Analytic study of the epidemiology situation of coronavirus disease-2019 (COVID-19) in Tarhouna, Libya

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الملخص:

تهدف الدراسة الحالية إلى تقييم الوضع الوبائي لـCOVID-19 في مدينة ترهونة في عامي 2020 و2021 ومناقشة الأسباب والتفسيرات المحتملة لحالات كوفيد-19 المبلغ عنها في المدينة. حللت هذه الدراسة جميع الحالات المؤكدة لفيروس كورونا في ترهونة، منذ أول حالة مؤكدة في المدينة في 15 يونيو 2020، حتى 31 ديسمبر 2021. تم جمع البيانات من المرضى المسجلين في الوثائق بمستشفى ترهونة التعليمي، من أول حالة مؤكدة لـCOVID-19، وتم تلخيصها على أنها العدد الإجمالي والنسبة المئوية للمرضى في كل مجموعة في الجدولين 1 و2. وتشير النتائج المتحصل عليها إلى تسجيل أول حالة إصابة بفيروس كورونا في المدينة كان خلال شهر يونيو 2020. وقد بلغ إجمالي الحالات المصابة المسجلة في عام 2020. حوالي 643 حالة، منها 420 ذكور (65.3٪) و233 إناث (36.2٪). بأعمار تتراوح بين 18 إلى 90 عاماً. توفي 13 مريضا فقط (2٪). وكانت نسبة الذكور تشكل 69.2٪ من عدد الوفيات المسجلة بالعام 2020 في حين نسبة وفيات الاناث كانت 31٪. من بين المرضى المتوفين، كان عدد الوفيات 2 للفئة العمرية اقل من 40 عاما ما نسبته 15.4 ٪ من العدد الكلي للوفيات بالعام 2020 حين بلغ عدد الوفيات 4 بالفئة العمرية 41-50 عاما ما نسبته 30.8٪ بينما كان عدد الوفيات 7 بالفئة العمرية 51 فما فوق 80 عاما ما نسبته 53.8٪من عدد الوفيات في سنة 2020. تم تسجيل حالات الإصابة المؤكدة بفيروس كورونا في اليوم الأول من شهر يناير 2021. ليصل إجمالي الحالات المصابة إلى 3435 حالة. ومن بين هذه الحالات 2312 ذكراً و1123 أنثى، وتتراوح أعمارهم

بين 15 و95 عاماً. توفي 30 مريضا فقط (1٪). وكانت نسبة الوفيات بين الذكور (38.3٪) أعلى مقارنة بالإناث (17٪). من بين جميع المرضى الذين توفوا، كان 3 (10٪) أقل من 40 عامًا، بينما 7 (23.3٪) تتراوح أعمارهم بين 41–50 عامًا. وتتراوح أعمار الأغلبية، والتي تضم 20 (66.7٪) من المرضى المتوفين، بين 51 وفوق 80 عامًا. بناءً على بياناتنا، تم تحديد أربع درجات من الشدة السريرية لحالات كوفيد-19: خفيفة، ومعتدلة، وحادة، وحرجة، في حين تم تسجيل أعلى معدلات الإصابة على أنها خفيفة، تليها متوسطة، وحادة، وحرجة، على التوالي، سواء في عام 2020. أو 2021، وفي المقابل، كانت معدلات الوفيات أعلى بين الحالات الحرجة والشديدة. وتتفق الدراسة الحالية مع دراسات أخرى أفادت بأن الإصابة بكوفيد-19 تختلف باختلاف عوامل كثيرة مثل العمر والجنس والكثافة السكانية وتعليم الناس واستقرار البلد.

الكلمات المفتاحية: كوفيد-19؛ جائحة؛ الحالة الوبائية؛ الانتشار؛ ترهونة؛ ليبيا.

Abstract:

The present study is aimed to assess the epidemiology situation of COVID-19 in Tarhouna in the years of 2020, 2021 and to discuss possible causes and give explanations regarding the cases of COVID-19 reported in the city.This study analyzed all confirmed cases of COVID-19 in Tarhouna, from the first confirmed case in the city on June 15, 2020, till December 31, 2021.The data were collected from registered patients in documents at Education Tarhouna Hospital, and then summarized as the total number and percentage of patients in each group in Tables 1 and 2**.** The obtained results indicated that the first case of COVID-19 was registered in the city in June 2020. A total of 643 infected cases were recorded in 2020. 420 cases were males (65.3%) and 233 were females (36.2%), with ages ranging from 18 to 90 years. Only 13 patients (2%) died. 69.2% of total death cases were males while 31% of death cases were females. Of the deceased patients, 2 individual died (15.4%) were under 40 years, and 4 individual (30.8%) were 41–50 years in addition 7 individual died constitute (53.8%) of total death cases aged 51 to > 80 years. In 2021, confirmed cases of COVID-19 were recorded on the first day of January 2021, A total infected cases were 3435, 2312 cases were males and 1123 were females, with an age range of 15 to 95 years. Only 30 patients (1%) died. The death rate in males (38.3%) was higher compared

to females (17%). 3 out of 30 death cases (10%) were under 40 years, 7 death cases (23.3%) were between 41 and 50 years, 20 death cases represent (66.7%) were aged 51 to >80. Based on our data, four degrees of clinical severity for COVID-19 cases were identified: mild, moderate, severe, and critical, whereas the highest infection rates were recorded as mild, followed by moderate, severe, and critical, respectively, either 2020 or 2021. In contrast, The mortality rates were highest among critical and severe cases. The present study agrees with other studies that have reported that the COVID-19 infection is different according to many factors such as, age, gender, population density, people education and stability of country.

Keywords: *COVID-19; Pandemic; Epidemiological situation; Spread; Libya*

Abbreviations:

COVID-19, Coronavirus disease-2019. **SARS-CoV-2,** Severe acute respiratory syndrome coronavirus 2.**WHO**, World Health Organization. **NCDC,** National Center for Diseases Control.

Introduction

Coronavirus disease-2019 (COVID-19) was discovered in late 2019 in Wuhan, China (Zhou et al, 2020; Andersen et al, 2020; Zhonglin et al, 2021).The rapid spreading and high contagiousness rate of covid 19 threat global public health therefore the World Health Organization (WHO) declared COVID a pandemic On March 11, 2020, (WHO, 2020). Hui et al, 2020; Wang et al, 2020).The virus responsible for causing COVID-19 is called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is classified as a beta-coronavirus (Cui et al, 2019; Muhammad et al, 2020). It is circular in shape, with a diameter of about 125 nm (Malik, 2020). It was named coronavirus due to the crown-like spikes on its outer surface (Zhonglin et al, 2020).There are four generation of coronavirus: α-coronavirus, β-coronavirus, γ-coronavirus, and δ-coronavirus (Zhonglin et al,2020).whereas, α-coronavirus and β-coronavirus infect mammals, γ-coronavirus infect birds, δ-coronavirus infect both mammals and birds while, the β-coronavirus infect human (Naqvi et al, 2020).

The coronavirus genome is composed of single-stranded RNA (Wu et al., 2020. It has the largest genome of all RNA viruses, which ranges between 27 and 32 kb

(Li, 2016).The coronavirus's RNA genome is surrounded by a nucleocapsid protein (N).and protected in a lipoprotein envelope. There are three structural proteins associated with the viral envelope: membrane protein (M) and envelope protein (E) are responsible for the virus's formation, and spike glycoprotein (S) facilitates the virus's entry into host cells to start the infection (Li, 2016; Shi et al., 2020). Spike proteins not only mediate viral entry but also determine the virus's host range and tissue orientation. and are also the main inducers of the host immune response. When the virus attaches to the host cell membrane, its spike proteins interact with the ACE2 receptor, initiating the infection process (Hoffmann et al, 2020). In addition, M proteins along with E, N, and S proteins, play a role in RNA packaging (Tang et al, 2020)

The COVID-19 infection starts in the throat, travels to the lungs, and then enters the bloodstream (Buja et al., 2020). It spreads through respiratory droplets released by infected individuals during coughing or sneezing. Healthy individuals can get infected by breathing in these droplets or touching surfaces contaminated with them and then touching their eyes, nose, or mouth. After entering the body, the spike-like proteins attach to the angiotensin-converting enzyme 2 (ACE2) as a key receptor (Wang et al, 2013), which is present in multiple organs of the human body, including the lung, heart, kidney, intestine and respiratory cells (Xu et al., 2020; Gralinski and Menachery, 2020). This leads to the virus entering the cells and causing them to malfunction. Once the virus is entered into the host cell's cytoplasm, the virus replicates its RNA genome and translates it into structural and accessory proteins (Malik, 2020; Panpan et al,2020). The newly formed viral particles fuse with the plasma membrane, releasing them to infect other host cells (Subramanian et al, 2020). It may enter the bloodstream causing sepsis, leading to secondary infections and death. (Ryu & Chun, 2020 Sarma et al. 2020).

The symptoms of COVID-19, including shortness of breath, sore throat, fever, dry cough, loss of smell and taste, muscle pain, pneumoniaas and diarrhoea as well as abdominal pain (Sara and, Abdussalam, 2021). The respiratory system is the first commonly affected. Moreover, it can affect another organs in the body, such as, liver, brain, heart, lungs and the intestines (Abdunnabi et al, 2020). through binding with angiotensin-changing enzyme 2-receptor, which is presented in

different human cells (Panpan et al, 2020). It is common knowledge that COVID-19 affects individuals differently, with some experiencing mild symptoms and others requiring hospitalization, intensive care, and ventilation (Chen et al, 2020; Bi et al, 2020). The risk of this virus increased with an increase in the age of patients because there is an increased chance of multi-organ fiasco. Which may ultimately lead to rapid death in the elderly COVID-19 patients with prevailing renal, metabolic and cardiovascular conditions (WHO, 2020).

Libya, the second largest country in Africa, has the longest Mediterranean coastline and faces Europe. This country is susceptible to the spread of infectious diseases, such as COVID-19. Armed conflicts and internal instability can hinder disease control and negatively impact the provision of health services (Daw, 2017). COVID-19 arrived in the country later than other North African countries, due to low levels of international commerce and travel (Abdusalam et al, 2021). The Libyan Minister of Health announced on 24th March 2020, that the first case of coronavirus had been registered in Libya (National Center for Diseases Control, 2020; Daw; 2020). The affected man was a 73-year-old man in Tripoli who returned from Saudi Arabia via Tunisia and was confirmed to have developed symptoms more than a week after returning to the country (National Center for Diseases Control, 2021). Due to recent conflicts and wars, Libya has no international airlines operating there. There are no direct flights to China or Europe,with the exception of a few local carriers that operate daily flights to Tunisia, Egypt, Jordan, and Turkey. Thus, there was very little chance that the virus would spread to Libya, which helps to explain why the country only had its first confirmed case on March (Abdunnabi et al, 2020; Abdusalam et al,2021).

Since then, COVID-19 has become widespread in the country, and displaced people and immigrants may contribute to its spread between cities (Daw et al, 2020). Although precautionary measures were taken to minimize transmission of the virus from travelers coming from infected countries, many confirmed cases of SARS-CoV-2 were reported among those who returned to Libya. This resulted in a change in the epidemiological situation of the disease and led to an increase in the number of cases recorded in various cities (Abdusalam et al, 2021). Because the epidemiological situations in neighboring countries varied greatly and had a

significant impact on the confirmed cases reported in Libya (Abdusalam et al, 2021).

The National Center for Disease Control (NCDC) has announced that Libya has taken the necessary measures in accordance with WHO instructions, indicating that it is one of the countries least at risk for disease outbreaks (Bredan and Bakoush, 2021). Many published articles have studied and analyzed the epidemiology of COVID-19 in several cities in Libya (Abdusalam et al, 2021 Daw et al 2021; Sharef et al, 2021).

Tarhouna city, has a population density of about 300,000, is situated in the Murqub District southeast of Tripoli.It is considered one of the largest cities in Libya, with a high population (Maetouq et al, 2021). Because there is still a dearth of knowledge about Tarhouna's COVID-19 epidemiological situation, Therefore, the purpose of this study is to assess the COVID-19 epidemiology in the city in 2020 and 2021 and to discuss possible causes and explanations for the cases of COVID-19 in this city.

Material and Method

We collected the data of all the registered patients in documents at Education Tarhouna Hospital, from the first confirmed cases of COVID-19 on June 2020, to December 31, 2022. Also, the clinical severity of all confirmed cases of COVID-19 was classified as follows: 1: mild (symptoms without pneumonia and no oxygen therapy needed); 2: moderate (fever, respiratory symptoms, and pneumonia on imaging), and 3: severe (respiratory distress, fast breathing, low oxygen saturation, and low arterial blood oxygen).4:Critical cases included respiratory failure, mechanical ventilation, septic shock, and admission to the intensive care unit with multiple organ dysfunctions or failures. The data were summarized as the total number and percentage of infected and death cases in each variable in six tables.

Results:

Table (1) Showed confirmed cases and death cases of COVID-19 according to the gender in 2020 in Tarhouna City. A total of 643 infected cases were recorded in 2020, 420 cases were males (65.3%) and 233 were females (36.2%) (Figure 1),

with ages ranging from 18 to 90 years. Only 13 patients died constitute 2% of infected cases. The fatality rate in males and females was 69.2% and 31% respectively, obviously males have higher rate of death than females (Figure 2). The fatality rate among ages were 2 individuals represent (15.4%) of the deceased patients were less than 40 years old, 4 individuals represent (30.8%) were between 41-50, and 7 individuals represent (53.8%) were over 50 years old. (Figure.3). In November, the infection rate reached its peak with 196 cases (30.5%), followed by December with 167 cases (26%) and September with 97 cases (15.1%). On the other hand, the lowest infection rates were observed in June with only 8 cases (1.2%), July with 27 cases (4.2%), and August with 49 cases (7.6%) (Table 2. Figure 4). It can be noticed that the first confirmed case was registered in the city in June 2020. Also, Figure (5) indicated that the highest monthly death cases were recorded in November, December and October, respectively. Table (3) Showed the clinical severity and death cases COVID-19 infection, where the total confirmed cases, 79.3% (500) were considered mild, .6% (100) moderate, 3.9% (25) severe and 2.8% (18) critical. The severity of illness tends to increase as age progresses. The mildest cases were observed in individuals under the age of 40 years, while moderate cases were found in those between the ages of 41 – 50 years. The most severe and critical cases were seen in older patients, particularly those aged 51 and above 70 years The critical and severe cases had the highest mortality rates, with 76.9% (10) and 23.1% (3) respectively.(Figure 6).

Table 1. Showed confirmed and death cases of COVID-19 according to the gender in 2020.

Variables		Infected cases	Ages	Infected cases %	Death	Death %
Gender	Male	420	15 -90	65.3%	9	69.2%
	Female	233	15 - 90	36.2%	4	31%
	Total	643	------	-----	13	2%

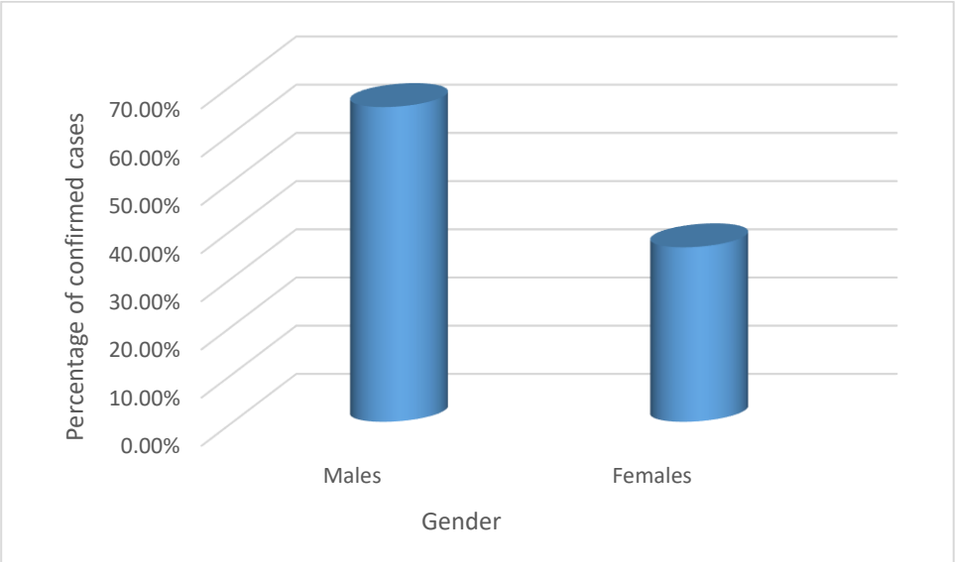

Figure.1. Showed confirmed cases of COVID-19 according to gender in 2020.

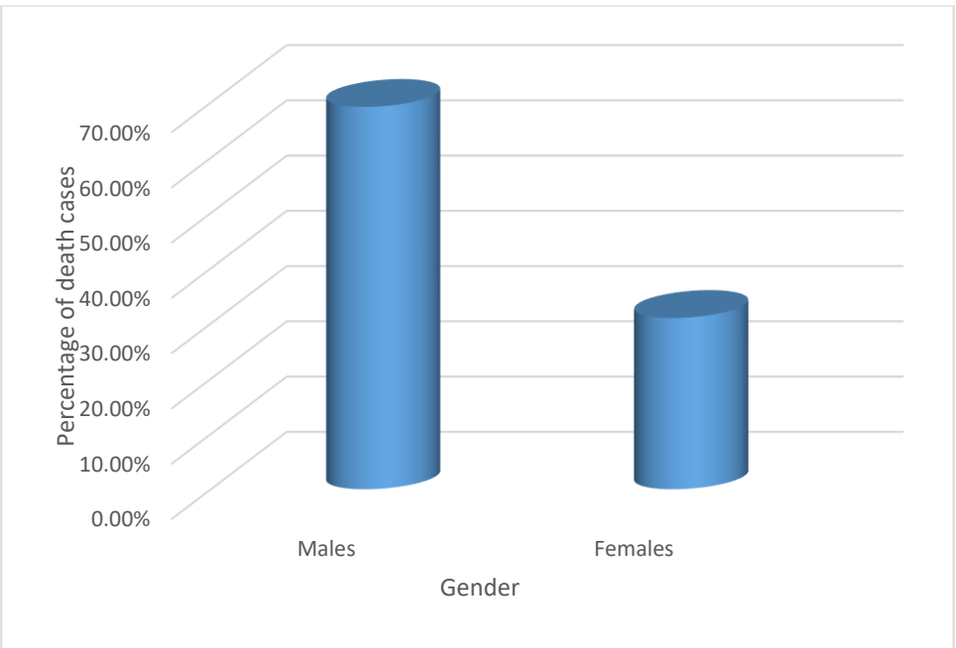

Figure.2. Showed death cases of COVID-19 according to gender in 2020.

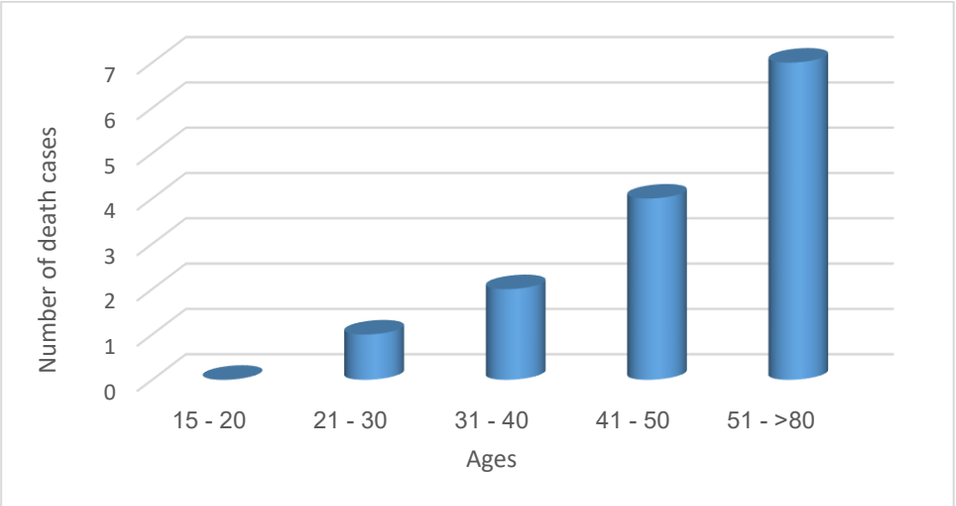

Figure.3. Showed number of death cases of COVID-19 in different ages in 2020

Table 2. Showed the monthly confirmed and death cases of COVID-19 infection in 2020.

Variables		Infected cases	Ages	Infected cases %	Death	Death %
Months	January	0	-----	-----	-----	-----
	February	0	-----	-----	-----	-----
	March	0	-----	-----	-----	-----
	Abril	0	------	------	------	------
	May	0	------	------	------	------
	June	8	20 - 60	1.2%	0	0%
	July	27	19 - 90	4.2%	1	8 %
	August	49	20 - 80	7.6%	2	15%
	September	97	20 - 85	15.1%	2	15%
	October	99	18 - 75	15.4%	2	15%
	November	196	20 - 85	30.5%	3	23%
	December	167	15 - 90	26%	3	23%

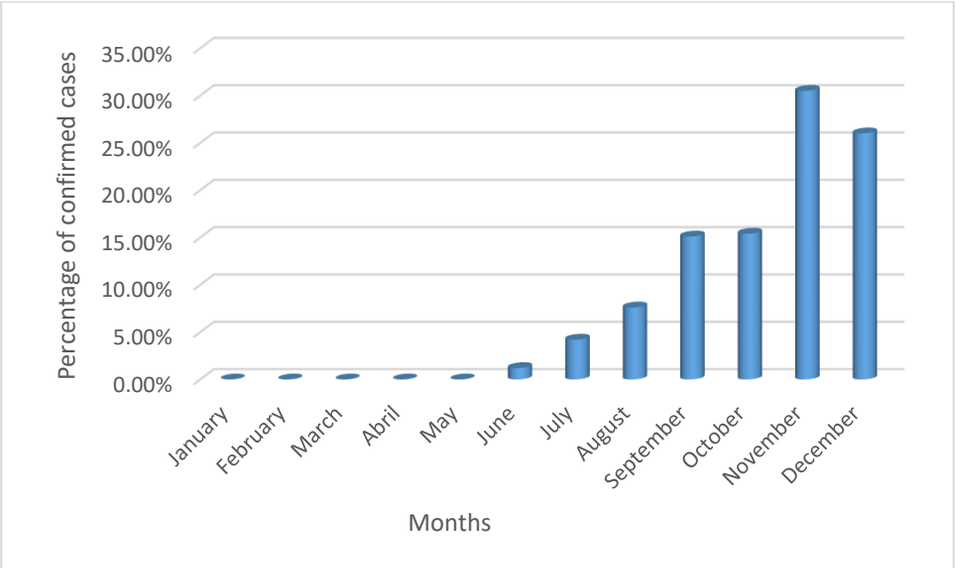

Figure.4.Showed the monthly confirmed cases of COVID-19 in 2020.

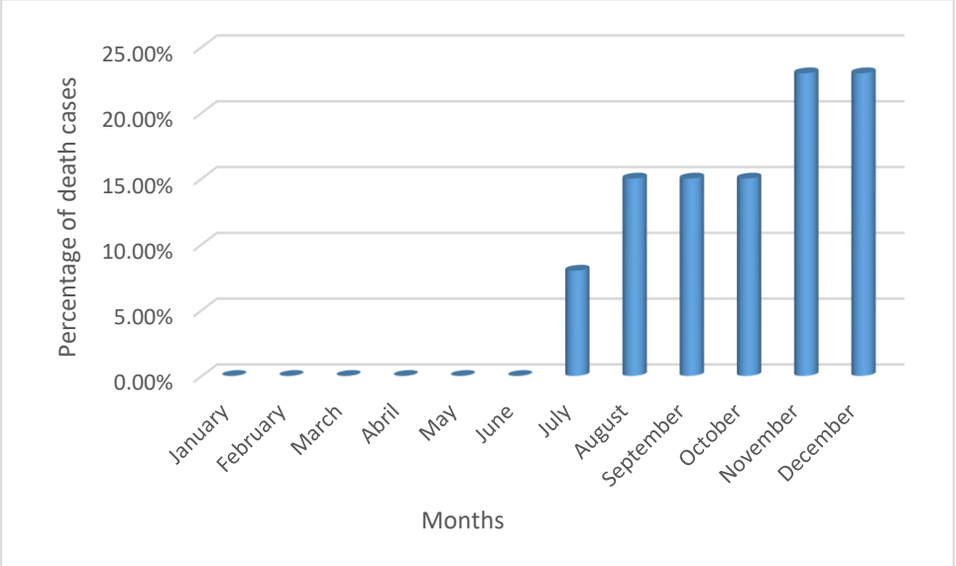

Figure.5. Showed the monthly death cases of COVID-19 in 2020.

Table 3. Showed the clinical severity and death cases of COVID-19 infection in 2020.

Variables		Infected cases	Ages	Infected cases %	Death	Death %
Clinical severity	Mild	500	15 - 39	79.3%	0	0%
	Moderate	100	40- 50	15.6%	0	0%
	Severe	25	51 - 60	3.9%	3	23.1%
	Critical	18	61- >70	2.8%	10	76.9%

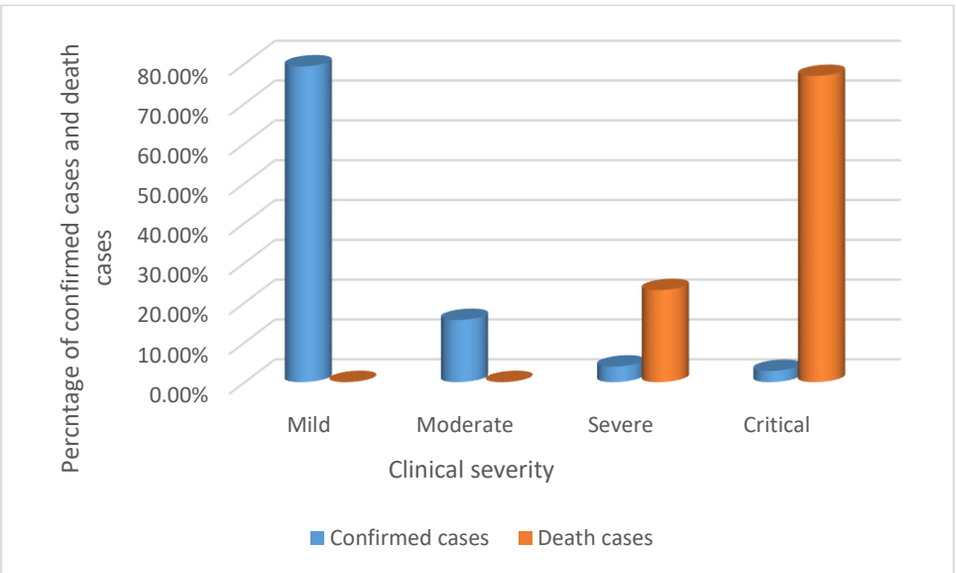

Figure.6. Showed the clinical severity and death cases of COVID-19 in 2020.

Table (4).showed all confirmed and death cases of COVID-19 in this city. A total infected cases were 3435. 2312 cases were male and 1123 cases were female with age ranged of 15 to 95 years, (Figure7). Only 30 patients (1%) died. The death rate in males (38.3%), was higher compared to females (17%), (Figure 8). Out of the total number of death cases, 3 cases (10%) were under 40 years, 7 cases (23.3%) were between 41 and 50 years, while 20 cases (66.7%) were recorded in individuals aged 50 and above, as illustrated in Figure 9. In addition, the data in

Table 5. Showed that infection rate peaked in August with 800 cases (23.3%), followed by September with 612 cases (17.82%), and July with 459 cases (13.36%). The months with the lowest infection rates were January with 20 cases (0.58%), February with 44 cases (1.28%), and June with 90 cases (2.26%), (Figure 10). From Figure (11), it can be noticed that the highest death cases were in August, September, and then November and December. In total, there were 3,435 confirmed cases, with 61.1% considered mild, 29.4% moderate, 6.70% severe, and 2.77% critical. Individuals under the age of 40 years showed the mildest cases, while moderate cases were found in those aged between 41-50 years. Older patients, especially those aged 51 and above 70 years, had the most severe and critical cases. The mortality rates were highest among critical and severe cases, with 23 cases (76.67%) and 5 cases (16.7%), respectively. (Table 6 and Figure 12).

Table 4. Showed confirmed and death cases of COVID-19 according to gender in 2021.

Variables		Infected cases	Ages	Infected cases %	Death	Death %
Gender	Male	2312	15 - 95	67.3%	25	38.3%
	Female	1123	15 - 95	33%	5	17%
	Total	3435	-------	------	30	1%

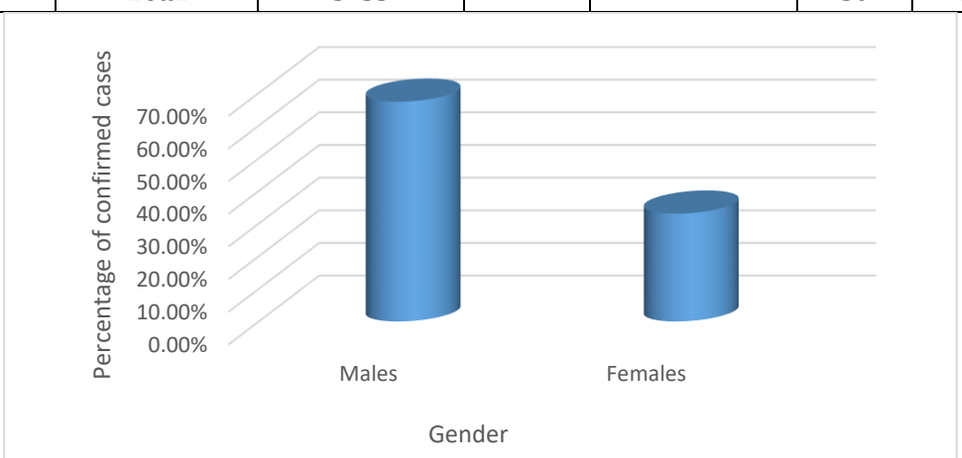

Figure.7.Showed confirmed cases of COVID-19 according to gender in 2021

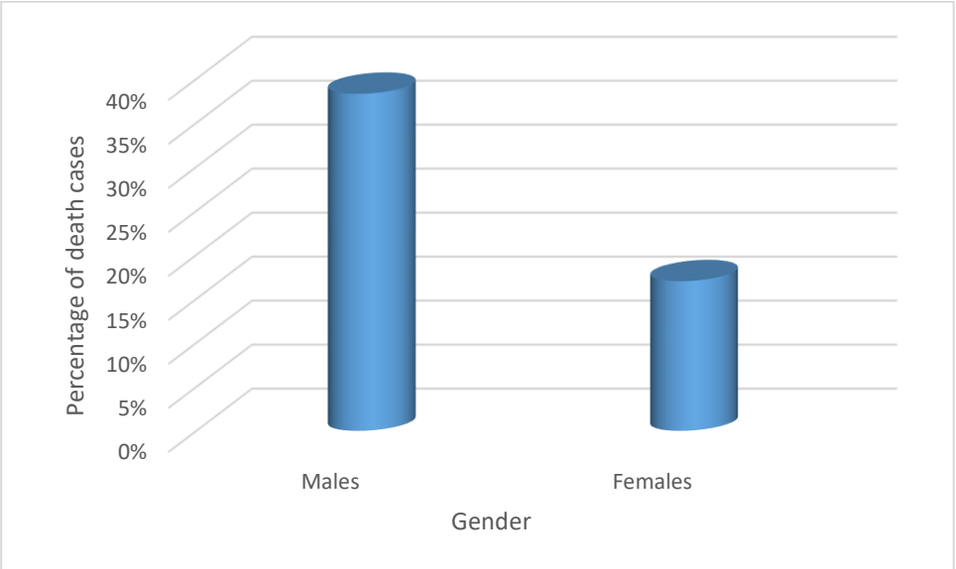

Figure.8.Showed death cases of COVID-19 according to gender in 2021

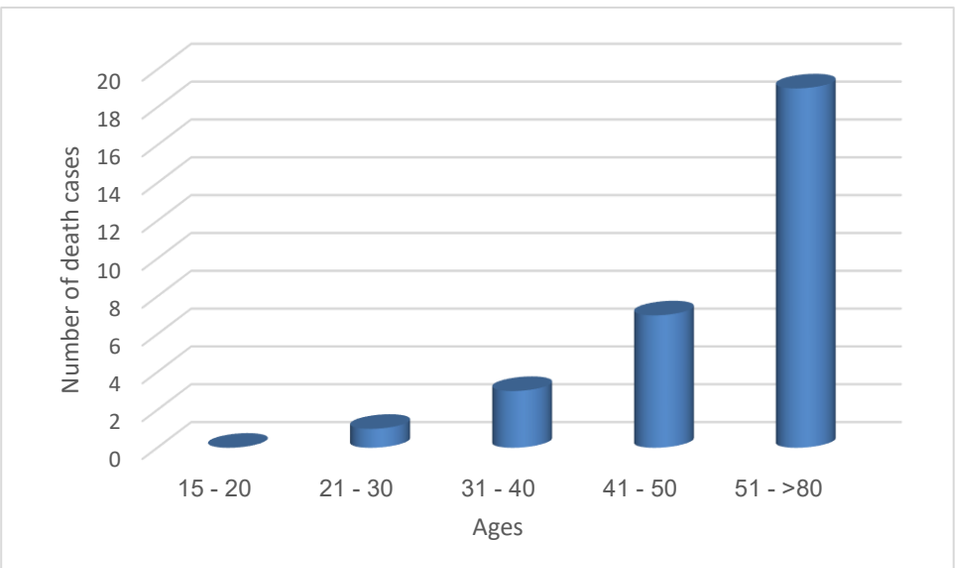

Figure.9. Showed number of death cases of COVID-19 in different ages in 2021.

Table 5. Showed the monthly confirmed and death cases of COVID-19 infection in 2021.

Variables		Infected cases	Ages	Infected cases %	Death	Death %
Months	January	20	30 -52	0.58%	0	0%
	February	44	25 - 75	1.28%	1	3.33%
	March	178	20 - 90	5.18%	2	6.67%
	Abril	142	21 - 85	5.13%	1	3.33%
	May	130	25 - 80	3.78%	1	3.33%
	June	90	15 - 88	2.26%	1	3.33%
	July	459	18 - 90	13.36%	3	10%
	August	800	20 - 90	23.3%	7	23.3%
	September	612	15- 89	17.82%	6	20%
	October	255	19 - 95	7.24%	2	6.67%
	November	416	18 - 86	12.11%	3	10%
	December	289	20 - 88	8.41%	3	10%

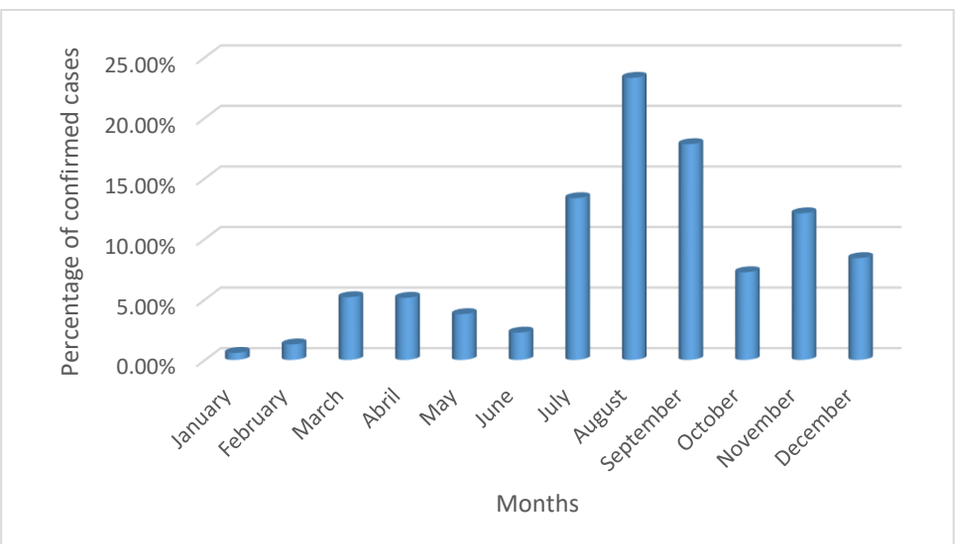

Figure.10.Showed the monthly confirmed cases COVID-19 in 2021.

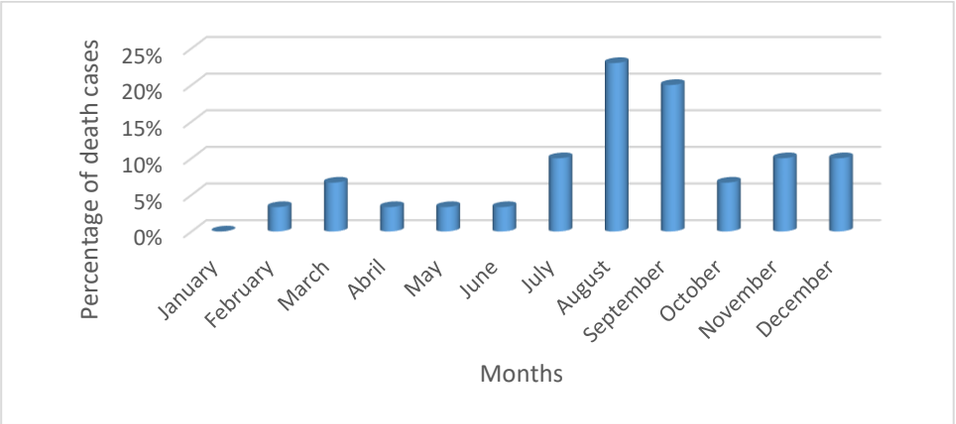

Figure.11.Showed the monthly death cases COVID-19 in 2021.

Table 6. Showed the clinical severity and death cases of COVID-19 infection in 2021.

Variables		Infected cases	Ages	Infected cases %	Death	Death %
Clinical severity	Mild	2100	15 – 39	61.1%	0	0%
	Moderate	1010	41 - 50	29.4%	2	6.67%
	Severe	230	51 - 60	6.70%	5	16.7%
	Critical	95	61 - >70	2.77%	23	76.67%

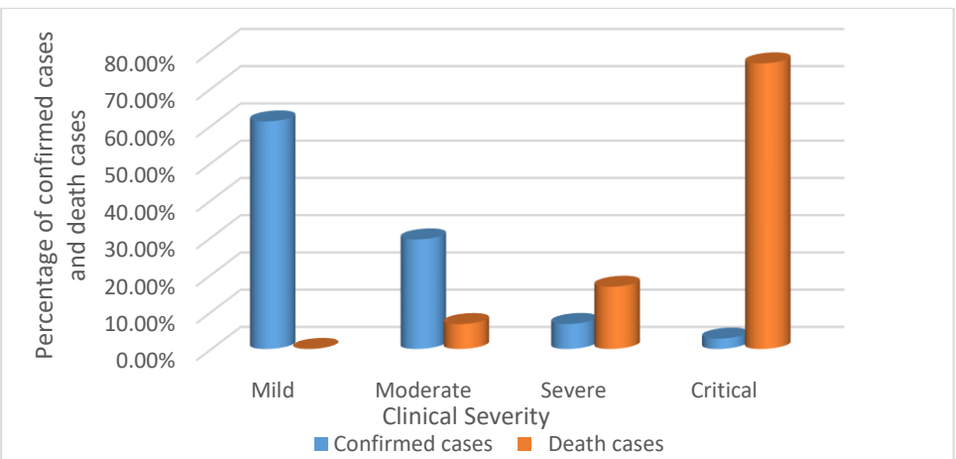

Figure.12. Showed the clinical severity and death cases of COVID-19 in 2021.

Discussion

The COVID-19 prevalence varies between cities due to factors such as the number of daily tests, population density, city activities and cultural and social lifestyles (Abdusalam et al, 2021; Mahmoud et al, 2021). In the present study, We analyzed the epidemiological situation of COVID-19 in Tarhouna City in 2020 and 2021. This study indicated that the first conformed case of COVID-19 in Tarhouna was in June 2020. This indicated to that the coronavirus disease- 2019 spread in the city after more than two months from declared the World Health Organization (WHO) the coronavirus outbreak as a pandemic on 11 March 2020 (WHO, 2020). At the beginning of the pandemic, the city strictly followed all recommended measures to prevent the transmission of the virus. The city remained free of confirmed cases until June, three months after the first reported case in Libya

Since the initial outbreak, numerous cases of varying clinical severity have been reported, and the epidemic curve of COVID-19 in Tarhouna has increased since July 2020. However, the number of reported cases was relatively low during June, July and August of 2020. The delay in COVID-19 infection rates and its low number during June, July, and August2020 may be due to the early measures that included shutting down schools, festivals, airports, and commercial and private industries. In line with recommendations from WHO, these measures implemented to prevent and control the spread of COVID-19, to minimize the risk of exposure and transmission for the population. Also, because of the war that coincided with the existence of the corona epidemic, it prevented movement between cities, which contributed to the reduction the spread of the corona epidemic in the city. In keeping with (Abdunnabi et al, 2020), who stated that due to the ongoing war and instability in Libya, mobility in Libya is limited, this may be a good thing because it would lessen the chance of the virus spreading across the nation. The current study is consistent with study of (Maetouq et al, 2021), which claimed that three months later, Tarhouna reported the first formally confirmed cases of COVID-19. Also, study of (Abdusalam et al, 2021), indicated to that the epidemiological situation in Libya underwent significant changes from mid-July to early August, and then COVID-19 has spread in almost all Libyan cities

On other hand, The findings of the current study reveal a concerning trend of rising COVID-19 cases reported in the months of September, October, November, and December 2020. This rising may be due to the return of Libyan travelers from infected areas and movements between small villages and cities. in agreement with the finding (Abdusalam et al, 2021), who demonstrated that the number of confirmed cases in Libya started to increase by the end of May, which synchronize with the first batch of returning flights to Libya. Also, According to the National Center for Disease Control (NCDC), 30 out of 62 confirmed COVID-19 cases in Libya's different cities were linked to individuals who traveled to infected countries, specifically the southern region, at the beginning of June 2020.

The obtained results show that COVID-19 infected males more than females, either in 2020 or 2021; these findings are in line with the study of (Maetouq et al, 2021) that revealed Tarhouna had the highest rate of COVID-19 infection in males. Additionally, other studies reported from China and Iran (Shahriarirad et al, 2020; Zhang et al, 2021). This variation in infection rates across genders may be caused by a variety of physiological or biological factors (Richardson et al, 2020; Scully et al, 2020). There are numerous studies that claim there are differences between the sexes in the expression of angiotensin converting enzyme 2 (ACE2) receptors, which may play a part in SARS-CoV-2 viral entry and transmission (Bukowska et al, 2017; Cai , 2019; Hoffmann et al, 2020; Zhao et al, 2020). Although it's possible that the sex bias found in the current study has an impact, the gender variation in infection rates may be complex. Factors affecting the infection rate between males and females include gender-based socio-cultural and behavioral variations. Men are more prone to contracting an infection due to attitudes, costumes, and lifestyle choices (Kragholm et al, 2020). In line with numerous studies showing that men are more likely than women to contract infectious diseases (Jin et al, 2020; *Daw* et al, 2021; ***Sara*** et al, 2021; Maetouq et al, 2021). Thus, male sex may be viewed as a risk factor for higher severity and mortality in patients with COVID-19, independent of age. Unlike prior findings, other studies discovered no discernible difference between the sexes of males and females infected with COVID-19 (Kragholm et al, 2020; Zhao et al, 2020; Klein et al, 2020).

It is well known that COVID-19 appears to affect some people more severely than others; some people experience just mild symptoms, whereas others end up hospitalized and require extensive care and ventilation (Bi et al, 2020; Chen et al, 2020). Based on our data, four degrees of clinical severity for COVID-19 cases were identified: mild, moderate, severe, and critical, whereas the highest infection rates were recorded in mild, followed by moderate, severe, and critical, respectively, either in 2020 or 2021. In contrast, critical and severe cases had the highest mortality rates: in 2020, there were 10 cases (76.9%) and 3 cases (23.1%), respectively; in 2021, there were 23 cases (76.67%) and 5 cases (16.7%).These findings might be due to differences in both age and immune system responses. In line with other studies, which reported that higher infection rates of COVID-19 were in mild cases (Wang et al, 2020; *Daw* et al, 2021), The current study found that people under the age of 40 had the mildest cases, while people between the ages of 41- 50 years had the moderate cases. Older patients, especially those aged 51 and over 70 years, had the most cases severe and critical. This finding might be due to the weak of immune system response and they have some health problems and chronic diseases.

According to the WHO, older people and people of all ages with chronic medical conditions like diabetes, hypertension, heart disease, lung disease, or other chronic underlying conditions seem to contract severe COVID-19 illnesses more than others (Kluge,2020). People aged 60 and older accounted for almost 95% of COVID-19 deaths. Also, more than 50% of all fatalities occurred among adults aged 80 years or older. In agreement with studies (Ceylan, 2020; *Daw* et al, 2021), which reported that most deaths in infected cases occurred in elderly people suffering from severe healthy conditions, particularly in the early stages of the epidemic. Age has a major impact on the prevalence of COVID-19 infections in the community (Tian et al, 2020). The old people are more exposed to COVID-19 infection.

Conclusion:

This study provides information on the epidemiological characterization of the COVID-19 pandemic in Tarhouna. and discuss some points which explain the low incidence of COVID-19 in the city during the first 3 months of the outbreak. Our

result indicated that the few infection cases at the beginning of the epidemic because the city strictly followed most recommended measures to prevent the transmission of the virus. Also due to the war-imposed restrictions on the movement of people between the cities. The COVID-19 infection tends to increase as age progresses and with some health problems and chronic diseases of individuals. The present study agrees with other studies that have reported that the COVID-19 infection is different according to many factors such as, age, gender, population density, people education and country instability. As a result, it is recommended to take preventative measures for elderly patients more seriously. Further research is recommended to understand the epidemiology of COVID-19 and its development stages in the Libyan population and to account for asymptomatic cases that might contribute subtly to the spread of the virus.

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