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Awareness Regarding Corticosteroids use and Side Effects among Patients and Irrational Users in Gadarif, Sudan: A Cross-Sectional Study

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Abstract **Original Research Article**

Background: Corticosteroids are widely used medications essential for managing various autoimmune, allergic, and inflammatory conditions. However, their misuse and prolonged use can lead to significant adverse effects, necessitating careful considerations and proper use. ***Aims and Objectives***: To assess the awareness of corticosteroid use and side effects among patients and those using them irrationally, to explore behaviors related to their use, and to identify and report associated side effects. ***Materials and Methods***: A structured questionnaire was administered through interviews to collect data from a total of 300 participants. The data collection was conducted by a team of well-trained assistant researchers at Gadarif Teaching Hospital, Outpatient clinics, and cosmetic shops where steroidal products are sold. Data analysis was performed using SPSS version 27, employing standard descriptive and analytical statistics, While POWER BI was utilized for data visualization. ***Results***: The study found that misuse of corticosteroid was prevalent, and only (21.0%) of participants demonstrating adequate awareness of their side effects. There was a week positive correlation between education level and awareness. ***Conclusion***: Enhanced education and increased awareness of the appropriate use of corticosteroids, along with vigilance for potential side effects, are crucial to optimizing patient safety and outcomes.

Keywords: Corticosteroids, Awareness, Side effects, Steroids, Risks, Topical, Dexamethasone, Patients, Irrational users.

INTRODUCTION

Corticosteroids are a class of steroid hormones produced naturally in the body by the adrenal cortex [1]. They can also be synthesized for medical use and are broadly classified into two main categories: glucocorticoids and mineralocorticoids [1]. Glucocorticoids are commonly used to treat a variety of inflammatory, allergic, autoimmune, dermatological, and Ophthalmologic conditions, such as chronic obstructive pulmonary disease (COPD), asthma, rheumatoid arthritis, allergic rhinitis and eczema [2, 1]. These medications can be administered through various routes, including oral, intravenous, intramuscular, intra-articular, topical and inhaled [4]. They are also available in different formulations like tablets, capsules, creams, ointments, and inhalers to target specific conditions.

However, Prolonged or high-dose use of glucocorticoids can result in significant side effects, such as weight gain, osteoporosis, diabetes, hypertension, adrenal suppression, fluid and sodium retention, mood disturbances, immunosuppressive effects, skin changes, cataract formation, and increased intraocular pressure [5, 6].

In Gadarif City, there is widespread use of corticosteroids, with many patients lacking adequate awareness of their proper use and potential risks. Additionally, inappropriate practices have been observed, such as pharmacists dispensing corticosteroids, particularly prednisolone, as over-the-counter medications without a prescription. Moreover, it is common for women and teenagers to use potent corticosteroid-containing cosmetic product for skin-whitening, or to take corticosteroid tablets like dexamethasone for weight gain. These behaviors are influenced by societal perceptions that associate beauty with fair skin and obesity, further encouraged by marketing strategies from commercial companies and

traders who promote these products through mass media advertisements.

While steroid creams have become popular among girls for their quick, satisfying, albeit temporary effects, prolonged use can lead to serious adverse outcomes, including skin disorders, kidney disorders, diabetes, and others.

Despite the significance of this issue, the associated risks, and the noticeable lack of awareness, no previous studies or published research have explored corticosteroid awareness in Gadarif city. Therefore, there is an urgent need to investigate this issue to gather adequate information and develop effective interventions, solutions, and recommendations to enhance awareness and improve the quality of the healthcare system.

The primary objective of this study is to assess awareness regarding corticosteroid use and its side effects among patients and irrational users, and to explore their behaviors related to usage. Additionally, to identify and report the side effects associated with corticosteroid use.

MATERIALS AND METHODS

Study Design:

This study employed a cross-sectional design and was conducted from April to July 2024. The primary objective was to assess awareness regarding corticosteroid use and its side effects, explore behaviors towards usage, and document any resulting side effects. Participants, including both patients and individuals using corticosteroids irrationally, were interviewed using a self-designed questionnaire.

Sample Population:

The study population comprised adult patients and individuals who used corticosteroids for non-medical purposes. Patients were randomly selected from Gadarif Teaching Hospital and various outpatient clinics, including rheumatology, dermatology, respiratory, and thoracic clinics. Irrational users were identified from shops selling corticosteroid-containing cosmetic products and tablets illegally in the market. Data were collected by a team of well-trained assistant researchers. All data were collected from Gadarif city.

Data Collection:

Data were collected using a self-prepared questionnaire, developed with guidance from faculty members in the departments of Pharmacy Practice and Pharmacology, reviewed and validated by the Department of Community Medicine. The questionnaire covered demographic information (e.g. gender, age, education, employment, and marital status), indications for corticosteroid use, methods of administration, whether corticosteroids were prescribed or purchased over-the-counter (OTC), and the duration of use. It also included questions specific to female participants regarding pregnancy status to assess potential effects on the fetus. Additionally, the questionnaire included participants' experiences with corticosteroid side effects, assessed awareness levels, and perceptions and attitudes toward corticosteroid therapy.

Sample Size:

The sample size was estimated using the Richard Geiger equation, considering a population size of (N=450), based on the newly reported corticosteroid use cases at Gadarif Teaching Hospital. The margin of error was set at (d=0.05), with a confidence level of 95% (Z=1.96). The required sample size was calculated to be 66 participants. However, 300 participants were included in the study to obtain more comprehensive results, incorporating outpatient clinics, and individuals who used corticosteroids illegally for other purposes.

Statistical analysis:

Data were analyzed using SPSS software version 27. Descriptive statistics were employed to present variables in frequency and percentage tables. The Chi-square test was used to assess the association between demographic characteristics (such as gender and age) and awareness levels regarding side effects. Spearman's rho correlation was utilized to determine the correlation between awareness and educational level.

Ethical consideration:

This study was approved by the Research Ethical committee of the Ministry of Health and Social Development in Gadarif state, Sudan (Ref No: SMH.IRB.Q3.7.4.24), on the 7th of April 2024. Informed consent was obtained from all participants before their involvement in the interviews and questionnaire-based investigation.

RESULTS

Demographic characteristics

A total of 300 participants were involved in this study. Around (62.0%) of participants were females and only 38.0% were males. Most of participants (23.7%) were aged between 31-40 years. (49.0%) of participant educational level were involved university students and graduates, (31.0%) of them were secondary school, (10.3%) of them were the primary school only. Also, (7.7%) of participants were intermediate school and (2,0%) were un educated. About (47.7%) of them were unemployed, (33.0%) were employed and (19.3%) were students. The vast majority of the study participants (73.0%) were married, while only (27.0%) of them were single. Tables No (1) below:

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	114	38.0	38.0	38.0
	Female	186	62.0	62.0	100.0
	Total	300	100.0	100.0	

Age Range					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-20	19	6.3	6.3	6.3
	21-30	50	16.7	16.7	23.0
	31-40	71	23.7	23.7	46.7
	41-50	63	21.0	21.0	67.7
	51-60	59	19.7	19.7	87.3
	61 years and above	38	12.7	12.7	100.0
	Total	300	100.0	100.0	

Education					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Primary school	31	10.3	10.3	10.3
	Intermediate school	23	7.7	7.7	18.0
	Secondary school	93	31.0	31.0	49.0
	University	147	49.0	49.0	98.0
	Uneducated	6	2.0	2.0	100.0
	Total	300	100.0	100.0	

Employment					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Student	58	19.3	19.3	19.3
	Employed	99	33.0	33.0	52.3
	Unemployed	143	47.7	47.7	100.0
	Total	300	100.0	100.0	

Marital Status					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Single	81	27.0	27.0	27.0
	Married	219	73.0	73.0	100.0
	Total	300	100.0	100.0	

Indications of use and methods of administration:

The most commonly reported indication for corticosteroid treatment were Asthma, using it as cosmetic for whitening skin purposes, rheumatoid diseases and using it for having weight, accounting for 23.3%, 23.0%, 18.3% and 16.7% respectively.

The most commonly reported types of corticosteroid treatment were Prednisolone, Dexamethasone, Clobetasol, Betamethasone and Budesonide, accounting for 30.7%, 21.3%, 13.0%, 10.3% and 10.0% respectively. The prevalent reported route of administration were Oral tablets, topical creams and mouth sprays, accounting for 47.3%, 26.0% and 10.3% respectively. The study showed that the most of participants (67.3%) were used corticosteroids as over-the counter drugs without prescription, and only (32.7%) of them were used prescribed corticosteroids. Mostly of the over-the counter corticosteroids users around (39.3%) were purchased it from shops in the market illegally and about (28.0%) of them purchased it from pharmacy. The missing values that the software presented about (32.7%) is actually not missing values because they used prescribed corticosteroids as mentioned above and this question not applied for them. Tables No (2) below:

What are the cases or purposes that required corticosteroids treatment?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asthma	70	23.3	23.3	23.3
	Rheumatoid disease	55	18.3	18.3	41.7
	Severe allergy	26	8.7	8.7	50.3
	Chronic obstructive pulmonary disease	10	3.3	3.3	53.7

	Psoriasis	4	1.3	1.3	55.0
	Eczema	2	.7	.7	55.7
	Eye inflammatory conditions	14	4.7	4.7	60.3
	As cosmetic for whitening skin	69	23.0	23.0	83.3
	For having weight	50	16.7	16.7	100.0
	Total	300	100.0	100.0	

What kind of the following corticosteroids do you take?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prednisolone	92	30.7	30.7	30.7
	Hydrocortisone	9	3.0	3.0	33.7
	Methylprednisolone	19	6.3	6.3	40.0
	Betamethasone	31	10.3	10.3	50.3
	Dexamethasone	64	21.3	21.3	71.7
	Budesonide	30	10.0	10.0	81.7
	Mometasone	9	3.0	3.0	84.7
	Triamcinolone	4	1.3	1.3	86.0
	Clobetasol	39	13.0	13.0	99.0
	Flucinolone	2	.7	.7	99.7
	Others	1	.3	.3	100.0
	Total	300	100.0	100.0	

Which type of dosage form do you take?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oral tablets	142	47.3	47.3	47.3
	Intravenous Injection	9	3.0	3.0	50.3
	Intramuscular Injection	3	1.0	1.0	51.3
	Articular Injection	16	5.3	5.3	56.7
	Mouth Spray	31	10.3	10.3	67.0
	Topical Cream	78	26.0	26.0	93.0
	Eye Drops	14	4.7	4.7	97.7
	Nasal Spray	6	2.0	2.0	99.7
	Topical Ointment	1	.3	.3	100.0
	Total	300	100.0	100.0	

Corticosteroids that you use are:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prescribed	98	32.7	32.7	32.7
	OTC	202	67.3	67.3	100.0
	Total	300	100.0	100.0	

If the corticosteroid is purchased OTC:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	It purchased from a pharmacy	84	28.0	41.6	41.6
	It purchased from a shop (Poteck)	118	39.3	58.4	100.0
	Total	202	67.3	100.0	
Missing	System	98	32.7		
Total		300	100.0		

Period of steroids use:

The participants were asked about their period of corticosteroids use to study the relation of prolonged use with the severity of side effects, However, the most participants (63.7%) reported that they used corticosteroids treatment for more than 3 years, and (19.0%) of them were used corticosteroids for a period ranging between 1 year to 3years, and that's mean majority of participants were used steroids for long term. Table No (3) below:

How long have you been taking this corticosteroids ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 weeks	2	.7	.7	.7

	2 weeks-3months	24	8.0	8.0	8.7
	3 months-1year	26	8.7	8.7	17.3
	1year-3years	57	19.0	19.0	36.3
	More than 3 years	191	63.7	63.7	100.0
	Total	300	100.0	100.0	

Female corticosteroids users' conditions:

This part of questionnaire was just specialized for female conditions and were asked about if they used corticosteroids during pregnancy or not, so as to study the effect on the foetus. Only (5.0%) of the sample were pregnant and all their foetuses were got affected by corticosteroids. The SPSS showed missing values about (95.0%) but, actually these values not missing because (38.0%) of them were males who obviously excluded from this part of investigation, Also, (57.0%) of female were not pregnant and the case not applied on them. Tables No (4) below:

If female use corticosteroids :					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pregnant	15	5.0	8.1	8.1
	Not Pregnant	171	57.0	91.9	100.0
	Total	186	62.0	100.0	
Missing	System	114	38.0		
Total		300	100.0		

If used in pregnancy:					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	It affect the foetus	15	5.0	100.0	100.0
Missing	System	285	95.0		
Total		300	100.0		

Experience of corticosteroids side effects:

All participants of this study were experienced some side effects of corticosteroids. The most commonly reported side effects were weight gain, Diabetes, Face roundness (moon face), and hypertension, accounting for 57.3%, 51.7%, 44.0%, and 43.3%, respectively. The participants were asked about if they stop corticosteroids treatment at any stage due to side effects, however (94.7%) of them were stopped using at a stage, then were asked about if the they visit a doctor after the side effects or not, the results showed that (61.7%) of them were visited a doctor, around (26.7%) of the major doctor advices to participants were to stop using corticosteroids gradually, and (24.3%) of the advices were to decrease the dose. The missing values (38.3%) that appeared were not actually missing because these values include participants who did not visit the doctor. Tables No (5) below:

Have you had any of the following side effects since starting on corticosteroid treatment?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	300	100.0	100.0	100.0

Weight gain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	172	57.3	57.3	57.3
	No	128	42.7	42.7	100.0
	Total	300	100.0	100.0	

Hypertension					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	130	43.3	43.3	43.3
	No	170	56.7	56.7	100.0
	Total	300	100.0	100.0	

Diabetes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	155	51.7	51.7	51.7
	No	145	48.3	48.3	100.0
	Total	300	100.0	100.0	

Muscle weakness					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	93	31.0	31.0	31.0
	No	207	69.0	69.0	100.0
	Total	300	100.0	100.0	

Thin skin and easy bruising					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	80	26.7	26.7	26.7
	No	220	73.3	73.3	100.0
	Total	300	100.0	100.0	

Stomach upset / Gastric reflux					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	51	17.0	17.0	17.0
	No	249	83.0	83.0	100.0
	Total	300	100.0	100.0	

Face roundness (moon face)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	132	44.0	44.0	44.0
	No	168	56.0	56.0	100.0
	Total	300	100.0	100.0	

Swelling of feet / ankles					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	113	37.7	37.7	37.7
	No	187	62.3	62.3	100.0
	Total	300	100.0	100.0	

Thin bone and osteoporosis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	68	22.7	22.7	22.7
	No	232	77.3	77.3	100.0
	Total	300	100.0	100.0	

Change in body shape					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	76	25.3	25.3	25.3
	No	224	74.7	74.7	100.0
	Total	300	100.0	100.0	

Depression / mood disturbance					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	72	24.0	24.0	24.0
	No	228	76.0	76.0	100.0
	Total	300	100.0	100.0	

Kidney disorders					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	79	26.3	26.3	26.3
	No	221	73.7	73.7	100.0
	Total	300	100.0	100.0	

Glaucoma					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	1.3	1.3	1.3
	No	296	98.7	98.7	100.0
	Total	300	100.0	100.0	

Eye cataracts					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	7.0	7.0	7.0
	No	279	93.0	93.0	100.0
	Total	300	100.0	100.0	

Reddening of skin					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	71	23.7	23.7	23.7
	No	229	76.3	76.3	100.0
	Total	300	100.0	100.0	

Black patches on skin					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	58	19.3	19.3	19.3
	No	242	80.7	80.7	100.0
	Total	300	100.0	100.0	

Others					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	7.0	7.0	7.0
	No	279	93.0	93.0	100.0
	Total	300	100.0	100.0	

Did you stop corticosteroid at any stage because of the side effects?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	284	94.7	94.7	94.7
	No	16	5.3	5.3	100.0
	Total	300	100.0	100.0	

Did you visit a doctor after the side effects?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	185	61.7	61.7	61.7
	No	115	38.3	38.3	100.0
	Total	300	100.0	100.0	

Which of the following advices has the doctor given you?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	To decrease the dose	73	24.3	39.5	39.5
	To have other alternatives	4	1.3	2.2	41.6
	To have other treatment for side effects beside corticosteroids	28	9.3	15.1	56.8
	To stop using corticosteroid gradually	80	26.7	43.2	100.0
	Total	185	61.7	100.0	
Missing	System	115	38.3		
Total		300	100.0		

Awareness and attitude toward corticosteroids side effects:

The participants were asked about if they have former awareness of risks of corticosteroids or not to assess the level of awareness, thus the results showed that (79.0%) of them were not aware. Also, participants were asked about their attitude and perception toward corticosteroids therapy benefits versus side effects, however, the most common reported responses (82.0%) were yes referring that side effects worse than benefits of steroids. Tables No (6) below:

Did you have former awareness of risks of corticosteroids?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	63	21.0	21.0	21.0
	No	237	79.0	79.0	100.0
	Total	300	100.0	100.0	

With regard to corticosteroid treatment, do you think the side effects were worse than benefits from steroids?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	246	82.0	82.0	82.0
	No	54	18.0	18.0	100.0
	Total	300	100.0	100.0	

The relationship between gender and level of education.

Noticed that males had higher awareness results (55.6%) than females (44.4%) Table No (7) below:

Gender * Did you have former awareness of risks of corticosteroids? Crosstabulation					
			Did you have former awareness of risks of corticosteroids?		Total
			Yes	No	
Gender	male	Count	35	79	114
		Expected Count	23.9	90.1	114.0
		% within Gender	30.7%	69.3%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	55.6%	33.3%	38.0%
	female	Count	28	158	186
		Expected Count	39.1	146.9	186.0
		% within Gender	15.1%	84.9%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	44.4%	66.7%	62.0%
Total		Count	63	237	300
		Expected Count	63.0	237.0	300.0
		% within Gender	21.0%	79.0%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	100.0%	100.0%	100.0%

Chi-Square Tests					
	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.432[a]	1	.001		
Continuity Correction[b]	9.510	1	.002		
Likelihood Ratio	10.174	1	.001		
Fisher's Exact Test				.002	.001
Linear-by-Linear Association	10.397	1	.001		
N of Valid Cases	300				
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 23.94.					
b. Computed only for a 2x2 table					

The association between age and level of education

Participants aged 41-50 exhibited higher awareness score than others**.** Table No (8) below:

Age Range * Did you have former awareness of risks of corticosteroids? Crosstabulation					
			Did you have former awareness of risks of corticosteroids?		Total
			Yes	No	
Age Range	18-20	Count	6	13	19
		Expected Count	4.0	15.0	19.0
		% within Age Range	31.6%	68.4%	100.0%

		% within Did you have former awareness of risks of corticosteroids?	9.5%	5.5%	6.3%
	21-30	Count	14	36	50
		Expected Count	10.5	39.5	50.0
		% within Age Range	28.0%	72.0%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	22.2%	15.2%	16.7%
	31-40	Count	10	61	71
		Expected Count	14.9	56.1	71.0
		% within Age Range	14.1%	85.9%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	15.9%	25.7%	23.7%
	41-50	Count	30	33	63
		Expected Count	13.2	49.8	63.0
		% within Age Range	47.6%	52.4%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	47.6%	13.9%	21.0%
	51-60	Count	2	57	59
		Expected Count	12.4	46.6	59.0
		% within Age Range	3.4%	96.6%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	3.2%	24.1%	19.7%
	61 years and above	Count	1	37	38
		Expected Count	8.0	30.0	38.0
		% within Age Range	2.6%	97.4%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	1.6%	15.6%	12.7%
Total		Count	63	237	300
		Expected Count	63.0	237.0	300.0
		% within Age Range	21.0%	79.0%	100.0%
		% within Did you have former awareness of risks of corticosteroids?	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	50.470[a]	5	.000
Likelihood Ratio	53.746	5	.000
Linear-by-Linear Association	10.148	1	.001
N of Valid Cases	300		
a. 1 cells (8.3%) have expected count less than 5. The minimum expected count is 3.99.			

The correlation between educational level and awareness towards risks of corticosteroids

There was a weak positive correlation between education and awareness level. Table No (9) below:

Correlations				
			Education	Did you have former awareness of risks of corticosteroids?
Spearman's rho	Education	Correlation Coefficient	1.000	.286**
		Sig. (2-tailed)	.	.000
		N	300	300
	Did you have former awareness of risks of corticosteroids?	Correlation Coefficient	.286**	1.000
		Sig. (2-tailed)	.000	.
		N	300	300
**. Correlation is significant at the 0.01 level (2-tailed).				

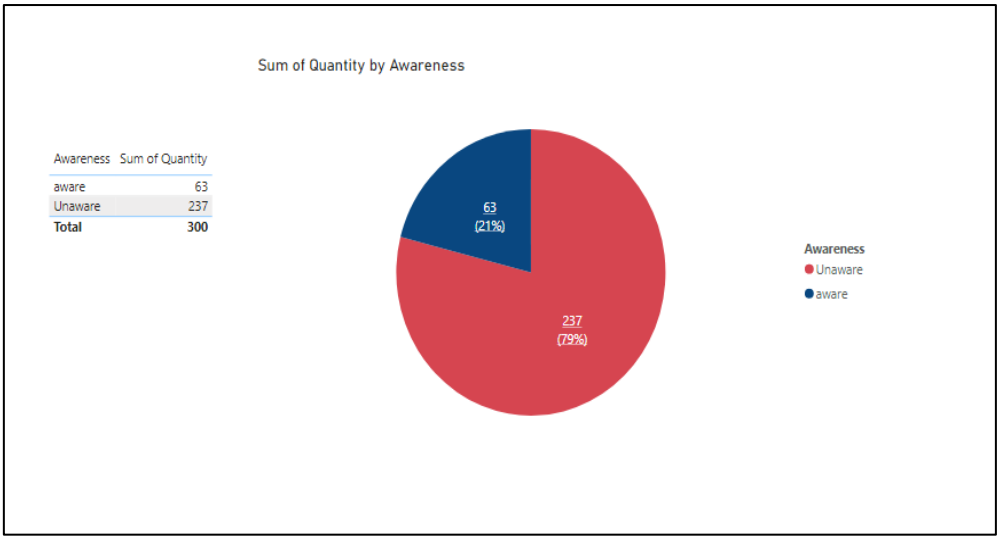

Fig-1: Demonstrate awareness regarding corticosteroids side effects (risks)

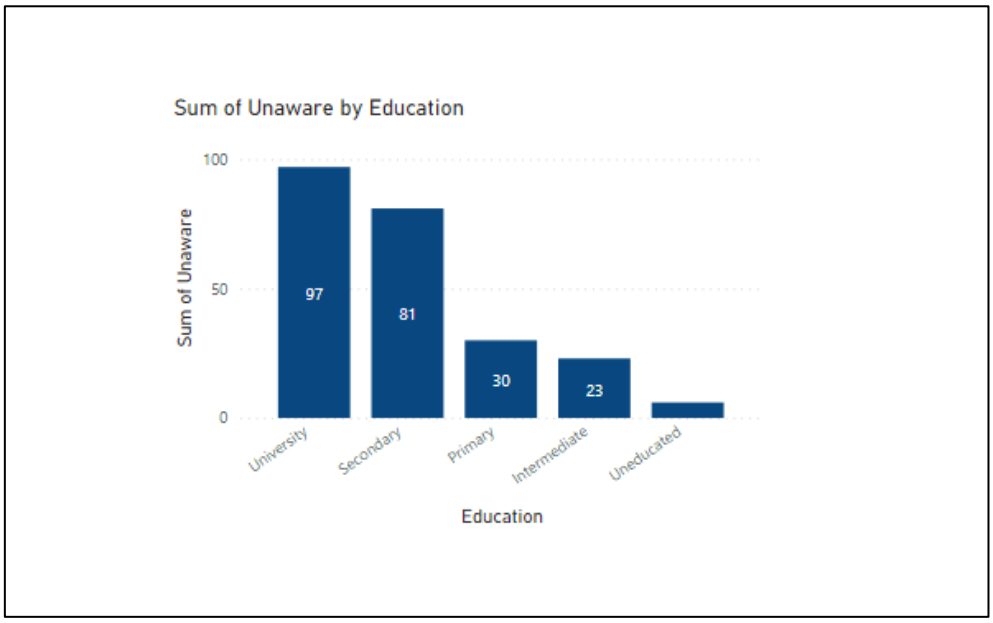

Fig-2: Demonstrate relation between unawareness score and educational level

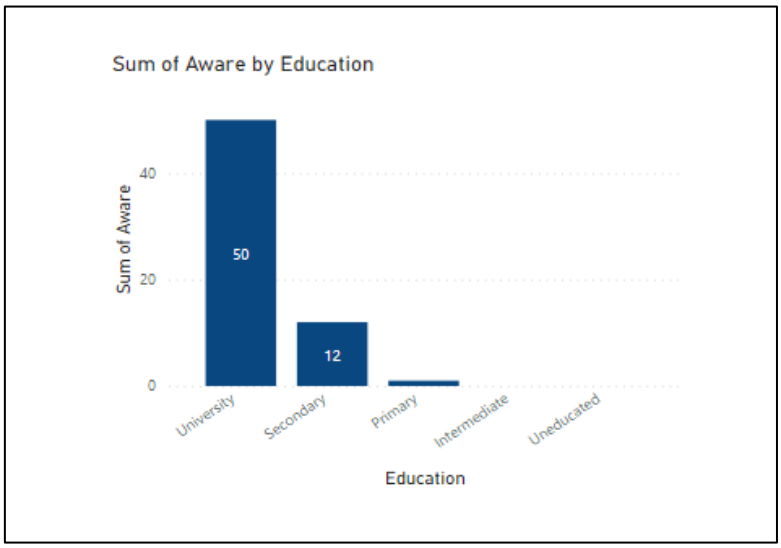

Fig-3: Demonstrate relation between awareness score and educational level

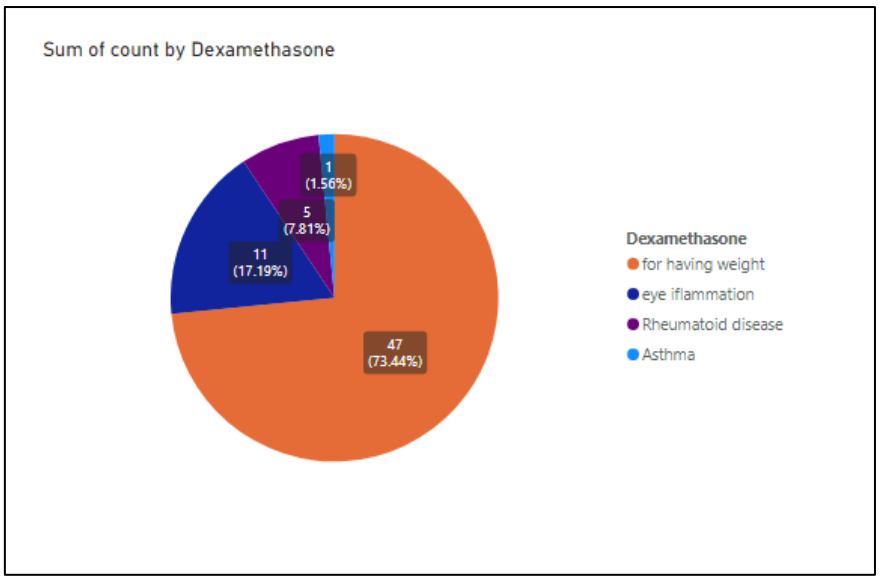

Fig-4: Demonstrate indications and purposes of Dexamethasone use

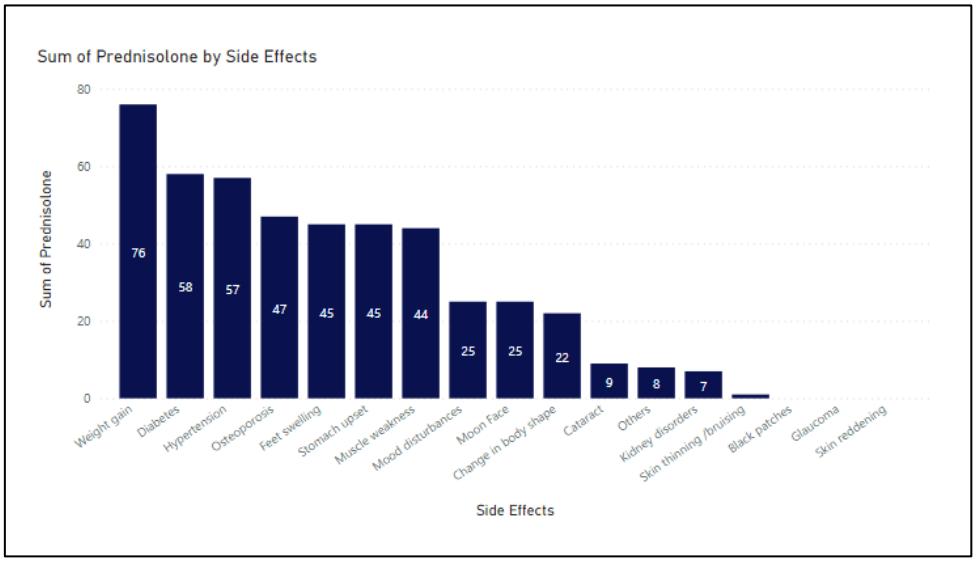

Fig-5: Demonstrate the count of side effects resulted from prednisolone

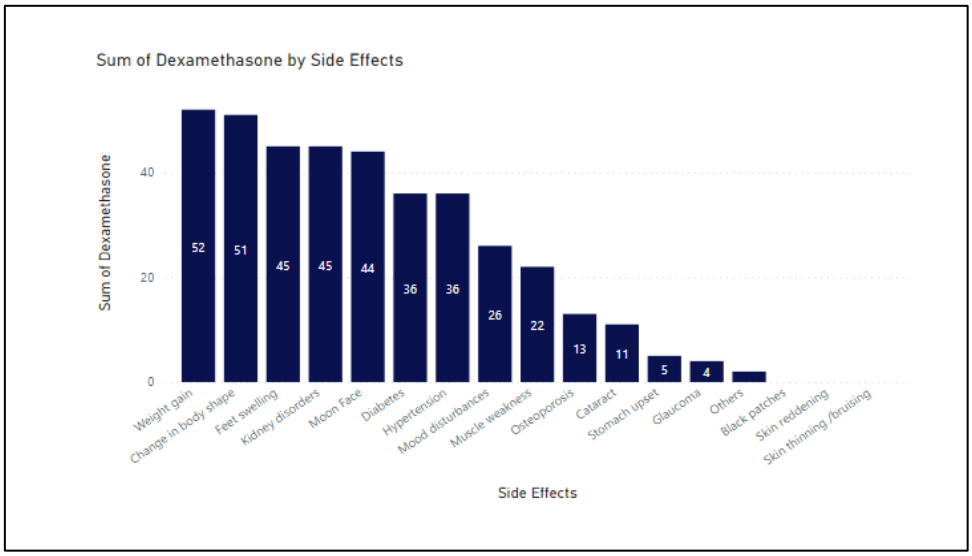

Fig-6: Demonstrate the count of side effects resulted from Dexamethasone

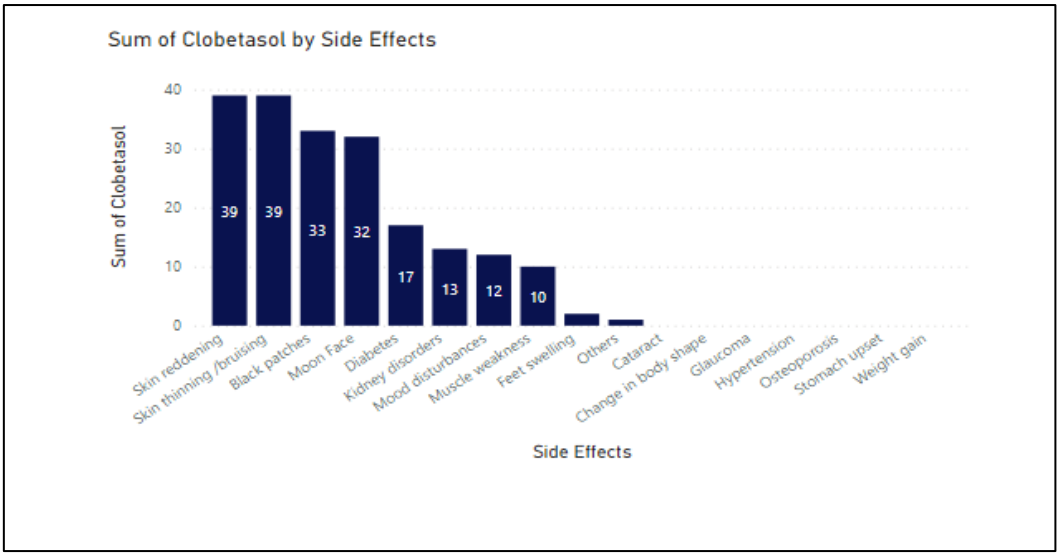

Fig-7: Allustrate the count of side effects resulted from clobetasol

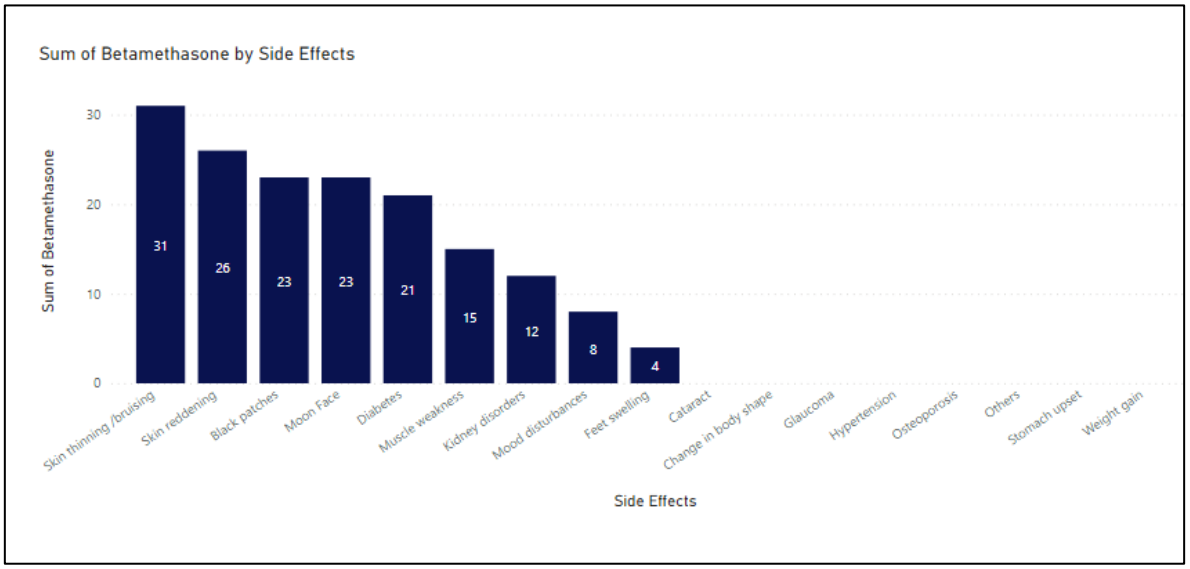

Fig-8: Allustrate the count of side effects resulted from Betamethasone

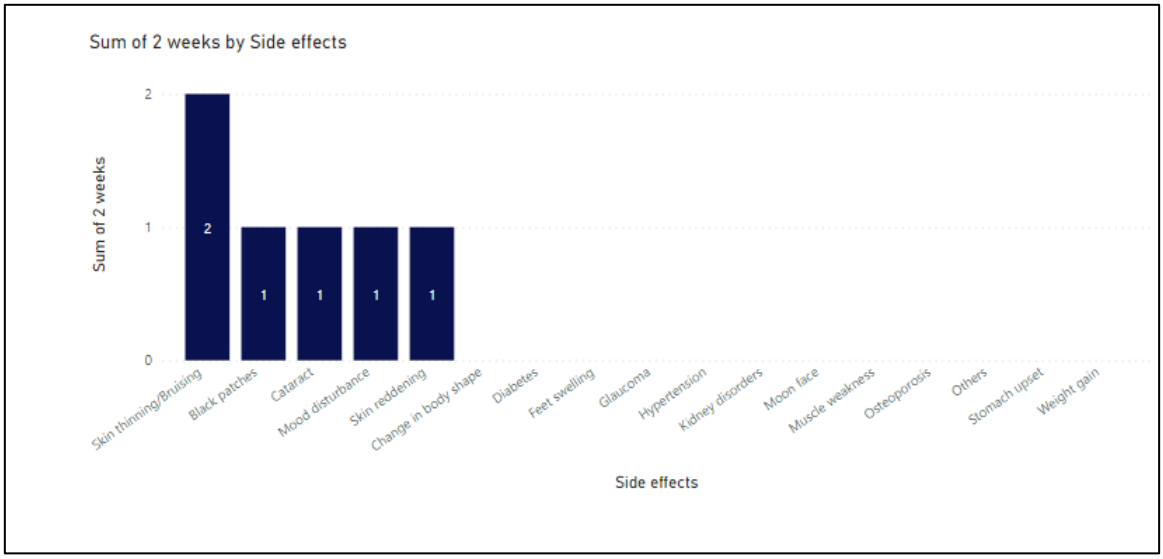

Fig-9: Allustrate the side effects resulted during the period of (2 week) of use

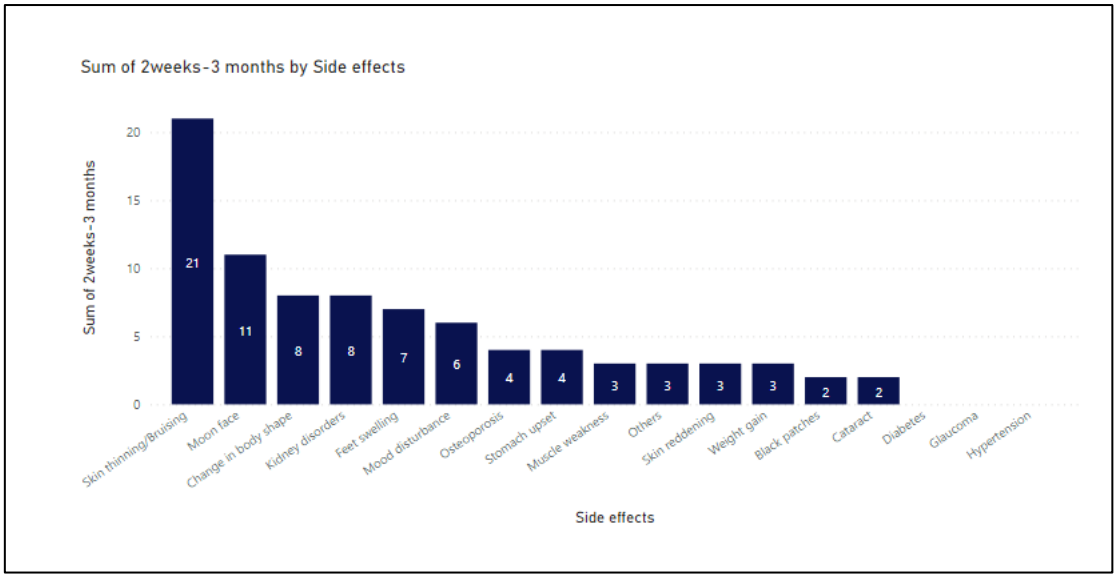

Fig-10: Allustrate the side effects resulted during the period (2 weeks- 3 months) of use

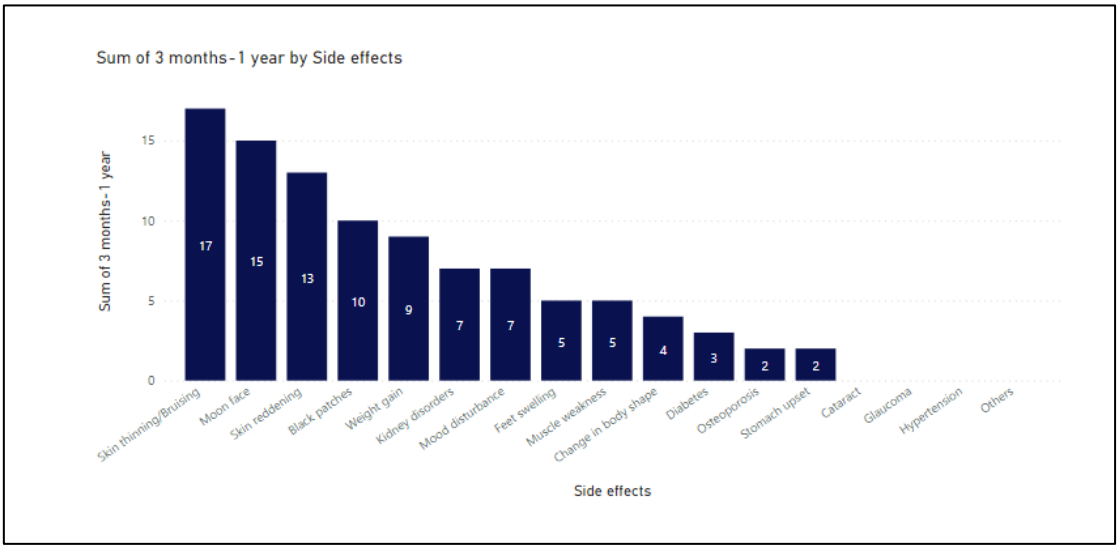

Fig-11: Demonstrate the side effects resulted during the period (3 months-1 year) of use

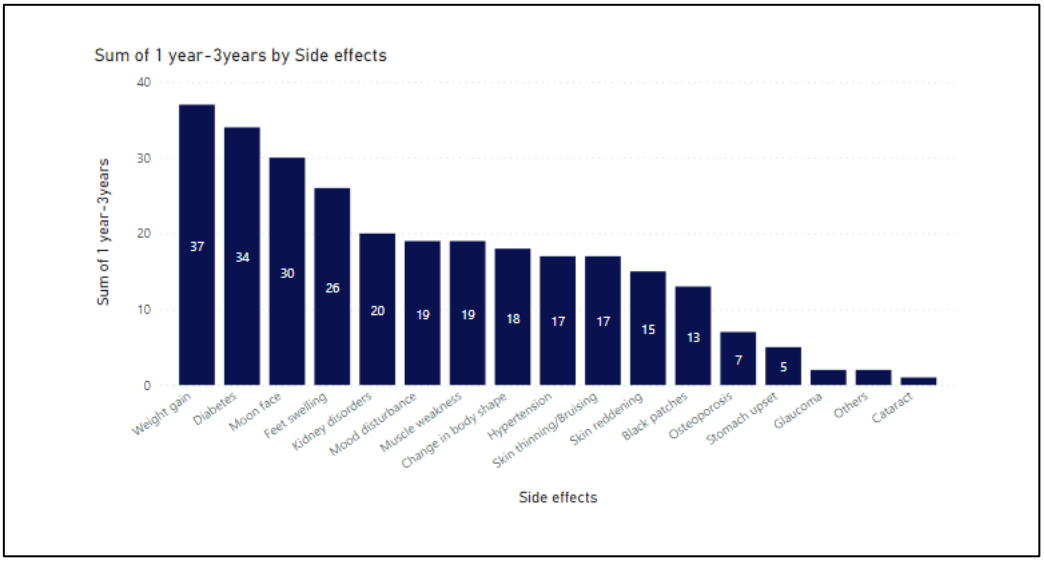

Fig-12: Demonstrate the side effects reported during the period (1 year-3 years) of use

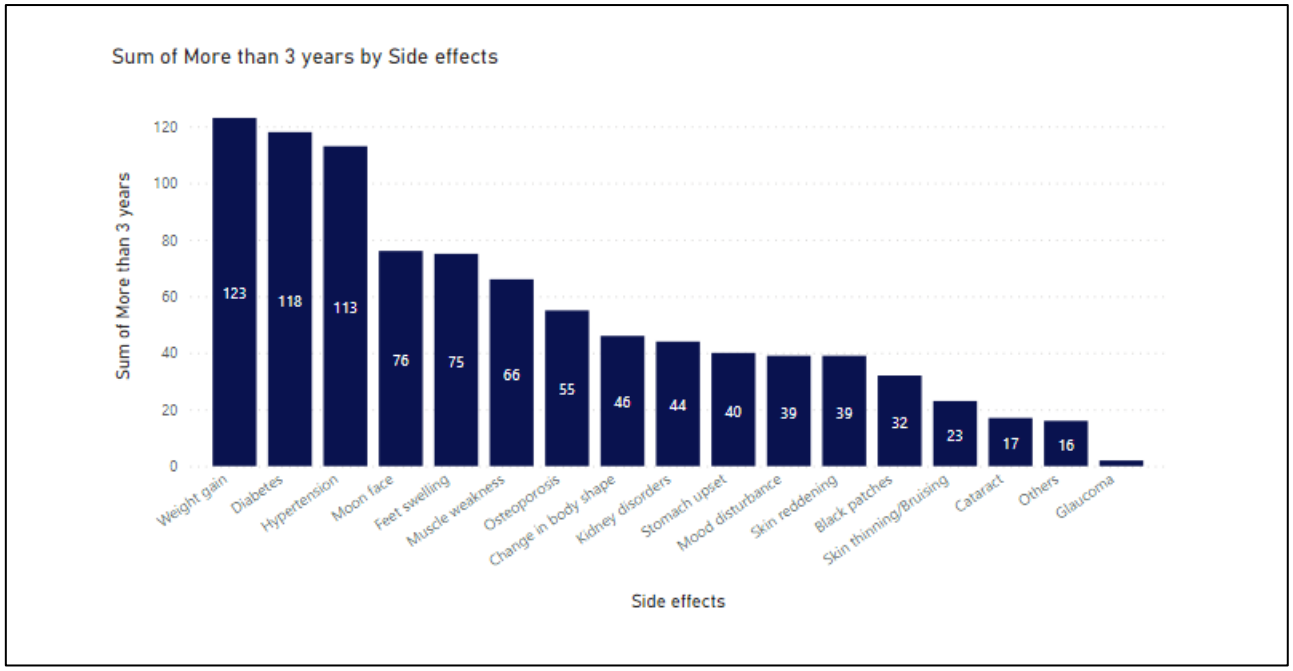

Fig-13: Demonstrate the side effects reported during the period (more than 3 years) of use

DISCUSSION

Corticosteroids are often regarded as a double-edged sword; while they are effective for managing various medical conditions, improper use can lead to serious adverse effects. Thus, awareness of proper use and potential side effects is crucial to minimizing these risks [11].

In Gadarif city, irrational use of corticosteroids has become a widespread problem. This study primarily aimed to assess awareness among patients and irrational users of corticosteroids, and to explore their behavior toward their use. Additionally, to identify and report the side effects resulted.

As observed from previous results, the study found that the most frequently reported indications for corticosteroid use were asthma (23.3%), cosmetic purposes for skin whitening (23.0%), rheumatoid disease (18.3%), and for weight gain (16.7%). Prednisolone (30.7%), Dexamethasone (21.3%), Clobetasol (13.0%), and Betamethasone (10.3%) were the most commonly used corticosteroids among participants. Oral tablets (47.3%) and topical creams (26.0%) were the most frequently reported methods of administrations.

A significant issue identified is the availability of corticosteroids without prescription in pharmacies and their illegal sale in markets. Approximately (67.3%) of participants reported purchasing corticosteroids as over-the-counter (OTC) medications, while only (32.7%) used them with a prescription. For example, Dexamethasone, a potent steroid, is widely available in markets, with 73.4% (47/64) of users taking it for weight gain, particularly among thin women (Figure 4). Due to a lack of awareness of its risks and prolonged use, serious side effects were reported, including: weight gain 81.2% (52/64), changes in body shape due to fluid accumulation 79.6% (51/64), feet swelling 70.3% (45/64), Kidney disorders 70.3% (45/64), moon face 68.7% (44/64), diabetes 56.2% (36/64), and hypertension 56.2% (36/64), and others. Therefore, noticed that the frequencies of side effects were significantly higher in comparison with the total count of dexamethasone use (64), as shown in (Figure 6).

Topical corticosteroids are also readily available in markets with different kinds and potencies, often used for skin whitening, a common practice among dark-skinned females, as seen in previous studies conducted in India and Senegal [3, 7, 8, 9]. In this study, Clobetasol and Betamethasone were the most reported topical steroids. Local side effects included skin thinning and easy bruising (26.7%), skin reddening (23.7%), and black patches (19.3%). Notably, skin thinning, bruising, and reddening appeared in 100% (39/39) of Clobetasol users, while black patches appeared in 84.6% (33/39) of users. Systemic side effects such as moon face 82.0% (32/39), diabetes 43.5% (17/39), and kidney disorders 33.3% (13/39) were also observed (figure 7). Similarly, among Betamethasone users, 100% (31/31) reported skin thinning and bruising, 83.8% (26/31) reported skin reddening, and 74.1% (23/31) reported black patches. The most common systemic side effects were moon face 74.1% (23/31), diabetes 67.7% (21/31), muscle weakness 48.3% (15/31), and kidney disorders 38.7% (12/31) (Figure 8).

These findings align with a study in Senegal where diabetes (46.3%) and hypertension (8.2%) were prevalent among women using topical steroids for cosmetic purposes [8]. Another study in Saudi Arabia found significant skin changes (21.8%) among

participants, including redness of the face, stretch marks, tender skin and bruising [1]. In India, facial acne (37.9%), plethoric face and telangiectasia (18.9%) were the most reported side effects of steroids [3].

The most frequent systemic side effects observed in this study were weight gain (57.3%), diabetes (51.7%), moon face (44.0%), and hypertension (43.3%). Previous research has shown that corticosteroids can cause insulin resistance in the liver, muscles, and adipose tissue, resulting in diabetes in about 20% of patients (range 10-60%) [10]. Another study demonstrated that hypertension occurs due to sodium retention [5].

Regarding corticosteroid use during pregnancy, 5.0% of the female participants reported using corticosteroids while pregnant, with all their fetuses reportedly affected. Furthermore, when participants were asked about medical consultations following side effects, (61.7%) visited a doctor; (26.7%) were advised to stop corticosteroids, (24.3%) to decrease the dose, 9.3% to receive additional treatment for side effects, and only (1.3%) to use alternative treatments.

Overall, the severity and likelihood of side effects can vary depending on dosage, duration of treatment, proper use, and individual patient factors. In this study, most participants (63.7%) used corticosteroids for more than three years, and it was observed that longer treatment duration increased the risk of serious side effects (figures 9,10,11,12,13). In addition to, using it irrationally without prescription and supervision of a doctor. Thus, all these factors result in serious and high score of side effects.

Unfortunately, the study revealed significant misuse, and poor awareness results regarding corticosteroid side effects among participants, with only (21.0%) aware of the risks (Figure 1). Statistical analysis showed that males had higher awareness (55.6%) compared to females (44.4%), and participants aged 41-50 exhibited greater awareness than others. A weak positive correlation was found between awareness and educational level (Tables 7, 8, 9), (Figures 2, 3). A previous study in Sudan examining awareness of oral corticosteroids use among rheumatoid disease patients, also reported poor awareness (53.0%) and a similar correlation between education and awareness [11]. Another prior study conducted in the United Arab Emirates (UAE) found poor knowledge, attitude, and practice among corticosteroid users [2].

In contrast, a study conducted in Saudi Arabia reported a generally good level of awareness, associated with demographic factors such as age, gender, and education [1]. Similarly, a previous study carried out in South Korea found appropriate knowledge of topical steroid use, but a lack of awareness about side effects [12].

Finally, most participants agreed that the side effects of corticosteroids outweighed their benefits, highlighting the need for increased awareness and education regarding their use.

CONCLUSION

Corticosteroids are highly effective for treating various medical conditions; however, improper use can lead to significant adverse effects. This study aimed to evaluate awareness regarding corticosteroid use and its associated side effects among patients and irrational users, and to report the side effects observed. A total of 300 participants from Gadarif Teaching Hospital, several outpatient clinics, and steroidal cosmetic shops in the market were included in the study. The findings indicated a high prevalence of corticosteroid misuse, with (67.3%) of participants using these medications without a prescription, and a very low awareness level about corticosteroid side effects (21.0%), with a weak positive correlation between awareness and educational level. Nevertheless, the most frequently reported side effects were weight gain (57.3%), diabetes (51.7%), moon face (44.0%), and hypertension (43.3%). To minimize these risks, it is crucial to implement awareness and educational programs focused on the proper use of corticosteroids and the potential side effects. Additionally, stringent controls should be established to regulate the dispensing of corticosteroids, ensuring they are only available with a medical prescription, and strict laws should be enforced to prevent illegal sales in markets. Furthermore, the use of corticosteroids should be carefully monitored and managed by healthcare professionals, particularly in cases of long-term or high-dose use, and patients should adhere to medical guidance.

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