

The impact of some climate characteristics on the spread of the COVID-19 virus in Iraq

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Abstract: Climatic characteristics play a major role in influencing many diseases and viruses, including the Corona virus, as the study aimed to know the impact of climate characteristics (temperature, wind speed and relative humidity) on the spread of the virus and the increase in the number of infections through the entry of the virus into Iraq from mid-February of the year 2020 to February of 2021, the research contained three topics, the first topic included:(Properties climatic in Iraq)The second topic contained(reality Spread virus covid 19in Iraq)The third topic included(comparison between elements the climate reality injuries virus covid 19in Iraq)And the study came out with a clear effect of high temperature by increasing the number of injuries and vice versa, and the effect of high relative humidity with a decrease in the number of injuries, and the effect of increasing wind speed between high and low during the four seasons, where the results of the statistical analysis showed (simple correlation equation) through the (Arab Statistical Processor) program IAPSS), with a direct correlation with temperature and an inverse correlation with relative humidity and a correlation between the direct and inverse with respect to wind speed in most of the results of the analysis, and the high injuries during the summer and the months of September and October of the autumn season, and the northern regions (Mosul) recorded the least injuries, followed by the regions The southern region (Basra) and the highest in the central regions (Baghdad), where there are overlapping reasons such as the increase in the population of the provinces of Mosul and Basra.

Climatic characteristics play a major role in influencing many diseases and viruses, including the Corona virus, as the study aimed to know the impact of climate characteristics (temperature, wind speed and relative humidity) on the spread of the virus and the increase in the number of infections through the entry of the virus into Iraq from mid-February of the year 2020 to February 2021The research contained three sections, the first topic included (climatic characteristics in Iraq), the second contained topic (the reality of the spread of the Covid -19 virus in Iraq), and the third topic included (Comparison of climate elements with the reality of covid 19 infections in Iraq). The study came out with a clear effect of high temperature by increasing the number of injuries and vice versa.

Key words : Climate, COVID-19, Iraq .

Introduction:

Climate is one of the important factors in influencing the surrounding environment, and consequently on human health and the extent to which it is affected by diseases. Therefore, the climate elements represented by (temperature, wind and humidity) are among the climatic factors affecting viruses and their spread. Our world today is a great spread of viruses and what the global health called a pandemic through the spread of the Corona virus19, which is an extension of the SARS virus strain, and to find out the reasons leading to the spread of this virus, the father claimedaugeeTo study the pandemic from the climatic aspect and the impact of the aforementioned climatic elements.

Research problem :

- 1- Do climate characteristics affect the incubation and spread of viruses?
- 2- Is there an effect of climate characteristics on the spread of the Corona pandemic?in Iraq?
- 3- Is there a discrepancy in the impact of climate characteristics on the spread of the Corona pandemic in Iraq?

Research hypothesis:

- 1-Climate characteristics have an effect on the incubation and spread of viruses.
- 2-There is an impact of the characteristics of the climate in Iraq in the spread of the Corona pandemic.

3-There is a discrepancy in the impact of climate characteristics on the spread of the Corona pandemic in Iraq.

Search objective:

The world is being invaded today by genetic viruses called the Corona pandemic. To me studying an important part of the reasons for its spread and there are the climatic elements and its impact on the spread of the Corona virus.

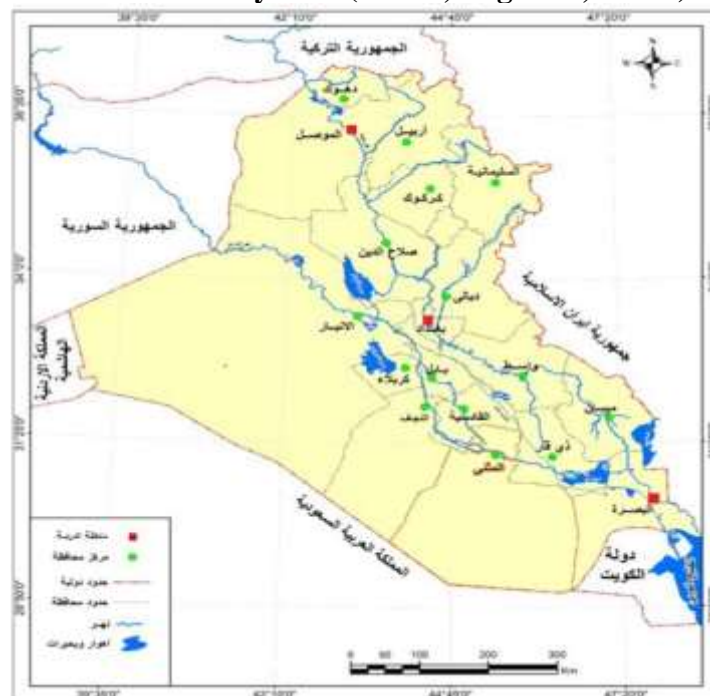
Search structure: The research contained three sections preceded by an introduction. The research included the Wal Ali (climatic characteristics in Iraq), which was devoted to the study of the governorates of Mosul, Baghdad, and Basra. As for the second topic (the reality of the spread of the Corona virus) in Iraq, and the third topic (comparison between elements of the climate reality and injuries from the COVID-19 virus in Iraq), and the research contained results and recommendations.

Research Methodology: The research followed the descriptive, analytical and statistical approach to the data using the (Arab Statistical Processor) program (APSS).

spatial boundaries: Iraq is located in the southwest of Asia, and in the northeast of the Arab world, between latitudes (6-29-27-37 5) in the north and longitudes (39-38-36-548) in the east. And it is bordered on the north by Turkey, on the south by Kuwait, Saudi Arabia and the Arabian Gulf, while it is bordered by eastern Iran and to the west by Saudi Arabia, Syria and Jordan. The area of Iraq is 35052 km². The study relied on three climatic stations represented in the northern station of the (Mosul) station. And the middle station at the station (Baghdad), and the southern station At (Basra) station, map (1).

the border temporal: Period study search 2020 –2021 cycle climatic From (1999- 2021).

Map (1) of the location of the study area (Mosul, Baghdad, Basra) in relation to Iraq



Source : From a job researcher by credit on me: 1-Ministry Resources aquatic, Directorate the public for space, Division Produce Maps, Unit digital, a map Iraq Admin Scale (1000000:1) Baghdad, 2007. 2-a program (10:3) GIS ARC).

Terminology of study :

- 1- **covid virus19 (corona)** : It is a disease of the coronavirus family, and it is the last virus discovered from the strain of the Corona virus that was discovered in China recently⁽¹⁾.
- 2- **pandemic** : It is an infection that spreads in many countries and continents, and causes many deaths and is difficult to control easily, as happened with the outbreak of the Corona virus and called it a pandemic.⁽²⁾.
- 3- **the climate** : The state of the atmosphere and the accumulation of weather phenomena, whether daily or seasonal, for a long period of time, a year or more⁽³⁾

Previous studies : And she did Many From Studies clarified that degree effect the heat in some Locations weak and some of them Average and some of them strong, and in All conditions is being for factors the weather and climate Affected me The spread of the virus, she adds study Egyptian for(Rania Amer) and study(Mohammed Al-Maliki) that Viruses see her ability on me Bearing grades the heat, so that Viruses surrounded From the outside cover greasy affected by big in degrees the heat Comparison without coated , and that virus corona new From Viruses coated cover greasy, It is affected by altitude Degree the heat , Done analysis for cases the weather in (500) region In the world between The number of injuries And the grades the heat and speed wind and humidity Relativity explained when high degrees the heat I retreated cases injury⁽⁴⁾. while clarified study Other that virus linked in the regions cold then adapt in Regions hot and spread distance that⁽⁵⁾, explained study in Erbil it's a will not Complete reduction cases injury in grades heat warmer, Where that to rise Degree the heat by (1M⁵), Increases cases by (4.9%)⁽⁶⁾.. showed study New that Degree the heat and the wind for them Effect Great on setting and height and lower injuries Viruses Done Application Indicator (AIR) it says Researchers that Sample Indicates to me that height grades the heat low humidity, will lower Preparation Injuries. and that Speed wind light in (2Mile/hour) can saliva that Move In which 18 ahead During five seconds⁽⁷⁾.

The first topic (Climate characteristics in Iraq)

The climatic characteristics in Iraq vary according to their locations, so we will study three climatic stations represented by (Mosul in northern Iraq, Baghdad in central Iraq, and Basra in southern Iraq), and study some climate elements represented by (temperature, wind, and relative humidity) during the period from (1999-2021), in order to reveal the effect of these elements on the spread of corona viruses in Iraq.

1- temperature :

Prepare Degree the heat From Elements climatic mission to influence on me Elements climatic other Through the analysis of the aforementioned studied stations, the following became clear:

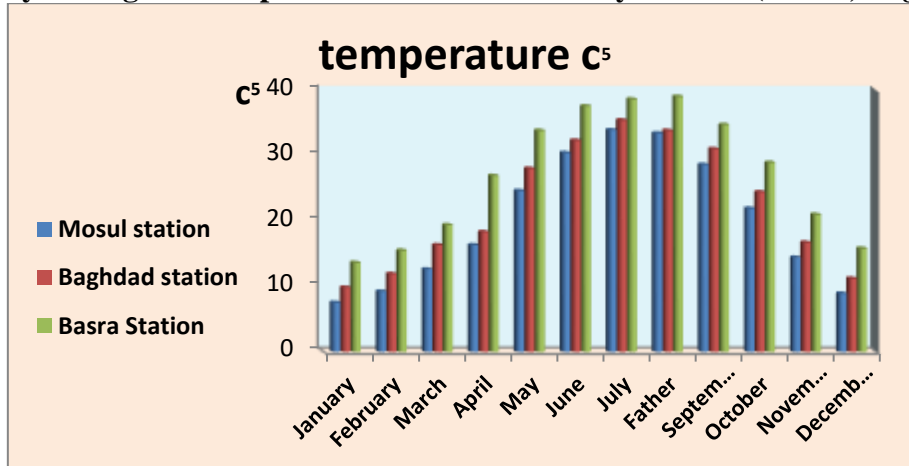
It is clear from Table (1), and Figure (1), that the rate Annual degree the heat It was reported in the stations (Mosul, Baghdad, and Basra), (20.1 ,22.42,27.1 M⁵), respectively. The highest annual rate was recorded in the Basra station, due to the dry desert climate. about for station(Mosul) It recorded the lowest rate in it due to its height above sea level, where Mosul enjoys a temperate climate. monthly degree the heat in Study area stations up progressive starting From Month March and continued in the increase to inform Maximum rates in Months(June,july, and father) As I reached the Mosul station (30.4, 33.9 and 33.4 respectively, while . reached in Station Baghdad(32.3, 35.4, 33.8) on me straight. and reached in Station Basra(37.5, 38.6,39) on me straight .

Table (1) Average monthly temperatures (m5) for stations (Mosul, Baghdad, and Basra) for the period (1990-2021)

Basra temperature M ⁵	Baghdad temperature M ⁵	Mosul temperature m5	Statione afor a month
13.6	9.8	7.5	January
15th.47	11.9	9.2	February
19.37	16.3	12.6	March
26.9	18.3	16.3	April
33.8	28	24.6	ahay
37.5	32.3	30.4	June
38.6	35.4	33.9	July
39	33.8	33.4	Father
34.7	31	28.6	September
28.9	24.4	21.9	October
20.96	16.7	14.4	November
15th.78	11.2	8.9	December
27.1	22.42	20.1	the average

Source: Ministry of Transport, General Authority for Meteorology, Climate Department, unpublished data, 2021 .

Figure (1) Monthly averages of temperatures 5 m for the study stations (Mosul, Baghdad, and Basra)



Source: From the researcher's work based on Table (1).

2-Wind speed :

It is clear from Table (2) the variation in the monthly wind speed rates in the cold season compared to the hot season in the study stations, as follows:

The annual average wind speed in the Mosul station was (1.3 m/s), which was the lowest in the studied stations, due to the erosion of the area in this station, which hinders wind movement, while the wind speed decreased in the cold season during the months (October and November). , and December and January (as they reached (1.1, 1.1, 0.7, 1.0 m/s), and varied in months (April, and may, and June, And in August, the wind speed reached (1.6, 1.9, 1.4, 1.6 m/s), and the highest wind speed was recorded in July, reaching (2 m/s).

As for the Baghdad station, it recorded an annual rate of (3.1 m/s), and the monthly rates decreased in the months of the cold season, as they were recorded in months (October the first, and October Second, and canon the first, and canon Second) wind speed reached (2.8, 2.5, 2.2, 2.6 M/Tha), while the rates increased in the hot season during the months (April, and may, and June, and father) The wind speed in it reached (3.4, 3.5, 3.7, 3.4 m / s), the highest recorded in the month of July, when it reached (4.6 m / s), while the Basra station recorded modified annual reach (4.0 M/Tha) This is due to the flatness of the surface and the lack of vegetation cover, which increases the wind speed, as well as decreased rates monthly in Months the classroom cold so registered in Months (October the first, and October Second, and canon the first, and canon Second) Quick winds reached (3.6, 3.1, 2.7, 3.1 M/Tha), Compared to the hot season that rose It has the rates During Months (April, May and July, and father) so reached Quick wind (4.5, 4.2, 4.9, 4.9 M/Tha), registered the highest in Month June so reached (5.9 pm/Tha).

Schedule(2) average wind speed(m/s)for stations(Mosul, and Baghdad, and Basra)for the duration(1990-202 .)1).

Basra	Baghdad	Mosul	Station
speedyi love you m/s	speedHeyh m/s	speedyi love you m/s	the month
3.1	2.6	1.0	January
3.2	2.9	1.0	February
3.2	3.2	1.2	March
4.5	3.4	1.6	April
4.2	3.5	1.9	May
5.9	3.7	1.4	June

4.9	4.6	2	July
4.9	3.4	1.6	Father
4.9	3.3	1.5	September
3.6	2.8	1.1	October
3.1	2.5	1.1	November
2.7	2.2	0.7	December
4.0	3.1	1.3	the average

source:Ministry Transport,the body the public for the time air,Division the climate,data not published, 2021.

3- Relative Humidity:

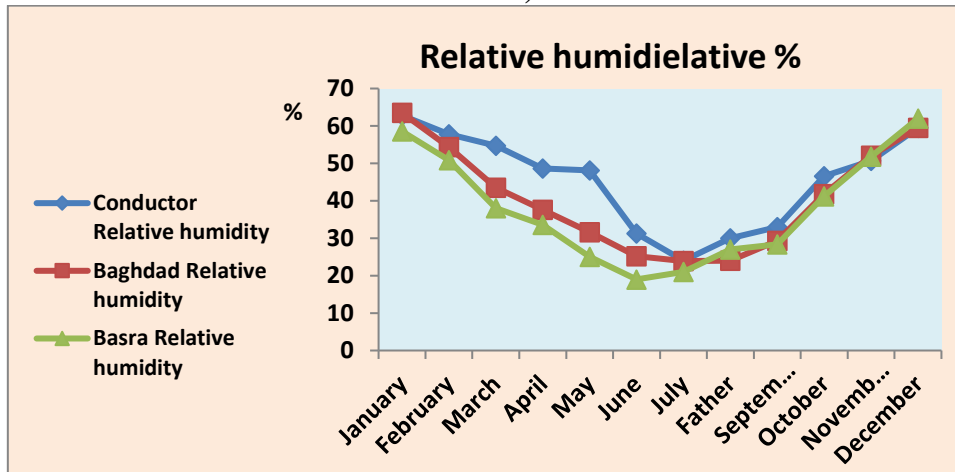
It can be seen from Table (3) and Figure (2) that the relative humidity rate in the Mosul station was (45.59%) due to the presence of highlands and mountain chains that reduce the temperature. The gradual increase begins in the Mosul station starting from the month of October as It reached (46.6%), and continues to increase to reach its maximum in

Schedule (3)relative humidity(M%)for stations(Mosul,and Baghdad,and Basra)for the duration(1990-202 .)1) .

Basra relative humidity %	Baghdad relative humidity %	Mosul relative humidity %	station the month
58.6	63.5	62.8	January
50.9	54.4	57.8	February
38	43.5	54.7	March
33.6	37.61	48.6	April
25	31.6	48.1	May
19	25.2	31.3	June
21	23.9	24	July
27	24	30	Father
28.4	29.3	33	September
41.2	41.8	46.6	October
51.8	52.1	50.7	November
62	59.5	59.5	December
38	40.5	45.59	the average

Source:Source:Ministry Transport,the body the public for the time air,Division the climate,data not published, 2021.

Appearance(2)rates monthly relative humidity (%) for stations the study(Mosul,and Baghdad,and Basra)



Source:From a job researcher by credit on me Schedule(3) .

Month Canon Second so reached Humidity Relativity(62.8%),while registered rates Humidity Relativity drop in the classroom hot During Months(June,july,and father)so reached(31.3 , 24 , 30 %)on me straight,while registered Station Baghdad modified Humidity reach(40.5%) ,Where start the increase progressive beginning From Month October the first so reached(41.8%)to inform maximum in Month Canon Second so reached(63.5%) ,As for rates in the classroom hot Lost registered in Months(June,july,and father)Humidity relativity reached(25.2 , 23.9 , 24%)on me straight,As for Station Basra Lost reach modified Humidity Relativity In which(38%)and goes down modified Humidity Relativity in Station Basra Comparison at the two stations the previous two because of Height in grades the heat.start the increase progressive also in Month October the first so reached(41.2%),and say rates Humidity in the classroom hot During Months(June,july,and father)so reached(19, 21, 27%).

**The second topic: (Reality Spread virus covid 19in Iraq)
 preamble:**

Start Spread virus corona in Iraq in a year2020From During the registration of the first case in Najaf Al-Ashraf in24from february , So when checking a sample From Student Holds Iranian citizenship and showed The result positive and hit him virus corona After that, cases began to increase until the current year 2022. as he reached sum Injuries confirmed (2,131,500) condition , recorded from24,267(Deaths and records)2,071,838) Number the recovering ,Cases are still increasing, but in smaller numbers than before, due to the availability of the vaccine for the virus. As for the study period in 2020-2021, confirmed infections amounted to (257,284) cases, while deaths amounted to (4578) cases, in the studied governorates, table (4).

Table (4) Confirmed cases and deaths in the study area for the year 2020-2021

death cases	confirmed cases	Governorate
914	26009	Mosul
2770	190200	Baghdad
894	41075	Basra
4578	257284	the total

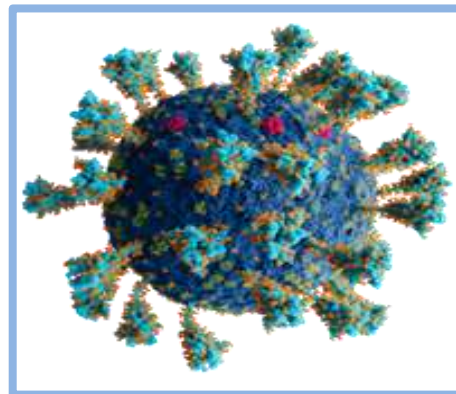
Source: Iraqi Ministry of Public Health data 2020-2021.

Corona viruses and how they spread:

Corona virus is one of the coronaviruses, and it is a family of viruses that cause disease in humans, including in animals, such as cats and dogs, and these viruses cause colds and other diseases such as the SARS syndrome. The name of the virus differed between the scientific name of the virus and its family family, but the international organization adopted the name “Covid”19⁽⁸⁾. Corona virus and SARS syndrome are only genetically related, but they are different from each other, and the disease was discovered when China reported an outbreak of the virus in the Chinese city of Wuhan on December 31, 2019. Sputum and an examination found that it contains the Corona virus⁽⁹⁾China hid the beginning of the disease until it spread and spread, which it believed could be controlled⁽¹⁰⁾

Because of the seriousness of this virus and the speed of its spread, the World Health Organization called it a pandemic on March 11, 2020, and called on the governments of the world to take steps and measures to stop the spread of this virus.⁽¹¹⁾. has evolved virus Corona from viruses crown other, which helped to his move , Where studies revealed that acid sequence amino virus bat RaTG13)) Similar to the position of(RBD)From virus corona , Which likely evolution This virus RaTG13)) , It consists of four proteins, one of which is a protein (S), which forms the bumps on the surface of the virus that give it its distinctive shape⁽¹²⁾. (Picture 1), and the danger of the Corona virus lies in these protrusions, as it is difficult to identify it by antibodies and it is easy for it to enter the cells of the body and settle in them, and the symptoms of the disease are coughing, fever and shortness of breath, as this virus spreads through droplets and very quickly, and anyone can The disease is transmitted to others easily, so mixing is prevented and it is preferable to isolate the person infected with the virus from others. Temperatures also affect vector viruses, as each virus has a temperature appropriate to its reproduction or death (13).

Picture (1) of the new Covid-19 virus



Source:<http://www.emro.who.int/en/health-topics/corona-virus/index.html>

Viruses also need a certain percentage of moisture in their bodies in order to multiply. As for the intensification of the wind speed associated with dust storms, it causes many diseases, while some winds, such as the northwest winds in Iraq, make them feel comfortable, and the cold winds cause colds, and work The Sirocco and Fohn winds that blow over Europe cause a feeling of discomfort (14). Solar radiation contains ultraviolet rays that help kill viruses, and exposure to solar radiation regulates the level of vitamin D in the body and regulates the work of the immune system, which works to resist the body when exposed to viruses (15) .

The path of the spread of the Corona virus in Iraq:

It is possible to know the path and indicator of the spread of the virus in the studied areas and in the months of the study year, by relying on the health evidence in those areas, and through the available data from the Iraqi Ministry of Health. According to what the study identified three northern governorates represented by (Mosul), the central governorates represented by (Baghdad), and the southern governorates represented by (Basra). The study relied on the number of casualties during the months of the study year and through the seasons of the year, as follows:

It is clear from Table (5) and Figure (3) that the infections began to be studied from the month of March, due to the entry of the virus in approximately mid-February. be Visibility is clear for the virus in Month

February, as Baghdad recorded in February (6) confirmed injuries, and Mosul and Basra did not record any confirmed injuries in this month. stretch the study to me Month February From general2021From Season winter,To study the results seasons quarter to .

First: Spring:

1- Injuries in the month of March:

Baghdad recorded during the month of March (174) injuries, which is the highest number of injuries in the studied governorates for the month of March, and recorded (8) deaths, and Basra recorded (92) injuries. Confirmed, and recorded (10) deaths, while Mosul was recorded during the month of March(4)injuries Confirmed , which is the lowest recorded injuries for the study areas for this month , and no deaths were recorded .

2- Injuries in Month April:

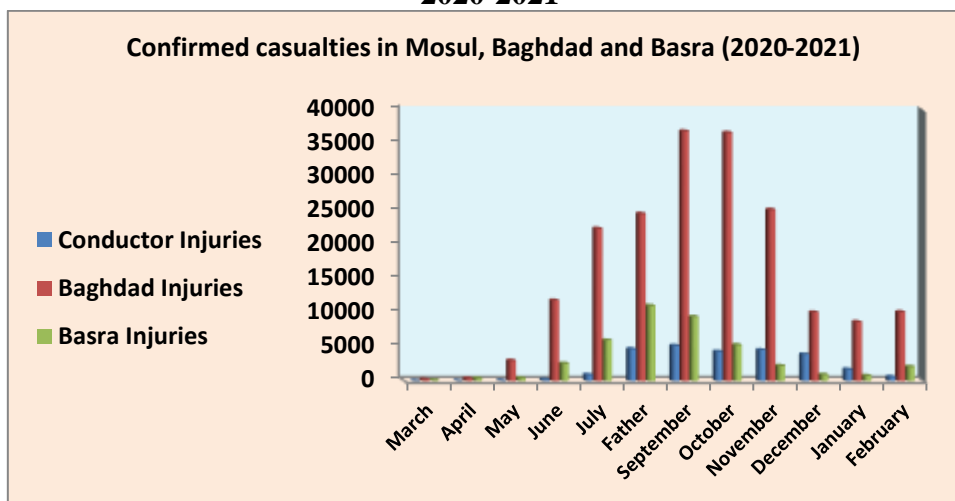
continued injuries in Baghdad and Basra in increment During Month April though From Procedures the ban mass Where registered injuries(348 , 357)infection confirmed on me straight,and recorded deaths(27 , 6)condition death on me straight,while decreased in Mosul to me infection one During a period the ban that continued From17March to me22April.and why register Which condition death.

Table (5) injuries and deaths in the governorates of (Mosul, Baghdad, and Basra) 2020-2021

Basra		Baghdad		Mosul		Governorate Months
deaths	injuries	deaths	injuries	deaths	injuries	
10	92	8	174	-	4	March
6	357	27	348	-	1	April
1	408	89	2975	-	39	May
59	2545	600	11862	3	188	June
266	5967	831	22481	40	879	July
226	11078	348	24669	125	4700	Father
163	9446	271	36837	534	5180	September
94	5284	218	36624	97	4313	October
45	2197	182	25260	60	4536	November
10	897	74	10105	46	3894	December
7	734	42	8693	4	1680	January
7	2070	89	10172	5	595	February
80	3479	241	15576	82	2158	the average

Source: Iraqi Ministry of Health data, 2020-2021

Appearance(3)Confirmed injuries for stations the study(Mosul,and Baghdad,and Basra)For the year 2020-2021



Source:From a job researcher by credit on me Schedule(5)

3- injuries in Month May:

rose injuries in All areas the study,so registered Baghdad,and Basra,and Mosul(2975, 408, 39)injuries confirmed on me straight,and recorded deaths in the month same(89 , 1 ,zero)on me straight and still Mosul register minimum injuries in areas the study,and why register Which condition death.

-secondly:Season the summer:

1- Injuries in the month of June:

The course of injuries changed in the month of June, as the injuries began to increase rapidly, and thus Baghdad, Basra and Mosul recorded (11862, 2545, 188) confirmed injuries, respectively, and deaths were recorded (600, 59, 3) deaths.

2- Injuries in July:

Injuries continued to rise in the study areas, as Baghdad, Basra and Mosul recorded (22481, 5967, 879) confirmed injuries, respectively, offset by an increase in deaths, which amounted to (831, 266, 40) deaths.

3- Injuries in the month of August:

In August, injuries recorded a rapid increase in the study areas, especially Mosul, compared to the previous month (July), when (4700) cases were recorded, while injuries were recorded in (Baghdad and Basra),(24669, 11078) confirmed cases of infection, respectively, while a decrease in deaths was recorded in (Baghdad and Basra), (348, 226) deaths, respectively, while deaths increased in Mosul from the previous month, when it recorded (125) deaths.

Third:Season The autumn:

1- Injuries in September:

Injuries began to decline gradually in (Basra), where it was recorded (9446) injury confirmed , while the increase continued in (Baghdad and Mosul) as it recorded (36837, 5180) confirmed cases, and deaths recorded an increase in Mosul, as they were recorded (534(Deaths, while it decreased in (Baghdad and Basra), as it recorded (271,163) consecutive deaths.

2- injuries in the month of october the first:

keep going down in injuries In Basra, I recorded(5284)infection confirmed,While it fell in Mosul so registered(4133)infection Confirmed, Baghdad recorded(36624)infection confirmed,Also recorded low in cases Death in areas the study About Month September so registered(Mosul,And the Baghdad,and Basra) , (97, 218, 94)condition death.

3- injuries in Month October Second:

I started injuries down clearly in(Baghdad , and Basra)so registered(25260, 2197)infection confirmed on me straight,while witnessed injuries in Mosul stable relatively so registered(4536)infection confirmed,while witnessed cases deaths continuation in decline so registered in(Mosul,and Baghdad,and Basra), (60, 182, 45)condition death.

Fourthly:Season winter:

1- injuries in Month Canon the first:

continue drop injuries in areas the study so registered(Mosul and Baghdad and Basra),injuries reached(3894, 10105, 897)infection confirmed on me straight,and continued deaths like that in decline so reached(46 , 74, 10)condition death on me straight.

2- injuries in Month Canon Second:

The decrease in the number of injuries continued in the regions the study so registered(Mosul and Baghdad and Basra),injuries It reached (1680, 8693, 734) injuries confirmed on me straight,and fell deaths Also, it reached (4, 42, 7) deaths.

3- Injuries in February:

I took injuries increasing in(Baghdad and Basra)I recorded(10172,2070)infection confirmed on me straight,and fell deaths also so reached(89,7)consecutive deaths.While the number of injuries in Mosul decreased, reaching (595) confirmed injuries, and (5) deaths were recorded.

The third topic

(comparison between elements the climate And the consequences virus infections covid 19in Iraq)

Through what was reviewed of injuries and deaths in the studied areas (Mosul, Baghdad and Basra), we will compare the data of the number of injuries with the climatic elements (temperature, wind speed, and relative humidity) for all study areas with the recorded injuries and deaths to reveal the extent of the impact or relationship. The climatic elements of the spread of the Corona virus during the study period.

Month February: Prepare Month February beginning Spread the pandemic and why register but Baghdad(6)injuries confirmed.

First, the spring season:

1- Month March:

registered Baghdad During Month March(174)infection And the(8)condition death,rate Degree heat registered in this the month so reached(16.3M⁵),A wind speed of 3.2 m/s and a relative humidity of 43.5% registered Basra(92)infection and recorded(10)deaths,rate Degree heat registered(19,37 .)M⁵, and speed winds(3.2M/Tha),and humidity relativity reached(38%)As for Mosul Lost registered During Month March(4)injuries confirmed,and why register Which condition death,rate Degree heat reached(12.6 .)M⁵)and speed winds(1,2M/Tha),and humidity relativity reached(54.7%),Which Prepare less Injuries in this the month and to a degree heat low Comparison in areas the study.

2- Month April:

though From Procedures the ban mass that continued From17March to me22April,registered Baghdad(348)infection confirmed degree heat(18.3M⁵),and speed winds(3,4 pm/Tha),and humidity relativity reached(37,61%), and recorded Basra(357)infection confirmed degree heat(26,9M⁵)and speed winds(4,5 pm/Tha) ,and humidity relativity reached(33,6%) ,and recorded deaths(27 , 6)condition death on me straight,and fell in Mosul to me infection one degree heat(16.3M⁵) . and speed winds(1,6 pm/Tha),and humidity relativity reached(48,6%)and why register Which condition death.

3- Month May:

Registered Baghdad,and Basra,and Mosul(2975, 408, 39)injury case confirmed on me straight,rate Degree heat registered in this the month(28, 33.8, 24,6M⁵), .and speed winds(3,5, 4,2,1,9 pm/Tha)Straight,and humidity relativity reached(31,6, 25,48,1%)straight and recorded deaths in the month same(89 , 1 ,zero)on me straight.

Secondly:Season The Summer:

1-Month June:

I started injuries increasing in the form of fast,And so be injuries confirmed in Baghdad and Basra and Mosul(11862 , 2545 , 188)infection confirmed,and rate grades heat registered During the month(32.3 , 37.5 , 30.4M⁵)on me straight and speed winds(3,7,5,9, 1,4 pm/Tha)on me straight,and humidity relativity reached(25,2,19,31,3%)on me straight and recorded deaths(600 , 59 , 3)condition death on me straight.

2- Month July:

registered Baghdad and Basra and Mosul(22481 , 5967, 879)infection confirmed on me straight,rate Degree heat registered(35,4 , 38,6 , 33.9M⁵)and speed winds(4,6, 4,9,2 pm/Tha)on me straight,and humidity relativity reached(23,9,21,24%)on me straight, corresponding a plus in deaths so reached(831 , 266 ,40)condition death.

3- Month Father:

registered injuries in Month Father to rise fast in areas the study especially Mosul Comparison per month Previous(July)so registered in(Mosul,and Baghdad,and Basra) (4700, 24669, 11078)condition infection confirmed on me straight,rate Degree heat registered(33,4, 33,8,39 AD⁵), and speed winds(1,6,3,4,4,9M/Tha)on me straight,and humidity relativity reached(30, 24,27%)on me straight , recorded drop in deaths in(Baghdad and Basra), (348, 226)condition death on me straight,while rose deaths in Mosul so registered(125)condition death.

Third: Autumn Semester:

1- Month September:

continued the increase in(Baghdad,and Mosul)so registered(36837,5180)infection confirmed,and recorded injuries drop gradual in(Basra)so registered(9446)infection confirmed,registered rates Degree the heat in areas the study (Baghdad, Mosul, and Basra) in Month September(31, 28,6, 34,7M⁵)on me straight,and speed winds(3,3,1,5,4,9M/Tha)on me straight,and humidity relativity reached(29,3,33,28,4%)on me straight

and recorded deaths to rise in Mosul so registered(534)condition death,while decreased in(Baghdad and Basra)so registered(271 , 163)condition death on me straight.

2- the month of october the first:

continue decline in injuries in Basra so registered(5284)infection confirmed,Baghdad was recorded in Rate injury(36624)infection confirmed,and recorded Mosul(4133)infection confirmed,and recorded rates Degree the heat in areas the study(Baghdad,and Mosul,and Basra)in Month October(24,4, 21,9,28,9 M⁵)on me straight,and speed winds(2,8, 1,1,3,6 pm/Tha)on me straight,and humidity relativity reached(41,8,46.6,41,2%)on me straight while decreased cases Death in areas the study About Month September so registered(Mosul,and Basra,and Baghdad) , (97, 94 , 218)condition death.

3- the month of october Second:

continued injuries down clearly in(Baghdad,and Basra)so registered(25260, 2197)infection confirmed on me straight rate Degree heat reached(16,7 , 20,96M⁵),and speed winds(2,5 ,3,1 pm/Tha)on me straight,and humidity relativity reached(52,1,51,8%)on me straight, while registered injuries in Mosul(4536)infection confirmed,rate Degree heat reached(14,4 pm⁵), and speed winds(1,1pm/Tha),and humidity relativity reached(50,7%)and saw cases deaths continuation in decline so registered in(Mosul,and Baghdad,and Basra), (60, 182, 45)condition death on me straight.

Fourth: Winter:

1- January the first:

continue drop injuries in areas the study in the form of general Comparison by months Previous so registered(Mosul and Baghdad and Basra),injuries reached(3894, 10105, 897)injury case confirmed on me straight,rate Degree heat reached(8,9 , 11,2 ,15th,78 M⁵), and speed winds(0,7,2,2,2,7 pm/Tha)on me straight,and humidity relativity reached(59,5,59,5,62%)on me straight, and it will continue deaths like that in decline so reached(46 , 74, 10)condition death on me straight.

2- January:

Injuries were recorded in(Mosul and Baghdad and Basra),injuries reached(1680, 8693, 734)infection confirmed on me straight,With a temperature of (7.5, 9.8, 13.6 °C), and a speed of winds(1,0, 2,6,3,1pm/Tha)on me straight,and humidity relativity reached(62,8,63,5 ,58.6%)on me straight,and fell deaths also in so reached(4 , 42 , 7)straight case.

3- February :

I started Injuries increasing in(Baghdad and Basra)so registered(10172, 2070)infection confirmed on me straight,degree heat reached(11.9,15th.47 m⁵),and speed winds(2,9, 3,2 pm/Tha)on me straight,and humidity relativity reached(54,4 , 50,9%)and fell deaths also so reached(89 , 7)condition death on me straight.while dropped Number Injuries in Mosul so registered(595)infection confirmed,With a temperature of (9.2 m), a wind speed of (1.0 m/s), and a relative humidity of (57.8%).(5)condition death.

Discuss Results:

The results were analyzed in the form of the four seasons of the studied governorates (Mosul, Baghdad, Basra) to find out the effect and correlation with climate elements (temperature, wind speed and relative humidity) with a simple linear correlation equation through the (Arab Statistical Processor) program between (seasons of the year and coronavirus infections). for the year 2020-2021), where the study lasted from mid-February 2020 to January 2021, as follows:

First, spring:

1- Northern Governorates (Mosul):

Through table (6) the results showed that the correlation coefficient between temperature and injuries was ($r = 0.928$), which is a very strong direct relationship, through the correlation, the effect of temperature is clearly visible, as injuries rise with the increase in temperature, but we see that injuries decreased to an oasis injury during the April season, despite the high temperature, due to the imposition of a comprehensive ban during this period, Where the virus spreads by contact and through droplets, as for the relationship with wind speed, the correlation factor was recorded($r = 0.88$), which is a very strong direct relationship, and the correlation coefficient with relative humidity ($r = -0.522$), which is a medium inverse relationship between the two variables, meaning that the injuries somewhat decrease with the increase in relative humidity, as the

highest relative humidity was recorded compared to (Baghdad and Basra) it reached in (March, April, and May) (54.7, 48.6, and May) respectively. %).

Schedule(6)Injuries in Mosul During the spring2020- 2021

relative humidity %	wind speed m/s	Degree the heat m5	injuries	the month
54.7	1.2	12.6	4	March
48.6	1.6	16.3	1	April
48.1	1.9	24.6	39	May
50.4	1.2	17.8	14.6	the average

Source is from the researcher's work based on Table (1, 2, 3, 5).

2- Central Governorates (Baghdad):

It is clear from Table (7) that Labs link between Degree the heat and injuries reach($r = 0.999$), Which Relationship orthodox strong very It is also noted in the central regions (Baghdad) that there is a clear effect of temperature on the increase in the number of injuries, despite the presence of a comprehensive ban, and that the number of injuries increases more than in the northern regions (Mosul), where the temperature rises in Baghdad compared to Mosul, and the relationship with Speed wind Lost

Schedule(7)Injuries in Baghdad During Season spring2020- 2021

relative humidity %	Wind speed m/s	Degree the heat m5	injuries	the month
43.5	3.2	16.3	174	March
37.61	3.4	18.3	348	April
31.6	3.5	28	2975	May
37.57	3.36	20.8	1.16	the average

Source : From a job researcher by credit on me Schedule(1, 2, 3, 5).

register Worker link($r = -1.729$), Which Relationship reverse strong very . As for Labs link with Humidity Relativity($r = -0.895$), Which Relationship Very strong reversal between the variables .

3- Southern Governorates (Basra):

From During schedule(8)I showed Results that Labs link between Degree the heat and injuries reach($r = 0.94$), Which Relationship orthodox strong very, Where the injuries increase with the rise in temperature, and we note the rise in injuries, as the comprehensive siege ended from the end of April and the partial siege began, and that the relationship with Speed wind Relationship orthodox strong very then register Worker link , as it reached($r = 0.99$) ,As for Labs link with Humidity Relativity($r = -0.849$) , Which Relationship reverse very strong between the variables As injuries rise with a decrease in relative humidity.

Schedule(8)Injuries in Basra During Season spring2020- 2021

relative humidity %	Wind speed m/s	temperature m5	injuries	the month
38	3.2	19.37	92	March
33.6	4.5	26.9	357	April
25	4.2	33.8	408	May
32.2	3.9	26.69	285.6	the average

Source : From a job researcher by credit on me Schedule(1, 2, 3, 5).

Second: the summer season:

1- provinces North(Mosul) :

From During schedule(9)I showed Results that Labs link between Degree the heat and injuries reach($r = 0.558$) ,Which Relationship orthodox medium,and the relationship with Speed wind Lost register Worker link($r = - 0.071$) ,Which Relationship weak reverse very, and coefficient link with Humidity Relativity($r = 0.21$) ,Which Relationship weak directivity between the two variables. It is noted that the influence of climatic elements (temperature, relative humidity and wind speed) was not clear despite the high number of injuries.

Schedule(9)Injuries in Mosul During Season the summer2020- 2021

relative humidity %	Wind speed m/s	Degree the heat m5	injuries	the month
31.3	1.4	30.4	188	June
24	2	33.9	879	July
30	1.6	33.4	4700	Father
28.4	1.6	32.5	1922.3	the average

Source : From a job researcher by credit on me Schedule(1, 2, 3, 5).

2- Central Governorates (Baghdad):

It is clear from Table (10) that Labs link between Degree the heat and injuries reach($r = 0.677$) ,Which Relationship orthodox strong , and the relationship with Speed wind she Relationship orthodox very weak lost register Worker link($r = 0.118$) ,and coefficient link with Humidity Relativity($r = - 1.86$) ,Which Relationship complete inverse between the variables,We notice in this chapter in Baghdad that the effect of humidity increases more than the effect of temperature, while the wind speed had no clear effect.

Schedule(10)Injuries in Baghdad During Season the summer2020- 2021

relative humidity %	Wind speed m/s	Degree the heat m5	injuries	the month
25.2	3.7	32.3	11862	June
23.9	4.6	35.4	22481	July
24	3.4	33.8	24669	Father
24.3	3.9	33.8	19670.6	the average

Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

3- provinces Southern(Basra):

can be seen from schedule(11)that Labs link between Degree the heat and injuries reach($r = 0.333$) ,Which Relationship orthodox Very weak , As for Relationship with Speed wind Lost register Worker link($r = - 0.684$) ,Which Relationship strong reverse and coefficient link with Humidity Relativity($r = - 0.975$) ,Which Relationship very strong repulsive between the variables.,It is also clear that the humidity factor has a clear effect compared to the temperature, and that the wind speed has a prominent effect as injuries decrease with the increase in wind speed.

Schedule(11)Injuries in Basra During Season the summer2020- 2021

relative humidity %	Wind speed m/s	Degree the heat m5	injuries	the month
19	5.9	37.5	2545	June
21	4.9	38.6	5967	July
27	4.9	39	11078	Father

22.3	5.2	38.3	6530	the average
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Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

Third: Autumn Semester:

1-provinces North(Mosul) :

I showed Results From During schedule(12)that Labs link between Degree the heat and injuries reach($r = 0.669$) ,Which Relationship orthodox strong,and the relationship with Speed wind she Relationship orthodox strong very Lost register Worker link($r = 0.97$) ,As for Labs link with Humidity Relativity($r = 0.88$) ,Which Relationship reverse strong very between the variables .

Schedule(12)Injuries in Mosul During Season The autumn2020- 2021

relative humidity %	wind speed m/s	Degree the heat m5	injuries	the month
33	1.5	28.6	5180	September
46.6	1.1	21.9	4313	October
50.7	1.1	14.4	4536	November
43.4	1.2	21.6	4676.3	the average

Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

2- Provinces the middle(Baghdad) :

It turns out From schedule(13)that Labs link between Degree the heat and injuries reach($r = 0.849$) ,Which Relationship orthodox strong very and coefficient link with Speed wind Lost register Worker link($r = - 0.891$) ,Which Relationship orthodox strong very, ma Relationship with Humidity Relativity($r = - 0.85$) ,Which Relationship reverse strong very between the variables .

Schedule(13)Injuries in Baghdad During Season The autumn2020- 2021

relative humidity %	wind speed m/s	Degree the heat m5	injuries	the month
29.3	3.3	31	36837	September
41.8	2.8	24.4	36624	October
52.1	2.5	16.7	25260	November
41.06	2.8	24.0	32907	the average

Source: From a job researcher by credit on me Schedule(1, 2, 3, 5).

3-provinces Southern(Basra) :

clear From schedule(14)It turns out that Labs link between Degree the heat and injuries reach($r = 0.672$) ,Which Relationship orthodox strong , and the relationship with Speed wind she Relationship orthodox strong very , so register Worker link ($r = 0.961$),. while reached coefficient link with Humidity Relativity ($r = - 1.0$) ,Which Relationship reverse complete between the variables .

Schedule(14)Injuries in Basra During Season The autumn2020- 2021

relative humidity %	wind speed m/s	Degree the heat m5	injuries	the month
28.4	4.9	34.7	9446	September
41.2	3.6	28.9	5284	October
51.8	3.1	20.96	2197	November
40.46	3.86	28.18	5642.3	the average

Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

Fourth: Winter:

1- provinces North(Mosul) :

It turns out From schedule(15)that Labs link between Degree the heat and injuries reach (0.32 $r = 0.32$),Which A very weak positive correlation, and record Worker link with Speed wind Lost($r = - 0.947$) ,Which Relationship reverse strong very.coefficient also reached link with Humidity Relativity($r = 0.134$) ,Which Relationship orthodox weak very between the variables,It is clear that the high humidity is offset by a slight increase in the number of injuries , We also note that the number of injuries is gradually declining compared to the seasons of the previous year.

Schedule(15)Injuries and deaths in Mosul During Season winter of the year (2020- 2021)

relative humidity %	wind speed m/s	Degree temperature m5	injuries	the month
59.5	0.7	8.9	3894	December
62.8	1.0	7.5	1680	January
57.8	1.0	9.2	595	February
60.03	0.9	8.53	1858	the average

Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

2- Provinces the middle(Baghdad) :

It turns out From schedule(16)that Labs link between Degree the heat and injuries reach($r = 0.999$) ,Which Relationship orthodox strong very,We note that the decrease in temperature in Baghdad led to a decrease in the number of injuries, but the number of injuries increased in Baghdad than in the province of Mosul, and this confirms the direct relationship between injuries and temperature, as the temperature in Mosul is lower than the temperature in Baghdad because of its location in northern Iraq, which represents semi-mountainous area, Relationship with Speed wind Lost register Worker link($r = -0.261$) ,Which Relationship weak reverse very.and coefficient link with Humidity Relativity($r = - 0.815$)The relationship was between the variables It's the opposite very strong .

3- provinces Southern(Basra) :

clear From schedule(17)that Labs link between Degree the heat and injuries reach($r = 0.483$) ,Which Relationship orthodox intermediate between the two variables We also note that the decrease in temperature is accompanied by a decrease in the rate of injuries, as the number of injuries decreased in the winter season compared to the fall. Relationship with

Schedule(16)Injuries and deaths in Baghdad During Season winter For the year(2020-2021)

relative humidity %	wind speed m/s	Degree temperature m5	injuries	the month
59.5	2.2	11.2	10105	December
63.5	2.6	9.8	8693	January
54.4	2.9	11.9	10172	February
59.13	2.56	10.96	9656.6	the average

Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

Speed wind Lost register Worker link($r = 0.566$) ,Which Relationship orthodox average between the two variables, log coefficient link with Humidity Relativity($r = -.933$) ,Which Relationship reverse strong very between the variables,Where the number of injuries decreases with the high humidity during the winter season.

Schedule(17)Injuries and deaths in Basra During Season winter For the year(2020-2021)

relative humidity %	wind speed m/s	Degree temperature m5	injuries	the month
62	2.7	15.78	897	December
58.6	3.1	13.6	734	January
50.9	3.2	15.47	2070	February
57.16	3	14.95	1233.6	the average

Source From a job researcher by credit on me Schedule(1, 2, 3, 5).

The decline continued until the winter season, as Baghdad recorded the highest injuries in February, reaching (10172), and the lowest injuries during the winter season were in Mosul, which recorded (595) injuries during the month of Shait, while Basra recorded the lowest rates in January, which amounted to (734). injury. The current study confirms the existence of a direct correlation with temperature in all study areas and the most affected areas are the central and southern regions due to the high temperatures in them, and the relationship is somewhat inverse with humidity in most areas of the study and in the seasons of the year, but with wind, the relationship was between direct and inverse According to the direction of the influencing wind, where Injuries increased in the summer and in September of the autumn season, and began to rise in November of the same season and continued to decline in Winter

The results showed a high incidence of infections in the central and southern regions and a decrease in the northern regions, which are characterized by low temperatures and high relative humidity, compared to the central and southern regions. Confirms Engagement drop high degree the heat with drop The higher the number of injuries and vice versa with the relative humidity. Study results varied with some Studies other Similar so I showed the study current Reverse What I found mechanism its predecessors,where proved The current study exists Relationship extrinsic between Degree the heat and number Injuries and the relationship reverse with Humidity Relativity and number Injuries and the relationship changing between Speed wind and number Injuries.If the percentage of injuries in the study sites were extracted, we find that the number of population Baghdad in2021(8,780,422million Population (16) and the number of injuries during 2020-2021 is (190,200) injuries, table (4), and the percentage of injuries to the population in it (2,166%), and the number population Basra (3,142,449million breeze) And the number of injuries (41075), and the percentage of injuries on me Number population in which (1.307%).and number population Mosul (4,030,006million breeze) And the number of injuries in it is (26,009) injuries, and the percentage of injuries on me Number population It is (0.645%), and the result is also that the highest injuries are in the central regions (Baghdad), followed by the southern regions (Basra) and the lowest in the northern regions (Mosul) in the number of injuries with some exceptions.

Conclusions:

- 1- The central governorates (Baghdad) recorded the highest injuries during the study period, followed by the southern governorates (Basra), and the least northern governorates (Mosul).
- 2- Injuries began to increase rapidly during the summer in June, reaching (11862, 2545, 188) in Baghdad, Basra and Mosul, respectively.
- 3- The highest injuries were in the fall season in September, Baghdad recorded the highest, with 36,837 confirmed injuries.
- 4- The number of injuries recorded a gradual decrease in Basra from September, October, November and December to January, reaching (9446, 5284, 2197, 897, 734) confirmed cases.
- 5- The number of injuries recorded a decrease during the winter season (February) in Mosul, compared to the central and southern regions, reaching (595) confirmed cases.
- 6- The results of the statistical analysis were shown through the (Arab Statistical Program).APSS), the presence of a link

Strong positive with temperatures in most of the results and inverse with humidity, while it varied between inverse and direct with wind speed.

- 7- It is clear that the Corona virus evolves and adapts under certain climatic conditions that are affected by its rise or fall, until it adapts to the climatic conditions of the areas in which it appears, where it spreads and multiplies by contact.
- 8- The results of the study varied with some other similar studies, as the current study showed the opposite of what its predecessors found, which confirms the existence of a direct relationship between temperature and the number of injuries and the inverse relationship with relative humidity. and number Injuries and the changing relationship between wind speed and the number injuries.

Recommendations:

- 1- Emphasis on health prevention by the Ministry of Health, in anticipation of any new mutation of the Corona virus strain through health awareness, spreading awareness and following health procedures and not tolerating their application.
- 2- Work on regulating the immune system through exposure to sunlight to obtain vitamin D.
- 3- Ensure general hygiene, use sterilizers and detergents, and go to take the vaccine in its three doses.
- 4- Establishing research centers on the developments of the corona mutator, working to discover the climatic conditions that incubate it and with which the virus adapts and develops, and work to treat it and prevent its development.
- 5- Continuing thermal scanning operations across the country through thermal cameras to detect early cases.

Margins:

- 1- The son of safe slave Allah,virus corona between Transport and the mind,magazine wisdom for studies Social,Folder(9) ,the number(2), 2021,s11 .
- 2- David Morey (Considerations General for patients covid).
<https://ecpc.org/covid-19-information>
- 3- Salar on me Khudair dzi,and others,Research historical and contemporary in Date Iraq,Dar: house books and documents Baghdad, 2022,s48 .
<https://www.bbc.com/arabic/vert-fut-52068538-4>
- 5- Mohammed Noor Religion Ibrahim Elsabaawy,Dimensions geographical and environmental epidemic corona Global(study in geographical medical),the magazine Egyptian to change environmental, 2020 ,s20 .
- 6- Randk huwaiz,catt On,name the long,Effect closure and degree the heat and humidity on me pattern). COVID-19in Governorate Erbil,province Kurdistan,Iraq,magazine Diyala medical, 2020 ,s63
<https://arabic.rt.com/technology-7>
- 8- Barqa Saad Jasem Rashidi,Immolate my fault Kazem Alsdkhan,Dimensions geopolitics to spread pandemic corona,magazine Research Maysan , Folder18 ,Number35 , 2022.
- 9- Hader Yousif Falih Smar Abdul Raheem Al-Gharrawi and Suhad Y.Abed The novel coronavirus (covid-19) history, pathogenesis, diagnosis and treatment , Samarra Journal Pure and Applied Science , 2022,4,1, pag 119
- 10 - look with me with me bad corona epidemic worldwide(webwww.bbc.com/news/world)
- 11- Ibrahim praiseworthy professions,Effect virus corona on me commitments contractual in Law civil Iraqi,magazine College Law for science Legal and political,Folder(9) ,Number Special, 2020 ,s151.
- 12- summer Ashraf (How Invades virus corona our cells),Article 13/4/2020 .
<https://www.scientificamerican.com>
- 13- Salam phone Ahmed Al-Jubouri, Applied Climatology, University of Baghdad, 1st Edition, 2014, p. 224
- 14- The same source, pp. 28-29.
- 15-Ahmed Fattah Hassoun, et al, Study Effect of Some Atmospheric Elements on COVID-19 Infections in Iraq, Al-Mustansiriyah Journal of Science, Volume 32, Issue 2. 2021, page 77
- 16-Ministry planning and the device central for stats , Estimates population Iraq according to provinces2021

Sources :

First - Arabic books:

- 1- Salar on me Khudair dzi,and others,Research historical and contemporary in Date Iraq,Dar: house books and documents Baghdad, 2022 .
- 2- Hello phone Ahmed Jubouri,Science the climate Applied , University Baghdad,i1, 2014 .

Second: magazines:

- 1- huwaiz , randak,cat On,name the long,Effect closure and degree the heat and humidity on me pattern)COVID-19in Governorate Erbil,province Kurdistan,Iraq,magazine Diyala medical, 2020.
- 2- Al Rashidi, Barqa Saad Jasem,Immolate my fault Kazem Alsdkhan,Dimensions geopolitics to spread pandemic corona,magazine Research Maysan'Folder18 ,Number35 , 2022
- 3- Al-Sabawi, Muhammad Noor Religion Ibrahim,Dimensions geographical and environmental epidemic corona Global(study in geographical medical),the magazine Egyptian to change environmental, 2020.
- 4- slave God, Ben safe,virus corona between Transport and the mind,magazine wisdom for studies Social,Folder(9) ,the number(2), 2021 .

Third: Governmental and official departments:

- 1- Ministry planning and the device central for stats , Estimated population of Iraq by governorates 2021.
- 2- Ministry the health Iraqi,data2020-2021.
- 3- Ministry Resources aquatic,Directorate the public for space,Division Produce Maps,Unit digital,a map Iraq Admin , Baghdad, 2007.
- 4- Ministry Transport,the body the public for the time air,Division the climate,data not published, 2020

Fourth: Foreign Sources:

- 1- Ahmad Fattah Hassoun, et al, Study Effect of Some Atmospheric Elements on COVID-19 Infections in Iraq, Al-Mustansiriyah Journal of Science, Volume 32, Issue 2. 2021, page 77
- 1-2-Hader Yousif Falih, et al, the novel coronavirus (covid-19) history, pathogenesis, diagnosis and treatment, Samarra Journal Pure and Applied Science, 2022,4,1, pag 119

Fifthly, the Internet:

[https://www.bbc.com/arabic/vert-fut-52068538- 1](https://www.bbc.com/arabic/vert-fut-52068538-1)

[webwww.bbc.com/news/world-2](http://www.bbc.com/news/world-2)

<http://www.emro.who.int/en/health-topics/corona-virus/index.html- 3>

<http://www.emro.who.int/en/health-topics/corona-virus/index.html-4>