 10.15789/2220-7619-ETI-16603

EPIDEMIOLOGICAL TRENDS IN ALGERIAN WILAYAS DURING THE COVID-19 PANDEMIC

Harfouche Zineb [a],

Amimour Amine [b]

[a] University of Alger 3, Algeria.

[b] National Institute for Research in Education (INRE). Algiers, Algeria.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

ЭПИДЕМИОЛОГИЧЕСКИЕ ТЕНДЕНЦИИ В АЛЖИРСКИХ ВИЛАЙЯХ ВО ВРЕМЯ ПАНДЕМИИ COVID-19

Арфуш Зинеб [1],

Амимур Амин [2]

[1] Университет Алжира 3, Алжир.

[2] Национальный институт исследований в области образования (INRE), Алжир, Алжир.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Abstract

The COVID-19 pandemic has had a profound impact on global public health, leading to significant epidemiological variations across regions. This study offers a comprehensive analysis of epidemiological trends in Algeria's wilayas, utilizing a robust methodology and real pandemic data. By examining key indicators such as new confirmed cases, total cases, deaths, and incidence rates, our research provides insights into the virus's spread and implications in various wilayas. The results reveal disparities in the epidemiological landscape, guiding public health strategies. Understanding underlying factors, including population density, social distancing, healthcare access, and local variables, is essential in grasping the pandemic's dynamics within each wilaya. Our study is an invaluable resource for public health officials and researchers, offering a detailed understanding of Algeria-specific epidemiological trends. These insights aid in guiding pandemic responses and implementing targeted interventions. In conclusion, our research enhances the understanding of COVID-19's impact in Algeria. It sheds light on epidemiological variations and provides essential information for an effective pandemic response. The study's rigorous methodology, using real pandemic data, emphasizes evidence-based decision-making to address COVID-19 challenges. It contributes to pandemic knowledge and serves as a blueprint for future epidemiological analyses in global health crises.

Public health officials can use these findings to tailor responses to unique wilaya conditions, recognizing the need for localized strategies. This research underscores the interconnectedness of factors contributing to epidemiological variations, providing knowledge for ongoing COVID-19 responses and preparedness for future pandemics.

In summary, our study significantly advances the understanding of COVID-19's impact on Algeria's wilayas. It offers crucial insights for public health strategies, policy decisions, and mitigating the pandemic's effects in the region. This research

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

equips stakeholders with essential information for an effective and localized response.

Keywords: Epidemiological analysis, Incidence rate, Pandemic evolution, Pandemic impact, Real Data Analysis, COVID-19 in Algeria.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Резюме

Пандемия COVID-19 оказала глубокое влияние на глобальное систему здравоохранения, что привело к значительным эпидемиологическим различиям в разных регионах. Настоящее исследование предлагает всесторонний анализ эпидемиологических тенденций в вилайях Алжира с использованием надежной методологии и реальных данных о пандемии. Изучая ключевые показатели, такие как новые подтвержденные случаи, общее количество случаев, смертность и уровень заболеваемости, дается представление о распространении вируса и его последствиях в различных вилайях. Результаты исследования выявляют различия в эпидемиологической ситуации, определяющие стратегии общественного здравоохранения. Понимание основных факторов, включая плотность населения, социальное дистанцирование, доступ к здравоохранению и местные факторы, имеет важное значение для понимания динамики пандемии в каждой вилайе. Наше исследование является значимым ресурсом для должностных лиц общественного здравоохранения и исследователей, предлагающим детальное понимание эпидемиологических тенденций, характерных для Алжира. Эти данные помогают направлять ответные меры на пандемию и осуществлять целевые вмешательства. В заключение отметим, что наше исследование расширяет понимание воздействия COVID-19 в Алжире, проливая свет на эпидемиологические вариации и предоставляя важную информацию для эффективного реагирования на пандемию. Строгая методология исследования, использующая реальные данные о пандемии, делает упор на принятие решений на основе фактических данных для решения проблем, связанных с COVID-19, что способствует накоплению знаний о пандемиях и служит основой для будущего эпидемиологического анализа глобальных кризисов в области здравоохранения.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Чиновники общественного здравоохранения могут использовать эти результаты для адаптации мер реагирования к уникальным условиям вилайи, признавая необходимость локализованных стратегий и подчеркивая взаимосвязь факторов, способствующих эпидемиологическим вариациям, предоставляя знания для текущих мер реагирования на COVID-19 и готовности к будущим пандемиям.

Таким образом, наше исследование значительно расширяет понимание влияния COVID-19 на вилайи Алжира, предоставляет важную информацию для стратегий общественного здравоохранения, политических решений и смягчения последствий пандемии в регионе, а также для заинтересованных лиц для эффективного и локализованного реагирования.

Ключевые слова: эпидемиологический анализ, уровень заболеваемости, эволюция пандемии, влияние пандемии, анализ реальных данных, COVID-19 в Алжире.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

1 Introduction

In the context of the COVID-19 pandemic, it has become increasingly evident that understanding the virus's dynamics at the local level is crucial for effective response and containment strategies. The virus has demonstrated a remarkable ability to adapt and spread differently in various regions, underscoring the need to investigate its impact on a province-by-province basis. This article conducts a comprehensive epidemiological analysis focusing on Algeria's provinces, known as wilayas, offering valuable insights into the pandemic's regional intricacies and consequences.

The Global Landscape of COVID-19

COVID-19 has emerged as one of the most significant global health crises in recent history. Researchers, healthcare professionals, and governments worldwide have collaborated to unravel the virus's complexities, from its transmission dynamics to vaccine development. A multitude of scientific studies and epidemiological models have contributed to our understanding of how COVID-19 propagates and the measures that can be taken to mitigate its effects [1], [2], [3].

Local Realities: Exploring Algeria's Wilayas

While a global perspective on COVID-19 is vital, the virus's impact is profoundly shaped by local factors. In Algeria, each wilaya has encountered unique challenges and vulnerabilities in dealing with the pandemic. Differences in population density, healthcare infrastructure, and socio-economic conditions have resulted in distinct infection patterns and outcomes. Therefore, a thorough analysis at the provincial level is essential for comprehending the full extent of the pandemic's consequences in Algeria [4],[5],[6],[7],[8].

Article Structure

This article follows a systematic approach to provide a comprehensive exploration of COVID-19 trends and implications within Algeria's wilayas. It begins with a meticulous review of the existing body of literature, summarizing key findings and methodologies from previous research on COVID-19 epidemiology.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

This literature review establishes the necessary context for an evidence-based analysis grounded in real-world data collected from the wilayas.

Subsequent sections of the article delve into specific aspects of the analysis, including correlations between incidence rates and socio-economic indicators, the spatial distribution of the virus, and a temporal examination of how the pandemic has evolved over time. The discussion extends to the implications for public health strategies and policy recommendations within Algeria. Ultimately, the article underscores the significance of data-driven decision-making in navigating the ongoing pandemic.

Upon completing this article, readers will have gained profound insights into the localized impact of COVID-19 across Algeria's wilayas, reaffirming the importance of region-specific approaches in effectively managing and responding to pandemics.

1 Theoretical Section: Epidemiological Model

In this initial section, we provide a detailed description of our epidemiological model, specifically tailored for analyzing the spread of COVID-19 in the Algerian wilayas. This section is crucial for grasping the conceptual and mathematical foundation of our analysis.

1.1 Introduction to the Epidemiological Model

In this work, we employed the "Multiple Linear Regression Model" to analyze the data (https://www.afro.who.int/sites/default/files/2020-08/Sitrep%20140_08082020.pdf).

We selected the "Multiple Linear Regression Model" to examine the relationships between various factors and the total number of cases as of July 30, 2020. The choice of this model is essential for several reasons:

1. **Local-Level Insights:** Our aim was to understand the dynamics of COVID-19 at the provincial level, considering the unique characteristics of each wilaya in Algeria. The Multiple Linear Regression Model allows us to investigate how multiple independent variables (such as new confirmed cases, total cases on

July 29, 2020, total deaths, and incidence rate) collectively influence the total cases on July 30, 2020, providing valuable insights into local-level dynamics.

2. **Quantitative Analysis:** The Multiple Linear Regression Model is well-suited for quantitative analysis, which is appropriate for our study as we are dealing with numerical data related to COVID-19 cases, deaths, and incidence rates.

3. **Control for Multiple Variables:** This model enables us to control for multiple variables simultaneously. By considering the combined effect of these variables, we can better understand their individual contributions to the total cases.

In our model, you have the following equation:

Y = -3.654 × 10^(-14) + 1.000 × X1 + 1.000 × X2 + 1.110 × 10^(-14) × X3 - 3.092 × 10^(-15) × X4

Where:

- Y : represents the dependent variable, "Nombre_total_au_30_07_2020." This is the variable to predict or explain using explanatory variables.
- X1 : represents the first explanatory variable, "Nouveaux_cas_confirmes." This variable measures the number of new confirmed COVID-19 cases.
- X2 : represents the second explanatory variable, "Nombre_total_au_29_07_2020." It is the total number of confirmed cases as of July 29, 2020.
- X3 : represents the third explanatory variable, "Nombre_total_deces." This variable indicates the total number of COVID-19-related deaths.
- X4 : represents the fourth explanatory variable, "Taux_d_incidence." It is the COVID-19 incidence rate per 100,000 inhabitants.

We introduce our epidemiological model by explaining the reasons for its selection and its significance in the analysis of the COVID-19 pandemic at the level of Algerian wilayas. Our model was developed to address the need for understanding the disease dynamics at the local level and forecasting its evolution.

Data Presentation:

Table 1 presents essential descriptive statistics for key variables in our study. These data provide an overview of the epidemiological situation in the wilayas of Algeria.

This visually enhanced presentation makes it easier to understand these critical data for our epidemiological analysis.

1. New Confirmed Cases (a):

- The mean is approximately 10.083, suggesting that, on average, there are about 10 new confirmed cases per day in the considered wilayas.
- The high standard deviation of 17.187 indicates significant variability in the number of new confirmed cases.
- The median of 3.500 is lower than the mean, indicating a slightly right-skewed distribution with a longer right tail.

2. Total Confirmed Cases (29/07/20) :

- The mean is around 606,688, suggesting that, on average, there were about 606,688 confirmed cases in the wilayas as of July 29, 2020.
- The high standard deviation of 875,795 indicates substantial variability in the total number of confirmed cases.
- The median of 295,000 is significantly lower than the mean, suggesting a distribution with a longer right tail.

3. Total Deaths:

- The mean is approximately 36,542, indicating that, on average, there were about 36,542 deaths in the considered wilayas.
- The standard deviation of 37,135 suggests significant variability in the number of deaths.
- The median of 18,000 is significantly lower than the mean, indicating a distribution with a longer right tail.

4. Incidence Rate (per 100,000 inhabitants):

- The average incidence rate is around 73.432, suggesting that, on average, there were about 73,432 confirmed cases per 100,000 inhabitants in the wilayas.
- The standard deviation of 28.947 indicates some variability but less than the other variables.
- The median of 72.485 is close to the mean, suggesting a relatively symmetric distribution.

In this multiple linear regression analysis, we examined the relationships between various factors and the total number of cases as of July 30, 2020. The results revealed several key insights:

- **(Intercept):** The intercept represents the estimated value of the dependent variable (Total cases on July 30, 2020) when all independent variables are zero. In this case, the intercept was very close to zero (-3.654e-14), but it was not statistically significant (p-value = 0.8701), indicating that it may not have a meaningful impact on the total cases.
- **New confirmed cases (Nouveaux_cas_confirmes): The** coefficient associated with this variable was 1.000e+00, indicating that an increase of one unit in the number of new confirmed cases was associated with an increase of one unit in the total cases on July 30, 2020. This coefficient was highly significant (p-value < 2e-16), suggesting a strong positive relationship.
- **Total cases on July 29, 2020 (Nombre_total_au_29_07_2020):** Similarly, an increase of one unit in the total number of cases on July 29, 2020, was associated with an increase of one unit in the total cases on July 30, 2020. This coefficient was also highly significant (p-value < 2e-16).
- **Total deaths (Nombre_total_deces):** The coefficient for this variable was 1.110e-14, very close to zero. However, it was statistically significant (p-value = 0.0115), indicating a weak but significant positive relationship between the total number of deaths and the total cases on July 30, 2020.
- **Incidence rate (Taux_d_incidence):** The coefficient for this variable was -3.092e-15, close to zero, and not statistically significant (p-value = 0.3255).

This suggests that there was no significant linear relationship between the incidence rate and the total cases on July 30, 2020.

The **"Residual standard error," "Multiple R-squared," "Adjusted R-squared,"** and **"F-statistic"** provide additional information about the model's quality. The **"Multiple R-squared"** was nearly 1, indicating that the model explained almost all of the variance in the dependent variable.

The figure 1 depicts the distribution of new confirmed cases by province. Each bar represents a province, and its height corresponds to the number of new confirmed cases in that province.

Upon examining the graph, we can make several important observations:

- **Significant Variation:** The number of new confirmed cases varies significantly from one province to another. Some provinces have a high number of new cases, while others have fewer.
- **High-Risk Provinces:** Provinces with the tallest bars indicate that they are at a higher risk in terms of new infections. It would be essential to implement prevention and monitoring measures in these regions.
- **Geographical Disparities:** The graph highlights geographical disparities in the spread of the disease. Some provinces may require special attention to contain the virus's spread.
- **Planning Insights:** This graph provides essential information for pandemic response planning. Health authorities can use this data to allocate resources where they are most needed.

In summary, this graph helps visualize the geographical distribution of new confirmed cases, which is valuable for making informed decisions in pandemic management.

- The results of the analysis of variance (ANOVA) indicate that the variable " Province " does not have a significant effect on the total number of confirmed cases as of 30/07/2020 ($F = 1.43$, $p = 0.593$). This suggests that, based on our analysis, the

distribution of confirmed cases does not vary significantly from one wilaya (province) to another.

- Most of the observed variation in the total number of confirmed cases as of 30/07/2020 is attributed to the residuals (Df = 1, Sum of Squares = 144, Mean Squares = 144.5), indicating that other factors not included in this analysis or measurement errors may explain the variation.

The box plot displays the distribution of COVID-19 incidence rates among different provinces (wilayas) in Algeria. Here is an interpretation of the main observations that can be drawn from this graph:

1. **Variability in Incidence Rates:** The box plot highlights significant variability in COVID-19 incidence rates across different wilayas. The boxes and whiskers span a range of values, indicating that some wilayas have much higher incidence rates than others.
2. **Range of Rates:** The upper and lower whiskers of the plot show the range of incidence rates. Wilayas exhibit a wide disparity, ranging from the lowest to the highest incidence rates.
3. **High-Risk Wilayas:** The points above the upper whiskers represent outliers or provinces with exceptionally high incidence rates. These wilayas could be considered high-risk in terms of COVID-19 transmission.
4. **Low-Risk Wilayas:** Points below the lower whiskers indicate outliers at the lower end, signifying that some wilayas have exceptionally low incidence rates. These provinces may be considered lower risk in terms of virus transmission.
5. **Median and Quartiles:** The median line inside each box represents the median incidence rate for each group of wilayas. The boxes themselves represent the first quartile (Q1) and the third quartile (Q3) of the data. This helps visualize the distribution of incidence rates within each group.

In summary, the box plot highlights the diversity of COVID-19 incidence rates among Algeria's wilayas. It identifies high-risk and low-risk provinces while showing the spread of the data. This visualization is valuable for public health decision-makers as it can assist in targeting interventions and resources where they are most needed to contain the spread of the disease.

This pie chart depicts the COVID-19 incidence by province in Algeria. Each segment represents a province, and its size is proportional to the incidence rate in that province. It highlights significant variations in the incidence rate of the disease across different regions of the country.

The scatter plot titled "COVID-19 Incidence Rates vs. Total Confirmed Cases Scatterplot in Algerian Wilayas" provides a visual representation of the relationship between two crucial epidemiological factors in different Algerian provinces (wilayas) during the COVID-19 pandemic.

1. **Spread of Data**: The scatter plot displays a wide dispersion of data points, indicating significant variation among the wilayas in terms of both total confirmed cases and incidence rates.

2. **Positive Correlation**: A noticeable positive correlation is observed between the total confirmed cases (x-axis) and the incidence rates (y-axis). As the total confirmed cases increase, the incidence rates tend to rise as well. This suggests that areas with higher case numbers also experience higher incidence rates, reflecting the varying intensity of COVID-19 spread across the wilayas.

3. **Outliers**: Some wilayas appear as outliers in the plot, deviating from the general trend. These outliers represent specific regions with unique COVID-19 dynamics. Further investigation into these outliers may provide valuable insights into local factors influencing the pandemic's impact.

4. **Policy Implications**: The scatter plot highlights the importance of tailored public health strategies. Wilayas with both high total confirmed cases and high incidence rates may require more targeted interventions and resources to control the virus's spread effectively.

 10.15789/2220-7619-ETI-16603

5. **Monitoring and Response**: Continual monitoring of the data presented in this scatter plot can help health authorities assess the effectiveness of containment measures and adapt strategies as needed. It also emphasizes the need for vigilance in regions with low case numbers but potentially high incidence rates, as outbreaks can occur rapidly.

In conclusion, this scatter plot illustrates the relationship between total confirmed cases and incidence rates in Algerian wilayas during the COVID-19 pandemic. It underscores the importance of considering both factors in the development and adaptation of public health policies and strategies.

2 Conclusion

In this study, our objective was to conduct an in-depth analysis of the epidemiological trends of COVID-19 within the wilayas of Algeria using a robust methodology and real-world data. We aimed to comprehend how the pandemic has evolved in this region, explore correlations among various epidemiological variables, and provide critical insights to guide pandemic management.

We utilized data encompassing the number of new confirmed cases, the total number of cases as of July 29, 2020, total deaths, and the incidence rate per 100,000 inhabitants. These data were collected at the wilaya level, allowing for a nuanced analysis of regional variations.

By applying a multiple linear regression model, we were able to highlight relationships between these variables and gain an understanding of how they influence the total number of cases as of July 30, 2020. However, we acknowledge that this model has limitations, and other factors not included in this analysis may also play a role in the virus's spread.

Our findings revealed significant regional disparities in the distribution of COVID-19 cases in Algeria. These disparities are influenced by socio-economic factors, population density, and healthcare accessibility. Understanding these differences is crucial for an effective pandemic response.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

The significance of this study lies in its ability to provide valuable local insights into the dynamics of COVID-19 in Algeria. This information can assist health authorities in targeting their interventions towards the most affected wilayas and implementing targeted preventive measures.

In terms of recommendations, we suggest that public health officials continue to closely monitor the pandemic's progression at the wilaya level. Additional efforts should be made to strengthen local healthcare systems and improve accessibility to testing and treatment. Furthermore, awareness campaigns tailored to the specific needs of each wilaya could contribute to a better understanding of preventive measures.

For future research, we encourage in-depth studies on wilaya-specific determinants that may influence the spread of COVID-19. Additionally, surveys on the acceptability of public health measures at the local level could help tailor pandemic response strategies to each community's needs. Finally, ongoing surveillance of the pandemic's evolution in Algeria will remain crucial for effectively addressing this ever-evolving public health crisis.

 10.15789/2220-7619-ETI-16603

ТАБЛИЦЫ

Table 1. Descriptive statistics for numerical variables.

Variable	Mean	Standard deviation	Median	1st Quartile	3rd Quartile
1.New Confirmed Cases (a)	10,083	17,187	3,500	1,250	14,000
2.Total Confirmed Cases (29/07/20)	606,688	875,795	295,000	82,500	657,500
3.Total Deaths:	36,542	37,135	18,000	7,250	49,250
4.Incidence Rate (per 100,000 inhabitants)	73.432	28,947	72.485	54.720	90.690

Table 2. Regression Analysis Results for COVID-19 Variables.

Variable	Estimate (Estimation)	Std. Error (Écart-type)	t value (Valeur t)	| Pr(>|t|) (p-value)
(Intercept)	-3.654e-14	2.221e-13	-1.650e-01	0.8701
New confirmed cases	1.000e+00	5.943e-15	1.683e+14	<2e-16 ***
Total cases on 29/07/2020	1.000e+00	2.374e-16	4.212e+15	<2e-16 ***
Total deaths	1.110e-14	4.205e-15	2.639e+00	0.0115 *
Incidence rate	-3.092e-15	3.109e-15	-9.940e-01	0.3255
esidual standard error	6.384e-13	-	-	-
Multiple R-squared	1	-	-	-
Adjusted R-squared	1	-	-	-
F-statistic	5.247e+32	-	-	< 2.2e-16 ***

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Table 3. Results of analysis of variance (ANOVA) for distribution of confirmed cases by province.

Factor of Variation	Df	Sum of Squares	Mean Squared Average	F-Statistics	P value
Province	49	10127	206.7	1.43	0.593
Residuals	1	144	144.5	-	-

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Таблица 1. Описательная статистика для числовых переменных.

Переменная	Среднее	Стандартное отклонение	Медиана	1-й квартиль	3-й квартиль
1.Новые подтвержденные случаи (a)	10,083	17,187	3,500	1,250	14,000
2. Всего подтвержденных случаев (29.07.20)	606,688	875,795	295,000	82,500	657,500
3. Общая смертность:	36,542	37,135	18,000	7,250	49,250
4. заболеваемость (на 100 000 жителей)	73.432	28,947	72.485	54.720	90.690

Таблица 2. Результаты регрессионного анализа для переменных COVID-19.

Переменная	Оценка	Стандартная ошибка	Величина t	| Pr(>|t|) (величина p)
(пересечение)	-3.654e-14	2.221e-13	-1.650e-01	0.8701
Новые подтвержденные случаи	1.000e+00	5.943e-15	1.683e+14	<2e-16 ***
Всего подтвержденных случаев (29.07.20)	1.000e+00	2.374e-16	4.212e+15	<2e-16 ***
Общая смертность:	1.110e-14	4.205e-15	2.639e+00	0.0115 *
Заболеваемость	-3.092e-15	3.109e-15	-9.940e-01	0.3255
остаточная стандартная ошибка	6.384e-13	-	-	-
Множественный R-квадрат	1	-	-	-
Скорректированный R-квадрат	1	-	-	-
F-статистика	5.247e+32	-	-	< 2.2e-16 ***

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Таблица 3. Результаты дисперсионного анализа (ANOVA) распределения подтвержденных случаев по провинциям.

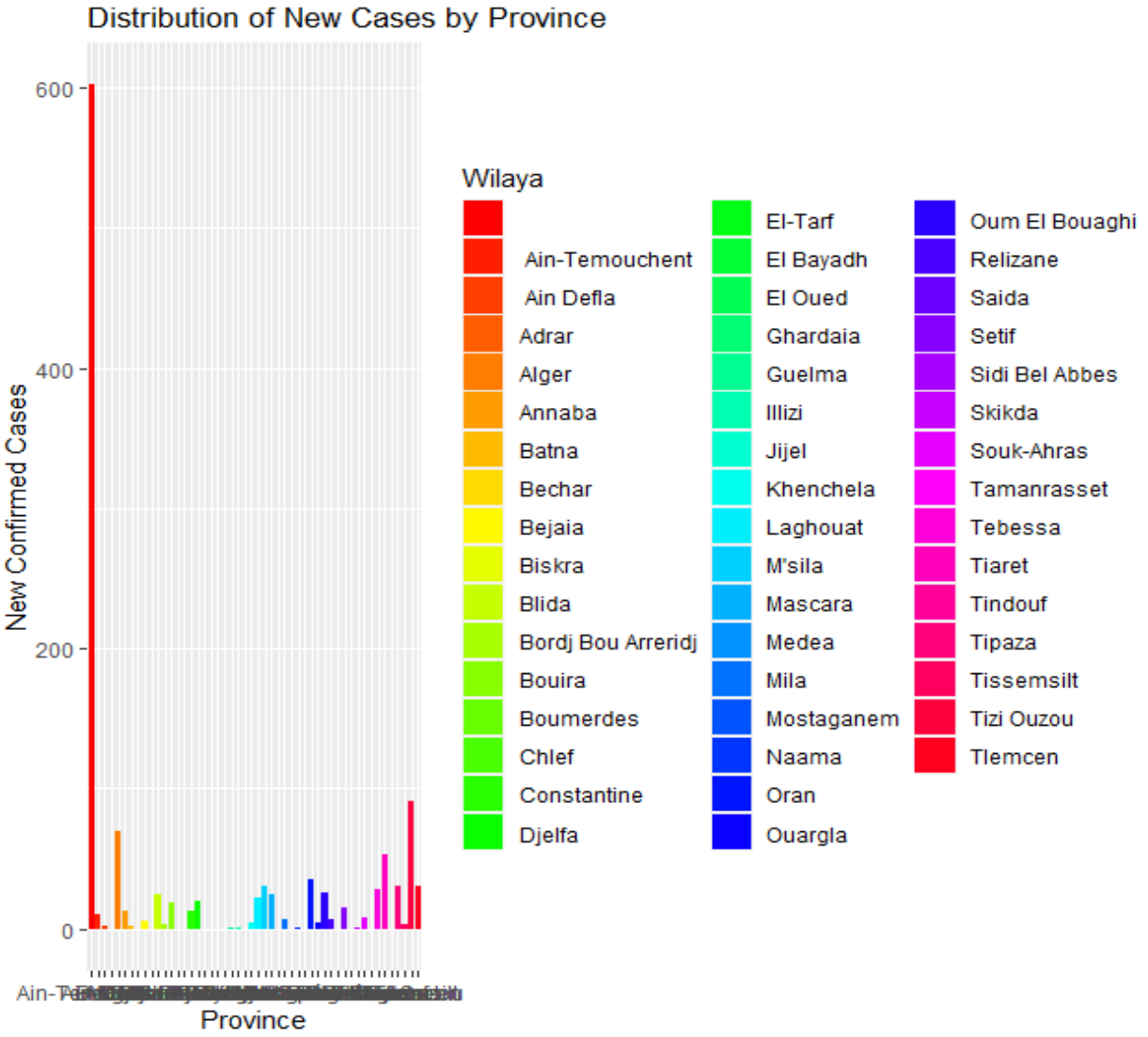
Фактор вариации	**Df**	**Сумма квадратов**	**Среднеквадратичное среднее**	**F-статистика**	**Величина P**
Провинция	49	10127	206.7	1.43	0.593
Остатки	1	144	144.5	-	-

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

РИСУНКИ

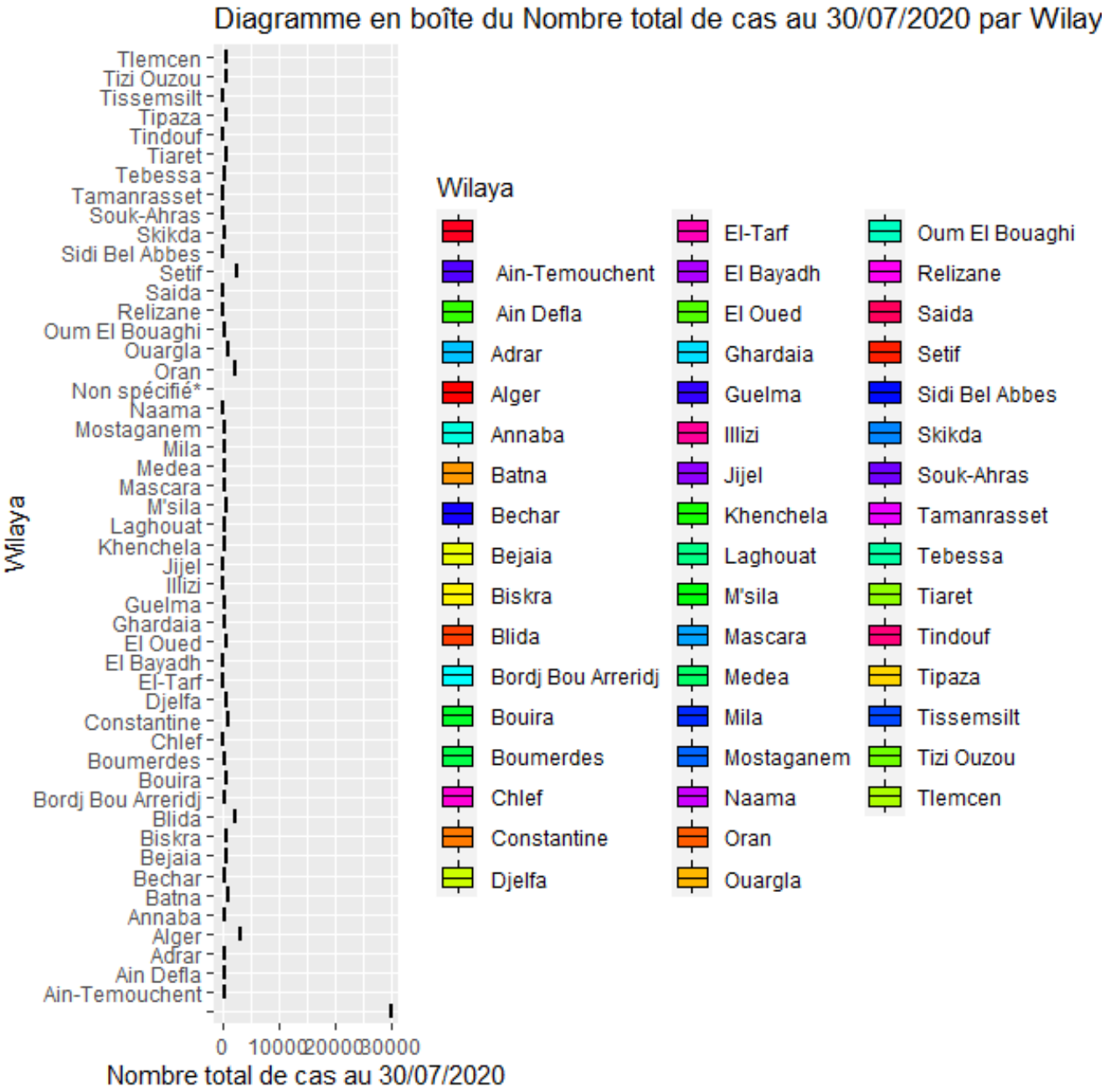
Figure 1. Distribution of New Confirmed Cases by Province.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

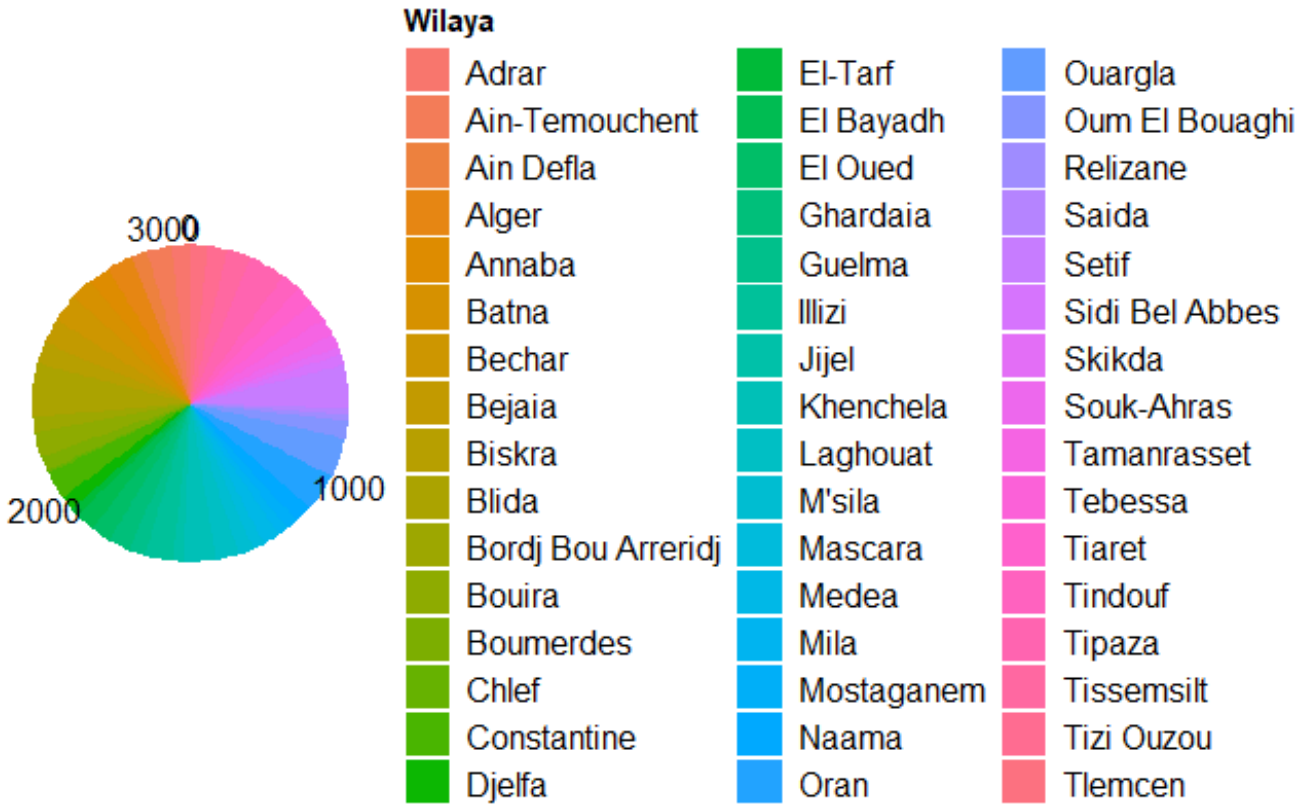
Figure 2. Box plot of total cases to 07/30/2020 by Wilaya.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

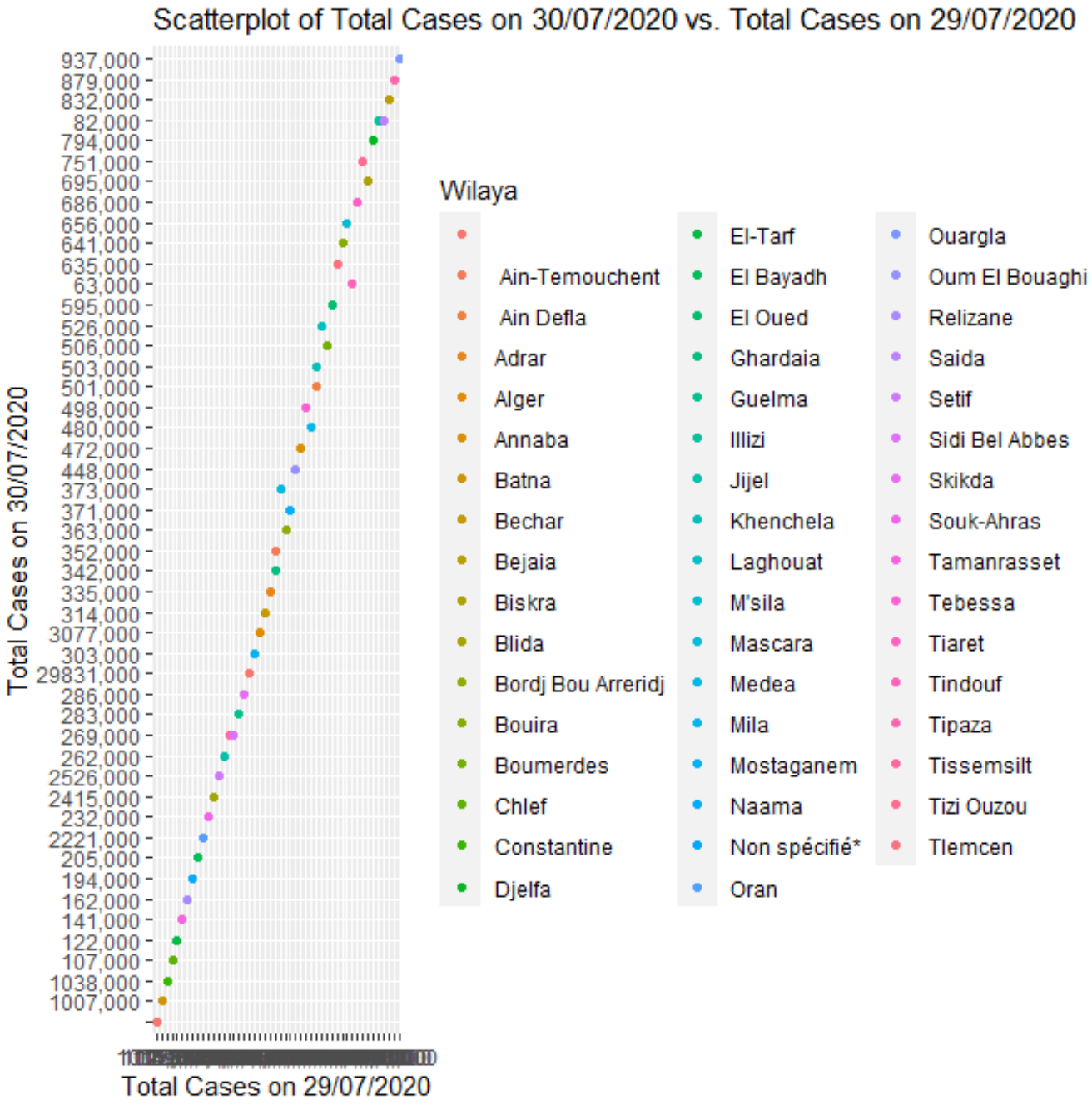
Figure 3. Incidence Rate by Wilaya.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

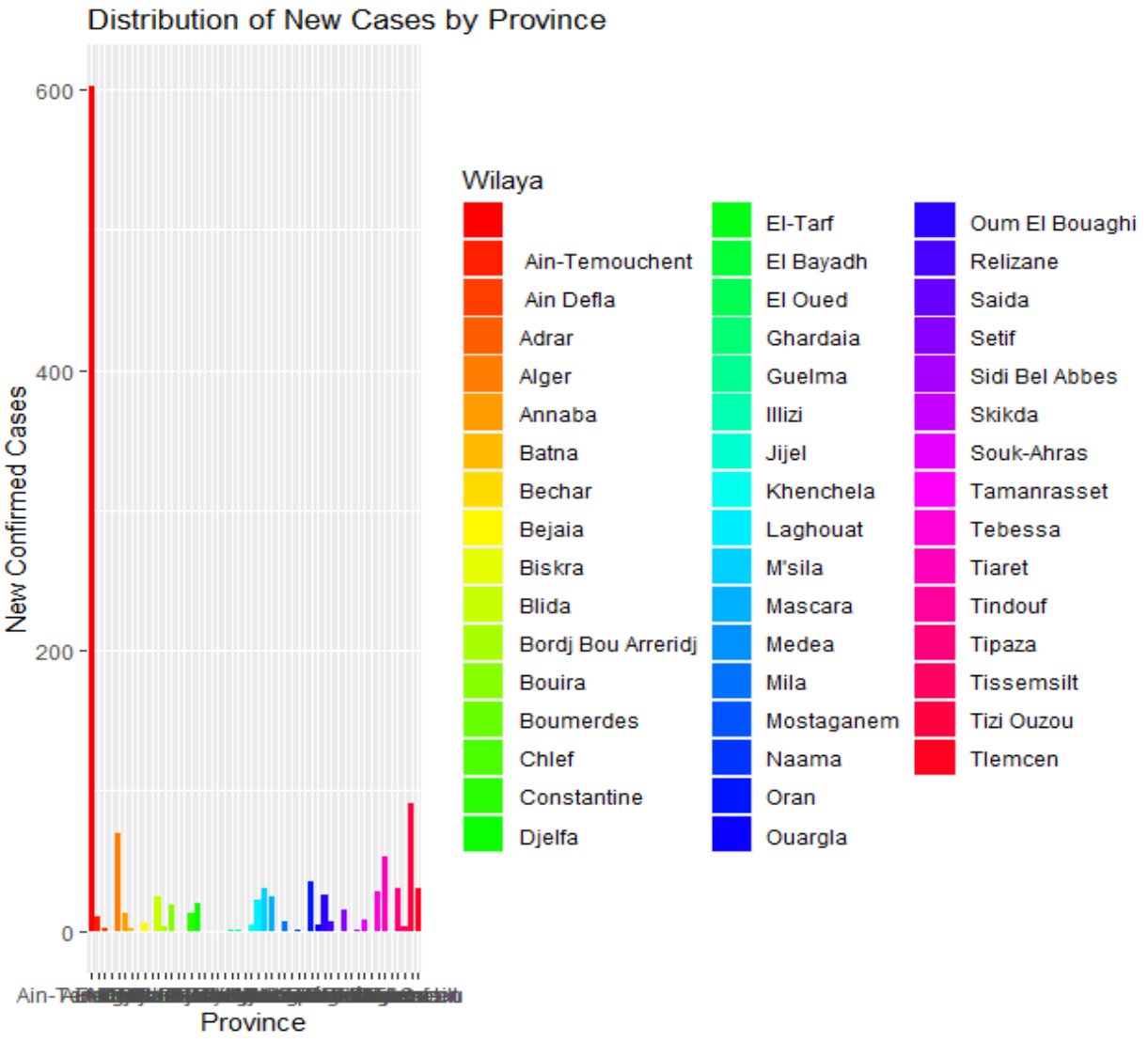
Figure 4. Relationship Between COVID-19 Incidence Rates and Total Confirmed Cases in Algerian Wilayas.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

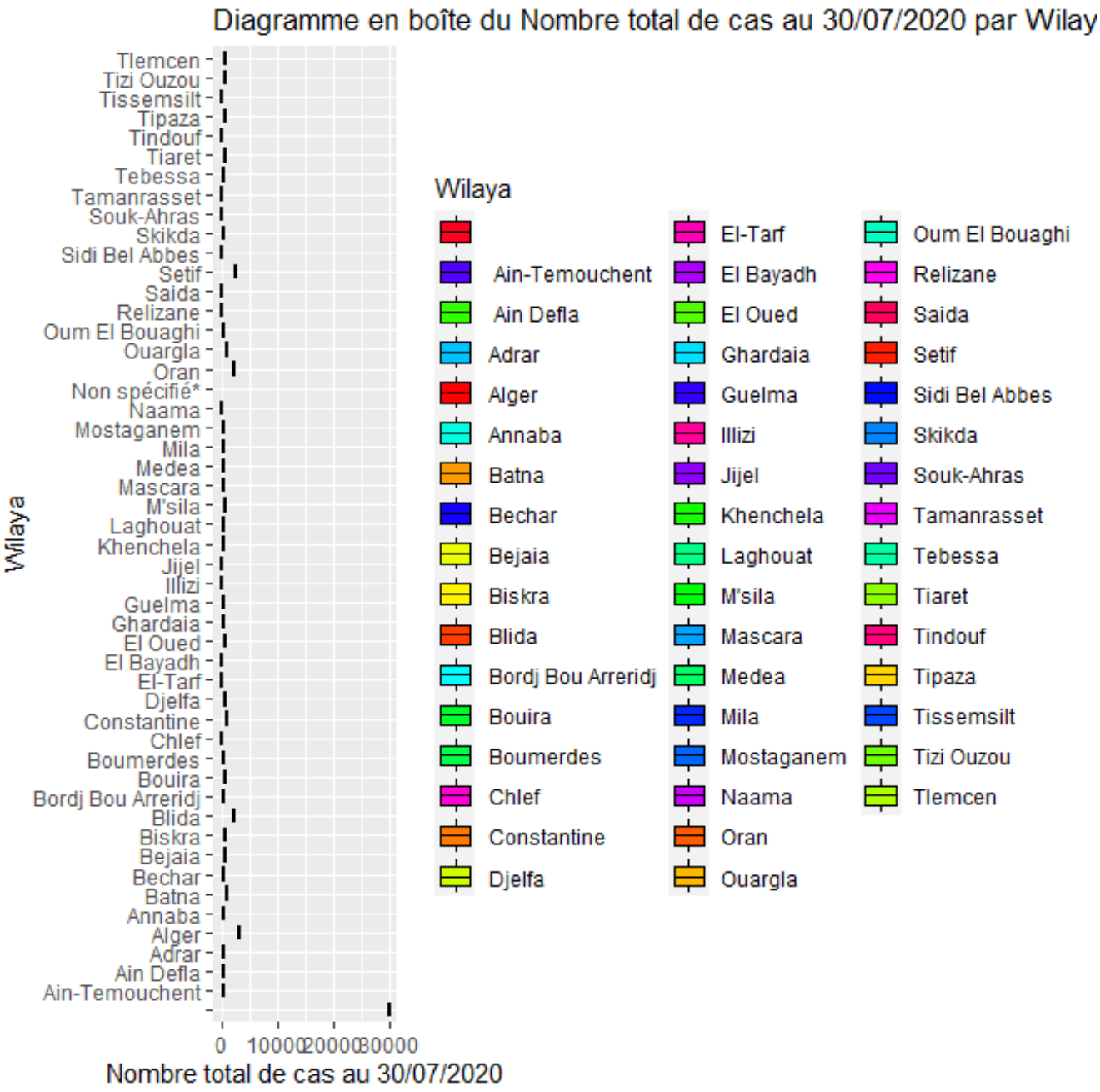
Рисунок 1. Распределение новых подтвержденных случаев COVID-19 по алжирским провинциям.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

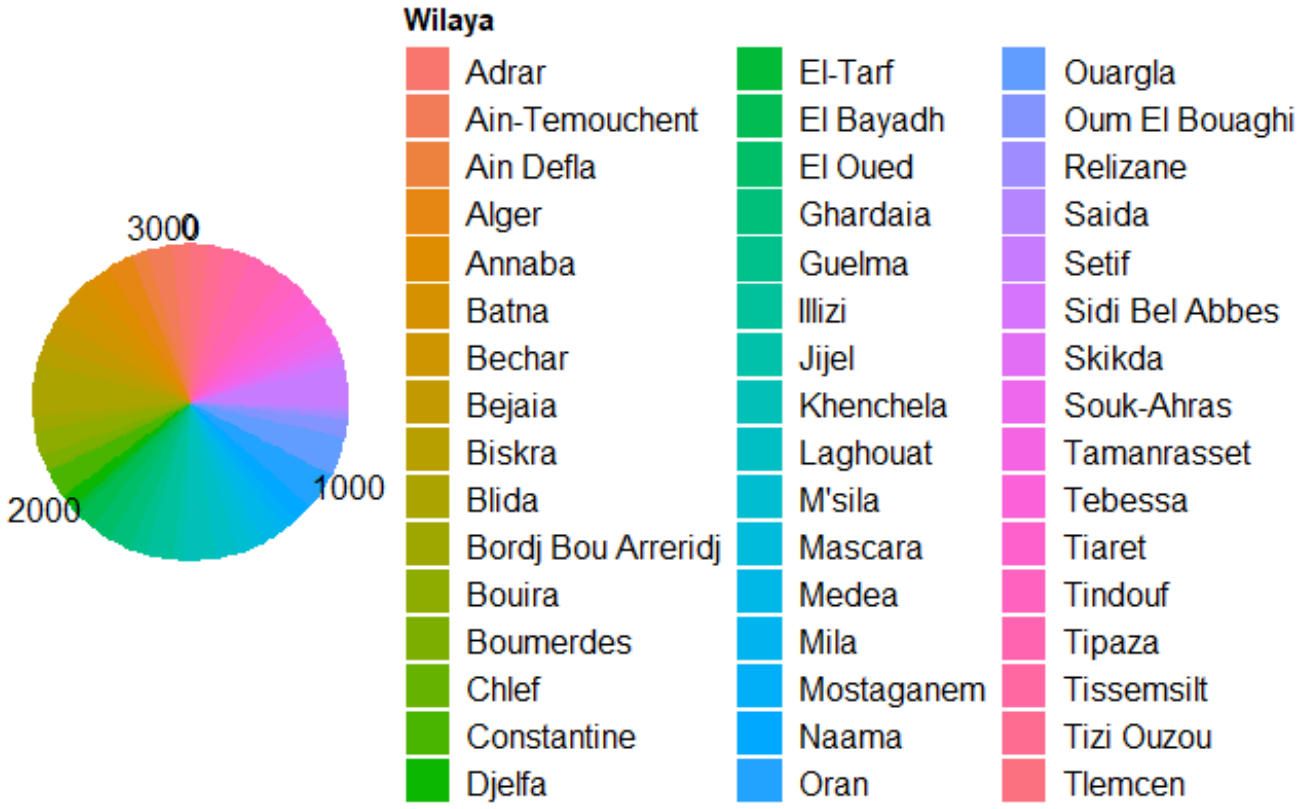
Рисунок 2. Диаграмма размаха общего количества случаев COVID-19 до 07/30/2020 в алжирских вилайях.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

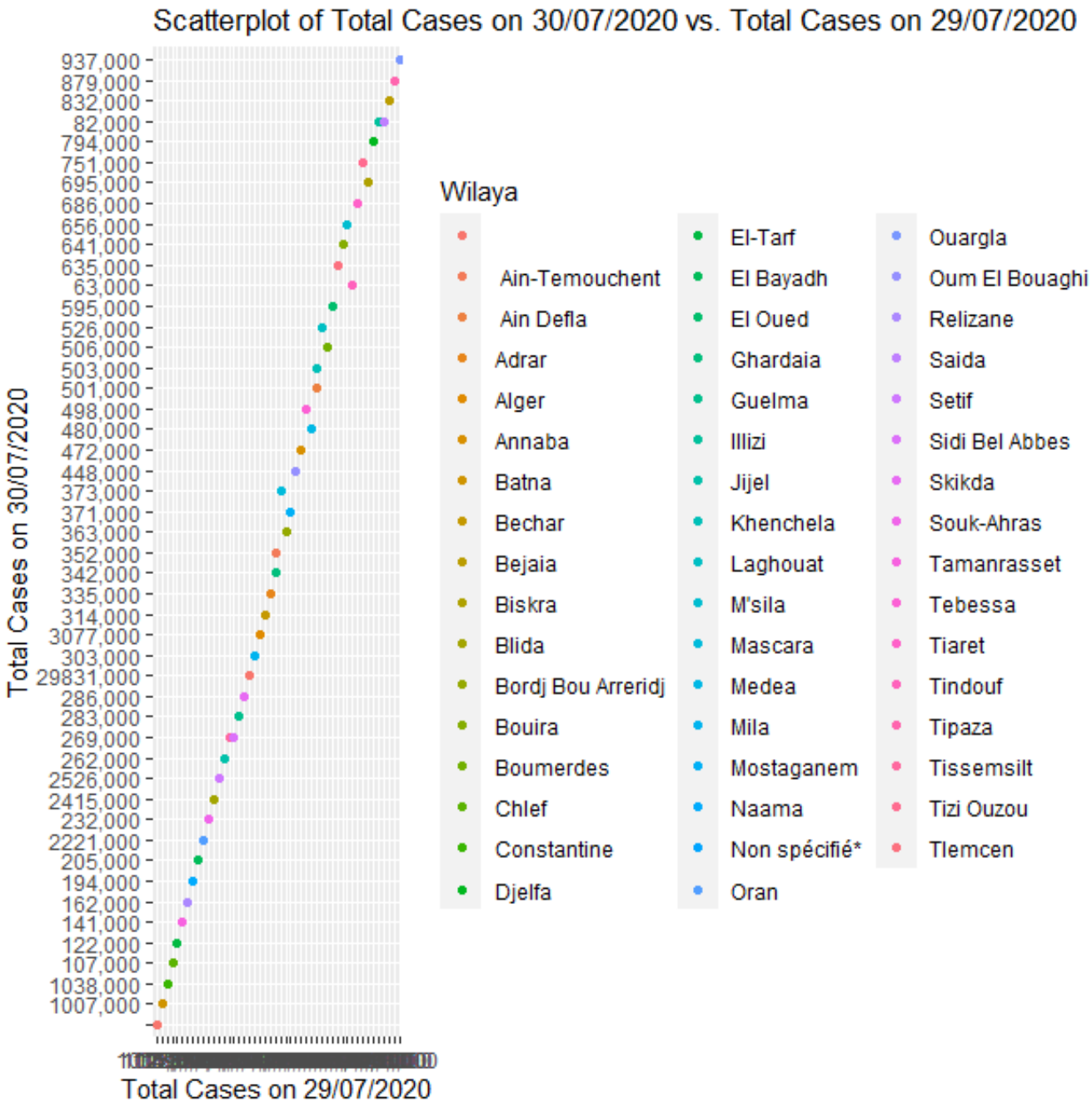
Рисунок 3. Уровень заболеваемости по алжирских вилайях.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Рисунок 4. Взаимосвязь между уровнем заболеваемости COVID-19 и общим количеством подтвержденных случаев в алжирских вилайях.



 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

ТИТУЛЬНЫЙ ЛИСТ_МЕТАДАННЫЕ

Блок 1. Информация об авторе ответственном за переписку

Zineb HARFOUCHE, Doctor of Mathematical Sciences, Master's degree in Financial Mathematics, Assistant Professor in Mathematics Faculty of Economic Sciences, Commercial Sciences, and Management Sciences, University of Alger 3, Algeria;
e-mail: zharfouche6@gmail.com

Блок 2. Информация об авторах

Amine AMIMOUR, Doctor of Mathematical Sciences, researcher Educational Governance Research Division, National Institute for Research in Education (INRE), Algiers, Algeria;
e-mail: amineamimour@gmail.

Блок 1. Информация об авторе ответственном за переписку

Зинеб АРФУШ, доктор математических наук, магистр финансовой математики, доцент математики факультета экономики, коммерческих наук и управления, Университет Алжира 3, Алжир;
электронная почта: zharfouche6@gmail.com

Блок 2. Информация об авторах

Амин АМИМУР, доктор математических наук, научный сотрудник отдела исследований в области управления образованием, Национальный институт исследований в области образования (INRE), Алжир, Алжир;
электронная почта: amineamimour@gmail.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

 10.15789/2220-7619-ETI-16603

Блок 3. Метаданные статьи

EPIDEMIOLOGICAL TRENDS IN ALGERIAN WILAYAS DURING THE COVID-19 PANDEMIC

ЭПИДЕМИОЛОГИЧЕСКИЕ ТЕНДЕНЦИИ В АЛЖИРСКИХ ВИЛАЙЯХ ВО ВРЕМЯ ПАНДЕМИИ COVID-19

Сокращенное название статьи для верхнего колонтитула:

COVID-19 TRENDS IN ALGERIAN WILAYAS

ТЕНДЕНЦИИ КОВИД-19 В АЛЖИРСКИХ ВИЛАЙЯХ

Keywords: Epidemiological analysis, Incidence rate, Pandemic evolution, Pandemic impact, Real Data Analysis, COVID-19 in Algeria.

Ключевые слова: эпидемиологический анализ, уровень заболеваемости, эволюция пандемии, влияние пандемии, анализ реальных данных, COVID-19 в Алжире.

Оригинальная статья.

Количество страниц текста – 11, количество таблиц – 3, количество рисунков – 4.

29.09.2023.

 ISSN 2220-7619 (Print)
ISSN 2313-7398 (Online)

СПИСОК ЛИТЕРАТУРЫ

References sequence number	Authors, title of a publication and source where it was published, publisher's imprint	Reference's URL
1	Ceylan Z Estimation of COVID-19 Prevalence in Italy, Spain, and France Sci Total Environ (2020) 729: 138817	DOI: 10.1016/j.scitotenv.2020.138817
2	Daw MA, El-Bouzedi AH, and Ahmed MO The Epidemiological and Spatiotemporal Characteristics of the 2019 Novel Coronavirus Disease (COVID-19) in Libya Front. Public Health 9 (2021): 628211	DOI: 10.3389/fpubh.2021.628211
3	Haffajee RL, Mello MM Thinking Globally, Acting Locally—The US Response to COVID-19 New Engl J Med (2020) 382: e75	DOI: 10.1056/NEJMp2006740
4	Hamidouch M	DOI: 10.1101/2020.03.20.20039891

	COVID-19 Outbreak in Algeria: A Mathematical Model to Predict Cumulative Cases." 2020. The preprint sever for health sciences	
5	Lounis M Epidemiology of Coronavirus Disease 2020 (COVID-19) in Algeria New Microbes New Infect. 2021 Jan; 39: 100822. Published online 2020 Nov 24. PMID: 33251017. PMCID: PMC7683942	DOI: 10.1016/j.nmni.2020.100822
6	WHO. "Sitrep 140_08082020." Available at:	https://www.afro.who.int/sites/default/files/2020-08/Sitrep%20140_08082020.pdf
7	WHO. "Sitrep 359_22032021." Available at:	https://www.afro.who.int/sites/default/files/2021-03/Sitrep%20359_22032021.pdf