الوضع الوبائي لجائحة كوفيد-19 وعوامل الخطر المرتبطة بالعدوى في مدينة الرياينة الليبية

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Epidemiological Profile of COVID-19 Pandemic and Risk Factors Associated with Infection in Al-Riyayna City of Libya

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الملخص:

تهدف هذه الدراسة إلى تحديد الوضع الوبائي لعدوى فيروس كورونا (COVID-19) خلال فترة الجائحة وعوامل الخطر المرتبطة بالعدوى في مدينة الرياينة في ليبيا. والطرق في هذه الدراسة الوصفية بأثر رجعي تمت مراجعة سجلات العينات التي تم جمعها خلال الفترة من نوفمبر 2020 إلى أكتوبر 2021، وتم تحليلها لتحديد عوامل الخطر الفئات العمرية، الجنس، والطقس الشهري المرتبط بالإصابة في مدينة الرياينة. وتم إجراء التحليل الإحصائي باستخدام الإصدار 26 لبرنامج SPSS ،الإحصاء الوصفي، وذلك باستخدام تحليل مربع كاي للتحقيق في مستوى الارتباط بين المتغيرات عند مستوى الأهمية 0.05 $\leq P$. النتائج: أظهرت الدراسة الحالية الحالات الموجبة (1430؛ 22.1%) عند (0.05$\leq P$)، كان معدل إيجابية الإناث أعلى مقارنة بالذكور (839؛ 58.7%، 591؛ 41.3%) على التوالي. كانت معظم الإصابات في الفئات العمرية (15-44 عامًا) مقارنة بالفئات العمرية الأخرى، وكان العدد الأعلى بين الفئة العمرية 25-34 عامًا (330؛ 23.1٪). خلال فترة الدراسة تم تسجيل موجتين من أعلى معدل إيجابية لحالات كوفيد-19، كانت الموجة الأولى في نوفمبر 2020 (250؛ 17.5%)، ثم بدأ المعدل في الانخفاض حتى فبراير 2021 (62؛ 4.3%). أما الموجة الثانية فكانت في مارس 2021، حيث بلغ معدل الإصابة في أبريل 275 حالة (19.2%). الاستنتاج: بناءً على بياناتنا، تم إثبات التأثيرات الكبيرة والانتشار التراكمي المرتفع لـCOVID-19 على مستوى العمر والجنس. وبالتالي، يوصى باتخاذ إجراءات وقائية عند الأفراد المسنين والحالات التي لا تظهر عليها أعراض، وذلك احتمالية كونهم حاملين لفيروس كورونا (COVID-19)، مما يعرض الفئات الاخرى للإصابة.

Abstract

The objectives of this study are to determine the epidemiological situation of virus infection through the period of pandemic and risk factors associated with COVID-19 infection in Al-Riyayna city of Libya. **Methods:** In this retrospective descriptive study were reviewed records of samples collected from November 2020 to October 2021, were analyzed to determine the risk factors Age groups, sex, and monthly weather associated with infection in the city of Al-Riyayna. Statistical analysis was performed using SPSS version 26 descriptive statistics, using chi-square analysis investigate the level of association among variables at the significance level of $P \leq 0.05$. **Results:** The current study reported (1430; 22.1%) positive at ($P \leq 0.05$), Females showed higher positivity rate compared to males (839; 58.7%, 591; 41.3%) respectively . of all positive COVID-19 cases, most infections occurred in the age groups (15-44 years) as compared to other age groups, the highest number was among age group 25-34 years (330; 23.1%). During study period was two waves of highest positivity rate of COVID-19 cases were recorded, the first wave occurred in November 2020 (250; 17.5%), then the rate begin to decrease until the February 2021 (62; 4.3%). The second wave was in March 2021, the rate of infection increase until April rate reached to 275 cases (19.2%). **Conclusion:** Based on our data, have demonstrated the significant effects and high cumulated prevalence of COVID-19 of age and gender. Consequently, it is recommended to take preventative in elderly individuals and asymptomatic cases lies in the fact that it may be a carrier of the COVID-19 virus, which exposes other groups to infection.

Keywords: Epidemiological situation, Corona virus, infection, Al-Rayina city, preventive measures.

INTRODUCTION:

In end December 2019, severe acute respiratory syndrome in Wuhan, in Hubei province in China, was a highly transmissible and pathogenic coronavirus, [1]. This viral pneumonia spread rapidly worldwide, in February 11, 2020, the disease received the name novel coronavirus disease 2019 (COVID-19) by the WHO Director-General, Dr. TedrosAdhanom, [2], and the International Committee on Taxonomy of Viruses named the novel coronavirus (Severe Acute Respiratory Syndrome CoronaVirus 2 (SARS-CoV-2)), The SARS-CoV-2 was a new betacoronavirus genus sarbecovirus sub-genus that belonged to the order Nidovirales, family Coronaviridae, subfamily Coronavirinae [3]. The incubation period is from two to fourteen days. The symptoms of COVID-19 include symptoms such as fever, dry cough, severe headaches, sore throat, rhinorrhea, dyspnea, diarrhea and fatigue. However, the disease can affect systems, including the gastrointestinal, respiratory, and nervous systems [4]. In severe cases, patients develop life- threatening complications, such as respiratory failure, (respiratory distress syndrome (ARDS)). It is estimated that >20% of patients infected with COVID-19 require hospitalization [5].

After the WHO declared that the SARS-CoV-2 outbreak in January 30, 2020, the more than 80, 000 confirmed cases had been reported worldwide as of 28 February 2020 [6]. In March 11, 2020, the WHO officially characterized the global COVID-19 outbreak as a pandemic. Libya is one of the most recent countries to be infected with the Coronavirus (COVID-19). The first positive case of Covid-19 in Libya was on March 24, 2020, who returned from Saudi Arabia [7]. After that, the number of positive cases began to increase in the southern region (Sabha), then the western and eastern regions of Libya.

The aim of the present study is to investigate the epidemiological situation of virus infection through the period of this pandemic and risk factors associated with COVID-19 infection in Al-Riyayna city of Libya.

MATERIALS AND METHODS

Sample Collection and study design

This study was designed to determine the percentage of positive cases of COVID-19 in Al-Riyayna city of Libya, during the period from November 2020 to October 2021. A total of 6471 nasopharyngeal swabs from suspected COVID-19 patients, travelers, people need disease free certificate for hospital admission and in recovered patients were collected in 3ml viral transport media for confirmation by RT-PCR test by send to Biotechnology Research Center in Tripoli, Libya.

Nucleic acid extraction and RT-PCR test

Using standard protocols for RNA extraction, a total of RNA was extracted from nasopharyngeal swabs samples and real-time PCR (RT-PCR) for COVID-19 were considered because this medical technique is widely used throughout the world, were done by Laboratories of Biotechnology Research Center in Tripoli, Libya. "Biotechnology Research Center (BTRC) is one of the major SARS COV-2 testing centers in Libya which analyzes 1500 samples daily received from different regions of Tripoli and western towns" [8].

Statistical Analysis

For statistical analysis, data was collected and analyzed by using SPSS, version 26. Descriptive analysis was used Chi-square test to detect the significance between sex, age group, temperature and period. Significant differences was considered if P-values ≤ 0.05.

RESULTS

A total of 6471 study samples from subjects were tested during the study period from November 2020 to October 2021. In Table (1), shows that, of 6471 respiratory samples, 1430 (22.1%) were positive, There was significant association between gender and infection with

COVID-19 ($P\leq 0.05$), females showed significantly higher positive 839 (58.7%) as compared to the positive rate 591 (41.3%) in males. And 5004 (77.3%) were negative for COVID-19. However, 37 (0.6%) samples were re-swabbed.

Table 1. Total number and percentage of positive, negative and re-swabed samples

Result	Male		Female		
	No.	%	No.	%	Total
Positive	591	41.3	839	58.7	1430
Negative	2417	48.3	2587	51.7	5004
Re-swabbed	20	54.1	17	45.9	37
Total	3028		3443		6471

There was an also significant difference among age groups at ($P\leq 0.05$). of all positive COVID-19 cases, most infections occurred in the age groups (15–44 years) as compared to other age groups, the highest number was among age group 25–34 years (330; 23.1%) which was higher in females (200; 60.6%) than in males (130; 39.4%) Table (2).

Table 2. Number and percentage of positive samples among females and males in different age groups

Age group	Male		Female		Total	
	No.	%	No.	%	No.	%
≤14	48	44	61	56	109	7.6
15–24	81	36.5	141	63.5	222	15.5
25–34	130	39.4	200	60.6	330	23.1
35–44	106	40.5	156	59.5	262	18.3
45–54	79	44.6	98	55.4	177	12.4
55–64	39	41.1	56	58.9	95	6.4
65–74	63	47.4	70	52.6	133	9.3
≥75	45	44.1	57	55.9	102	7.1
Total	591	41.3	839	58.7	1430	100

During this study period was two waves of highest positivity rate of COVID-19 cases were recorded, the first wave occurred in November 2020 (250; 17.5%), was higher in females (150; 60%) compared to males (100; 40%) then the rate begin to decrease until the February 2021 (62; 4.3%). The second wave of infection rate is much higher than the first wave. Was in March 2021, the rate of infection increase until April rate reached to 275 cases (19.2%) was higher in females (150; 52.7 %) than in males (130; 47.3 %). after that, the rate of infection decreased gradually. The positivity rate of infection was compared to the average of temperature of every month Table (3) and Fig. (1).

Table 3. Number and percentage of positive samples among females and males and temperature in the period from November 2020 to October 2021

| Months	Temp (˚C)	Male		Female		Total	
		No.	%	No.	%	No.	%
Nov 2020	22	100	40	150	60	250	17.5
Dec 2020	17	75	40.5	110	59.5	185	12.9
Jan 2021	15	48	37.8	79	62.2	127	8.9
Feb 2021	17	28	45.2	34	54.8	62	4.3
Mar 2021	20	100	39.8	146	60.2	251	17.6
Apr 2021	31	130	47.3	150	52.7	275	19.2
May 2021	35	50	40	75	60	125	8.7
Jun 2021	39	21	41.2	30	58.8	51	3.6
Jul 2021	40	10	29.4	24	70.6	34	2.4
Aug 2021	36	9	31	20	69	29	2
Sep 2021	33	11	47.8	12	52.2	23	1.6
Oct 2021	28	9	50	9	50	18	1.2
Total		591	41.3	839	58.7	1430	100
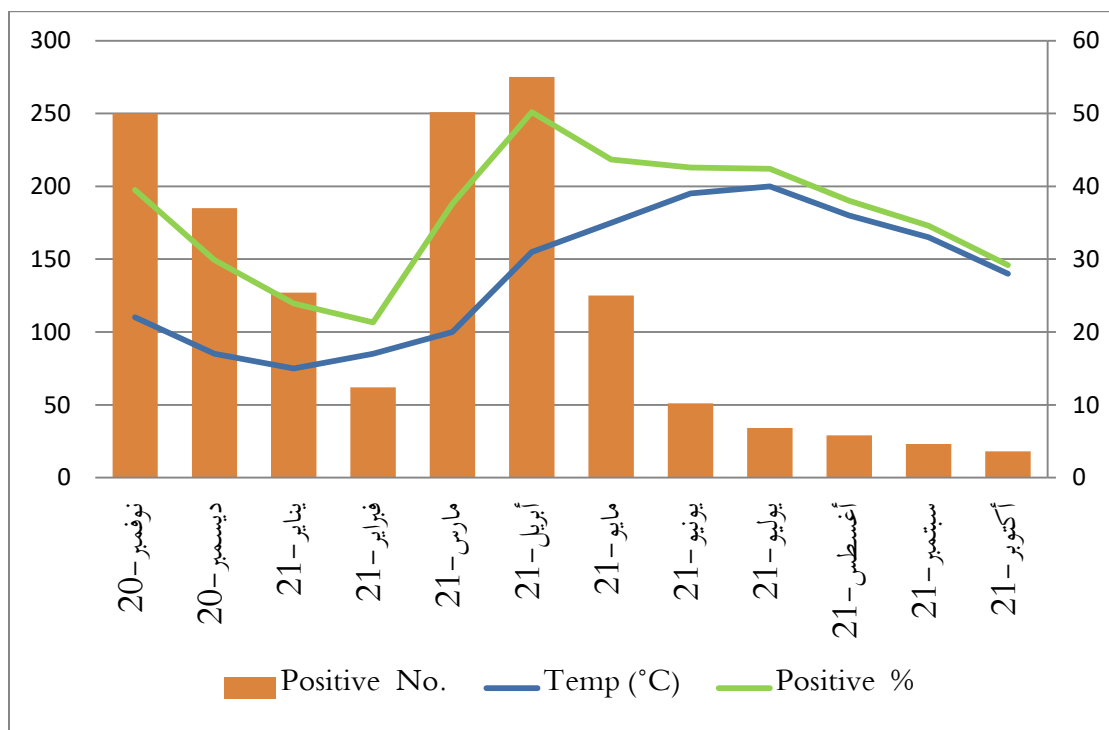
Fig. 1. Number and percentage of positive cases in different months and monthly temperature

DISCUSSION

In 2003 and 2012, human coronaviruses (coronaviruses and SARS, respectively) spread significantly worldwide, causing a burden on respiratory infections. It was believed that coronaviruses cause simple, specific infections of the respiratory system in humans [9–11]. In contrast, in the end 2019, the COVID-19 pandemic occurred on the contrary.

This study reported an epidemiological overview of the COVID-19 pandemic in Al-Riyayna city in Libya This study showed the significant difference between genders in the percentage of males and females infected with Covid-19. Females showed higher positive rate for COVID-19 (839; 58.7%) as compared to the positive rate (591; 41.3%) in males. This result is in agreement with study in Zintan City of Libya, by [12] reported that the infection rate was estimated to be (2100; 54%) in females and (1791; 46%) in males. On the other hand, our results are in contrast with previous studies' results reported by [13] to determine the prevalence of COVID-19 in Tarhouna city of Libya, was estimated to be 70.74% and 29.50% in males and females respectively. as well as that, other study in Libya, out of 3,695 confirmed cases of COVID-19 were estimated to be (2,515; 68.1%) in males and (1,180; 31.9%) in females with a male-to-female ratio of 2.1:1 [14]. Furthermore, a study was conducted some regions of Ghana, its results were higher infected in males (4897; 51.5%) compared to females (4619; 48.5%) [15]. Also, [16] reported that, out of a total 211 patients of COVID-19 in India,

were males more infected than females (57%, 43%) respectively. Physiological, biological, social, cultural and behavioral differences between the sexes are attributed to the variation in infection rates between males and females. Enzyme receptors are different between the sexes, which prevents the entry of the Covid-19 virus [17, 18].

In the current study, the results showed that, age group ≤14 years were less infected with COVID-19, compared to older age groups, and that consistent with many studies that have shown that [13, 14]. The risk of this age group lies in the fact that it may be a carrier of the COVID-19 virus, which exposes other groups to infection. Besides, our results indicate that among age groups, the highest positive rate was recorded in patients aged 25-34 years old (330; 23.1%) which was higher in females (200; 60.6%) than in males (130; 39.4%). This result is in agreement with study in Zintan City of Libya, by [12], the highest positive rate was in the age group of 25-34 years. Importantly, in this study, have shown that the elderly age group (>75 years) is less susceptible to infection with COVID-19 compared to the middle age groups. One of the reasons may be that young age groups are active and move to work and go out without adhering to safety protocols, as a consequently, leads to an increase in cases of COVID-19 infection. This is compatible with many studies conducted by [13-16, 19]. However, the older age groups are more at risk of serious infection, due to physiological changes, the incidence of some chronic diseases, and the weakness of the immune system as one age.

Based on our results, which showed the correlation between the COVID-19 infection rate and the average ambient temperature during the study period from November 2020 to October 2021, which were a higher infection rate at moderate temperatures and a lower infection rate at high and low temperatures Table (3) and fig. (1). As well as, results were reported by [20], which indicate that the prevalence of infection with COVID-19 is lower in areas with high temperatures in the Western Pacific region. Moreover, [21] who expected a decrease in infection rates during the summer when the temperature rises. Furthermore, [22] indicated that infection rates in warm and humid countries are constantly increasing. In summer, temperatures and UV rays increases, which likely reduce indirect transmission of COVID-19. In contrast, this does not mean that summer alone stops the spread of COVID-19 in any part of the world, without public health measures high temperatures cannot probably mitigate outbreaks.

CONCLUSION

This study is the first to provide information on the epidemiological characterization of the COVID-19 pandemic in Al-Riyayna city of Libya. Based on our data, have demonstrated the significant effects and high cumulated prevalence of COVID-19 of age and gender.

Consequently, it is recommended to take preventative in elderly individuals and asymptomatic cases lies in the fact that it may be a carrier of the COVID-19 virus, which exposes other groups to infection.

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