

# Public awareness of side effects of systemic steroids in Asir region, Saudi Arabia

**Nouf Ahmed Alhammadi, Saud Mushabbab Mohammed Al Oudhah, Mofareh Ahmed Mofareh Asiri, Mohammed Abdullah Alshehri, Bassam Ahmed B. Almutairi, Abdullah Mohammed Abdullah Thalibah, Fahad Nasser Mohammed Asiri, Abdullah Saad Aldarani Alshahrani**

*Department of Medicine, College of Medicine, King Khalid University, Abha, Saudi Arabia*

## ABSTRACT

**Background:** Corticosteroids have been used since the 50s and it represent the most important and frequently used class of anti-inflammatory and immunosuppressive drugs for the treatment of several diseases such as numerous neoplastic, asthma, allergy, rheumatoid arthritis, and dermatological disorders. This study aims to determine the public awareness of side effects of systemic steroids in Asir region, Saudi Arabia. **Methods:** A descriptive cross-sectional web-based study was used. An online questionnaire was developed by the study researchers based on the literature review and consultations of the field experts. The questionnaire included the following components: Participants demographic data, medical history, and steroids use. Also, it covered participants awareness regarding systemic steroids and side effects. **Results:** A total of 439 participants fulfilling the inclusion criteria completed the study questionnaire. Ages ranged from 18 to 65 years with mean age of  $26.1 \pm 13.9$  years old, of those, 227 (51.7%) respondents were males. Around 346 (78.8%) had poor overall awareness level while only 93 (21.2%) had good awareness regarding systematic steroids. The study also showed that awareness was significantly higher among young aged participants in the health care field and among those who previously used steroids. Two hundred and eighty two (64.2%) of the respondents reported previous use of steroids. **Conclusion:** In conclusion, the current study showed that nearly one out of each five people know about systemic steroids and related side effects which is below the satisfactory level. Higher awareness was observed with regards drug associated side effects and long-term use consequences.

**Keywords:** Adverse effect, awareness, corticosteroids, knowledge, population, Saudi Arabia, steroids, use

## Introduction

Steroids are “magic drug”, which may show beneficial effect for all diseases. one globally, steroids are one of the most hugely used drugs as which is referenced from their high sales rates<sup>[1,2]</sup> More than 25 lakh people in US used oral steroids from the period

of 1999-2008<sup>[3]</sup> A corticosteroid taken by orally or given by injection are mostly called a systemic steroid. Systemic steroids are synthetic derivatives of the natural steroid, cortisol, produced by the adrenal glands, and have anti-inflammatory effects.<sup>[4,5]</sup>

Systemic steroids work in the same way as natural cortisol. Cortisol has significant effects on the body, including regulation of protein, carbohydrate, lipid and nucleic acid metabolism, inflammation and immune response, distribution and excretion of solutes water, and secretion of adrenocorticotrophic hormone (ACTH) from the pituitary gland.<sup>[6-8]</sup> Though, their

**Address for correspondence:** Dr. Nouf Ahmed Alhammadi, Department of Medicine, College of Medicine, King Khalid University, Abha, Saudi Arabia. E-mail: noufalhammadi10@gmail.com

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considerable efficiency is often counter-balanced by many adverse events.<sup>[9]</sup> These corticosteroid-related adverse events signify a wide clinical and biological issue from mild irritability to severe and life-threatening adrenal insufficiency or cardiovascular events.<sup>[10]</sup>

The most reported side effects that noticed in adults included osteoporosis and fractures,<sup>[11]</sup> hypothalamic-pituitary-adrenal (HPA) axis suppression,<sup>[12]</sup> cushingoid appearance and weight gain,<sup>[13]</sup> hyperglycemia/diabetes<sup>[14]</sup> cardiovascular diseases (CVD) and dyslipidemia, myopathy, cataracts and glaucoma, psychiatric disturbances; immunosuppression, as well as other gastrointestinal (GI) and dermatologic events.<sup>[15]</sup>

In spite of the increased current awareness of corticosteroid-induced complications and side effects,<sup>[16,17]</sup> the magnitude of this population at risk still unclear which may be reduced by improving public awareness regarding the drug and its related side effects. The objective of this study was to determine the public awareness of side effects of systemic steroids in Asir region, Saudi Arabia.

## Materials and Methods

A descriptive cross-sectional study was conducted to assess public awareness for systematic steroids and its related side effects in Asir region, Southern of Saudi Arabia. All residents who aged 18 years or more and live in Asir region with consented to participate in the study were included in the study. People who declined to consent, less than 18 years, or spoke a language other than Arabic were excluded from the study. An online questionnaire was developed by the study researchers after intensive literature review and expert's consultation. Questionnaire validity, clarity, and applicability were assessed independently by a panel of three experts. The final questionnaire was published using the social media platforms from March 2022 to October 15, 2022 participants were encouraged to participate in this study after ensuring confidentiality and explaining the significance of this research to the community. The questionnaire of this study included participants demographic data which includes age, gender, medical history, employment, education, and work. Part 2 covered participants awareness regarding systematic steroids use and related side effects in the form of general awareness, side effects, and consequences. Last section covered participants use and pattern of using steroids. All question had one correct answer. The questionnaire was uploaded online by the researchers till no more new answers were obtained. The approved by research ethical committee of the King Khalid university on 14-8-2022.

## Data analysis

The data were collected, reviewed and then fed to statistical package for social sciences version 21 SPSS: An IBM company. All statistical methods used were two tailed with alpha level of 0.05 considering significance if *P* value less than or equal to 0.05. Overall awareness level regarding systematic steroids was assessed through summing up discrete scores for different

correct knowledge items. The overall awareness score was categorized to poor level if participants score was less than 60% of the overall score and good level of awareness was considered if the participants score was 60% or more of the overall score. Descriptive analysis was done by prescribing frequency distribution and percentage for study variables including participants personal data, awareness items, and use of steroids while participants overall awareness level was graphed. Cross tabulation for showing distribution of participants' overall awareness level by their personal data and use of steroids was carried out with Pearson Chi-square test for significance and exact probability test if there were small frequency distributions.

## Results

Four hundred and thirty nine participants fulfilling the inclusion criteria completed the study questionnaire. Age ranged from 18 to 65 years with mean age of  $26.1 \pm 13.9$  years old. 51.7%

**Table 1: Bio-demographic data of study participants, Asir region, Saudi Arabia**

Bio-demographic data	No	%
Age in years		
18–25	214	48.7%
26–35	90	20.5%
36–45	81	18.5%
46–55	37	8.4%
56–65	17	3.9%
Gender		
Male	227	51.7%
Female	212	48.3%
Nationality		
Saudi	429	97.7%
Non-Saudi	10	2.3%
Educational level		
Elementary School	4	0.9%
Middle School	13	3.0%
High School	77	17.5%
Diploma or university	304	69.2%
Higher education	41	9.3%
Occupation		
Student	203	46.2%
Health practitioner	41	9.3%
Military	22	5.0%
Civilian job	105	23.9%
Others	68	15.5%
Marital status		
Single	254	57.9%
Married	163	37.1%
Divorced/widow	22	5.0%
Do you have any chronic diseases?		
None	343	78.1%
DM	38	8.7%
Asthma	30	6.8%
Eczema	23	5.2%
Psoriasis	14	3.2%
Rheumatoid arthritis	16	3.6%
SLE	1	0.2%

SLE=Systemic lupus erythematosus

respondents were males. 46.2% were students while 9.3% were health care practitioners. The most reported chronic health problems were Diabetes Mellitus (DM) 8.7%, asthma 6.8%, and eczema 5.2% while 78.1% had no chronic disease as shown in Table 1.

Public awareness regarding systematic steroid and related side effects, Asir region, Saudi Arabia. Generally, 47.2% of the respondents correctly know that steroids are anti-inflammatory drugs and only 18.9% know that its related side effects are common and mild. 19.8% know that gradual discontinuation is the proper way to discontinue the steroids. 52.4% know that vitamin D should added for long term course of steroids. Regarding side effects, delayed wound healing as a dermatological side effect was known for 30.8% of the participants, hyperglycemia was known for 37.4%, and thinning the bone density which increased risk of fractures was reported by 40.8% [Table 2].

Table 3. Public awareness regarding systematic steroid long-term use consequences, Asir region, Saudi Arabia. Twenty six percent of the participants know that central obesity as effect of long-term use of systematic steroids, 61.5% know about increased risk for Cataract and glaucoma, 65.4% know about depressed mode, 44.2% know about peptic ulcer, 46.9% know about increased risk for infection, 54.7% know about insomnia and anxiety. On the other hand, 43.5% know that steroids are not addictive.

Overall public awareness level of systematic steroids and related side effects, Asir region, Saudi Arabia. Three hundred and forty six (78.8%) had poor overall awareness level while only 93 (21.2%) had good awareness regarding systematic steroids [Figure 1].

Table 4. Steroid use among study participants, Asir region, Saudi Arabia. About 64.2% of participants reported previous use of steroids and about 53.5% used the drugs for less than

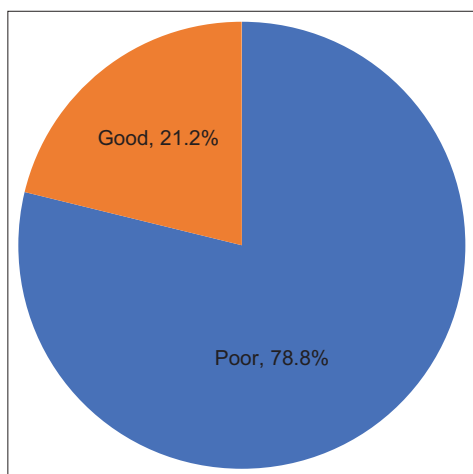


Figure 1: Overall public awareness level of systematic steroids and related side effects, Aseer region, Saudi Arabia

one week while 20 (12.7%) use for more than six months. Also, 48.8% users had the drug topically and 29.9% had oral steroids. The most reported reasons for using steroids were skin disease 28%, eczema 14%, allergic rhinitis 12.1%, and asthma 11.5% while 26.1% used the drug for other reasons.

Table 5. Factors associated with public awareness level regarding systematic steroids use and side effects. About 29.4% of participants aged less than 26 years had good awareness level for the drugs compared to 8.1% of those who aged 45–55 years with recorded statistical significance  $P = 0.001$ . Also, 39% of health care practitioners had good awareness level in comparison to 7.4% of unemployed group  $P = 0.001$ . Good awareness

Table 2: Public awareness regarding systematic steroid and related side effects, Asir region, Saudi Arabia

Domain	Awareness items	No	%	
General awareness	Do you know about the use of steroid?	Antibiotic	56	12.8%
		Anti-inflammatory	207	47.2%
		Analgesic	66	15.0%
		Antihypertensive	6	1.4%
		I don't know	104	23.7%
	Side effects of steroids	Common and mild	83	18.9%
		Common and severe	109	24.8%
		Rare but severe	59	13.4%
		Rare and mild	28	6.4%
		I don't know	160	36.4%
	If the steroids used locally, this can decrease the side effects	No	295	67.2%
		Yes	61	13.9%
	The proper way to discontinue the steroids	I don't know	83	18.9%
		Discontinuation immediately	166	37.8%
Discontinuation gradually		87	19.8%	
Vitamins that should added for long term course of steroids	Discontinuation when symptoms disappear	186	42.4%	
	Vitamin B6	127	28.9%	
	Vitamin B12	217	49.4%	
	Vitamin C	172	39.2%	
Side effects	Vitamin D	230	52.4%	
	Dermatological side effects of steroids	Acne	107	24.4%
		Eczema	85	19.4%
		Delayed wound healing	135	30.8%
Metabolic change can occur with steroids use	I don't know	184	41.9%	
	Hypotension	77	17.5%	
The effect of steroids on the bone	Hyperglycemia	164	37.4%	
	Weight loss	45	10.3%	
	I don't know	204	46.5%	
	Thinning the bone density which increased risk of fractures	179	40.8%	
	Increase the risk of bone infection	52	11.8%	
	I don't know	179	40.8%	
Both of them	29	6.6%		

**Table 3: Public awareness regarding systematic steroid long-term use consequences, Asir region, Saudi Arabia**

Long term use consequences	No	%
The effect of steroids on the weight with long term use	Generalized obesity	141 32.1%
	Weight loss	32 7.3%
	Central obesity	114 26.0%
	I don't know	152 34.6%
The steroid use for long period can cause vision problem	Cataract and glaucoma	270 61.5%
	No	169 38.5%
Long term use can lead to depressed mood	No	152 34.6%
	Yes	287 65.4%
Why do you think the patient on long course of steroids should take antacid drugs like omeprazole?	Risk of reflux esophagitis	128 29.2%
	Risk of peptic ulcer	194 44.2%
	Other	117 26.7%
Steroids increase the risk of infection	No	233 53.1%
	Yes	206 46.9%
Steroids cause insomnia or anxiety	No	199 45.3%
	Yes	240 54.7%
Steroids are addictive	No	248 56.5%
	Yes	191 43.5%

**Table 4: Steroid use among study participants, Asir region, Saudi Arabia**

Steroid use	No	%
Do you use steroid before?		
No	282	64.2%
Yes	157	35.8%
If yes for how long? <i>n</i> =282		
1 week or less	84	53.5%
1–4 weeks	35	22.3%
1–6 months	18	11.5%
More than 6 months	20	12.7%
What was the route of administration? <i>n</i> =282		
Topical	76	48.4%
Nasal spray	34	21.7%
Oral	47	29.9%
Reasons of using steroids <i>n</i> =282		
Skin diseases	44	28.0%
Eczema	22	14.0%
Allergic rhinitis	19	12.1%
Asthma	18	11.5%
Rheumatological diseases	9	5.7%
Facial palsy	4	2.5%
Others	41	26.1%

for systematic steroids was detected among 28.7% of single participants compared to 9.1% of divorced/widow group  $P = 0.001$ . Additionally, 29.3% of those who used steroids had good awareness for the drug versus 16.7% of non-users  $P = 0.002$ .

## Discussion

Prolong use of corticosteroid use is associated with numerous adverse effects.<sup>[18,19]</sup> Oral form of corticosteroids is used more frequently for chronic health conditions-such as rheumatoid

arthritis, topical form is used for dermatological problems, and inhaler for chronic obstructive pulmonary disease COPD.<sup>[20]</sup> While systemic corticosteroids are regularly used to manage acute attacks or exacerbations of serious diseases.

The current study aimed to assess public awareness of systemic steroids and its related side effects, which showed nearly one-fifth of the respondents had good awareness level regarding systemic steroids and related consequences. In more details, generally, less than half of the participants correctly know that steroids are anti-inflammatory drugs but less than one-fifth of them know that its related side effects are common and mild and also know that if the steroids used locally, this can decrease the side effects. Nearly one-fifth of the participants know that gradual discontinuation is the proper way to discontinue the steroids.

The study showed significantly higher awareness level among young aged participants in the health care field and among those who previously used steroids. In Saudi Arabia, similar results were reported by AlDhabbah *et al.*<sup>[21]</sup> who found that low level of awareness among participants “users and non-users” in King Fahd Specialist Hospital (KFSH) about the adverse effects of corticosteroids, and the awareness of users were higher than non-users. The most common source of knowledge for corticosteroids were relatives and friend 75.1%. Old age had significant association with good knowledge in contrast to the current study finding. Khan *et al.*<sup>[22]</sup> in Pakistan found that public protective measures against side effects of steroids long use were estimated to be about 19% while 81% were not aware. Awareness is significantly associated with occupation, attitude and practices,  $P < 0.05$ , while insignificantly associated with age, gender and knowledge,  $P > 0.05$ . Also, Alkhatim<sup>[23]</sup> in Sudan showed that 53% of their patient had poor knowledge of the oral corticosteroids’ adverse effects even those who had a health condition that needs this treatment.

## Conclusions and Recommendations

Our study showed that nearly one out of each five people know about systemic steroids and related side effects which are below the satisfactory level. Higher awareness was for drug associated side effects and long-term use consequences. Young age participants who work in the health care field and previously used steroids showed significantly higher awareness level. More efforts are needed to improve public awareness for these group of drugs to avoid its life-threatening adverse effects, through health education workshops/campaigns related to corticosteroid use, adverse event and prevention of complications.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

**Table 5: Factors associated with public awareness level regarding systematic steroids use and side effects**

Factors	Awareness level				P
	Poor		Good		
	No	%	No	%	
Age in years					
18–25	151	70.6%	63	29.4%	0.001* <sup>§</sup>
26–35	72	80.0%	18	20.0%	
36–45	75	92.6%	6	7.4%	
46–55	34	91.9%	3	8.1%	
56–65	14	82.4%	3	17.6%	
Gender					
Male	176	77.5%	51	22.5%	0.496
Female	170	80.2%	42	19.8%	
Nationality					
Saudi	339	79.0%	90	21.0%	0.490 <sup>§</sup>
Non-Saudi	7	70.0%	3	30.0%	
Educational level					
Below secondary	15	88.2%	2	11.8%	0.265 <sup>§</sup>
High school	66	85.7%	11	14.3%	
Diploma or university	233	76.6%	71	23.4%	
Higher education	32	78.0%	9	22.0%	
Occupation					
Student	144	70.9%	59	29.1%	0.001*
Health practitioner	25	61.0%	16	39.0%	
Non-health care practitioner	114	89.8%	13	10.2%	
Others	63	92.6%	5	7.4%	
Marital status					
Single	181	71.3%	73	28.7%	0.001*
Married	145	89.0%	18	11.0%	
Divorced/widow	20	90.9%	2	9.1%	
Chronic health problem					
Yes	80	80.8%	19	19.2%	0.581
No	266	78.2%	74	21.8%	
Do you use steroid before?					
No	235	83.3%	47	16.7%	0.002*
Yes	111	70.7%	46	29.3%	

P: Pearson  $\chi^2$  test, §: Exact probability test, \*P<0.05 significant

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