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The prevalence of topical steroid use and steroid induced Rosacea among Saudi Population, Hail city: A cross sectional study

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ABSTRACT

Background: The use of topical steroids for an extended period of time causes rosacea like dermatitis with varying clinical manifestations. In 1951, the first topical corticosteroids were approved for usage. Since then, uncontrolled usage (abuse) has resulted in a variety of responses similar to rosacea steroid dermatitis or steroid induced rosacea. Multiple mechanisms for such reactions have been hypo the sized, including rebound vasodilation and pro inflammatory cytokine release. In the current study, the incidence of steroid induced rosacea and other side effects of steroids in the Hail population of the Kingdom of Saudi Arabia will be evaluated. *Methods:* A descriptive cross sectional study was conducted from January 2022 to April 2022. Raosoft was used to calculate the sample size, with a confidence level of (95%). *Results:* The study included 399 patients. Among them there were 341 females and 214 from the age group 40-59 years. There were 163 participants responded to the study questionnaire. The frequently mentioned side effect associated with using cortisone was Telangiectasia (13.5%), followed by acne (12.9%) and hypopigmentation (9.2%). The most common symptom associated with the use of cortisone was skin dryness (44.4%), followed by erythema (38.9%), and burning or stinging sensation (22.2%). Long term use of cortisone (>1 month) was significantly associated with Telangiectasia (p=0.044) in comparison to those who did not know about the side effects of cortisone (p=0.021). *Conclusion:* Using topical corticosteroids excessively can lead to rosacea like symptoms and various other side effects in people who have never been diagnosed with the condition.

Keywords: Topical corticosteroids, rosacea, misuse, over the counter drugs, steroids.

1. INTRODUCTION

One of the most often used medications in dermatology is topical corticosteroids (Chudal & Paudel, 2021). They are quite efficacious; however, unsuitable and lengthy usage has been linked to a number of significant side effects (Shakya Shrestha et al., 2015). There are a variety of diseases that can be treated with corticosteroids, both systemic and cutaneous. The administration method might be intravenous, oral, intra muscular, intralesional or topical. Different types of topical corticosteroids have different effects (Diehl & Cohen, 2021). It has been abused by the general public and has many side effects since topical corticosteroids are available at low cost and easily over the counter in some countries (Sendrasoa et al., 2017). Many corticosteroids are over used for a variety of reasons, including pigmentation, acne, pruritus, fungal or bacterial infections, rashes and a variety of other problems (Jaccob et al., 2020). Long term use of topical corticosteroids can lead to the development of dermatitis known as topical steroid induced rosacea like dermatitis (Diehl & Cohen, 2021). The most common clinical manifestation of this dermatosis is wide spread face redness, which may or may not be accompanied by papulopustular lesions (Hameed et al., 2013). This study aims to be to document the prevalence and association between topical steroid usage and the incidence of rosacea like dermatitis in Hail community.

2. MATERIALS AND METHODS

Objectives

Topical steroids abuse or prolonged use may result in rosacea like symptoms, so the study aims to assess the incidence of steroid induced rosacea and other side effects of steroids in Hail population, Kingdom of Saudi Arabia also to identify the prevalence and know the aims of topical steroid use among Hail population. Furthermore, our study was aimed at identifying the risk factors of developing steroid induced rosacea among Hail population; hence establishing an awareness protocol against the misuse and excessive use of topical steroids among Hail population.

Study design and study sample

This study was conducted in Hail region which is located in north western Saudi Arabia with a population of approximately 413,000. A descriptive cross sectional study was conducted from January 2022 to April 2022. Raosoft was used to calculate the sample size, with a confidence level of (95%). The minimum significant sample size is 384 we were able to obtain 399 responses.

Data collection

A self administered close ended questionnaire was design. The questionnaire was translated in to Arabic and approved by 1 dermatologist, thereafter, tested for both comprehension and readability by 19 subjects who were not included in the study. The questionnaire consisted of 23 questions involving both open and closed ended questions. It is divided into three sections: Demographic data (age, gender, residency, etc.), effects of corticosteroids use (indications of topical steroids, duration of use, side effects, etc.) and incidence of steroid induced rosacea. A P-value of 0.05 was considered statistically significant. The collection of data was accomplished by using a self administered online questionnaire given to the targeted population that matched the inclusion criteria.

Data analysis

All data analyses were performed using the Statistical Packages for Software Sciences (SPSS) version 26 (Armonk, New York, IBM Corporation, USA).

3. RESULTS

Frequency and proportion (percentage) were used to summarize all the data in this project. The relationship between the prolonged use of cortisone as well as the side effect after using it in regards to the selected characteristics of participants had been conducted using Chi square test. A P-value of 0.05 was considered statistically significant. All data analyses were performed using the Statistical Packages for Software Sciences (SPSS) version 26 (Armonk, New York, IBM Corporation, USA.).

Table 1 Participants' socio-demographic characteristics (n=399)

Study variables	N (%)
Age group	
<20 years	53 (13.3%)
20 – 39 years	130 (32.6%)
40 – 59 years	214 (53.6%)
≥60 years	02 (0.50%)
Gender	
Male	58 (14.5%)
Female	341 (85.5%)
Place of residence	
Hail City	373 (93.5%)
Rural area	26 (06.5%)
Level of education	
Elementary school	32 (08.0%)
Middle school	66 (16.5%)
High school	278 (69.7%)
Bachelor's degree	23 (05.8%)
Occupational status	
Student	92 (23.1%)
Employed	225 (56.4%)
Retired	34 (08.5%)
Unemployed	48 (12.0%)

163 participants responded to our survey. Table 1 described Participants' socio-demographic characteristics. The most common age group was 40 – 59 years old (50.3%) with females compromising most of the participants (94.5%). Nearly all (92.6%) were living in Hail city. With regards to education, 76.7% were high school level and only 8.6% were bachelor's degree. With respect to occupation, 58.3% were employed others were students (20.2%). In addition, more than half (56.4%) were using corticosteroids by prescription from either pharmacists or doctors.

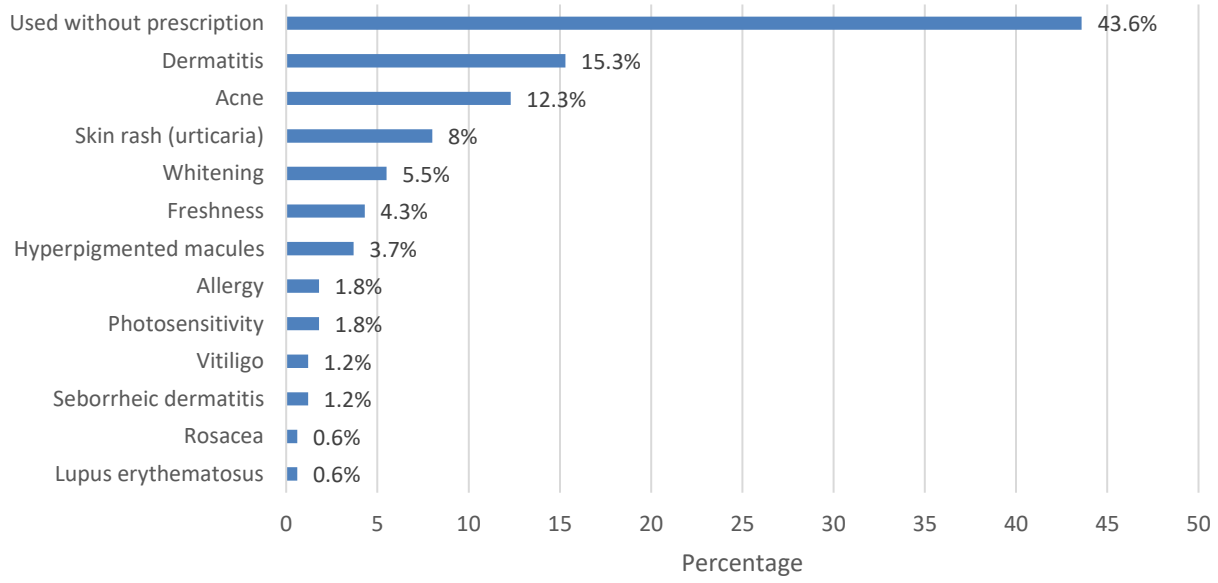

Figure 1 Medical condition treated by cortisone with prescription

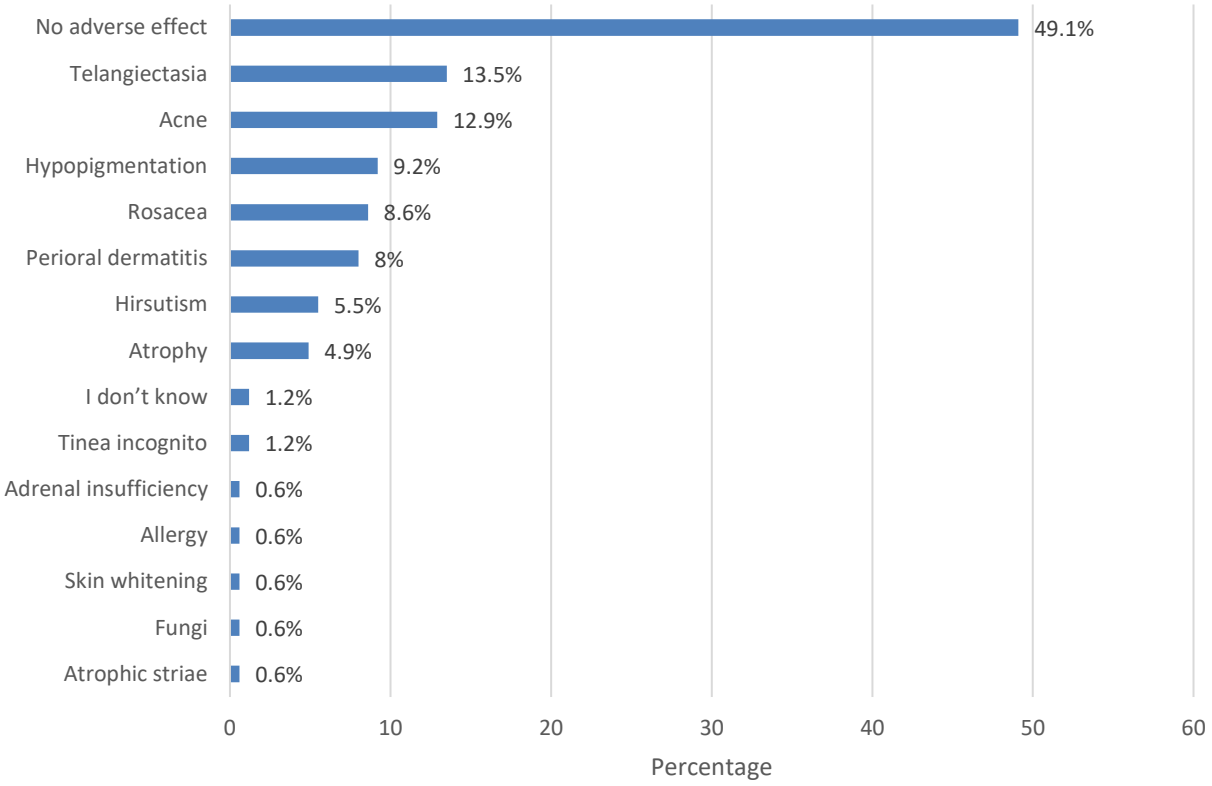

Figure 2 Adverse effect associated with using cortisone

In Figure 1, the most common condition treated by cortisone was dermatitis (15.3%), followed by acne (12.3%) and skin rash (8%). In Figure 2, the frequently mentioned side effect associated with using cortisone was Telangiectasia (13.5%), followed by acne (12.9%) and hypopigmentation (9.2%). In Figure 3, the most common symptom associated with cortisone use was skin dryness (44.4%), followed by erythema (38.9%) and burning or stinging sensation (22.2%).

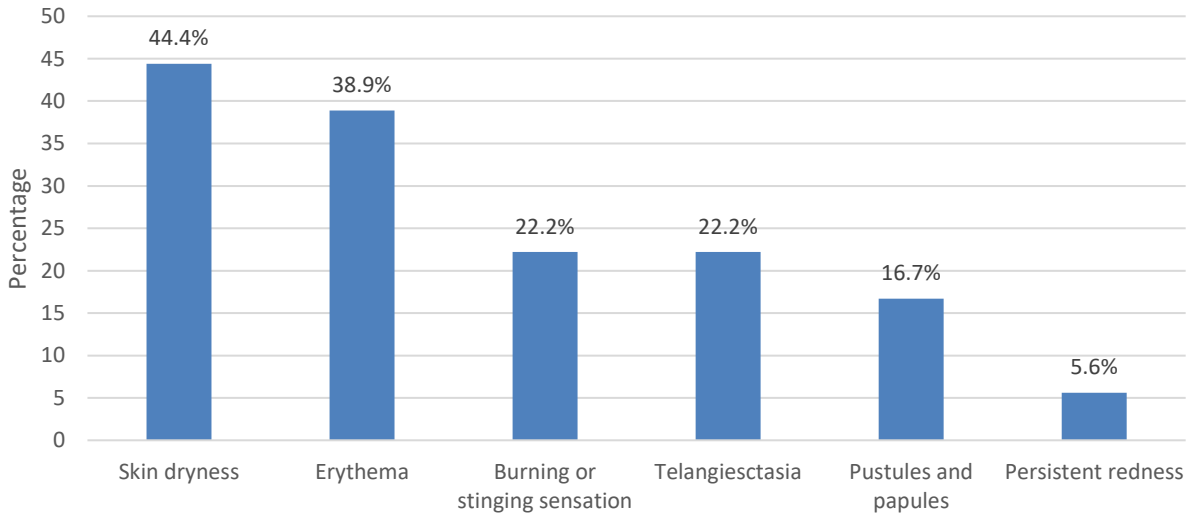

Figure 3 Cortisone induced symptoms associated with rosacea treatment

Table 2 Perception of participants regarding cortisone treatment (n=163)

Variables	N (%)
Did you know that the treatment you used was cortisone?	
Yes	137 (84.0%)
No	26 (16.0%)
What is the potency of corticosteroids that used?	
Low potency	37 (22.7%)
Moderate potency	57 (35.0%)
High potency	29 (17.8%)
Ultra-high potency	07 (04.3%)
I don't know	33 (20.2%)
Duration of use of cortisone	
Less than a week	47 (28.8%)
Week to month	71 (43.6%)
More than 1 to 3 months	26 (16.0%)
More than 3 months to 6 months	10 (06.1%)
More than 6 months to a year	02 (01.2%)
More than a year	07 (04.3%)
How many times a day is cortisone used?	
Only once a day	115 (70.6%)
Twice a day	43 (26.4%)
3 times a day	03 (01.8%)
More than 3 times	02 (01.2%)
Were you aware of the problems of cortisone treatments?	
Yes	69 (42.3%)
No	94 (57.7%)
Are you aware of all the creams that you use, or whether they contain cortisone?	
Yes	85 (52.1%)
No	78 (47.9%)
Do you have rosacea?	
Yes	18 (11.0%)
No	145 (89.0%)
Did the symptoms of rosacea increase with cortisone treatments? (n=18)	
Yes, they increased	12 (66.7%)
No, they decreased	06 (33.3%)
Have you stopped using cortisone treatments for rosacea? (n=18)	
Yes	10 (55.6%)
No	08 (44.4%)
If your answer is yes, did you stop using cortisone (n=10)	
Gradually	09 (90.0%)
Suddenly	01 (10.0%)
Relapse of the disease after stopping the	

cortisone treatment for rosacea? (n=10)	
Yes	06 (60.0%)
No	04 (40.0%)
If yes, the disease has increased after stopping the use of cortisone during (n=06)	
Less than a week	05 (83.3%)
A week	0
More than a week	01 (16.7%)
What was the reason for stopping the use of cortisone? (n=10)	
Symptoms disappear	06 (60.0%)
Symptoms got worse	01 (10.0%)
No improvement	03 (30.0%)

In Table 2, the prevalence of participants who were aware that they are using cortisone for treatment was 84% with moderate potency as the most common potency level (35%). Approximately 43.6% were using cortisone for a week to 1 month, mostly once per day (70.6%). 42.3% of participants knew that cortisone treatments could cause problems, while 52.1% knew that the cream being used might contain cortisone. The prevalence of participants who had been diagnosed with rosacea was 11%. Of them, 66.7% (n=12) expressed that the symptoms increase with cortisone treatment. Of those who were using cortisone for rosacea (n=18), 55.6% reported that they stopped using it gradually (90%) and 60% of them reported an incidence of relapse after stopping cortisone treatment after less than a week (83.3%). In 60 percent of cases, cortisone use was discontinued because symptoms disappeared.

Table 3 Relationship between the prolonged use of cortisone among the selected characteristics of participants (n=163)

Factor	Duration of cortisone use		P-value §
	≤1 month N (%) (n=118)	>1 month N (%) (n=45)	
Age group			
<40 years	70 (59.3%)	22 (48.9%)	0.289
≥40 years	48 (40.7%)	23 (51.1%)	
Occupational status			
Student	29 (24.6%)	04 (08.9%)	0.079
Employed	66 (55.9%)	29 (64.4%)	
Unemployed	23 (19.5%)	12 (26.7%)	
The recommendation to use corticosteroids was			
By prescription	70 (59.3%)	22 (48.9%)	0.289
Without prescription	48 (40.7%)	23 (51.1%)	
Did you know that the treatment you used was cortisone?			
Yes	96 (81.4%)	41 (91.1%)	0.156
No	22 (18.6%)	04 (08.9%)	
Frequency of cortisone per day			
Once per day	79 (66.9%)	36 (80.0%)	0.125
More than once per day	39 (33.1%)	09 (20.0%)	
Were you aware of the problems of cortisone treatments?			
Yes	52 (44.1%)	17 (37.8%)	0.485
No	66 (55.9%)	28 (62.2%)	
Are you aware of all the creams that you use, or whether they contain cortisone?			
Yes	61 (51.7%)	24 (53.3%)	0.863

No	57 (48.3%)	21 (46.7%)	
Do you have rosacea?			
Yes	12 (10.2%)	06 (13.3%)	0.582
No	106 (89.8%)	39 (86.7%)	
Adverse effect of using cortisone *			
Acne	19 (16.1%)	02 (04.4%)	0.047 **
Atrophy	07 (05.9%)	01 (02.2%)	0.447
Telangiectasia	12 (10.2%)	10 (22.2%)	0.044 **
Hypopigmentation	12 (10.2%)	03 (06.7%)	0.489
Perioral dermatitis	12 (10.2%)	01 (02.2%)	0.094
Rosacea	09 (07.6%)	05 (11.1%)	0.478
Tinea incognito	01 (0.80%)	01 (02.2%)	0.476
Hirsutism	06 (05.1%)	03 (06.7%)	0.693
Atrophic Striae	01 (0.80%)	0	0.536
Fungi	0	01 (02.2%)	0.104
Nothing happened	63 (53.4%)	17 (37.8%)	0.075
Skin whitening	0	01 (02.2%)	0.104
Allergy	01 (0.80%)	0	0.536
I don't know	0	02 (04.4%)	0.021 **
Adrenal insufficiency	0	01 (02.2%)	0.104

* Variable with multiple response answers. § P-value has been calculated using Chi-square test. ** Significant at p<0.05 level.

Using Chi square test, we evaluated the relationship between prolonged cortisone use and participant characteristics in Table 3. It was revealed that using cortisone for a long period (>1 month) significantly correlated with Telangiectasia as a side effect of cortisone use (p=0.044) and those who do not know any side effects of cortisone (p = 0.021) while the short duration of cortisone use (≤ 1 month) was significantly related with those who developed acne after using cortisone (p = 0.047). Other variables included in the test did not significantly influence the prolonged use of cortisone including age group, occupational status, recommendation to use corticosteroids, knowledge about the used treatment was cortisone, frequency of cortisone use per day, awareness about the problems of cortisone treatment, awareness of all the creams could contain cortisone and having rosacea (p >0.05).

Table 4 Relationship between the side effects of cortisone among the selected characteristics of participants (n=163)

Factor	Side effect		P-value §
	With side effect N (%) (n=83)	Without side effect N (%) (n=80)	
Age group			
<40 years	39 (47.0%)	42 (52.5%)	0.482
≥40 years	44 (53.0%)	38 (47.5%)	
Occupational status			
Student	16 (19.3%)	17 (21.2%)	0.479
Employed	46 (55.4%)	49 (61.2%)	
Unemployed	21 (25.3%)	14 (17.5%)	
The recommendation to use corticosteroids was			
By prescription	44 (53.0%)	48 (60.0%)	0.368
Without prescription	39 (47.0%)	32 (40.0%)	
What is the potency of corticosteroids that used?			
Low potency	18 (21.7%)	19 (23.8%)	0.408
Moderate potency	31 (37.3%)	26 (32.5%)	

High/Ultra-high potency	21 (25.3%)	15 (18.8%)	
I don't know	13 (15.7%)	20 (25.0%)	
Duration of cortisone use			
One month or less	55 (66.3%)	63 (78.8%)	0.075
More than 1 month	28 (33.7%)	17 (21.2%)	
Did you know that the treatment you used was cortisone?			
Yes	69 (83.1%)	68 (85.0%)	0.745
No	14 (16.9%)	12 (15.0%)	
Frequency of cortisone per day			
Once per day	56 (67.5%)	59 (73.8%)	0.379
More than once per day	27 (32.5%)	21 (26.2%)	
Were you aware of the problems of cortisone treatments?			
Yes	35 (42.2%)	34 (42.5%)	0.966
No	48 (57.8%)	46 (57.5%)	
Are you aware of all the creams that you use, or whether they contain cortisone?			
Yes	44 (53.0%)	41 (51.2%)	0.822
No	39 (47.0%)	39 (48.8%)	
Do you have rosacea?			
Yes	15 (18.1%)	03 (03.8%)	0.004 **
No	68 (81.9%)	77 (96.2%)	

§ P-value has been calculated using Chi-square test. ** Significant at p<0.05 level.

When measuring the relationship of having side effects in regards to the selected characteristics of participants, it was found that participants with having rosacea were more associated with having to develop side effects as a result of cortisone use (p=0.004). However, age group, occupational status, recommendation to use corticosteroids, potency level of corticosteroids, duration of cortisone use, knowledge about the treatment of cortisone, frequency of cortisone per day, awareness of problems brought by cortisone treatment and awareness that all creams might contain cortisone did not show a significant relationship with having side effect after using cortisone (p>0.05) (Table 4).

4. DISCUSSION

Topical steroids are frequently prescribed by dermatologists to treat several dermatological conditions. They are also found over the counter in Saudi Arabia, so they can lead to misuse without doctors' prescription which can result in unwanted side effects like rosacea like symptoms (Jha et al., 2016). The purpose of this study is to determine the prevalence and incidence of steroid induced rosacea and other side effects of steroids. Overuse of topical corticosteroids on the face can produce Skin complications like rosacea like eruptions. It is not only a medical problem that these patients suffer from, but it is also a social problem since they are usually prescribed steroids by friends and relatives for minor dermatoses like seborrheic dermatitis (Bhat et al., 2011).

In a study conducted by (Jha et al., 2016), out of 410 study patients, 306 were women (74.6%). Similar to our study, out of 163 participants, 94.5%were women. Caused by a cortisone treated condition, dermatitis (15.3%), followed by acne (12.3%) and rash (8%). Among the 410 patients, 33.6% were aged 20-29, similar to our study with 50.3% aged 40-59 years. Acne was the most common side effect of TC in the study (Jha et al., 2016). In our study, the frequently mentioned associated side effects with using cortisone were telangiectasia (13.5%), followed by acne (12.9%) and hypopigmentation (9, 2%). However, only 12.9% developed acne due to TC in our study compared with 42.9% in a study by (Jha et al., 2016). In our study, dry skin was the most common symptom associated with cortisone use (44.4%), followed by erythema (38.9%) and burning or stinging sensation (22.2%). Our study shows that 84% of the patients were aware that they were using a corticosteroids medications, it is a big difference when we compare it to a study conducted by (Karekar et al., 2020) in India where the percentage was only 5.5% and according to our study, there are very few differences between prescription and non prescription use of steroids, which does not negate the possibility that patients misuse the medications, steroid used By prescription 56.4% and Without prescription 43.6% and only 57.7% of the patients were not aware of the unwanted effects of corticosteroids which leads to unwanted side effects. In our study, almost half of the

patients had been using moderate potency followed by low potency steroids whereas (Karekar et al., 2020) reported that more than half of the patients had been using ultrahigh potency steroids and they were being prescribed by general practitioners, for conditions like tinea.

5. CONCLUSION

Using topical corticosteroids for a long period of time or misusing them can have a variety of side effects on the skin that may trigger rosacea or rosacea like symptoms in people who have never been diagnosed with rosacea before. The Patients may present with diffuse erythema with or without papules, pustules and sometimes nodules with telangiectasia. Treatment should begin with tapering of topical steroids, avoiding abrupt discontinuation of corticosteroids.

Limitations

Due to its cross sectional design and applied to only one centre, the results could not be reached generalized. Furthermore, the data was captured at a single point of time which means no follow up was done for participants. In other words, some side effects might appear after the period of the study. Authors urge prospective co relational studies to be conducted with good follow up of participants similar to the patients included in this study.

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Authors' contribution

Each author contributed to the data analysis and interpretation and they all contributed to the final draft's critical review and approval. They are also each accountable for the manuscript's content and similarity score.

Ethical approval

This study was approved by the research ethic committee, University of Hail, Saudi Arabia (H-2022-313).

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflict of interest

The authors declare that there is no conflict of interests

Data and materials availability

All data associated with this study are present in the paper.

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