

Original Research Article

A survey study on adverse effects of synthetic cosmetics

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ABSTRACT

Background: Cosmetics are substances used to enhance the appearance or odour of the human body. The use of cosmetics in the present era has enormously increased and the chemicals present in them quite frequently cause adverse reactions like contact dermatitis, allergic reaction and so on. Therefore, a survey study was planned to evaluate awareness and knowledge about adverse effects of synthetic cosmetics among inmates of SDM Institute of Ayurveda and Hospital Bangalore.

Methods: Descriptive survey study with self-administered questionnaire method sent to 500 participants selected randomly emailed through self-generated Google form.

Results: Among 500 inmates of age between 18-50years, 427 (85.4%) responded as cosmetics are used for beautification, 454 (90.8%) inmates believe there will be long-term side effects by continuous use of synthetic cosmetics. 352 (70.4%) inmates are aware of harmful ingredients used in cosmetics.

Conclusions: Majority of inmates have knowledge about adverse effects of cosmetics and are giving preference to herbal cosmetics. Inmates are even aware of hazardous toxic contents of cosmetics. The adverse effects caused by the cosmetics can be correlated to the toxicity signs and symptoms caused by of gara visha/artificial poisons and dushi visha/cumulative toxicity explained in ayurveda. The study forms the basis for future studies where in management of adverse effects of cosmetics could be tried in line of Garavisha and Dushivisha chikitsa.

Keywords: Adverse reactions, Dushivisha, Herbal cosmetics, Inmates, Synthetic cosmetics

INTRODUCTION

AgadaTantra (toxicology) is meant for alleviating the poisonous effects caused by bite or sting of different animals, combination of toxic and nontoxic substances.¹ In the present world humans are constantly exposed to several toxins present in the environment through food (preservatives, packing materials etc), water, atmosphere (pollutants), radiations and so on. Long term use of chemical products produces various toxic symptoms in human beings. This type of toxicity explained under the concepts of gara visha (artificial poisoning) and dushivisha (cumulative toxicity) in ayurveda.²⁻⁵

Cosmetics are articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body or any part for cleansing, beautifying, promoting attractiveness, or altering the appearance.⁶ They are generally mixtures of chemical compounds, some being derived from natural sources, many being synthetic. Most cosmetic products contain different chemicals as ingredients such as emulsifiers, preservatives, thickener, color, fragrance; UV filters (sunscreens), humectants, occlusive agents, ACT-ING and pH stabilizers.

The use of cosmetics in the present era is increased and the chemicals present in skin-care cosmetics [parabens,

formaldehyde, sodium lauryl sulphate, phthalates], hair-care cosmetics [sulphates, isopropyl alcohol, silicones], face-care cosmetics [lead, triclosan, hydroquinone]. Nail-care cosmetics [dibutylphthalate, toluene, formaldehyde], fragrance products [acetone, benzaldehyde, methylene chloride] frequently cause adverse reactions like contact dermatitis, allergic reaction^{7,8}

Hence forth a study was planned to evaluate the knowledge regarding awareness of synthetic cosmetics and its hazardous chemical ingredients used regularly among study population.

METHODS

Study design

This was a single group study. A structured questionnaire with 20 questions related to adverse effects of cosmetics was prepared and administered to the subjects through self-generated google forms. Total 500 subjects were randomly selected and included in this study.

Study population

Students studying from 1st year BAMS to 4th year BAMS, Internship students, staffs and few out patient who visited Shri Dharmasthala Manjunatheshwara Institute of Ayurveda and Hospital, Bengaluru for health check-up. All the subjects were between the age group of 18-50 years. Informed consent was collected from each subject through google form for survey study.

Inclusion criteria

Random selection of inmates with age between 18-50 years were included in the study.

Statistical analyses

The responses were evaluated by assessing mean, median, mode, the standard deviation for each question and by using a One-Sample T test with SPSS software version-20.

RESULTS

Type of cosmetics and factors for buying cosmetics

Table 1 shows among the study population of 500, 408 (81.6%) of people use skin care products in cosmetics and 333 (66.6%) people use hair care products followed by eye care (30%) and lastly oral care (24.2%). This indicates more products used are skincare and hair care synthetic cosmetics. A large portion of study population purchased cosmetics based on Safety and environmental records and trusting the brand name. 27-30% purchase is based on their easy applicability and pocket friendly nature.

Table 1: Types of cosmetics used by study population and factors influencing their purchase.

Variables	Percent %
Type of cosmetics	
Skin care products	81.6
Hair care products	66.6
Eye care	30
Oral care	24.2
Factors for buying cosmetics	
Safety and environmental records	65
Trusting the brand name	64
Easy applicability	27
Pocket friendly nature	32

Influence of advertisement about cosmetics

There were 60% of the subjects purchased cosmetics after taking the opinions of friends and family members. The subgroup of about 29% purchase is attributed to Internet and social media references which is an area of concern. In this study population, it was observed that subjects have given importance to warning/caution mentioned in cosmetics. 96% of the study population were aware about the safety tests done before using cosmetics (Figure 1).

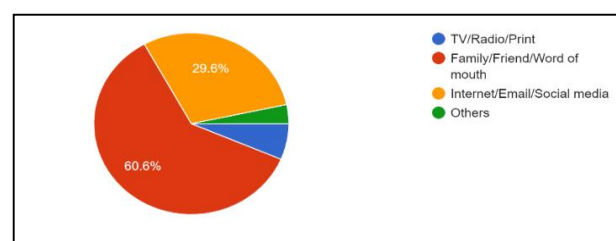


Figure 1: Influence of advertisement about cosmetics.

Use of cosmetics per day

There were 48% of the sample used cosmetics occasionally, 33.2% rarely while 16.8% used cosmetics daily. A very small portion used them multiple times a day (Figure 2).

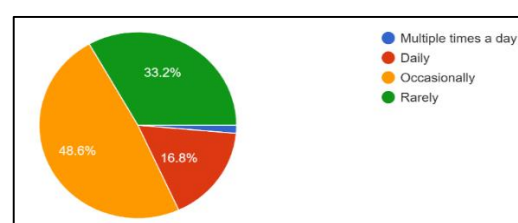


Figure 2: Use of cosmetics per day.

Ingredients and toxic components in cosmetics: 69.8% are aware of ingredients in the cosmetics while 30.2% are not aware of them. 70.4 % of study subjects are aware of the toxic contents in them where as 30.2 % are not aware (Figure 3).

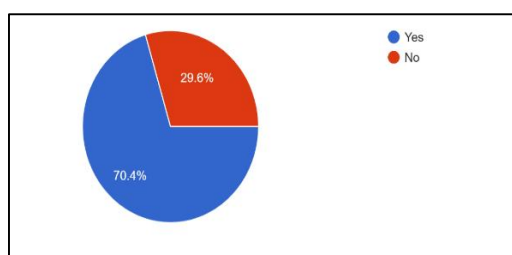


Figure 3: Awareness about toxic contents used in cosmetics.

Synthetic/herbal cosmetics

There were 86.4% of the sample preferred herbal over synthetic cosmetics and 88.4% of the population preferred to use only herbal cosmetics.

Adverse reactions

Table 2 shows nearly half of the subjects have experienced allergic reactions followed by adverse effects

Table 2: Results of queries related to adverse reactions.

Variables	N (%)
Adverse reactions	
Allergic reactions	154 (55.7)
Redness of skin	116 (43.3)
Eye irritation	90 (33.6)
Watering in the Eyes	86 (32.1)
Blackish discoloration of skin	71 (26.5)
Head ache	42 (15.7)
Opinion regarding discontinuation of cosmetics after the observation of adverse effects of cosmetics	
Yes	85
No	15
How often noticed adverse effects of cosmetics	
1-2 times	50
2-5 times	25
More than 5	12.5
Never	12.5
Reporting of adverse effects of cosmetics to concerned authority	
Yes	42.8
No	57
Awareness about long-term side effects of synthetic cosmetics	
Yes	90.8
No	9.2

Table 3: Knowledge regarding regulations.

Variables	Percent %
Need for regulatory control of cosmetics	
Yes	75.8
No	24.2
Suggestions regarding making rules and regulation to avoid harmful effects of cosmetics	
Yes	97.2
No	3

such as redness of skin, eye irritation, watering in the eyes, blackish discoloration of skin and as shown in the figure 6. 85% of the population preferred to discontinue the cosmetics after experiencing the adverse reactions. 50% of them experienced these reactions 1-2 times, 25% have experienced the adverse reactions 2-5 times. Among the rest 25% half have experienced more than 5 times and the other half have never encountered any adverse reactions. 90% of the survey population know about the long-term side effects of synthetic cosmetics.

Regulations

There were 57% population know the reporting of adverse effects of cosmetics to concerned authority while 42% are not aware of it. 75% of the study subjects have given opinion that there should be regulatory control of these cosmetics. 97% have opinionated that there should be rules and regulations to avoid the harmful effects of cosmetics (Table 3).

DISCUSSION

The toxicity caused by the prolonged use of cosmetics can be correlated to the concepts of Gara Visha and Dushivisha of Ayurveda.

Garavisha is a combination of poisonous or nonpoisonous substance which exerts toxic effect after sometime and it doesn't kill the person instantly. Gara visha may be given through anna (food), Pana (drinks), Utsadana (massage), Anulepana (application), Anjana (eye lid application), pariseka (bath). Pandu (anemia), poor digestion, udarrog (GI disorders), Grahani (sprue), Fever, Gulma (tumours), Odema on hands and feet, flatulence, wasting are explained the clinical features of garavisha.⁹

Any kind of poison originating from inanimate or animate sources or any artificial poison (Kritrima Visha) retained in the body after partial expulsion or which has provisionally undergone detoxification, by the anti-poisonous drugs, forest fire, the wind or the sun is termed latent poison (Dushi Visha). The symptoms are followed by sense of intoxication after consuming food, indigestion, anorexia, appearance of red patches all over the body, oedema of the face and extremities, urticaria, fainting, ascites, vomiting, diarrhoea, discoloration, epileptic attacks, intermittent fever and increased thirst¹⁰

Currently there are number of natural, synthetic and semi synthetic agents which are playing major role of causative factors causing diseases in human beings due to continuous persistent exposure. Cosmetics are the one of the major factors which cause adverse effects so, can be attributed to these concepts of Ayurveda explained 5000 years ago itself.

The survey study was done to assess the knowledge regarding awareness of synthetic cosmetics among inmates of SDM Institute of Ayurveda and Hospital Bangalore. According to the survey results:

Skincare and hair care synthetic cosmetics are mostly used by the study population. It is well documented that these products contain many chemical additives in order to improve performance, effectiveness, and viability of the cosmetics. Exposure to various chemical substances present in cosmetics poses a health risk that varies from a mild hypersensitivity response to a lethal intoxication.¹¹

A large portion of study population purchased cosmetics based on Safety and environmental records and trusting the brand name. Brand loyalty is defined as keeping preferable to a specific product or service (BNET Business Dictionary). Research has indicated that brand attributes are viewed as important elements in a consumer's decision-making. For example, Lau et al. (2006) in his article mentioned that there were seven factors that influenced consumers' brand loyalty towards certain brands. The factors were brand name, product

quality, price, design, store environment, promotion and service quality.¹²

Near about 27-30% purchase is based on their easy applicability and pocket friendly nature. Brand name stands almost equal to the safety record for purchase of cosmetics. Most of the subjects purchased cosmetics after taking the opinions of friends and family members. This shows that personal experience of others had greater influence on attitude and purchase behaviour of consumers. The subgroup of about 20% purchase is attributed to Internet and social media references which is an area of concern.

About 70 % of study subjects are aware of ingredients in the cosmetics as well as the toxic contents in them. This could be one of the reasons for the occasional and rare use of synthetic cosmetics by the study population.

A significant portion of population preferred herbal cosmetics over synthetic cosmetics. This may be because majority of them were aware of the adverse effects that synthetic cosmetics had on health. The composition of herbal cosmetic products includes the incorporation of various natural additives such as wax, natural colour oils, natural fragrances and plant components such as leaves, flowers, etc. The benefits of herbal cosmetics are low cost, no side effects, environmental safety, and safety to use and there is a better future ahead compared to synthetic cosmetics. Proper regulation of these remedies and efficacy will lead to significant growth in the field of herbal cosmetics.

Nearly half of the subjects have experienced allergic reactions followed by adverse effects such as redness of skin, eye irritation, watering in the eyes, blackish discoloration of skin and head ache.^{13,14}

Allergic reactions

Fragrance Components are frequent culprits in cosmetic allergies. Sensitization is most often induced by highly perfumed products, such as toilet waters, after-shave lotions, and deodorants, but fragrance-containing skin-care products may also cause reactions. The main skin sites affected are the face, neck, axillae, and hands. The literature confirms that the fragrance mix, which contains 8 perfume components (amyl cinnamal, cinnamal, cinnamyl alcohol, hydroxycitronellal, eugenol, isoeugenol, geraniol, and Evernia prunastri (oakmoss) extract, all diluted 1% in petrolatum and emulsified with sorbitan sesquioleate) and which is tested routinely in the baseline series, remains the best screening agent for contact allergy to perfumes because it can detect some 70% to 80% of all perfume allergies. Preservatives: They are very important cosmetic allergens in water-based products such as cleansers, skin-care products) acrylates are important causes of reactions to artificial nails preparations, more recently to gel formulations being the newest development in this regard, particularly in

excipients, emulsifiers, surfactants, and humectants. They are common ingredients to topical pharmaceutical and cosmetic products. The classical contact-allergens reported were rare cosmetic allergens, such as wool alcohols, fatty alcohols (e.g., cetyl alcohol), and propylene glycol but more recently introduced ingredients are also described: for example, dicaprylyl maleate isononyl iso nonanoate and trioleyl phosphate and the humectants butylene glycol and pentylene glycol being aliphatic alcohols with similar uses (solvent, humectant, and antibacterial) to propylene glycol that is considered to be more irritant and allergenic.

Eye symptoms

The ingredients such as preservatives, fragrances, and metal can cause irritation and inflammation on the ocular surface and disrupt the tear film and cause dry eyes symptoms; OSDI score(5)A more detailed study has reported on the impact of make-up towards ocular comfort and meibomian gland atrophy. Ingredients such as preservatives, fragrances, and metals included in eye cosmetics could cause several adverse effects such as irritation and inflammation, disruption of tear film and impact of ocular surface disorders. Preservatives can cause inflammation on the ocular surface and periocular region, of which 10% are allergic-inflammatory reactions, and the other adverse reactions induced by chemicals in ocular products are chemical irritation). Furthermore, when fragrances are mixed with cosmetics, it is commonly known to cause allergy symptoms. A retrospective study of 115 people found that cosmetic goods were shown to be the source of fragrance allergic contact dermatitis in 95.8% of cases. As for the effects of metals on the eye, a study following the application of metal (Ni) in green eye pencil in a patient was found to have clinical symptoms such as itching, erythema, mild infiltration, and scaling of both eyelids

Less than half of inmates are not aware of the reporting system which indicates their ignorance and lack of knowledge regarding the adverse effects caused by the usage of cosmetics. Majority have opinionated that there should be rules and regulations to avoid the harmful effects of cosmetics. Rules and regulations regarding production, marketing and sales of cosmetics already exists in Drug and Cosmetics Act, many products pour into market with low quality chemical ingredients quite often resulting in adverse reactions. Therefore, it is the need of the hour to keep a stringent vigilance on quality pf these products before they enter the market.

The study might have certain limitations in terms of smaller sample size, use of self-administered questionnaire. Since it was a time bound study smaller sample was chosen With the self-administered questionnaire method for data collection one cannot vouch for the validity of responses. Having said these the data generated in the present study may be used for further studies with large sample size targeting specific populations.

CONCLUSION

The Study revealed majority of the population use skin care and hair care cosmetics predominantly. The consumer consumption of these cosmetics is highly influenced by the quality, safety records and brand name of the individual products. The study shows that people are aware of the toxic chemicals present in synthetic cosmetics and the long-term side effects associated with their usage and also, they have personally experienced the adverse reactions. These could be the prime factor for them to prefer herbal cosmetics over synthetic cosmetics. In future it is recommended to conduct survey study on targeted population with high rate of exposure to synthetic cosmetics. The adverse effects caused by these synthetic cosmetics can be managed by Gara visha and Dushi visha line of treatment.

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Conflict of interest: None declared

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