ISSN: 2581 – 3633
PubMed - National Library of Medicine - ID: 101745081

International Journal of Medical Science and Advanced Clinical Research (IJMACR)

Available Online at:www.ijmacr.com

Volume – 8, Issue – 2, March - 2025, Page No. : 118 – 128

A Questionnaire Based Assessment of Skin Bleaching Practice Among Female Medical Students in A Tertiary Care Institute: A Cross Sectional Study

[1]Dr Padma K, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

[2]Dr Girish PN, HOD, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

[3]Dr Maria Ansari, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

[4]Dr Delgeena Devis Edakulathur, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

[5]Dr Suraksha P, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

[6]Dr Rithvik M Hegde, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

Corresponding Author: Dr Padma K, MD Resident, Department of Dermatology, AJ Institute of Medical Sciences and Research Centre, Mangaluru, India

How to citation this article: Dr Padma K, Dr Girish PN, Dr Maria Ansari, Dr Delgeena Devis Edakulathur, Dr Suraksha P, Dr Rithvik M Hegde, "A Questionnaire Based Assessment of Skin Bleaching Practice Among Female Medical Students in A Tertiary Care Institute: A Cross Sectional Study", IJMACR- March - 2025, Volume – 8, Issue - 2, P. No. 118 – 128.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: Skin bleaching involves the application of chemicals such as ammonia, hydrogen peroxide, and hypochlorite, either in salons or at home, with repeated treatments over time. Skin bleaching products often contain hazardous ingredients that can lead to adverse outcomes, including rashes, dryness, sunburns, and more severe long-term effects such as DNA damage and increased vulnerability to skin cancers. Despite these effects there is a scarcity of medical research and literature focused on their misuse. (1)

Aims and objectives

1. To estimate the prevalence of 'skin bleaching' among female medical students.

2. To assess the pattern of practices regarding 'skin bleaching' in female medical students.

Materials & Methods: A cross-sectional study was conducted among 103 female medical students in a tertiary care medical college in Mangalore, using a preformed digital questionnaire. It included socio-demographic questionnaire, and questions related to use of bleaching agents, pattern of use, and side effect following use. Ethical committee clearance was obtained prior to the study.

Results: The most common bleaching products used were cream bleach (35.3%), oxybleach (17.6%), milk bleach (11.8%), or powder bleach (5.9%). Post procedure protective measures like moisturizer, sunscreen, avoiding sunlight and soaps (88.2%) were practiced by majority of cases. While, 70.6% didn't have any side effects, rashes (23.6%), burning sensation (11.8%), dryness (11.8%), and darkening on exposure to sunlight (5.9%) were the most common complains noted.

Conclusion: Around one sixth of female medical students used bleaching products at some time of life. While majority of participants used occasionally, around half of them did the procedure in salon, and post-procedural protective measures were carried in most cases. Despite that, around one-fourth of the participants complained of some degree of side effects. Awareness of potential risks and effects of skin bleaching remains limited, even among well-educated youth and medical students**.**

Keywords: Bleaching, medical students, side effects, prevalence, rashes

Introduction

The human skin is the largest and the most visible organ.[1] It plays a significant role in an individual's identity and self-expression. Alterations to skin appearance through lightening treatments, tattooing, or piercing, are often influenced by societal norms and perceptions. In many cultures, especially in the Indian subcontinent, lighter skin tones are frequently associated with beauty, success, and social superiority. These deeply ingrained ideas are reinforced by media portrayals and societal expectations, often driving individuals toward practices that promise fairer skin. Historically, lighter skin has been associated with higher social standing, a notion perpetuated by centuries-old caste dynamics. This bias, coupled with the aggressive marketing of fairness products, has cultivated an environment where skin-lightening practices are not only normalized but are often seen as essential for personal and professional success. While much international attention has been drawn on the issue of persons with fair skin trying to attain a tan to look brown by various means, relatively less attention has been paid to the eternal quest of people with darker skin types trying to become fair. The quest to be fair has become an obsession in this era and has resulted in people wanting more topical treatments and procedures to enhance their looks. Hence, "Bleaching" is one of the readily available procedures undertaken for the same.[2] Its socio psychological significance may exceed its biological function, even to the extent of causing cosmetic problems, resulting in lower quality of life and one's self-esteem. White-skinned individuals tan their skin, while dark skinned individuals seek various ways to brighten their skin.[3] Most of the skin bleaching creams may contain hazardous chemicals like hydrogen peroxide, ammonia, sodium hypochlorite, hydroquinone, steroids, heavy metals like mercury, combinations of herbal preparations and other chemicals in varying

concentrations. There is a lack of clarity regarding the preparations used in the common practice of 'bleaching' prevalent in our society and therefore, frequently applying these products to the body can mean frequently exposing of oneself to these harmful elements which increases the severity of the harm which can be caused by the products. Skin bleaching is a common method of achieving lighter skin. It involves the application of chemicals such as hydrogen peroxide, ammonia, and hypochlorite, either as salon-based or home-based treatments. Skin bleaching products often contain hazardous ingredients that can lead to adverse outcomes, including rashes, dryness, sunburns, and more severe long-term effects such as DNA damage and increased vulnerability to skin cancers. Most manufacturers do not fully list the ingredients in the bleaching creams and the harmful chemicals in the products cause problems such as exogenous ochronosis, delayed wound healing and kidney problems. The effects can be worsened by sun exposure. Direct sun exposure of especially light skin is a risk factor for developing conditions such as melanoma. Therefore, directly exposing bleached skin to sunlight could also increase the odds of developing melanoma.[4]

Melanogenesis is a process to synthesize melanin, which is primary responsible for the pigmentation of human skin, eye and hair. Melanin is primarily responsible for the pigmentation of human skin, eyes and skin, which is produced from epidermis melanocytes in an approximate ratio of 1:36 with basal keratinocytes. In response to ultraviolet B (UVB)-irradiation, melanocyte synthesizes melanin through the process called melanogenesis and the synthesized melanin in melanosomes is transported to neighbouring keratinocytes in epidermis. Under normal physiological conditions, pigmentation has a beneficial effect on the photo-protection of human skin against harmful UV injury and plays an important evolutionary role in camouflage and animal mimicry. However, an excessive production of melanin causes dermatological problems such as freckles, solar lentigo, melasma, cancer, and post inflammatory melanoderma. In addition, continuous UV-irradiation can result in DNA damage, gene mutation, cancer development and impairment of the immune system or photoaging. Melanogenesis is a complex pathway involving a combination of enzymatic and chemical catalyzed reactions. Melanocytes produce two types of melanin: eumelanin (brown-black) and pheomelanin (red yellow) formed by the conjugation of cysteine or glutathione.[5] Melanin, a skin pigment, consists of blackish-brown eumelanin and reddish-yellow pheomelanin. Higher pheomelanin proportion will make skin brighter.[6] Ultraviolet (UV) radiation is a unique modulator of skin pigmentation influencing tanning pathways.[7] Hydrogen peroxide, ammonia and hypochlorite are all known irritants and cause local irritation of skin when used in higher concentrations or for longer duration. Ammonia is a corrosive agent which could cause immediate skin damage including blistering and burns. Burns may leave behind post-inflammatory hyper or hypopigmentation and permanent scarring. Long term toxicity with repeated use of bleaches should also be taken into account. Hydrogen peroxide has been found to cause hydroxylation of guanine and thymidine, DNA breaks and chromosomal aberrations.[8]

Skin bleaching might enable one's skin to temporarily look beautiful and smooth as reported by some of the participants or to obtain the social favours but it cannot make one's skin healthy. Skin bleaching is actually dangerous to one's skin health and overall health. It is

vital for people to have full information about skin bleaching cosmetics so that they can make informed decisions before they decide to use the products.[9-10]

Despite its widespread prevalence, particularly among young women, the practice of facial and skin bleaching remains underexplored in medical literature, with limited attention given to its effects and potential risks. Even among individuals with higher educational backgrounds, such as medical students, awareness of the ingredients and side effects of bleaching agents is often low. This highlights the need for more awareness programs to help people make informed decisions regarding the use of bleaching products. The motivations and perceptions behind this practice, especially among populations like medical students who may become future influencers of public health behaviour, are crucial to understand.

This study aims to address the existing knowledge gap by exploring the prevalence and practices related to skin bleaching among female medical students in a tertiary care institution. To assess the association with body image, we used the Body Image Scale, which is a validated questionnaire with four options namely"not at all " (score 0), "a little" (score 1), "quite a bit" (score 2) and "very much" (score 3) for rating body image changes.[11]

By shedding light on this under-researched topic, the findings seek to inform public health strategies, enhance awareness of the potential risks associated with bleaching practices, and provide a foundation for future studies. Additionally, the study emphasizes the importance of understanding the various bleaching products and their potential side effects, encouraging dermatologists to guide patients in making informed decisions and avoiding the misuse of over-the-counter bleaching products. Ultimately, this research will contribute to the development of targeted awareness initiatives and help prevent the misuse of bleaching agents.

Aims and Objectives

1. To estimate the prevalence of 'bleaching' among female medical students.
2. To assess the knowledge, attitude and practices regarding 'bleaching' in female medical students.

Materials and Methods

A hospital based cross-sectional study was conducted among female medical students from the A J Institute of Medical Sciences, Mangalore, aged 18–45 years using digital questionnaire. On the basis of the study conducted by Jagadeesan S, Kaliyadan F and Karalikkattil, assuming P= 57.1 %, 95 % Confidence Interval, 10% absolute allowable error(L), the sample size estimated for the study was 89. Further assuming 10% non-response rate, the final sample size estimated for the study is 98. A study population of 103 was taken into the final study by simple random sampling technique.

Inclusion Criteria

1. Female medical Students at AJ Institute of Medical Sciences, Mangalore.
2. Age between 18 - 45 years.
3. Willingness to give consent for the study

Exclusion Criteria:

1. Age <18 years >45 years
2. Males
3. On photosensitive drugs or history of drug with photosensitive potential,
4. On oral isotretinoin,
5. Pregnant or lactating,
6. Females who have undergone a resurfacing procedure (Dermabrasion, laser resurfacing, deep

peels) in the last 6 months prior to a bleaching session,

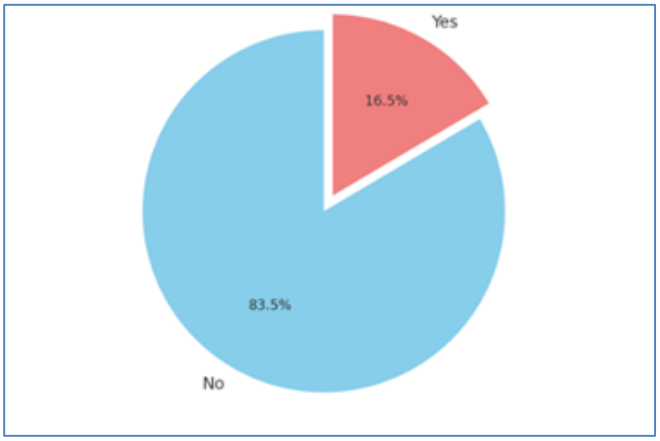
7. Hypersensitivity to the bleaching agents.

Results

The study included 103 female medical students including undergraduate and post-graduates. The mean age of participants was 22.4±3.5 years.

Prevalence of bleaching practice

Out of 103 respondents, 17 students reported using bleaching products, indicating that the prevalence of skin bleaching (using home-based or parlor-based products) among female medical students was 16.5%.(Graph No.1)



Graph 1: Prevalence of bleaching practice among medical students (N=17)

Pattern of bleaching practice

Out of the 17 participants who used bleaching, majority of participants were above 15 years of age during initial use of bleaching products (64.7%). Majority used the bleaching products to improve the glow before a function (58.8%), or to appear fair (23.6%) or to lighten facial hair (17.6%). Majority of participants used the products for less than 10 times (41.2%) or only once (29.4%).

Table 1: Pattern of bleaching practice among medical students

Characteristics	Frequency (N=17)	Percentage
At what age did you start bleaching?		
Below 15 years	6	35.3
After 15 years	11	64.7
Reasons for bleaching		
To improve glow only before function	10	58.8
To appear fair	4	23.6
For lightening facial hair	3	17.6
Frequency of bleaching face		
Do it every 2 weeks	1	5.9
Do it once in every 3 months or major functions	3	17.6
Few times (<10 times)	8	47.1
Only once	5	29.4
Areas commonly bleached		

Face and neck	8	47.1
Face alone	5	29.4
Face, neck, back, and underarms	1	5.9
Face and underarms	1	5.9
Neck	1	5.9
Back	1	5.9
Bleaching done by		
Parlour	9	52.9
Self	3	17.6
Parents/siblings	3	17.6
Friends/roommate	2	11.8

Only 23.5% of participants used bleaching products every 3 months or for major functions, and 5.9% used them every 2 weeks. The face was the most common site for bleaching, either alone or in combination with other areas (88.2%). Other commonly bleached areas included the neck, back, and underarms. Around half of the participants (52.9%) had their bleaching done at a parlour, while the rest did it themselves (17.6%), or had it done by parents/siblings (17.6%) or friends/roommates (11.8%). Only 5.9% consulted physicians before using bleaching products. **(Table No.1)**

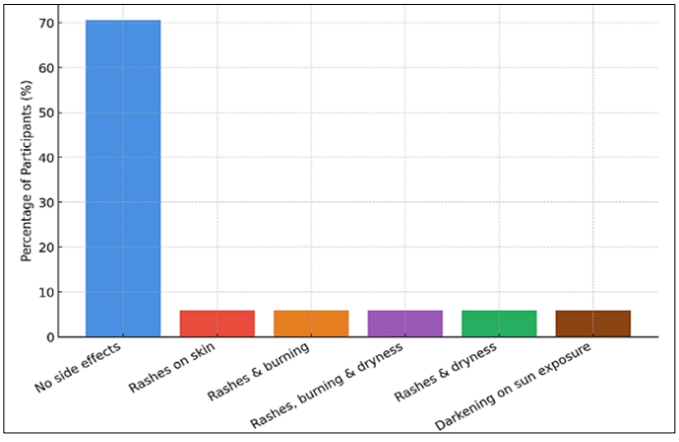
Table 2: Practices of bleaching among medical students

Characteristics	Frequency (N=17)	Percentage
Type of skin bleach used		
Cream bleach	6	35.3
Oxy bleach	3	17.6
Milk bleach	2	11.8
Powder bleach	1	5.9
Don’t know	4	29.4
Usual time period of application		
5 minutes	2	11.8
10 minutes	6	29.4
15 minutes	1	5.9
20 minutes	7	41.2
> 20 minutes	2	11.8

Side effects		
None	12	70.6
Rashes on skin	1	5.9
Rashes on skin and burning sensation	1	5.9
Rashes, burning sensation, and dryness	1	5.9
Rashes and dryness	1	5.9
Darkening on sun exposure	1	5.9
Post procedure protective measures		
Yes	15	88.2
No	2	11.8

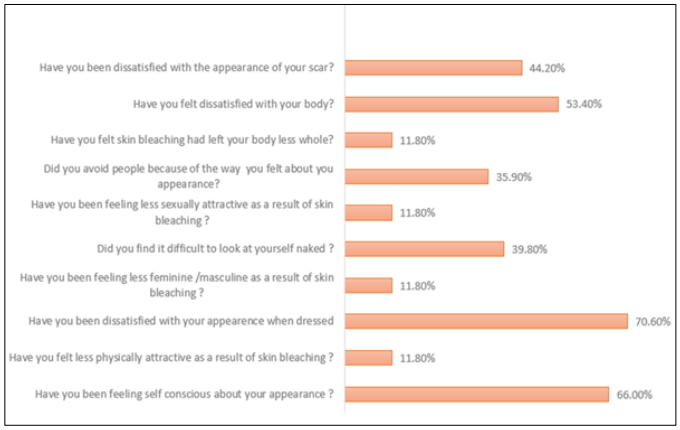
The most common bleaching products used were cream bleach (35.3%), followed by oxybleach (17.6%), milk bleach (11.8%), and powder bleach (5.9%). However, 29.4% of participants were unaware of the components in the bleaching products they used. The majority of participants applied the bleaching products for 20 minutes (41.2%), while others used them for 10 minutes (29.4%), 5 minutes (11.8%), or 15 minutes (5.9%). Additionally, 11.8% of participants applied bleaching products for more than 20 minutes. Post-procedure protective measures, such as using moisturizers, sunscreen, avoiding sunlight, and using soaps (88.2%), were practiced by the majority of participants. (Table No.2)

Graph 2: Side effects noted among female medical students (N=17)



While 70.6% of participants reported no side effects, rashes on the skin (5.9%), rashes and burning sensation (5.9%), rashes, burning sensation, and dryness (5.9%), rashes and dryness (5.9%), and darkening on sun exposure (5.9%) were the most common side effects noted. (Graph No. 2). Furthermore, 20% of participants stopped bleaching due to side effects/adverse effects, 40% initially stopped but resumed after changing products, and 40% continued bleaching despite experiencing side effects.

Graph 3: Horizontal bar chart showing Perceived Emotional and Physical Effects of Skin Bleaching Among Medical Students (N=17).



70.60% of respondents reported dissatisfaction with their appearance when dressed, indicating that skin bleaching

has a significant impact on how they perceive their external appearance in daily life.

66.00% of respondents stated that they felt self-conscious about their appearance as a result of skin bleaching, suggesting that it contributes to decreased self-esteem.

53.40% of respondents expressed dissatisfaction with their bodies, highlighting the broader negative effects of skin bleaching on body image.

44.20% of respondents were dissatisfied with the appearance of their scars, potentially pointing to concerns about skin damage or uneven skin tone post-bleaching.

39.80% of respondents found it difficult to look at themselves naked, reflecting deeper discomfort with their body and physical changes after skin bleaching.

35.90% of respondents admitted to avoiding social interactions due to dissatisfaction with their appearance, suggesting that skin bleaching may lead to social withdrawal and isolation.

11.80% of respondents felt skin bleaching left their body "less whole" or felt less physically attractive, less sexually attractive, or less feminine/masculine due to skin bleaching, indicating that these concerns, while less common, still affect a minority of individuals.

Discussion

This study explores the prevalence and practices related to skin bleaching among female medical students in Mangalore shedding light on an under-researched aspect of dermatological and cosmetic health. The findings provide insights into the usage patterns, and consequences of skin bleaching practices within this specific demographic.

Prevalence of skin bleaching

In our study, the prevalence of skin bleaching among female medical students was 16.5%, demonstrating a prevalent practice among medical student community. However, it was lower than the reported prevalence by Jagadeesan S et al among medical students in Kochi (37.7%)[4]. Our reported prevalence was lower than among medical/health science students in African countries of Somaliland (52.2%)[11] and Nigeria (40.9%)[12]. A study by Alrayees SF et al among female students in Saudi Arabia noted a prevalence of 56.2%.[13] While 67.2% used for cosmetic conditions, and 17.5% for medical conditions.[13] In addition, they noted that all participants were relatively light skinned (type 3 and 4 skin type), and had a positive perception for light skin tone.[13] A multi-centric study by Peltzer K et al from 27 universities in 26 countries across Asia, Africa, and the Americas, noted that the overall prevalence of skin lightening creams among female students was 30%, with ranged from 0% in Turkey, and 83.3% in Thailand.[14] The study also noted that the prevalence was higher among health and welfare students.[14] Hence, our study noted a lower prevalence of bleaching skin compared to other studies. However, recent study has noted the increasing trend in usage and interest in skin lightening/bleaching creams.[15] India ranked among the top five countries assessing online search for skin lightening creams. Our neighbouring country, Pakistan ranked first, followed by Nigeria, Ghana, Srilanka, and India.[15] Women of colour constitute for 80% market for global skin lightening products.[16] This growing trend is of concern, and focus needs to be given for early recognition of the problem, and appropriate preventive and promotive measures to reduce the practice.

Patterns of skin bleaching practices

Among the participants using bleaching products, around one-third of them initiated the practice before the age of 15 years. Hence, early education on the side and adverse effects of usage of skin bleaching products is of utmost importance. Moreover, while majority of participants admitted using these products only few times, a proportion of them used the cream before some function or family events, suggestive of usage of these products to feel inclusive to the society, and appreciated during social gathering. Face was the commonest area bleached, recognizing the social role of looks on persons confidence and need for acceptance. Similarly, Jagadeesan S et al noted that lightening facial hairs (19.5%), glow before a function (15.2%), and lighter skin complexion (15.1%) were the commonest reasons for bleaching product use.[4] Previous studies have also recognized that need for smooth and healthy skin, beauty, marriage, occupation, and complexion are the common reasons for usage of these products.[17-18] A study among nursing students and professionals in Tamil nadu noted that fair skin was considered more beautiful, and it increases the chances in profession and marriage.[18] There is a need to retrospect these, and steps need to be taken to reduce the impact of skin tone on health professional career. Previous study by Shroff H et al in Mumbai have also noted the role of media on influencing skin lightening products use.[19] Hence a collective action needs to be taken to address such issues.

Various types of skin bleaching products like cream, oxybleach, and milk bleach were used by our study participants. It was concerning that around one-third of participants were unaware of the ingredients of the products used. Jagadeesan S et al noted that, 63.8% of female medical students using these products were unaware of the ingredients of bleaching products.[4] With majority of participants using these products in parlour/saloons, there is a increased need to educate the participants on the need for awareness of the contents of the products. Moreover, only 5.9% participants had approached medical professional before its use, despite being medical students. Lower professional consultation (dermatologist) was also noted by Jagadeesan S et al (2.8%).[4] This re-iterates the need for social awareness regarding their effects on human skin based on factors like skin type.

Side effects of skin bleaching

Various chemical ingredients like hydroxyquinone, steroids, gluthathione, mercury, retinoids, and kojic acid are available in the market. They are associated with documented local and systemic side effects and adverse reactions.[16] Our study noted that 29.4% had adverse reactions following use of bleaching products. These included skin rashes, burning sensation, dryness, and darkening on exposure to sun. Jagadeesan S et al noted that 38.6% participants had side effects following bleaching.[4] Acne, itching, and peeling of skin were the most common reactions noted by them.[4] Shroff H et al noted that 17% of the participants reported of adverse/side effects following application. In their study among female health care students in Somlaliland, Yusuf MA et al noted that 92% developed undesired local, and 87% developed systemic adverse reaction following application of bleaching products.[20] Hence, adverse reactions of various degrees and proportion are documented by various studies across the globe. Therefore studies regarding bleaching products and their impact are necessary to document these reactions, and educate the population regarding them, and to provide

evidence based information to advocate on the need for widespread policy on the use and misuse of these products.

Strength, limitations, and recommendation

Our study is one of the earliest studies to document prevalence, patterns, and side effects of bleaching products in the study area. It provides geographical perspective of its use. However, single centered, and a medical student cohort participant selection reduces the generalisability of the study. It also relies on self-reported data. However, the cohort was selected due to their future impact on educating their patients and general population.

Based on our study, we recommend advocacy to encourage body positivity and inclusivity by long term actions towards challenging societal norms that equate fair skin with beauty, success, or higher social status. We also recommend targeted campaigns highlighting the adverse effects of skin-bleaching products, including dermatological complications. Introducing modules in medical education on the risks of skin-lightening agents and safe dermatological practices will help in improvement knowledge, attitude, and practice of these products.

Conclusion

Based on our study, we conclude that, a significant proportion of participants reported engaging in bleaching practices, driven by societal beauty standards and event-driven motivations. The most commonly used products were cream-based bleaches, with many participants unaware of their ingredients or risks. While most adhered to post-bleaching protective measures, nearly 30% experienced side effects, including rashes, burning sensations, and dryness.

References

1. Swann G. The skin is the body's largest organ. J Vis Commun Med. 2010 Dec;33(4):148-9. doi: 10.3109/ 17453054.2010.525439. PMID: 21087182.
2. Shivakumar S, Jafferany M. "The unfair drive to be fair": Psychosocial aspects and implications of the use of skin lightening agents. Dermatol Ther. 2020 Nov;33(6):e14091. doi: 10.1111/dth.14091. Epub 2020 Aug 24. PMID: 32720427
3. Sitohang IBS, Ninditya S. Systemic Glutathione as a Skin-Whitening Agent in Adult. Dermatol Res Pract. 2020 Apr 24;2020:8547960. doi: 10.1155/ 2020/ 8547960. PMID: 32373172; PMCID: PMC7196133
4. Jagadeesan S, Kaliyadan F, Ashique KT, Karunakaran A. Bleaching and skin-lightening practice among female students in South India: A cross-sectional survey. J Cosmet Dermatol. 2021 Apr;20(4):1176-1181. doi: 10.1111/ jocd.13689. Epub 2020 Sep 16. PMID: 32854171.
5. Pillaiyar T, Manickam M, Namasivayam V. Skin whitening agents: medicinal chemistry perspective of tyrosinase inhibitors. J Enzyme Inhib Med Chem. 2017 Dec;32(1):403-425. doi: 10.1080/ 14756366. 2016.1256882. PMID: 28097901; PMCID: PMC 6010116.
6. Nordlund JJ, Abdel-Malek ZA, Boissy RE, Rheins LA. Pigment cell biology: an historical review. J Invest Dermatol. 1989 Apr;92(4 Suppl):53S-60S. doi: 10.1111/ 1523-1747.ep13074988. PMID: 2649615.
7. Yardman-Frank JM, Fisher DE. Skin pigmentation and its control: From ultraviolet radiation to stem cells. Exp Dermatol. 2021 Apr;30(4):560-571.

8. Dadzie OE. Unethical skin bleaching with glutathione. BMJ. 2016 Aug 31;354:i4386. doi: 10.1136/bmj.i4386. PMID: 27581922
9. Nyoni-Kachambwa P, Naravage W, James NF, Van der Putten M. A preliminary study of skin bleaching and factors associated with skin bleaching among women living in Zimbabwe. Afr Health Sci. 2021 Mar;21(1):132-139. doi: 10.4314/ ahs.v21i1.18. PMID: 34394290; PMCID: PMC8356578
10. Verma SB. Obsession with light skin--shedding some light on use of skin lightening products in India. Int J Dermatol. 2010 Apr;49(4):464-5. doi: 10.1111/j.1365- 4632.2010. 04330.x. PMID: 20465708
11. Hopwood P, Fletcher I, Lee A, Al Ghazal S. A body image scale for use with cancer patients. Eur J Cancer. 2001 Jan;37(2):189-97.
12. Agorku ES, Kwaansa-Ansah EE, Voegborlo RB, Amegbletor P, Opoku F. Mercury and hydroquinone content of skin toning creams and cosmetic soaps, and the potential risks to the health of Ghanaian women. SpringerPlus 2016;5:319.
13. Egbi OG, Kasia B. Prevalence, determinants and perception of use of skin lightening products among female medical undergraduates in Nigeria. Skin Health Dis. 2021 May 20;1(3):e46. doi: 10.1002/ ski2.46.
14. Alrayyes SF, Alrayyes SF, Farooq UD. Skin-lightening patterns among female students: A cross-sectional study in Saudi Arabia. Int J Womens Dermatol. 2019 Apr 26;5(4):246-250. doi: 10.1016/ j.ijwd.2019.04.026.
15. Peltzer K, Pengpid S, James C. The globalization of whitening: prevalence of skin lighteners (or bleachers) use and its social correlates among university students in 26 countries. Int J Dermatol. 2016 Feb;55(2):165-72. doi: 10.1111/ijd.12860.
16. Arora N, Amin S. Analyzing Global Interest in Skin Whitening by Geographic Region. Proc (Bayl Univ Med Cent). 2024 Mar 14;37(3):505-507. doi: 10.1080/08998280.2024.2328448.
17. Pollock S, Taylor S, Oyerinde Ol. The dark side of skin lightening: an international collaboration and review of a public health issue affecting dermatology. Int J Womens Dermatol. 2020; 7(2): 158–164. doi: 10.1016/j.ijwd.2020.09.006
18. Nyoni-Kachambwa P, Naravage W, James NF, Van der Putten M. A preliminary study of skin bleaching and factors associated with skin bleaching among women living in Zimbabwe. Afr Health Sci. 2021 Mar;21(1):132-139. doi: 10.4314/ahs.v21i1.18.
19. Jacob SM, Thillaikarasi A. Awareness on Skin Lightening Practice and their Side Effects among Nursing Staff in a Tertiary Care Centre. Indian J Dermatol. 2023 May-Jun;68(3):356. doi: 10.4103/ ijd.ijd_1010_22.
20. Shroff H, Diedrichs PC, Craddock N. Skin Color, Cultural Capital, and Beauty Products: An Investigation of the Use of Skin Fairness Products in Mumbai, India. Front Public Health. 2018 Jan 23;5:365. doi: 10.3389/fpubh.2017.00365.
21. Yusuf MA, Mahmoud ND, Rirash FR, Stoff BK, Liu Y, McMichael JR. Skin lightening practices, beliefs, and self-reported adverse effects among female health science students in Borama, Somaliland: A cross-sectional survey. Int J Womens Dermatol. 2019 Aug 23;5(5):349-355. doi: 10.1016/ j.ijwd. 2019.08.006.