According to the report from Jesutofunmi et al., (2023), there have been several prohibitions against the production and importation of skin care products containing harmful chemicals. However, the inability to completely implement the laws and sanctions against such perpetrators has left Africa a destination for these products from Europe and Asia. Report from the business insider Africa (2017) revealed that Ghana is waging war against the multi-billion skin-bleaching industry with strict regulations against products containing hydroquinone and other harmful chemicals. The Food and Drug Authority also issued a ban on the importation of all products containing these chemicals.

As indicated by Yayehrad et al., (2023), people, especially females may know a bit about the potential threats of these products to their health but may not exactly be aware of the severity and nature of these complications. Their study further reported high prevalence of this practice in highly urbanized communities in Ethiopia, which are likely to be populated with educated individuals. Hence, this study seeks to investigate the prevalence of skin lightening and its associated factors among the university educated and less educated adults in Ghana.

According to these researchers, the practice is growing steadily among people of all genders, ages, socio-economic status and religious affiliations in black communities. It has become common for African men and women to chemically alter their skin complexion without dermatological supervision, despite known effects of continuous use for several reasons.

Africa and Asia are becoming popular for this practice, with Africa recording a prevalence of about 27.1%. According to the World Health Organisation (2011), 40% of women all over the world engage in skin bleaching of some sort, with 77% of women in Nigeria, 59% in Togo, 52% in Dakar and 67% in Senegal use skin lightening products. South Africa recorded 35%, while Ghana recorded 30% in a recent study done by Yayehrad et al., (2023). The report recently recorded a 75% prevalence for Nigeria, hence, making Nigeria a popular African country known for this practice. Skin lightening practices are prevalent among young adults, especially female students, in many countries across Africa. However, education can play a significant role in reducing these practices by increasing awareness of the associated health risks and dangers.

Education plays a crucial role in preventing and reducing skin lightening practices. When individuals understand the dangers involved in using skin lightening agents irrationally, they are more likely to avoid these practices. Massive public health educational interventions on the harmful effects of skin lightening are needed to curb this trend (Dlova et al., 2015).

Studies have shown that most young adults are aware of skin lightening practices, with the majority gaining their first information from teachers or educational literature. A study done in Ghana by Dadzie & Petit, (2009) revealed that 71.8% of respondents were knowledgeable about skin lightening, and 84.3% understood that it involves the practice of making the skin smooth. However, 93.4% also recognized that skin lightening can cause stretch marks and skin cancer

The prevalence of skin lightening varies among different student populations. In South Africa, a study found a relatively low prevalence (12%) among health science students (Rahiman et al., 2021). In contrast, a survey in Ghana reported a high usage among young adults (Asumah

et al., 2022) Factors like location, employment, and education level were associated with skin bleaching practices (Dlova et al., 2015).

While skin lightening practices are prevalent among young adults, especially female students, education can significantly impact these practices. Increasing awareness of the health risks through educational campaigns and interventions in schools and universities can help prevent and reduce skin lightening practices.

2.2 Skin lightening products: Toxic ingredients

In the case of cosmetic skin whitening, the use of bleaching treatments might be medicinal or aesthetic. Psychosocial, cultural, and economic factors are often the driving forces behind the popularity of darker skin tones in these nations. It's common to find skin-lightening products on the market that contain highly toxic active ingredients, such as corticosteroids, hydroquinone, and derivatives of mercury (Minnesota Department of Health. (2021). These depigmenting agents can have several negative effects, including very serious and occasionally fatal complications, and their use is currently raising concerns about health in many nations. Some chemical compounds in skin lightening products such as Hydroquinone, Mercury, Corticosteroids are considered toxic and have been discussed below.

2.2.1 Hydroquinone

For many years, hydroquinone has been used to treat a variety of illnesses, such as solar lentigines, dyschromia from photoaging, melasma, and post-inflammatory hyperpigmentation. Although this extensively used agent is recognized to be a very powerful lightening agent, certain concerns have been raised concerning it (Shivaram et al., 2024).

A ubiquitous phenolic chemical, hydroquinone (1,4-dihydroxybenzene) is soluble in water and appears as colorless or white crystals. Other common sources of this substance include tea,

coffee, beer, berries, propolis, and certain types of mushrooms. α-arbutin is a glycoside that naturally arises from hydroquinone and has hydroquinone linked to a D-glucose molecule in its structure. Arbutin can be found in aqueous solutions in α, β, or γ-anomeric forms, with β-anomer being the most common type. Because it inactivates tyrosinase, arbutin can lighten skin. It also has antioxidant qualities that may aid in its depigmenting effects (Boo, 2021; Juliano, 2022). Arbutin has inherent depigmenting qualities that are independent of the release of hydroquinone, even though it is possible for a tiny quantity of hydroquinone to be created by cutaneous bacteria or UV light when administered topically.

Hydroquinone has numerous industrial applications, such as an intermediary for rubber processing chemicals, an antioxidant for fats and oils, and a polymer inhibitor in photographic development. In quantities ranging from 2% to 10%, it also functions as a depigmenting agent.

Following the unintentional discovery of hydroquinone's skin-whitening impact on African American laborers who were regularly exposed to it in the rubber industry, interest in the drug as a skin-lightening agent emerged in the 1960s (Buger et al., 2016; Kooyers and Westerhof, 2006). The use of hydroquinone for depigmenting grew in popularity in the ensuing decades, and it is now used to treat a variety of hyperpigmentation conditions, including melasma, chloasma, freckles, age spots, and post-inflammatory hyperpigmentation brought on by acne (Ladizinski et al., 2011). Regulatory bodies in Japan, Europe, and the US have recently questioned the safety of hydroquinone, even though it has been the dermatologists' gold standard for skin lightening for more than 50 years.

Because hydroquinone poses health concerns to humans, its use in cosmetics has been prohibited in Europe since 2001. It is currently forbidden to utilize hydroquinone in skin-lightening cosmetic compositions. Several other nations, including the UK, Australia, and Japan, have outlawed the use of hydroquinone in cosmetics (MacKendrick et al., 2018)

Similarly, the government of Ghana has taken concrete steps to combat the skin lightening product trade through legislative means, empowering the Food and Drugs Authority (FDA) to implement and enforce a nationwide ban on the importation and sale of creams containing hydroquinone and other proscribed ingredients. The regulatory body has been tasked to cease the registration of cosmetic items containing the active ingredient hydroquinone, which has been linked to various adverse health effects. In 2017, the nation implemented a comprehensive ban on the importation and sale of skin bleaching creams and lotions. This policy was enacted in response to growing public health concerns surrounding the use of such products

The FDA again launched a targeted sensitization campaign aimed at removing these proscribed products from the Ghanaian market (FDA, 2019). Currently, the national standard stipulates that all skin lightening creams must contain 0% hydroquinone. Finally, the FDA regularly conducts laboratory analysis of cosmetic products to detect the presence of banned substances and ensure compliance with the new regulations (Adanu et al., 2022). This policy was made in alignment with a similar ban instituted by the neighbouring country of Ivory Coast in 2015, citing analogous health-related justifications. Although progress has been made in several countries to ban the use of Skin products containing toxic ingredients, challenges persist in eliminating the availability of these products through informal channels, necessitating further action.

The processes by which hydroquinone causes depigmentation have drawn the attention of numerous researchers. Hydroquinone treatment reduces the number of melanized melanosomes and causes the formation of abnormally melanized melanosomes, which eventually die. It has been demonstrated that hydroquinone inhibits the activity of the tyrosinase enzyme by blocking the oxidation of tyrosine to DOPA and the subsequent oxidation of DOPA, causing the cessation of melanin synthesis. Hydroquinone has been shown to have effects on cytoskeletal structures such as microtubules and actin filaments in cultivated

melanophores of Xenopus laevis, indicating that it is not limited to targeting tyrosinase. These effects are shown in a dose-dependent way. Hydroquinone-induced depigmentation is reversible, and melanin production returns following its discontinuation (Jow et al., 2014).

The danger about hydroquinone is that it can be absorbed through the skin quickly and easily, even though the vehicle may have an impact on percutaneous absorption. Once absorbed, the drug is found in the bloodstream where it is partially bound to proteins irreversibly, partially reversibly, and partially as free hydroquinone. These studies on dermal absorption have been conducted on both in vitro models and in vivo human subjects. Compared to the absorption phase, it is expelled through the urine, but more slowly. Glucuronide and sulphate from hydroquinone metabolism in the liver are converted to p-benzoquinone by oxidation, particularly in the bone marrow. P-benzoquinone has been shown to be an initiator of carcinogenesis and to generate certain mutations (Rotava et al., 2020; Desmedt et al., 2016).

Using hydroquinone-containing skin-lightening products can have both acute and long-term short- and medium-term effects. Irritant contact dermatitis is the most frequent acute consequence. The more concerning chronic side effects of hydroquinone exposure are ochronosis, nail discoloration, conjunctival melanosis, and corneal degeneration. On the other hand, ocular complications have never been documented following topical application of the compound and only arise in those exposed to atmospheric hydroquinone. Exogenous ochronosis, a localized hyperpigmentation of the skin with asymptomatic blue-black and grey-brown macules without systemic manifestations and histologically characterized by banana-shaped ochre deposits and irregularly shaped collagen bundles in the dermis, is the most common complication caused by prolonged exposure to hydroquinone (Bhattar et al., 2015; Ghandi et al., 2012; Ladizinski et al., 2011; Nordlund et al., 2006). Trimethylaminuria, often known as "fishy smell syndrome," is a rare side effect of long-term hydroquinone use. It is characterized by the excretion of trimethylamine in breath, urine, saliva, perspiration, and

vaginal secretions, which gives off an offensive, rotting fishy odor. This effect is most likely caused by hydroquinone by slowing down the enzymatic conversion of trimethylamine-to-trimethylamine N-oxide (Olumide et al., 2008).

Because hydroquinone's genotoxicity and carcinogenicity in rodents are so well documented, there has been a suggestion that long-term usage of this substance as a skin brightener may be linked to squamous cell carcinoma in humans. Regulatory bodies, however, have determined that not enough information exists to categorize hydroquinone as carcinogenic. For instance, hydroquinone was assigned a classification of "A3" by the American Conference of Governmental Industrial Hygienists, indicating that although it is known to be carcinogenic in animals, its potential harm to people is uncertain. Similarly, hydroquinone has been categorized by the International Agency for Research on Cancer (IARC) as belonging to Group 3 (not classifiable as a human carcinogen). This classification is based on insufficient data in people and limited evidence in experimental animals (Gbandama et al., 2019; Ly et al., 2010). According to the Agency for toxic substance and disease registery (2014), hydroquinone is categorized in the EU under Regulation (EC) No 1272/2008 as Carcinogenic Cat. 2 H351 (suspected for causing cancer) and Muta. Cat 2. (Suspected for causing genetic abnormalities).

2.2.2 Mercury

In various parts of the world, the use of skin-lightening cosmetics containing mercury is currently one of the main causes of chronic mercury poisoning; yet, these products are still widely used and available despite their toxicity, poor effectiveness, and national bans (WHO, 2023). A variety of creams, milks, lotions, gels, oils, and soaps contain them. There are three different types of mercury: organic mercury compounds, inorganic mercury compounds (which exist in two oxidative states: mercuric, Hg++, and mercurous, Hg+), and elemental mercury (Hg0). The type of mercury commonly found in skin-lightening preparations is inorganic

mercury (mercurous chloride or calomel, Hg2Cl2; ammoniated mercury, HgNH2Cl; mercuric iodide, HgI2; mercurous oxide, Hg2O; mercuric chloride, HgCl2). However, methylmercury has recently been reported to be present in a skin-lightening product in the United States (Gbetoh & and Amyot, 2016); Ricketts et al., 2020). According to Bastiansz et al., (2022), mercury is used in some cosmetic products as preservatives, and purposefully added to skin lightening products to alter the enzymatic action of tyrosinase, hence blocking the skin from producing melanin.

Mercury exposure in humans occurs by ingestion, cutaneous absorption, and inhalation of elemental mercury vapours (particularly in long-term exposure scenarios). Easily absorbed by the skin, inorganic mercury salts found in creams and other cosmetics also pass through the epidermis, sweat glands, sebaceous glands, and hair follicles, causing Hg to eventually build up in the scalp's hair (Park & and Zheng, 2012). In a study conducted among students who practiced skin lightening, it was observed that the concentration in hair demonstrated a statistically significant link with the Hg concentration in cosmetics. (Abbas et al., 2020).

Mercury can be ingested following topical application near the mouth and hand-to-mouth contact. Dermal absorption is dependent on variables like mercury concentration, frequency of product application, skin integrity, lipophilicity of the vehicle in the cosmetic product, and stratum corneum hydration (Chan, 2011). The body's organs store inorganic mercury compounds, with the kidney containing the largest concentration of these compounds close to the proximal tubule; the primary method of removal is through urine excretion. As per the available data on cosmetic exposure (1.22 g for face cream and 4.42 g for body lotion), a consumer applying a cosmetic containing 10,000 ppm mercury might potentially absorb 450 µg of mercury in a single application. The conversion of inorganic mercury compounds into elemental mercury, which can happen in the presence of low pH and UV light, is what causes elemental mercury vapours to be inhaled (Park et al., 2012)

Elements of mercury are highly diffusible through cell membranes and lipid-soluble when in vapour form. They are readily absorbed in the lungs and through the nose through the olfactory pathway, enter the bloodstream, and travel quickly throughout the body before passing through the blood-brain barrier and building up in the central nervous system. Tissue cells also undergo oxidation of elemental mercury to mercuric form. This process demonstrates how elemental mercury can be dispersed throughout the home through contaminated surfaces or goods (clothing, towels) when lotions containing mercury salts are used for an extended period (Park and Zheng, 2012). By this, users of mercury-contained SLPs are not the only ones at risk. The producers of these products as well as individuals who share space and clothing of users are also at risk. Since the early 1900s, items containing mercury that are administered topically have been shown to have harmful consequences. Renal, gastrointestinal, neurological, and skin damage can occur from either acute or long-term exposure. The more lipophilic organic and metallic mercury is usually linked to brain harm, whereas inorganic mercury is more frequently linked to renal impairment. Hyperpigmentation paradoxically, erythroderma, nail discoloration, purpura, and allergic contact dermatitis are among the dermatological consequences (Juliano, 2022).

Mercury levels in well-known skin-lightening products have been the subject of several investigations, which have shown that these cosmetics pose a risk to human health and are a significant source of Hg exposure. For instance, using cold vapor atomic absorption spectrometry (CV-AAS), Peregrino et al., (2011) examined six locally made Mexican skin-lightening products. Six of the sixteen samples contained mercury, ranging in concentration from 878 to 36,000 ppm. Using X-ray fluorescence spectrometry, Hamann et al., (2014) investigated 549 US skin-lightening cosmetics sold both online and in physical stores. Of the goods that were examined, 6% and 45%, respectively, had mercury concentrations over 1000 and 10,000 parts per million. According to Copan et al. (2015), there was a range of 28,000 to

210,000 parts per million of mercury in handmade lightening creams made in Mexico that contained calomel. More recently, 60 well-known lightening cosmetics on the Jamaican market were examined for mercury contents using X-ray fluorescence and cold vapour atomic absorption spectroscopy by Ricketts et al (2020). Mercury levels varied from 0.05 ppm to 17,547 ppm; six samples had mercury contents above 1 ppm, which is the upper limit permitted by the US Food and Drug Administration (FDA); three samples had exceptionally high mercury concentrations (17,547, 465.73, and 422.04 ppm, respectively). More mercury was found in creams than in soaps and lotions. Bastiansz et al., (2022) suggest that pregnant women who use these products are at the potential risk of transferring mercury to the fetus, and can have neurological and nephrological disorders. These studies' findings suggest that skin-lightening cosmetics can contain mercury at levels that are occasionally dangerously high, endangering the health of users and their families by raising the possibility of poisoning.

2.2.3 Corticosteroids

Topical corticosteroids include anti-inflammatory, antimitotic, and immunomodulatory properties hence, they are among the most often recommended medications in clinical dermatology. They are used to treat a variety of medical disorders. However, it is often abused, especially by women in many nations, including sub-Saharan African states and India, with the goal of getting lighter skin. The fact that these products are inexpensive over the counter (OTC) medications makes them easier to misuse (Sendrasoa et al., 2017; Dey, 2014; Olumide et al., 2008). A study done by Dey et al., (2014), revealed corticosteroid abuse was observed to be one of the major problems indicated for the proportion of women who visited the dermatologists. However, the major problem was that many people who had used these drugs may not have presented adverse effect of the drug yet. Because of their strong depigmenting

properties and anti-inflammatory qualities, which help lessen the potentially irritating effects of other whitening products when applied in combination, they are used as skin brighteners. The most often used agents are fluocinonide (fluocinolone acetonide), betamethasone dipropionate, and clobetasol propionate (Naidoo et al., 2016; Dey, 2014).

Corticosteroids cause skin to seem lighter by blocking the production of pro-opiomelanocortin (POMC), a protein synthesized in the anterior pituitary that cleaves into various biologically active peptides, including α-melanocyte-stimulating hormone (α-MSH), which controls the activity of melanocytes (Ladizinski et al., 2011; Olumide et al., 2008). Given that steroids used as lighteners are typically categorized as potent or very potent, the vast spectrum of adverse effects, both dermatological and systemic, associated with the cosmetic use of corticosteroids are directly related to the substances' potency. Telangiectasias, hypertrichosis, skin atrophy, allergic contact dermatitis, and acne vulgaris are examples of skin problems related with this agent. Topical corticosteroids also putt a person at risk of skin infections, such as viral warts, erysipelas, dermatophytosis, and folliculitis at risk. Chronic corticosteroid use can have systemic deleterious effects such as Cushing's syndrome, diabetes mellitus, immunosuppression, hypertension, and suppression of the hypothalamic-pituitary-adrenal axis with adrenal suppression. The latter issue is particularly concerning as it could result in mortality (Dey, 2014; Ladizinski et al., 2011).

Studies by Dey, (2014) and Ladizinski et al., (2011) suggest that a maximum monthly dose of clobetasol propionate cream (0.05%) applied to the skin for lightening purposes can reach 480g. Additionally, 50g of this cream per week can cause a profound suppression of the hypothalamic-pituitary-adrenal (HPA) axis. Lastly, long-term daily steroid use can result in "steroid dependency syndrome," which is usually associated with men and is only relieved by reapplying the drug. This syndrome is marked by severe burning and possibly permanent

erythema (also known as "Homme rouge") after stopping steroid treatment (Juliano, 2022; Ladizinski et al., 2011; Olumide, 2008; Petit, 2006).

2.3 Factors influencing skin lightening.

Skin tone cosmetics may be used by vulnerable people to improve their appearance in a society that values beauty and perfection due to the extensive usage of idealized pictures, particularly on the Internet. These substances are frequently promoted online as "safe" and "natural" substitutes for over-the-counter medications and as ways to enhance physical attractiveness (Corazzaetal, 2019; Mcveighetal, 2016; VanHout, 2014).

According to Craddock (2016), skin tone is just as crucial in determining a woman's attractiveness as physical shape in the global beauty standards. Females from a variety of origins, including European, Asian, African, and Caribbean, who have varying skin tones, have been shown to be dissatisfied with their skin tone. This is the reason why attempts to lighten or tan one's natural skin tone have become common in many cultures (Swami et al., 2013). The World Health Organization (WHO) states that partaking in such activities has a detrimental impact on people's health and may result in potentially fatal consequences (WHO, 2019).

Seeking beauty and attractiveness is a major sociocultural component that influences relationships and is also a means of achieving other social and cultural rewards, like improving one's work and dating prospects. According to a 2011 study by Charles and colleagues, black men are typically more drawn to fair-skinned women when choosing marriages, which results in many darker-skinned women remaining single. To profit from the socioeconomic advantages associated with fair skin, males from higher social classes may also prefer to marry light-skinned wives (Charles, 2011). Several research also revealed that skin lightening products are used to cure underlying skin disorders or to achieve softer skin that is free of pimples and acne. According to Dlova et al. (2015), the primary goals of utilizing skin

lightening creams are to treat hyperpigmentation and other skin conditions, as well as to attain a lighter skin tone. Nevertheless, the research was carried out in a clinical environment, which could skew the findings. Furthermore, women of Indian or African descent were the target population, since their skin tones may be more susceptible to hyperpigmentation lesions than those of other skin tones.

According to Kamagaju et al., (2016), a study conducted in Rwanda revealed that the main reasons women use SLPs are to be "beautiful," to draw attention from males, and to have smooth, evenly coloured skin. Six motivational themes have been identified by another qualitative study looking into Tanzanians' reasons for utilizing SLPs. The four most common themes, according to percentages arranged in descending order, were: (1) to be European-looking and white; (2) to impress peers; (3) to address skin issues including acne; and (4) to impress a male spouse or mate (Lewis et al., 2010). According to Buchanan et al. (2008), these two studies were carried out in African nations where having lighter skin is generally associated with being considered "beautiful." Quantitative data from the Swedish "the fairer the better" study revealed that women born in the Middle East, Asia, and Africa use SLPs more frequently than their Swedish counterparts. Sixteen women provided qualitative data, which revealed that the primary reason for skin bleaching was to be "more beautiful," which for most of the participants meant to have lighter skin tone. Additionally, they believe that being fair leads to greater social and economic rewards, such as improved employment and marriage prospects (Darj et al., 2015). Lighter skin tones are linked to better socioeconomic outcomes for certain ethnic groups (Buchanan et al., 2008).

According to (Charles, 2003), darker skinned people's self-esteem is adversely impacted by the belief that light skin is a sign of beauty and attractiveness in certain cultures. In Malaysia, research participants expressed that having "lighter skin tone" was a prerequisite for marriage, better employment, higher social status, and increased self-esteem (Rusmadi et al., 2015).

Evidence from studies conducted by Swami et al. (2013) and Thompson and Keith (2001) indicate that minorities with lighter skin tones, such as African Americans, have higher levels of self-esteem than those with darker tones.

Literature has also linked skin lightening to psychological issues like a history of trauma and depressive symptoms. A study that investigated this and was carried out in three Caribbean nations concluded that those with lighter skin tones exhibited symptoms associated with depression, past traumatic exposure, or maltreatment as children (James et al., 2016). According to Buhlmann et al. (2012), there is a possibility that childhood sexual and physical abuse will contribute to the development of BDD, which may lead to bodily altering procedures like skin lightening.

2.4 Implications on public health

The popularity of skin lightening (also known as skin whitening or bleaching) products has grown markedly in recent years. Most agents function by inhibiting tyrosinase and thereby reducing melanin production. Examples of tyrosinase inhibitors include hydroquinone, arbutin, kojic acid, azelaic acid, and flavonoid-like agents. These products are often prescribed by dermatologists to treat hyperpigmentation disorders; however, many skins lightening products are also readily available directly to the consumer as cosmetic products (Gillbro and Olsson, 2011; Yuangao et al., 2020).

Inadequate medical care may lead to unfavourable outcomes, some of which are irreversible. These side effects, which include exogenous ochronosis, irritating dermatitis, elastosis, sunburn, acne, hypertrichosis, and fragile skin, have been extensively studied. Many skin-lightening solutions contain hazardous quantities of mercury, and patients who use these items

topically may present with contact dermatitis or develop systemic toxicity over time, which can damage the kidneys and nervous system. These adverse effects are essentially a public health concern and reflect the lack of regulation surrounding cosmetic ingredients (Gbetoh and Amyot, 2016; Yuangao et al., 2020). Premarket approval by the US Food and Drug Administration (FDA) is not required for direct-to-consumer cosmetic products or ingredients (apart from color additives), which includes a lot of skin-lightening chemicals (USFDA, 2022). This contrasts with prescription and over-the-counter pharmaceuticals. Federal control over cosmetic items, both domestic and foreign, have the tendency of having a wider scope than state-level efforts to address uncontrolled cosmetic substances as a public health concern.

According to Yuangao et al., (2020), there are two measures that would increase the FDA's jurisdiction over personal care products: the Cosmetic Safety Enhancement Act (H.R.5279) and the Personal Care Products Safety Act (S. 726). The FDA would have more authority over cosmetic products under both bills, which would require: (1) manufacturing facilities to register and comply with good manufacturing practices; (2) companies to submit cosmetic ingredient statements to the FDA, which will be available to consumers; (3) the FDA to track and report serious adverse events and have the authority to issue mandatory recalls; and (4) the FDA to evaluate the safety of at least five ingredients annually and carry out investigative studies if needed.

CHAPTER THREE

METHODOLOGY

3.1 Study area

This study was conducted at the University of Ghana, Legon campus and Madina La Nkwantanang, in the greater Accra Region of Ghana. Located in the Ayawaso West Wuogon Municipality, it was originally established as the University College of the Gold Coast by Ordinance on August 11, 1948. The University of Ghana is the top university in Ghana and was established with the goals of advancing research, education, and learning at the university level. The Legon campus is located between 300 and 400 feet above sea level, approximately 13 kilometres northeast of Ghana's capital, Accra. The University of Ghana main campus covers a land area of 11.4 km2, with a population of 76, 013 (UG Statistics, 2022)

Situated in the Greater Accra Region in southeast Ghana, Madina is a suburb of Accra and part of the La Nkwantanang Madina Municipal District. Geographically, Madina is the sixth most populous settlement in Ghana. Among Accra's largest and liveliest markets is the Madina market, situated on what is commonly referred to as Old Road, Chief Alhaji Seidu Street. It extends from the Madina Zongo intersection to the Madina Polyclinic in Kekele. The Madina Divisional Police Station is located across from the main entrance. It has a populace of 244,676, according to the Ghana Statistical Service census report (2021)

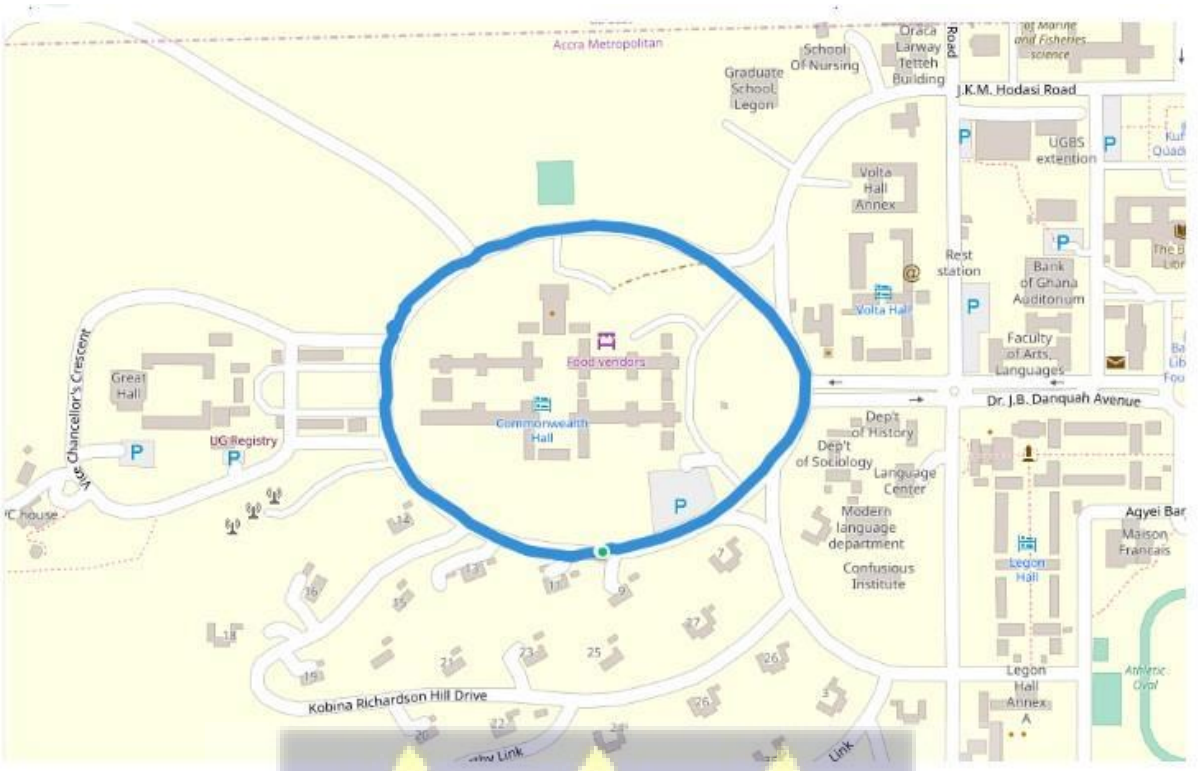


Figure 3: University of Ghana map

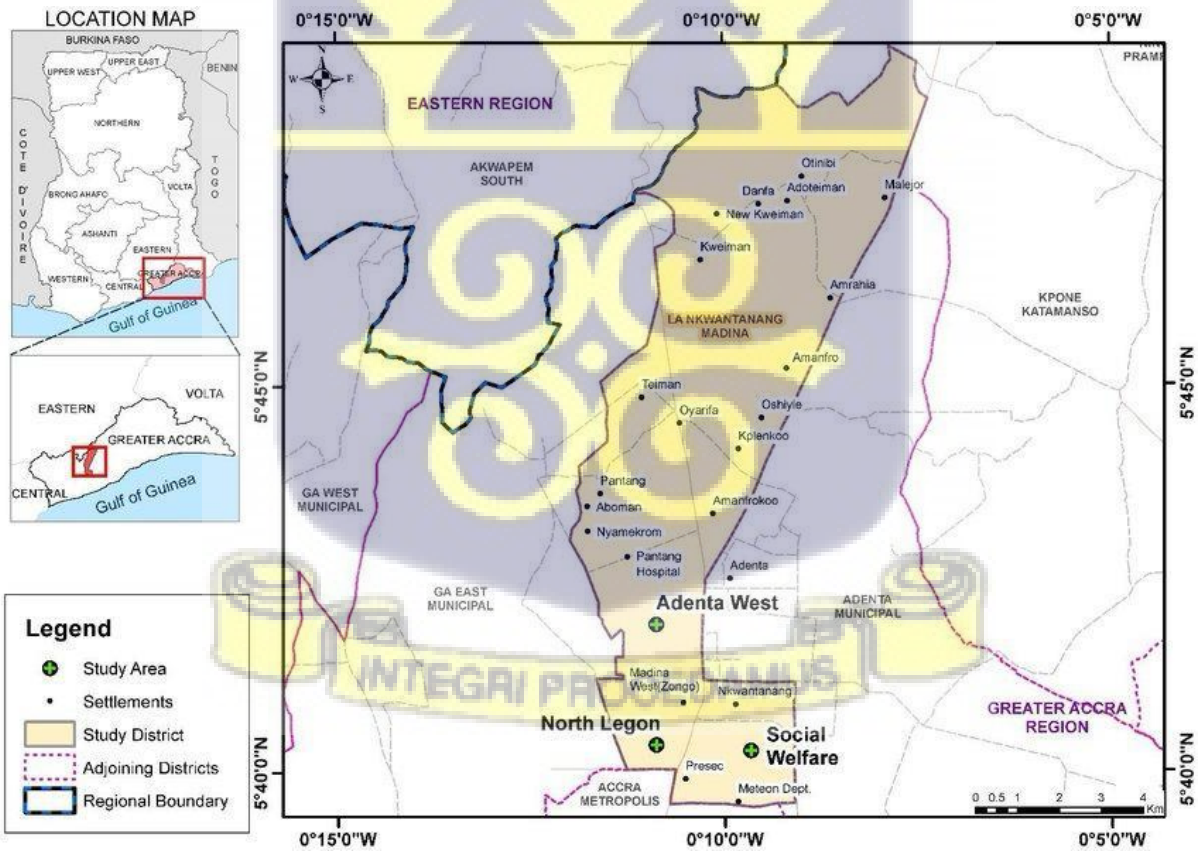


Figure 4: La Nkwantanang Madina map

3.2 Pre-testing

The questionnaire was piloted among 30 adults, 10 of which were university-educated and 20 less educated adults. For the educated population, a digitized questionnaire was disseminated to any university-educated individual who consented to participate, while printed copies were disseminated to less educated individuals at Atomic junction. This was done to test for the validity of the questionnaire and allow the researcher make modifications to the questionnaire, where applicable. Again, it helped determine whether respondents understood all the questions or there was ambiguity. It also helped the researcher to know the amount of time needed to complete one questionnaire. This information helped the researcher make all necessary corrections to the questionnaire before administering the actual data collection, to ultimately gather higher quality data.

3.3 Study Design

This research adopted a cross-sectional study design to determine the prevalence of skin lightening and its associated factors among university educated and less educated adults in Accra. The study made use of quantitative methods to capture insights and perspectives from study participants. Although the cross-sectional design has its limitations, such as recall bias, inability to generalize findings, and inability to establish causality, it was the most appropriate approach to address the study objectives within the available resources and timeframe. Also, studies showed that it was the best design to use when examining the prevalence of an outcome at a particular moment in time (Kahn & Sempos, 1989). The findings from this study can serve as a foundation for future research, including longitudinal studies, to further explore the complex dynamics of skin lightening practices and their associated factors.

3.4 Study variables

3.4.1 Dependent variables

The dependent variable for this study was the prevalence of skin lightening among university-educated and less educated adults in Accra, Ghana.

3.4.2 Independent variables

Independent variables for the study included:

- Demographic variables (Age, Gender, Marital status, Religion, Educational status)
- Knowledge of skin lightening
- Risks perception of skin lightening (perceived risks and benefit, awareness of health risk, personal health consciousness)

The dependent variable was categorized as either good or bad based on the prevalence determined after analysis. Data were collected using a structured questionnaire, which was divided into five sections: socio-demographic factors, perceived benefits, knowledge of skin lightening, risk perception, attitudes toward skin lightening, prevalence and use of skin lightening products (SLPs), and other factors influencing SLP usage. The questionnaire included multiple-choice and Yes/No questions. To assess knowledge and risk perception related to skin lightening products and practices, a five-point Likert scale was employed, where respondents rated their agreement from 1 (strongly agree) to 5 (strongly disagree). Scores were averaged, with higher scores reflecting greater knowledge and risk awareness. The questionnaire was adapted from the study by Asumah et al. (2022).

3.4 Target Population

The study sought to capture responses from students on the main campus of the University of Ghana as well as residents and pedestrians commuting the Madina La Nkwantanang enclave.

This population was targeted for the study because studying the practice among both university students, residents, and pedestrians at Madina could provide valuable and comparative data on the topic under study across the university educated and less educated urban population. In this study, the less educated class of people included individuals with no or only basic education up to junior high school, together with those with high school certificates and O levels, while university students and university certificate holders were classified as 'university-educated.' Madina was selected because, it is presumably one of the largest places in Accra and a major commercial hub. Surveying respondents at this location provided insights into skin lightening practices among a diverse group within the urban population, including both less educated and non educated individuals. Comparatively, university students represented a population of highly educated young adults. Studying their skin lightening practices and perceptions threw light on the prevalence and motivations among educated urban residents. Comparing the prevalence and associated factors between university educated students and less educated adults at Madina revealed differences in skin lightening practices based on educational attainment. Educated individuals may have greater awareness of the health risks, however, social pressures and perceptions linking lighter skin to beauty and success may still drive some individuals to use skin lightening products. Although skin lightening is reported to be a widespread practice, with prevalence estimates ranging from 30-65.6% in Ghana, more research will be needed to understand the nuances between the various socioeconomic and demographic groups in urban areas like Accra, hence the the study location.

3.5 Sampling

3.5.1 Sample size

The sample size for the study was determined using the formula;

$n = z^2 \times pq/d^2$ (Snedecor & Cochran, 1989), where

n = the required sample size

z = Z-score corresponding to the desired confidence level (1.96 for a 95% confidence level)

p = Estimated proportion of the population exhibiting the trait of interest (30% or 0.30 based on prior studies)

d = margin of error of 5% (0.05)

q = 1 – p.

The estimated sample size was calculated as follows:

$$n = \frac{1.96^2 \times 0.30\ (1 - 0.30)}{0.05^2}$$

$$n = \frac{3.8416 \times 0.21}{0.0025}$$

$$n = 323$$

Adjusting for a 10% non-response rate (10% of 323 = 32), the minimum sample size for the study was estimated as 323+ 32 = 354. Therefore, the sample size for the study was set at 355

3.5.2 Sampling procedure

The study included a total of 355 participants. A proportionate sampling method was employed to derive the sample size for the two study locations: Madina and the University of Ghana. This approach was selected because the target population was a relatively small group within the larger population under study. Data were collected using questionnaires administered to participants at both locations, following their consent.

Stratification

The entire study population was first divided into two distinct strata based on educational level: university-educated adults and less educated adults. This stratification ensured that the specific characteristics and influences of each subgroup were adequately captured.

Proportional Random Sampling

Within each stratum, participants were selected using a proportional random sampling technique to reflect the actual proportions of each subgroup within the total population. This method ensured that both subgroups were adequately represented, allowing for meaningful comparisons.

Sample Size Allocation

Using proportional allocation, the sample size was distributed between the two study locations:

Madina Residents/Shoppers (76% of the population):

355×0.76=269.8≈270355 \times 0.76 = 269.8 \approx 270355×0.76=269.8≈270 participants

University of Ghana Students (24% of the population):

355×0.24=88.75≈89355 \times 0.24 = 88.75 \approx 89355×0.24=88.75≈89 participants

Participant Selection

University of Ghana (Educated Subgroup):

A list of potential participants was obtained from the University of Ghana Computerized System (UGCS). Random number tables or computer-generated random numbers were used to select participants, ensuring that every individual within this stratum had an equal chance of selection.

Madina (Less Educated Subgroup):

At Madina, data collection began at a randomly selected starting point determined by spinning

a pen at Zongo Junction toward Alhaji Seidu Street. Shops were then sampled systematically: the 1st, 3rd, 5th, 7th, and so on, until the required sample size was reached.

Enhancing Reliability and Validity

The stratified random sampling approach improved the reliability and validity of the study by ensuring adequate representation of both subgroups. This provided a comprehensive understanding of the prevalence and factors associated with skin lightening practices among university-educated and less educated adults.

Final Sample Size

After accounting for a 10% non-response rate, the final sample size was adjusted from 355 to 360 participants. This ensured robustness in the analysis and conclusions.

3.6.1 Inclusion Criteria

The respondents that were included in this study were adult males and females who were between the ages of 18 and 50 years old and consent to the study. This group of people were selected for the study because skin lightening behaviours often start in early adulthood. This age range was considered to help investigate skin lightening behaviours; a practice that typically emerged in early adulthood. The study focused on this age group because early adulthood, typically defined as the period between ages 18 and 25, is when many individuals first engage in skin lightening practices, knowingly or unknowingly. This onset pattern can be attributed to various socio-cultural and psychological factors. The adolescent age is an age associated with hormonal changes, excessive sebum production and clogged hair follicles. This, therefore has an impact on their daily lives, including their self-esteem, social relationships and well-being (Revol et al., 2015). During this stage, individuals are highly responsive to societal beauty norms, peer influences, and media representations that often promote lighter skin as a standard of beauty and success. Evidence from multiple studies

indicated that early adulthood is a period of heightened sensitivity to such external pressures, making young adults more prone to adopting skin lightening practices to align with perceived ideals (Swami et al., 2013; Motseki & Oyedemi, 2017).

It is also at this age that adolescents or young adults start to get attracted to the opposite sex and seek to look their best. For this reason, the tendency to use products to help clear their skin or lighten their skin, in order to look attractive is high. Comparatively, the study according to Asumah et al., (2022) suggest that skin lightening is commonly used by young adults for reasons like "beautification" and "improved marriage prospects.

3.6.2 Exclusion criteria

Individuals who were unwilling to participate in the study were not included. On the University of Ghana campus, individuals who may have gotten university admission but had not yet started school will not be included. Alternatively, at Madina, individuals with university education were not be included in the study. These criteria were considered so that the results will be representative of the population under study and also help to establish relevance of the study, regarding the prevalence of skin lightening among people of the two educational statuses.

3.7 Data Collection and measurement

The questionnaire was adapted from Manoj et al., (2024) and Asumah et al., (2022). It was divided into seven distinct sections. Section 1 covered their demographic characteristics; (Age, Gender, Religion, Marital status, Education level, etc.), Section 2 was on participants' perceived benefit of skin lightening practice, while Section 3 focused on their knowledge on skin lightening. Section 4 also consisted of questions that assessed respondents' risk perception. Section 5 tackled attitudes toward skin lightening. Section 6 covered the prevalence and use of skin lightening products. Finally, section 7 covered other contributing factors that influenced individual's skin lightening decision. For each variable, four questions were asked

with the help of a five-point likert scale. The individual scores were then pooled to get an average score point. Knowledge, attitude and perception (KAP) was measured as poor, average and good. This classification was adapted from a similar study done by Khalil, (2022) who categorized scores of 0 to 3 as poor, 4 to 6 as average and 7 to 10 as excellent.

3.8 Data Analysis Plan

A total of 375 respondents submitted their questionnaires, representing a 100% response rate. However, after carefully scrutinizing the data, only 360 were considered for analysis. Data was analysed using Stata (Stata version 18.0). The data was descriptively presented as the frequency with proportion and mean with standard deviation. The categorical data was compared with the Chi-square test. Pearson correlation was also used to estimate the relationship between variables, after adjusting for potential confounding variables. The coefficient of determination was estimated through multiple logistic regression. A significance level of $p < 0.05$ value was used in all analyses.

The data was carefully examined to identify for missing data. A comprehensive approach was used to cater for missing data, beginning with complete case analysis for datasets with less than 5% missing information. While this method ensured simplicity and consistency, its potential for bias when data were not missing completely at random (MCAR) was acknowledged. To address this limitation, multiple imputation was utilized to generate plausible values for missing data based on observed patterns, creating multiple datasets that were analysed and pooled for unbiased estimates. Sensitivity analyses further evaluated the robustness of results under various assumptions, such as best-case and worst-case scenarios, ensuring that findings remained reliable despite potential biases. To address cases where missingnesss was related to observed variables, inverse probability weighting (IPW) was applied. This technique assigned weights to each case based on the probability of having complete data, reducing bias due to systematic differences between complete and incomplete datasets. By integrating complete

case analysis with advanced methods like multiple imputation, sensitivity analyses, and IPW, the study ensured a rigorous and reliable approach to handling missing data, thereby enhancing the validity and robustness of its findings.

linear regression was used in addition to logistic regression due to the specific nature of the variables and outcomes analyzed. Logistic regression was employed primarily to model the relationship between categorical outcome variables (e.g., likelihood of engaging in skin lightening practices) and predictor variables, including educational level, while adjusting for confounders. This method was particularly suited for binary or categorical outcomes, allowing for the estimation of odds ratios and the coefficient of determination.

Linear regression, on the other hand, was used to analyze continuous outcome variables, such as scores derived from the Knowledge, Attitude, and Perception (KAP) assessments. This approach enabled the researcher to evaluate how independent variables, such as educational level, influenced mean KAP scores, adjusting for potential confounders. By using linear regression for continuous outcomes and logistic regression for categorical outcomes, the study applied appropriate statistical tools tailored to the nature of each analysis, enhancing the precision and validity of the results. This helped the researcher to isolate the independent effect of educational level on skin lightening practices.

Prior to the categorization, all responses given to questions set to examine level of knowledge on SLP, attitude towards SLP and perception on the use of SLP were respectively aggregated and averaged to determine the levels for each. The overall level of knowledge, attitude and perception (KAP) as then categorized into poor (0 to 3), average (4 to 6) and excellent (7 to 10) as done by Khalil, (2022) in his study. This approach was chosen because its application in Khalil's study was to assess KAP on SLP, a similar study as this.

Pearson correlation analysis in this study was utilized to examine the relationships between continuous variables. The dependent variable for this analysis was the Knowledge, Attitude, and Perception (KAP) score, treated as a continuous variable. Independent variables included age, level of education, and other continuous demographic or socioeconomic indicators. This method provided insights into linear associations between KAP scores and these predictors without adjusting for confounders.

In contrast, multiple logistic regression was employed to analyze categorical outcomes while accounting for confounding variables. The dependent variable in this model was the likelihood of engaging in skin lightening practices, a binary outcome (Yes/No). Independent variables included educational level (primary, secondary, tertiary), age group, marital status, religion, and categorized KAP scores (poor, moderate, good). By clearly defining the variables in each model, the study ensured a systematic approach to addressing the research objectives, with Pearson correlation focusing on unadjusted linear relationships and logistic regression isolating the independent effects of key predictors on categorical outcomes.

Prior to the categorization, all responses given to questions set to examine level of knowledge on SLP, attitude towards SLP and perception on the use of SLP were respectively aggregated and averaged to determine the levels for each. The overall level of knowledge, attitude and perception (KAP) as then categorized into poor (0 to 3), average (4 to 6) and excellent (7 to 10) as done by Khalil, (2022) who categorized scores of 0 to 3 as poor, 4 to 6 as average and 7 to 10 as excellent. This approach was chosen because its application in Khalil's study was to study the KAP of SLP, a similar study as this. The scores from hist study was adapted for this study.

3.9 Ethical consideration

Ethical clearance was sought from the NOGUCHI Ethics Review Board, with ethical certificate number 021/24-25. All participants recruited for the study were provided with their informed and voluntary written consent to participate in the study. The purpose of the study was explained briefly to participants recruited for the study. Participation was solely voluntary, and participants were allowed to opt out at any stage of the study. They were also assured of privacy and confidentiality. Code numbers were used identifying participants instead of their names.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the findings of the study, in accordance with the objectives of the study. The chapter is in four sections. The first section presents on the demographic characteristics of the respondents. The second section focuses on the level of knowledge and associated factors of skin lightening practices of respondents. The third section covers the level of knowledge, perception and attitudes associated with skin lightening practices. The last section presents on the associations between socio-demographic factors, knowledge, perception and attitudes on the prevalence of skin lightening practices.

4.1 Demographic characteristics of respondents

Table 1 presents the demographic characteristics of 360 respondents who were sampled for the study. Out of the total sample, females were most predominant, with a frequency of 242. This constitutes 67.41% which is more than one-third of the study participants. The number of males sampled for this study was 117, which forms 32.59% of the entire respondents. This suggests a gender skew in the population in this study and can affect the generalizability of this study.

The age category included in this study ranges from 18 to 50. 134 respondents (37.2%) recorded to be between the ages 18 to 24. 169 respondents were between ages 25 to 34 years, making up 46.94% of the study sample. Also, 54 respondents (15.0%) fell within the ages 35 to 44. Finally, only 3 respondents, representing 0.84% of the entire study sample fell within the ages 45 to 50. This signifies that most participants fall within the younger age ranges, particularly 18-34 years, which combines to form 84.16% of the entire study sample. This thereby indicates that younger individuals are more likely to engage in or aware of skin-

lightening practices than older ones. This could be influenced by contemporary beauty standards and social media.

Out of the total study sample, 298 respondents, making up 83.01% were single. 55 of them (15.32%) were married. 4 of the respondents, making 1.11% of the study sample reported they were divorced and 2 of them (0.56%) reported to be separated. This signifies that majority of the respondents who engaged in skin lightening were single, with a few married ones.

With educational attainment, it was observed that 233 of the respondents, making up 64.72% of the study sample, had either SSS, SHS or some Vocational or technical education. 89 of them (24.7) of them had tertiary education, while 31, making up 1.94 of the study sample, had been educated up to the middle or JSS and JHS level. About 7 of them (1.94%) had only primary level education. A large number of the respondents (64.72%) have education up to the secondary level, and about a quarter of them (24.72%) have tertiary education. This data suggests that the participants generally have at least high school education and relatively few of them have attained University education. For instance, individuals with higher education levels might have better access to information about the risks associated with skin-lightening products, potentially leading to lower usage rates. Conversely, those with secondary education might be more susceptible to societal pressures and marketing strategies promoting skin lightening.

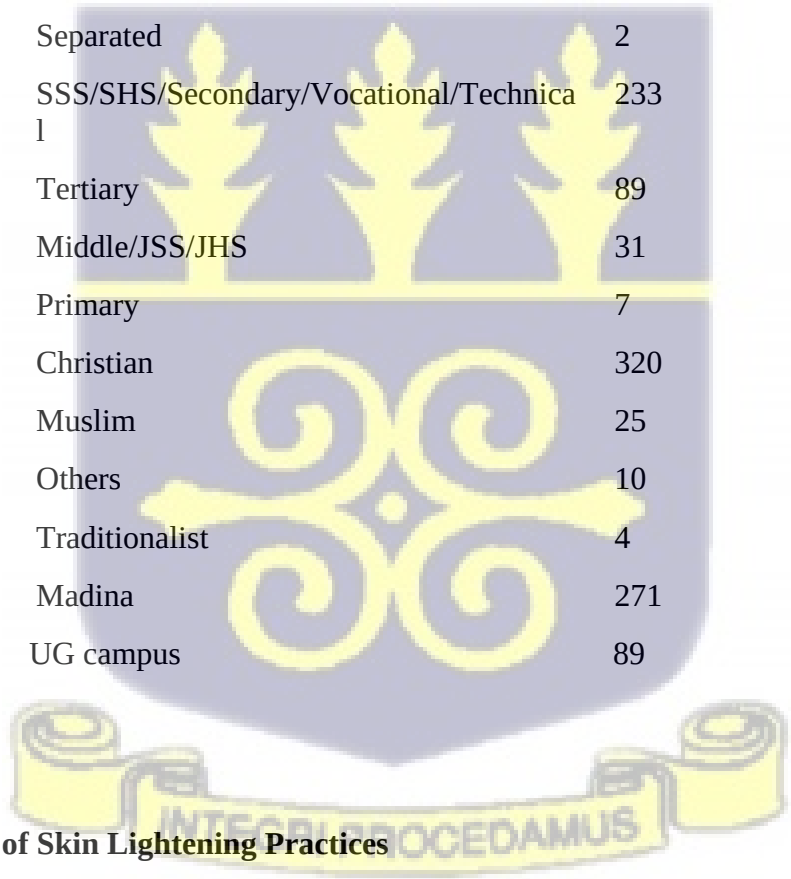
With their religious affiliation, Christians were about 320, that is about 89.14% of the study sample. 25 of them (6.96%) were Muslim. 4 of the respondents, that is 1.11% reported to be traditionalists, while 10 of them (2.79%) belonged to other religious denominations. This suggest that the vast majority of respondents were Christians. This observation could be as a result of certain religious teachings that might emphasize natural beauty and discourage the use

of skin-lightening products, while others might not address these practices explicitly, leading to varying prevalence rates among different religious groups.

Also, the findings present on respondents from two locations; Madina and University of Ghana campus. Out of 360 respondents, 271individuals (75.27%) were sampled from Madina, 89 individuals (24.7%) were from the University of Ghana. This indicate that a greater proportion of the study sample came from Madina. However, the two samples were a representation of the various populations in the two study locations. The demographic characteristics of Madina residents differ from those at the University of Ghana, hence displaying the disparities in the two populations with regards to skin lightening practices. For instance, the residents of Madina, although not university-educated, might have greater exposure to advertisements and availability of skin-lightening products, while university students might be more influenced by academic and peer discussions on the health implications of such practices.

Table 1: Demographic characteristics

Variable	Category	Frequency	Percent (%)
Gender	Female	242	67.41
	Male	117	32.59
Age Group	25-34	169	46.94
	18-24	134	37.22
	35-44	54	15.0
	55 and above	2	0.56
	45-54	1	0.28
Marital Status	Single	298	83.01
	Married	55	15.32
	Divorced	4	1.11
	Separated	2	0.56
Educational Attainment	SSS/SHS/Secondary/Vocational/Technical	233	64.72
	Tertiary	89	24.72
	Middle/JSS/JHS	31	8.61
	Primary	7	1.94
Religion	Christian	320	89.14
	Muslim	25	6.96
	Others	10	2.79
	Traditionalist	4	1.11
Location	Madina	271	75.27
	UG campus	89	24.73



4.2 Prevalence of Skin Lightening Practices

Table 2 shows the overall prevalence of skin lightening practice for this study. Out of 360 respondents, 255, representing 70.83% reported that they do not use skin lightening products.

A total of 105, representing 29.17% of the study population reported to use skin lightening products.

Table 2: Prevalence of SL

Prevalence of SLP usage	Freq.	Percent	Cum.
No	255	70.83	70.83
Yes	105	29.17	100.00
Total	360	100.00	

4.2.1 Level of education and Prevalence of Skin Lightening Practices

Table 3 shows the prevalence of skin lightening between the university educated and less educated individuals in this study. Out of the 360 respondents, the less educated population which comprised of Middle/JHS/JSS, Primary and SSS/SHS/Vocational/Technical formed 75.28% of the entire study sample, that is 271 in total. The university educated were 89 in total, representing 24.72% of the study sample.

Out of the university educated respondents, 73 (28.63%) of them did not use SLPs, whereas 16 (15.24%) used SLPs. Comparatively, 182 (71.37) of the less educated respondents did not use SLPs, while 89 (84.76%) used SLPs. The overall sample of 360 participants included 255 individuals (70.83%) who did not use SLPs and 105 individuals (29.17%) who did. This indicates that nearly one-third of the total participants were engaged in skin-lightening practices.

The Pearson chi-square test value of 7.1646, with a p-value of 0.007, indicates a statistically significant association between the level of education and the use of SLPs. Since the p-value is less than the standard threshold of 0.05, the association between the two variables is significant. Hence, level of education significantly influenced the likelihood of using skin-lightening products in this study.

Table 3: level of education and Prevalence of SLP

Use of SLPs	University	Less educated	total
No	73 28.63%	182 71.37%	255 100.00%
Yes	16 15.24%	89 84.76%	105 100.00%
Total	89 24.72%	271 75.28%	360 100.00%

Pearson chi2(1) = 7.1646 pr = 0.007

4.2.2 Other contributing factors to Skin lightening practices

The graph below shows other contributory factors that influenced respondents' decision to indulge in skin lightening practices. The graph reveals that the use of SLP is driven by a myriad of several other factors. The score for each blue bar and corresponding brown, represents 360 (100%) of the respondents in this study. The blue bar represents yes for the respondents, while the brown ones represent no.

It is observed that 86.67% of the respondents indicated that availability of SLPs influenced their decision to patronize and use SLPs, whereas 13.33% were not influenced by it. Also, 84.4% of them reported that affordability of the SLPs influenced their decision to use SLPs. 93.87% while 15.6% were not influenced by that. 93.87% indicated that the effectiveness of a SL product influences their decisions to use, while 6.13% were not influenced by it. Others; 84.92% indicated that the ingredients used in a SL product was what influenced them to use, while 15.08% were not influenced by that. Meanwhile, 78.33% reported that advertisements on SL products influenced their decision to buy, while 21.67% were not influenced by it. Lastly, 77.44% of respondents reported to use SLPs with the influence of friends or influencers recommendation while 22.56% were not influenced by that. The finding shows that Advertisement (93.87%) is the most significant factor influencing individual's skin lightening

choices, followed by availability of the products on the market (86.67%), affordability (84.40%), ingredients (84.92%), effectiveness of the product (78.33%), and social influence from friends and media influencers (77.44%).

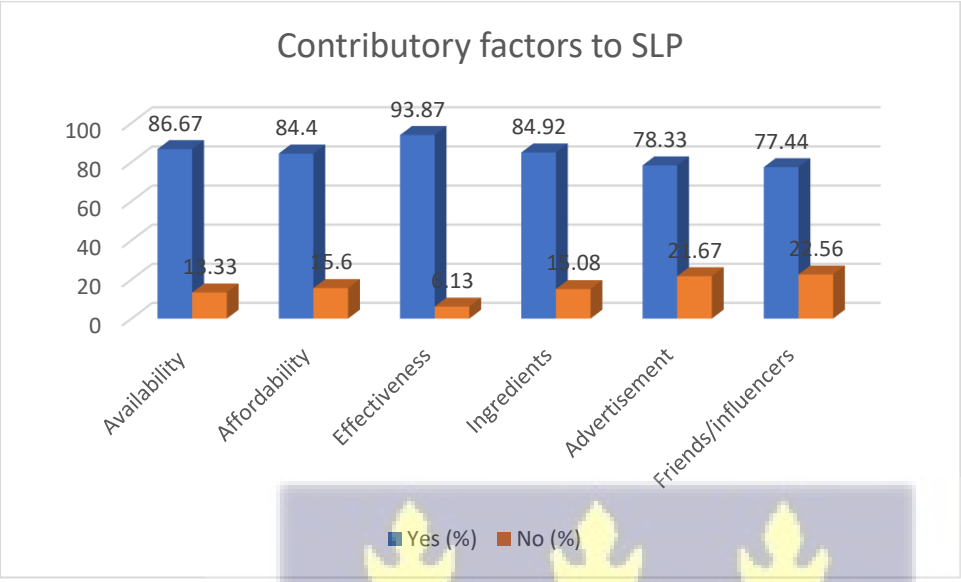


Figure 5: Other contributing factors of SLP

4.3 Level of Knowledge, Perception and Attitudes Regarding Skin Lightening Practices

Table 4 shows descriptive statistics of the level of knowledge, risk perception, perceived benefit and the attitudes of respondents regarding skin lightening practices. Knowledge was assessed based on respondents' awareness and understanding of skin-lightening practices, including the potential risks and benefits. While perception measured the extent to which respondents believe that skin-lightening practices offer positive outcomes, such as improved appearance or social acceptance, as well as respondents' awareness of the potential health risks and adverse effects associated with skin-lightening practices. Also, Attitudes was measured based on respondents' overall attitudes toward skin-lightening practices, including their acceptance or rejection of these practices.

A score of less than 5 indicates poor knowledge, suggesting limited awareness of the implications of skin-lightening practices. Scores from 5 to 6.9 indicate moderate knowledge,

reflecting some awareness but potentially incomplete understanding. Scores from 7 to 10 indicate good knowledge, signifying a comprehensive understanding of the practices and their consequences.

Also, for perception, a score of less than 5 denotes a poor risk perception, indicating that respondents were not sufficiently aware of the dangers. Scores from 5 to 6.9 represent moderate risk perception, suggesting some awareness but possible underestimation of the risks. Scores from 7 to 10 indicate good risk perception, demonstrating a thorough understanding of the potential hazards.

Again, with attitude, a score of less than 5 reflects negative attitudes, indicating acceptance or endorsement of these practices. Scores from 5 to 6.9 represent neutral or ambivalent attitudes, while scores from 7 to 10 suggest positive attitudes, indicating strong disapproval or rejection of skin-lightening practices.

From the table, a mean value of 2.655556 for knowledge indicated that the respondents had a poor level of knowledge on skin lightening practices. For perceived benefit, a mean value of 2.941667 indicated that the respondents' perceived benefit of the practice was poor. Also, risk perception of respondents was poor, with a mean value of 3.955787. In totality, risk perception for the respondents in this study was poor. Also, attitudes towards skin lightening practices were poor, with a mean value of 3.81412. This could be due to respondents' low knowledge and perception of SL practices.

Table 4.3: level of knowledge, perception and attitudes of SLP

Variable	Obs.	Mean	Std. Dev.	Min	Max
knowledge	360	2.655556	.7184184	0	3
benefit perception	360	2.941667	.9721995	1	5
risk perception	360	3.955787	.574355	1	5
attitude	360	3.81412	.5008478	2.25	5

4.4 Association between Sociodemographic factors and Skin Lightening Practices.

The results of the logistic regression analysis provide comprehensive insights into the factors influencing skin lightening practices among the sampled individuals. This analysis examines the complex interplay between demographic characteristics such as age, gender, marital status educational level and religion in determining SLP usage.

The results reveal that age is an influential factor in SLP usage. The reference group for age is individuals aged 18-24. The results indicate that individuals aged 25-34 have a coefficient of 1.403, with a p-value of 0.214 and a confidence interval of 0.823 to 2.394. This suggests that there is no statistically significant difference in SLP usage between the 18-24 and 25-34 age groups. For the 35-44 age group, the coefficient is 0.398, with a p-value of 0.076 and a confidence interval of 0.143 to 1.102 also indicate no statistical significance to SLP usage. This suggests that individuals aged 35-44 are less likely to use SLPs compared to those aged 18-24. Conclusively, the findings reveal that age has no significant impact on skin lightening practices. However, people aged 18-24 are more likely to engage in skin lightening practices, for several other reasons.

With gender, males were the reference group. With a coefficient of 1.569 for females, a p-value of 0.104, and a confidence interval of 0.911 to 2.702, this indicates that while females are more likely to use SLPs than males, the difference is not statistically significant.

Marital status, using married individuals as the base, reveals that single individuals, with a coefficient of 0.544, a p-value of 0.132, and a confidence interval of 0.246 to 1.201 have no statistical significance to SLPs. This negative significance shows that being married or single has no significant relationship with the practice of skin lightening.

Educational level is also considered, with individuals having a tertiary education as the reference group. The coefficients for individuals with Middle/JSS/JHS education and SSS/SHS/Secondary/Vocational education are 0.721 and 0.877, respectively, with corresponding p-values of 0.806 and 0.918, and confidence intervals of 0.053 to 9.863 and 0.071 to 10.77. These results indicate no significant association between the level of education and SLP usage. The coefficient for individuals with tertiary education is 0.36, with a p-value of 0.434 and a confidence interval of 0.028 to 4.654, further supporting this finding that level of education does not have any significant relationship with skin lightening practices.

With religion, Christians were used as the reference group to determine whether belonging to the other religious group had any significant relationship with the use of SLPs. With a coefficient of 2.616, a p-value of 0.03, and a confidence interval of 1.098 to 6.235, Muslims are reported to have a higher likelihood of using SLPs than Christians. This suggests a statistically significant higher likelihood of SLP usage among Muslims compared to Christians. Lastly, traditionalists have a coefficient of 2.814, a p-value of 0.423, and a confidence interval of 0.224 to 35.339, indicating no significant difference in SLP usage compared to Christians. Similarly, individuals of other religions have a coefficient of 0.327, a p-value of 0.333, and a confidence interval of 0.034 to 3.149, suggesting no significant difference from Christians. In conclusion, although religion has no statistically significant relationship with people's skin lightening decisions, Muslims have a higher likelihood in SL practices, compared to other religions.

Table 5: Sociodemographic factors and prevalence of SLP

Logistic regression

Variable	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
age : base 18-24	1	.	.	.	.	.
25-34	1.403	.382	1.24	.214	.823	2.394
35-44	.398	.207	-1.77	.076	.143	1.102
45-50	1	.	.	.	.	.
Gender : base Male	1	.	.	.	.	.
Female	1.569	.435	1.62	.104	.911	2.702
Marital status:	1	.	.	.	.	.
Single	.544	.22	-1.51	.132	.246	1.201
Divorced	1	.	.	.	.	.
Separated	1	.	.	.	.	.
	1	.	.	.	.	.
Level of education						
Middle/JSS/JHS	.721	.962	-0.25	.806	.053	9.863
SSS/SHS/Secondary/	.877	1.122	-0.10	.918	.071	10.77
Tertiary	.36	.47	-0.78	.434	.028	4.654
Religion : base Christian	1	.	.	.	.	.
Muslim	2.616	1.159	2.17	.03	1.098	6.235
Traditionalist	2.814	3.633	0.80	.423	.224	35.339
Others	.327	.378	-0.97	.333	.034	3.149
Constant	.623	.863	-0.34	.733	.041	9.396

4.5 Association between knowledge and Skin Lightening Practices

Table 6 presents data on the relationship between the knowledge of skin lightening (SL) and the prevalence of skin lightening product (SLP) usage among 360 individuals. Out of the total sample, 60 individuals have no knowledge of SL, and 300 individuals have knowledge of SL. Among those with no knowledge of SL, 45 individuals (75%) do not use SLP, while 15 individuals (25%) use SLP. Conversely, among those with knowledge of SL, 210 individuals

(70%) do not use SLP, whereas 90 individuals (30%) use SLP. Overall, 255 individuals (70.83%) do not use SLP, and 105 individuals (29.17%) use SLP.

The Pearson Chi-Square test was conducted to determine whether there is a statistically significant association between knowledge of SL and the prevalence of SLP usage. The Chi-Square statistic is 0.61, and the corresponding p-value is 0.4367.

Given that the p-value (0.4367) is greater than the significance level of 0.05, there is no significant relationship between knowledge of skin lightening and its prevalence. This indicates that there is no statistically significant association between having knowledge of SL and the usage of SLP among the sampled individuals.

In summary, the data does not provide sufficient evidence to conclude that knowledge of skin lightening is associated with the usage of skin lightening products. The prevalence of SLP usage does not significantly differ between individuals with and without knowledge of SL in this sample. Despite the findings that knowledge of skin lightening (SL) does not significantly influence the usage of skin lightening products (SLP) in this sample, several other factors could contribute to this observation. Factors such as ccultural norms and societal beauty standards often has influence on people's behaviour, especially in environments where lighter skin is highly valued and associated with beauty, status, and social acceptance. These cultural and peer pressures can lead individuals to use skin lightening products regardless of their knowledge about the potential risks or lack of benefits associated with these products.

Table 6: Knowledge and prevalence of SLP

	Prevalence of SLP usage		
Knowledge of SL	No	Yes	Total
No	45	15	60
	75.00	25.00	100.00
Yes	210	90	300
	70.00	30.00	100.00
Total	255	105	360
	70.83	29.17	100.00

Pearson Chi2 = 0.61 Prob = 0.4367

CHAPTER FIVE

DISCUSSION

5.0 Introduction

This study investigated the prevalence of skin-lightening practices (SLPs) among university-educated and less-educated adults in Accra, Ghana. Through a quantitative approach, the research aimed to understand the demographic and socio-cultural factors influencing SLPs. Key findings indicate that SLPs are prevalent among a significant portion of the population, with notable differences observed based on education level, age, and gender. This chapter discusses these findings in relation to existing literature and explores their implications for public health interventions. It also addresses the limitations of the study and suggests directions for future research.

5.1 Prevalence of Skin-Lightening Practices

The study found that 29.17% of respondents reported using skin-lightening products. This aligns with global and regional data, underscoring the widespread nature of this phenomenon. For instance, some studies have reported high prevalence rates in Ghana (40.4), Nigeria (77%), Togo (59%), and Senegal (67%) (World Health Organization, (2011); Owusu-Agyei et al., (2020); Aumah et al., (2022)). skin-lightening practices are prevalent among both educated and less educated individuals, albeit more common among the latter, is consistent with other studies highlighting the pervasiveness of this practice across different demographic groups (Yayehrad et al., 2023). The practice was generally reported to be driven by socio-cultural norms and perceptions of beauty (Asumah et al., 2022). The relatively high prevalence observed in this study highlights the widespread nature of SLPs in Accra and the need for targeted public health strategies. This assertion aligns with that of Owusu-Agyei et al. (2020), who suggest that the growing rate of skin lightening practices will potentially make what was once a concern limited

to low- and middle-income countries a global health issue. However, in contrast to the above, as reported by Asumah et al.,

5.2 Educational Level and Skin Lightening Practices

Educational level was significantly associated with skin-lightening practices. The findings revealed that less educated individuals showed a higher prevalence of skin-lightening practices, which aligns with findings from previous research suggesting that higher education levels correlate with better knowledge about the risks associated with these practices and more critical perspectives on societal beauty norms (Dlova et al., 2014). Also, Asumah et al., (2022) found in their study that young adults with no formal education were 3.2 times likely to use skin lightening products.

According to an online article by GhanaWeb (2024), titled "30% of students bleaching" the Eastern regional Education Director revealed that skin lightening had become a menace in senior high schools, despite the ban of such practice in high schools by the Ghana Health service. This could be as a result of lack of awareness on the dangers of skin lightening. This is similar to a study conducted on students in Central Sudan, that revealed that the high prevalence of the practice could be attributed to lack of health awareness on the dangers of skin lightening (Yousif et al., 2014). Dloval et al., (2014) acknowledged in his study that poor understanding of the risks associated with the use of SLPs increases the prevalence.

The findings of this study suggests that high educational attainment may play a critical role in shaping attitudes and behaviors toward skin lightening. This is because higher education levels might correlate with better knowledge of the risks associated with SLPs and greater access to information that discourages the practice. However, a contrasting view from another study revealed that women with higher level of education rather practiced skin lightening more (Tenai & N. K.,2016). Despite their knowledge of adverse effects, a substantial number of

university students still engaged in skin lightening, indicating that awareness alone may not be sufficient to deter the practice (Asumah et al., 2022). This is in accordance with Dlova et al., (2014) study that suggests that educational level or knowledge on SLPs does not necessarily deter individuals from engaging in the practice. Other factors such as discussed in this chapter could be reasons why individuals, although very educated, continue to practice SL. For instance, perceived benefits of getting job opportunities, attracting suitors or looking more beautiful could be other reasons why individual's engage in the practice. Also, the proliferation of the product and influence from relatives can influence one's SL choices.

As a way to help fight this menace, educational interventions that raise awareness about the dangers of SLPs could be particularly effective in reducing its prevalence among less-educated populations. Apart from school learning, community engagement can be used as a platform to educate individuals practically on the dangers on skin lightening.

5.3 Other Contributing factors of SLPs

The results of this study showed that there are other contributing factors that influence a person's decision to practice skin lightening. The high percentage (93.87%) of respondents indicating that advertisement influenced their decision to use skin lightening products aligns with assertions from Jesutofunmi et al., (2023) that spelt that aggressive marketing and pervasive media campaigns have a powerful impact on consumer behavior, shaping perceptions and driving demand for these products. This highlights the role of advertisement in promoting fair skin as a beauty ideal.

Availability (86.67%) and affordability (84.40%) are also significant contributory factors, suggesting that the widespread distribution and competitive pricing of skin-lightening products make them easily accessible to a wide audience. The accessibility of these products helps facilitate the adoption of SLPs across different socio-economic groups, as noted in studies that

emphasized the importance of market reach and product pricing in consumer choices (Asumah et al., 2022).

The ingredients (84.92%) and effectiveness (78.33%) of the products further greatly influence their use. Consumers are likely attracted to products that claim to use safe or natural ingredients and demonstrate visible results. This belief in the products' efficacy and hence patronage, aligns with the study of Dlova et al., (2015) that suggests that many individuals are encouraged to continue use of a product despite potential health risks if they get their desired results. This highlights the importance of product composition and performance in consumer satisfaction. It is important for individuals to read carefully content labels on the skin products they purchase. According to Asumah et al., (2022), this allows them to avoid the likelihood of using products that are toxic to their skin

Again, the strong influence that social interactions (77.4% friends and influencers recommendations) have on SLP users decisions underscores the role of peer pressure and endorsements from influencers in promoting skin-lightening practices. This is consistent with the study of Daftary et al., (2023) that revealed that certain university students reported to use SLPs because some relatives of theirs also used. This social dynamics of friends and social media personalities significantly impact consumer decisions. This perpetuates the cycle of of SLP use through social validation and aspirational beauty standards (Daftary et al., 2023). In another Ghanaian study by Owusu-Agyei et al., (2020), the female students and about 34% of male users reported that they were influenced by relatives who also used SLPs.

This result highlights the multifaceted nature of the factors contributing to the use of skin-lightening products. It underscores the need for comprehensive public health strategies that address not only the availability and affordability of these products but also the powerful influence of advertising and social norms.

5.4 Age and Skin Lightening Practices

Age was another significant factor influencing SLP prevalence. Younger individuals (18-34 years) were more likely to use skin-lightening products compared to older age groups. This underscores a study done by Tenai & N. K. (2016) reported that individuals who use skin lightening products tend to be younger. The high prevalence among younger respondents may be attributed to the influence of social media, peer pressure, and contemporary beauty standards that prioritize lighter skin tones (Jesutofunmi et al., 2023). Similarly, these findings are consistent with other studies that have reported higher rates of SLPs among young adults due to similar socio-cultural pressures. Swami et al., 2013; Motseki & Oyedemi, 2017). Their study revealed that early adulthood is a period of heightened sensitivity to such external pressures, making young adults more prone to adopting skin lightening practices to align with perceived ideals of beauty. Dr. Patel (2019), revealed in an interview that during puberty, adolescents are pressured from friends, relatives and social media to conform to a certain acceptable standard of skin tone. She discussed that their skin is tied to their perception of themselves. Hence, they tend to engage in risky behaviors like use of skin lightening creams to either lighten their skin or suntanning to tan their skin.

5.5 Gender and Skin Lightening Practices

Although the p-value for gender was on the borderline of statistical significance (0.0500), the data indicated a trend where females (32.23%) were more likely to engage in SLPs than males (22.22%). This trend reflects broader global patterns where women are often more influenced by beauty standards that promote lighter skin. This is in accordance with the study of Owusu Agyei et al., (2020) which revealed that the prevalence of the practice was high among females in Ghana and consistent in other sub-Saharan African countries like Togo and Senegal. Their study further revealed that female students in Ghana and Somaliland reported that a lighter skin complexion heightened their confidence and presented them more job opportunities and

chances of marriage. According to Adetoogun et al., (2023), women are more likely to engage in this practice because they are more likely to be judged according to their appearance. They also have less capital compared to men and experience worse body image as well. In order to appeal to society, especially the opposite sex, women are more likely to want to enhance their body, including their complexion.

The higher prevalence among women underscores the need for gender-sensitive public health campaigns that address the specific pressures faced by women regarding skin color and beauty (Daftary et al., 2023). Another study however revealed that 51%of both males and females used SLPs. Although the motivations for skin lightening amongst men was not documented in this study, a study by Blay & Y. A. (2011). revealed that some Ghanaian women reported to be attracted to light skinned men, which could be the driving force for men who practiced skin lightening.

5.6 Marital Status and Religion, and skin lightening practices

The study found no statistically significant association between marital status or religion and the prevalence of SLPs. Despite this, descriptive data suggested that Muslims had a higher prevalence of SLPs (48%) compared to Christians (28.44%) and other religions. These differences, however, were not statistically significant, indicating that marital status and religion may not be primary determinants of SLP behaviors in this context. Nevertheless, a study done by AlGhamdi (2010) in Saudi Arabia that revealed that the married Saudi women sought lighter skin and consequently, used skin lightening products, despite their marital status.

5.7 Knowledge, Perception, and Attitudes Towards SLPs

The study also assessed respondents' knowledge, risk perception, perceived benefits, and attitudes toward SLPs. The results of this study revealed poor knowledge and risk perception, alongside low perceived benefits and poor attitudes towards SLPs. This finding is consistent

with other research indicating that many individuals, particularly women, may not fully understand the severity of the health risks associated with skin-lightening products (Yayehrad et al., 2023), but are rather consumed with the perceived benefits they believe to get with a lighter skin. Public health interventions should focus on improving knowledge and risk perception regarding SLPs. Owusu-Agyei et al., (2020) found similar findings in their study that most of the female students they interviewed recorded that a lighter skin gives a woman more confidence and increased her opportunity to get a job. Blay, (2011) revealed in his study also that many Ghanaian women considered lighter skin a surrogate for beauty.

The solution to this menace transcends being educated only. Educational campaigns that highlight the potential health hazards, including skin damage, increased risk of skin cancer, and other long-term effects, could help shift attitudes and reduce the prevalence of SLPs.

5.8 Association between knowledge and SLP

The findings reveal no statistically significant association between knowledge of skin lightening (SL) and the prevalence of skin lightening product usage among the sampled individuals. Despite high awareness of the risks associated with SL, many continue to use these products. This aligns with findings by Asumah et al., (2022), where a substantial number of well-informed university medical students still engaged in SL practices. This suggests that knowledge alone is insufficient to deter usage, highlighting the powerful role of socio-cultural pressures and the entrenched preference for lighter skin.

The literature underscores the pervasive influence of historical and cultural factors in promoting fair skin as a beauty ideal. Daftary et al., (2023) explain that colorism, with roots in colonialism, continues to drive the preference for lighter skin, often linked to social prestige and attractiveness. This societal bias can overshadow health considerations, leading individuals to prioritize social acceptance. The prevalence data from the World Health Organization (2011)

and Yayehrad et al., (2023) show that skin lightening practices are widespread across Africa, including Ghana, Nigeria, and Senegal, despite regulatory efforts to curb them.

Additionally, the economic dimension plays a significant role in the persistence of SL practices. Jesutofunmi et al., (2023) highlight the skin lightening industry's growth, projected to reach USD 31.2 billion by 2024, driven by aggressive marketing and the accessibility of these products. This commercial influence exacerbates the challenge of reducing SL practices solely through education and regulation, as the market continues to expand and products remain affordable and widely available.

5.9 Limitations of the study

The study has several limitations that need to be addressed for a comprehensive understanding of the findings. One significant limitation is the cross-sectional design, which restricts the ability to infer causality between demographic factors and skin-lightening practices. This design only provides a snapshot of the associations at one point in time, making it difficult to establish temporal relationships or causative links.

Another limitation stems from the reliance on self-reported data. Self-reported information can be subject to various biases, including social desirability bias, where respondents might underreport or overreport their use of skin-lightening products due to the stigma associated with such practices. This could lead to inaccuracies in the data and potentially affect the validity of the results.

Additionally, the study did not document the motivations for skin-lightening among men. While the findings indicate that both men and women engage in skin-lightening practices, the motivations for men were not explicitly explored. Understanding these motivations is crucial for a more complete analysis, as the reasons behind skin-lightening can significantly influence the behavior and prevalence among different genders.

CHAPTER SIX

SUMMAY, CONCLUSION AND RECOMMENDATION

6.1 Summary

The study explored the prevalence and factors influencing skin-lightening practices among university-educated and less-educated adults in Accra, Ghana. a quantitative approach was adopted to identify the demographic and socio-cultural factors influencing SLPs. 29.17% of respondents reported using skin-lightening products. The study found that less-educated individuals and younger age groups were more likely to engage in SLPs as influenced by socio-cultural norms, perceptions of beauty, and aggressive marketing. The findings revealed that a higher education level was correlated with level of awareness of the dangers of SL. Also, among the genders, females had a higher prevalence of SL than males, which was a reflection of global trends reflecting societal beauty norms. However, the motivations of men in the practice were not explored.

Despite a significant portion of participants being aware of the health risks associated with skin-lightening products (SLPs), a substantial number are still engaged in the practice. This indicates that knowledge alone is insufficient to deter usage, as socio-cultural factors and entrenched beauty standards play a critical role. The findings align with broader trends in Africa, where skin-lightening is prevalent due to historical, cultural, and economic influences. The study highlights the persistent preference for fair skin, driven by colorism and reinforced by media and commercial interests.

6.2 Conclusion

This study provided valuable insights into the prevalence and determinants of skin-lightening practices among different educational levels in Accra, Ghana. The findings reveal no statistically significant association between knowledge of skin

lightening (SL) and the prevalence of skin lightening product usage among the sampled individuals. Despite high awareness of the risks associated with SL, many continue to use these products. It revealed that a significant portion of the population, particularly less-educated individuals and younger age groups, engaged in these practices. By highlighting the significant role of education, age, and gender, the study underscored the need for comprehensive public health strategies, with a multifaceted approach to address the socio-cultural factors driving skin lightening practices. Effective interventions, including educational campaigns, school programs, community outreach, healthcare training, policy enforcement, media regulation, support services, research, and collaborations, can help mitigate the health risks associated with skin lightening and promote healthier, more inclusive beauty standards.

6.3 Recommendations

The findings highlight the importance of multi-faceted public health strategies to reduce the prevalence of skin-lightening practices. Effective interventions should include:

1. Comprehensive Public Health Campaigns: Targeted educational programs should be developed to raise awareness about the dangers of skin lightening, particularly among less-educated and younger populations. This is in agreement with a report from the WHO (2014) that suggests that although regulations and labelling requirements in some countries have been affected, more information for the general public about possible effects of hazardous substances in the products must be made available (Tenai, N.K., 2016).

2. Community Engagement: Public health practitioners can engage community leaders and influencers in education programs targeting the harmful effects of skin lightening. These stakeholders can help disseminate information and challenge beauty standards

that promote lighter skin tones to community members, using several media of communication. Grassroots initiatives can be more effective in changing deeply rooted cultural perceptions

3. Regulation and Enforcement: Institutions such as FDA and GSA, responsible for enforcement of quality standards can strengthen regulations on the sale and distribution of skin-lightening products, along with robust enforcement mechanisms, can help reduce the availability of harmful products. Regular monitoring of skin care products on the market to ensure that only certified products are on sale to consumers.

4. Gender-Sensitive Approaches: Educational programs addressing the specific pressures faced by women regarding beauty standards is crucial. Public health messages should be tailored to resonate with women and encourage natural beauty. The media outlets can also be brought on board to use their media platforms to promote positive representations of dark skin and challenge existing beauty standards.

5. Research and Monitoring: Continuous research and monitoring are needed to track the prevalence of SLPs and the effectiveness of interventions. Understanding changing trends and emerging products can help adapt strategies accordingly.

6. Lastly, governments and consumer protection agencies can embark on anti-bleaching campaigns to create awareness on the adverse effect associated with the practice, if done without a doctor's guidance

6.4 Future research

1. Future research should consider longitudinal studies and more diverse sampling methods to enhance the generalizability of the findings.

2. Future researchers can research further into why men also practice it, to better understand the varying motivations for the practice between the two genders.

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APPENDIX A: PARTICIPANTS INFORMATION SHEET

Title of Research: Educational Attainment and Skin Lightdening: Comparing the Practice among University Educated and Less Educated Adults In Accra, Ghana.

Principal Investigator: Eunice Kesewa Baffoe Dadzie

Address: Department of Biological, Environmental and Occupational Health-School of Public Health, University of Ghana-Legon.

General Information about Research

Skin lightening (SL) is a cosmetic procedure that aims to lighten dark areas of skin or achieve a generally paler skin tone by reducing the concentration or production of melanin in the skin, according to the UK National Health Service website. Skin lightening, often called skin whitening or skin bleaching in dermatology, is the purposeful, unsupervised application of topical and sometimes systemic chemicals to suppress melanin production and achieve a uniformly lighter skin tone. Cosmetic products such as soap, lotions, creams, scrubs and so on are utilized to lighten, brighten, and tone the complexion of skin. This act has its roots in complex historical, economic, sociocultural, and psychosocial as motivating factors. The history of skin lightening practice can be traced back as far as the early 20th century, among African Americans who were enslaved. They engaged in the practice as a psychological means of escaping from the memories of "negro past". Due to the increasing occurrence of this practice worldwide, several studies have been done to assess the prevalence, knowledge and risk perception of Skin lightening among people. In Ghana however where Skin lightening is predominantly on the rise among citizens, it is prudent to determine the role various forms of education has in enhancing or discouraging skin lightening. This study therefore seeks to assess the prevalence of skin lightening practices among adults in Ghana. This study is expected to

last for 4 weeks within which one time study participants will spend ten to fifteen minutes each responding to a structured questionnaire as well as standard interviews.

Possible Risks and Discomforts

There may be no anticipated risks associated to this study within the stipulated time. Your answers will solely be used for research.

Possible Benefits

There may be no direct benefits to you as an individual, however, the study will be of more relevance for policy directives in curbing the menace of using skin lightening products and its patronage.

Outcome and Feedback

Findings obtained at the end of the study would be presented to the general public by way of publication in peer review journals. Findings would also be shared with the management of the Ghana Health Service, Greater Accra Regional Directorate.

Feedback to participant

Feedback of findings would be communicated to participants at the end of the study on request.

Funding Information

The study would be self-funded by the Principal Investigator

Confidentiality

The information in the study will be kept strictly confidentially. Data will be stored securely, and measures will be taken to protect the data. No reference will be made in oral or written report which could link you to the study, you will NOT be asked to record your name so that no one can match your identity to the answers that you provide. For the purpose of this study,

participant confidentiality is key and hence as a researcher, i will like to state unreservedly that, information obtained about you will be secured to the best of my ability by de-identifying responses with unique codes. For possible review and publication purposes as well, you will not be named in any reports.

Compensation

There will be no compensation for completing this survey. Your effort and time spent will however be "immensely" appreciated. Participants will be appreciated for their time and effort with non-monetary tokens such as small gift items (e.g., notebooks or pens). This form of appreciation is considered ethically sound and appropriate for the study context. The appreciation tokens will be handed to participants at the end of their participation. Participants will be informed of this appreciation during the consent process to ensure transparency and understanding.

Voluntary Participation and Right to Leave the Research

This study involves voluntary participation throughout the study, as the researcher encourages. However, study participants might be excused at any point of the study without coercion when they deem it fit to.

Contacts for Additional Information

For further clarity and consultation with regards to this study, participants are encouraged to reach out to the underlisted persons.

Eunice Kesewa Baffoe Dadzie (School of Public Health)

Phone: 0576351448/0544662810

Dr. Serwaa Akoto Bawua (Lecturer, School of Public Health)

Phone: 0553696864

Your rights as a Participant

This research has been reviewed and approved by the Ethics Review Committee of NOGUCHI MEMORIAL INSTITUTE OF MEDICAL RESEARCH. If you have any questions about your rights as a research participant, you can contact the NMIMR Administrator for further information.

APPENDIX B: CONSENT FORM

Study Title: Prevalence of skin lightening practices and its associated factors among educated and uneducated adults in Ghana.

PARTICIPANTS' STATEMENT

I acknowledge that I have read or have had the purpose and contents of the Participants' Information Sheet read and all questions satisfactorily explained to me in a language I understand (English/Twi/Ga/Ewe/Hausa). I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name of Participant……..

Participants' Signature ……...OR Thumb Print……

Date:…….

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet to the afore named participant to the best of my ability in the (English) language to his/her proper understanding.

All questions, appropriate clarifications sorted by the participant, and answers were also duly interpreted to his/her satisfaction.

Name of Interpreter……

Signature of Interpreter…….. OR Thumb Print …….....

Date: ……

Contact Details: …….

STATEMENT OF WITNESS

I was present when the purpose and contents of the Participant Information Sheet were read and explained satisfactorily to the participant in the language, he/she understood (English/Twi/Ga/Ewe/Hausa).

I confirm that he/she was given the opportunity to ask questions/seek clarifications and the same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name: ……

Signature…….... OR Thumb Print …….....

Date: ……

INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name ……

Signature ……

Date……

Should you wish to contact me at any stage regarding consent you can contact me at Cell: 0544662810/0576351448 or email: obaapadarlinx@gmail.com/ebkdadzie@st.ug.edu.gh

APPENDIX C: STUDY QUESTIONNAIRE

Participant ID: ……

SECTION ONE (1) – Sociodemographic factors

1. What age group do you fall within?

a. 18–24 [ ] b. 25–34 [ ] c. 35–44 [ ] d. 45–50 [ ]

2. Gender.

a Male [ ] b. Female [ ]

3. What is your marital status?

a. Married [ ] b. Single [ ] c. Divorced [ ] d. Separated [ ]

4. What is your Highest Level of formal education?

a. No formal education [ ]

b. Primary [ ]

c. Middle/JSS/JHS [ ]

d. SSS/SHS/Secondary/Vocational/Technical [ ]

e. Tertiary [ ]

5. What is your religious orientation?

a. Christian [ ] b. Muslim [ ] c. Traditionalist [ ] d. Others [ ]

6. Location ……

7. Occupation/Profession……

8. Skin tone

a. Very Dark [ ] b. Brown [ ] c. Dark Brown [ ] d. Fair [ ]

SECTION TWO (2):

Perceived benefits of skin lightening

9. A lighter skin tone increases a woman's sexual appeal.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

10. A lighter skin tone increases a woman's chance of getting a job opportunity.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

11. A lighter skin tone is more beautiful.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

12. A lighter skin tone increases the self-confidence of women.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

SECTION THREE (3): Knowledge on negative effects onf skin lightening

13. Have you heard about skin lightening?

a. Yes [ ] b. No [ ]

14. Do you have knowledge about skin lightening?

a. Yes [ ] b. No [ ]

15. Are you aware of the negative effects of skin lightening?

a. Yes [ ] b. No [ ]

16. What is skin lightening?

a. Changing skin color [ ] b. using chemicals to treat skin problems [ ] c. making the skin smooth [ ] d. natural skin care [ ]

17. First source of information on lightening

a. relatives [ ] b. friends [ ] c. media [ ] d. teacher/literature [ ]

SECTION FOUR (4): Risk perception of skin lightening

18. Skin lightening results in skin damage (Rashes/Irritation).

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

19. One could get skin infections from skin lightening (skin cancers).

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

20. Skin lightening causes cancer

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

21. Skin lightening products containing mercury could lead to mercury poisoning.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

SECTION FIVE (5): Knowledge and attitudes towards skin lightening products

22. The price is an important criterion for selecting the skin-lightening product you use.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

23. The active ingredient is an important criterion for selecting the skin lightening

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

24. Continuous use of skin lightening products after expected to maintain skin tone.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

25. Check expiry date before buying cosmetics.

a. Agree [ ] b. Strongly agree [ ] c. don't know [ ] d. Disagree [ ] e. Strongly disagree [ ]

SECTION SIX (6): Prevalence and use of skin lightening products

26. Have you used skin lightening products?

a. Yes [ ] b. No [ ]

27. if yes, Preferred skin toning products?

a. Local [ ] b. Foreign [ ] c. Both [ ]

28. if yes, number of skin lightening products used in the last 12months?

a. two [ ] b. less than two [ ] c. more than two [ ]

29. Why do you use skin products?

a. Medical purposes [ ] b. Lighten skin [ ] c. Daily routine [ ]

30. How often do you use skin toning products?

a. Once/twice daily [ ] b. once a week [ ] c. once a month [ ]

SECTION SEVEN (7): Perception of people on other contributing factors in choosing SLPs.

31. Brand of the product

a. Yes [ ] No [ ]

32. Affordability

a. Yes [ ] No [ ]

33. Effectiveness of product

a. Yes [ ] No [ ]

34. Ingredients

a. Yes [ ] No [ ]

35. Advertisement by media

a. Yes [ ] No [ ]

36. If Yes to the above, which media platform influences your decision the most?

a. Social media [ ] b. TV [ ] c. Radio [ ]

37. Friends'/ influencer recommendation

a. Yes [ ] No [ ]

Thanks for participating in this study.