

Knowledge about Atopic Dermatitis among Primary Health Care Physicians In Jeddah 2017

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ABSTRACT

Background and Objectives: Allergic dermatitis, also called atopic dermatitis or atopic eczema, is a chronic recurring inflammatory skin disorder that is characterized by itching and redness of the skin. In order to improve the quality of health care to patients with allergic dermatitis, this study sought to assess the level of knowledge of physicians about the treatment and proper management of allergic dermatitis in the primary health care setting in Jeddah, 2017, and to determine the factors effecting the level of knowledge.

Methods: This study is a cross-sectional analytic study which used self-administered questionnaires. A simple descriptive statistics was used to define the characteristics of the study variables. An independent *t*-test and One-way ANOVA, with Least Significant Difference (LSD) as a post hoc test, were used to compare two group means and more than two groups, respectively. These tests were done with the assumption of normal distribution. A Linear Regression analysis was used to estimate the coefficients of the linear equation, involving the significant variables that best predict the value of the dependent variable, overall knowledge. Lastly, a conventional *p*-value <0.05 was the criteria to reject the null hypothesis.

Results and Conclusion: Among the 200 PHC practitioners who participated in this study, the average age was 35 years old. The findings showed that the among the three domains, the self-assessment domain had the highest percentage mean of 55.20% correct answers, followed by the overall knowledge domain which had 49.83% correct answers, and lastly, the clinical competency domain having 41.06% correct answers. The relationship between the three domains and age of the participants was found to be statistically significant. The findings show that in terms of gender, the overall knowledge and self-assessment domains were found to be statistically significant. Clinical competency domain, however,

was revealed to be insignificant. The female practitioners were found to be more equipped than men in terms of knowledge and self-assessment in managing children with atopic dermatitis. Although there was a correlation between the self-assessment and clinical competency domains, their relationship was identified as a weak positive correlation due to the low *r* value. Childhood atopic eczema has an overwhelming bearing on the social, personal, emotional, and financial viewpoints of affected families. This is a condition that requires proper management and follow up by the primary health care physicians who are usually the first line in managing and treating its common problems. Thus, assessment of the knowledge, attitude, and competency of the health care providers is needed first.

Keywords: Ministry of Health, Primary Health Care, Atopic Dermatitis, General Practitioner.

Abbreviations:

MOH: Ministry of Health; **PHC:** Primary Health Care; **AD:** Atopic Dermatitis; **SD:** Standard Deviation; **GP:** General Practitioner.

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INTRODUCTION

Allergic dermatitis, also called atopic dermatitis or atopic eczema, is a chronic recurring inflammatory skin disorder that is characterized by itching and redness of the skin. It generally affects 15 to 20% of children¹ and 1 to 3 % of adults worldwide.² The symptoms of allergic dermatitis may range from a small mildly irritating patch to a more widespread and painful rash. This can be

physically extrusive and painful, and may persist for several years.³

Various reports have shown that childhood atopic dermatitis has a major impact on children and families' quality of life. Among children with allergic dermatitis, 86% was found to have disturbances in sleeping patterns which in turns affect the normal

cyclic excretion of hormones, which could be partly associated to the small stature of some severely affected children.⁴ Children with moderate or severe allergic dermatitis have been reported to have a significantly higher impact on family score than families of children with early onset of diabetes mellitus. It was also found that the cost of treatment and management of atopic eczema can be financially challenging. An appropriate estimation of the annual personal financial cost of managing mild, moderate, and severe eczema was 330, 818, and 1255 Australian dollars, respectively.⁵ The incidence of atopic dermatitis has increased by 2-- to 3-- fold during the past decades.² A recent study in Korea involving 31201 children, presented the prevalence of atopic dermatitis was 19.3% in children 0 to 3 years of age, 19.7% in children 4 to 6 years of age, 16.7% in children 7 to 9 years of age, and 14.5% in children 10 to 13 years of age.⁶ In a study conducted in Qassim region of Saudi Arabia, which included 3051 patients comprising 1786 males and 1265 female, aged between 5 and 34 years old, the findings showed that allergic dermatitis was the most prevalent skin disease in both groups with prevalence of 19.5% and 20.7% in females and males, respectively.⁷ Another study piloted in Najran analyzed the pattern of skin diseases observed and diagnosed in the dermatology unit for 12 months, and among the recorded 1192 new patients seen in the dermatology unit, 37% had allergic dermatitis.⁸

Rationale

In Saudi Arabia, the pattern of skin diseases has shown a predominance of allergic dermatitis. This is why there is a dire need to improve the management of this condition in the primary health care setting. However, despite the commonality and importance of this issue, there is no research done on the assessment of the knowledge of primary health care physicians about management of atopic dermatitis in Saudi Arabia.

Atopic dermatitis is a multifactorial, persistent inflammatory and heterogeneous skin condition stemming from interactions between genetic, immune and environmental causes. It is a common skin disease in most countries, although the prevalence differs greatly throughout the world. Current studies have shown that allergic dermatitis is a disease of developed as well as developing countries, and in poorer countries, atopic dermatitis will be competing for insufficient resources. Allergic dermatitis has become an important public health problem because of its presence in most countries and its increasing prevalence, together with rising evidence that it may progress to other allergic conditions. The last few years have seen significant development in the understanding of the interactions between the skin barrier, genetic and immunological factors. A better understanding of the key environmental risk factors that could be manipulated, altered or changed is essential for an enhanced prevention of the disease.²

AIM OF STUDY

Childhood atopic eczema has an overwhelming bearing on the social, personal, emotional, and financial viewpoints of affected families.⁵ This is a condition that requires proper management and follow up by the primary health care physicians who are usually the first line in managing and treating its common problems. This is why it is very important to improve the quality of health care to patients with allergic dermatitis by enhancing the knowledge of primary health care physicians about its proper management.

OBJECTIVES

This study seeks to accomplish the following objectives:

1. To assess level of knowledge of physicians about the management of allergic dermatitis in the primary health care setting in Jeddah, 2017.
2. To determine the factors effecting the level of knowledge about the management of allergic dermatitis in the primary health care setting in Jeddah, 2017

LITERATURE REVIEW

In a cross-sectional study by Al-Zahrani et al.⁹ conducted in Abha City, Saudi Arabia, they aimed to assess knowledge, attitudes and practice among primary health care providers in Abha City regarding common dermatological problems and correlate their level of knowledge and practice gap with their background characteristics. The self-administered questionnaires were distributed to the target population. After data collection, data was analyzed by SPSS version 20. Descriptive statistics was applied using frequency and percentage. Analytical statistics was applied using chi-square test for testing the difference or association between two categorical variables. Among the 138 primary healthcare providers invited to participate in the present study, 14 were excluded from the analysis because they joined their PHC for duration of three months or less. Thus, 124 were eligible and 105 responded giving a response rate of 84.7%. The study included 105 primary health care physicians. Forty percent of them were in the age group 31--40 years whereas 30.5% were in the age group 31--30 years. Almost two-thirds of them (65.7%) were males. More than half of them (59%) were non-Saudi. Majority of the participants (84.8%) had MBBS degree of qualification whereas 5.7% had board degree. Almost a third of them (35.2%) were family medicine residents while 61% were general practitioners and only 3.8% were family medicine consultants. Majority of the respondents (81.9%) joined work at PHCC since more than 3 months. Almost a third of the primary health care physicians (34.3%) claimed that they managing more than 40 patients per day. Majority of them (85.7%) reported that they had no educational activities in Dermatology at PHCC. As well as 91.4% reported that there were no registers on Dermatology in PHCC and 95.2% cited that haven't guidelines for management of dermatological disorders. Forty percent of them responded that they managed between 6 and 10 patients with dermatological disorders monthly where as 10.5% of them managed more than twenty patients monthly. Half of the participants reported that their PHCC serving 5000 persons or less. Two thirds (69.5%) of primary healthcare physicians had insufficient knowledge regarding common dermatological disorders whereas 21.9% of them had good knowledge and only 4.8% had excellent knowledge. The physicians who had degrees more that bachelor showed significant higher sufficient level of knowledge regarding common dermatological problems compared to those who had Bachelor (83.3%, 75% and 50% of those having Diploma, master and board, respectively compared to 23.6% of those having bachelor). More than half (51.7%) of physicians who attended training courses in dermatology had sufficient knowledge regarding management of common dermatological disorders compared to 22.4% among those who did not attend training courses. Number of patients managed by PHC physicians ranged between two and 80 patients. More than half of them (55.2%)

managed more than 40 patients daily as seen in figure 2. The educational activities in dermatology at PHCC were reported by 15.2% of the respondents whereas 9.2% and 4.8% of them reported presence of data or registers for dermatological cases and guideline for management of dermatological disorders, respectively. Almost a third of the respondents (31.4%) managed more than 10 years dermatological patients. Almost half of the PHC providers (49.5%) were incompetent to manage patients with skin disorders and only 4.8% were very competent. Among those who are incompetent, lack of knowledge was reported by 92.3% of them whereas lack of skills and negative attitude were reported by 71.2% and 32.7% of them. Almost a third of the PHC physicians in Abha (30.2%) reported attendance to any training courses in dermatology at their PHCCs. Physicians who were confident in managing infestations were more knowledgeable about the management of common dermatological problems than those who reported that they need to learn (47.1% versus 22.5%). The physicians who were confident in managing fungal diseases were more knowledgeable about the management of common dermatological problems than those who reported that they need to learn (35.4% versus 15.4%). Physicians who are confident in managing leg ulcers were more knowledgeable about the management of common dermatological problems than those who reported that they need to learn (58.8% versus 25.0%). Physicians who are confident in managing angioedema were more knowledgeable about the management of common dermatological problems than those who reported that they need to learn (72.7% versus 19.3%).

Finally, physicians who are confident in managing rosacea were more knowledgeable about the management of common dermatological problems than those who reported that they need to learn (73.3% versus 23.3%). 61% of physicians had good experience in managing skin disorders whereas only 1% reported excellent experience and 38.1% had poor experience in managing skin disorders. Lack of guidelines (86.7%), lack of training (80%), lack of educational materials (66.7%) and lack of time and place (64.8%) were the commonest reported barriers that face PHC physicians' practices regarding management of dermatological disorders. By asking of the respondents about their opinion regarding difficulty in management of skin disorders compared to other body disorders, 73.3% of them answered that it is more difficult whereas only 7.8% answered that it is easier. Difficulties to arrange for referral, difficulties to communicate, lack of experience, difficulties to give counseling about diet and difficulties to give counseling about general hygiene were reported by 52.4%, 41%, 40% and 39% of them, respectively.

More than two-thirds of primary health care providers in Abha City had insufficient knowledge regarding management of common skin disorders. Half of PHC physicians were incompetent in managing patients with skin disorders. Lower qualification among physicians and lack of training courses were important indicators for such insufficient knowledge. Health services that are commonly provided to dermatological patients in PHCCs were prescribing drugs and referral. Thirty percent of PHC physicians attended training courses in dermatology. More than half of the PHC physicians strongly agreed that they should have a role in the managing of common dermatological disorders. The commonly reported barriers for that are lack of guidelines and training in dermatology.⁹

A cross-sectional study was conducted at the Ministry of Health (MOH) primary healthcare centers (PHCCs) in Jeddah city in 2014 with the purpose of assessing the knowledge of PHCPs regarding common dermatological disorders in Jeddah, Saudi Arabia, and correlating the level of knowledge with the background characteristics (and other possible relevant factors) of the studied physicians. A self-administered two-part questionnaire was used in the study. The data were coded and entered into a personal computer after being verified by hand, and SPSS version 20 was used for the analysis. Descriptive statistics were applied using the frequency and percentage, since all of the data were categorized. Analytical statistics were applied using a chi-squared test for determining the difference or association between two categorical variables. The study included 212 PHCPs out of 233 who were invited to participate, giving a response rate of 91%. The demographic/personal characteristics of the study physicians showed that 62.3% of the participants were general practitioners (GPs). Approximately 50% of the PHCPs were between 30 and 40 years of age, and 77.8% had graduated after the year 2000. Most of them (84%) were Saudis, and the majority (63.2%) were males. Of the participants, 8.69% had participated in educational activities (e.g. lectures, group discussions, seminars) about common dermatological disorders. More than two-thirds of them (72.2%) felt that they were competent, to some extent, to manage a patient with a skin disorder, while only (11.3%) felt very competent. The remaining (16.5%) felt incompetent to manage a patient with a skin disorder. Moreover, 72.2% of the participants admitted that a lack of knowledge was the main reason that they felt incompetent to manage a skin disorder, while 25.9% admitted that they felt incompetent due to a lack of skills. The majority of the PHCPs (about 91%) knew that ultraviolet radiation (UV) is involved in the etiology of skin cancer, and that decubitus ulcerations in patients are caused by an insufficient number of positional changes. A high proportion of them (80.7%) also knew that antihistamine drugs affect all symptoms related to itching, and 75.9% knew that blisters and scar tissue point to severe burns in burn patients. A similar proportion of the PHCPs (64.6% and 62.3%, respectively) knew that angioedema in urticaria requires an emergency evaluation of the patient, and that scabies is characterized by itching at night. Only 27.4% of the participants did not correctly agree that fungal diseases of the foot are always itchy, and that psoriasis may infect others via direct contact at a rate of approximately 20%. In addition, only 28.3% did not correctly agree that moisturizing the feet is as important as using medications for the prevention of tinea pedis. Very few of the PHCPs (5.2%) did not correctly agree that following the blood glucose is necessary while treating a patient with systemic steroids because they cause a decrease in the blood glucose levels. Unfortunately, many of the questions were answered with 'have no idea,' as follows: viridans streptococci are the causative factor for vitiligo (84.5%), topical steroids provide a speedy recovery in cases of folliculitis (71.7%), powerful topical steroids must be used for the inguinal area and face because of the insufficient effect (71.2%), air-circulated bed use is the proposed cause for decubitus ulceration in patients (71.2%), and systemic steroids provide a speedy recovery in cases of psoriasis (61.4%). Overall, the knowledge level in 93.9% of the study PHCPs regarding common dermatological disorders was considered to be insufficient (less

than 60%). There were no statistically significant differences between the common dermatological diseases knowledge score and the different age groups, genders, nationalities, medical education years (MBBS), or professions. Moreover, there were no statistically significant associations between the dermatological knowledge scores of the PHCPs who attended the dermatological educational activities (e.g. lectures, group discussions, and seminars), those who thought that PHCPs can play important roles in the management of common skin disorders, or with those who felt a good degree of competence in managing patients with common dermatological disorders. Overall, in Jeddah in the Kingdom of Saudi Arabia, the PHCPs' knowledge regarding common dermatological disorders was insufficient, indicating the need to improve such knowledge among them. He recommended that additional training should be supplemented with the collaboration of academic dermatologists, who should organize workshops, lectures, and other continuing medical education activities for PHCPs.¹⁰

A cross-sectional study was conducted in Aden governorate, a Southern seaport of Yemen aimed to evaluate self-perception and attitudes of PHC physicians toward their competencies in diagnosing and treating skin diseases, and to identify misconceptions among PHC physicians related to common skin diseases and therapeutic drugs frequently prescribed for skin complaints. After data collection using self-administered questionnaires, Chi-squared test was used to test the associations among categorical variables. All tests were two-tailed and $p < 0.05$ was considered statistically significant. Data were analyzed using SPSS version 19. Among the 50 questionnaires distributed, 40 were completed and returned representing a response rate of 80%. The mean age (SD) of the sample was 39 (7.4) years, 85% being females, with a mean (SD) of 12.36 (6.7) years of clinical experience. Fifteen PHC physicians (37.5%) perceived their ability to diagnose skin diseases as very good/good and 16 (40.0%) PHC physicians perceived their ability to treat skin diseases as very good/good. All PHC physicians referred a patient with skin manifestations to a dermatologist at some point during their clinical practice, 3 (7.5%) PHC physicians always referred a patient with skin manifestations to a dermatologist and 12 (30%) usually do so. Two-thirds of PHC physicians believe patients receive better medical care at private clinics than public clinics. PHC physicians who believed that patients receive better medical care at private clinics than public clinics referred patients more frequently to a dermatologist than those who did not believe so. Overall, PHC physicians did not show adequate knowledge in the common skin diseases and therapies. The average score of PHC physicians' ability to classify skin lesions was 7.48 (± 1.2) (out of 10). Ability to classify skin lesions was not related to highest educational level or years of clinical experience ($p = 0.41$ and $p = 0.69$ respectively). PHC physicians who perceived their ability to diagnose and treat skin diseases as good had higher average classification scores of skin lesions than those who perceived their ability to diagnose and treat skin diseases as bad, this difference was not statistically significant ($p = 0.53$). However, the results show a significantly higher average score of classifying skin lesions among those identified topical antifungal monotherapy as superior to a combination therapy for fungal skin infections ($p = 0.018$). PHC physicians who correctly answered daily anti-histamines cannot

prevent atopic dermatitis were able to classify skin lesions significantly better than those who had wrong answers to this question ($p = 0.018$). In Aden governorate, there was no relationship between ability to classify skin lesions and PHC physicians' self-perception of competency in dermatology. PHC physicians were not properly trained to diagnose and treat skin diseases.¹¹

In order to explore the experiences of GPs in assessing and managing children with eczema, a qualitative study in primary care in England was conducted. The study used semi-structured interviews with 15 GPs were audio-recorded, transcribed verbatim and analyzed thematically using the framework method. Expressions of interest were received from 48 GPs in 20 practices. Of the 32 GPs invited to interview, 15 (47%) took part; 13 interviews were undertaken face-to-face and two by telephone. The 11 female and four male participants had a range of personal characteristics and worked in a variety of practices located in Bristol, Gloucestershire, Portsmouth, and Nottingham, England. Most GPs reported working in practices serving mainly white British patients, although several reported having communities of eastern European patients, particularly Polish. One-third of the GPs interviewed work within inner-city practices or had a branch surgery, where they reported seeing a higher proportion of ethnic minorities. Three main themes emerged: dermatology training, education, and practice; eczema consultations; and GPs' perception of parental management of eczema. Both recently qualified GPs and those with more experience felt that eczema was generally accorded a low priority in primary care practice. Exceptions to this were two GPs with a specialist interest (GPSI) who had undertaken a diploma in dermatology, and one GP who had undertaken a dermatology position as part of a medical rotation before GP training. GPs maintained their dermatology knowledge through study days or peer group learning. Some relied on dermatology outpatient letters about their patients as a learning resource. A minority of GPs said their practice had a GP dermatology lead to whom they would make internal referrals when uncertain about patient management. Rather than using guidelines, GPs turned to professional online resources (for example, www.gpnotebook.co.uk), links from within the clinical software systems, or Google searches for guidance. Websites with photographs were utilized to achieve a shared understanding with the parents of the working diagnosis. Some GPs viewed consultations for eczema as an opportunity to catch up if running late. The impact of childhood eczema and its effect on quality of life were infrequently described. However, for those GPs with a specialist interest in dermatology, and those with personal experience of eczema, eczema consultations were described as time consuming. Diagnosing eczema in children was not reported to present a challenge to most GPs. Where uncertainty was described, it was in the context of a rash in an atypical distribution or where the differential diagnosis included a fungal or viral infection. There was also varying confidence in recognizing bacterial and viral infection complicating eczema, and eczema in different ethnic skin types. Almost half of GPs interviewed said they routinely asked about current skin care regimens, and most expressed awareness that parents have usually tried over-the-counter topical products, although use of complementary and alternative therapies was said to be uncommon. Though many

GPs were aware of parents that disliked the consistency of some emollient treatments, few reported discussing options with parents, or sought agreement about what was acceptable to them before prescribing. With a large range of emollients available, a trial- and- error approach to prescribing emollients was commonplace, with GPs also being uncertain about quantities to issue. Although several GPs found the formularies within clinical systems helped them with prescribing, others complained that systems which automatically recommended switches to more cost-- effective products created confusion for parents and clinicians, who were unfamiliar with the alternative products. Sometimes when changes were made, it brought GPs into conflict with parents wanting previously prescribed treatments. All participants were confident prescribing mild and moderate potency TCS in children with eczema. However, there was widespread reluctance to prescribe a potent TCS in children when indicated, unless accompanied by a specialist dermatology referral. The fear of potent steroid use among GPs was evident in the experience of the GPSI below who took referrals from colleagues. Advice given to parents about TCS risks, and using them sparingly, as well as a stepwise approach to potencies, was mentioned by most of the interviewees, although several participants expressed uncertainty about quantities of TCS to prescribe. GPs' under confidence with potent TCS is compounded for some by their perception of parental fear of TCS. Some reported a need to address parental misconceptions around TCS safety and the challenging conversations they experienced with parents around TCS use. A minority of participants described managing some patients who they felt were over reliant on TCS. GPs tended to only give limited supportive information, with a minority reporting giving advice about avoidance of triggers and irritants, or instructions on the quantity or application of topical treatments. When written information was offered, the resources most commonly referred to were websites, with only a few GPs providing (informal) written instructions or viewing the prescription as a form of written advice. Several GPs expressed a desire to have greater access to community dermatology nurses, who they felt had more time and expertise to explain treatments. Review of patients with eczema was a reactive process, in which around half of GPs said they routinely gave safety net advice;; that is, to return if their eczema became infected or treatment escalation was needed. Proactive assessment of symptoms and adherence to treatments was uncommon, although many GPs saw their potential value. They attributed the current lack of routine review to pressure on appointments, no financial incentives to undertake such reviews, and shortage of trained nurses to support them. GPs perceived differences to parents regarding the assessment of the severity of eczema, underlying etiology, and expectations around treatments and/or referrals. GPs thought that parents struggled with their understanding of eczema as a long-term condition. GPs felt online resources and word--of-- mouth were the most common sources of advice for parents of children with eczema, with the internet being blamed for misinformation around allergies. Most GPs believed that the evidence for food allergy causing eczema was weak, except when the clinical history strongly supported this, or in more severe cases of eczema. Uncertainty was expressed about how to discuss allergy testing and dietary manipulation with parents. In addition, GPs were concerned about the limitations of currently available allergy tests, as well as a shortage of allergy

clinic appointments and a desire to conserve resources. GPs tended to dissuade referral for allergy testing or trials of exclusion diets. Sometimes this was done by explaining their concerns about the limitations of testing. A few GPs reported feeling pressured by parents to refer children for allergy testing. GPs reported that parents struggled to recall the names of previous treatments, making it a challenge for them to keep track of what had been tried. This, together with participants' perception that parents have difficulty recalling instructions on their use, may be contributing to the confusion with treatments which GPs felt was common in eczema care. Records of repeat prescriptions on patients' electronic medical records were the most commonly reported method used by GPs to assess adherence to treatments, particularly emollients. Underuse of both emollients and TCS by parents was felt to be common place. This is the first study to explore GPs' experiences of diagnosing and managing children with eczema. Participants described important gaps in training, knowledge, and practice. This was coupled with a feeling that other chronic diseases and older patients took priority. Apart from children with darker skin types or with possible skin infections, diagnosis of eczema was straightforward for most GPs, yet there was uncertainty about prescription quantities, use of potent TCS, and a trial--and--error approach to emollients. Parents were reported to frequently forget medication names and instructions on their use, and low adherence to medications was felt to be commonplace, with reluctance to use TCS. However, support offered to parents by means of verbal and written advice about treatments was limited, and few participants said they routinely arranged reviews to assess treatment acceptability, adherence, and disease control. A particular challenge for GPs was reconciling parents' concerns about allergy and requests for allergy testing with their understanding that it had no role for the majority of children.¹²

In another study in the Middle East, physicians working in primary care clinics in King Khalid University Hospital (KKUH) were asked to answer a multiple-choice questionnaire regarding various dermatoses. These were grouped into: common, infrequent and rare. Questions included identification of the correct description of the skin lesion, diagnosis, treatment and the desirability of referral. Demographic characteristics of the physicians were also assessed. The purpose of our study is to assess the ability of the primary care physicians, with or without training in dermatology, to identify, diagnose and manage skin disorders. The study included 19 out of 22 primary health care physicians (86%) working in primary care clinics of King Khalid University Hospital. Of the 19 PHC physicians, nine were male (47%) and 10 females (53%). Their mean age was 39.4±3.3years. Their highest academic degrees included MBBS (5%), MS (42%), and MRCGP or MRCP (53%). Only eight (42%) had special training in dermatology (in the form of clinical courses of 6-- week duration or less). The number of patients examined by each physician weekly ranged from 20 to 126 (mean 94±30). The percentage of physicians correctly identifying the correct lesion description ranged from 21% for verruca vulgaris to 100% for pompholyx. Regarding diagnosis, only one physician (5%) diagnosed verruca vulgaris compared to 18 (95%) correctly diagnosing impetigo. The correct treatment for basal cell carcinoma was known by one physician (5%) compared to 18 (94%) for impetigo. All physicians referred cases of psoriasis and hidradenitis suppurativa to a dermatologist.

On the other hand, the highest score regarding diagnosis was for common diseases (3.47 ± 0.77) and the difference between mean scores of diagnosis of the three groups was also statistically significant ($P < 0.05$). With respect to treatment, the highest mean score was also for common diseases (2.78 ± 0.96), however, the difference between the mean scores for the three groups was not statistically significant ($P > 0.05$). There was not a statistically significant difference between the scores of male and female physicians.

The total mean score was equal for physicians with a master's degree only, compared to those with a higher degree. Those who had undergone a specific training in dermatology received higher total scores than who did not ($P = 0.04$).

PHC physicians with a short period of specific clinical training in dermatology perform better in identifying, diagnosing and managing skin disorders than those without. Such training for PHC physicians should be considered to provide more effective delivery of health care.¹³

MATERIALS AND METHODS

Study Design & Population

This study is a Cross-sectional analytical study and included all family physicians and general practitioners working at the Ministry of Health, under the primary health care unit.

Study Area

Jeddah is the second largest city in Saudi Arabia, it is the main port of the kingdom and main gate through which most of the pilgrims arrive by air and sea to perform umrah or hajj. The population of the city is currently at 3.4 million people. In Jeddah, there are around 12 governmental hospitals, 44 primary health care centers, more than 30 private hospitals, and 128 polyclinics. In Jeddah, there are 44 primary health care centers sponsored by the ministry of health distributed over 5 sectors.

Sample Size

The current number of primary health care physicians in the centers is 382. There is no precise figure for the level of knowledge of primary health care physicians about allergic dermatitis. To calculate for the proper sample size, the proportion in the equation was substituted by 50% to get the maximal sample size, given a confidence level of 95% and a margin of error of 5%, the sample size computed for this study's population is 192. This number was rounded up to 200 to account for any missing data or non-response from the participants.

Sampling Technique

The selection of primary health care centers was done using stratified sampling technique with two stages:

Stage 1: The 44 primary health care centers were distributed into 5 strata, and for each stratum, four primary health care centers were selected. A total of 20 centers were included in this study.

Stage 2: All physicians who were available during the time of data collection were included in this study.

Data Collection Instrument

This study used a structured self-administered questionnaire that was validated by three consultants.

Data Collection Procedure

After getting the approval from the MOH, the researcher visited the selected PHC centers. The self-administered questionnaires were distributed to all the physicians attending in each of the PHC center and was collected by the researcher on that same day.

Study Variables

This study used overall knowledge, self-assessment, and clinical competency on allergic dermatitis of the participants as the dependent variable. On the other hand, the independent variables were as follows: age, gender, nationality, years of experience, medical specialty, training undergone, and number of cases handled per week.

Ethical Considerations

This research obtained its approval from the research committee and higher authority. Institutional and departmental approvals were subsequently accomplished. A written consent was then obtained from all participants of the study.

Data Analysis

The collected data of this study was analyzed using IBM SPSS version 23. A simple descriptive statistics was used to define the characteristics of the study variables through a form of counts and percentages for the categorical and nominal variables, while continuous variables are presented by mean and standard deviation. Knowledge questions are converted to correct and wrong answer, and grouped three domains by using a simple additive method and scale the domains to 100%.

The three domains namely overall knowledge, self-assessment, clinical competency, had 29, 18, and 11 items, respectively.

Overall Knowledge

- From your knowledge, what is the prevalence of atopic dermatitis in children?
- Atopic dermatitis has a complex pathogenesis, which factors are involved in its pathogenesis (you can choose more than one)?
 - Genetic
 - Infectious
 - Immunologic
 - Environmental
- Which of the following is a known Risk factors for atopic dermatitis?
 - Family history of atopy
 - Timing of solid food introduction
 - Type of delivery during childbirth
 - Loss of function mutations in the FLG gene
 - Elevated birth weights
 - Withholding of allergenic foods
 - Early antibiotic exposure
- Which of the following symptoms is considered in the (United Kingdom Working Party diagnostic criteria) for the diagnosis of atopic dermatitis in a patient with itchy skin
 - History of a flexural involvement
 - Visible flexural dermatitis
 - Personal history of asthma or hay fever
 - History of generally dry skin in the last year
 - Onset under the age of 2
- What is the commonest Sites of atopic dermatitis in infants?
- What is the commonest site for atopic dermatitis in children?
- How often do you need to investigate for food allergy in the management of atopic dermatitis?
- Which of the following is the most effective nonpharmacological treatment for patient with atopic dermatitis?

- A 5--year--old, has excoriated plaque on the dorsum of both feet, what is the best treatment option for this patient?
- A 3--month--old baby girl, come to clinic with excoriated plaque on her cheeks, what is the best treatment?
- How is topical corticosteroid instructed to be applied?
- The most common side effect from regular use of Topical corticosteroid is:
- Which of the following topical antibiotics is prescribed for infected atopic dermatitis patients? (you may circle more than 1)
 - Tetracycline
 - Mupirocin
 - Fusidic acid
 - Polymycin, Bacitracin and Neomycin combination
 - Combination of corticosteroid and antibiotic
- Is oral antihistamines prescribe for patients with atopic dermatitis?
- What Type of oral antihistamines are prescribed in atopic dermatitis?

SELF--ASSESSMENT

- From your knowledge, what is the prevalence of atopic dermatitis in children?
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 - Withholding of allergenic foods
 - Early antibiotic exposure
- Which of the following symptoms is considered in the (United Kingdom Working Party diagnostic criteria) for the diagnosis of atopic dermatitis in a patient with itchy skin
 - History of a flexural involvement
 - Visible flexural dermatitis
 - Personal history of asthma or hay fever
 - History of generally dry skin in the last year
 - Onset under the age of 2
- What is the commonest Sites of atopic dermatitis in infants?
- What is the commonest site for atopic dermatitis in children?

CLINICAL COMPETENCY

- How often do you need to investigate for food allergy in the management of atopic dermatitis?
- Which of the following is the most effective nonpharmacological treatment for patient with atopic dermatitis?
- A 5--year--old, has excoriated plaque on the dorsum of both feet, what is the best treatment option for this patient?

- A 3--month--old baby girl, come to clinic with excoriated plaque on her cheeks, what is the best treatment?
- How is topical corticosteroid instructed to be applied?
- The most common side effect from regular use of Topical corticosteroid is:
- Which of the following topical antibiotics is prescribed for infected atopic dermatitis patients? (you may circle more than 1)
 - Tetracycline
 - Mupirocin
 - Fusidic acid
 - Polymycin, Bacitracin and Neomycin combination
 - Combination of corticosteroid and antibiotic
- Is oral antihistamines prescribe for patients with atopic dermatitis?
- What Type of oral antihistamines are prescribed in atopic dermatitis?

An independent t--test and One--way ANOVA, with Least Significant Difference (LSD) as a post hoc test, were used to compare two group means and more than two groups, respectively. These tests were done with the assumption of normal distribution. Otherwise, Welch's t--test for two group means and Games Howell for multiple groups were used as an alternative for the LSD test. In order to identify the relationship between variables which was represented by the mean value, a Pearson's correlation coefficient was used. A Linear Regression analysis was used to estimate the coefficients of the linear equation, involving the significant variables that best predict the value of the dependent variable, overall knowledge. Lastly, a conventional p--value <0.05 was the criteria to reject the null hypothesis.

RESULTS AND DISCUSSION

Demographic Profile of the Participants

The demographic characteristics of the 200 participants were shown in Table 1. The average age of the study samples was 35 years old (SD=10.545), with a range of 25 to 48 years of age. Majority of the participants were females which comprised 67.3% (n=132), the other 32.7% (n=64) was composed of male respondents, with 4 missing data. Most of the participants were Saudi nationals (90.5%, n=181), while the remaining 9.5% (n=19) were foreigners. In terms of years of experience, 42.5% (n=85) of the participants had less than 5 years, 32.5% (n=65) had 5 to 10 years of experience, while 25.0% (n=50) had more than 10 years. Regarding medical specialty, majority of the participants were general practitioners comprising of 47.5% (n=94), 21.2% (n=42) participants were family medicine residents, 20.7% (n=41) were family medicine board certified, 6.6% (n=13) had family medicine diploma, while the remaining 4.0% (n=8) had other medical specialty namely intern (n=2), pediatric (n=3), and 3 were unidentified. Two of the responses were missing, thus not included in the analysis. Among the 200 participants, 60.5% (n=121) had no training in dermatology, while 39.5% (n=79) had training. In terms of the number of atopic dermatitis cases seen per week, 68.5% (n=137) have seen 1 to 10 cases per week, 14.0% (n=28) have seen 11 to 20 cases per week, 6.0% (n=12) saw more than 20 cases per week, while the remaining 11.5% (n=23) of the participants had no cases seen. When asked about

their knowledge on the prevalence of atopic dermatitis in children, 8.5% (n=17) of the study participants answered >1%, 46.0%

(n=92) answered 5--10%, 41.5% (n=83) answered 15--20%, while the remaining 4.0% (n=8) of the participants answered >20%.

Table 1: Demographic profile of the study participants

Demographics	N	Min	Max	Mean	SD
Age	6	25	48	35.00	10.545
		Count			%
Total		200			100.0
Gender	Male	64			32.7
	Female	132			67.3
	Missing	4			
Nationality	Saudi	181			90.5
	Non--Saudi	19			9.5
Years of experience	"< 5 years"	85			42.5
	"5--10 years"	65			32.5
	"11--15 years"	17			8.5
	"16--20 years"	20			10.0
	">20 years"	13			6.5%
	"More than 10 years"	50			25.0
Medical Specialty	Family medicine board certified	41			20.7
	Family Medicine diploma	13			6.6
	Family medicine resident	42			21.2
	General practitioner	94			47.5
	Other	8			4.0
	Missing	2			
Specialty other	Total	8			100.0
	Intern	2			40.0
	Pediatric	3			60.0
	Missing	3			

Table 2: Assessment of training, number of cases

Variables		Count	%
Total		200	100.0
Did you have any training in dermatology?	Yes	79	39.5
	No	121	60.5
What are the Number atopic dermatitis cases seen in your practice per week?	1-10 cases	137	68.5
	11-20 cases	28	14.0
	more than 20 cases	12	6.0
	no cases	23	11.5

Specificities of the three domains

Table 2 shows that out of the 200 respondents, 79 (39.5%) answered yes when they were asked whether or not that have any training in dermatology while 121 (60.5%) answered no. 137(68.5%) responded that there were 1--10 cases of atopic dermatitis seen in their practice per week, 28 (68.5%) had seen 11--20 cases of atopic dermatitis per week, 12 (14.0%) had seen more than 20 cases of atopic dermatitis per week and 23 (11.5%) responded that there were no cases of atopic dermatitis seen in their practice.

Table 3 shows the percentage of the respondents who got the correct answer during the surveys based on the tables aforementioned. On the prevalence of atopic dermatitis in

children, 108 (54.0%) got the wrong answer while 92 (46.0%) got the correct answer. On the commonest sites of atopic dermatitis in infants, 76 (45.0%) got the wrong answer while 120 (61.2%) got the correct answer, with 4 missing information. For the most common sites of atopic dermatitis in children, 87 (43.7%) got the wrong answer while 112 (56.3%) got the correct answer, with 1 missing information. On how often the need to investigate for food allergy in the management of atopic dermatitis, 136 (68.3%) got the wrong answer while 63 (31.7%) got the correct answer, with 1 missing information. On the most effective non--pharmacological treatment for patient with atopic dermatitis, 35 (17.6%) got the wrong answer while 164 (82.4%) got the correct answer, with 1 missing information. On the best treatment option for a 5--year old

patient who has excoriated plaque on the dorsum of both feet, 147 (75.8%) got the wrong answer while 47 (24.2%) got the correct answer, with 6 missing information. On the best treatment option for a 3-month old baby girl with excoriated plaque on her cheeks, 113 (58.2%) got the wrong answer while 81 (41.8%) got the correct answer, with 6 missing information. On how topical corticosteroid instructed to be applied, 108 (55.4%) got the wrong answer while 87 (44.6%) got the correct answer, with 5 missing information. On the common side effect from regular use of topical corticosteroid, 126 (64.3%) got the wrong answer while 70 (35.7%) got the correct answer with 5 missing information. On oral antihistamines prescribed for patients with atopic dermatitis, 71 (36.0%) answered wrongly while 126 (64.0%) answered correctly, with 3 missing information. On the type of oral antihistamines prescribed in atopic dermatitis, 170 (87.2%) got the wrong answer while 25 (12.8%) got the correct answer, with 5 missing information. Table 4 shows the percentage of the respondents who got the correct answer based on the table about the factors involved in atopic dermatitis' pathogenesis. Out of the 200 respondents, 38 (19.0%) answered wrongly on genetics, while 162 (81.0%) answered correctly. 73 (36.5%) answered wrongly on

immunologic while 127 (63.5%) answered correctly. 90 (45.0%) answered wrongly on environmental while 110 (55.0%) answered correctly.

Table 5 shows the percentage of the respondents who got the correct answer on the table about known risk factors for atopic dermatitis. On family history of atopy, 13 (6.6%) got the wrong answer while 184 (93.4%) got the correct answer, with 3 missing information. On timing of solid food introduction, 133 (67.5%) got the wrong answer while 64 (32.5%) got the correct answer, with 3 missing information. On type of delivery during childbirth, 60 (30.5%) got the wrong answer while 137 (69.5%) got the correct answer with 3 missing information. On loss of function mutations in the FLG gene, 153 (77.7%) got the wrong answer while 44 (22.3%) got the correct answer, with 3 missing information. On elevated birth weights, 89 (45.2%) got the wrong answer while 108 (54.8%) got the correct answer, with 3 missing information. On withholding of allergenic foods, 133 (67.5%) got the wrong answer while 64 (32.5%) got the correct, with 3 missing information. On early antibiotic exposure, 117 (59.4%) got the wrong answer and 80 (40.6%) got the correct answer, with 3 missing information.

Table 3: Clinical competency results from situational questions

Correct Answer		Count	%
Total		200	100.0
From your knowledge, what is the prevalence of atopic dermatitis in children?	Wrong Answer	108	54.0
	Correct Answer	92	46
	Missing		
What is the commonest Sites of atopic dermatitis in infants?	Wrong Answer	76	38.8
	Correct Answer	120	61.2
	Missing	4	
What is the commonest site for atopic dermatitis in children?	Wrong Answer	87	43.7
	Correct Answer	112	56.3
	Missing	1	
How often do you need to investigate for food allergy in the management of atopic dermatitis?	Wrong Answer	136	68.3
	Correct Answer	63	31.7
	Missing	1	
Which of the following is the most effective nonpharmacological treatment for patient with atopic dermatitis?	Wrong Answer	35	17.6
	Correct Answer	164	82.4
	Missing	1	
A 5--year--old, has excoriated plaque on the dorsum of both feet, what is the best treatment option for this patient?	Wrong Answer	147	75.8
	Correct Answer	47	24.2
	Missing	6	
A 3--month--old baby girl, come to clinic with excoriated plaque on her cheeks, what is the best treatment?	Wrong Answer	113	58.2
	Correct Answer	81	41.8
	Missing	6	
How is topical corticosteroid instructed to be applied?	Wrong Answer	108	55.4
	Correct Answer	87	44.6
	Missing	5	
The most common side effect from regular use of Topical corticosteroid is:	Wrong Answer	126	64.3
	Correct Answer	70	35.7
	Missing	4	
Is oral antihistamines prescribe for patients with atopic dermatitis?	Wrong Answer	71	36.0
	Correct Answer	126	64.0
	Missing	3	
What Type of oral antihistamines are prescribed in atopic dermatitis?	Wrong Answer	170	87.2
	Correct Answer	25	12.8
	Missing	5	

Table 4: Knowledge scores based on identified factors in pathogenesis of AD.

Atopic dermatitis has a complex pathogenesis, which factors are involved in its pathogenesis?		Count	%
Total		200	100.0
Genetic	Wrong Answer	38	19.0
	Correct Answer	162	81.0
Immunologic	Wrong Answer	73	36.5
	Correct Answer	127	63.5
Environmental	Wrong Answer	90	45.0
	Correct Answer	110	55.0

Table 5: Clinical competency results from situational questions

Which of the following is known Risk factors for atopic dermatitis?		Count	%
Total		200	100.0
Family history of atopy	Wrong Answer	13	6.6
	Correct Answer	184	93.4
	Missing	3	
Timing of solid food introduction	Wrong Answer	133	67.5
	Correct Answer	64	32.5
	Missing	3	
Type of delivery during childbirth	Wrong Answer	60	30.5
	Correct Answer	137	69.5
	Missing	3	
Loss of function mutations in the FLG gene	Wrong Answer	153	77.7
	Correct Answer	44	22.3
	Missing	3	
Elevated birth weights	Wrong Answer	89	45.2
	Correct Answer	108	54.8
	Missing	3	
Withholding of allergenic foods	Wrong Answer	133	67.5
	Correct Answer	64	32.5
	Missing	3	
Early antibiotic exposure	Wrong Answer	117	59.4
	Correct Answer	80	40.6
	Missing	3	

Table 6: Knowledge scores based on the identified symptoms for the diagnosis of AD

Which of the following symptoms is considered in the (United Kingdom Working Party diagnostic criteria) for the diagnosis of atopic dermatitis in a patient with itchy skin?		Count	%
Total		200	100.0
History of a flexural involvement	Wrong Answer	81	41.1
	Correct Answer	116	58.9
	Missing	3	
Visible flexural dermatitis	Wrong Answer	72	36.5
	Correct Answer	125	63.5
	Missing	3	
Personal history of asthma or hay fever	Wrong Answer	36	18.3
	Correct Answer	161	81.7
	Missing	3	
History of generally dry skin in the last year	Wrong Answer	106	54.1
	Correct Answer	90	45.9
	Missing	4	
Onset under the age of 2	Wrong Answer	106	53.8
	Correct Answer	91	46.2
	Missing	3	

Table 7: Reliability statistics of the three domains

Reliability Statistics	Cronbach's Alpha	N of Items
Overall knowledge	0.639	29
Self-Assessment	0.671	18
Clinical Competency	-0.177	11

Table 8: Assessment of the three domains in terms of the percentage of the correct answers

Domains	N	Min	Max	Mean	SD	Skewness	Kurtosis
Overall knowledge	200	6.9	82.8	49.83	14.2	-0.387	0.480
Self-Assessment	200	11.1	100.0	55.20	18.5	-0.337	0.151
Clinical Competency	200	0.0	72.7	41.06	13.8	-0.345	0.377

Table 9: Relationship between the three domains and age

Correlations	Age	
Overall knowledge	r	0.142
	p-value	0.105
	N	131
Self-Assessment	r	0.213
	p-value	0.014
	N	131
Clinical Competency	r	-0.055
	p-value	0.535
	N	131

Table 10: Relationship between the three domains and the demographic variables

Variables	N	Domains			
		Overall knowledge	Self-Assessment	Clinical Competency	
Gender	Male	64	45.63 ±16.2	48.96 ±19.8	40.21 ±15.5
	Female	132	51.96 ±12.9	58.21 ±17.4	41.75 ±13.1
	p Value		0.004b	0.001a	0.466
Nationality	Saudi	181	49.49 ±14.4	54.70 ±18.7	41.00 ±14.0
	Non-Saudi	19	53.01 ±12.4	59.95 ±16.4	41.64 ±12.6
	p Value		0.306	0.240	0.848
Years of experience	"< 5 years"	85	47.37 ±12.4	51.64 ±15.5	40.44 ±14.5
	"5--10 years"	65	52.15 ±17.0	57.94 ±22.3	42.67 ±14.6
	"More than 10 years"	50	50.97 ±12.5	57.67 ±17.0	40.02 ±11.6
	p Value		0.099	0.064	0.517
Medical Specialty	Family medicine board certified	41	56.94 ±9.2	63.15 ±11.0	46.79 ±12.3
	Family Medicine diploma	13	48.02 ±16.1	52.14 ±22.4	41.28 ±13.7
	Family medicine resident	42	48.11 ±14.1	52.90 ±17.5	40.27 ±15.8
	General practitioner	94	47.58 ±13.6	52.66 ±18.9	39.29 ±12.1
	Other	8	61.64 ±13.6	70.84 ±20.5	46.60 ±10.2
p Value		<0.001c	0.002c	0.029c	
Did you have any training in dermatology?	Yes	79	52.12 ±14.1	57.67 ±17.4	43.05 ±13.9
	No	121	48.33 ±14.1	53.58 ±19.1	39.76 ±13.7
	p Value		0.065	0.127	0.101
What are the Number atopic dermatitis cases seen in your practice per week?	1-10 cases	137	51.24 ±12.7	56.94 ±16.4	41.95 ±13.4
	11-20 cases	28	51.98 ±18.2	55.75 ±27.0	45.78 ±12.2
	more than 20 cases	12	33.61 ±17.0	37.07 ±19.7	28.05 ±17.1
	no cases	23	47.23 ±10.0	53.62 ±12.1	36.79 ±12.4
	p Value		<0.001c	0.004c	0.001c

a--significant using Independent *t*--test @<0.05 level.

b--significant using Welch's *t*--test @<0.05 level.

c--significant using One--Way ANOVA Test @ <0.05 level.

Table 6 shows the percentage of the respondents who got the correct answer on the table about symptoms considered in the (United Kingdom Working Party diagnostic criteria) for the diagnosis of atopic dermatitis in a patient with itchy skin. On History of a flexural involvement, 81 (41.0%) got the wrong answer while 116 (58.9%) got the correct answer, with 3 missing information. On Visible flexural dermatitis, 72 (36.5%) got the wrong answer while 161 (81.7) got the correct answer, with 3 missing information. On personal history of asthma or hay fever, 36 (18.3%) got the wrong answer while 161 (81.7%) got the correct answer, with 3 missing information. On history of generally dry skin in the last year, 106 (54.1%) got the wrong answer while 90 (45.9%) got the correct answer, with 4 missing information. On onset under the age of 2, 106 (53.8%) got the wrong answer while 91 (46.2%) got the correct answer, with 3 missing information.

Reliability statistics of the three domains

The reliability and consistency of the questionnaires were assessed by computing the Cronbach's Alpha for each of the three domains. The values for Cronbach's alpha in overall knowledge, self-assessment, and clinical competency were 0.639, 0.671, and -0.177 (Table 7), respectively, which means that the domains overall knowledge and self-assessment were fairly reliable, while the clinical competency domain was found to be inconsistent.

Assessment of the three domains

In order to assess the knowledge of the PHC practitioners who participated in this study, the researcher counted the correct answer for each question. Table 8 shows the assessment of the three domains in terms of the percentage of the correct answers. The results showed that the self-assessment domain had the highest percentage mean of 55.20% correct answers, followed by the overall knowledge domain which had 49.83% correct answers, and lastly the clinical competency domain having 41.06% correct answers.

Relationship between the three domains and various variables

The relationship between the three domains and age of the participants was evaluated using Pearson's correlation, as shown in **Table 9**. Based on the findings of this study, among the three domains, only the self-assessment domain was found to be statistically significant (p -value=0.014), with r of 0.213 which indicates that the self-assessment domain and the age of the participants have a weak positive correlation. In Table 10, the relationship between the three domains and the demographic characteristics of the study respondents was assessed. The findings show that in terms of gender, the overall knowledge and self-assessment domains were found to be statistically significant, having p -values of 0.004 and 0.001, respectively. Clinical competency domain, however, was revealed to be insignificant. However, it is notable to mention that in all three domains, the female participants had more correct answers with percentages of 51.96 ± 12.9 , 58.21 ± 17.4 , 41.75 ± 13.1 in the overall knowledge, self-assessment and clinical competency domains, respectively. In comparison to the male participants who got 45.63 ± 16.2 , 48.96 ± 19.8 , 40.21 ± 15.5 in the overall knowledge, self-assessment and clinical competency domains,

respectively. Therefore, the female practitioners were found to be more equipped than men in terms of knowledge and confidence in dealing with children with atopic dermatitis. The results also show that medical specialty and number of atopic dermatitis cases seen per week were significant variables in assessing the three domains. In the overall knowledge domain (p -value<0.001), the other medical specialty (intern, pediatric, etc.) got the highest percentage of 61.64 ± 13.6 , followed by the family medicine board certified with 56.94 ± 9.2 , then the family medicine resident with 48.11 ± 14.1 , the family medicine diploma with 48.02 ± 16.1 , and lastly, the general practitioner with 47.58 ± 13.6 . In terms of self-assessment domain (p -value=0.002), the other medical specialty (intern, pediatric, etc.) still got the highest percentage of 70.84 ± 20.5 , followed by the family medicine board certified with 63.15 ± 11.0 , then the family medicine resident with 52.90 ± 17.5 , the general practitioner with 52.66 ± 18.9 , and lastly, the family medicine diploma with 52.14 ± 22.4 . However, in the clinical competency domain (p -value=0.029), the family medicine board certified got the highest percentage with 46.79 ± 12.3 , followed by the other medical specialty (intern, pediatric, etc.) with 46.60 ± 10.2 , then the family medicine diploma the overall knowledge, self-assessment and clinical competency domains, respectively. In comparison to the male participants who got 45.63 ± 16.2 , 48.96 ± 19.8 , 40.21 ± 15.5 in the overall knowledge, self-assessment and clinical competency domains, respectively. Therefore, the female practitioners were found to be more equipped than men in terms of knowledge and confidence in dealing with children with atopic dermatitis. The results also show that medical specialty and number of atopic dermatitis cases seen per week were significant variables in assessing the three domains. In the overall knowledge domain (p -value<0.001), the other medical specialty (intern, pediatric, etc.) got the highest percentage of 61.64 ± 13.6 , followed by the family medicine board certified with 56.94 ± 9.2 , then the family medicine resident with 48.11 ± 14.1 , the family medicine diploma with 48.02 ± 16.1 , and lastly, the general practitioner with 47.58 ± 13.6 . In terms of self-assessment domain (p -value=0.002), the other medical specialty (intern, pediatric, etc.) still got the highest percentage of 70.84 ± 20.5 , followed by the family medicine board certified with 63.15 ± 11.0 , then the family medicine resident with 52.90 ± 17.5 , the general practitioner with 52.66 ± 18.9 , and lastly, the family medicine diploma with 52.14 ± 22.4 . However, in the clinical competency domain (p -value=0.029), the family medicine board certified got the highest percentage with 46.79 ± 12.3 , followed by the other medical specialty (intern, pediatric, etc.) with 46.60 ± 10.2 , then the family medicine diploma with 41.28 ± 13.7 , the family medicine resident with 40.27 ± 15.8 , and lastly, the general practitioner with 39.29 ± 12.1 . Regarding the number of atopic dermatitis cases seen per week, the overall knowledge (p -value<0.001), self-assessment (p -value=0.004), and clinical competency (p -value=0.001) domains were found to be statistically significant. In the overall knowledge domain, the practitioners who have seen 11--20 cases per week had the highest percentage of 51.98 ± 18.2 , followed by those who had 1--10 cases with 51.24 ± 12.7 , then those who had no cases with 47.23 ± 10.0 , and lastly, those who had more than 20 cases with 33.61 ± 17.0 . In the self-assessment domain, practitioners who have seen 1--10 cases per week had the highest percentage of 56.94 ± 16.4 , followed by those who had 11--20 cases with 55.75

± 27.0, then those who had no cases with 53.62 ± 12.1, and lastly, those who had more than 20 cases with 37.07 ± 19.7. In the clinical competency domain, the practitioners who have seen 11--20 cases per week had the highest percentage of 45.78 ± 12.2, followed by those who had 1--10 cases with 41.95 ± 13.4, then those who had no cases with 36.79 ± 12.4, and lastly, those who had more than 20 cases with 28.05 ± 17.1. It was also revealed in this study that the nationality, years of experience and relevant training in dermatology had no significant relationship with the knowledge, self-assessment and competency of the practitioners. Nonetheless, it is still mentionable that non--Saudi nationals had higher percentages of 53.01 ± 12.4, 59.95 ± 16.4, and 41.64 ± 12.6 in the overall knowledge, self--assessment and clinical competency domains, respectively, compared to the

Saudi nationals who had 49.49 ± 14.4, 54.70 ± 18.7, 41.00 ± 14.0 in the overall knowledge, self--assessment and clinical competency domains, respectively.

In terms of years of experience, participants who had 5--10 years of experience got the highest percentages of 52.15 ± 17.0, 57.94 ± 22.3, and 42.67 ± 14.6 in the overall knowledge, self--assessment and clinical competency domains, respectively. As expected, although it was found statistically insignificant, the participants with training in dermatology got higher percentages of 52.12 ± 14.1, 57.67 ± 17.4, and 43.05 ± 13.9 in the three domains, compared to those who did not undergo training with 48.33 ± 14.1, 53.58 ± 19.1, and 39.76 ± 13.7 in the overall knowledge, self-- assessment and clinical competency domains, respectively.

Table 11: Comparison of the three domains and the different medical specialty

Dependent Variable: Medical Specialty	I	J	Mean Difference (I--J)	95% Confidence Interval		p--value
				Lower Bound	Upper Bound	
Overall knowledge (LSD)	Family medicine board certified	Family Medicine diploma	8.9135*	.681	17.146	0.034
		Family medicine resident	8.8294*	3.151	14.508	0.002
		General practitioner	9.3600*	4.519	14.201	<0.001
	Family Medicine diploma	Other	-4.7009	-14.698	5.296	0.355
		Family medicine board certified	-8.9135--*	-17.146	--.681	0.034
		Family medicine resident	-.0841	-8.293	8.125	0.984
	Family medicine resident	General practitioner	.4465	-7.207	8.100	0.909
		Other	-13.6144*	-25.237	-1.992	0.022
		Family medicine board certified	-8.8294--*	-14.508	-3.151	0.002
	General practitioner	Family Medicine diploma	.0841	-8.125	8.293	0.984
		General practitioner	.5305	-4.270	5.331	0.828
		Other	-13.5304*	-23.508	-3.553	0.008
	Other	Family medicine board certified	-9.3600--*	-14.201	-4.519	<0.001
		Family Medicine diploma	-.4465	-8.100	7.207	0.909
		Family medicine resident	-.5305	-5.331	4.270	0.828
Self--Assessing (Games--Howell)	Family medicine board certified	Other	-14.0609*	-23.587	-4.535	0.004
		Family medicine board certified	4.7009	-5.296	14.698	0.355
		Family Medicine diploma	13.6144*	1.992	25.237	0.022
	Family Medicine diploma	Family medicine resident	13.5304*	3.553	23.508	0.008
		General practitioner	14.0609*	4.535	23.587	0.004
		Other	11.0079	-9.104	31.120	0.461
	Family medicine resident	Family medicine resident	10.2416*	1.288	19.195	0.017
		General practitioner	10.4836*	3.275	17.692	0.001
		Other	-7.6912	-33.604	18.222	0.834
	Family medicine resident	Family medicine board certified	-11.0079	-31.120	9.104	0.461
		Family medicine resident	-.7663	-21.402	19.870	1.000
		General practitioner	-.5243	-20.729	19.680	1.000
	Family medicine resident	Other	-18.6990	-47.958	10.560	0.329
		Family medicine board certified	-10.2416*	-19.195	-1.288	0.017
		Family Medicine diploma	.7663	-19.870	21.402	1.000
General practitioner	General practitioner	.2420	-9.028	9.512	1.000	
	Other	-17.9327	-43.930	8.065	0.223	
	Family medicine board certified	-10.4836*	-17.692	-3.275	0.001	
Other	Family Medicine diploma	.5243	-19.680	20.729	1.000	
	Family medicine resident	-.2420	-9.512	9.028	1.000	
	Other	-18.1747	-44.089	7.740	0.203	
Other	Family medicine board certified	7.6912	-18.222	33.604	0.834	
	Family Medicine diploma	18.6990	-10.560	47.958	0.329	
	Family medicine resident	17.9327	-8.065	43.93	0.223	
	General practitioner	18.1747	-7.740	44.089	0.203	

Table 12: Assessment of the three domains based on the number of atopic dermatitis cases seen per week.

Dependent Variable: What are the Number atopic dermatitis cases seen in your practice per week?	I	J	Mean Difference (I--J)	95% Confidence Interval		p-- value
				Lower Bound	Upper Bound	
Overall knowledge (Games-- Howell)	"1--10 cases"	"11--20 cases"	-0.7362	-10.512	9.040	0.997
		more than 20 cases	17.6340*	2.747	32.521	0.019
		no cases	4.0162	-2.328	10.360	0.335
	"11--20 cases"	"1--10 cases"	0.7362	-9.040	10.512	0.997
		more than 20 cases	18.3702*	1.754	34.986	0.027
		no cases	4.7525	-6.005	15.510	0.642
	more than 20 cases	"1--10 cases"	-17.6340--*	-32.521	-2.747	0.019
		"11--20 cases"	-18.3702--*	-34.986	-1.754	0.027
		no cases	-13.6178	-28.960	1.724	0.091
	no cases	"1--10 cases"	-4.0162	-10.360	2.328	0.335
		"11--20 cases"	-4.7525	-15.510	6.005	0.642
		more than 20 cases	13.6178	-1.724	28.960	0.091
Self-- Assessment (Games-- Howell)	"1--10 cases"	"11--20 cases"	1.1893	-13.155	15.534	0.996
		more than 20 cases	19.8691*	2.535	37.203	0.023
		no cases	3.3140	-4.471	11.099	0.664
	"11--20 cases"	"1--10 cases"	-1.1893	-15.534	13.155	0.996
		more than 20 cases	18.6798	-2.176	39.536	0.092
		no cases	2.1247	-13.151	17.400	0.982
	more than 20 cases	"1--10 cases"	-19.8691--*	-37.203	-2.535	0.023
		"11--20 cases"	-18.6798	-39.536	2.176	0.092
		no cases	-16.5551	-34.453	1.343	0.075
	no cases	"1--10 cases"	-3.3140	-11.099	4.471	0.664
		"11--20 cases"	-2.1247	-17.400	13.151	0.982
		more than 20 cases	16.5551	-1.343	34.453	0.075
Clinical Competency(LSD)	"1--10 cases"	"11--20 cases"	-3.8238	-9.282	1.634	0.169
		more than 20 cases	13.9047*	5.982	21.827	0.001
		no cases	5.1678	-7.62	11.098	0.087
	"11--20 cases"	"1--10 cases"	3.8238	-1.634	9.282	0.169
		more than 20 cases	17.7286*	8.649	26.808	<0.001
		no cases	8.9916*	1.586	16.397	0.018
	more than 20 cases	"1--10 cases"	-13.9047--*	21.827	-5.982	0.001
		"11--20 cases"	-17.7286--*	26.808-	-8.649	<0.001
		no cases	-8.7370	18.108-	.634	0.067
	no cases	"1--10 cases"	-5.1678	11.098-	.762	0.087
		"11--20 cases"	-8.9916--*	16.397	-1.586	0.0188
		more than20 cases	8.7370	-.634	18.108	0.067

*. The mean difference is significant at the 0.05 level.

Table 13: Correlation of self--assessment domain and clinical competency domain.

Correlations	Clinical Competency	
Self--Assessment	r	0.348**
	p-value	<0.001
	N	200

** Correlation is significant at the 0.01 level (2--tailed).

Table 14: Assessment of overall knowledge based on gender, age, medical specialty, and number of cases per week.

Model	Unstandardized Coefficients		Standardized Coefficients	t	p Value
	B	Std Error	Beta		
(Constant)	52.884	7.131		7.416	<0.001
Gender	2.280	2.276	0.089	1.002	0.319
Age	0.137	0.136	0.087	1.008	0.316
Medical Speciality	-2.194	0.817	-0.234	-2.684	0.008*
What are the Number atopic dermatitis cases seen in your practice per week?	-2.382	1.157	-0.184	-2.059	0.042*

a--Dependent Variable: Overall knowledge; R Squared = 0.121 (Adjusted R Squared = 0.092)

Table 11 shows the comparison of the three domains and the different medical specialty. In terms of the overall knowledge domain, the other medical specialty (intern, pediatric, etc.) had the highest mean difference, compared to the four medical specialties including family medicine board certified (4.7009), family medicine resident (13.5304), family medicine diploma (13.6144), and general practitioner (14.0609). The family medicine board certified was revealed to have higher overall knowledge scores than family medicine resident (8.8294), family medicine diploma (8.9135), and general practitioner (9.3600). Family medicine residents were also found to be more knowledgeable than family medicine diploma (0.0841) and general practitioner. Also, family medicine diploma holders were more knowledgeable than general practitioners. However, the mean differences that were statistically significant were found between the following comparisons: family medicine board certified VS family medicine diploma (p -value=0.034), family medicine resident (p -value=0.002), and general practitioner (p -value<0.001); and other medical specialty VS family medicine diploma (p -value=0.022), family medicine resident (p -value=0.008), and general practitioner (p -value=0.004). In the self-assessment domain, practitioners with other medical specialty still have the highest mean difference in contrast to the other four specialties, however, these differences were found to be statistically insignificant. Furthermore, the comparison between family medicine board certified VS family medicine resident (p -value=0.017), and general practitioner (p -value=0.001) revealed to be statistically significant with mean differences of 10.2416 and 10.4836, respectively. Consistent with the results of the self-assessment domain, in terms of clinical competency, only the comparison between family medicine board certified VS family medicine resident (p -value=0.024), and general practitioner (p -value=0.002) were statistically significant with mean differences of 6.5164 and 7.4984, respectively. The three domains were also assessed based on the number of atopic dermatitis cases seen per week, which is shown in Table 12. In terms of the overall knowledge, participants who have seen 1–10 cases per week were more knowledgeable than those with more than 20 cases, having a mean difference of 17.6340 (p -value=0.019). Moreover, participants who have seen 11–20 cases per week were more knowledgeable than those with more than 20 cases, having a mean difference of 18.3702 (p -value=0.027). Regarding the self-assessment domain, participants who have seen 1–10 cases per week were more confident than those with more than 20 cases, having a mean difference of 19.8691 (p -value=0.023). In terms of clinical competency, participants who have seen 1–10 cases per week were more competent than those with more than 20 cases, having a mean difference of 13.9047 (p -value=0.001). Furthermore, participants who have seen 11–20 cases per week were more competent than those with more than 20 cases and those with no cases, having a mean difference of 17.7286 (p -value<0.001) and 8.9916 (p -value=0.018), respectively. Table 13 shows the correlation of self-assessment and clinical competency domains. With p -value of <0.001, it was shown that the correlation between self-assessment and clinical competency are statistically significant. Although there was a correlation between the two domains, r value is 0.348 which means that their relationship is a weak positive correlation. Overall knowledge was assessed based on gender, age, medical

specialty, and number of cases per week, as shown in Table 14. Based on the computed p -value, only medical specialty (p -value=0.008) and number of atopic dermatitis cases seen per week (p -value=0.042) had a significant effect on the dependent variable which is overall knowledge.

DISCUSSION

In order to improve the quality of health care to patients with allergic dermatitis, this study sought to assess the level of knowledge of physicians about the treatment and proper management of allergic dermatitis in the primary health care setting in Jeddah, 2017, and to determine the factors effecting the level of knowledge.

The findings showed that the among the three domains, the self-assessment domain had the highest percentage mean of 55.20% correct answers, followed by the overall knowledge domain which had 49.83% correct answers, and lastly, the clinical competency domain having 41.06% correct answers. However, considering these percentages, it is alarming to know that the participants of this study had very low scores in all three domains, especially the overall knowledge since they are assumed to be the most knowledgeable in terms of treating and managing children with atopic dermatitis. In 2005, Hay reported that skin conditions are often not well managed on the PHC level. According to him, there were two main factors that influence this, one is the poor knowledge level of the PHC physicians and the other is the unavailability of the treatment.¹⁴ To support our findings, Alkatheri¹⁰ conducted a study on common dermatological disorders showing that about 94% of the PHC practitioners had low scores (less than 60%) in their knowledge. These low knowledge scores were also reported by previous studies conducted in Bulgaria¹⁵, Mediterranean island¹⁶, England and Wales^{17,18}, and North India.¹⁹ This general lack of dermatological knowledge among PHC physicians may be explained by the scarce or lack of factual training, with most of the education based on the didactic, lecture-type classes.²⁰ As emphasized by other researchers, the re-evaluation of the dermatology curriculum in medical schools and family practice residencies is much needed.²¹ Although it was revealed in this study that the other two domains had no significant association with age, it is still notable that the self-assessment domain and the age of the participants have a positive correlation, which means that with increasing age, there is also a rising self-assessment or attitude score. However, since the r value is very small, this correlation is considered weak. This relationship is universally known in the medical world for as the PHC practitioner ages, s/he gains more knowledge and experience on the field which translates to increasing confidence in dealing with the disease condition. In previous studies though, none was able to point out any significant association between the two variables, yet it is still worth to mention that in a study conducted by Alkatheri¹⁰, the level of perceived insufficient knowledge on dermatological disorders decreased as the participants age. For instance, despite the lack of statistical significance, he was able to show that 47.6% practitioners were aged 30 to 40 who exhibited insufficiency, while 24.5% were 41 to 50 years old, and finally only 3.3% who were above 50 years of age.¹⁰

The results also showed that the female practitioners who participated in this study were found to be more equipped than

men in terms of overall knowledge and self-assessment in managing children with atopic dermatitis. As strength, this study is first in Jeddah to assess the association between gender and knowledge level of PHC practitioners in the management of children with atopic dermatitis. In a study on common dermatological disorders, Alkatheri¹⁰ reported out that less women (35.4%) had insufficient knowledge scores compared to the men counterpart (58.5%). The results also revealed that medical specialty and number of atopic dermatitis cases seen per week were significant variables in assessing the three domains. Al-Hoqail et al.¹³ emphasized that there is a significant difference in the overall performance of those who had had specific training in dermatology compared to those who did not. In addition, it was recently reported by Le Roux et al.¹² that medical specialization has a big role in treating skin disorders. Previous studies have identified limited training for general practitioners in dermatology at both undergraduate and postgraduate levels.^{22,23}

The self-assessment and clinical competency domains exhibited a weak positive correlation, as previously shown in this study. Evans et al.²⁴ pointed out previously that self-perception and self-assessment may not necessarily correlate always with clinical competency. In a recent study by Bahelah et al.¹¹, they found that there was no relationship between ability to classify skin lesions and PHC physicians' self-perception of competency in dermatology. Our findings are also consistent with previous studies. Wherein Tracey et al.²⁵ found a poor correlation between general practitioners' self-evaluation and their test scores which consisted of true and false question style. In 1998, Edwards et al. found that PHC practitioners were able to assess their knowledge correctly if the relevant questions based on patients' needs were asked. Our results are comparable to previous findings from a study assessing self-perceptions of competency among physicians providing immunization in Riyadh City, Saudi Arabia, which revealed that 67.3% of participants evaluated themselves as average, 30.7% as excellent, and 2% as poor immunization providers.²⁶

Finally, in order to identify the factors affecting the overall knowledge of the PHC practitioners involved in this study, a linear regression analysis was conducted, which resulted to revealing medical specialty and number of atopic dermatitis cases seen per week as the variables which had a significant effect on overall knowledge levels. Le Roux, et al.¹² highlighted that the common, impactful primary care condition of eczema is given low priority in the context of high competing demands, and the practitioners' knowledge and confidence in managing it could be improved, especially those first in line in the treatment and management. General practitioners are urged to be aware of and to acknowledge the psychosocial impact of eczema since among the medical specialty attending to atopic dermatitis, GPs are consistently found to be the least knowledgeable.²⁷ Alkatheri¹⁰ also revealed that when the experience of PHC practitioners in the diagnosis and management of skin disorders was compared with that of the dermatologists, he found that despite the fact that relatively more cases for skin ailments were managed by PHC physicians, they were still unable to treat every case thus resulting to referral to dermatologists. Consequently, he recommended that delivery of dermatological health care services must be put into priority, and to improve the dermatological care by designing future plan of educational programs for PHC practitioners.²⁸

CONCLUSION

Allergic dermatitis, also called atopic dermatitis or atopic eczema, is a chronic recurring inflammatory skin disorder that is characterized by itching and redness of the skin. It generally affects 15 to 20% of children and 1 to 3 % of adults worldwide. Various reports have shown that childhood atopic dermatitis has a major impact on children and families' quality of life. In order to improve the quality of health care to patients with allergic dermatitis, this study sought to assess the level of knowledge of physicians about the treatment and proper management of allergic dermatitis in the primary health care setting in Jeddah, 2017, and to determine the factors effecting the level of knowledge.

Among the 200 PHC practitioners who participated in this study, the average age was 35 years old. Majority of the participants were females which comprised 67.3%, the other 32.7% was composed of male respondents. Most of the participants were Saudi nationals (90.5%), while the remaining 9.5% were foreigners. In terms of years of experience, 42.5% of the participants had less than 5 years, 32.5% had 5 to 10 years of experience, while 25.0% had more than 10 years. Regarding medical specialty, majority of the participants were general practitioners comprising of 47.5%, 21.2% participants were family medicine residents, 20.7% were family medicine board certified, 6.6% had family medicine diploma, while the remaining 4.0% had other medical specialty namely intern, pediatric, and others. Among the 200 participants, 60.5% had no training in dermatology, while 39.5% had training. In terms of the number of atopic dermatitis cases seen per week, 68.5% have seen 1 to 10 cases per week, 14.0% have seen 11 to 20 cases per week, 6.0% saw more than 20 cases per week, while the remaining 11.5% of the participants had no cases seen.

The findings showed that the among the three domains, the self-assessment domain had the highest percentage mean of 55.20% correct answers, followed by the overall knowledge domain which had 49.83% correct answers, and lastly, the clinical competency domain having 41.06% correct answers. The relationship between the three domains and age of the participants was found to be statistically significant. The findings show that in terms of gender, the overall knowledge and self-assessment domains were found to be statistically significant. Clinical competency domain, however, was revealed to be insignificant. The female practitioners were found to be more equipped than men in terms of knowledge and self-assessment in managing children with atopic dermatitis. The results also showed that medical specialty and number of atopic dermatitis cases seen per week were significant variables in assessing the three domains. Although there was a correlation between the self-assessment and clinical competency domains, their relationship was identified as a weak positive correlation due to the low *r* value. Overall knowledge was assessed based on gender, age, medical specialty, and number of cases per week, and based on the computed *p*-value, only medical specialty and number of atopic dermatitis cases seen per week had a significant effect on the overall knowledge.

Childhood atopic eczema has an overwhelming bearing on the social, personal, emotional, and financial viewpoints of affected families. This is a condition that requires proper management and follow up by the primary health care physicians who are usually the first line in managing and treating its common problems. This is why it is very important to improve the quality of health care to

patients with allergic dermatitis by enhancing the knowledge of primary health care physicians about its proper management. However, before giving proper intervention to the patients, the health care providers must be well-equipped and knowledgeable on the disease condition. Thus, assessment of the knowledge, attitude, and competency of the health care providers is needed first.

RECOMMENDATIONS

The researcher believes that this study raises several hypotheses that merit further research about the overall knowledge of physicians on treating patients with atopic dermatitis. Based on the results, it may be suggested that the health care institution put more emphasis in assessing the competencies of the physicians attending to patient with atopic dermatitis. Because of the low ratings on the three domains (overall knowledge, self-assessment, clinical competency), more trainings and seminars on atopic dermatitis may be given to physicians especially to those who are specializing in dermatology. Increased and wider exposure to the disease may also be helpful in honing the skills of the clinical physicians. Moreover, since male physicians were found to be less equipped than their female counterparts, a gender-specific training or seminar can help them enhance their knowledge and skills in treating such cases.

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