

Use of Cosmetic Products and Related Adverse Reactions among Health Science Students

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ABSTRACT

Objectives: This research was carried out in Dar es Salaam, Tanzania to assess cosmetic use and related adverse reactions among university students studying medicine and pharmacy in Dar es Salaam, Tanzania.

Methods: A cross sectional study design was employed and data was collected by random stratified sampling technique. Data was collected and analyzed using SPSS version 20 and the chi square test was used to determine the associations between variables. **Results:** Findings indicated that majority (91%) of respondents were using cosmetic products at the time of the study. More than half of respondents (58.4%) admitted to have experienced at least one type of adverse reaction from using cosmetic products. The most commonly experienced adverse reactions were allergic reactions (30.8%) followed by burning sensation (18.5%) mostly from perfumes and face products. Moreover, there were associations ($p < 0.05$) between use of cosmetic products and some demographic variables (gender and year of study) and there were also associations ($p < 0.05$) between adverse reactions and gender. Findings again revealed that, 17.9% of the respondents use cosmetics for the purpose of skin protection,

17.9% to boost attractiveness and improve beauty. Majority of respondents obtained awareness about the possible adverse effects of cosmetic products from friends and family (29.5%), the media (23.2%), internet (21.4%) and fellow students (17%). Respondents were also mostly aware of the adverse effects of the cosmetics but still used them. **Conclusion:** There is a high occurrence and knowledge of cosmetics use-related adverse reactions.

Key words: Cosmetics, Cosmetic products, Cosmetics use-related adverse reactions, Allergic reactions, Skin protection.

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INTRODUCTION

The use of cosmetic products dates back to ancient times where people topically applied various substances for reasons ranging from religious rituals to beautification and therapy.^{1,2} Cosmetics are defined as articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness or altering appearance.³ Common examples of cosmetic formulations described in this definition are skin lotions, perfumes, fingernail polishes, moisturizers, eye shadows, lipsticks and facial makeup preparations, cleansing shampoos, hair colors, permanent waves and deodorants, as well as any substance intended for use as a component of a cosmetic product. The cosmetic industry is fast growing in economic and product value, with the global market estimated to be worth \$863 billion by 2024.⁴ Although cosmetics can help us feel more beautiful, their use has been associated with many adverse and unwanted reactions generally traced to their main ingredients or excipients.⁵⁻⁷ Several studies conducted in Africa, Asia and the Middle East on the awareness, attitude and perception of cosmetic users revealed a high prevalence of cosmetic use especially among young people as well as a high incidence of adverse reactions.⁸⁻¹⁵ Skin bleaching rates among women in Tanzania and other East African countries are estimated to be as high as 30%,¹⁶ reasons cited are mainly to improve beauty and

attractiveness as dark skinned women are generally regarded inferior in beauty when compared to women of Middle eastern or Asian ancestry.¹⁶ Another study conducted among students of tertiary institutions in Tanzania reported a high level of awareness of the adverse and unwanted reactions associated with the application of cosmetic products, it also reported high prevalence of the adverse effects as well as high level of cosmetic usage.⁹ Reactions to cosmetics have been observed more in women than men because women tend to use cosmetic products more than men.^{17,18} Unlike pharmaceutical products, cosmetic products have less stringent regulatory requirements in many countries. In the United States for example, there is no clear regulation requiring cosmetic manufacturers to conduct safety and efficacy testing before marketing their products, nor a clear regulation requiring cosmetic manufacturers to release their chemical formulas or to report adverse reactions of their products to the FDA.³ This may be a contributing factor to the high prevalence of cosmetic-induced adverse effects especially in developing countries like Tanzania where the level of regulation is generally poor. Cosmetic use-related adverse reactions occur but are generally under-reported or overlooked. In a survey conducted by pharmacists involving 4373 consumers in Naples, Italy, 60% of individuals who reported to have experienced cosmetic use-related adverse reaction did not consider

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seeking medical attention. Surprisingly, 2.5% who sought medical help continued using those products while taking medications to manage the adverse effects.¹⁹ Similarly, the Norwegian Institute of Public health notes that after its introduction in 2008, the National Register of Adverse Effects from Cosmetic Products received about 442 notifications on cosmetics related adverse effects between 2008 and 2014, majorly reported by women between ages 30-56 and mainly submitted by pharmacists.²⁰

An understanding of the prevalence of the adverse reactions arising from cosmetics use among future doctors and pharmacists can form the basis for advocacy, regulation, policy review or health promotion. This research was therefore carried out to determine the cosmetic use pattern and occurrence of cosmetics related adverse effects among medicine and pharmacy students in Kampala International University in Tanzania (KIUT), Dar es Salaam, Tanzania.

METHODOLOGY

This study was conducted among medicine and pharmacy students in the School of Health Sciences, Kampala International University in Tanzania in Pugu Road, Dar es Salaam, Tanzania. The university offers multidisciplinary undergraduate programs among which are medicine and pharmacy. A sample of 150 respondents was arbitrarily selected from a database of 1354 medicine and pharmacy students at Kampala International University in Tanzania. While recruiting the respondents, the inclusion criteria applied involved the selection of female and male students studying at the university at the time when data was collected. Respondents were randomly selected from each of the stratum (year of study) for medicine (754) and pharmacy (600) students. A total of 150 questionnaires were distributed to the respondents to be collected on a pre-arranged date. A total of 10 questionnaires were discarded due to a high amount of missing data and 28 were not returned by participants leaving 112 questionnaires for analysis.

The questionnaire was designed based on review of literature and its content validated by a group of experts in the Department of Clinical Pharmacy, Kampala International University in Tanzania.

The questionnaire design contained both open and close-ended questions. Participants responded to questions about their demography, whether they used cosmetic products or not, types of cosmetics being used and the reasons, if any, for such use. Participants also indicated the types of adverse reactions (if any) they have experienced in the course of their cosmetic use, the types of cosmetic products that gave rise to such reactions and lastly they were asked if they were aware of possible adverse effects that can arise from the use of cosmetics. They were also asked about their sources of recommendation for the cosmetic products they were using and knowledge about possible adverse reactions associated with cosmetic products.

The study was approved by the Ethical Committee of Kampala International University in Tanzania. Participants were recruited voluntarily and administered the questionnaire after an informed verbal consent and were assured that the information they provided would be treated with anonymity and confidentiality.

The responses from the questionnaires were coded into SPSS version 20 (Chicago IL) and then used to generate descriptive statistics and these were represented in figures, percentages and bar chart. Associations between variables were analyzed using the χ^2 test.

RESULTS

A total of 112 participants responded to the administered questionnaire, 28 participants did not return their questionnaires while 10 of the returned questionnaires were discarded due to high amount of missing data. Of the 112 questionnaires analyzed, 71% are females and 36.6%

are males. Up to 91% of the respondents attest to using cosmetic products. The age with highest use of cosmetics was ages 20 -24, accounting for 61.6% of respondents followed by the 25-29 years of age which accounted for 15.2% of the analyzed questionnaires (Table 1). There were associations ($p<0.05$) between use of cosmetic products and some demographic variables (gender and year of study) as well as associations ($p<0.05$) between cutaneous adverse reactions and gender (Table 2). The study also revealed little difference between medicine students and pharmacy student's participation in the study and on their use of cosmetic products. Majority of the respondents (37.5 %) use cosmetics for the purpose of skin protection, followed by 17.9% who use cosmetics to boost attractiveness and improve beauty respectively. Other factors include boosting confidence, following trend and fashion and using the beneficial ingredients in cosmetics (Table 3).

Most of the respondents (58.04%) admitted experiencing at least one adverse reactions to cosmetics. The most common adverse reaction was allergic reactions reported by 30.8% of the respondents followed by

Table 1: Demographic characteristics of respondents.

Variable		Frequency (%)
Gender	Male	41 (36.6)
	Female	71 (63.4)
Age	15-19	6 (5.4)
	20-24	69 (61.6)
	25-29	17 (15.2)
	30-34	9 (8.0)
	35 above	11 (9.8)
Year of study	First year	21 (18.8)
	Second year	51 (45.5)
	Third year	38 (33.9)
	Fourth year	2 (1.8)
Course of study	Medicine	58 (51.8)
	Pharmacy	54 (48.2)

Table 2: Proportion of respondents that use cosmetics and those that experienced adverse reactions.

Characteristics	Variable	No. Using cosmetics	p-value	No. that experience adverse reactions	p-value
Gender	Male	31	0.0083	19	0.00004
	Female	71		46	
Age in years	15-19	4	0.1556	3	0.05952
	20-24	65		44	
	25-29	15		9	
	30-34	7		6	
	35 and above	11		3	
Year of Study	First year	21	0.0020	15	0.4066
	Second year	50		34	
	Third year	29		15	
	Fourth year	2		1	
Course of Study	Medicine	51	0.2270	36	0.14941
	Pharmacy	51		29	

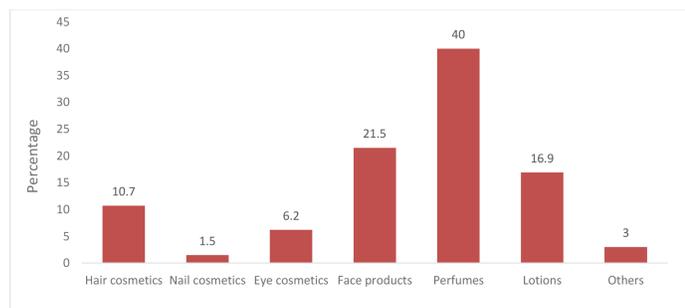
Significant at $p<0.05$

Table 3: Factors influencing the use of cosmetics.

Factor	Frequency (%)
Skin protection	42 (37.5)
Trend and fashion	9 (8.0)
Boost attractiveness	20 (17.9)
Improve beauty	20 (17.9)
Boost confidence	19 (17.0)
Beneficial ingredients	2 (1.8)

Table 4: Type of adverse reactions experienced.

Adverse reaction	Frequency (%)
Skin rash	11 (16.9)
Burning sensation	12 (18.5)
Allergic reaction	20 (30.8)
Itching	9 (13.8)
Eczema	5 (7.7)
Skin lighting	5 (7.7)
Others	3 (4.6)

**Figure 1: Cosmetic products associated with adverse reactions.**

burning sensation in 18.5% of the respondents; skin rash and itching also accounted for 16.9% and 13.8% respectively, while skin lightening and eczema accounted for 7.7% of adverse reactions respectively. Other reactions accounted for 4.6% among respondents. These revealed that majority of the respondents experience allergic reactions followed by burning sensations (Table 4). The cosmetics identified for causing the most adverse reactions were: perfumes in 40% of respondents, face products in 21.5% of respondents, lotions 16.9% of respondents and hair cosmetics in 10.7% (Figure 1). Majority (29.5%) of the respondents obtained awareness about the adverse effects associated with cosmetic use from friends and family, 23.2% from the media, 21.4% from internet, 17.0% from fellow students and 8.9% from other sources (Table 5)

DISCUSSION

The results obtained revealed that, majority of the respondents (91.1%) were using cosmetics at the time of this study. These results indicate a widespread use of cosmetic as almost all respondents in the study use cosmetics irrespective of gender. A similar observation was also reported in a similar study⁸ where 85% of the respondents were using at least one type of cosmetics and skin rash was the predominant adverse reaction experienced by the respondents. Similar studies conducted in Ethiopia and Malaysia report skin rash to be the most common unwanted effect among participants.^{8,13} This indicates that cosmetics use related adverse reactions occur significantly among cosmetics users but are generally underreported.

Table 5: Source of Awareness on induced adverse effects.

Source	Frequency (%)
Fellow students	19 (17.0)
Friends and Family	33 (29.5)
Media	26 (23.2)
Internet	24 (21.4)
Others	10 (8.9)

Other studies^{14,16} revealed that, 97.8% and 97.3% of participants respectively had a habit of using cosmetics. That the respondents with the highest percentage of cosmetic use are young adults between ages 20-24 is suggestive of future increase in use of cosmetics from continuous use by current users and likely initiation especially of the younger population growing into the age bracket. The use of cosmetics mostly for skin protection (37.5%) and boosting attractiveness (17.9%) as seen in this study corroborates those of a study done in Iran.^{11,12} Results also revealed that 53.6% of the respondents admit to have experienced adverse reaction from using cosmetics compared to 39.3% that did not experience any adverse reaction. This almost double higher occurrence of adverse reactions should serve as a call for regulatory authorities to enforce more stringent regulatory measures as the predicted growth of the number of cosmetic users⁴ will most likely result in increased incidence of adverse reactions associated with cosmetic use. Allergic reactions are the most commonly experienced adverse reactions followed the feeling of a burning sensation. This may be due to fragrance added in cosmetic products which studies suggest account for a high prevalence of allergic reactions among users.⁷

It is also interesting to note that perfumes, face products and lotions users reported the highest incidence of adverse reactions-in descending frequency (Figure 1). Studies have revealed that fragrance in perfumes and other cosmetic products account allergic reaction in up to 1% of the general population.⁷ Only recently, "cosmetovigilance", a term used to describe surveillance on the safety of cosmetics is beginning to receive global attention.²¹ For example, the Norwegian National Register of Adverse Effects from Cosmetic Product was opened in 2008 and received submissions from only healthcare professionals, it has received far more submissions from 2015 when it was made accessible to the public. A prevalence of this magnitude (53.6%) should serve as a call to regulatory authorities to create avenues for cosmetic surveillance and appropriate reporting of cosmetics use-related adverse reactions.

A comparatively higher percentage of the respondents (69.6%) were aware of the adverse effects of cosmetics but still used them. This finding is consistent with other research^{9,10} which revealed that respondents were aware of the number of adverse reactions associated with the use of cosmetic products but continued to use them. This suggests a compelling desire for improved beauty and attractiveness even with substantial knowledge of the health consequences. This is also similar to the pattern observed in the study conducted in Naples, Italy.¹⁹

The sources of awareness about the adverse effects was found to be predominantly from family and friends (29.5%) followed by the media (23.2%) while 21.4% obtained information from the internet, 17% from fellow students and 8.9% from other sources. These results revealed that, awareness is mostly obtained from family, friends and the media. Health advocacy and the formulation of health policies and a thorough implementation of these policies will benefit the society. An intensive government supported sensitization of the possible and common adverse effects associated with the use of cosmetic products especially through media campaigns, proper education of healthcare personnel who would serve in adding

strength in the advocacy as well as empowering regulatory authorities such as the Tanzania Food and Drugs Authority (TFDA) technically and through the law will help curb the rising incidence of adverse reactions associated with the use of cosmetic products.

Limitation

This study was based on respondents' self-reported experience of adverse effects from cosmetic product use. Therefore, there is a probability of reporting incorrect reactions and reports may be subject to respondents' bias. Another limitation is the small sample size involved in this research.

CONCLUSION

This study has therefore demonstrated a use of cosmetic products among students of in the health sciences as well as a high prevalence of adverse effects associated with the use of these products. Allergic reaction was most commonly experienced by the students from the use of perfumes, face products and lotions. Students had a high level of awareness about adverse effects from cosmetic products which was mostly obtained from family and friends and the media.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest

ABBREVIATIONS

FDA: United states Food and Drug Administration; **KIUT:** Kampala International University in Tanzania; **TFDA:** Tanzania Food and Drug Agency; **SPSS:** Statistical Package for Social Sciences.

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