ABSTRACT
Background: Few studies on the prevalence of asthma symptoms and allergies have been performed in the UAE. Objectives: The aim of the study was to investigate further trends in prevalence and severity of symptoms asthma, allergic rhinitis and eczema in schoolchildren. Methods: The Arabic and English version of The International Study of Asthma and Allergies in Childhood (ISAAC) standard questionnaire was used. Four thousand eight hundred and forty six Schoolchildren were studied. Data were analysed using SPSS. Results: The prevalence rates of 'ever wheezed', 'current wheeze', 'speech limitation', 'ever diagnosed With asthma, dry cough, and exercise-induced asthma were (19.9%, 14.1%, 5.0%, 19.5%, 16.7%, and 33 12.2%, respectively. The prevalence rates of symptoms of allergic rhinitis, current rhinitis, rhinitis accompanied with itching/tearing eyes in the last 12 months' and ever diagnosed with allergic rhinitis were 18.8%, 27.7%, 19.5%, and 14.9% respectively. The prevalence of eczema ever, current eczema, areas of eczema-like and ever diagnosed with eczema were 12.5%, 13.9%, 23.1%, and 15.2%, respectively. Conclusion: The prevalence of asthma, respiratory symptoms, blocked nose symptoms and eczema symptoms were relatively higher in Fujairah compared with the other emirates. This might be related to its location in a mountainous area where industrial dust is prevalent. Dubai had the highest prevalence of 'rhinitis” accompanied with itching/tearing eyes in the last 12 months' compared with Sharjah, Ajman and Fujairah. Males showed a higher percentage rate of asthma and allergic rhinitis symptoms than females. However, the prevalence of eczema was higher in females than males due to physiological factors.

INTRODUCTION
Asthma is reported to affect 5-10% of population or an estimated 23.4 million persons, including 7 million children.[1] The average number of bronchospasm due to exercise is 3-10% of the general population, if persons who do not have asthma or allergy are excluded, but the rate increases to 12-15% of the general population if patients with underlying asthma are included. Worldwide, asthma is estimated to affect 300 million individuals. The WHO has estimated that annually 15 million disability adjusted life-years are lost and 250,000 asthma deaths are reported worldwide.[2]

Godfrey S[3] reported that asthma is the commonest chronic disease of children in developed countries, affecting about 10-30% of all school age children. Industrialized countries are seemed to be the most common prevalence of asthma ranges from 2-10%. Trends suggest an increase in both prevalence and morbidity of asthma, especially in children younger than 6 years. Factors that have been implicated include urbanization, air pollution, passive smoking, and change in exposure to environmental allergens. A study has been conducted by Janahi et al[4] showed that the prevalence rate of asthma (19.8%) in Qatari schoolchildren is very close to that in the neighboring Gulf country, Oman (20.7%), and higher than in some developing countries. Also the researchers suggested that the genetic factors have a great share in the prevalence of asthma among Qatari population, in addition to the environmental and lifestyle factors.

In very young persons and very old persons, asthma prevalence is elevated due to the airway responsiveness and lower levels of lung function.[5] On the other hand, Martin AJ et al[6] showed that two third of all asthma cases are diagnosed before the patient is aged 18 years. Approximately, half of all children diagnosed with asthma have a decrease or disappearance of symptoms by early adulthood.

The geographic varieties in the types and the strength of allergens and overall aeroallergen burden, lead to variations of allergic rhinitis within and among countries.[7] Meltzer EO[8] revealed that allergic rhinitis in United States affects nearly 40 million people. Allergic rhinitis is not life threatening (unless accompanied by severe asthma or anaphylaxis) but...
morbidity from that condition can be significant. Allergic rhinitis can be associated with other disorders like asthma and with exacerbations of asthma as well.\cite{9}

Atopic eczema, in the United States affects approximately around 10-20% of children and 2% of adult. Children with asthma and hay fever are more susceptible to develop atopic eczema by 30-50%.\cite{10} The prevalence of atopic eczema over a 1-year period ranged from 2% in Iran and China to about 20% in Australia, England, and Scandinavia.\cite{11}

A cross-sectional study conducted in UAE by Al Maskari et al\cite{12} from September 1997 to February 1998, aimed to determine the prevalence of asthma, wheezing, hay fever, and eczema among primary school children aged 6-13 years in UAE. The study was performed using the ISAAC questionnaires. They covered seven Emirates. The author concludes that the prevalence of physician diagnosed asthma was 13% and the wheeze by history was 15.6%. While the prevalence of nocturnal cough was 21% but the prevalence of eczema was 11% and hay fever was 14.9%. Parental asthma but not parental atopy was associated with an increased risk of asthma and wheezing in children. The highest prevalence was in Dubai 20% then in Sharjah 18% and the least was in Fujairah 8.4% while in Al Ain, the prevalence was 10% when compared with Bener et al\cite{13} as there was reduction in the prevalence of asthma from 13.6% to 10%.

A study Conducted by Mahboub et al\cite{14} in UAE, 200 asthmatic patients were interviewed face to face and a related questionnaire had been filled. The survey was conducted between January 2007 and March 2008. The authors showed that majority of asthmatics in UAE were undertreated because most of them had chronic symptoms and many had limitation of activities and loss of school/work days. Although the participants in that survey came from different age groups, but the conclusion of the study could be extrapolated to children. The authors introduced regional factors that related to language problem specially which is related to asthma terminology for example they stated that there is no good translation of inflammation in Arabic and the using of allergy by doctors instead of asthma which in Arabic means acute sever problem, such a thing might lead to underestimation by patients to their disease severity and to rely on rescue medication for the treatment of their condition. The authors concluded also that the physician’s adherence to asthma guidelines was poor.

A case control study have been done in Iraq, by Al Kubaisy et al\cite{15} The authors investigated the socio-demographic and other risk factors related to the asthma occurrence in primary school children in Baghdad. The study included 644 schoolchildren aged 6-12 years old and the study conducted from 2000 to 2002 using the ISSAC questionnaire as well. The author found that the remarkable risk factors for asthma were as follows: crowding, low parental education, prematurity, low birth weight, family history of asthma and indoor air pollutant (tobacco smoke) was the significant risk factors for asthma exacerbation among primary school children. The study failed to detect a significant association between asthma and gender, residency, type of birth, and duration of breastfeeding.

A nationwide survey of respiratory diseases and symptoms in middle-school students in Taiwan was conducted between 1995 –1996 by Lee et al\cite{16} aimed to investigate the relationship between traffic related air pollutants and allergic rhinitis. The researchers found that among 331,686 nonsmoking children attended schools, the parental reports of physician-diagnosed allergic rhinitis were highly correlated with traffic-related air pollutant (nitrogen oxides, carbon monoxide and ozone) but not with other pollutants (particulate matter with a 50% cut-off aerodynamic diameter of 10 nm and sulphur dioxide). In addition, there was weak correlation of allergic rhinitis with air pollutant (Ozone). Besides, the study revealed the relationship between warmth climate and allergic rhinitis as the authors suggested the presence of common allergens like dust mites. On the other hand, Khalifa et al\cite{17} conducted a study which aimed to determine the prevalence rate of skin disease among primary-school children in Baghdad. The prevalence rate of skin disease was 40.9% as it has a significant relationship with the educational level of their parents. In addition, the prevalence rates of transmissible and non transmissible skin diseases were 8.8% and 33.7% , respectively, and the higher prevalence was related to the low socioeconomic conditions.

Another cross-sectional study has been conducted in Iraq by Al Samarai et al\cite{18} who investigated the correlation between allergic rhinitis and asthma in 1384 individuals aged 18-45 years old. The incidence of allergic rhinitis among asthmatic individuals was higher than those of non-asthmatics. They concluded that the allergic rhinitis is highly associated with asthma and it might help in the direction of the treatment approach that should consider the entire airway.

The aims and objectives of the present study were to compare the prevalence rates of asthma and allergies between UAE and Iraqi schoolchildren aged\cite{4-15} years old and to compare factors affecting these disorders. The study will help to clarify regional factors affecting asthma and allergies in the Middle East.

METHODS

Study population

The study was conducted from September 2013 to March 2014. Schoolchildren aged 4-15 years were targeted in this study. All children in the target age group were invited to take part in the study. Schools were randomly selected From Fujairah and AlKala cities in UAE and Baghdad and Rumadi in Iraq.
Questionnaire
The Arabic version of the international study of asthma and allergies in childhood questionnaire (ISAAC 1998)\textsuperscript{[19]} was used in the study. The questionnaire was established in 1991 for the investigation of asthma, allergic rhinitis and eczema in children due to remarkable concern that these conditions were increasing in western and developing countries. It is used for comparison of the prevalence and severity of the asthma, allergic rhinitis and eczema worldwide, in addition to the association of these conditions with the lifestyle and environmental factors. The questionnaire consists of four parts; part one is related to the asthmatic symptoms and their severity, the second part is related to the allergic rhinitis symptoms and their severity, the third part is related to the eczema symptoms and their severity while the fourth part is related to the general questions which was associated with the genetic, environmental and lifestyle factors that might contribute to the severity of those conditions.

The four parts of questionnaire are

Asthma section
In this section, the questions are emphasized on the wheezing of the child whether still or ever wheezed, wheezing during or after the exercise in the last 12 months, and the dry night cough in the last 12 months without the presence of infection or cold. The severity of symptoms had a great share in the questionnaire as it includes the number of wheezing episodes in the last 12 months, sleep disturbances by wheezing and the degree of speech limitations during attack in the last 12 months.

Allergic rhinitis section
In this section, the questions are related to allergic rhinitis whether the child had ever allergic rhinitis, the presence of allergic rhinitis in the past year and whether it is associated with the itchy eye, if the child had ever hay fever and the impact of the symptoms on the normal life style.

Eczema section
In this section, the questions are assigned to whether the child ever had eczema or rash in the past year, the age at which the rash started in addition to the curing time of that rash and if the child ever had eczema.

Additional questions section
In this section, the questions are related to the factors that might associate with the severity of the three allergic diseases. The questions are related to the presence of the wheezing, and whether the child still has asthma now and if he/she is still on medication. There were additional questions that were related to the effect of the scented product on the respiratory system of the child and other questions related to the family history of asthma, eczema, and breastfeeding.

Statistical Analysis
All data were analyzed through the Statistical Package for Social Sciences version 16.0 (SPSS). The mean age, height and weight of the children were compared between boys and girls using the independent sample t-test. The prevalence rates of symptoms between the two countries (UAE and Iraq) and the two cities of UAE (Fujairah and Kalba) were compared using Chi-square test. Outcomes when \(p\) value $<0.05\%$, highly significant when \(p<0.01\) and very highly significant when \(p<0.001\).

Ethical Approval
The study has been approved by the head teachers of schools. Consent forms have been signed by parents / guardians.

RESULTS
Two cites from both countries have been selected for the study (Fujairah and Kalba from UAE, Baghdad and Rumadi from Iraq). Seven hundred and ninety three questionnaires were completed and returned from Iraq. Nine hundred and eighty seven questionnaires were completed and returned from the UAE (Figure1).

![Study population per Country](n=1780)

Figure 1: Represents the study population in UAE (55.4\%) and Iraq (44.6\%)

The prevalence of asthma symptoms of children in UAE of ever wheezed, current wheezing, speech limitation, ever diagnosed with asthma, dry cough and exercise-induced asthma induced by exercise were 24.6\%, 18.9\%,
2.1%, 24.7%, 21.6% and 20.0%, respectively. The prevalence of these previous symptoms of children in Iraq were 19.0%, 14.4%, 2.3%, 18.0%, 14.2% and 13.0%, respectively (Table 1).

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Boys(n=803)</th>
<th>Girls(n=1004)</th>
<th>Total(n=1780)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>UAE(n=496)</td>
<td>Iraq(n=307)</td>
<td>UAE(n=518)</td>
</tr>
<tr>
<td>Ever wheezed</td>
<td>25.8*</td>
<td>21.2</td>
<td>23.6*</td>
</tr>
<tr>
<td>Current wheeze</td>
<td>19.2</td>
<td>16.3</td>
<td>18.7*</td>
</tr>
<tr>
<td>Speech limitation</td>
<td>4.7**</td>
<td>2.9</td>
<td>3.0**</td>
</tr>
<tr>
<td>Ever diagnosed with asthma</td>
<td>26.2*</td>
<td>19.9</td>
<td>23.3**</td>
</tr>
<tr>
<td>Dry cough</td>
<td>22.0</td>
<td>19.2</td>
<td>21.3***</td>
</tr>
<tr>
<td>Exercise induced asthma</td>
<td>21.1*</td>
<td>16.3</td>
<td>19.0***</td>
</tr>
</tbody>
</table>

There was a high significant difference in the prevalence rates of wheeze ever and current wheeze as it was higher in UAE (24.6% and 18.9%) than Iraq (19.0% and 14.4%), respectively (p<0.01). On the other hand, there was a very high significant difference in the following prevalence rates: asthma ever, dry cough and exercise-induced asthma were higher in UAE children compared to Iraqi children (24.7%, 21.6% and 20.0% vs. 18.0%, 14.2% and 13.0%), respectively, (p<0.001). There was no significant difference in the prevalence of speech limitation between UAE and Iraqi children (2.1% vs. 2.3%). The prevalence rates of wheeze ever, asthma ever and exercise-induced asthma were significantly higher in UAE boys than Iraqi boys (25.8%, 26.2% and 21.1% vs. 21.2%, 19.9% and 16.3%), respectively, (p<0.05), while the prevalence of speech limitation in UAE boys (4.7%) was significantly higher than the boys in Iraq (2.9%) (p<0.01). There was no significant difference in the prevalence rates of current wheezing and dry cough between UAE boys and Iraqi boys.

The prevalence rates of wheeze ever and current wheeze were significantly higher in UAE girls than Iraqi girls (23.6% and 18.7% vs. 17.7% and 13.2%), respectively, (p<0.05). While the prevalence rates of speech limitation and asthma ever were significantly higher in UAE girls than Iraqi girls (3.0% and 23.3% vs. 1.9% and 16.9%), respectively, (p<0.01). The prevalence rates of dry cough and exercise-induced asthma were significantly higher in UAE girls than Iraqi girls (21.3% and 19.0% vs. 11.1% and 10.9%), respectively, (p<0.001).

As indicated in Table 2, the prevalence rates of symptoms of allergic rhinitis; blocked nose, current rhinitis, rhinitis accompanied with itchy/tearing eyes in the last 12 months and hay fever in UAE children were 23.3%, 17.5%, 5.9% and 17.8% respectively while in Iraqi children, they were 17.7%, 14.5%, 3.5% and 14.2% respectively.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Boys(n=803)</th>
<th>Girls(n=1004)</th>
<th>Total(n=1780)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>UAE(n=469)</td>
<td>IRAQ(n=307)</td>
<td>UAE(n=518)</td>
</tr>
<tr>
<td>Ever had blocked nose without flu or cold</td>
<td>24.9*</td>
<td>18.6</td>
<td>21.8*</td>
</tr>
<tr>
<td>Current allergic rhinitis</td>
<td>19.6</td>
<td>17.6</td>
<td>15.4</td>
</tr>
<tr>
<td>Itchy eyes/tearing in the last 12 months</td>
<td>5.8**</td>
<td>3.9</td>
<td>5.9**</td>
</tr>
<tr>
<td>Ever diagnosed with hay fever</td>
<td>18.9*</td>
<td>14.0</td>
<td>16.9</td>
</tr>
</tbody>
</table>

*P<0.05 **P<0.01 ***P<0.001

There was significant difference in the symptoms of current allergic rhinitis and ever diagnosed with hay fever as it was higher in UAE (17.5% and 17.8%) than Iraq (14.5% and 17.8%), respectively (p<0.05). There was a high significant difference in the symptoms of blocked nose and rhinitis accompanied with itchy/tearing eyes which was higher in UAE children (23.3% and 5.9%) than Iraqi children (17.7% and 3.5%, respectively) (p<0.01).

The prevalence rates of blocked nose and hay fever was significantly higher in UAE boys (24.9% and 18.9%) than Iraqi boys (18.6% and 14.0%), respectively (p<0.05) but the prevalence of rhinitis accompanied with itchy/tearing eyes in the last 12 months was highly significant in UAE boys (5.8%) than Iraqi boys (3.9%) (p<0.01). There was no significant difference in the symptoms of current allergic rhinitis between the boys of the two countries.
There was no significant difference in these symptoms between UAE girls 21.8%, 15.4%, 5.9% and 16.9% compared with Iraqi girls (17.1%, 12.6%, 3.3% and 14.4%), respectively, with the exception of blocked nose symptoms which was significantly higher in UAE girls (21.8%) than Iraqi girls (17.1%) (p<0.05), and rhinitis with itchy/tearing eyes in the last 12 months which was significantly higher in UAE girls (5.9%) compared with Iraqi girls (3.3%) (p <0.01).

The prevalence rates of eczema symptoms such as: ever had itchy rash, current rash, areas of rash like (folds, elbows and around the neck) and ever diagnosed with eczema in children in UAE were 22.0%, 20.6%, 20.7% and 15.5% respectively, while in Iraq they were 18.8%, 17.3%, 11.9% and 11.6% respectively (Table 3). There was significant difference in the prevalence rates of the following symptoms between UAE and Iraqi children: ever had itchy rash, current rash and ever diagnosed with eczema; they were higher in UAE children (22.0%, 20.6% and 15.5% respectively) compared with Iraqi children (18.8%, 17.3%, and 11.6 % respectively) (P<0.05). On the other hand, there was very high significant difference in the areas of rash like (folds, elbows and around the neck) symptoms; the UAE girls recorded higher prevalence rate (20.7%) compared with Iraqi girls (11.9%) (P< 0.001). There was no significant difference in these symptoms between the boys in UAE (20.7, 19.1, 19.0 and 13.2 %) and the boys in Iraq (17.6, 16.6, 11.7 and 9.8%), respectively. There was an exception; the difference of area of rash symptoms which was very high significant in UAE boys (19.0%) compared with Iraqi boys (11.7%) (P<0.001) and in the symptoms of ever diagnosed with eczema which was significantly higher in UAE boys (13.2%) than Iraqi boys (9.8%) (p<0.05).

The girls in UAE have significantly higher prevalence rates in symptoms of ever had itchy rash, current rash and ever diagnosed with eczema which recorded (23.2, 22.0 and 17.6%, respectively) than Iraqi girls (19.5, 17.7 and 12.8% respectively) P<0.05. While the frequency of areas of rash like (folds, elbows and around the neck) symptoms was very highly significant in UAE girls (22.1%) compared to Iraqi girls (11.9) (p <0.001).

DISCUSSION

Although a few population-based studies on childhood asthma and allergic disease in the middle-east countries are available for comparison, there appears to be an apparent time trend of increase in asthma and allergic disease (rhinitis and eczema) symptoms in Arab countries. This can be explained through the difference in survey methodology and increasing in the awareness of asthma and respiratory symptoms among the general public. The prevalence and trends of allergic rhinitis and eczema also has been noted. Although the direct comparison may not obviously valid, the increasing trend is similar with that found within the past few decades in Bahrain by Alwan et al[20], in UAE by Mahboub et al[14], and in Iraq by Al Thamiri et al.[21]. Geographical, air pollution and genetic factors may contribute to this trend. As shown in table 1. UAE outdistanced Iraq in the frequency of the asthma symptoms (Ever wheezed, current wheeze, speech limitation, ever diagnosed with asthma, dry cough and exercise-induced asthma). The prevalence of these symptoms recorded in UAE vs. Iraq were as follows: 24.6%, 18.9%, 2.1%, 24.7%, 21.6% and 20.0% vs. 19.0%, 14.4%, 2.3%, 18.0%, 14.2% and 13.0%, respectively. The difference was statistically significant. In 1994, a study has been conducted in UAE by Bener, et al[22] recorded that the prevalence rate of diagnosed asthma was 13.6%, breathlessness or tightness in chest was 9.7% and nocturnal cough was 8.9% indicating that asthma prevalence is increasing. Another study has been conducted in Iraq by Al Thamiri D et al[21] revealed that the prevalence rate of diagnosed asthma and current wheeze were (22.3% and 19.9%, respectively), which was nearly similar to our findings although the population of Al Thamiri, et al[21] was higher than the current study.

The prevalence rate of asthma in schoolchildren in Saudi Arabia was 11.4%[23] while in Bahrain, it was relatively higher (27%).[20] Internationally, 2% of school children in Tabriz (northwestern of Iran) reported by Sahebi et al[24], had diagnosed asthma. On the other hand, children in Hong Kong reported lower rate of asthma symptoms (7.8%).[25] One of the exacerbated factors is that the humidity in UAE is relatively higher compared to Iraq which is affecting the severity of asthma symptoms. The average annual relative humidity in UAE is 50-60% while the average annual relative humidity in Iraq is 20-40%. Hayes JR et al[26] justified that the humidity is an exacerbating factor in patient with allergic asthma compared with allergic rhinitis alone.

The presence of mountains and industrial stone dust in Fujairah city in the UAE are possibly affecting the severity of asthma and respiratory system of the schoolchildren in this area. The respirable crystalline silica dust generated during stone crushing may increase the risk of airway diseases.[27] Since both UAE and Iraq are relatively large countries with the diverse geographical areas, the significant difference in asthma and respiratory systems between both countries could due to the different type of weather, the level of air pollution and genetic factors. A study has been done in Iraq by Al Kubaisy W, et al[13], the author noticed that a child of asthmatic father or mother were showing significantly higher rate of asthma compared to those children with no parental history of asthma. Similarly, statistically high significant rate of asthma was detected by Al Kubaisy W et al[13] among children when one or more of their sibling was asthmatic compared to those with non-asthmatic sibling. Moreover, the presence of family history of asthma whether father, mother or
siblings was noticed as a significant risk factor for having asthma by their index child.

Further study needed to explore other risk factors that would make the prevalence of asthma symptoms in UAE significantly higher than in Iraq. In addition, more data is needed to highlight the other risk factors in both countries such as environmental, geographical and the educational levels of the parents. Some researchers came a step closer regarding the reasons for differences between different countries; differences may due to the effect of hot and humid weather on mild asthma. Hot and humid air activates vagal bronchopulmonary C- fiber sensory nerves, which can cause bronchoconstriction.[28]

Regarding the prevalence rate of allergic rhinitis, it was also significantly higher in UAE children compared to Iraq. Table 2 showed the prevalence rates of the allergic rhinitis symptoms like blocked nose ever, current allergic rhinitis, allergic rhinitis associated with itchy/tearing eyes and ever diagnosed with hay fever in UAE were 23.3%, 17.5%, 5.9% and 17.8% respectively, while in Iraqi children, they were 17.7%, 14.5%, 3.5% and 14.2%, respectively. In 2010, the prevalence rate of allergic rhinitis was lower in school children of Saudi Arabia (12.7%)[23], while in Bahrain it was (10%) in 2009 by Al Alwan O et al.[20]. In Hong Kong in 1998, a study done by Lau et al.[25] reported a prevalence of 1.2% of hay fever ever symptom.

Some studies claimed that there is an association between asthma and allergic rhinitis. One of the studies conducted in Iraq by Al Samarai AM et al. 2009[18], compared subjects with asthma and allergic rhinitis vs. subjects with asthma and without allergic rhinitis. The author concluded that the prevalence of allergic rhinitis among asthmatic children was 56.9% vs. 5.1% among non-asthmatic children (P<0.0001). All studies showed a significant prevalence of allergic rhinitis in asthmatic patients compared with non-asthmatic children. Since the frequency of asthma symptoms is relatively higher in UAE children compared with Iraqi children, this may lead to a higher prevalence of allergic rhinitis in UAE children compared with Iraqi children.

Table3: Prevalence of eczema symptoms between UAE and Iraq

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Boys(n=803)</th>
<th>Girls(n=1004)</th>
<th>Total(n=1780)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UAE(n=469)</td>
<td>IRAQ(n=307)</td>
<td>UAE(n=518)</td>
</tr>
<tr>
<td>Ever had itchy rash</td>
<td>20.7</td>
<td>17.6</td>
<td>23.2*</td>
</tr>
<tr>
<td>Current rash</td>
<td>19.1</td>
<td>16.6</td>
<td>22.0*</td>
</tr>
<tr>
<td>Areas of rash</td>
<td>19.0***</td>
<td>11.7</td>
<td>22.1***</td>
</tr>
<tr>
<td>Ever diagnosed with eczema</td>
<td>13.2*</td>
<td>9.8</td>
<td>17.6*</td>
</tr>
</tbody>
</table>

*P≤ 0.05 **P≤ 0.01 *** P≤ 0.001

The prevalence of eczema was also higher in UAE than Iraq. As shown in table 3, the prevalence rates of the eczema symptoms such as ever had itchy rash, current rash, areas of rash like (folds, elbows and around the neck) and eczema in children in UAE were 22.0, 20.6, 20.7 and 15.5, respectively, while the frequency of these symptoms in Iraqi children were 18.8, 17.3, 11.9 and 11.6, respectively. The findings of this study on Iraqi children was relatively lower than other studies in Iraq. Khalifa KA et al[17] claimed that the overall prevalence of skin disorders among primary school children in Iraq was 40.9%. The author indicated that the educational level of the parents was significantly associated with the prevalence of skin diseases. However, the difference could also be contributed to the deterioration in the general socioeconomic conditions of most groups of Iraqi people and in the health and teaching services at that time.

Another study has been conducted by Al Saimary et al[29] suggested that the prevalence in atopic eczema was higher in Iraqi infants and children than adults (P<0.001). The author claimed that the earlier introduction of weaning foods, highly use of food additives, and changes in the formulation of infant formula has an effect on the prevalence of atopic eczema in infants and children than other age groups.

Bener A et al[30] found that among 3283 children in UAE, the frequency of eczema was 22.5%. The rate of eczema was significantly lower among 1100 school children in Saudi Arabia (5.6%)[23], and higher among Bahraini school children (28%).[20] Globally, the prevalence of eczema ever in Hong Kong[25] was 28.1% which was higher than our study in UAE (15.5%) and Iraq (11.6%). While, the prevalence rate of atopic eczema in the northeast of England was 27.8% as reported by Shamssain et al.[31] On the other hand, Sahebi et al[24] concluded that the prevalence rate of eczema in Tabriz (northwestern of Iran) was 7.3%. The difference in the prevalence rate between countries may be due to the difference in the sample size of each study as well as the difference in the geographical areas of the countries.

Mohrensclager M et al.[32] emphasized that girls have been associated with indoor leisure activities, which has been linked with more current eczema. Girls have high PH in their skin surface and lower stratum corneum hydration compared to boys.
The lower skin stratum corneum hydration could be as a result of using skin care products that affect the normal function of the skin leading to dryness and irritation. The high surface PH might lead to insufficient barrier maturation due to impaired lipid processing hence leading to the high prevalence of eczema in girls than boys.

CONCLUSIONS

The present study has demonstrated the difference in the prevalence rates of asthma, allergic rhinitis and eczema between UAE and Iraq; Fujairah and Kalba cities represented UAE while Baghdad and Rumadi cities represented Iraq. However, the prevalence rates of asthma symptoms, allergic rhinitis and eczema were significantly higher in UAE schoolchildren than Iraqi schoolchildren.

The reasons for these differences may due to the presence of geographical factors, air pollution and especially the significant presence of mountains in Fujairah city (UAE) compared to Iraq. These factors had a significant effect on the prevalence of these diseases and symptoms in UAE than Iraq. Further studies are recommended to cover other factors that might contribute to these differences. These factors include differences in the life style, air pollution profile and other local risk factors.

Limitations

Although the current study has been well prepared, as any other study, there were limitations. The sample size in UAE doesn’t represent the UAE population; it presents only the northern Emirates (Fujairah and Kalba city). The same applies to Iraqi children; the sample size represents Baghdad and Rumadi city only. Because of the time limitation, the sample size was not large enough to study the prevalence of symptoms by age group.

ACKNOWLEDGMENT

The authors would like to express their gratitude to the schools and the parents of the children who participated in this study for providing the information that was so vital for this study to be successful. The authors would also like to thank the children for delivering the questionnaires home and back to the school safely. The authors also like to thank the College of Pharmacy and Health Sciences, Ajman University of Science and Technology (AUST) for approving the study and for providing the facilities to conduct this study.

Declaration of interest

The authors declare that they have no competing interests.

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