



**ORIGINAL ARTICLE**

**Knowledge and Practice in Addressing Atopic Dermatitis Amongst Primary Care Physicians in The Kingdom of Bahrain- A Cross-Sectional Study**

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**Abstract**

**Background:** Atopic dermatitis is a chronic relapsing-remitting dermatosis commonly presented in primary healthcare facilities. Although there is no cure for atopic dermatitis, early diagnosis, and appropriate treatment are essential in the management of atopic dermatitis and in preventing its complications. Primary healthcare physicians are the first to encounter most patients with atopic dermatitis; hence, correct practices and knowledge of atopic dermatitis are important among primary healthcare physicians. This study aims to assess the knowledge and practice of primary healthcare physicians concerning diagnosing and treating patients with atopic dermatitis.

**Methods:** A cross-sectional study was conducted among primary health care physicians working at governmental primary health centers in Bahrain to determine the knowledge, attitudes, and practices towards atopic dermatitis. In addition, a self-administered online questionnaire was distributed among the participants using online surveys.

**Results:** A total of two hundred and eighty (n=280) primary healthcare physicians were recruited (response rate 80%). The average knowledge score (correct answers) was  $46.7 \pm 14.0$  out of 100. Being a general practitioner ( $P < 0.002$ ), having more years of experience ( $P = 0.044$ ), and being of older age ( $P = 0.003$ ) were significantly associated with a lower knowledge score. The study also showed a wide range of varying practices among participants in managing patients with atopic dermatitis.

**Conclusion:** There were significant variations in the knowledge and practice amongst primary care physicians towards atopic dermatitis that could delay the treatment of the condition and, therefore, possibly decrease treatment adherence. Conducting targeted educational interventions and developing strategies by dermatologists could minimize such gaps in practice and knowledge.

**Keywords:** Atopic, Dermatitis, Bahrain, Physicians, Primary Care

## Introduction

Atopic dermatitis is a chronic, inflammatory, and relapsing-remitting skin disease that results from a complex interaction between the immune system, epidermal barrier alterations, and environmental factors. There is a dramatic increase in the prevalence of the disease, which is often attributed to better access to medical care, improved detection, more significant epidemiologic reporting, and increasing environmental allergens.<sup>1</sup> Generally, atopic dermatitis is divided into two main categories: extrinsic and intrinsic. The extrinsic type of atopic dermatitis is associated with IgE-mediated sensitization. It affects around 70-80% of the patients, while intrinsic atopic dermatitis is unaffected by IgE-mediated sensitization and affects up to 20-30%.<sup>2</sup>

Atopic dermatitis often presents in early childhood and affects as many as 20% of children and 3% of adults worldwide.<sup>3</sup> The prevalence of atopic dermatitis has nearly tripled during the past decades in developing and developed countries. For instance, the prevalence of atopic dermatitis in Latin America and Africa was as high as 14%, reaching up to 27% in Asian-Pacific countries.<sup>4</sup> A parallel worldwide increase in atopic dermatitis-related adverse events and complications was concluded in phase III of the International Study of Asthma and Allergies in Childhood (ISAAC).<sup>5</sup> Clinically, atopic dermatitis presents characteristic features of pruritis, erythema, vesiculation, papules, exudation, excoriation, crusting, scaling, and sometimes lichenification.<sup>6</sup> Pruritus can be intractable, leading to severe physical and psychological consequences. Such consequences can be minimized once effective management is started.<sup>7</sup>

Management of atopic dermatitis aims to control the disease, minimize exacerbations, prevent further dermatological manifestation, and improve the patient's quality of life, all while minimizing the adverse effects of treatment. Topical corticosteroids are first-line management in treating atopic dermatitis. However, their use should not replace the daily liberal use of moisturizers. In addition, topical calcineurin inhibitors such as Pimecrolimus and Tacrolimus, as well as phosphodiesterase-4 inhibitors like Crisaborole, are used as second-line

therapy for immunocompetent patients who are two years of age and older, diagnosed with moderate-to-severe atopic dermatitis.<sup>8</sup> In addition, ultraviolet A (UVA), ultraviolet B (UVB), or combined UVA and UVB phototherapies are effective options in treating refractory cases of atopic dermatitis and as second or third-line treatments.<sup>9</sup> Furthermore, non-sedating antihistamines can be used during the day to stop the itch-scratch cycle and to reduce the secreted histamine in the skin layers, while sedating antihistamines should be used before bedtime. Nonetheless, no strong studies support the usefulness of these agents.<sup>10</sup> Some guidelines recommend against using systemic antihistamines to treat pruritis caused by atopic dermatitis.<sup>11</sup> Dupilumab is a monoclonal antibody that inhibits Interleukins 4 and 13, which block the release of inflammatory cytokines and IgE. It is administered subcutaneously and approved by the FDA for use in adults and children above six years with moderate-to-severe disease.<sup>12</sup> Additionally, Tralokinumab selectively inhibits IL-13, resulting in a response similar to Dupilumab.<sup>13</sup>

Primary healthcare physicians are the first to encounter most patients with atopic dermatitis; hence, they are crucial in managing the disease efficiently. Nevertheless, studies consistently show that most healthcare professionals, particularly general practitioners, express inadequate knowledge about dermatological diseases and the available treatments; therefore, they require more training in dermatology. For example, a study conducted in Abha City in Saudi Arabia showed that almost two-thirds (69.5%) of primary care physicians had insufficient knowledge regarding common dermatological disorders. In contrast, around 4.8% had excellent knowledge, and 21.9% had good knowledge.<sup>14</sup> Another study in Jeddah city in Saudi Arabia revealed that 93.9% of primary care physicians needed more understanding of prevalent dermatological conditions (scored less than 60% of all tested questions).<sup>15</sup> Furthermore, a study in Cameroon concluded that the general level of practice was inadequate in 50% of medical personnel. In comparison, the level of knowledge about atopic dermatitis was adequate in 65% of medical personnel.<sup>16</sup>

According to some studies, multiple physician-related factors were associated with greater knowledge of atopic dermatitis, such as having specific training in dermatology, encountering a higher number of patients diagnosed with atopic dermatitis, and, in some, female physicians.<sup>16,17</sup> In Bahrain, a study showed that the prevalence of atopic dermatitis was around 10% in 2014, consistent with other population-based studies worldwide.<sup>18</sup> With the increase of atopic dermatitis worldwide, the study aims to assess the knowledge and practice of primary care physicians working in governmental sectors at Primary Care Health Centers concerning AD and identify whether their knowledge of atopic dermatitis requires strengthening. This study would directly impact management and disease outcomes and determine the areas dermatologists should focus on during training and teaching. To the best of our knowledge, no study has assessed the knowledge and practices of primary health care physicians regarding atopic dermatitis in Bahrain.

## Methods

### *Study design, setting, and population*

A cross-sectional study was conducted among primary healthcare physicians working at governmental health centers in Bahrain between August and October 2021. Bahrain has five health regions, twenty-eight primary health care facilities, and 350 primary health care physicians. The research committee in primary health care approved the protocol of this study.

### *Inclusion and exclusion criteria*

All primary healthcare physicians (general practitioners and family physicians) from the five regions were eligible to participate, including Bahraini and Non-Bahraini physicians. However, family practice tutors, family practice residents currently in the training program, and those with incomplete responses were excluded from the study.

### *Data collection tool and procedure*

The primary investigator developed a self-administered online questionnaire based on the literature review of similar studies. Then, a panel of two family physicians and one dermatologist reviewed the questionnaire for content and

appropriateness. All panel members agreed that the items in the questionnaire were sufficient to measure the domains of interest. Then, a pilot study was conducted among ten family physician tutors, and the feedback was considered in preparing the questionnaire. The questionnaire comprised of three main parts: demographic data, physicians' knowledge of diagnosing and managing atopic dermatitis, and their current practice methods. All participants were contacted through the head of the primary healthcare sector by email. The questionnaire was sent to all participants as a Google form, a free online survey-creating website. Participants' confidentiality was maintained by not including any questions pertaining to their identity.

### *Data analysis*

SPSS 26 Software program was used for data entry and analysis. Frequencies and percentages were computed for the categorical variables, while means and standard deviations were computed for the knowledge score overall and its relation to the demographical characteristics. Cross-tabulation with the Chi-Square test was done to investigate the association between two categorical variables. Independent samples t-test or Mann-Whitney test was used to determine whether the two groups significantly differed in the mean score. Analysis of variance (ANOVA) or Kruskal-Wallis tests were used to determine whether there was a significant difference in mean score between more than two groups. Finally, the correlation was calculated using the correlation coefficient ( $r$ ) to compare continuous variables. A  $p$ -value of less than 0.05 was statistically considered significant in all statistical tests.

## Results

### *Baseline characteristics of the participants*

A total of two hundred and eighty ( $n=280$ ) primary healthcare physicians from different health regions completed the questionnaires (response rate 80%). The mean age of the participants was 41.2 ( $\pm 9.9$ ) years, and the mean years in practice were 14.6 ( $\pm 9.2$ ) years. Most participants were females (77.5%) and board-certified family physicians (85.7%). Around 20% of the physicians had a clinical experience of more than 20 years, while around one-third had a clinical experience of fewer

than 10 years. Participants reported that lectures in medical schools, rotations during medical school, and family practice residency programs were the most common types of exposure to dermatology (97.1%, 93.6%, and 88.9%, respectively). Table 1 presents the demographic characteristics of the study population.

**Table 1:** Baseline characteristics of primary care physicians (Total = 280)

Baseline Characteristics of the Participants		n (%)
Age (yrs), mean $\pm$ SD		41.2 $\pm$ 9.9
< 35 years		98 (35)
Age category	35 - 45 years	103 (36.8)
	>45 years	79 (28.2)
Sex, females		217 (77.5)
Years of Experience, mean $\pm$ SD		14.6 $\pm$ 9.2
<10 yrs.		108 (38.6)
Years of Experience	10-20 yrs.	109 (38.9)
	> 20 yrs.	63 (22.5)
Professional title	Consultant family physician	126 (45)
	Family physician	114 (40.7)
	General practitioner with a diploma/ master's degree	16 (5.7)
	General practitioner	24 (8.6)
Type of exposure to dermatology	Lectures in Medical School	272 (97.1)
	Lectures and rotations during Medical School	262 (93.6)
	Family Practice Residency Program	249 (88.9)
	Continuous medical education	243 (86.8)
	Master's/PhD degree	15 (5.4)
	Online courses	97 (34.6)

### **Knowledge regarding atopic dermatitis**

Most participants in this study incorrectly identified: the most common locations of atopic dermatitis in infants (71.4%), the prevalence of atopic dermatitis in children (69.6%), the biomarkers that indicate the presence of atopic dermatitis (67.9%), the usefulness of non-sedating antihistamines in treating pruritus associated with atopic dermatitis (85.4%), an association between food allergy and atopic dermatitis exacerbation in children (83.9%), and the biological treatments usage for resistant atopic dermatitis (83.6%). The typical location of atopic dermatitis in infants is in the extensors, which only 28.5% have answered correctly. As for the prevalence of atopic dermatitis in children worldwide, the answer is 20-30%. None of the biomarkers mentioned (total IgE, allergen-specific serum IgE, and CD30) indicate the presence of atopic dermatitis. It is a misconception to give patients with atopic dermatitis non-sedating antihistamines as they do not reduce pruritus; however, sedating antihistamines are of benefit due to the ability of the child to sleep, therefore reducing the chances of the itch-scratch cycle to continue. Multiple biological agents were mentioned, though only Dupilumab was the correct answer. Most participants answered correctly that the continuous daily use of systemic corticosteroids for atopic dermatitis is not recommended (97.1%), and they also answered the correct ideal time to apply moisturizers, which is shortly after a bath (81.4%). In addition, around 70% of the participants correctly identified the correct major criteria for diagnosing atopic dermatitis (77.1%) and the recommended treatment options for uninfected atopic dermatitis, them being topical corticosteroids, topical calcineurin inhibitors, and emollients (67.9%). The average score of correct answers was 46.7  $\pm$  14.0 out of 100. Table 2 summarizes the knowledge of atopic dermatitis amongst primary care physicians.

**Table 2:** Knowledge of atopic dermatitis amongst primary care physicians (Total = 280)

Knowledge of atopic dermatitis amongst primary care physicians (Total = 280)	Correct n (%)	Incorrect n (%)
The most common location of AD lesions in infants	80 (28.6)	200 (71.4)
Classic locations for childhood AD lesions	150 (53.6)	130 (46.4)
Whether biomarkers definitively indicate the presence of AD	90 (32.1)	190 (67.9)
Prevalence of atopic dermatitis in children worldwide	85 (30.4)	195 (69.6)
Prevalence of atopic dermatitis in adults worldwide	120 (42.9)	160 (57.1)
The major criteria for diagnosing atopic dermatitis	216 (77.1)	64 (22.9)
Which infections are AD patients more likely to have	136 (48.6)	144 (51.4)
Recommended treatment options for uninfected AD	190 (67.9)	90 (32.1)
Recommendation for continuous daily use of systemic corticosteroids for AD	272 (97.1)	8 (2.9)
Non-sedating antihistamines are useful in treating itchiness associated with AD	41 (14.6)	239 (85.4)
The most ideal time to apply moisturizers	228 (81.4)	52 (18.6)
Is it common for children with AD to have an exacerbation due to food allergies?	45 (16.1)	235 (83.9)
Biologic treatments are used for resistant AD	46 (16.4)	234 (83.6)
The average number of correct answers (out of 100) ± SD	46.7 ± 14.0	

**Practices regarding atopic dermatitis**

As shown in Table 3, most primary health care physicians revealed that they manage patients with atopic dermatitis in their facilities, recommend moisturizers for the maintenance phase, recommend soap-free cleansers, and prescribe non-sedating antihistamines more than sedating antihistamines (26% vs. 10% respectively).

**Table 3:** Practices of primary care physicians towards atopic dermatitis cases

Practices of primary care physicians towards atopic dermatitis cases	Always	Sometimes	Rarely	Never
How often do you manage atopic dermatitis without referring it to a secondary or tertiary care center?	128 (45.7)	136 (48.6)	13 (4.6)	3 (1.1)
How often do you recommend moisturizers for the maintenance phase of treatment?	257 (91.8)	17 (6.1)	5 (1.8)	1 (0.4)
How often do you recommend the use of soap-free cleansers?	194 (69.3)	65 (23.2)	14 (5)	7 (2.5)
How often do you refer cases of atopic dermatitis to a Dermatologist?	12 (4.3)	132 (47.1)	128 (45.7)	8 (2.9)
How often do you prescribe sedating antihistamines to your patients with atopic dermatitis?	27 (9.6)	124 (44.3)	80 (28.6)	49 (17.5)
How often do you prescribe non-sedating to your patients with atopic dermatitis?	73 (26.1)	155 (55.4)	39 (13.9)	13 (4.6)

Approximately 70% of primary health care physicians encounter at least 6 cases of atopic dermatitis per month. Around 30% of primary healthcare physicians thought that managing atopic dermatitis is simple, and 40% stated that their patients were satisfied with the management. In addition, most participants reported that they refer five or fewer cases per month to dermatologists (94.3%). Table (4) presents the practices of primary care physicians regarding atopic dermatitis.

**Table 4:** Practices of primary care physicians towards atopic dermatitis

Practices of primary care physicians towards atopic dermatitis cases	n (%)	
How many patients diagnosed with atopic dermatitis do you see monthly?	≤ 5	93 (33.2)
	6-10	119 (42.5)
	11-20	49 (17.5)
	>20	19 (6.8)
Do you think the management of atopic dermatitis is simple?	Simple	86 (30.7)
	Complicated	60 (21.4)
	Neutral	134 (47.9)
How many patients with atopic dermatitis do you refer to a Dermatologist per month on average?	≤ 5	264 (94.3)
	6-10	13 (4.6)
	11-20	2 (0.7)
	>20	1 (0.4)
In your experience, how satisfied are the patients with the management of their atopic dermatitis?	Satisfied	111 (39.6)
	Neutral	148 (52.9)
	Dissatisfied	21 (7.5)

As presented in Table 5, there is an inverse relationship between the physician’s age and the knowledge score. Younger physicians showed significantly higher knowledge of atopic dermatitis (P=0.003). No differences in the knowledge score between male and female physicians were

found. Furthermore, physicians with fewer years of experience scored more in knowledge than those with long years of experience (P=0.044). In comparison to general practitioners, family physicians had significantly higher knowledge scores (P=0.002).

**Table 5:** Association of participant’s demographics and practices with knowledge score

Baseline Characteristics	Knowledge score (Mean ± SD)	P value	
Age (years)	< 35	50.0 ± 14.5	0.003
	35 - 45	46.4 ± 13.4	
	>45	42.9 ± 13.1	
Sex	Males	46.9 ± 12.7	0.892
	Females	46.6 ± 14.3	
Years of Experience	<10	48.9 ± 14.7	0.044
	10-20	46.3 ± 13.7	
	> 20	43.5 ± 12.4	
Professional title	Consultant family physician	45.8 ± 12.9	0.002
	Family physician	49.7 ± 14.3	
	General practitioners	41.0 ± 14.1	

Most male doctors encounter five or fewer cases of atopic dermatitis per month, while most female doctors encounter between 6 and 10 cases monthly (P<0.007). There is a significant relationship between the sex of the physician and the recommendation to use soap-free cleansers. A much higher percentage of females (75.1%) than males (49.2%) recommended using soap-free cleansers. Compared to males, female physicians said they rarely refer cases of atopic dermatitis to a dermatologist (P=0.045; Table 6).

**Table 6:** Correlation of the sex of primary care physicians and their practice in managing atopic dermatitis

	Male n (%)	Female n (%)	P-value
<i>How many patients diagnosed with AD do you see monthly?</i>			
≤5	28 (44.4)	65 (30)	0.007
6 – 10	16 (25.4)	103 (47.5)	
>10	19 (30.2)	49 (22.6)	
<i>How often do you manage AD without referring it to a secondary or tertiary care center?</i>			
Always	25 (39.7)	103 (47.5)	0.551
Sometimes	34 (54)	102 (47)	
Rarely/Never	4 (6.3)	12 (5.5)	
<i>How often do you recommend moisturizers for the maintenance phase of treatment?</i>			
Always	53 (84.1)	204 (94)	.....
Sometimes	7 (11.1)	10 (4.6)	
Rarely/Never	3 (4.8)	3 (1.4)	
<i>How often do you recommend the use of soap-free cleansers?</i>			
Always	31 (49.2)	163 (75.1)	<0.001
Sometimes	21 (33.3)	44 (20.3)	
Rarely/Never	11 (17.5)	10 (4.6)	
<i>How often do you refer cases of AD to a Dermatologist?</i>			
Always	5 (7.9)	7 (3.2)	0.045
Sometimes	35 (55.6)	97 (44.7)	
Rarely/Never	23 (36.5)	113 (52.1)	
<i>How often do you prescribe sedating oral antihistamines to your patients with AD?</i>			
Always	9 (14.3)	18 (8.3)	0.361
Sometimes	27 (42.9)	97 (44.7)	
Rarely/Never	27 (42.9)	102 (47)	
<i>How often do you prescribe non-sedating oral antihistamines to your patients with AD?</i>			
Always	20 (31.7)	53 (24.4)	0.399
Sometimes	34 (54)	121 (55.8)	
Rarely/Never	9 (14.3)	43 (19.8)	
<i>Do you think the management of atopic dermatitis is simple?</i>			
Simple	22 (34.9)	64 (29.5)	0.045
Complicated	19 (30.2)	41 (18.9)	
Neutral	22 (34.9)	112 (51.6)	
<i>How many patients with AD do you refer to a Dermatologist per month on average?</i>			
≤ 5	59 (93.7)	205 (94.5)	0.763
>5	4 (6.3)	12 (5.5)	
<i>In your experience, how satisfied are the patients with the management of their AD</i>			
Satisfied	20 (31.7)	91 (41.9)	0.340
Neutral	38 (60.3)	110 (50.7)	
Dissatisfied	5 (7.9)	16 (7.4)	

AD: Atopic Dermatitis

## Discussion

Consistent with other studies conducted in the Gulf region, this study revealed that the overall knowledge of atopic dermatitis still needs to be improved among primary healthcare providers in Bahrain. Specifically, this study revealed that the average percentage of correct answers was 46.7 % (compared to around 33% to 50% in other studies).<sup>16</sup> Multiple studies concluded that primary care physicians had insufficient knowledge of managing common general skin disorders, including atopic dermatitis. The reported uncertainty in managing atopic dermatitis and the trial-and-error approach indicates deficient knowledge.<sup>19</sup>

Similar to the reported literature, the results of this study showed that family physicians had higher knowledge compared to general practitioners. In addition, young physicians and physicians with fewer years in practice had higher knowledge scores in atopic dermatitis.<sup>14,15</sup> These findings could be attributed to recent exposure to a structured training program in dermatological diseases during residency or medical school periods. Having structured training in dermatology was found to be associated with a better understanding of atopic dermatitis. An example is a study among pediatric residents at the Mayo Clinic and the University of Colorado School of Medicine, concluding that residents who reviewed an online module about atopic dermatitis had significantly higher knowledge scores than controls.<sup>20</sup> Thus, educational activities, including online lectures, may effectively improve physicians' knowledge.

Although no significant association between the sex of the physician and knowledge score was seen in this study, such an association was reported in the literature.<sup>14,15</sup> Here, we found that female physicians tend to recommend using soap-free cleansers more than males and refer fewer cases of atopic dermatitis to dermatologists.

Studies showed that conflicting practices and variations in knowledge among physicians result in patient confusion and reduced adherence.<sup>21</sup> An example of different practices is the tendency toward prescribing one class of antihistamines over another. For example, a large study conducted

over nine years found that family physicians and general practitioners mainly prescribed non-sedating antihistamines for atopic dermatitis, while dermatologists and pediatricians primarily used sedating antihistamines.<sup>22</sup> Similarly, the results of this study showed that primary care physicians prescribe both sedating and non-sedating antihistamines for atopic dermatitis, though the participants more often prescribed the latter.

The gaps in knowledge and different practices should be minimized as much as possible. The importance of a holistic management approach is crucial in managing atopic dermatitis. A better understanding of the subjective component of atopic dermatitis and its comorbidities might help improve the outcome of patient management. Adopting clear, simple, and practical guidelines for primary care physicians is associated with better management and adherence to treatment. Continuous medical activities, dermatology-related meetings, and seminars can improve the knowledge and practice of primary care physicians in atopic dermatitis.<sup>23</sup>

Considering the high prevalence of atopic dermatitis, the psychosocial consequences of the disease, and the relatively uncomplicated management pathways, this topic should be prioritized and adequately taught in medical school and residency training programs, especially for primary healthcare physicians.

There are several strengths in this study. Firstly, a high response rate was achieved (80% of primary care physicians). Secondly, multiple areas of knowledge and practices were assessed and analyzed. The third aspect of strength was the cross-sectional nature of the study. However, there are limitations to our study, one being that it did not assess the knowledge in managing the different presentations and complications of atopic dermatitis, the indications for referrals, and the differences in acute-vs-chronic management. Further studies are needed to assess these areas to determine the effectiveness of teaching and educational activities in improving primary care physicians' knowledge of atopic dermatitis. In addition, further studies are also needed to confirm the associations found in this study.



## Conclusion

Primary care physicians are typically the first providers encountered by most patients with atopic dermatitis and are essential in diagnosing and managing the condition. However, at times, management of atopic dermatitis may be delayed due to varied fluency in diagnosis, which may decrease adherence to its treatment. Although primary care physicians are incredibly knowledgeable about many medical conditions, we found a knowledge gap in managing atopic dermatitis. This study identified certain targeted educational interventions and developed strategies conducted by dermatologists that could help bridge that gap.

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