Prevalence of Atopic Dermatitis among Adults in Jazan Region, Saudi Arabia

Abuobaida Yassin[1], Reem Maashi[2], Amna Zila[2], Nuha Dilyh[2], Samar Dilyh[2], Fatima Ezzi[2], Maha madkhali[2], Meshal Bajoned[3]

[1]Assistant Professor, Department of Internal Medicine Faculty of Medicine, Jazan University, Jazan, Saudi Arabia
[2]Intern, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia
[3]5th Year Medical student, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia

Abstract: Atopic dermatitis (AD) and other allergies have developed into the most popular chronic diseases. Little information is available about the prevalence of these diseases in Jazan Region, Saudi Arabia, especially among the adult group.

Objective: This study was designed to identify the prevalence of AD symptoms among adults in Jazan Region Saudi Arabia.

Methods: A cross-sectional study was conducted health college students, Jazan University, Jazan, Saudi Arabia. The study used the International Study of Asthma and Allergies in Children (ISAAC) questionnaire.

Result: The number of students studied was 1210 the male 654 (54.0%) and the female were 556 (46.0%). The mean age of them was 21.5 ± 1.4 years. The prevalence of AD-related symptoms is shown in Table II, which revealed the prevalence of ever AD, recurrent AD during last six months, AD symptoms during last 12 months, and Eczema confirmed by doctor was 53 (4.3%), 222 (18.3%), 197 (16.3%) and 53 (3.4%) respectively. The frequency rate of rash cleared completely during the last 12 months was 29 (3.4%), which showed clear significant statistical difference between gender (p = 0.000). The prevalence of AD-related symptoms according to geographical distribution of study population showed that the ever eczema in costal, plain and mountain was 22 (1.8%), 21 (1.7%) and 10 (0.8%) respectively as shown in table III. Those who had eczema confirmed by doctor in costal, plain and mountain area was 23 (1.9%), 29 (2.4%) and 15 (1.2%) respectively.

Conclusion: The present study has demonstrated the prevalence of AD in Jazan Region SA. Although more studies are needed to investigate the role of environmental factors, which may lead to changes in prevalence of AD and other associated allergic diseases as asthma and allergic rhinitis. The prevalence of AD among Jazan University students was 18.3% only 5.5% had confirmed AD by doctor.

Keywords: Prevalence, Atopic Dermatitis, ISAAC, Adult, Jazan Region.

1. INTRODUCTION

Atopy is a personal and/or familial tendency, usually in childhood or adolescence, to become sensitized and produce IgE antibodies in response to ordinary exposure to allergens, usually proteins. The terms 'atopy' and 'atopic' should be reserved to describe the genetic predisposition to become IgE-sensitized to allergens commonly occurring in the environment and to which everyone is exposed but to which the majority do not produce a prolonged IgE antibody response. Thus, atopy is a clinical definition of an IgE antibody high-responder. The term atopy can't be used until an IgE sensitization has been documented by IgE antibodies in serum or by a positive skin prick test. Allergic symptoms in a typical atopic individual can be referred to as atopic, e.g., atopic asthma. However IgE mediated asthma in general should not be called atopic asthma. Neither a positive skin prick test nor presence of IgE antibody to a less common allergen, e.g. Hymenoptera sting or a drug, which are high dose exposures, is a diagnostic criterion for atopy [1]. Atopic diseases

manifested as:- asthma, allergic rhinitis, and eczema/atopic dermatitis (AD) are the principal atopic diseases. Allergic or atopic diseases are among the most widespread disorders in humans. The estimated prevalences of allergic rhinitis, asthma, and AD are 20%, 10%, and 5%, respectively [2,3]. Urticaria and angioedema, in response to environmental, food or drug allergens in some cases, are additional manifestations of atopy.

AD is a pruritic disease of unknown origin that usually starts in early infancy (an adult-onset variant is recognized); it is characterized by pruritus, eczematous lesions, xerosis (dry skin), and lichenification (thickening of the skin and an increase in skin markings). AD may be associated with other atopic (immunoglobulin E [IgE]–associated) diseases (eg, acute allergic reaction to foods, asthma, urticaria, and allergic rhinitis).[4] AD has enormous morbidity, and the incidence and prevalence appear to be increasing. Further, AD is the first disease to present in a series of allergic diseases such as food allergy, asthma, and allergic rhinitis (in order), provoking the "atopic march" theory, which suggests that early or severe AD and cutaneous sensitization to environmental allergens may lead to subsequent allergic disease at other epithelial barrier surfaces (eg, gastrointestinal or respiratory tract) [5].

AD does not only affect children. Although it almost always appears during early childhood and often before the age of two, it does not always disappear before adolescence or adulthood. It is estimated that some 10% of patients continue to suffer from eczema as adults. In some cases this eczema is a cause for worry and can bring about complicated problems [6, 7]. AD in adults is often a serious condition. It involves chronic, red, thick, lichenified plaques, sometimes with isolated pruritic papules. In addition to this chronic eczema, patients experience acute, vesicular or oozing flare-ups. Pruritus is always intense, with knock-on effects on daily life, morale, sleep and activity. In adults, the disease affects different areas of the body compared to infantile manifestations. The hands, face and especially the eyelids are most often involved, as well as large skin folds and sometimes other areas. Inflammatory flare-ups can affect skin all over the body. This is called erythroderma. These widespread conditions are serious, and can become more complicated when infections and metabolic disorders develop. They require hospitalization.

The International Study of Asthma and Allergy in Children (ISAAC) phase I protocol was designed to identify the symptoms of asthma, AR and eczema. The data generated from these surveys can estimate the prevalence of these health problems, which based on the symptomatology and participants perception.

The aim of this study was to investigate the prevalence and severity of AD in adults in Saudi Arabia (SA) using the validated Arabic version of the ISAAC questionnaire.

2. MATERIAL AND METHODS

Study Area:

This study conducted in Jazan (also called Gizan) region is one of the thirteen regions of the Kingdom of SA. It is located on the tropical Red Sea coast in southwestern Saudi Arabia. Jazan covers an area of 11,671 square kilometers, including some 5,000 villages and towns with a total population of 1.5 million. This study was cross-sectional study conducted among health colleges' students, Jazan University, Jazan region, SA over a period of 3 months started in January 2016 to fulfill the proposed objectives.

Sample Design and Size:

The ultimate objective of the study was to estimate the prevalence of AD among adult in Jazan region, SA using Health Colleges students, Jazan University as target population to represent adults in the region. For this purpose, multistage cluster random sampling utilized. Health Colleges in Jazan University is classified into three main campuses, the medical campus 1 (College of Medicine and College of Applied Medical Sciences (AMS)), Medical campus 2 (College of Pharmacy, College of Public Health and College of Nursing) and medical campus 3 (College of dentistry). Following Cochrain (1977), the suitable sample size determined on the bases of the standard formula given by:

$$n = \frac{Z^2 \pi (1 - \pi)}{d^2}$$

Where:

n: the sample size.

π: is an anticipated proportion here, the prevalence of asthma.

Z: the standardized variable that corresponds to 95% level of confidence.

d: the desired marginal error.

Since there is no prior knowledge about the prevalence of AD in Jazan region we will set the values π = 0.5 to provide the maximum sample size, d the desired marginal error = 0.05 and z=1.96, the study sample size, denoted (n), is given by:

$$n = \frac{(1.96)^2 \, x(0.5)x(0.5)}{(0.05)^2} = 384$$

Since the sample proportion to the total population is less than 0.05 of the total number of health colleges' students in Jazan region, we don't need to use the finite population correction factor to adjust the sample size. However, in order to increase precision, which might be lost as a result of adopting multi-stage cluster sampling method, we multiply the sample size (n) by the design effect factor, which is the ratio of the variance of estimates for a particular sample design to the variance of estimates for a simple random sample of the same size. The design effect is equal to the number of medical campuses in Jazan University, so that the minimum sample size required is 1152. The sample size distributed between both sexes according to the sex ratio in the colleges. The colleges as well students in the different clusters selected using simple random technique. We add 15% to total sample size as non responders for that the total sample were 1325 distributed according to the three medical campuses as follow 500, 625 and 200 respectively.

Data collection and analysis:

Data collected using structured questionnaire that developed by ISAAC. The questionnaire written in Arabic and were mainly address to target group and filled by them. These data had been entered and analyzed using Statistical Package for Social Sciences (SPSS) software version 20.0.

3. RESULT

A total of 1325 questionnaires were distributed to the students, 38 questionnaires were removed due to incomplete data. The overall response rate was 91.3% for that the final total sample size was 1210 students. Male students completed 654 (54.0%) questionnaires, and female completed 556 (46.0%). The background characteristics of the study population are shown in Table I. The mean age of them was 21.5 ± 1.4 years. Most of them 1074 (88.8%) within age from 20 to 23 years old. The maximum age was 30 years, which account only 0.2% of all population. Most of study population was lived in rural area 761 (62.9%). Students from mountain area only represent 13.4% of study population. Most of study population was single 1093 (90.3%).

Table I: The background characteristics of the study population

Total students		Gender		Total
		Male	Female	
		654 (54.0%)	**556 (46.0%)**	**1210 (100%)**
Age	18 years old	2	3	5 (0.4%)
	19 years old	8	33	41 (3.4%)
	20 years old	156	138	294 (24.3%)
	21 years old	161	109	270 (22.3%)
	22 years old	193	119	312 (25.8%)
	23 years old	98	100	198 (16.4%)
	24 years old	21	35	56 (4.6%)
	25 years old	13	14	27 (2.2%)
	26 years old	1	1	2 (0.2%)
	27 years old	0	2	2 (0.2%)
	28 years old	0	1	1 (0.1%)
	29 years old	0	0	0 (0.0%)
	30 years old	1	1	2 (0.2%)
	Total			**1210 (100%)**
Residency	Urban	226	223	449 (37.1%)

	Rural	428	333	761 (62.9%)
	Total (0.049)			**1210 (100%)**
Geographical Distribution	Coastal	210	258	468 (38.7%)
	Plain	347	233	580 (47.9%)
	Mountain	97	65	162 (13.4%)
	Total (0.000)			**1210 (100%)**
Marital Status	Single	627	466	1093 (90.3%)
	Married	26	80	106 (8.8%)
	Divorced	1	8	9 (0.7%)
	Widow	0	2	2 (0.2%)
	Total (0.000)			**1210 (100%)**
College (Program)	Medicine	100	100	200 (16.5%)
	Dentistry	111	76	187 (15.5%)
	Pharmacy	76	64	140 (11.6%)
	Applied Medical Sciences	149	102	251 (20.7%0
	Nursing	146	169	315 (26.0%)
	Public Health	72	45	117 (9.7%)
	Total (0.006)			**1210 (100%)**
Academic Level	3rd	140	128	268 (22.1%)
	4th	46	55	101 (8.3%)
	5th	172	146	328 (27.1%)
	6th	31	56	87 (7.2%)
	7th	153	86	239 (19.8%)
	8th	35	13	48 (4.0%)
	9th	46	22	68 (5.6%)
	10th	4	17	21 (1.7%)
	11th	0	0	0 (0.0%)
	12th	27	23	50 (4.1%)
	Total (0.000)			**1210 (100%)**

The prevalence of AD-related symptoms is shown in Table II, which revealed the prevalence of ever AD, recurrent AD during last six months, AD symptoms during last 12 months, and Eczema confirmed by doctor was 53 (4.3%), 222 (18.3%), 197 (16.3%) and 53 (3.4%) respectively. The frequency rate of rash cleared completely during the last 12 months was 29 (3.4%), which showed clear significant statistical difference between gender ($p = 0.000$).

Table II: Prevalence of AD-related symptoms

#	Items	Male	Female	Total	*P*
1	Have you ever has eczema	16 (1.3%)	37 (3.0%)	53 (4.3%)	0.104
2	Itchy rash come and go for the last 6 months	107 (8.8%)	115 (9.5%)	222 (18.3%)	0.134
3	Itch rash at any time in last 12 months	88 (7.3%)	109 (9.0%)	197 (16.3%)	0.016
4	Eczema confirmed by doctor	37 (3.0 %)	30 (2.5%)	67 (5.5%)	0.799
5	The rash cleared completely during the last 12 months	5 (0.4%)	24 (2.0%)	29 (3.4%)	0.000

The prevalence of AD-related symptoms according to geographical distribution of study population showed that the ever eczema in costal, plain and mountain was 22 (1.8%), 21 (1.7%) and 10 (0.8%) respectively as shown in table III. Those who had eczema confirmed by doctor in costal, plain and mountain area was 23 (1.9%), 29 (2.4%) and 15 (1.2%) respectively. AD-related symptoms that occurred during last 12 months not show any significant statistical differences according to geographical distribution. Students with rash cleared completely during the last 12 months in costal, plain, and mountain area were 14 (1.2%), 8 (0.7%) and 7 (0.5%) respectively. It also showed clear statistical significant difference in frequencies according to geographical distribution (0.000%).

Table III: Prevalence of AD-related symptoms according to gender & geographical distribution

#	Items		Costal	Plain	Mountain	Total	P
1	Have you ever has eczema	Male	4 (0.3%)	6 (0.5%)	6 (0.5%)	16 (1.3%)	0.023
		Female	18 (1.5%)	15 (1.2%)	4 (0.3%)	37 (3.0%)	0.726
		Total	**22 (1.8%)**	**21 (1.7%)**	**10 (0.8%)**	53 (4.3%)	**0.076**
2	Itchy rash come and go for the last 6 months	Male	30 (2.5%)	54 (4.4%)	23 (1.9%)	107 (8.8%)	0.238
		Female	59 (4.9%)	37 (3.0%)	19 (1.6%)	115 (9.5%)	0.095
		Total	**89 (7.4%)**	**91 (7.4%)**	**42 (4.5%)**	222 (18.3%)	**0.055**
3	Itch rash at any time in last 12 months	Male	27 (2.2%)	41 (3.4)	20 (1.7%)	88 (7.3%)	0.206
		Female	59 (4.9%)	35 (2.9)	15 (1.2%)	109 (9.0%)	0.187
		Total	**86 (7.1%)**	**76 (6.3%)**	**35 (2.9%)**	197 (16.3%)	**0.089**
4	Eczema confirmed by doctor	Male	12 (1.0%)	15 (1.2%)	10 (0.8%)	37 (3.0%)	0.343
		Female	11 (0.9%)	14 (1.2%)	5 (0.4%)	30 (2.5%)	0.598
		Total	**23 (1.9%)**	**29 (2.4%)**	**15 (1.2%)**	**67 (5.5%)**	**0.222**
5	The rash cleared completely during the last 12 months	Male	0 (0.0%)	0 (0.0%)	5 (0.4%)	5 (0.4%)	0.000
		Female	14 (1.2%)	8 (0.7%)	2 (0.1%)	24 (2.0%)	0.012
		Total	**14 (1.2%)**	**8 (0.7%)**	**7 (0.5%)**	**29 (3.4%)**	**0.000**

Table IV showed frequency of AD-related symptoms in colleges. Those who had ever eczema in College of Medicine, College of Pharmacy and College of AMS, was 23 (1.9%), 0 (0.0%), 21 (1.7%), and 9 (0.7%) respectively, with 0.0% in College of Dentistry, College of Public Health and College of Nursing. There was no clear difference in frequency of AD-related symptoms according the college distribution. Medical student had high prevalence of eczema confirmed by doctor 24 (2.0%) and only 5 (0.4%) reported in College of Nursing. Students with the rash cleared completely during the last 12 months in College of Medicine, College of Pharmacy and College of AMS, was 13 (1.1%), 10 (0.8%) and 6 (0.5%) respectively, but no students were experienced these symptoms in College of Dentistry, College of Public Health and College of Nursing. The AD-related symptoms occur at any time in last 12 months according to college distribution College of Medicine, College of Dentistry, College of Pharmacy, College of AMS, College of Public Health and College of Nursing was 29 (2.4%), 22 (1.8%), 29 (2.4%), 44 (3.6%), 27 (2.2%) and 46 (3.9%) respectively.

Table IV: Frequency of AD-related symptoms according to the colleges.

#	Items		Colleges						Total	P
			Medicine	Dentistry	Pharmacy	AMS	Public Health	Nursing		
1	Have you ever has eczema	Male	6 (0.5%)	0 (0.0%)	10 (0.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	16 (1.3%)	0.881
		Female	17 (1.4%)	0 (0.0%)	11 (0.9%)	9 (0.7%)	0 (0.0%)	0 (0.0%)	37 (3.0%)	0.200
		Total	23 (1.9%)	0 (0.0%)	21 (1.7%)	9 (0.7%)	0 (0.0%)	0 (0.0%)	53 (4.3%)	0.048
2	Itchy rash come and go for the last 6 months	Male	16 (1.3%)	16 (1.3%)	13 (1.1%)	25 (2.1%)	20 (1.6%)	17 (1.4%)	107 (8.8%)	0.069
		Female	24 (2.0%)	16 (1.3%)	12 (1.0%)	23 (1.9%)	12 (1.0%)	28 (2.3%)	115 (9.5%)	0.342
		Total	40 (3.3%)	32 (2.6%)	25 (2.1%)	48 (4.0%)	32 (2.6%)	45 (3.7%)	222 (18.3%)	0.004
3	Itch rash at any time in last 12 months	Male	6 (0.5%)	12 (1.0%)	16 (1.3%)	21 (1.7%)	16 (1.3%)	17 (1.5%)	88 (7.3%)	0.011
		Female	23 (1.9%)	10 (0.8%)	13 (1.1%)	23 (1.9%)	11 (0.9%)	29 (2.4%)	109 (9.0%)	0.680
		Total	29 (2.4%)	22 (1.8%)	29 (2.4%)	44 (3.6%)	27 (2.2%)	46 (3.9%)	197 (16.3%)	0.067
4	Eczema confirmed by doctor	Male	10 (0.8%)	0 (0.0%)	10 (0.8%)	10 (0.8%)	7 (0.6%)	0 (0.0%)	37 (3.0%)	0.503
		Female	14 (1.2%)	0 (0.0%)	8 (0.7%)	0 (0.0%)	3 (2%)	5 (0.4%)	30 (2.5%)	0.155
		Total	24 (2.0%)	0 (0.0%)	18 (1.5%)	10 (0.8%)	10 (0.8%)	5 (0.4%)	67 (5.5%)	0.477
5	The rash cleared completely during the last 12 months	Male	5 (0.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (0.4%)	0.000
		Female	8 (0.7%)	0 (0.0%)	10 (0.8%)	6 (0.5%)	0 (0.0%)	0 (0.0%)	24 (2.0%)	0.000
		Total	13 (1.1%)	0 (0.0%)	10 (0.8%)	6 (0.5%)	0 (0.0%)	0 (0.0%)	29 (3.4%)	0.000
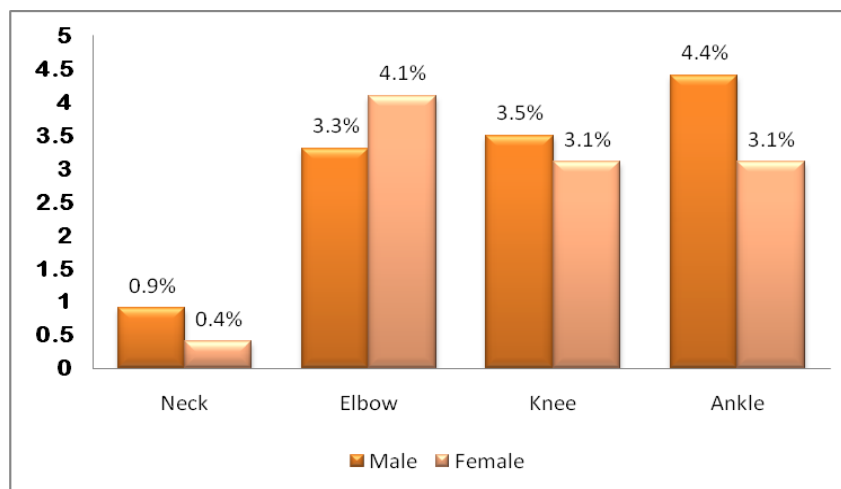
Figure I: Common sites of symptoms

#	Site of lesions	Male	Female	Total	*P*
1	Neck	11(0.9%)	5 (0.4%)	**16 (1.3%)**	0.282
2	Elbow	40 (3.3%)	50 (4.1%	**90 (7.4%)**	0.047
3	Knee	42 (3.5%)	38 (3.1%)	**80 (6.6%)**	0.291
4	Ankle	53 (4.4%)	38 (3.1%)	**91 (7.5%)**	0.223

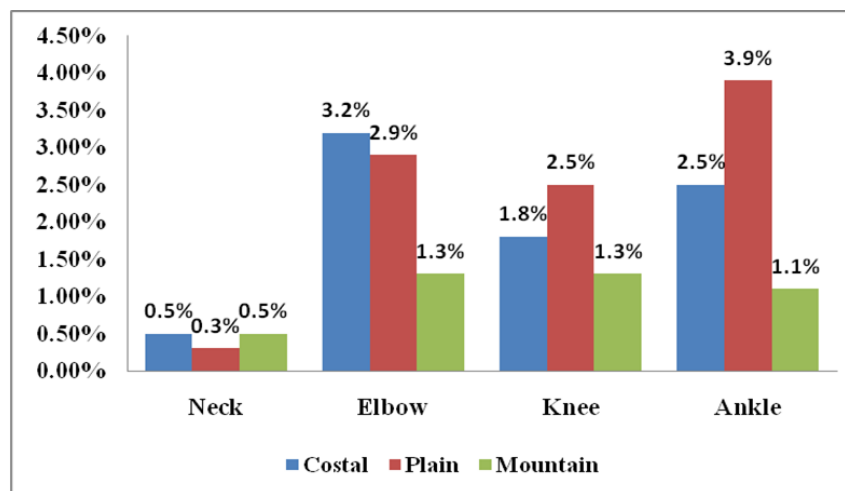Figure I revealed neck, knee and ankle symptoms were common in male 11(0.9%), 42 (3.5%) and 53 (4.4%) respectively.

Figure II: Common site of lesions according to the geographical distribution

#	Site of lesions		Costal	Plain	Mountain	Total	*P*
1	Elbow	Male	13 (1.1%)	18 (1.5%)	9 (0.7%)	40 (3.3%)	0.331
		Female	26 (2.1%)	17 (1.4%)	7 (0.6%)	50 (4.1%)	0.445
		Total	**39 (3.2%)**	**35 (2.9%)**	**16 (1.3%)**	**90 (7.4%)**	**0.150**
2	Knee	Male	8 (0.7%)	27 (2.2%)	7 (0.6%)	42 (3.5%)	0.169
		Female	14 (1.1%)	16 (1.3%)	8 (0.7%)	38 (3.1%)	0.192
		Total	**22 (1.8%)**	**43 (2.5%)**	**15 (1.3%)**	**80 (6.6%)**	**0.080**
3	Ankle	Male	16 (1.3%)	28 (2.3%)	9 (0.8%)	53 (4.4%)	0.884
		Female	15 (1.2%	19 (1.6%)	4 (0.3%)	38 (3.1%)	0.489
		Total	**31 (2.5%)**	**47 (3.9%)**	**13 (1.1%)**	**91 (7.5%)**	**0.401**
4	Neck	Male	4 (0.3%)	2 (0.16%)	5 (0.4%)	11 (0.9%)	0.000
		Female	2 (0.16%)	2 (0.16%)	1 (0.1%)	5 (0.4%)	0.309
		Total	**6 (0.5%)**	**4 (0.3%)**	**6 (0.5%)**	**16 (1.3%)**	**0.000**

Neck and elbow involvement was commonly reported in costal and plain area (6 (0.5%) and 39 (3.2%) respectively). Knee and ankle involvement was commonly reported in plain area (43 (2.5%) and 47 (3.9%) respectively)
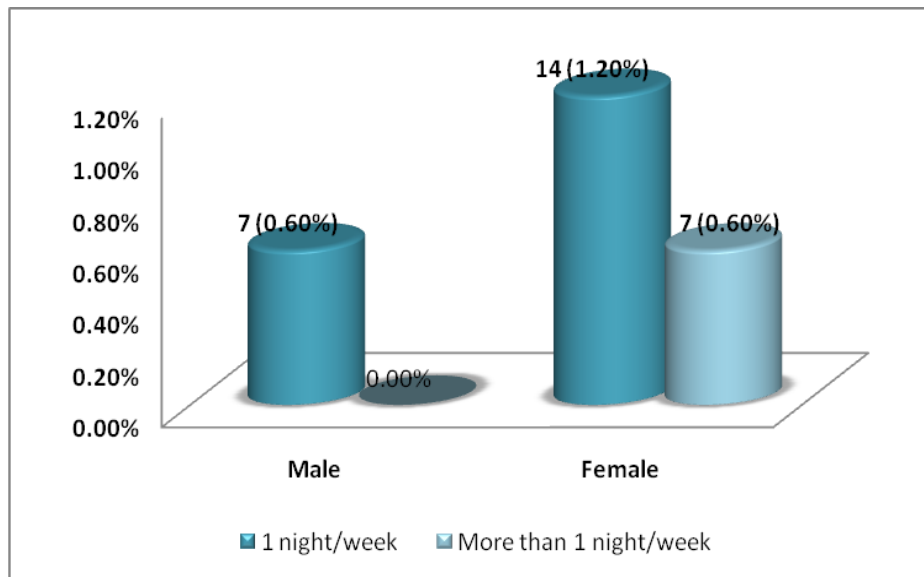

Figure III: Severity of the diseases

Figure showed severity of the disease in form of occurrence nocturnal symptoms with female predominance 21 (1.7%)
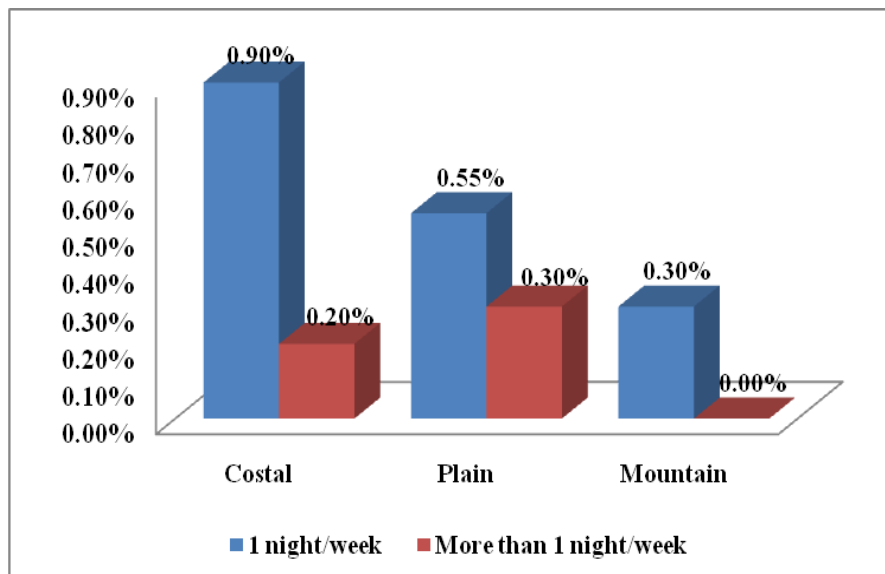

Figure IV: Severity of the diseases according to geographical distribution

	Severity		**Costal**	**Plain**	**Mountain**	**Total**	*P*
1	1 night/week	Male	2 (0.2%)	2 (0.2%)	3 (0.2%)	7 (0.6%)	0.115
		Female	9 (0.7%)	4 (0.3%)	1 (0.1%)	14 (1.1%)	0.644
		Total	**11 (0.9%)**	**6 (0.5%)**	**4 (0.3%)**	**21 (1.7%)**	**0.281**
2	More than 1 night/week	Male	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0.115
		Female	3 (0.2%)	4 (0.3%)	0 (0.0%)	7 (0.6%)	0.644
		Total	**3 (0.2%)**	**4 (0.3%)**	**0 (0.0%)**	**7 (0.6%)**	**0.281**

The severity of symptoms had relation with geographical distribution, which increased in coastal area 13 (1.1%) rather than others plain and mountain areas 10 (0.8%) and 4 (0.3%) respectively.

4. DISCUSSION

The ISAAC questionnaire has been used for many years all over the world and has proven it-self useful for assessing the prevalence and morbidity of asthma and allergic diseases. It is an easy-to-apply questionnaire that can be completed quickly without interfering with activities. This first study carried out in university student in Jazan Region to establish the prevalence of AD-related symptoms among adult in Jazan Region, Saudi Arabia.

The current study revealed the prevalence rates of ever AD, recurrent AD during last six months, AD symptoms during last 12 months, and Eczema confirmed by doctor was 53 (4.3%), 222 (18.3%), 197 (16.3%) and 53 (3.4%) respectively. The frequency rate of rash cleared completely during the last 12 months was 29 (3.4%), which showed clear significant statistical difference between gender ($p = 0.000$). The prevalence of AD was similar to which had been reported in wide range study to estimate the prevalence of AD in Saudi Arabia (SA) ranged between 16.3% in Hail to 37% in Najran [8]. The higher frequency of AD among all diseases in all regions in the kingdom is unlikely to be by chance, but may reflect an overall exposure to various allergens encountered in the food and the environment. Because of the consanguineous marriages in the tribal based society of SA, endogenous factors might be involved particularly the genetic predisposition to allergic diseases, such as atopic dermatitis, although the mode of inheritance is yet to be known [9].

The prevalence of AD in this study is similar than other Gulf countries as UAE (15.5%) and Iraq (11.6%) [10], Qatar (22.5%) and Oman (7.5%) [11].

The role of environmental factor was clearly evident in severity of symptoms had relation with geographical distribution, which increased in coastal area 13 (1.1%) rather than others plain and mountain areas 10 (0.8%) and 4 (0.3%) respectively. And AD-related symptoms according to geographical distribution of study population showed that the ever eczema in costal, plain and mountain was 22 (1.8%), 21 (1.7%) and 10 (0.8%) respectively as shown in table III.

5. CONCLUSION

The present study has demonstrated the prevalence of AD in Jazan Region SA. Although more studies are needed to investigate the role of environmental factors, which may lead to changes in prevalence of AD and other associated allergic diseases as asthma and allergic rhinitis. The prevalence of AD among Jazan University students was 18.3% only 5.5% had confirmed AD by doctor.

6. LIMITATION OF THE STUDY

Although the present study is the first to consider prevalence of AR among Jazan University students, it has some significant limitations. First the study was based on sample size, so the AR prevalence results should be interpreted carefully. Second, our participants were health college students and thus may not truly represent the adult group population. Finally, this study depend of participant experience to report symptoms , which can be miss interpreted inform of over/under estimated these symptoms, which may affect the result of this study.

Competing Interest:

The authors have no conflict of interest to declare.

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