



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

<https://doi.org/10.5281/zenodo.17069121>Available online at: <http://www.iajps.com>

Research Article

PEDIATRICIANS' KNOWLEDGE AND PRACTICES REGARDING
CORTICOSTEROID USE IN THE WESTERN REGION OF SAUDI
ARABIA¹Wardah Alharthi, ¹Hind Alhumayani¹, ¹Hanaa Alrbeeai, ²Doaa Alhumayani,³Khaled Althobaiti, ⁴Muneer Aljumaie¹ Pediatrics, Children's Hospital, Taif, KSA² Pediatric Endocrinology, Children's Hospital, Taif, KSA³ Pediatric Pulmonology, Children's Hospital, Taif, KSA⁴ Pediatric Allergy and Immunology, Children's Hospital, Taif, KSA**Abstract:**

Introduction: Corticosteroids are potent medications widely used to treat various inflammatory, allergic, immunologic, and malignant conditions. Physicians must be aware of the diverse local and systemic side effects of corticosteroids, which may result from misuse or unrestricted availability. Therefore, this study aimed to assess pediatricians' knowledge and practices regarding corticosteroid use in the Western Region of Saudi Arabia, particularly in the city of Taif.

Methodology: This descriptive cross-sectional study involved 165 pediatricians practicing in the Western Region of Saudi Arabia, particularly the city of Taif, who were recruited using a convenient sampling method. The data were analyzed using SPSS Statistics (version 25.0). Regarding descriptive statistics, categorical variables are presented as frequencies (n) and percentages (%), and numerical variables are presented as means $\pm$ standard deviations. Regarding inferential statistics, the variables were compared between groups using independent sample t-tests and one-way analysis of variance. A p-value of <0.05 was considered statistically significant.

Results: This study included 165 participants. Two-thirds of the participants (n = 112, 67.9%) worked in Taif, and one-third (n = 53, 32.1%) worked outside Taif. Regarding the frequency of prescribing corticosteroids in the past year, 50 participants (30.3%) prescribed them for fewer than 10% of all patients. The mean knowledge score regarding corticosteroid use was 3.6 ± 1.9 . Knowledge level regarding corticosteroid use was significantly associated with age, years of practice, subspecialty, and board certification status.

Conclusions: This study revealed a gap in pediatricians' knowledge regarding corticosteroid use. Further research is needed to generate more evidence-based data. We recommend well-structured educational programs to enhance knowledge and improve clinical practice regarding corticosteroid use among pediatricians.

Keywords: Saudi Arabia, practices, knowledge, pediatricians, corticosteroids

Corresponding author:**Wardah Alharthi,**

Pediatrics, Children's hospital, Taif, SAU

wardah-15@hotmail.com**QR CODE**

Please cite this article in press Wardah Alharthi et al., *Pediatricians' Knowledge And Practices Regarding Corticosteroid Use In The Western Region Of Saudi Arabia*, *Indo Am. J. P. Sci*, 2025; 12(09).

INTRODUCTION:

Corticosteroids are potent medications widely used to treat various inflammatory, allergic, immunologic, and malignant conditions [1]. It has been estimated that at least 10% of all children require some form of glucocorticoids during their childhood [2]. According to population-based data, oral corticosteroids are commonly prescribed to children, particularly for non-life-threatening conditions which carry a 1.4- to 2.2 fold higher risk of GI bleeding, sepsis, and pneumonia in the first month after initiation of corticosteroid therapy [3]. Corticosteroids can be administered in various forms for both systemic and local conditions. However, they can cause numerous harmful side effects that may outweigh their benefits, including impaired growth, osteoporosis, and iatrogenic Cushing's syndrome [4]. Since administering exogenous glucocorticoids can suppress the hypothalamic-pituitary-adrenal axis, abrupt cessation or rapid withdrawal may result in adrenal insufficiency. This significant side effect of corticosteroids often presents asymptotically or with nonspecific symptoms such as fatigue, nausea, and abdominal pain [5]. Despite adrenal crisis being a preventable complication, it continues to be reported in children [6]. While it was initially believed that topical corticosteroids were highly effective with no or minimal systemic side effects, a broad range of both local and systemic adverse effects have been reported among users [7], which can result from their misuse and unrestricted availability, such as their use for non-labeled indications. Therefore, careful and responsible use is required by the prescriber and the patient or their caregiver [8-10]. For instance, a study at a tertiary hospital in India found that topical corticosteroids accounted for 28% of 500 prescriptions, with 85% lacking a clear indication [11]. A further study conducted in the Western Region of Saudi Arabia showed that 37.6% of participants used topical steroids without a clear medical indication, and 59.4% were unaware of their potential systemic side effects, revealing significant gaps in public awareness [12]. However, there are limited data on the use of corticosteroids among children in Saudi Arabia, and data regarding pediatricians' knowledge and clinical practices relating to corticosteroids are scarce. Pediatricians play a crucial role in the appropriate use of corticosteroids, and their level of knowledge directly influences clinical practice and raises parental awareness. By delving into this topic, this study aimed to fill a gap in existing research and contribute valuable information to the understanding of corticosteroid use in the Saudi context. It also aimed to offer practical recommendations that individuals and institutions can implement to address and mitigate the impact of corticosteroids on overall well-being.

Materials & Methods**Ethics approval**

This study received ethical approval from the Institutional Review Board of the Directorate of Health Affairs in Taif, Saudi Arabia (Approval No. 879). The participants were assured of the confidentiality and anonymity of the information they provided, and they received no financial compensation.

Study setting and participants

This descriptive cross-sectional study was conducted in the Western Region of Saudi Arabia, specifically in the city of Taif, which is situated in the mountainous area of the Hejaz region. It recruited 165 pediatricians working in various healthcare centers in the Western Region of Saudi Arabia using a convenience sampling approach. A self-administered online survey was widely distributed to the target population, as defined by the inclusion and exclusion criteria..

STUDY INSTRUMENT:

A structured questionnaire was used to assess participants' knowledge and practices, adapted with permission from a validated survey originally developed by Sekler et al. [13]. The original instrument, which was distributed among board-certified pediatricians in Israel to evaluate corticosteroid prescription practices and knowledge, was modified to align with the specific objectives and local context of the current research, while maintaining adherence to ethical standards. The questionnaire was structured into three domains. Part A consisted of nine demographic items, including age, sex, location of medical education, years of pediatric practice, current practice setting, board certification status, and presence of a subspecialty. Part B consisted of eight items assessing current clinical practices regarding corticosteroid use, based on estimated weekly patient volume, frequency of corticosteroid prescription, and the type and route of administration. Part C comprised nine items evaluating knowledge of corticosteroids, including their relative potency across various formulations (oral, topical, nasal, and inhaled), half-life, anti-inflammatory potency, and mineralocorticoid activity. The participants were also asked about their preferred methods for receiving continuing medical education on topics related to corticosteroids. To ensure content validity and clarity, the questionnaire was reviewed by three expert physicians in the field. It was revised based on their feedback, followed by further refinement of item content and survey structure. A total knowledge score was calculated based on the nine knowledge-based questions in Part C. Each correct answer was assigned a score of 1, resulting in a final score ranging from 0 to 9; a higher score indicated better knowledge.

Data collection

A self-administered online questionnaire was then distributed to pediatricians in all subspecialties of different nationalities and training levels working in private, military, and Ministry of Health (MOH) hospitals in the Western Region of Saudi Arabia, accompanied by an electronic informed consent.

Statistical analysis

The data were initially entered into and cleaned using Microsoft Excel before being analyzed using SPSS Statistics (version 25.0). Regarding descriptive statistics, categorical variables are presented as frequencies (n) and percentages (%), and numerical variables are presented as means $\pm$ standard deviations (SDs). Regarding inferential statistics, variables were compared between groups using independent sample t-tests and one-way analysis of variance. A p-value of < 0.05 was considered statistically significant.

RESULTS:

Study participants' demographic characteristics

Table 1: Participants' demographic characteristics

Variable	Taif (n = 112, 67.9%)	Outside Taif (n = 53, 32.1%)	Total (N = 165)
Age (years), n (%)			
<30	32 (28.6%)	15 (28.3%)	47 (28.5%)
30–40	47 (42.0%)	23 (43.4%)	70 (42.4%)
41–50	26 (23.2%)	4 (7.5%)	30 (18.2%)
51–60	5 (4.5%)	6 (11.3%)	11 (6.7%)
>60	2 (1.8%)	5 (9.4%)	7 (4.2%)
Sex, n (%)			
Male	57 (50.9%)	22 (41.5%)	79 (47.9%)
Female	55 (49.1%)	31 (58.5%)	86 (52.1%)
Number of years practicing as a pediatrician, n (%)			
<5	34 (30.4%)	23 (43.4%)	57 (34.5%)
6–10	32 (28.6%)	14 (26.4%)	46 (27.9%)
11–15	25 (22.3%)	3 (5.7%)	28 (17.0%)
16–20	13 (11.6%)	2 (3.8%)	15 (9.1%)
>20	8 (7.1%)	11 (20.8%)	19 (11.5%)
Where do you currently practice medicine?			
MOH hospitals	79 (70.5%)	40 (75.5%)	119 (72.1%)
Military hospitals	34 (30.4%)	6 (11.3%)	40 (24.2%)
Private hospitals	3 (2.7%)	7 (13.2%)	10 (6.1%)
University hospital	0	2 (3.8%)	2 (1.2%)

Overall, 109 (66.1%) participants were practicing only as a general pediatrician, 31 (18.8%) were practicing only their subspecialties, and 25 (15.2%) were practicing both. An overview of the participants' subspecialty distribution is provided in Figure 1.

This study included 165 participants. Two-thirds of the participants (n = 112, 67.9%) worked in the city of Taif, and one-third (n = 53, 32.1%) worked outside Taif. The most common age group was 30–40 years (n = 70, 42.4%), and more participants were female (n = 76, 52.1%) than male (n = 79, 47.9%). Moreover, about one-third (n = 57, 34.5%) had less than five years of experience as a pediatrician, and most (n = 119, 72.1%) were practicing medicine at Ministry of Health Hospitals (Table 1). In addition, just over two-thirds (n = 113, 68.5%) had attended medical school in Saudi Arabia. Furthermore, just over half (n = 87, 52.7%) were board certified, just under one-third (n = 49, 29.7%) were in progress, and almost one-sixth (n = 29, 17.6%) were general practitioners. While almost two-thirds (n = 107, 64.8%) were practicing as general pediatricians, only about one-third (n = 58, 35.2%) had a subspecialty, of which the most common were emergency medicine, pediatric intensive care unit (PICU), and neonatal intensive care unit (NICU; n = 12, 36.2%), followed by pulmonology (n = 9, 15.5%).

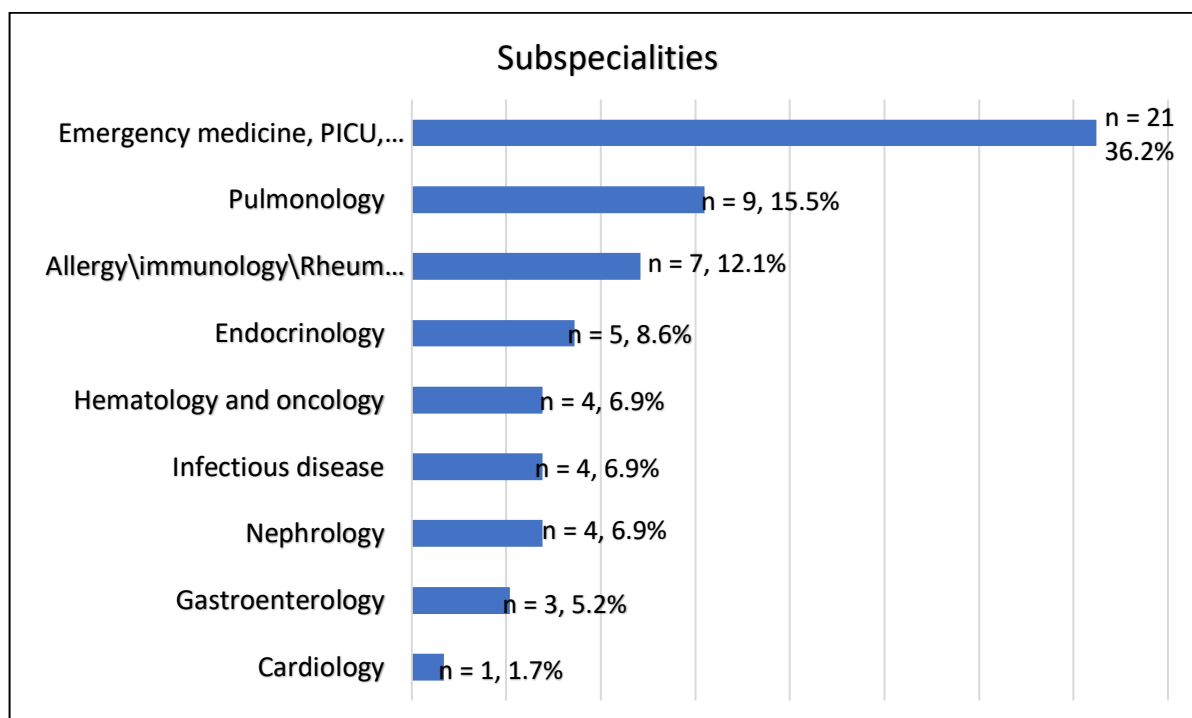


Figure 1: The numbers and percentage of participants from each subspecialty (N = 58)

Practice

Regarding corticosteroid prescribing practices (Table 2), just over one-third (n = 63, 38.2%) of the participants were seeing 30–60 patients per week on average. Regarding the frequency of prescribing corticosteroid in the past year, just under one-third (n = 50, 30.3%) reported prescribing it for fewer than 10% of their patients. Just over half (n = 85, 54.5%) reported administering a form of corticosteroid to patients with a moderate wheezing episode, with the preferred forms being oral and inhaled. In addition, almost three-quarters (n = 113, 74.8%) reported prescribing steroids to patients with skin rash, with the topical form being the most used. Moreover, over half (n = 84, 59.2%) reported sometimes prescribing corticosteroid to patients with allergic rhinitis, with the intranasal form being the most popular.

Table 2: Participants' practice of prescribing corticosteroids.

Statement	Answer	n	%
How many patients do you see per week on average?	<30	51	30.9
	30–60	63	38.2
	61–90	24	14.5
	91–120	7	4.2
	>120	20	12.1
Overall, in the past year, what percentage of your patients have been prescribed any formulation of corticosteroid?	<10%	50	30.3
	10%–20%	44	26.7
	20%–30%	35	21.2
	>30%	36	21.8
In patients with a moderate wheezing episode, how often do you administer any formulation of corticosteroid?	Never	7	4.5
	Sometimes	85	54.5
	Always	64	41.0
In patients with skin rashes, how often do you administer any formulation of corticosteroid?	Never	22	14.6
	Sometimes	113	74.8
	Always	16	10.6
In patients with allergic rhinitis, how often do you administer any formulation of corticosteroid?	Never	27	19.0
	Sometimes	84	59.2
	Always	31	21.8

Knowledge

Regarding knowledge about corticosteroids (Table 3), only 14 (8.5%) of the participants knew that betamethasone is the most potent oral steroid, 56 (33.9%) knew that betamethasone dipropionate ointment (0.05%) is the most potent among the mentioned topical steroids, 46 (27.9%) identified mometasone furoate as the most potent nasal steroid, and 71 (43.0%) knew the most potent inhaled form is Flixotide (fluticasone propionate). In addition, 106 (64.2%) knew that dexamethasone has the longest biological half-life/duration of action, and 99 (60.0%) knew that hydrocortisone has the shortest biological half-life. Moreover, 70 (42.4%) knew that hydrocortisone has an equal anti-inflammatory and mineralocorticoid potency. Furthermore, 47 (28.5%) knew that dexamethasone has no mineralocorticoid potency, while 84 (50.9%) identified the most potent mineralocorticoid drug as fludrocortisone.

Table 3: Participants correct responses to corticosteroid knowledge questions

Statement	Answer	n	%
Which of the following is the most potent oral corticosteroid?	Betamethasone	14	8.5
Which of the following is the most potent topical corticosteroid?	Betamethasone dipropionate ointment (0.05%)	56	33.9
Which of the following is the most potent nasal corticosteroid?	Mometasone furoate	46	27.9
Which of the following is the most potent inhaled corticosteroid?	Flixotide (fluticasone propionate)	71	43.0
Which drug has the longest biological half-life/duration of action?	Dexamethasone	106	64.2
Which drug has the shortest biological half-life/duration of action?	Hydrocortisone	99	60.0
Which of the following steroids has equal anti-inflammatory and mineralocorticoid potency?	Hydrocortisone	70	42.4
Which of the following has no mineralocorticoid potency?	Dexamethasone	47	28.5
Which of the following has potent mineralocorticoid activity?	Fludrocortisone	84	50.9

Of the participants, 157 (95.2%) agreed that it would be helpful to have continued medical education on corticosteroid, with online lectures (n = 101, 61.2%), case-based learning and tutorials (n = 95, 57.6%) being the most preferred methods for continued medical education (Figures 2 and 3).

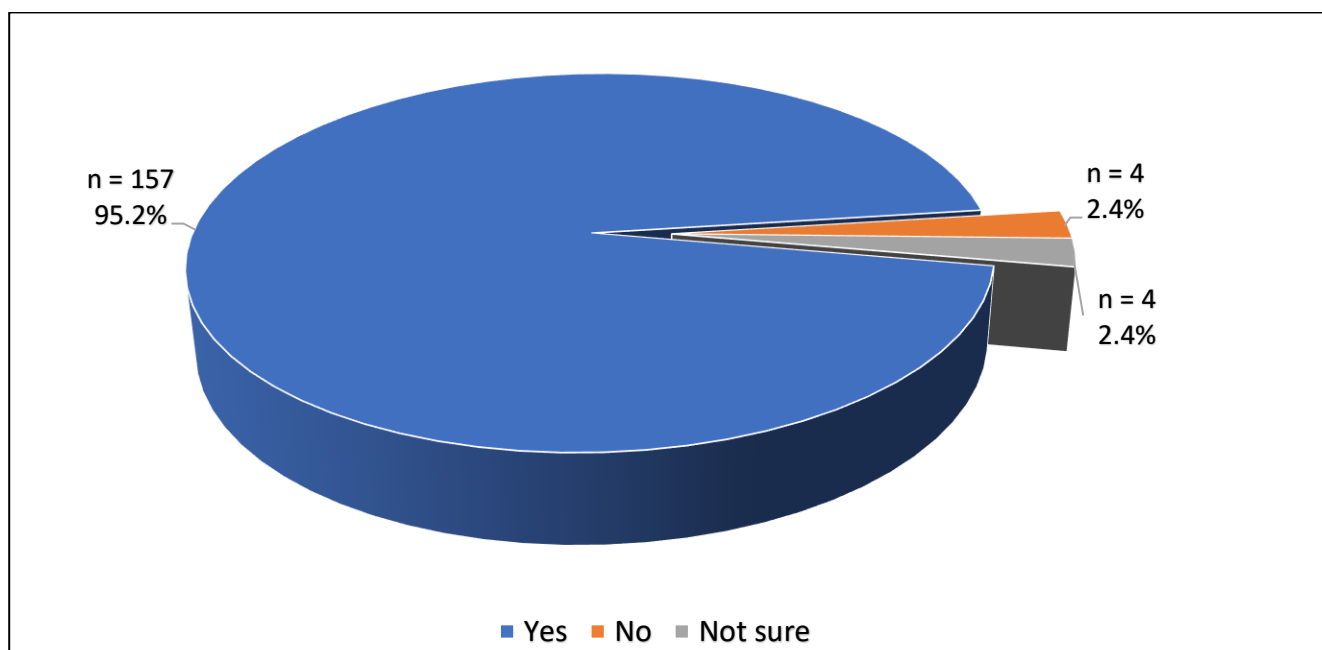


Figure 2: Participants' responses on the need for continued corticosteroid education

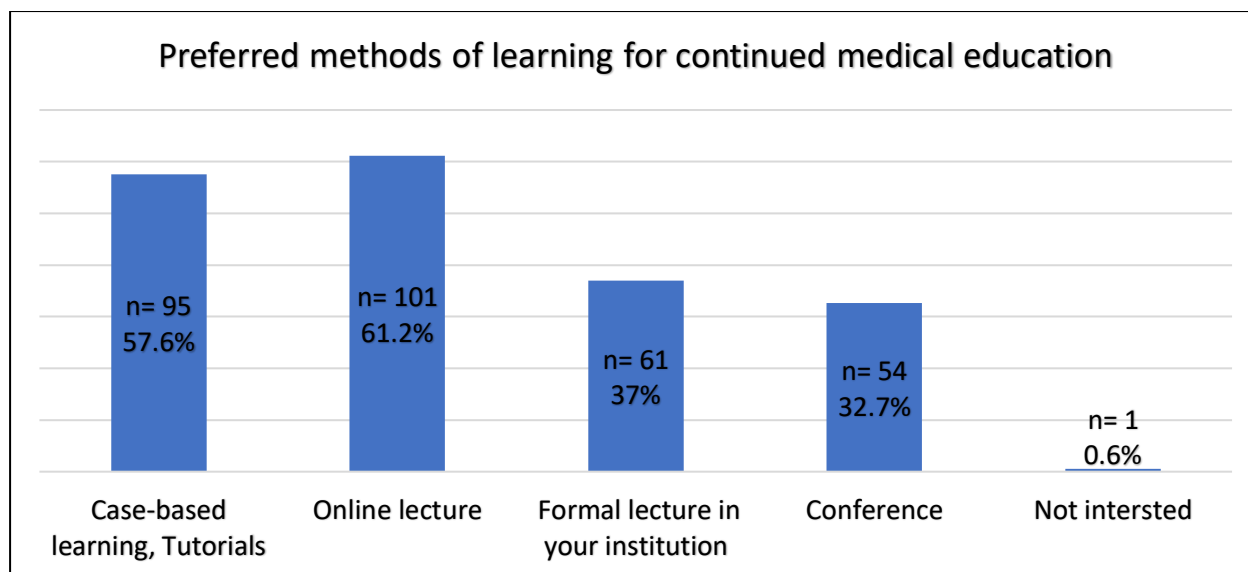


Figure 3: Participants' preferred learning methods for continued medical education

Factors associated with the level of knowledge

Among participants, the mean knowledge score was 3.6 ± 1.9 , which varied significantly by age ($F = 4.4$, $p = 0.002$), years of practice ($F = 4.4$, $p = 0.002$), subspecialty ($F = 2.4$, $p = 0.002$), and board certification status ($F = 6.8$, $p = 0.002$; Table 4).

Table 4: Comparative analysis of corticosteroid knowledge by different characteristics

Variable	Subgroup	Mean $\pm$ SD	df (1)	df (2)	F	p-value
Age (years)	<30	2.6 ± 1.9	4	16.	4.4	0.002
	30–40	4.0 ± 1.8				
	41–50	4.0 ± 1.8				
	61–60	3.6 ± 1.8				
	>60	4.0 ± 2.6				
Years of practice	<5	2.8 ± 1.9	4	160	4.4	0.002
	6–10	4.2 ± 1.7				
	11–15	3.9 ± 1.9				
	16–20	4.4 ± 1.9				
	>20	3.6 ± 2.1				
Board certification status	Board certified	4.1 ± 1.8	2	162	6.8	0.001
	In progress	2.9 ± 1.8				
	General practitioner	3.2 ± 2.2				
Subspecialty	Allergy\immunology\Rheumatology	5.4 ± 2.0	8	49	2.4	0.030
	Emergency medicine, PICU, NICU	3.6 ± 1.3				
	Infectious disease	4.8 ± 2.5				
	Gastroenterology	5.3 ± 1.2				
	Pulmonology	4.0 ± 1.3				
	Endocrinology	5.0 ± 2.6				
	Nephrology	3.0 ± 0.8				
	Hematology and oncology	2.3 ± 2.2				
	Cardiology	2.0 ± 0.0				

Note: df = degrees of freedom, df (1) = between groups, df (2) = within groups.

DISCUSSION:

While corticosteroids are key agents in pediatric care, their use requires careful clinical judgment, as improper prescribing can lead to serious short- and long-term adverse effects. Therefore, ensuring that pediatricians have a solid understanding of appropriate corticosteroid use is critical to optimizing patient outcomes and minimizing risks.

This study enrolled 165 pediatricians, of whom just over half ($n = 76$, 52.1%) were female and approximately one-third ($n = 57$, 34.5%) had less than five years of experience. These demographic characteristics may influence clinical decisions and familiarity with updated steroid guidelines.

Almost one-third ($n = 50$, 30.3%) of the participants prescribed corticosteroids to fewer than 10% of their patients, a noticeably lower rate compared to a previous Saudi study conducted among primary care physicians, where 89.6% of the participants reported using corticosteroid more frequently [14]. This discrepancy may stem from differences in the scope of practice, sample characteristics, or increased awareness of potential corticosteroid -related harms.

The participants favored oral and inhaled forms for patients with moderate wheezing episodes. This finding is consistent with previous studies suggesting that inhaled corticosteroid work just as well as oral corticosteroid, and may even be preferred, for treating mild to moderate wheezing in emergency settings [15]. For patients with skin rash, topical corticosteroids were predominantly used.

The participants' average knowledge score was 3.6 ± 1.9 out of 9, which is considerably lower than the 17.1 ± 5.5 reported in a previous study using a different scale [14]. This difference highlights the need for improved corticosteroid-related education among pediatricians in the Western Region of Saudi Arabia. Notably, while only 14 (8.5%) participants recognized betamethasone as the most potent oral steroid, 106 (64.2%) correctly identified dexamethasone's long half-life, and 99 (60.0%) recognized hydrocortisone's short duration of action. Moreover, the inclusion of "not sure" as a response option to the knowledge-based questions may have influenced these findings, as it could affect the interpretation of participants' actual knowledge levels.

Correlation analyses revealed that age, years of practice, subspecialty, and board certification status were significantly associated with the level of knowledge. Pediatricians aged >30 years, those with more than five years of experience, those who were board certified, and those specializing in allergy, immunology, or rheumatology demonstrated greater knowledge levels. These findings are consistent with previous literature, where physicians with

MBBS/MD and diploma certifications scored lower than board-qualified primary care physicians ($p < 0.05$), and family medicine physicians scored higher than general practitioners ($p < 0.05$) [14]. Recognizing these trends can help researchers and healthcare providers better understand corticosteroid use among pediatricians and develop targeted educational interventions to enhance knowledge and optimize patient care.

Only a limited number of studies have explored this topic in Saudi Arabia, making this study a valuable contribution to the existing evidence. One of its strengths lies in including pediatricians from diverse demographic and socioeconomic backgrounds, which may help decision-makers and healthcare leaders approach the issue from multiple perspectives. This study can also serve as a foundation for future research in this area. However, it is not without limitations. Firstly, this study was restricted to a single region, which may have introduced selection bias, limiting the generalizability of its findings. A larger, more geographically diverse sample, particularly with increased participation from areas outside Taif, would enhance the robustness of future studies. Secondly, it did not assess knowledge related to corticosteroid adverse effects or tapering plans. Thirdly, it did not fully evaluate the practical application of corticosteroid use.

Nonetheless, 157 (95.2%) of the participants expressed interest in continued medical education on corticosteroids, with online lectures ($n = 101$, 61.2%) and case-based learning ($n = 95$, 57.6%) being the most preferred formats. Overall, the insights from this study can support the development of context-specific strategies to ensure safer and more informed use of corticosteroids in pediatric settings across the Western Region of Saudi Arabia.

CONCLUSIONS:

This study found that the average knowledge score towards corticosteroids use was 3.6 ± 1.9 . In addition, only 50 (30.3%) participants prescribed corticosteroids to fewer than 10% of their patients. The participants preferred oral and inhaled forms for wheezing episodes and the topical form for skin rashes. We recommend well-structured educational programs and establish a clear protocol to guide pediatricians in the appropriate use of corticosteroids to ensure their safe and effective use in pediatric care.

Acknowledgments

The authors gratefully acknowledge the contributions of all individuals and institutions who supported and facilitated this study.

REFERENCES:

1. Coutinho AE, Chapman KE. The anti-inflammatory and immunosuppressive effects of glucocorticoids, recent developments and mechanistic insights. *Mol Cell Endocrinol.* 2011;355:2–13. <https://doi.org/10.1016/j.mce.2010.04.005>
2. Mushtaq T, Ahmed SF. The impact of corticosteroids on growth and bone health. *Arch Dis Child.* 2002;87:93–96. <https://doi.org/10.1136/ad.87.2.93>
3. Yao TC, Wang JY, Chang SM, et al. Association of Oral Corticosteroid Bursts With Severe Adverse Events in Children. *JAMA Pediatrics.* 2021;175:723–731. <https://doi.org/10.1001/jamapediatrics.2021.0453>
4. Fahad Aljebah, Imti Choonara, Sharon Conroy. Systematic Review of the Toxicity of Long-Course Oral Corticosteroids in Children. *PLOS ONE.* 2017;12:e0170259. <https://doi.org/10.1371/journal.pone.0170259>
5. Ahmet A, Mokashi A, Goldbloom EB, et al. Adrenal suppression from glucocorticoids: preventing an iatrogenic cause of morbidity and mortality in children. *BMJ Paediatr Open.* 2019;3:e000569. <https://doi.org/10.1136/bmjpo-2019-000569>
6. Shulman DI, Palmert MR, Kemp SF. Adrenal insufficiency: still a cause of morbidity and death in childhood. *Pediatrics.* 2007;119:484–494. <https://doi.org/10.1542/peds.2006-1612>
7. Saraswat A, Lahiri K, Chatterjee M, et al. Topical corticosteroid abuse on the face: a prospective, multicenter study of dermatology outpatients. *Indian J Dermatol Venereol Leprol.* 2011;77:160–166. <https://doi.org/10.4103/0378-6323.77455>
8. Coondoo A, Chattopadhyay C. Use and abuse of topical corticosteroids in children. *Indian J Paediatr Dermatol.* 2014;15:1–4. <https://doi.org/10.4103/2319-7250.131826>
9. Coondoo A, Phiske M, Verma S, Lahiri K. Side-effects of topical steroids: a long overdue revisit. *Indian Dermatol.* 2014;5:416–425. <https://doi.org/10.4103/2229-5178.142483>
10. Mahar S, Mahajan K, Agarwal S, Kar HK, Bhattacharya SK. Topical corticosteroid misuse: the scenario in patients attending a tertiary care hospital in New Delhi. *J Clin Diagnostic Res.* 2016;10:16–20. <https://doi.org/10.7860/JCDR/2016/23419.8986>
11. Rathi S. Abuse of topical steroid as cosmetic cream: a social background of steroid dermatitis. *Indian J Dermatol.* 2006;51:154–155.
12. Roblah TM, Baabdullah AM. Awareness and Knowledge of Adverse Effects of Topical Corticosteroids Among the General Population in Jeddah, Saudi Arabia. *Clin Cosmet Investig Dermatol.* 2023;16:3065–3075. <https://doi.org/10.2147/CCID.S421282>
13. Sekler O, Segev-Becker A, Interator H, et al. Paediatricians' practices and knowledge of corticosteroids: A national survey. *Acta Paediatr.* 2021;110(2):711–717. <https://doi.org/10.1111/apa.15841>
14. Alsukait SF, Alshamlan NM, Alhabees ZZ, Alsuwaidan SN, Alajlan AM. Topical corticosteroids knowledge, attitudes, and practices of primary care physicians. *Saudi Med J.* 2017;38(6):662–665. <https://doi.org/10.15537/smj.2017.6.17586>
15. Murphy KK, Hong IG, Wandalsen G, et al. Nebulized Inhaled Corticosteroids in Asthma Treatment in Children 5 Years or Younger: A Systematic Review and Global Expert Analysis. *J Allergy Clin Immunol Pract.* 2020;8(6):1815–1827. <https://doi.org/10.1016/j.jaip.2020.01.042>