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Knowledge, Attitude and Practice Based Study of Cosmetics Use in Acne Patients

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ABSTRACT: *Acne vulgaris is one of the leading skin problems in the world and multifactorial nature of the disease. The current study was aimed at carrying out a knowledge, attitude and practice-based analysis of acne patients towards the use of different cosmetics in a Pakistani setting. To begin with, 300 people were asked to fill a self-designed, validated questionnaire related to the cosmetics and their effect on acne patients. The tool, containing 37 closed-ended questions, was uploaded on Google Forms and the link was shared on social media platforms. On attaining the target count, statistical analysis was performed through SPSS and result were recorded. Among the respondents, only 29% indicated their acne was worsening by use of cosmetics (OR :1.25) whereas acne of 30 % people was not affected by the use of cosmetics. The study showed the use of cosmetics in acne can worsen their skin condition and can cause failure of anti-acne treatments. The study also showed that a lesser number of people prefer visiting dermatologist for dermo-cosmetics prescription. Most of the respondents select cosmetics on their own or they take recommendations from friends and family. Analysis of the current nation-wide survey of Pakistani acne patients revealed that the Pakistani population believes that acne is worsened by the use of cosmetics and that it can cause treatment failure of anti-acne treatment. Most of people select cosmetics on their own after taking advice from family and friends and in severe acne, they stop using cosmetics without visiting dermatologist.*

Keyword: Cosmetics; Safety testing; Emulsions; Acne vulgaris; Treatment failure

INTRODUCTION

Acne vulgaris is one of the most prevalent skin diseases. It affects almost 80 %-85 % population of adults in their puberty worldwide (Dréno, 2010; Heng and Chew, 2020; Stamu-O'Brien et al., 2020). Pathophysiological presentation of acne includes increase in sebum production, keratinization of follicular regions and inflammation (Dréno, 2017; Dréno et al., 2018; Dréno et al., 2020; Leung et al., 2021). These are partially related to the proliferation of acne bacterium (*Propionibacterium acnes*) in pilosebaceous unit. Other contributors of skin microbiota are also found residing in the acned skin area and contributing to overall impression of diseases (Fournière et al., 2020). Apart from the aesthetic and physiological impact, the psychological effect of acne is much more intense and long lasting as it affects self-esteem, causes anxiety and depression, yield suicidal thoughts, social rejection and social isolation (Natsuaki and Yates, 2021; Samuels et al., 2020; Stamu-O'Brien et al., 2020).

Skin is considered as the first line of defense between the environment and the body (Šniepienė and Jankauskienė, 2020). Internal factors that affect acne include fluctuating hormonal level, increased sebum production, colonization of *Propionibacterium acne*, increased consumption of dairy products while external factors that may have a direct or indirect effect on acne are light, pollution, humidity and cosmetics (Conforti et al., 2021; Đurović et al., 2021; Šniepienė and Jankauskienė, 2020).

Cosmetics are directly applied on skin for protection, exfoliation and cleansing and can affect acne presence. Use of cosmetics containing too much oil and having unsuitable ingredients can affect skin negatively and can cause skin irritation and worsen acne (Dréno et al., 2018; George and Sridharan, 2018). On the other hand cosmetics containing ingredients with antimicrobial properties, sebum controlling properties and anti-inflammatory properties are considered as good source to treat acne and that is the reason for the inclusion of a Dermo-cosmetics as complementary to the main treatment (Araviiskaia et al., 2021; Conforti et al., 2021). Studies suggest that use of synthetic cleanser with pH of 5.5 are found to lessen the extent of inflammatory lesions (Korting et al., 2010). Dermo-cosmetics are user friendly and their use encourage patient adherence to therapy and give patients more satisfaction over other treatments (Araviiskaia et al., 2021). In the case of low acne groups cost is major factors that influence the adherence to therapy and leaving the therapy in complete can

worsen the situation (Kwon et al., 2022).

Pakistan is the fifth most populous country and shares the climatic, cultural, geographical and dermatological profile with some of the other heavily populated countries including India and Bangladesh being second and eighth with respect to population wise distribution (united nations, 2023). Using the Pakistani population as the representative sample where the prevalence of acne in adults almost matches the prevalence worldwide can provide an opportunity to dissect the understanding of the people towards the use of cosmetics in acne (Rasool et al., 2017). Large number of patients in Pakistan use either locally or foreign manufactured cosmetics and are unaware of their effects on their skin. Different forms of medicated and non-medicated dermo-cosmetics such as creams, lotions and face wash solutions are available abundantly and over-the-counter in Pakistan. Decisions about the selection of cosmetics, their use and their stoppage, are considered in an irrational manner without having any information about their constituents in Pakistan. Till-date, there is no study that investigates the level of understanding about the cosmetics and their use during acne in Pakistani population. The current study was designed to determine the knowledge, attitude, practices and preferences of Pakistani people about use of cosmetics during acne and evaluation of effects of cosmetics use on the development of acne.

MATERIALS AND METHOD

Questionnaire design

Anonymized questionnaire containing 37 closed ended questions and a statement summarizing objectives of study and request for informed consent to participate in the study was included in questionnaire. The first portion of questionnaire was about demographical data and the second part of questionnaire was aimed at gathering information about the use of cosmetics, their effect on acne, awareness about the ingredients, use of medicated cosmetics, plans of using cosmetics and from where to take recommendation for use cosmetics. The detailed pattern of questionnaire is shown below in Table I.

Table I: Components of the questionnaire structure used in survey

1. Introduction about acne
2. Consent statement
3. Demographical data Including: Age, gender, residence, income status, educational status
4. Questions about acne: Acne type, Skin type, family history of acne, siblings heaving acne
5. Questions about cosmetics: cosmetic use, cosmetic type use, frequency of cosmetic use, adverse effect observed,
6. Question about effects of cosmetics: time since using cosmetics, adverse effect of cosmetics, cosmetics effect on therapy, stopping cosmetics effect on acne
7. Perception of individuals: about cosmetic should be used or not use, about cosmetic effects on antiacne treatment, about dermo-cosmetics

Afterwards, the questionnaire was validated by: two dermatologists, two social researchers, two pharmacists, one psychologist, one English language expert and two individuals of age 18 and 23 years. After incorporation of recommended changes, a pilot study was conducted on 30 individuals and Cronbach's alpha value obtained was 0.804. Questionnaire was then finalized and was transferred to Google Forms to ensure a wide distribution and collection of data from diverse regions of the country.

Sample Size Calculation

Sample size to calculate the representative population of the Pakistan was calculated by using online sample size calculator raosoft (Raosoft, 2020). While calculating the sample size Pakistani population was considered as 235 million as per world bank data of 2022 (worldbank, 2022). Adding the population number of sample size calculation raosoft sample size calculators it come 271 with 90 % confidence level and 385 with 95% confidence level. In current study sample from 300 individual was taken which was more than computed size in case of 90 % confidence level and nearly 80 percent of 385 and can be used as representative sample size for Pakistani population.

Data Collection and Processing

Random sampling schemes was used to collect “patient’s prospects” data from 300 respondent either acne patients and control/non acne patients, acne patients were referred to those who are categorized as acne patient clinically. Internet users from all across the

country were contacted through social media platforms and questionnaire was distributed. Leaflet containing information about acne to increase awareness was also distributed to the respondents alongside the questionnaire. Multiple cycle of posting on three major social media platforms with highest usage in different groups related to skin care, research and dermo-cosmetics was carried out. Response to all questions was made compulsory to ensure that there were no missing values in the data.

Statistical Analysis

Qualitative variables were denoted by using frequency table and percentage. The relationship between variables was analyzed by using correlation. Chi-Square test was used for inter group comparison. Odds ratio was used to find the outcome of factors influencing acne. Mann-Whitney U test was used to compare the degree of acne and gender relationship. A 5% significance level was applied. Statistical analysis was performed using IBM SPSS version 25.0.

RESULTS

Demographic Data

A total of 300 people participated in this survey. It can easily be computed from Table 2 that almost 95 % (285/300) of people who participated were of from 11 to 30 years of age. Out of the participants, 202 were female and 98 were male which comes almost 67 % and 33 % respectively. Among all participants almost 34 % (102/300) of the participants were from Punjab 23.3 % (70/300), from Sindh 24.3%, from KPK and Federal area 5% (15/300) each, from Kashmir nearly 9.3% (28/300) while 4% (12/300) of the respondents were from Baluchistan. Almost 55 % (165/300) of all participants were enrolled in an undergraduate degree program.

Among the participants, 14 % (42/300) had never experienced acne, 32% (96/300) people were having mild acne, 25% (75 /300) had moderate, 19.3 % (58/100) had severe while 9.7 % (29/300) participants had very severe acne. Females self-reported a higher tendency of acquiring acne as compare to males ($P < 0.05$). Almost 21 % of acne patients had a family history of acne while 15% people were not well aware of family history. Almost 60 % (179/300) people participated in study were from middle and lower middle class. Table 2 summarizes this information in a tabulated form.

Table 2. Socio-demographic distribution of acne severity level in participants (n=300)

Demographic Data of Participants								
	Overall percentage	**Non acne**	**Mild acne**	**Moderate acne**	**Severe acne**	**Very Severe**	***Total**	****P value**
Punjab	34%	14	36	28	15	9	102	<0.05
%		13.7 %	35.3%	27.5%	14.7%	8.8%		
Sind	23.3%	10	26	15	13	6	70	
%		14.3%	37.1%	21.4%	18.6%	8.6%		
KPK	24.3%	11	22	19	13	8	73	
%		15.1%	30.1%	26%	17.8%	11%		
Kashmir	9.3%	3	7	6	8	4	28	
%		10.7%	25%	21.4%	28.6%	14.3%		
Federal	5%	2	5	2	5	1	15	
%		13.3%	33.3%	13.3%	33.3%	6.7%		
Baluchistan	4%	2	0	5	4	1	12	
%		16.7%		41.7%	33.3%	8.3%		
Gender Wise Distribution								
Male	33%	15	22	26	23	12	98	<0.05
Female	67%	27	74	49	35	17	202	
Age wise Distribution								
11-20 years	29.3%	9	30	26	16	7	88	<0.05
%		10.2%	34.1%	29.5%	18.2%	8.0%		
21-30 years	65.7%	32	63	43	39	20	197	
%		16.2%	32.0%	21.8%	19.8%	10.2%		
31-40 years	5%	1	3	6	3	2	15	
%		6.7%	20.0%	40.0%	20.0%	13.3%		
Socio-Economic grouping								
lower middle	23 %	12	16	17	16	8	69	<0.05
%		17.4%	23.2%	24.6%	23.2%	11.6%		
Middle class	36.7%	15	44	22	18	11	110	

%		13.6%	40.0%	20.0%	16.4%	10.0%		
Upper middle class	21 %	10	16	16	17	4	63	
%		15.9%	25.4%	25.4%	27.0%	6.3%		
Upper class	19.3	5	20	20	7	6	58	
%		8.6%	34.5%	34.5%	12.1%	10.3%		

* Descriptive statistics, **X^2 test is used ($P < 0.05$)

Province wise, gender wise, age wise and socio-economic status wise distribution of participants in the form of numbers and percentages values.

Cosmetic Type and Cosmetic Use Frequency

Around 30% of the respondents said that they used face wash on regular basis and almost 27% each were users of creams and lotions. Only 10 % were applying makeup on regular basis. Frequency of cosmetics use was significantly higher in respondents heaving severe and very severe acne as compared to respondent with moderate, mild or no acne. It was found that almost 64 % of participants who did not have acne were applying cosmetics once a day and ratio was almost similar to the respondents with moderate acne (65%) but the percentage was slightly higher in people with mild acne 81%.

Almost 24% of people with severe acne reported applying cosmetics at least twice a day. Around 14% of individuals with very severe acne were applying cosmetics thrice or even more times every day. A positive correlation can be established on studying the number of times of cosmetics use with acne severity. Trend of using imported cosmetics was relatively higher as nearly 44 % (132/300) percent of individuals were using imported cosmetics while 32 % (96/300) were using local and 9 % (27/300) were using home remedies for curing acne (Fig. 1).

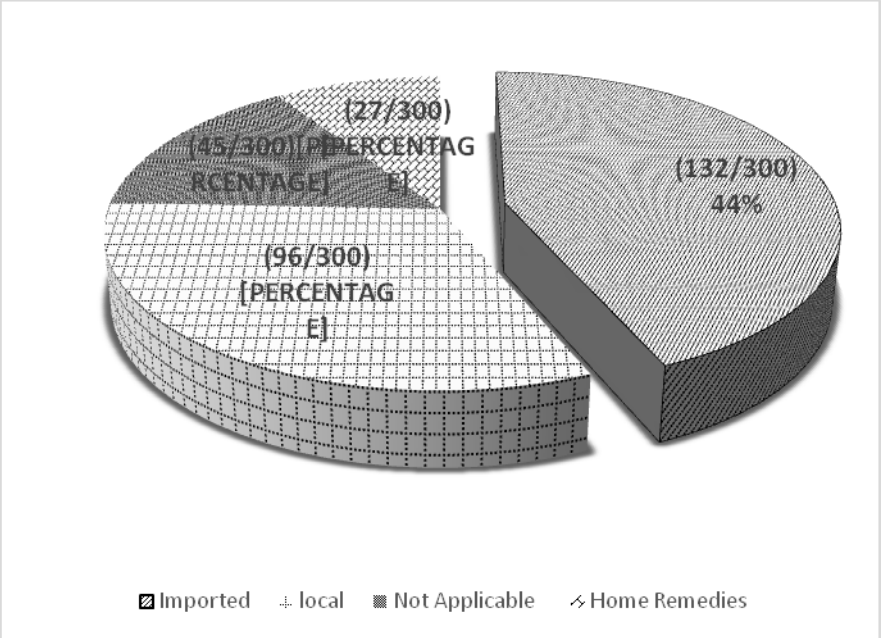

Fig. 1. Trend of using cosmetics (local vs imported brands) among Pakistani participants (n = 300)

Cosmetic Recommendation

A Statistically Significant percentage of individuals having (26.2 %) no acne or (17%) mild to moderate acne were using cosmetics suggested by dermatologists. Only 13 % of individuals with very severe acne were using cosmetics upon the recommendation of a dermatologist (P<0.05). It was found that a higher percentage of participants having severe (69%) or very severe acne (72%) were taking cosmetics either on their own or on the recommendation of their family members which was higher as comparison to the individual with no acne 57% (24/42) and mild acne 51% (49/96) (P<0.05).

In response to question, *"Who recommended you to stop using cosmetics?"*.The ratio of the individuals who take opinion from dermatologist about stopping use of cosmetics was higher in mild acne patient as compare to severe acne patients. Which was 17 % and 6 % respectively. (P<0.05). Over all 75 % of the participants did not take advice from the dermatologists or any other health care professional and stopped using the cosmetics on their own or on the advice of family or friends fig. 2. Only 15 % (45/300) of individuals visited dermatologists for taking advice about use or not to use the cosmetics (P<0.05).

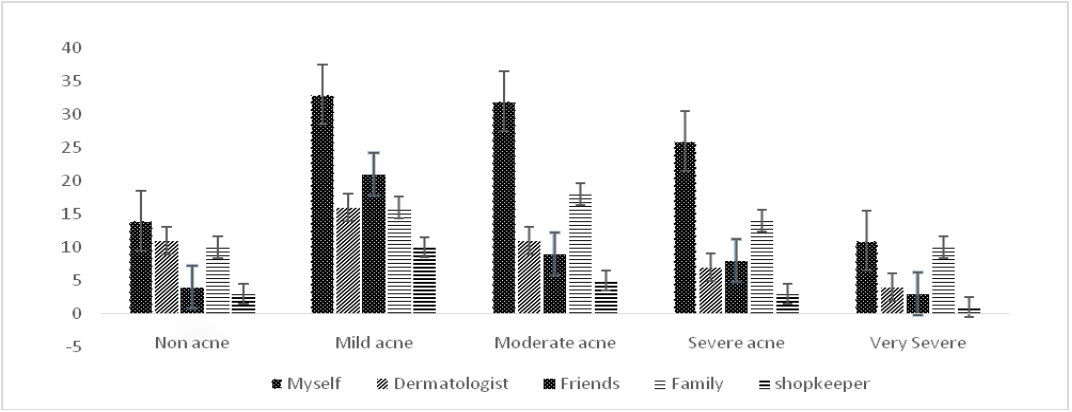

Fig. 2. Recommendation about the discontinuation of cosmetics in response acne symptoms

Knowledge about ingredients of cosmetics and anti-acne medications

In response to the question about the participants having any knowledge about the ingredients of their cosmetics, 46 % (138/300) of the individuals responded with a 'yes'. Nearly 35 % (107/300) individuals responded that they were not aware and almost 18% (55/300) answered that they did not know anything about the ingredients of their cosmetics ($P<0.05$).

Among the participants who were using medication for the treatment of acne, the most common medication came out to be antibiotics with almost 16% of individuals taking antibiotics. This was followed by retinoids (12%) and benzyl peroxidase (10%). Almost 8% of the participants were using home remedies to cure the acne. ($P<0.05$).

Acne Severity relation to use of cosmetics

Around 29% (87/300) of respondents indicated that their acne was worsened by the use of cosmetics and nearly 30 % (91/300) people thought that their acne is not affected by cosmetics use. Almost 41% individuals were not sure whether their cosmetics have any effect on the severity of acne or not ($P<0.05$). Odd ratio of 1.25 was calculated. In another question, respondents were asked if stopping the use of cosmetics improved their acne condition or not. Almost 19 % (57/300) individuals responded by saying no whereas 30 % (90/300) respondents claimed that stopping use of cosmetics have improved their acne presentation. Nearly half number of individuals were not sure about the effect imparted by discontinuing cosmetics on acne ($P<0.05$). Odd ratio was 1.125.

Perception of Individuals

Almost 48 % (144/300) of the respondents were of the opinion that cosmetics can be used while taking any sort of oral treatment for acne while only 13 % individuals had contrary opinion (P<0.05). Only13.3 % (14/300) of individuals thought that cosmetics have no effect on acne. Nearly 40.3% (121/300) individuals considered that cosmetics have an effect on acne while rest were not sure about the relationship (P<0.05), details about perception of participant is more descriptive manner is mentioned in Table 3. Around 38 % (114/300) participants considered that the cosmetics use in acne can cause treatment failure while 49 % (147/300) people were not sure about that (P<0.05). It was found that 45 % respondents thought that the dermo-cosmetics heaving antiacne properties should be used while taking any sort of treatment and only 9 % (27/ 300) respondents have the contrary point of view. A higher percentage of the individuals (46%) (138/300) were suspicious about the role of dermo-cosmetics (P<0.05).

Table 3: Perceptions of respondents about cosmetic use and acne from close ended questions

	Perceptions of individuals				
	Cosmetic have effect on acne?				
	yes	**No**	**Don't know/ May be**	**total**	****P. Values**
Number*	121	40	139	300	<0.05
%	40.3%	13.3%	46.3%		
	Cosmetic can cause treatment failure?				
Number	114	39	147	300	<0.05
%	38%	13%	49%		
	Dermo cosmetic with anti-acne property should be used?				
Number	136	27	138	300	<0.05
%	45%	9 %	46%		

***Descriptive Statistics, ** significance value.**

DISCUSSION

In the current study in which perceptions, views and practice behaviors of Pakistani population were recorded, through an anonymized, validated questionnaire, it was found that a greater percentage of the respondents associated the use of cosmetics with progression of acne. Similar association between acne severity and cosmetics has recently been established in a study from one of the neighboring countries of Pakistan (Shah et al., 2021; Sinha et al., 2016). In another study from Indonesia, it was reported that there exists no significant relationship between acne and cosmetics (Perera et al., 2018; Yueng et al., 2018). In this study, around 29% individuals claimed their acne severity increased by use of cosmetics. Odds ratio ≥ 1 indicated increase of acne severity with cosmetic use.

The current study convincingly reports that individuals with severe and very severe acne were using cosmetics more frequently than individuals heaving no acne which indicates association of cosmetics use and acne progression. Similar findings have also been reported in Korean population signifying the association of colored cosmetics with increase in acne severity (Lee et al., 2020). In another study from Korea, 38.1 % of individuals claimed that their treatment failure to acne was caused by cosmetics use (Suh et al., 2021). Psychological reasons may be behind using cosmetics frequently. It can be assumed that an increase in the use of cosmetics, without knowing the biological effect, to improve physical appearance of skin in acne patients is more desirable by them in order to deal with psychological pressure and social stigma.

Careful selection of cosmetics is a major factor in controlling the progression of acne severity. Face wash is the most abundantly used cosmetic product in Pakistan. Our study indicates that a statistically significant number of acne patients in Pakistan chose cosmetics without taking any advice from dermatologist as they selected cosmetics on their own or upon the recommendation of their family and friends. Past studies also suggest that almost 51% of men take information about cosmetics from their friend and spouse and 63% women take this information from friends, magazines and social media platforms (Girdwichai et al., 2018). It is recommended through a number of clinical and observational studies that selection of cosmetics should only be done upon consultation with a dermatologist (Draelos, 2001).

As in the case of peeling therapy dermatologist conduct detailed interviews of patients to evaluate which agent best suits them (Castillo and Keri, 2018). The trend to use cosmetics recommended by spouse, family and friends exists in whole world (Girdwichai et al., 2018). However, being an under-resourced country with a lower literacy level, it is recommended that well designed awareness campaigns are necessary to improve the education level of the individuals. Much like the developed world, cosmetics authorities must be made to monitor the manufacture and use of cosmetics.

It was also found that the frequency of cosmetics use was also a factor in acne severity as 24 % individuals with severe acne were applying cosmetics at least twice a day and 14 % of respondents with very severe acne were applying cosmetics thrice or more times a day indicating frequent use of cosmetics may cause acne severity. Notably, a related study from Ethiopia, an African country established a similar relationship (Bilal et al., 2017). This point needs more investigation to establish the better understanding about frequency of cosmetic use and adverse effects on acne which may include the quantitative analysis about the exact type of cosmetic, ingredient of cosmetics, frequency of that particular cosmetic and evaluation of the role of exposomes.

Information about ingredients of cosmetics is necessary to avoid their adverse effects. Only 46 % of participants in this study were aware of ingredients of their cosmetics. Antibiotics, serum, benzyl peroxide, retinoids, herbal ingredients and many other pharmaceutical agents are used in cosmetics (Dange et al., 2020; Dréno et al., 2018; Kawashima et al., 2017). They all act on different stages of pathogenesis of the acne (Ak, 2019; Kawashima et al., 2017; Otlewska et al., 2020). Using these ingredients unknowingly make more harm than benefits. So, awareness should be provided to individuals about the ingredients of cosmetics to stop irrational use of cosmetics. Lately, dermo-cosmetics used alongside main acne therapy are getting more attention. Dermo-cosmetics work either by decreasing the side effects of main therapy or by decreasing the effect of exposome (Dréno et al., 2020). Different ingredients of dermo-cosmetics impart sebum controlling, anti-inflammatory or antioxidant effects (Araviiskaia et al., 2021; Conforti et al., 2021). Their growing popularity has also been depicted in the current study as 45%

responds thinks demo-cosmetics should be integrated in the therapy only 9 % refuse from this idea.

Though in this study, we have tried to gather information about the views and perceptions of a sample size comprising the whole of the country, it has some limitations. We got the data only from the internet users who are considered to be computer literate. Moreover, as with all KAP studies, the results rely on the self-administered, self-reported outcomes. Therefore, clinical confirmation of the severity of the acne could not be done.

CONCLUSION

Our data suggests that a greater percentage of the Pakistani population thinks that the cosmetics use is associated with acne severity. Moreover, a lot of individuals use cosmetics irrationally, without taking advice from dermatologists. Frequency of cosmetics use is also important and awareness about ingredients of cosmetics can help to choose more appropriate cosmetics including dermo-cosmetics. It is, therefore, recommended that in order to achieve the therapeutic targets for acne and other skin conditions, strict regulatory role of the responsible agencies and institutes shall be established.

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Consent for publication: consent for Publication was taken.

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