Ministry of higher education

And scientific research

University of Diyala

College of medicine

Climate Change Health Effects in Diyala Province

Submitted to the council of College of medicine, Diyala university, in partial fulfillment of requirements for the bachelor degree in medicine and general surgery.

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بسم الله الرحمن الرحيم

{{ يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُم والَّذِينَ أُوتُوا العِلْمَ

دَرَجاتٍ واللَّهُ بِما تَعْمَلُونَ خَبِيرٌ} }

صدق الله العلي العظيم

(المجادلة : 11)

Acknowledgement

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We would like to express our sincere appreciation and gratitude to our supervisor Prof. Dr. Shahab Ahmed and guidance during the study.

We are so grateful for Baquba Teaching Hospital ,Al-Batool Teaching Hospital and Baladrose Hospital in diyala province and everyone who supported us to complete the study.

Climate Change Health Effects in Diyala Province

Abstract:

Background: Climate change can be defined as changes in the atmosphere layers, such as temperature, precipitation, and other climate variables. These changes have caused many environmental problems affecting human health; some are the depletion of the ozone layer, the spread of infectious diseases and pressures on natural resource.

Aim of study: To determine the health effects that associated with climate change in Diyala province.

Patients and methods: A Cross-section study done in Baquba Teaching Hospital , Al-Batool Teaching Hospital and Baladrose Hospital in diyala province from 1st of October 2022 to 31th of March 2023 included (549) patients (in different age groups, gender and residence) who were diagnosed with disease related to climate change. Data collected by using special questionnaire form containing face to face interview and data base. The data was analyzed by statistical programs analyzed by frequency distribution and percentage.

Results : Allergic bronchitis is more in female and in (1-10) years age group . Baghdad boil more in male and in (1-10) years age group . Typhoid fever more in female and in (21-30) years age group . Hepatitis more in female and in (1-10) years age group . Diarrheal disease more in female and in (1-10) years age group. Regarding the residence approximately all climate change disease more in urban.

Conclusion: We conclude that exposure to the climate changes are associated with highly health effects. The percentage of allergic bronchitis show increase in age group from (1 - 10) years as other disease like Baghdad boil, typhoid fever, hepatitis A and diarrheal disease. Allergic bronchitis according to the gender high in female as in typhoid fever, hepatitis A and diarrheal disease, unlike to Baghdad boil and E-coli that is high in male. Regarding to residence the percentage is high in urban as other climate change disease.

Keywords: climate change, allergic bronchitis, Baghdad boil, infectious disease, diarrheal disease, hepatitis.

Introduction:

Climate change and the associated global warming are among the most severe problems of the area [1,2]. Climate change and global warming are often confused and interchangeably [3]. Climate change can be defined as changes in the atmosphere layers, such as temperature, precipitation, and other climate variables. Climate change happens for two reasons: the natural causes which happened at long-term period and the causes related to human activities. According to the International Panel on Climate Change (IPCC), most heat observed over the last 50 years can be attributed to human activities [4,5] .

These changes have caused many environmental problems affecting human health; some are the depletion of the ozone layer, the spread of infectious diseases, pressures on natural resources, and freshwater scarcity [6]. Many scholars have studied the future climate projections model, and they figured out that climate change is happening and its impact on water resources is inevitable [7,8].

It is impossible to address climate change and bring about a fundamental change in reducing its environmental effects if it is kept within the ambit of the scientifc elite and confined to academic frameworks. Real change requires that society adopts confronting the impacts of climate change. This, in turn, requires spreading awareness about the current and future causes and impacts of climate change so that there is a real value for national plans and international adaptation and mitigation initiatives. Recent research on public perceptions of climate change has improved our understanding of the lay public's evolving response, as the levels of climate change awareness, knowledge, perceived risk, and support for mitigation or adaptation vary significantly across the world [9,10,11] . However, strengthening adaptive capacities in developing countries needs to focus on promoting these measures at all levels [12].

Thus, for societies to prepare and educate for climate change adaptation initiatives, one of the most important rules is to know the public and design the education program according to their preconditions to facilitate the achievement of the change efects through the participation and support of the people [13,14] . The term climate change awareness summarizes the factors that describe and determine the participation of people in creating an environmentally and climate-friendly society [14,15,16] ; as to understand the environmental issues better, it is essential to adjust the social understandings and actions to support the changing climatic conditions [17,18].

Aim of study:

To determine the health effects that associated with climate change in Diyala province .

Patients and methods:

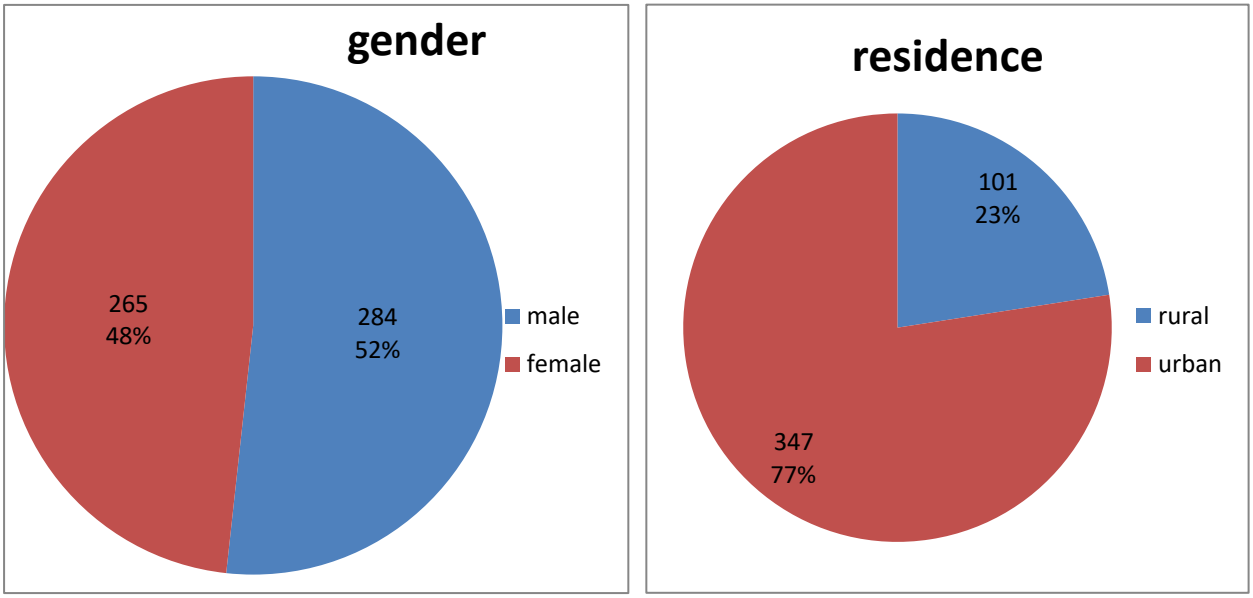
Study design & settings: A Cross-section study involved (549) patients (in different age groups, gender and residence) who were diagnosed with (Allergic bronchitis , Baghdad boil, Typhoid fever, Hepatitis, Diarrheal disease ,E-coli infection) .

Data collection: The data was collected by face to face interview with patients complained health problems and from data base of Baquba Teaching Hospiral , Al-Batool Teaching Hospital and Baladrose Hospital in diyala province. The patients asked a special questionnaire contains questions about demographic data and common health problems that effected by climate change. Collection of data started at 1st of October 2022 To 31th of March 2023.

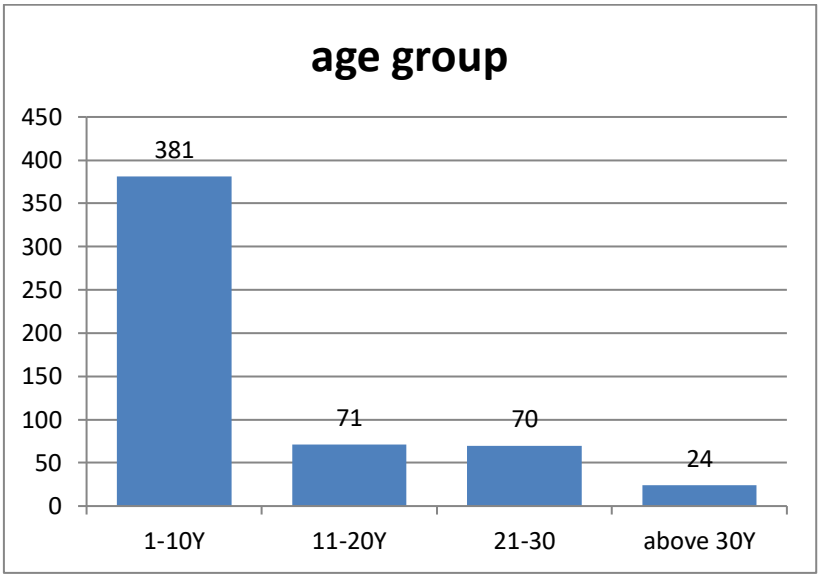
Statistical analysis: Data were using Microsoft Excel laptop 2010 analyzed by frequency and percentile.

Results:

This study involved (549) patients (in different age groups, gender and residence). (284) male and (265) female. (23%) live in rural area and (77%) live in urban area. According to age group of sample ,the study included (381) patients aged below (10) years, (71) patients aged between (10-20) years, (70) patients aged between (20-30) years and (24) patients aged between above (30) years.



Pie gram of climate changes effect according to the gender and residence



Die gram of climate changes effect according to the age

Table (1) shows distribution and percentage of allergic bronchitis according to the age groups, the majority of patients were below 10 year 13 (92%) and only 1 (8%) in (11-20) year age group .

Table 1: Frequency distribution of Allergic bronchitis due to air pollution according to the age.

Age (years)	Number	Percentage
<1-10	13	92%
11-20	1	8%
21-30	____	____
>31	____	____
Total	14	100%

Table (2) shows distribution and percentage of Baghdad boil according to the age groups, the result was below (10) year age group 103 (52%) , (11-20) year age group 37 (19%), (21-30) year age group 36 (19%) and above (31) year age group 19 (9%) .

Table 2: Frequency distribution of Baghadad boil due to vector borne infection according to the age.

Age (years)	Number	Percentage
<1-10	103	52%
11-20	37	19%
21-30	36	18%
>31	19	9%
Total	197	100%

Table (3) shows distribution and percentage of typhoid fever according to the age groups, the result was below (10) year age group 19 (24%) , (11-20) year age group 19 (24%), (21-30) year age group 34 (44%) and above (31) year age group 5 (6%) .

Table 3: Frequency distribution of Typhoid fever due to water borne disease according to the age.

Age (years)	Number	Percentage
<1-10	19	24%
11-20	19	24%
21-30	34	44%
>31	5	6%
Total	77	100%

Table (4) shows distribution and percentage of hepatitis according to the age groups, the result was below (10) year age group 22 (62%) , (11-20) year age group 13 (37%) .

Table 4: Frequency distribution of Hepatitis due to water borne disease according to the age.

Age (years)	Number	Percentage
<1-10	22	62%
11-20	13	37%
21-30	___	___
>31	___	___
Total	34	100%

Table (5) shows distribution and percentage of typhoid fever according to the age groups, the result was below (10) year age group 124 (99%) , (11-20) year age group 1 (1%) .

Table 5: Frequency distribution of Typhoid fever due to water borne disease according to the age.

Age (years)	Number	Percentage
<1-10	124	99%
11-20	1	1%
21-30	___	___
>31	___	___
Total	125	100%

Table (6) shows distribution and percentage of E.coli according to the age groups, the result was below (10) year age group 100 (100%) .

Table 6: Frequency distribution of E.coli due to water borne disease according to the age.

Age (years)	Number	Percentage
<1-10	100	100%
11-20	____	____
21-30	____	____
>31	____	____
Total	100	100%

Table (7) shows distribution and percentage of allergic bronchitis according to the gender , it is high in male 10 (71%) and low in female 4 (29%).

Table 7: Frequency distribution of Allergic bronchitis due to air pollution according to the gender.

Gender	Number	Percentage
Male	10	71%
Female	4	29%
Total	14	100%

Table (8) shows distribution and percentage of Baghdad boil according to the gender , it is high in male 121 (61%) and low in female 77 (39%).

Table 8: Frequency distribution of Baghdad boil due to vector borne infection according to the gender.

Gender	Number	Percentage
Male	121	61%
Female	77	39%
Total	197	100%

Table (9) shows distribution and percentage of typhoid fever according to the gender , it is high in female 39 (51%) and low in male 38 (49%).

Table 9: Frequency distribution of Typhoid fever due to water borne disease according to the gender.

Gender	Number	Percentage
Male	38	49%
Female	39	51%
Total	77	100%

Table (10) shows distribution and percentage of hepatitis according to the gender , it is high in female 18 (52%) and low in male 17 (48%) .

Table 10: Frequency distribution of Hepatitis due to water borne disease according to the gender.

Gender	Number	Percentage
Male	17	48%
Female	18	52%
Total	35	100%

Table (11) shows distribution and percentage of diarrheal disease according to the gender, it is high in male 75 (60%) and low in female 50 (40%).

Table 11: Frequency distribution of Diarrheal disease due to water borne disease according to the gender.

Gender	Number	Percentage
Male	75	60%
Female	50	40%
Total	125	100%

Table (12) shows distribution and percentage of E.coli according to the gender , it is high in male 54 (54%) and low in female 46 (46%) .

Table 12: Frequency distribution of E.coli due to water borne disease according to the gender.

Gender	Number	Percentage
Male	54	54%
Female	46	46%
Total	100	100%

Table (13) shows distribution and percentage of allergic bronchitis according to the residence, it is high in urban 11 (79%) and low in rural 3(21%).

Table 13: Frequency distribution of Allergic bronchitis due to air pollution according to the residence.

Residence	Number	Percentage
Rural	3	21%
Urban	11	79%
Total	14	100%

Table (14) shows distribution and percentage of Baghdad boil according to the residence, it is high in urban 173 (88%) and low in rural 24(12%) .

Table 14: Frequency distribution of Baghdad boil due to vector borne infection according to the residence.

Residence	Number	Percentage
Rural	24	12%
Urban	173	88%
Total	197	100%

Table (15) shows distribution and percentage of typhoid fever according to the residence, it is high in urban 64 (83%) and low in rural 13(17%) .

Table 15: Frequency distribution of Typhoid fever due to water borne disease according to the residence.

Residence	Number	Percentage
Rural	13	17%
Urban	64	83%
Total	77	100%

Table (16) shows distribution and percentage of hepatitis according to the residence, it is high in urban 28 (80%) and low in rural 7(20%) .

Table 16: Frequency distribution of Hepatitis due to water borne disease according to the residence.

Residence	Number	Percentage
Rural	7	20%
Urban	28	80%
Total	35	100%

Table (17) shows distribution and percentage of diarrheal disease according to the residence, it is high in urban 71 (57%) and low in rural 54 (43%) .

Table 17: Frequency distribution of Diarrheal disease due to water borne disease according to the residence.

Residence	Number	Percentage
Rural	54	43%
Urban	71	57%
Total	125	100%

Discussion:

This study included (549) patients (in different age groups, gender and residence). (284) male and (265) female. This study will discuss the main effects of climate changes on public health and incidence of diseases according demographic characteristic.

Age :

Allergic bronchitis is one of the common diseases that associated with climate change this study shows allergic bronchitis was commonest in people who aged between (1-10) years (92%) and the prevalence decrease with age. This disagree with another Iraqi study performed by Mutlag et al. that showed allergic bronchitis more common child who aged between (10-14) years[19] .

Baghdad boil was more common in children who aged (1 - 10) years. This agree with study performed in Kufa university by Muslim et al. who showed highest infection rate was in people aged below(10) years [20] .

Typhoid fever also common disease. the disease is more common in people aged between (21 - 30) years as shown above. Another Iraqi study showed the age group (31-40) year was the most infected [21] . Bangladesh study showed patients aged between (6-15) years were more common[22].

Hepatitis A can be transmitted by contaminated food and water. Patient with hepatitis often aged below 10 years (62%). This results agree with another Iraqi study performed in Wasit province by Hameed et al. that showed similar result [23] .

Diarrheal disease and gastroenteritis is one of commonest disease especially in children who aged below 10 years. This agree with African study performed by Doris Bah et al. who showed people who aged between (6 – 17) years had higher rate of infection[24] .

Gender:

Allergic bronchitis shows males(71%) are more common than females (29%). Agree when compare with another Iraqi study performed by Mutlag et al. that showed allergic bronchitis more common in male[19].

Baghdad boil is common disease in our society males are higher risk to be affected than females as shown in table 8 this may be due to higher duration of exposer to sand-fly. This results also agree with other iraqi study performed in university of Babylon by Hussien who showed the infection rate for males was 46%, while the infection rate for females was (36%) [25].

Typhoid fever also common in female . This result disagree with other Iraqi study that showed there were (57.7%) men and (42.3%) women[21]. Bangladesh study showed males higher rate for typhoid fever than females[22].

According to hepatitis disease the gender rate of infection between male and female are approximately equal. This results agree with another Iraqi study performed in Wasit province by Hameed et al. that showed same result [23] .

Diarrheal disease and gastroenteritis is more common in males than males. This disagree with African study performed by Doris Bah et al. who showed females were more common[24].

E-coli is slightly commoner in male than female . this disagree with Pakistani study performed by Z. Huma et al that showed female was more common this difference may be due to difference in race or environmental factors between Iraq and Pakistan [26].

Residence:

Current study shows allergic bronchitis is more common in urban cities . this result agree with Iranian study that showed patients in urban area were higher risk for allergic bronchitis. This may be due to increase air pollution and number of factories and cars[27]

This study shows people who live in urban are higher risk for baghdad boil this disagree with study performed in Kufa university by Muslim et al. who showed Baghdad boil was more common in rural cities[20].

Typhoid fever also common disease the rate of infection was more in urban than rural. This agree with another Iraqi study showed (67%) in urban and (33%) in rural area [21].

Hepatitis also commoner in urban area (80%). This similar to another Iraqi study performed in Wasit province by Hameed et al. that showed same result [23] .

Diarrheal disease is slightly equal between rural and urban. This disagree with Brazilian study that showed diarrheal disease is more common in urban area comparing with rural area[28].

Conclusion:

We conclude that exposure to the climate changes are associated with highly health effects. The percentage of allergic bronchitis show increase in age group from (1-10) years as other disease like Baghdad boil, typhoid fever, hepatitis A and diarrheal disease. Allergic bronchitis according to the gender high in female as in typhoid fever, hepatitis A and diarrheal disease, unlike to Baghdad boil and E-coli that is high in male. Regarding to residence the percentage is high in urban as other climate change disease.

Recommendations:

1. wearing mask and decrease exposure to pollution .

2. Don’t eat contaminated food .

3. Avoid drink or swimming in contaminated water.

4. Further study in large population size

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(التأثيرات الصحية لتغير المناخ في محافظة ديالى)

خلاصة البحث

الخلفية: يمكن تعريف تغير المناخ على أنه تغيرات في طبقات الغلاف الجوي ، مثل درجة الحرارة ، وهطول الأمطار ، ومتغيرات المناخ الأخرى. تسببت هذه التغييرات في العديد من المشاكل البيئية التي تؤثر على صحة الإنسان ؛ بعضها استنفاد طبقة الأوزون وانتشار الأمراض المعدية والضغوط على الموارد الطبيعية.

هدف الدراسة: تم إجراء هذا البحث لتحديد الآثار الصحية المصاحبة للتغير المناخي في محافظة ديالى.

المرضى والطرق الدراسة : دراسة مقطعية أجريت في مستشفى بعقوبة والبتول وبلدروز في محافظة ديالى في الفترة من 1 أكتوبر 2022 إلى 31 مارس 2023 وشملت (549) مريضًا (من مختلف الفئات العمرية والجنس والإقامة) تم تشخيصهم بأمراض مرتبطة لتغير المناخ. تم جمع البيانات باستخدام نموذج استبياني يحتوي على اسئلة من خلال مقابلة وجهاً لوجه وقاعدة بيانات في المستشفى. تم تحليل البيانات من خلال برامج إحصائية وأخذت الموافقة الأخلاقية من المرضى ومديري المستشفيات.

النتائج: التهاب الشعب الهوائية التحسسي يكون أكثر في الإناث وفي الفئة العمرية (1-10) سنوات. تغلي بغداد أكثر في الذكور وفي الفئة العمرية (1-10) سنوات. الحمى التيفية أكثر عند الإناث وفي الفئة العمرية (21-30) سنة. التهاب الكبد أكثر في الإناث وفي الفئة العمرية (1-10) سنوات. يزيد مرض الإسهال عند الإناث وفي الفئة العمرية (1-10) سنوات. فيما يتعلق بإقامة جميع أمراض تغير المناخ تقريبًا في المناطق الحضرية.

الاستنتاج: نستنتج أن التعرض لتغيرات المناخ مرتبط بتأثيرات صحية عالية .تظهر النسبة المئوية لالتهاب الشعب الهوائية التحسسي زيادة في الفئة العمرية من (10 - 1)سنوات مثل الأمراض الأخرى مثل حبة بغداد وحمى التيفوئيد والتهاب الكبد أ ومرض الإسهال .التهاب الشعب الهوائية التحسسي حسب الجنس مرتفع عند الإناث كما هو الحال في حمى التيفوئيد والتهاب الكبد Aومرض الإسهال ،على عكس حبة بغداد و E-coliالذي يرتفع عند الذكور .فيما يتعلق بالسكن ،فإن النسبة المئوية مرتفعة في المناطق الحضرية مثل أمراض تغير المناخ الأخرى.

الكلمات المفتاحية: تغير المناخ ، تحسس القصبات الهوائية ، حبة بغداد ، الأمراض المعدية ، مرض الإسهال ، التهاب الكبد الفيروسي.

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

جامعة ديالى / كلية الطب

(الآثار الصحية لتغير المناخ في محافظة ديالى)

قدم الى مجلس كلية الطب جامعة ديالى مستوفياً جزئياً لمتطلبات درجة البكالوريوس في الطب والجراحة العامة.

مقدم من قبل الطالبة

كوثر أديب طالب

باشراف الاستاذ الدكتور

شهاب احمد شاكر

بورد طب مِهَني و بيئي

1444 2023