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The Logistical Geo-Medical Analysis of the Epidemiological Curve of the Corona Pandemic, and the Most Important Proposed Strategies to Limit its Spread.

Tasamer Mahdi Jassam[1], Dr. Abdel Amir Abbas Abd Al-Hayali[2]

[1]*Assistant Lecturer, Geographical Department, College of Education for Human Sciences, University of Diyala, Iraq.*
ge.hum@uodiyala.edu.iq.101
[2]*Prof., Geographical Department, College of Education for Human Sciences, University of Diyala, Iraq.*
dr.abdalamer@yahoo.com

Abstract

The study of the logistical geological analysis of the epidemiological curve of the Corona epidemic (Covid-19), and the most important proposed strategies to limit its spread for the year (2020-2021) are important studies, as Iraq is one of the countries in which the Corona virus spread early due to the volume of trade exchange with the countries of the region, Especially Iran, as well as the dependence of the consumer sector in Iraq on Chinese goods to a large extent.

The government did not take urgent measures in a timely manner to cut off its contact with the countries of the region via land roads, which increased the number of infections, especially in the cities of Baghdad, Karbala and Najaf, and it did not prevent huge religious gatherings, and for this reason we find that the number of injuries in these governorates is high compared to other Iraqi governorates.

Keywords: analysis, geological, epidemiological, corona, strategies

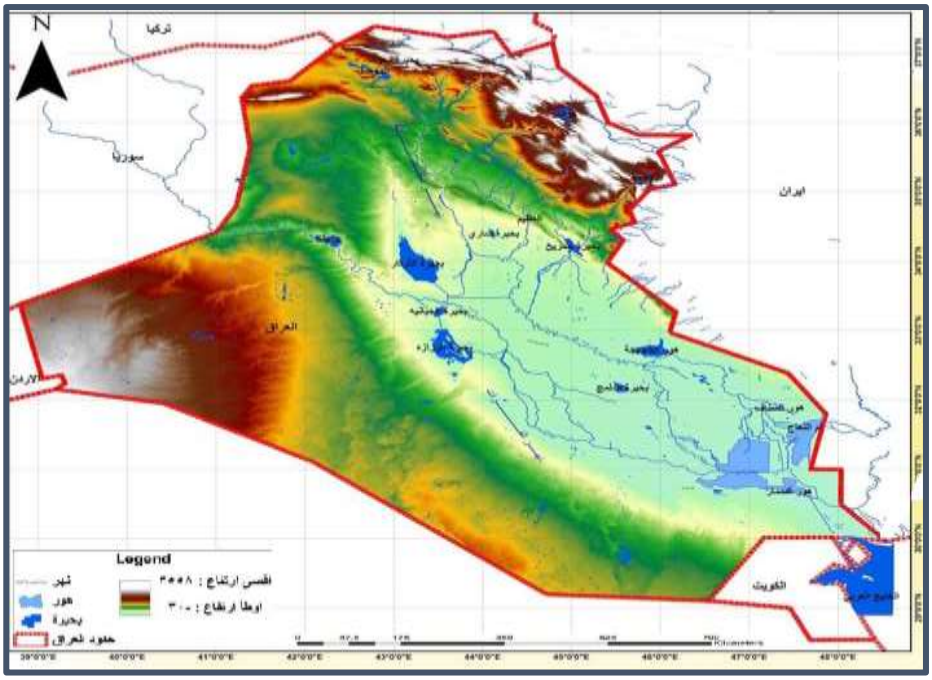
Introduction

Since the eighties of the last century until today, Iraq has been witnessing external and internal wars and conflicts, and has gone through many conditions of political instability. These circumstances have had negative effects on the country itself, its cohesion, and on the effectiveness and legitimacy of state institutions.

Nowadays, Iraq faces basic challenges related to the ability to face crises and the fragility of the internal situation, and COVID-19 pandemic consider the most important of these challenges. Because of the long-term crises that has been experienced, the health system in Iraq has limited capabilities in prevention, early detection, response to risks, and epidemics to which all countries of the world are committed. This made Iraq weak in capabilities, and begin to develop new strategies as it was identified as a model for the study for its modernity in a statement the role of the state in managing this crisis.

The geographical location of Iraq

The study includes the geographical borders of Iraq, which is located in the southwestern part of Asia, and represents the northeastern flank of the Arab world, extending between latitudes (29°.5) and (37°.22) in the north, and longitudes (48°.45-) and (38°.45) to the east, whose area is estimated to be about (435,052 km2). Generally, Iraq borders on the north is Turkey, on the east is Iran, on the west is the Hashemite Kingdom of Jordan, on the northwest is Syria, on the south to the west is the Kingdom of Saudi Arabia, and to the south is Kuwait and the Arabian Gulf.



Source: the researcher's work based on: The Ministry of Water Resources, the General Authority for Surveying, the Map Production section, the Geological Survey Department, the topographic map of Iraq at a scale of 1:1000000 in 2016 (using the Arc GIS 10.2 program).

The limits of the study

Objective Domain: Logistic geological analysis of the epidemiological curve of the Corona pandemic, and the most important proposed strategies to limit its spread.

Spatial Domain: The Republic of Iraq with an area of (435,052 km2).

Time Domain: 2020 **AD** - 2021 **AD**.

The problem of the study

The current study seeks to identify the problems associated with the Corona pandemic (Covid-19), which has spread all over the world, and particularly in Iraq. It also includes the effective solutions that must be apply in place in order to put an end to this pandemic that has decimated mankind.

Each study has a main problem, which is the main motivation for research. The problem represents the first step of scientific research problems, and it can be formulated in clear and understandable terms. It can also be formulated in the form of a question that needs to be answered, as follows:

- What are the problems of the spread of the Corona pandemic (Covid-19) in Iraq?

- What are the solutions to be put in place to eliminate it or reduce it?

Sub-problems:

1. Does the spread of the pandemic differ from one city to another in Iraq?

2. What is the percentage of cases of this pandemic in Iraq?

Hypothesis of the study

When the disease and epidemic spread suddenly and quickly, a collapse occurs in most of the health institutions of the cities of Iraq, which leads to a low level of efficiency of the health sector as well as the collapse of most other governmental and non-governmental institutions, which had a significant impact on the increase in the number of injured and dead.

The aim of the study

- Presenting a realistic picture of the diseases and epidemics that swept Iraq and

the relationship to the fate of the human race must be presented.

- Determining the difficulties and problems faced by health institutions in Iraq.

- Analyzing the efficiency and activity of the health sector services in Iraq, which was invaded by the Corona pandemic (Covid-19).

The importance of the study

The research is interested in investigating the seriousness of the Corona pandemic (Covid-19) in Iraq.

How to address, eliminate, or limit the presence of Covid-19?

The methodology of the study

The study relied on the descriptive analytical approach to achieve the objectives of the study which is based on the study and analysis of the geographical phenomenon. Also, knowing its causes by studying the Corona pandemic (Covid-19), the extent of its spread in Iraq, its geographical distribution, its relationship to the human race, and the extent of the need for health services. Thus, the study used the quantitative method to analyze the injuries caused by this pandemic by using the data obtained from the competent authorities.

Terms of the study

1. Epidemiology

The World Health Organization defines it as an outbreak of a disease in an unexpected manner, affecting many people at once and can spread across one or several communities. It requires alertness or it will be a disaster.

2. The pandemic

It is an epidemic spreading on a very wide scale that transcending international borders. It Affects, as usual, a large number of individuals, and pandemics may occur to affect the environment and agricultural organisms such as livestock, agricultural crops, fish and trees.

First Section

The state's strategy in managing the Corona crisis (Covid-19) in Iraq.

When the first case of Covid-19 took place in Iraq on (24/2/2020 AD), the Iraqi government applied multiple measures to control the Corona virus. The first thing was to close the international and domestic flights, except Iraqis who live outside Iraq. And in coordination with our embassies in these countries after providing places for quarantine Examination of arrivals for a period of (14) days.

By imposing a curfew, time was gained to strengthen the health system in Iraq, establish caravan hospitals, and allocate quarantine places for contacts, as well as strengthen laboratories in Baghdad and the provinces. Experts from China were hosted to see the health reality and contribute to improving it through their expertise in this field. Furthermore, the security forces then controlled the prices of food commodities, vegetables and fruits, and prevented price hikes. Since the beginning of the crisis, injuries increased in this densely populated areas, which did not fully comply with the ban, which led to the spread of the epidemic to other areas after lifting the complete curfew, and turning it into a partial ban like other countries according to the directives of the World Health Organization (WHO)[(1)].

The researcher tried as much as possible to benefit from studies that are consistent with the subject of the current study, despite the fact that there are difficulties in finding studies close to the subject of the current study due to the novelty of a variable (the Corona virus crisis) that was taken as a model, and the analysis of the state's strategy to manage this crisis. However, the pandemic has caused severe global social, economic, and political damage that includes almost the largest global economic recession, in addition to the postponement or cancellation of sporting, religious, political and cultural events, significant shortages of supplies and equipment, and the closure of schools, universities and colleges at the national or local levels in 190 countries, what It affected about 73.5% of students in the world [(2)].

Reconsidering the criteria of state power, the prevailing criterion was military and economic. However, the epidemic added new criteria to measure the strength of the state and its

influence in the international system; The existence of a strong health system that ensures the health security of the population, an advanced system in the field of scientific research, and the current competition between major powers over the discovery of a vaccine for the Corona virus (Covid-19) is an example of this.

Procedures and decisions taken by the Iraqi government to control COVID-19:

The state attempted to control the disease by using the following techniques:

- Forming a crisis cell and a higher committee to confront the pandemic. Providing the necessary capabilities to take actions and decisions at a high level, with the cooperation and advice of the World Health Organization.

- Closing the border with Iran on February 22, 2020, when Iran announced the discovery of the first cases on February 20, 2020.

- Canceling annual religious visits and their gatherings, closing all places of worship, and canceling Friday prayers throughout Iraq. Canceling sporting events and official and social celebrations, disrupting schools and universities, and closing restaurants, recreational clubs and sports halls.

- Coordinating with the World Health Organization, other international organizations, and civil society organizations inside Iraq regarding the disease and related updates. Cooperation in the field of training health cadres and the creation of a toll-free number program in health departments to respond to citizens' inquiries or any other bodies via the hotline.

- Procedures at border crossings (air, land, and sea): installing scanners and thermal detectors at Baghdad International Airport, and making shift program for epidemiologists and medical personnel to monitor arrivals.

- Circulating that the Ministry of Health is the only ministry inside Iraq authorized to announce confirmed cases and deals with the media regarding the disease and the epidemiological situation in the country.

- Systematic disinfection of sites suspected of contamination with the virus, allocating specific ambulances to transport confirmed or suspected cases to nearby hospitals and health centers during the curfew.

- Allocating hospitals for isolation cases on both sides of Al-Rusafa and Al-Karkh from Baghdad and the other governorates.

- Conducting analysis, surveying samples by hospitals and health centers, and distributing vaccines to people infected with the Corona virus free of charge by the state.

As for the plans and strategies that the Pakistani army must have to confront disasters, on which the Civil Defense relies when planning to face disasters, it has two main elements:

1. Forecasting potential disasters, i.e. predicting the type of disaster, its probability, size and dimensions, and determining the nature of the damages resulting from it.

2. Preparing to face the disaster by providing human, technical and material capabilities, as well as coordination and follow-up between all relevant authorities.

3. Determining the requirements for preventing and treating fires and other hazards, and the implementation of firefighting, rescue and ambulance works:

The Ministries of Interior and Defense have taken a set of measures to implement preventive awareness plans and programs through the following points:

1. Exploiting and using all media channels to follow up (read, audio and video) to hold preventive awareness seminars for all segments of society.

2. Preparing applied professional studies and scientific research for all areas related to civil defense work, and coordinating with universities and other academic institutions to assist in the preparation of relevant research and studies.

3. Implementing the intervention and treatment works in order for operations management to be effective to confront potential disasters. This requires the implementation and maintenance of an early warning network to warn the population about potential risks so that it covers all governorates (provincial centers, districts, sub-districts).

4. Assessing the situation where the amount and type of aid required for the affected population is determined, and includes medical and health services and care.

5. The implementation elements are represented by the formations of all civil defense departments in Baghdad and the governorates and at the level of headquarters departments and civil defense centers. These formations undertake the implementation of duties such as securing and organizing early warning means.

6. Follow up on the implementation of the statement of shelters and the preparation of shelters, the implementation of the duties of total disinfection of polluted areas, and the follow-up of the implementation of the law and instructions related to the protection of the environment.

The Ministry of Health and Environment and the College of Science at Al-Mustansiriya University issued a daily bulletin related to the number of injuries, recovery and deaths due to the new Corona epidemic in Iraq, and drawing graphs, or maps that benefit scholars in tracking statistical data as shown in Map (2) in the second section.

The Ministry of Environment undertakes a set of important measures, as the Ministry of Environment is the sectorial body responsible and concerned with the implementation of a strategy to reduce disaster risks. This strategy included implementation areas distributed over time stages, namely:

1. The first phase (2018-2020) includes determining the current situation in terms of disaster losses, legislation and institutional laws to reduce disaster risks.

2. The second phase (2021-2025) includes strengthening institutional procedures, legislation, and laws to avoid the formation and accumulation of risks in the future and to reduce existing risks. Risk assessment will also continue and the development of sectorial and local programs to reduce them.

3. The third stage (2026-2030) includes the generalization of risk reduction programs to all sectors and cities, in cooperation with all concerned bodies.

As for the decisions of the Supreme Committee for National Health and Safety, it is developing the plans of the Ministries of Education and Higher Education, which has been greatly affected by these decisions, and in particular, the education sector in Iraq has been suffering since the beginning of the 2019-2020-2021 academic year from paralysis and suspension in Iraqi schools and universities almost due to popular protests that erupted in most of the Iraqi governorates since October of the year 2019, and then the spread of the Corona virus came to be a decisive factor in stopping the traditional study.

For its part, the Iraqi Ministry of Education tried to manage this important sector and develop the appropriate strategy to continue the study to launch its website for distance education in the name of “Newton Educational Platform”, as it is supposed to broadcast through it the lessons scheduled through it, leading to the completion of what can be completed from the curricula, but in the end it was not achieved. The "Newton" platform has the desired goal, and the attempts had stumbled, and the ministry found that the safest solution requires a decision to adopt the mid-year results as final results. Instructions for Higher Education Higher Education Free education through conducting electronic exams on the method of multiple tests, short questions and an open book with their assistance in the degrees of pursuit, as well as assisting them on the topic of the opportunity to write a report in obtaining the opportunity to obtain a percentage of the final exam score and the purpose of all that Facilitating the task of their crossing to the next stage and the following year, i.e. 2021, the working hours were integrated, i.e. in attendance and electronically.

The Second Section / Statistical Analysis

First: The Binary Logistic Regression Model:

In this section, the binary logistic regression model is studied. It is a statistical model that belongs to the linear regression models, through which a binomial variable is modeled in terms of a set of expected random variables (numeric, categorical), and it is used to predict the probability of an event with additional knowledge of the values of variables that can be interpreted. Or related to this event, and it is one of the modern non-laboratory statistical methods developed to predict the set of categorical variables (nominal or monotonous), and it is considered as an alternative test for the linear

regression equation of its simple and multiple types, and it is subject to the concepts of the model in terms of the possibility of testing the effect of the total format of the set of independent variables on the variable subordinate, and in terms of its use of the concepts of typical conformity criteria.

The logistic regression model is important for several reasons, including the lack of presuppositions about the explanatory variables, and that the model determines the affiliation of the new observations to which societies they belong and the probability of this affiliation.

1. The dependent variable contains the two values (0, 1).

2. T sample size must be large.

3. The logistic model assumes a distribution within the exponential family (as in a binomial distribution)

4. There should be little correlation between the independent variables.

5. The error is distributed in a Binomial distribution.

The data that was studied included the number of people infected with Corona virus (Covid-19) during two years (2020-2021), determining the factors of gender (gender), and the age of the patient (age group), and the dependent variable represents the condition of the person infected with Corona Virus Covid-19 (cure or death).

The statistical analysis proved that there were significant differences between the injuries, according to the qualitative structure, and the age. The dependent variable represents the condition of the person infected with the Corona virus Covid-19 (recovery or death), the dependent variable, and the explanatory variables were defined as follows:

Y: The response variable represents the patient's condition

The symbol (1) was given for death, and the symbol (0) for healing.

The explanatory variables are:

X2: represents Age and it is an ordinal categorical variable consisting of nine levels: the symbol (1) for age groups (0-9 years), (2) for age groups (10-19 years), and (3) for age groups (20-). 29 years), (4) for age groups (30-39 years), (5) for age groups (40-49), (6) for age groups (50-60 years), and (7) for age groups (61). -70 years), (8) for age groups (71-80 years), and (9) for age groups (18- and above).

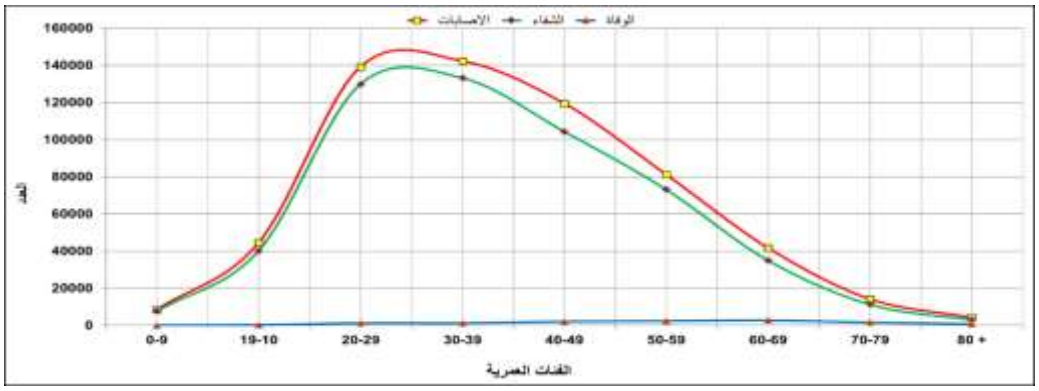
Descriptive statistics such as percentages of study data will be displayed as in Tables (1) and (2) classified by age groups, and the numbers of deaths and recoveries from Corona Virus (Covid-19)

Table (1) Relative distribution, % of age groups of Corona-Covid-19 patients in Iraq for the year (2020).

Percentage %	**Deaths**	**Percentage %**	**Healing**	**Percentage %**	**injuries**	age categories
0.9	117	1.4	7680	1.4	8472	0-9
2.7	349	7.5	40244	7.5	44490	10-19
9.8	1260	24.1	129885	32.4	139219	20-29
10	1287	24.8	133176	23.9	142329	30-39
16.7	2146	19.4	104351	20.1	119501	40-49
18.9	2418	13.6	73209	13.6	81249	50-59
21.7	2781	6.5	35014	7	41694	60-69
12.9	1649	2.1	111365	2.4	14160	70-79
6.3	806	0.5	2918	0.7	4178	+80

Annual Statistical Report, Iraqi Ministry of Health/Environment (2020-2021), House of Books and Documents, Baghdad, 2022.

Figure (1) Relative distribution of % of age groups for Corona Covid-19 patients in Iraq for the year (2020)



It was clear from table (1), the percentage and numbers (injury, recovery, and death) of Corona Covid-19 patients in Iraq according to the age groups with the highest rates of injuries for the year (2020) age group (30-39), with a total of (142329) injuries, At a rate of (23.9%), the number of deaths was (1287) and the number of those recovered was (133,176), then the age group (20-29) came in second place, with a total of (139,219) injuries, and at a rate of (23.4%), and the number of deaths was (1260), and the number of those recovered (129885). The age group (+80) ranked last, with the lowest rates of injuries among the groups amounting to (0.7%), with a total of (4178) injuries, and the number of deaths was (806), and the number of those recovered was (2918).

Table (2) (2021) showed the percentage and numbers (injury, recovery, and death) of Corona (Covid-19) patients in Iraq according to the age groups that had the highest infection rate of (28.6%), among the age group (20- 29), with a total of (427357) injuries, and the number of recovery cases was (422715), and the number of deaths was (2722), then the age group came in second place (30-39) with a total of (307227) injuries, and a rate of (20.6%), and the number of deaths was (917), and their number is (304,335). The age group (+80) ranked last, which recorded the lowest rates of injuries among the groups amounting to (0.8%), with a total of (12,524) injuries, while the number of cases of recovery was (11530) cases of recovery, and the total number of deaths (913) cases.

Table (2) Relative distribution, % of age groups of Corona-Covid-19 patients in Iraq for the year (2021)

Percentage %	Deaths	Percentage %	Heals	Percentage %	Injuries	Age category
0.6	65	12.5	257073	1.6	25326	0-9
2.7	283	5.7	118001	8	119409	10-19
25.8	2722	20.5	422715	28.6	427357	20-29
8.7	917	14.8	304335	20.6	307227	30-39
15.5	1633	13.5	284238	19.3	287687	40-49
12.1	1283	9.1	186919	12.7	189580	50-59
12.3	1298	4	82502	5.6	84368	60-69

13.6	1437	19.3	394469	2.8	41083	70-79
8.7	913	0.6	11530	0.8	12524	+80

From the researcher's work based on: Annual Statistical Report, Iraqi Ministry of Health/Environment (2020-2021), House of Books and Documents, Baghdad, 2022.

Figure (2) Relative distribution, % of age groups of Corona-Covid-19 patients in Iraq for the year (2021)

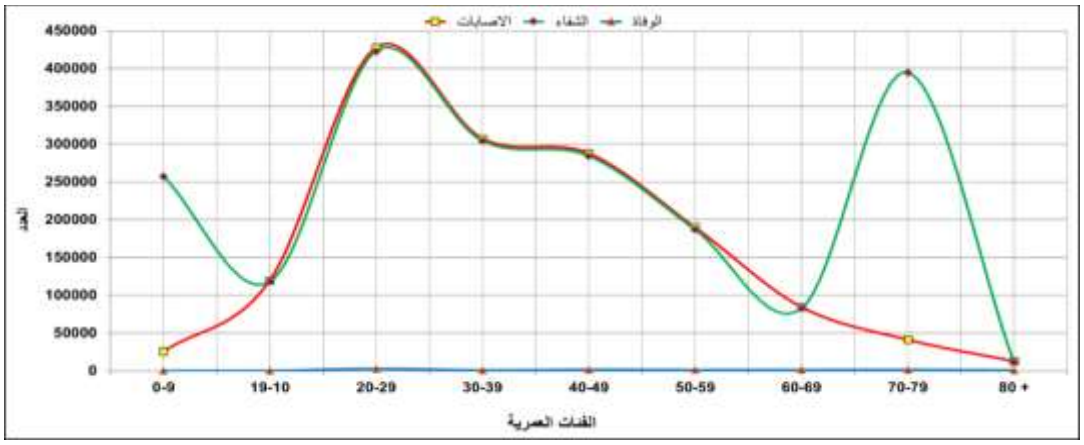


Table (3) Estimation of the fixed term, wald statistic and zero step significance level

		a	*Degree of freedom*	*Morale level*
Step	*stability*	*0,05*	*1*	*.000*

The method of greatest possibility (Likelihood ratio test)) was used. In the method of iterative cycles of derivatives of the possibility function, this statistic is used in evaluating the significance of the variable or explanatory variables by comparing the observed values and the expected values of a model that contains the fixed term only, and the model that contains all the variables and showing which one is better significant than the other through the test statistic which is known as (the Deviances statistic) for deviation, according to the following hypothesis:

H_0: $B_1 = B_2 \ldots \ldots = B_P = 0$

H_1: at least one of them not equal Zero

It can be calculated by the following formula:

$$D = -2\text{Log}\left[\frac{LM1}{LM2}\right] = -2[\text{Log LM1} - \text{Log LM2}$$

D: the deviation of the possibility ratio, and it follows the chi-square distribution with a degree of freedom equal to the number of explanatory variables in the model

L_{M1}: The function of the greatest possibility in the case of the model that includes only the term of the constant.

L_{M2} is the function of the greatest possibility in the case of the model that contains all the variables, and the hypothesis of H0 is rejected when the (P-value) of the test is less than a significant level (0.05). When the H_0 hypothesis is rejected, the H1 hypothesis is accepted, including the conclusion that not all of the regression parameters are equal to zero. And when obtaining the lowest value of the negative twice the logarithm of the possibility function, and in the third cycle, we obtained the derivative of the negative twice the possibility of the possibility function at its lowest value, which is equal to (214.643 = Log Likelihood - 2). We stopped in this cycle because the change in the coefficients of the fixed term became less than (0.001) in the cycles (2, 3), which are similar, and we stopped at the third cycle. We considered its features as the best result that can be obtained for the features, since the negative double of the

logarithm of the potential function is at its lower end.

When adding the factors affecting the model, we use the explanatory power test of the model (R2). The coefficient of determination (R2) is the percentage of variance in the dependent variable from the independent variables.

We can mention the formula Cox& Snell R^2 as follows:

$$1 - (\frac{L_0}{L_M})^{\frac{2}{n}} = R^2{}_{CS}$$

Hence:-

L_M: The weighting function of the model that includes all the independent variables.

L_0: The weighting function for the model that contains the constant term only.

r: Sample size

The scale in this equation is adjusted because it allows for the value of one by dividing by the maximum possible value of R^2_{CS}.

Whereas *Nagelkerke* R^2 is:

$$R^2_N = \frac{R^2_{CS}}{1-(L_0^{\frac{2}{n}})}$$

The scale in this equation cannot take a single value even if the model matches the data.

Table (4) explains the variables included in the model

Step	-2 Log likelihood	$R^2_{Cox\ \&\ Snell}$	$R^2_{Nagelkerke}$
1	107.473[a]	0.458	0.648

As for Table (4), it shows us what the independent variables explain from the variable based on the R^2 statistic, and it shows the suitability of the logistic regression model for the data through the coefficient of determination. The results showed that the value of (-2 Log Likelihood) is equal to ([a]107.473), and that the value of ($R^2_{Cox\ \&\ Snell}$) is (0.458), and they indicate that the change in the dependent variable is total differences and the rest are random differences.

Also, the value of ($R^2_{Nagelkerke}$) indicates that the change in the dependent variable is total differences and the rest are random differences, and that the value of ($R^2_{Nagelkerke}$) and the value of ($R^2_{Nagelkerke}$) are an indicator of the importance of X^2 in terms of prediction and this indicates However, there is still a percentage of changes in the dependent variable due to other variables not included in the model.

We note the Cox test, which is a test for X2, meaning that the explanatory variables explain 45.8% of the logistic regression model, and the remaining 54.2% is included in the error, meaning that there are other high-impact variables that were not included in the logistic regression model. The adjusted square R Nagelkerke value is 0.648, which means that 64.8% of the variables that occur in death are caused by explanatory variables.

Second, the EPIDEMIC CURVE model:

The study of the EPIDEMIC CURVE which is a graphic form that shows the course of the disease that turns into an epidemic over time, and the geographical epidemiological curve is one of its types, which is a graphic form that shows the course of the disease through time and space. It consists of three phases: the phase of evolution, which is either rapid or gradual, the peak phase, which is either pointed or flat, representing the ascending line of the curve, and the phase of decline, which represents the descending line of the curve It is either gradual or rapid.

The epidemiological curve is classified into two parts:

1. Explosive type: The curve in which the lines of the ascending and descending curve appear almost vertically with a pointed top. This form applies to single-source epidemics that are transmitted through a common medium, such as epidemics caused by food and water contamination.

2. Progressive type: It is the curve in which the line of the ascending and descending curve

appears in a gradual manner with an almost flat top. This applies to epidemics in which infection is spread by direct or indirect contact.

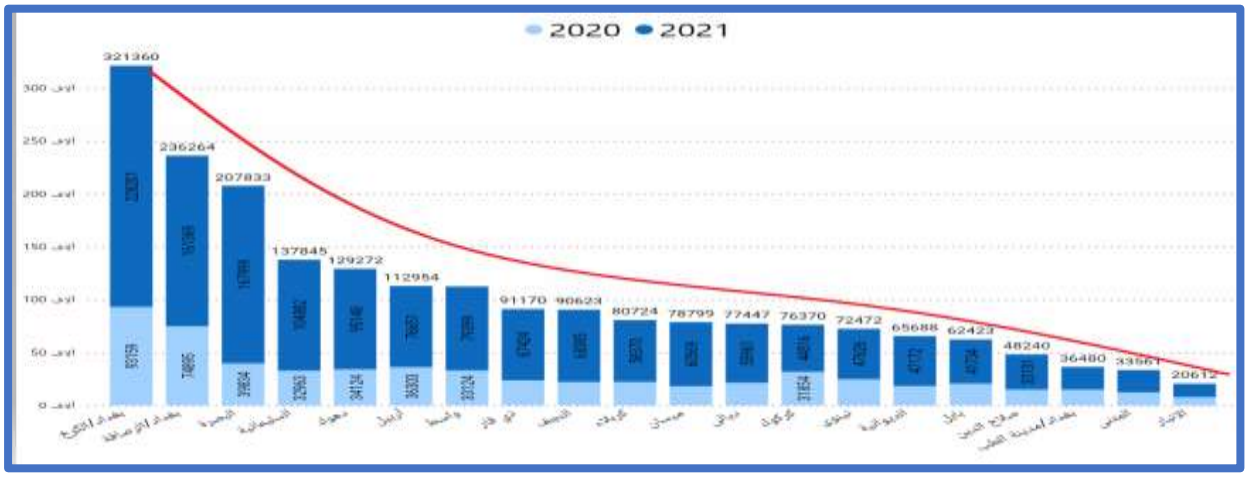
3. Investigate and analyze the relationships and their degree of strength, direction and significance. The Pearson correlation coefficient was used, which is a quantitative indicator of the strength and direction of the relationship between two variables, i.e. the relationship is weak, medium or strong, and whether the relationship is negative (i.e. the inverse relationship) or positive (ie the relationship direct) between two or more variables. The results of the analysis of the correlation relationship (Pearson) between the variables explained above with the condition of the person infected with the Corona virus Covid-19 (recovery or death) indicated to the medium of the relationship between the explanatory variables.

As the study data was applied to the epidemic curve of the Corona Covid-19 pandemic in Iraq (2020-2021), that is, since the beginning of the Corona pandemic in Iraq January 24, 2020, until December 31, 2021, by identifying health indicators (the number of cases of infection) The total number of cases of total recovery, the number of total deaths, their percentages, the number of injured in the health sector, cases of recovery, and death) necessary to confront the epidemic that were used by the Ministry of Health.

When studying the data of Table (5), Figure (3) and Map (2), for the number of confirmed cases of Corona Covid-19 in Iraq in 2020 AD (598,857) confirmed cases, i.e. 1.5% of the population, and the increase in the number of infections continued until it reached the end of 2021 AD. (1493844) confirmed cases, or 3% of the population of Iraq.

Thus, it turns out that there is an escalation in the number of cases at a very accelerated pace, that is, the epidemiological curve of the Corona pandemic in Iraq is of the type of an explosive curve, in which the lines of the ascending curve appear, and the descending curve is almost vertical with a pointed top, where the ascending line of cases appears almost vertically With a pointed top, and therefore the state must develop integrated crisis plans (medically, security, economically, religiously, and in the media) to confront this crisis, or any possible epidemic in the future.

Figure (3) Distribution of the epidemiological curve of confirmed cases of coronavirus (Covid-19) in Iraq (2020-2021)



The researcher worked according to Table (7), using Minitab 16 and SPSS 22.

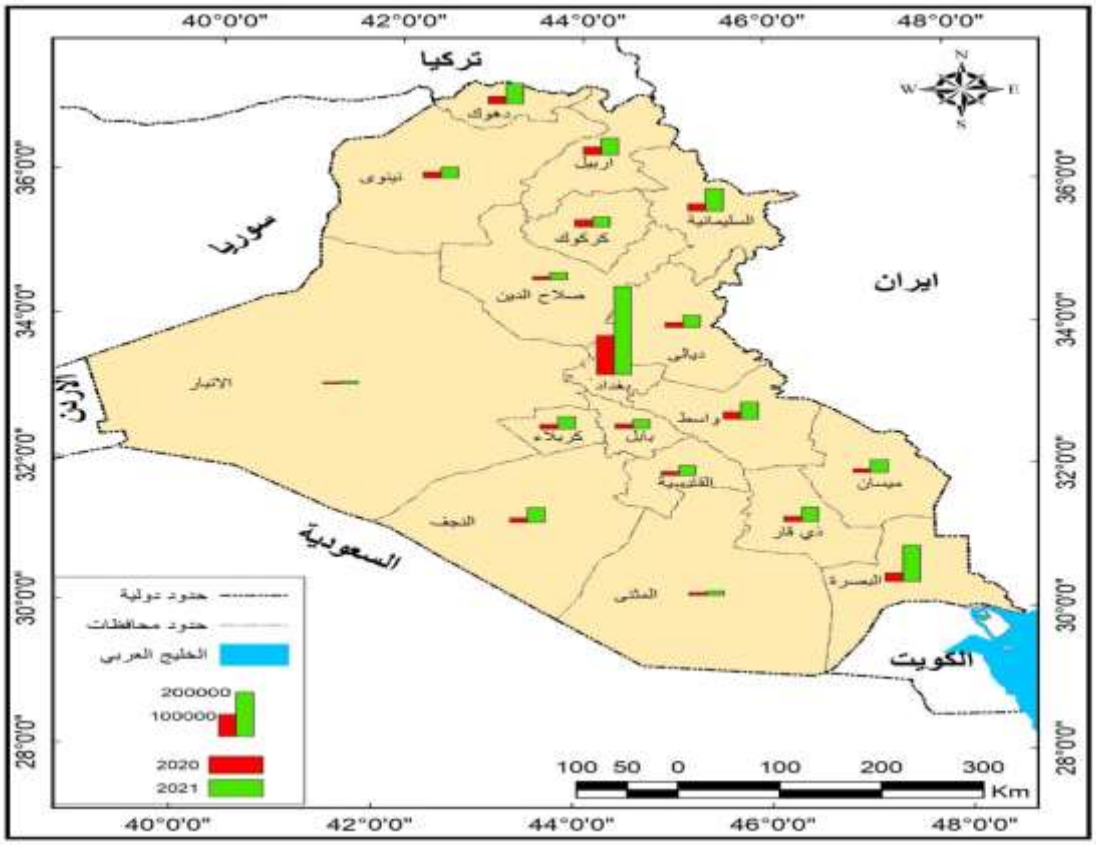
Table (5) Distribution of confirmed cases of coronavirus COVID-19 in Iraq (2020-2021)

Confirmed cases for 2021	Confirmed cases for 2020	Provinces

228201	93159	Baghdad / Al-Karkh
161357	74895	Baghdad / Al-Rusafa
21420	15065	Baghdad/ Al-Tib City
410978	183119	Baghdad total cases
167999	39834	Basra
47626	24846	Nineveh
60569	18230	Misan
47172	18516	Diwaniyah
55934	21486	Diyala
12691	7925	Al-Anbar
41738	20689	Babel
58370	22354	Karbala
44572	31854	Kirkuk
79399	33124	Wasit
67424	23746	Dhi Qar
21164	12397	Al-Muthana
33131	15109	Salah Al-Din
68396	22238	Al-Najaf
76651	36303	Erbil
95148	34124	Dohuk
104882	32963	Sulaymaniyah
1493844	**598857**	Total

Based on the annual statistical report and the Iraqi Ministry of Health/Environment (2020-2021).

Map (3) Distribution of confirmed cases of COVID-19 in Iraq (2020-2021)



Conclusion

In light of what has been reached, the following most important conclusions can be drawn:

1. The escalating spread of the Corona epidemic led to a decline in the performance of the state, as it stood unable to limit its spread, which caused multiple crises that exceeded the health dimension, revealing a clear defect in its structure.

2. There is a variable (indicator) that affects those infected with the Corona pandemic, which is age X2.

3. According to Wald's test, the percentage of the effect of the age variable on those infected with the corona pandemic is a positive effect, and this means that when the patient's age increases, it leads to an increase in the probability of death for the person affected by the corona pandemic, meaning that an increase in one year in the age variable will increase the probability of the infected to be deceased provided that he is recovered by an amount 0.045 times or 4.5%.

4. Through the results, we note that the age group with the highest percentage of those recovering is the age group (20-29) with a percentage (22.2%), then the age group (30-39) with a percentage (19.7%) and the age group greater than (81 +) came in the last place) a year at a rate of (0.6%).

5. The value of ($R^2_{Nagelkerke}$) indicates that the change in the dependent variable is total differences and the rest are random differences, and that the value of ($R^2_{Nagelkerke}$) and the value of ($R^2_{Nagelkerke}$) are an indicator of the importance of X2 in terms of prediction, and this indicates However, there is still a percentage of changes in the dependent variable due to other variables not included in the model.

6. The probability value of Wald's statistic for the variable X2 (age) is equal to (P-Value = 0.042), which is less than the level of significance (α = 0.05), and this indicates that the age variable has a significant effect on the dependent variable, and this indicates that the age variable has an effect. Significant in the variable infected with the Corona pandemic.

7. The epidemic curve of the Corona pandemic in Iraq is of the type of explosive curve, in which the lines of the ascending curve appear, and the descending curve lines are almost vertical with a pointed top, where the ascending line of cases appears almost vertically with a pointed top.

8. The epidemic curve of the total cumulative Corona pandemic in Iraq (2020-2021) for patients (injuries, recovery cases, and deaths) showed an increase in the curve course of injuries, and recovery at a very accelerating pace, in contrast, a decrease in the death line.

Recommendations

The researcher made certain recommendations of public interest, as follows:

1. Benefiting from studies of pandemics that are consistent with the subject of the current study (Corona Covid-19), although there are difficulties in finding studies close to the subject of Corona, due to the recentness of this pandemic.

2. Urging researchers to study such topics because of their importance in human life.

3. Educating the citizen by holding health seminars related to the Corona pandemic and other pandemics for the purpose of immunizing society from these disasters.

4. Observing the border crossings and dependence on honest affiliates and officials.

5. Adhering to the laws, and holding anyone who disturbs public order accountable, where the law is above all

Resources

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