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Research Article

Prevalence of Skin Sensitization Among Undergraduate Females at Buitems Caused by Exposure to Cosmetic Products

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Abstract

The health risks associated with the use of cosmetic products become currently an emerging public health problem especially among university undergraduates. In current studies prevalence of Skin sensitization among undergraduate female students at BUITEMS due to cosmetic usage was found to be relatively high i.e. 62% while 38% female undergraduates reported as non-sensitized skin (face). Clinical manifestation of adverse reactions on face skin (sensitized skin) caused by cosmetic use includes acne, redness, burns, itching/inflammation, dullness/discoloration, dehydration and allergies were the most commonly reported side effects in this study. The main reason for such adverse reactions includes sharing of cosmetics, careless behaviour towards cosmetic use safety regulations, over use of cosmetics on daily basis, multiple cosmetic products usages simultaneously without following proper guidelines, purchasing cheap or low-quality makeup/cosmetic products from nearby local shops etc. Besides Mothers' education/occupation, fathers' income, financial status etc were found to be statistically significant predictors for cosmetic use elevation potential risk of skin sensitization among female undergraduate students. Thus, the development of educational intervention to raise female awareness about harmful effects of the chemicals contained in cosmetics after prolonged use is important

Keywords: sensitizer; contact dermatitis; allergens; cosmetics; undergraduates

Introduction

A significant, class of synthetics that possess the characteristic to prompt the condition of skin sensitivity in people are defined as sensitizers [1]. Toxicologically, these synthetic substances are depicted as skin sensitizers and for a really long time have been recognized by in vivo techniques in the guinea pig or the mouse [2]. When an individual has become sharpened, for example has created contact sensitivity, then given further and adequate openness they are definitely in danger of the outflow of the clinical illness we perceive as hypersensitive contact dermatitis (ACD) [3]. The greater part of people who are exposed to skin sensitizers neither foster distinguishable contact sensitivity nor do they express hypersensitive contact dermatitis [4]. The recurrence of positive diagnostic patch tests in dermatology has stayed raised, with 1 in each 7 patients positive in a new report [5]. Consequently, dermal sensitization sharpening to scents in these synthetics stays a huge issue [6]. Nonetheless, the material that follows connects with all compound skin sensitisers and not explicitly to scent substances [7]. The cycles related with the risk assessment of skin sensitizing synthetic substances have advanced impressively over the most recent twenty years. To a limited extent this has emerged in light of the enthusiasm for the enormous variety in the natural enlistment power of skin contact sensitizers [8].In 2008, a proposition was made for the dermal quantitative risk assessment (QRA) for scent associated synthetics to lay out industry rules, for risk evaluation and as a reason for risk the board of scent fixings in beauty care products [9].Recent studies revealed that most skin sensitization reactions were brought about by skincare items (36.6%), trailed by private tidiness items (29.5%), eye beauty care products (24.0%), antiperspirants (12.6%), and facial make-up items (8.3%) [10]. Most of the women could tackle the issue by halting the utilization of such items and buying an alternate brand. According to a report side effects of cosmetic-induced sensory skin discomfort includes skin distress (consuming, stinging, tingling and so forth) happened all the more generally in the delicate skin accomplice (53%) than in the people who viewed themselves as non-sensitive (17%) [11]. The European standard series, which is routinely used to test patients suspected of having allergic contact dermatitis, contains seven such allergens: p-phenylenediamine (dye), colophony (resin), parabens (preservative), wool alcohols (emollient, emulsifier), balsam of Peru (resin, indicator for fragrance sensitivity), formaldehyde (preservative), fragrance mix (cinnamic alcohol, cinnamic aldehyde, eugenol, hydroxycitronellal, amylcinnamaldehyde, geraniol, isoeugenol, oak moss absolute), and quaternium- 15 (preservative) [12,13,14]. Contact-incited dermatitis might be because of allergens incorporated in cosmetic products such as metals (nickel, gold), effective

medicaments (effective corticosteroids), and beauty care products and individual consideration items (scents and additives like methyl-and methylchloro-isothiazolinone) [15]. Limitations of this research study includes firstly, estimations of negative events related to the cosmetics were based on participant self-report, which could be influenced by recall bias and thus cause underestimation. Secondly, social desirability image and unique university, limit generalization to other non-university women. The findings of this study may be useful to safety assessors in protecting the general public and those who are vulnerable. Thus, the aim of this research is to assess the prevalence of skin sensitization due to cosmetic use among undergraduate females at BUITEMS and also to identify its determinant and adverse effects on their face skin.

Materials And Methods

This study was a cross-sectional study, directed among the undergraduate female students studying in different departments at BUITEMS, Quetta, Pakistan. The students were selected at random studying in different departments. Informed verbal consent was obtained from these students keeping the sample size 100. The cross-sectional study design is best used when the researcher is interested to gather information at one point in time; it provides a snapshot of the population.

Inclusion criteria

- Adolescent undergraduate female students (aged between 18 and 25 “years”), who were ready to participate in the study
- Cosmetic user for a period of atleast an year
- Usage of atleast one cosmetic product on their face (lips, eyes, eyebrows included) on daily basis
- Self-reported occurrence of one or more cosmetic related adverse reaction in the past

Exclusion criteria

- Usage of cosmetic products on hand, feet, nails or hair were excluded
- Undergraduate female students with clinically diagnosed skin allergies/disease (face) due to any other reason rather than cosmetic use

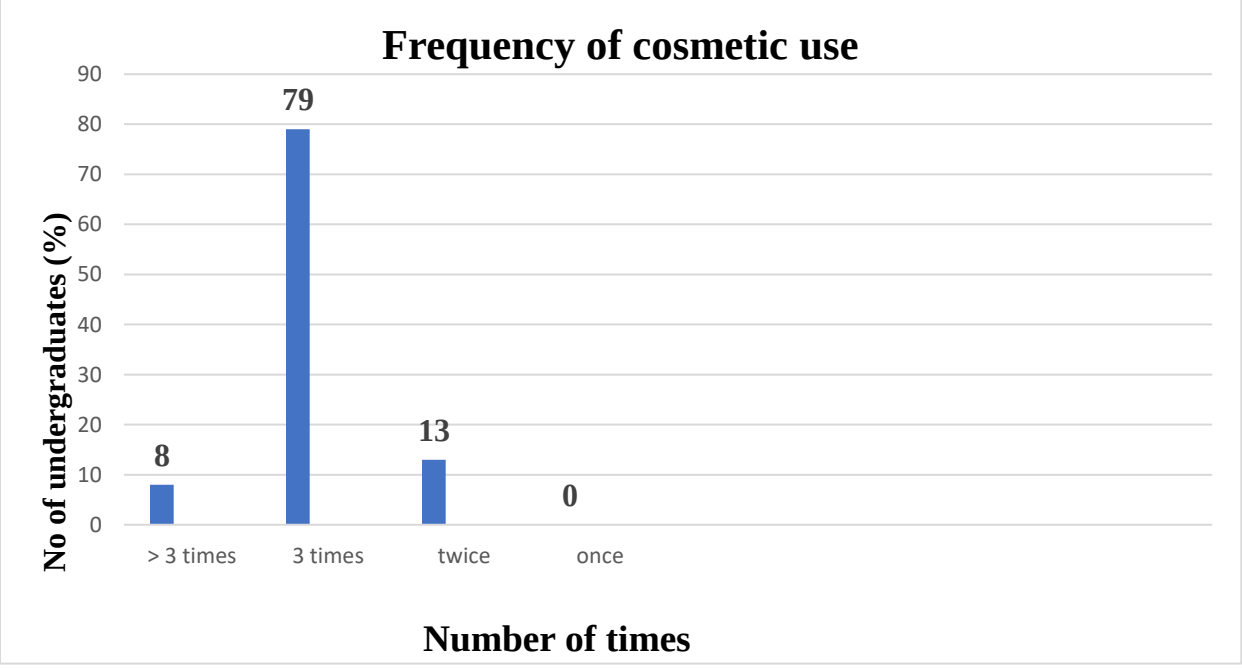
Study was conducted with the help of a self-developed skin sensitization identification questionnaire designed to find the prevalence of skin sensitization due to cosmetic use and its associated contributing factors among undergraduates’ females. The questionnaire included items relating to the undergraduate’s frequency (number of times) of current daily cosmetic usage on their face (all the products they had used currently on a daily basis), type of cosmetic products used (make-up, sunblock, moisturizers etc), purpose of using cosmetics, place where they often buy their cosmetic products etc. In addition, information about cosmetics utilization cautions related practices such as label reading habit, reading special notes such as date of expiration and safety tips, content, and side effects, the user's instructions following etc, adverse effect/reaction after cosmetic application or after prolonged cosmetic product use in the past prior to data collection etc. Socio-demographic data of undergraduate female students e.g. family income, mother education/occupation were also obtained. By means of Microsoft excel 2013, statistical analysis of the data was done.

Results

Table 1 and Graph 1 depicts the frequency of cosmetic utilization among undergraduate females at BUITEMS.

S.no	Frequency of cosmetic use	No of undergraduates (%) (n=100)
1	> 3 times	8
2	3 times	79
3	twice	13
4	once	0

Table 1: Frequency of cosmetic use among undergraduate females

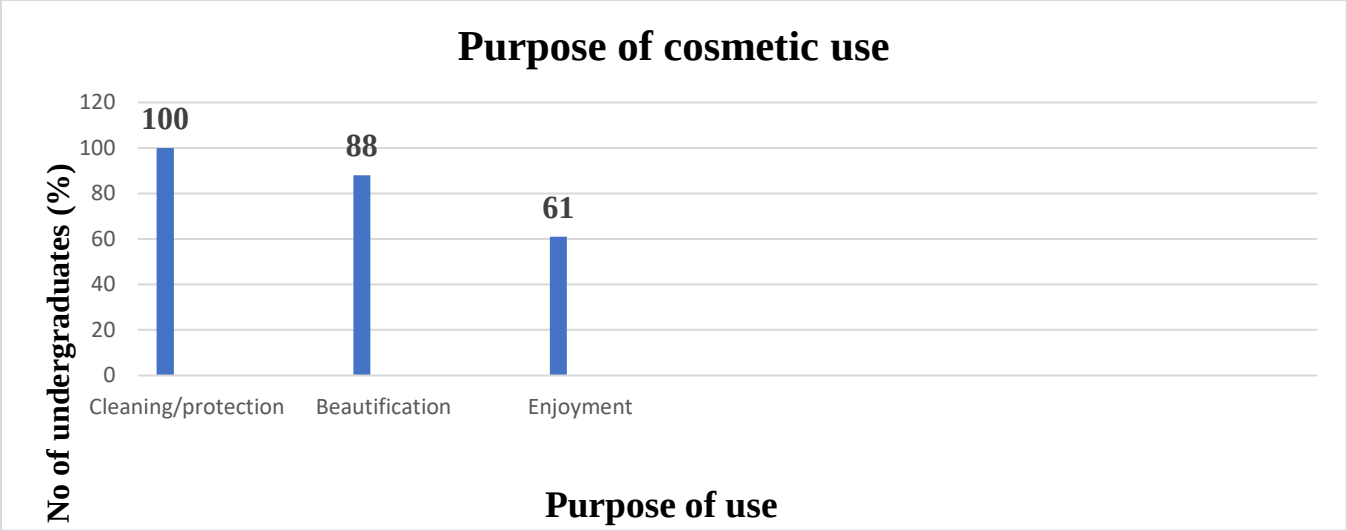


Graph 1: Frequency of cosmetic use among undergraduate females

Table 2 and Graph 2 depicts the purpose of cosmetic use on face among undergraduate females at BUITEMS

S.no	Purpose of cosmetic use	No of undergraduates (%) (n=100)
1	**Cleaning/protection**	100
2	**Beautification**	88
3	**Enjoyment**	61

Table 2: Purpose of cosmetic use among undergraduate females

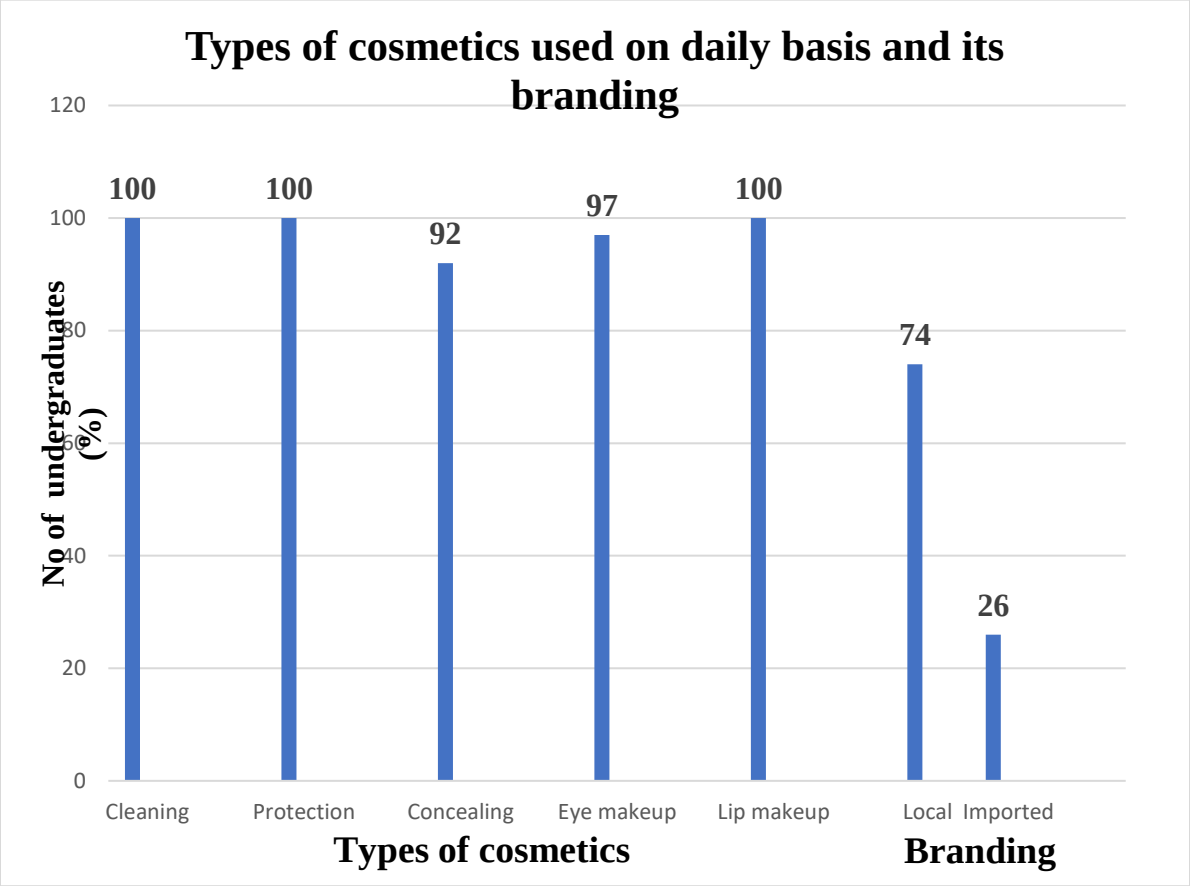


Graph 2: Purpose of cosmetic use among undergraduate females

Types of cosmetics used on daily basis and their branding by the undergraduate females at BUITEMS were given in Table 3 and Graph 3.

S.no	Parameters	No of undergraduates (%) (n=100)
1	**Types of cosmetics used on daily basis**	
	CLEANING-Soaps/facewash/scrubers/masks etc	100
	PROTECTION-Moisturizers/creams/serums/sunblock (bb or cc creams)/primers etc	100
	CONCEALING-Foundations/powder/concealer/contour/ Highlighters/blush etc	92
	Eye makeup (mascara, liner, eye shadows etc)	97
	Lip products (balms/lipsticks etc)	100
2	**Branding**	
	Local	74
	Imported	26

Table 3: Types of cosmetics used on daily basis and their branding by the undergraduate females

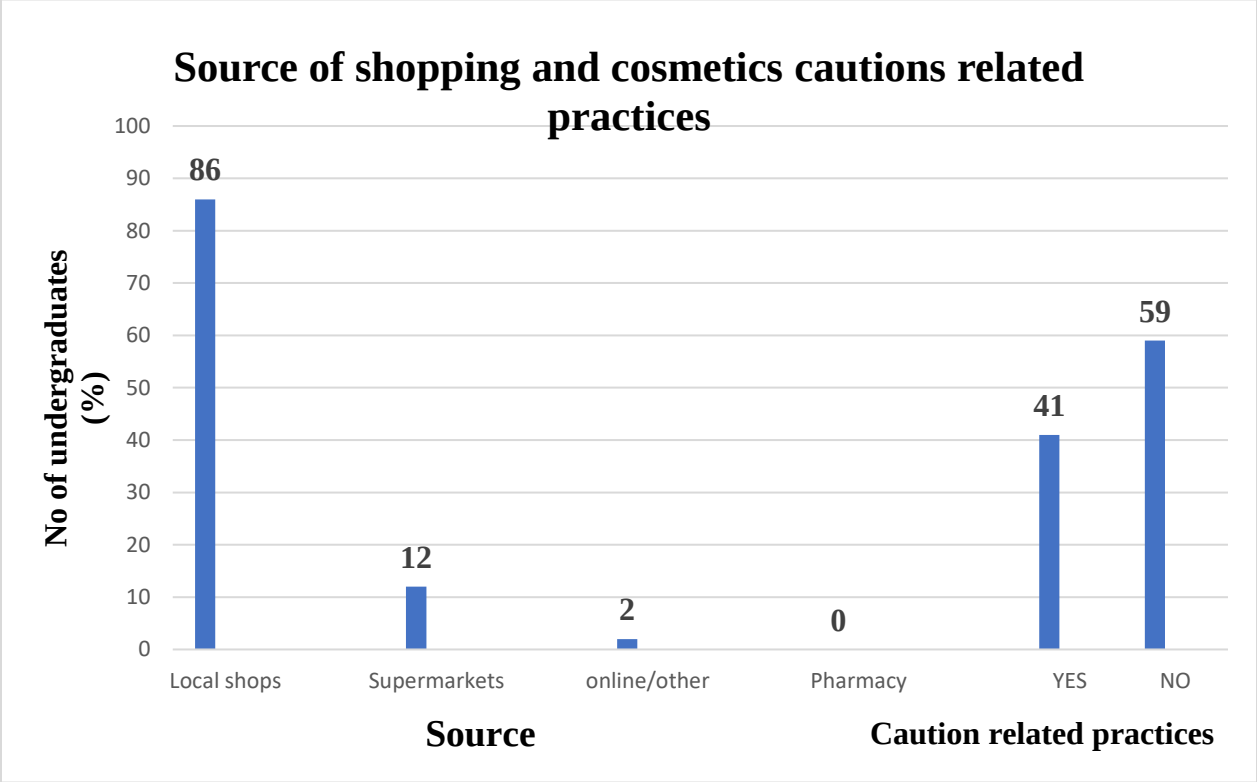


Graph 3: Types of cosmetics used on daily basis and their branding by the undergraduate females

Source of shopping and cosmetics cautions related practices among the undergraduate females were given in Table 4 and Graph 4.

S.no	Parameters	No of undergraduates (%) (n=100)
1	**Source of shopping**	
	Local cosmetic shops	86
	Supermarkets/marts	12
	Online/others	2
	Pharmacy	0
2	**Cosmetics cautions related practices**	
	Yes	41
	No	59

Table 4: Source of shopping and cosmetics cautions related practices among the undergraduates

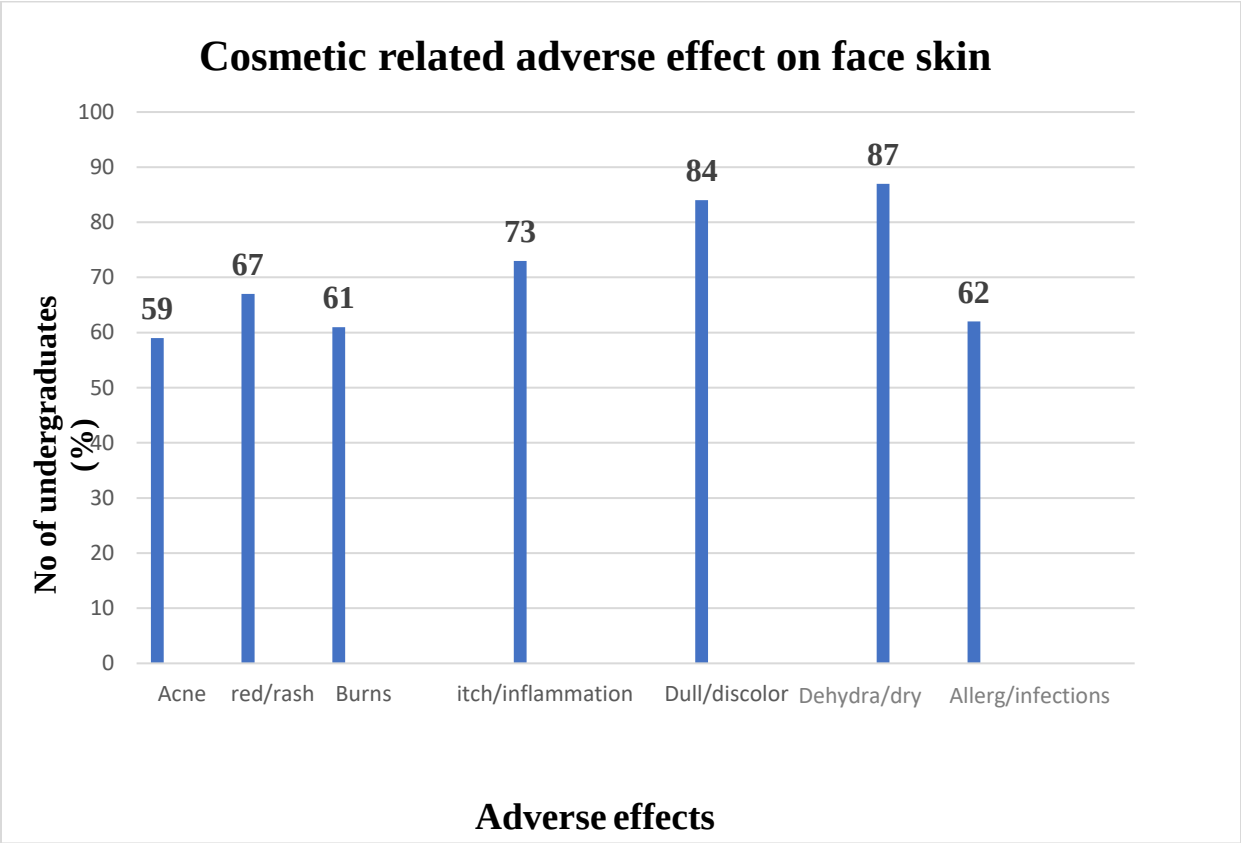


Graph 4: Source of shopping and cosmetics cautions related practices among the undergraduates

Self-reported adverse effect/reaction after cosmetic application or after prolonged cosmetic product use in the past among undergraduate females at BUITEMS is given in Table 5/Graph 5

S.no	Cosmetic related adverse effect	No of undergraduates (%) (n=100)
1	**Acne**	59
2	**Redness/rash**	67
3	**Skin burns**	61
4	**Itching/inflammation/Soreness**	73
5	**Dullness/discoloration**	84
6	**Dehydration/dry/skin breakage**	87
7	**Allergies/any other infection etc**	62

Table 5: Self-reported cosmetic related adverse effect on face skin

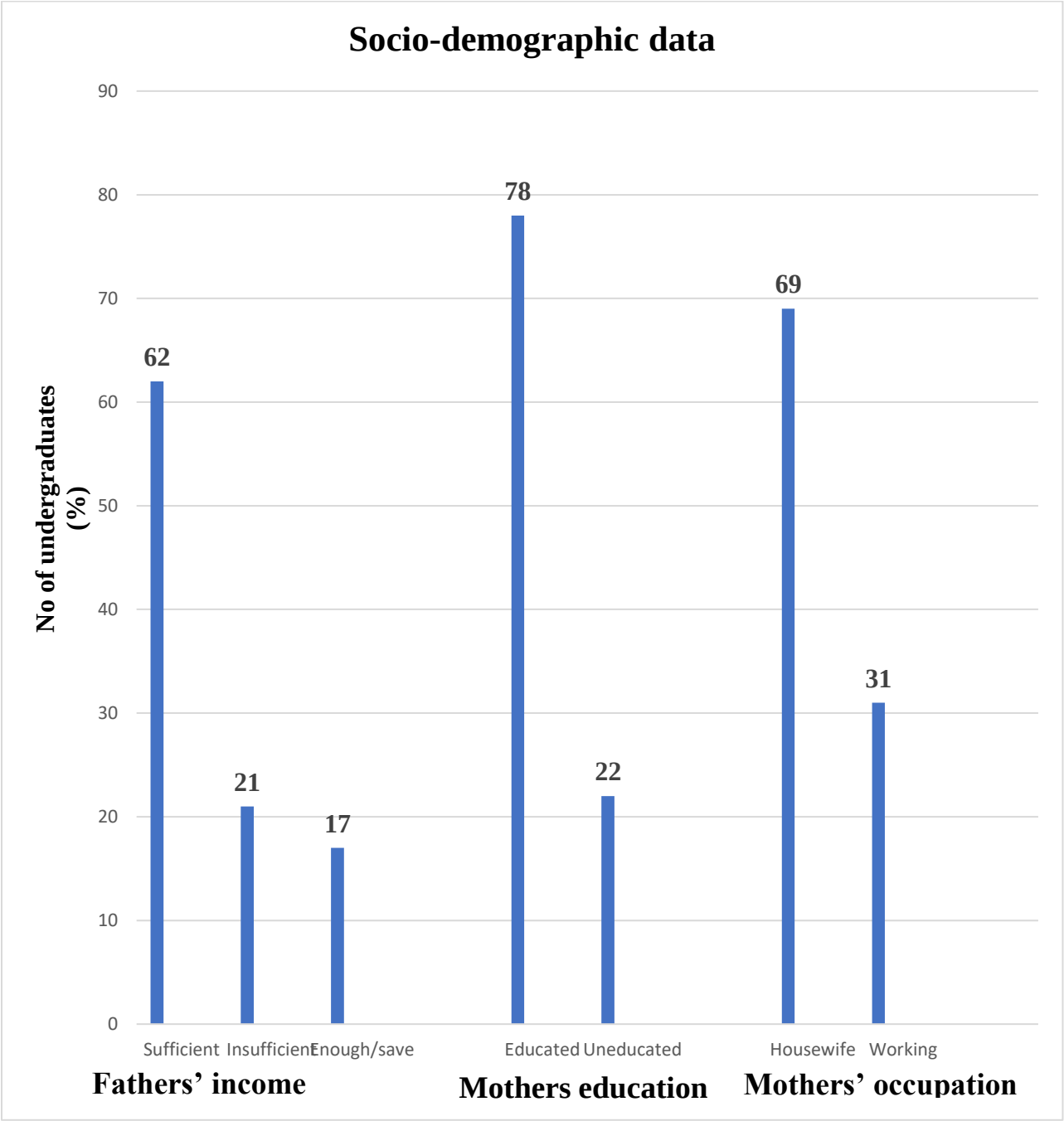


Graph 5: Self-reported cosmetic related adverse effect on face skin

Socio-demographic data of undergraduate female students e.g. family income, mother education/occupation etc were given in Table 6 and Graph 6.

S.no	Socio-demographic data	No of undergraduates (%) (n=100)
1	**Family income**	
	Sufficient	62
	Insufficient	21
	Enough/save	17
2	**Mothers' education**	
	Educated	78
	Uneducated	22
3	**Mothers' occupation**	
	Housewife	69
	Working	31

Table 6: Socio-demographic data of undergraduate female students

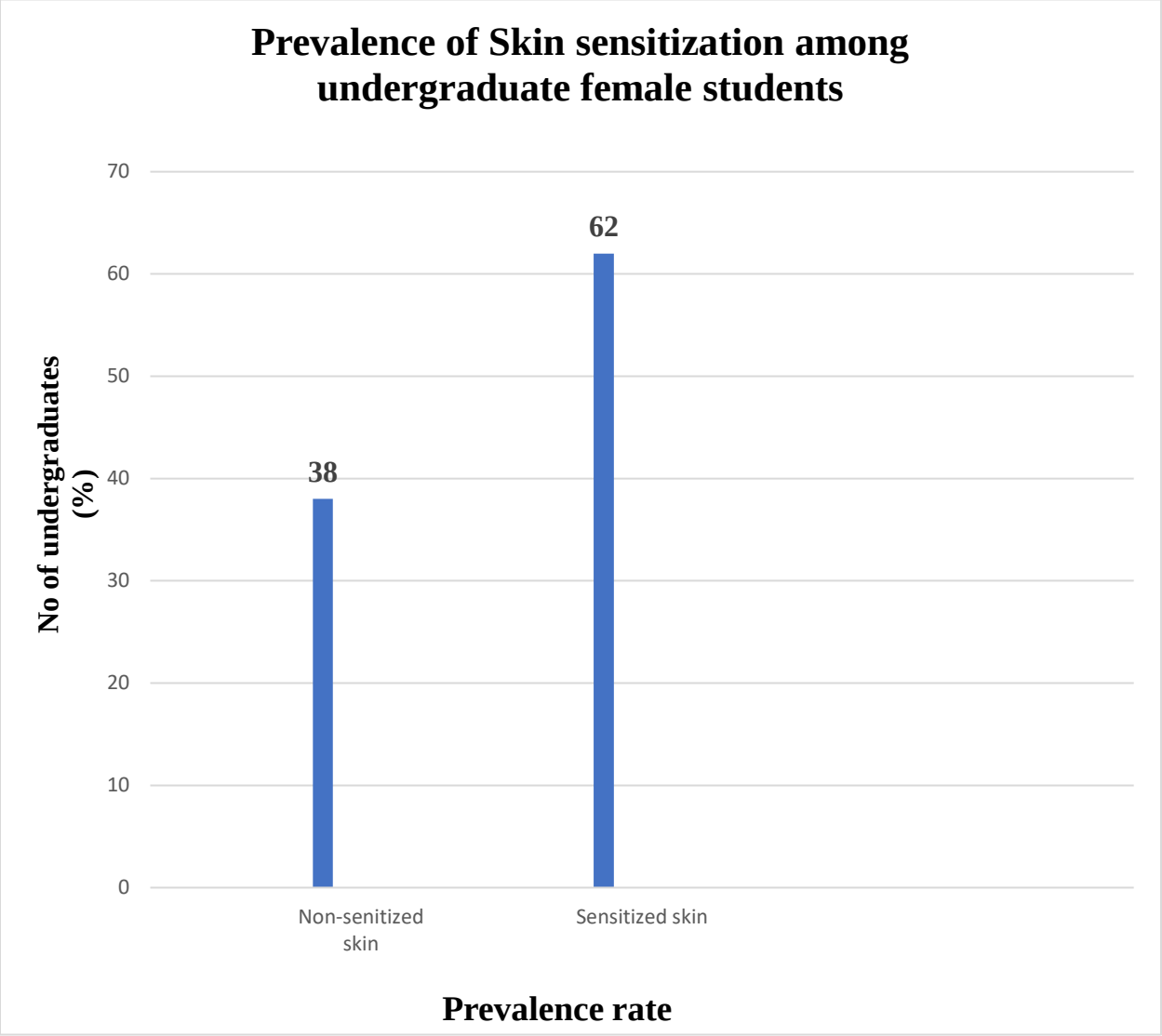


Graph 6: Socio-demographic data of undergraduate female students

Prevalence of Skin (face) sensitization among undergraduate female students at BUITEMS were given in Table 7 and Graph 7.

Prevalence	No of undergraduates (%) (n=100)
Non- sensitized skin	38
Sensitized skin	62

Table 7: Prevalence of Skin sensitization among undergraduate female students



Graph 7: Prevalence of Skin sensitization among undergraduate female students

Discussion

In this work, we evaluated the prevalence of Skin sensitization among undergraduate female students at BUITEMS due to cosmetic usage which accounted for 62% i.e., high while 38% female undergraduates reported as non-sensitized skin (face) as depicted in Table/Graph 7. A high percentage of undergraduate female students uses cosmetics products on daily basis for beautification, cleaning, or other purposes. As depicted in Table/Graph 1 the frequency of cosmetic utilization among undergraduate females is quite high i.e., 79% reported to use cosmetic products three times a day while 8% undergraduate females' cosmetic usage frequency was more than three times and there was not even a single individual who have reported to be a non-user of cosmetic products. This high percentage indicates that due to their young age, students are more concerned about their appearance and beauty especially in a co-education setting, which might increase the demand for cosmetics use [16]. As depicted Table/Graph 2 a high percentage of university females uses cosmetic based products for the purpose of beautification and cleansing i.e. 88% and 100% respectively. Widespread usage of cosmetic products may be attributed to advances in the cosmetic industry and scalable cosmetic companies advertising cosmetics and personal care products [17]. In addition, beauty may be a common goal for university female students who use cosmetics which might be attributed to their adulthood age and a higher percentage of unmarried status as well [18]. Over recent years, the global cosmetic market is increasing at alarming rate, driven by demands from consumers who are increasingly concerned about their appearance. Naturally, from the perspective of the need that could be either physiological or sociological, females tend to place more interest in maintaining their self-images, and due to this fact, cosmetics appeared to be linked with females [19]. Thus, the main claimed purpose of cosmetics use by female students were beautification and entertainment. Cosmetic sources have shown a significant association with the incidence of adverse reactions on face skin. In this study, the proportion of female undergraduate students who obtained their cosmetics from local shops sources was very high i.e. 74% while only 26% reported to use imported cosmetics as depicted in Table/Graph 3 and majority of those females buy cosmetic products from nearby

local shops i.e.86% than from drug retail outlets, such as pharmacy as indicated by our obtained results in Table/Graph 4. Furthermore, cosmetic usage habits have been reported in several studies as a significant predictor of the occurrence of negative events. As our obtained results in Table/Graph 4 indicated that 59% of female undergraduates were careless regarding cosmetic usage safety regulations and tend to not read the cautions before using a cosmetic product thus ignoring the probable health risks. Because of

improper habits regarding safety advice that they should follow while using cosmetics near to 1/5th of female cosmetic users develop at least one adverse event due to cosmetic product usage in the university [20]. In addition, use of many types /numbers of cosmetic products since they can afford to purchase, females' undergraduate students who had a number of varieties of cosmetic products at hand could over use [21]. Using multiple cosmetics at a time, might increase synergistic action of cosmetic products or increase the concentration of ingredients above the limit which might lead to adverse events [22]. Mothers' education/occupation, fathers' income, financial status etc were found to be statistically significant predictors for cosmetic use as indicated in Table/Graph 6. Thus, these factors pose increased risk of skin sensitization among female undergraduates at BUITEMS. A number of studies identified evidences for the association between the rate of continuous use of cosmetic products with female especially in the younger age group, who are highly educated and have better economic status [23]. Exposure to various chemical compounds contained in cosmetics presents health risks ranging from a mild hypersensitivity response to fatal poisoning [24]. Clinical manifestation of adverse reactions on face skin caused by cosmetics includes acne (59%), redness (67%), burns (61%), itching/inflammation (73%), dullness/discoloration (84%), dehydration (87%) and allergies (62%) were the most commonly reported side effects in this study due to cosmetic usage among undergraduates as depicted in Table/Graph 5. The possible explanation for such adverse events is majority of students use cosmetics with friends and family members. Sharing has been shown to expose cosmetics to microbic pollution, which can contribute to acne and other infections [25]. Additionally, addition of water or saliva to some of their cosmetics was also identified as an undesirable habit. Water and saliva are ideal medium for bacterial development since they reduce the quantities of preservatives in some way [26]. This could be one of the probable reasons for the unpleasant adverse events reported by the students. Therefore, in the light of this research, the development of educational intervention to raise female awareness about harmful effects of the chemicals contained in cosmetics after prolonged use is important. In terms of cosmetic exposures and its associated health outcomes, could provide valuable information for public health in the area of risk assessment and future service regulation [27]. Moreover, such information will help to attract the attention of consumers who are more susceptible to the dangerous effects of chemicals contained in cosmetic products [28]. On top of that, cosmetics consumers are highly recommended to follow some safety tips. This includes reading expiration dates and ingredients on the labels, not sharing cosmetic products, consuming products hygienically and with fewer ingredients, and shopping from the right sources [29]. Nevertheless, selling products without the authorities' approval, lack of population awareness about proper use of cosmetics and lack of proper adverse effect reporting systems are still prevailing factors particularly in developing countries [30].

Conclusion

In this study, a recent information is provided on the pattern of using large number of cosmetics that are widely consumed by female students in at BUITEMS. Such data is critical for determining exposure and risk. The overall prevalence of cosmetic use was significantly high. It was discovered that the utilization of cosmetics varies substantially, and different products are consumed at the same time. Reporting adverse effects of cosmetic products requires observance of safety concerns related to cosmetic use. Furthermore, the majority of students had unacceptable habits regarding the safety precautions that they should follow during use.

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