



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Diabetes & Metabolic Syndrome: Clinical Research & Reviews

journal homepage: www.elsevier.com/locate/dsx

Original Article

The impact of COVID-19 pandemic on the care of patients with kidney diseases in Duhok City, Kurdistan Region of Iraq

Nawfal R. Hussein^a, Zana Sidiq M. Saleem^b, Nashwan Ibrahim^c, Dildar H. Musa^c, Ibrahim A. Naqid^{a,*}^a Department of Biomedical Sciences, College of Medicine, University of Zakho, Kurdistan Region of Iraq, Iraq^b Department of Medicine, College of Medicine, University of Duhok, Kurdistan Region of Iraq, Iraq^c Department of Surgery, College of Medicine, University of Duhok, Kurdistan Region of Iraq, Iraq

ARTICLE INFO

Article history:

Received 22 July 2020

Received in revised form

8 August 2020

Accepted 13 August 2020

Keywords:

COVID-19

Care of patients

Kidney diseases

Duhok

Kurdistan region

Iraq

ABSTRACT

Background and aims: The coronavirus disease-2019 (COVID-19) pandemic impacted healthcare services for kidney disease patients. Lockdown and social distancing were mandated in Kurdistan, Iraq to combat the transmission of the infection. The report analyzed the impact of the COVID-19 pandemic on kidney disease patient care in Duhok City, Kurdistan Region of Iraq.

Methods: This study took place in the Duhok Kidney Disease and Transplant Center and compared data from February–April 2019 and 2020.

Results: The average number of patients visiting the consultation unit per week was reduced from 68.67 ± 13.6 , to 33.42 ± 29.36 ($P = 0.001$) during the pandemic. In the dialysis unit, weekly hemodialysis sessions were reduced from 341.5 to 306.42 sessions ($P = 0.002$). The number of patients visiting the kidney transplant consultation unit was significantly reduced (135.7 ± 37.7 versus 102.5 ± 26.3 ; $P = 0.005$). The number of kidney transplant operations per week was reduced from 1.167 to 0.5 ($P = 0.025$).

Conclusions: The COVID-19 pandemic interrupted healthcare services and may continue to impart long-term negative consequences for kidney disease patients.

© 2020 Diabetes India. Published by Elsevier Ltd. All rights reserved.

1. Introduction

Coronavirus disease- 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. The first case was diagnosed in Wuhan, China on December 2019 [1]. Moreover, its rapid spread across the globe led to its declaration as a pandemic by the World Health Organization on the March 11, 2020. Currently recorded as the largest outbreak in the 21st century, this pandemic may yield more serious health consequences. It is important to understand that the impact of this pandemic is not only confined to the morbidity and mortality directly caused by the infection. A study from China showed that the overall mortality rate of COVID-19 reached 2.3%. In the same study, it was also shown that the main risk factors for death were cardiovascular diseases (10.5% mortality), diabetes mellitus (7.3% mortality), chronic obstructive pulmonary diseases (6.3%

mortality), hypertension (6% mortality), and cancers (5.6% mortality) [2]. In Italy, the mortality of COVID-19 was around 10% and was associated with chronic kidney disease patients and those undergoing renal replacement therapy with hemodialysis [3]. Subjects with preexisting kidney diseases possess a high risk of acute renal injury fever, poor oral intake, diarrhea, and non-steroidal anti-inflammatory drug use for the treatment of fever and myalgias during the infection [3]. Indirectly, the COVID-19 pandemic affected patients with preexisting kidney diseases by causing a shortage in healthcare providers, risk of transmission, and loss of access to healthcare facilities due to the lockdown [1]. The report aimed to analyze the impact of the COVID-19 pandemic and reflect on the issues encountered when delivering medical services to kidney disease patients during the initial phase of the pandemic in Duhok City, Kurdistan region of Iraq.

* Corresponding author.

E-mail address: ibrahim.naqid@uoz.edu.krd (I.A. Naqid).

2. Material and methods

2.1. Study setting

This study was performed at the Duhok Renal Disease and Organ Transplant Center in Duhok City, Kurdistan Region of Iraq. The center is composed of the Nephrology and the kidney transplant (KT) departments. The Department of Nephrology is further subdivided into four units: consultation, emergency, infectious disease, and hemodialysis (HD). On the other hand, the KT Department is subdivided into the operation and consultation units. As a referral center, both departments provide care to 745 patients who underwent transplantation and received hemodialysis. The average ages for KT patients and those undergoing HD were 36 ± 12.6 and 48.3 ± 11.4 years, respectively.

On the other hand, the infectious disease units are responsible for treating difficult infections, screening for blood-borne viruses, and vaccination. Vaccination services include hepatitis B, influenza, pneumococcal, and meningococcal vaccines.

2.2. Statistics

This study compared the data from February to April of the years 2019 and 2020. The data was expressed in average numbers per week \pm STD. Student T test was used to compare the means and a P value of 0.05 was considered significant. Data computing was performed using Minitab 17 software.

2.3. Ethics

This study was approved by the Ethics and Scientific Committee of the College of Medicine, University of Zakho, Kurdistan Region of Iraq.

3. Results

3.1. Nephrology department

The average number of patients visiting the consultation unit per week was 68.67 ± 13.6 , which was significantly higher than the number of patients visiting the unit during the pandemic (33.42 ± 29.36 ; $P = 0.001$). Additionally, the number of patients admitted to the hospital was reduced from 32.67 ± 5.3 in 2019 to 18.08 ± 4.29 during the pandemic ($P = 0.00001$). In the infectious disease unit, a decrease in the number of patients attending the virology screening and vaccination program (Table 1) was noted. In the emergency unit, the number of performed catheter insertions remained almost unchanged ($P = 0.2$). No significant changes were

Table 1
The impact of pandemic on services of the Department of Nephrology.

| | 2019 | | 2020 | | P value |
|-------------------------|-------|-------|--------|-------|---------|
| | Mean | SD | Mean | SD | |
| Nephrology consultation | 68.67 | 13.6 | 33.42 | 29.63 | 0.001 |
| Nephrology Admission | 32.67 | 5.3 | 18.08 | 4.29 | 0.0001 |
| Catheter Insertion | 14 | 5.36 | 11.5 | 2.91 | 0.2 |
| Renal Biopsy | 4.417 | 1.832 | 1 | 1.414 | 0.0001 |
| Virology Screening | 40.33 | 7.19 | 11.92 | 15.82 | 0.0001 |
| Vaccination | 20.42 | 10.31 | 6.83 | 7.69 | 0.009 |
| Death in CKD | 0.917 | 0.793 | 1.25 | 0.866 | 0.36 |
| New cases CKI | 2.167 | 1.03 | 1.75 | 0.866 | 0.29 |
| New cases HD | 1.667 | 0.778 | 1.167 | 1.03 | 0.21 |
| Dialysis sessions | 341.5 | 17.63 | 306.42 | 18.76 | 0.002 |

CKD: chronic kidney disease; CKI: chronic kidney insufficiency; HD: hemodialysis; SD standard deviation.

Table 2

The impact of pandemic on services of kidney transplant department.

| | 2019 | | 2020 | | P value |
|-----------------|-------|-------|-------|-------|---------|
| | Mean | SD | Mean | SD | |
| KT consultation | 135.7 | 37.7 | 102.5 | 26.3 | 0.005 |
| KT Admission | 9 | 2.335 | 3.417 | 3.147 | 0.001 |
| KT | 1.167 | 0.577 | 0.5 | 0.674 | 0.025 |
| Death in KT | 0 | 0 | 0.25 | 0.452 | 0.1 |

KT: kidney transplant; SD standard deviation.

seen in the number of new patients with chronic kidney insufficiency (CKI) as well as patients undergoing hemodialysis (HD). Furthermore, no significant changes were seen in the number of deaths per week (Table 1). In the dialysis unit, the number of dialysis sessions per week was reduced from 341.5 to 306.42 sessions per week ($P = 0.002$) (see Table 2).

3.2. Kidney transplant department

A significant reduction in the number of patients attending the KT consultation unit (135.7 ± 37.7 versus 102.5 ± 26.3 ; $P = 0.005$) was noted. The number of KT operations was reduced from 1.167 to 0.5 operations per week ($P = 0.025$) Table 2

4. Discussion

The COVID-19 outbreak began in China on December 2019 and spread to countries all over the world. The infection was widespread and became intense in Iraq, which had been recovering from years of sectarian conflicts and political instability. The country's health system was chronically under-funded, under-resourced, over-burdened, and ill prepared for the COVID-19 pandemic. In February 2020, the first few COVID-19 cases were diagnosed in Iraq. As a response, the local government in Duhok City took extraordinary actions to slow down the spread of the infection and decrease the fatality rate. These measures included closing boarders and airports, cancellation of mass gatherings and non-emergency services in hospitals, and a community-wide lockdown [4,5]. Additionally, local authorities diverted the city's limited staff and resources to cater to COVID-19 patients [6,7]. Majority of our patients had coexisting diseases such as hypertension and diabetes. Therefore, such patients were at high risk for COVID-19 infection and its complications. The restriction of movement and infection control measures in the center were generally successful in preventing COVID-19 infection in our patients. Only a limited number of COVID-19 patients were diagnosed in the city [4]. However, the lockdown and diversion of staff and resources brought about issues. In our study, there was a significant reduction in the number of patients attending the consultation units of the nephrology and KT departments. This may be a result of the community-wide lockdown or the fear of getting infected with the virus. Additionally, a significant decrease in the number of HD sessions was noted. This was due to the reduced number of staff in the dialysis unit. This is consistent with a study conducted in India where the number of patients attending their HD sessions [8] was significantly reduced. Additionally, the already crowded schedule caused by internally displaced people in the city [9] hindered the allocation of a machine specifically for COVID-19 patients. Such reduction in services will have a long-term impact on our patients. On the other hand, emergency services were not affected and the number of catheter insertions did not change. The death rates increased in both departments, although statistical significance was not achieved. The death rates might increase in the future due to

long-term complications, rather than acute complications. It is worth mentioning that a KT candidate died due to failure to solve preoperative administrative issues because of the lockdown. To avoid issues such as this, it is important to issue new working patterns and responsibilities to cope with the demands of patients with kidney diseases.

In a study investigating the prevalence of the hepatitis B (HBV) and C virus (HCV) in patients undergoing regular HD in the city, 3.49% and 2.1% of the patients tested positive for HBV and HCV, respectively [10]. Additionally, our center suffered from two outbreaks of HCV infection in the recent years [9,11]. In our study, we found a significant reduction in the number patients undergoing blood-borne virus screenings, which may lead to another outbreak in the center. This is due to the limited number of staff, which caused laboratories to be open for only 2 days of the week.

To conclude, the lack of preparedness before the pandemic resulted in an interruption in healthcare services and negatively affected patients with kidney disease. In addition, this pandemic will continue to negatively affect patients with kidney diseases in the long-term.

Financial disclosure

The author(s) received no specific funding for this work.

Declaration of competing interest

The authors have declared that no competing interests exist.

References

- [1] Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese center for disease control and prevention. *J Am Med Assoc* 2020;323(13):1239–42.
- [2] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395(10223):497–506.
- [3] Grasselli G, Pesenti A, Cecconi M. Critical care utilization for the COVID-19 outbreak in lombardy, Italy: early experience and forecast during an emergency response. *J Am Med Assoc* 2020;323(16):1545–6.
- [4] Hussein NR. Possible factors associated with low case fatality rate of COVID-19 in Kurdistan region, Iraq. *J Kerman Univ Med Sci* 2020;24(1):e103393.
- [5] Hussein NR, Naqid IA, Saleem ZSM, Musa DH, Ibrahim N. The impact of breaching lockdown on the spread of COVID-19 in Kurdistan region, Iraq. *Avicenna J Clin Microbiol Infect* 2020;7(1):34–5. 2020/2/1.
- [6] Hussein N. The impact of COVID-19 pandemic on the elimination of viral hepatitis in Duhok city, Kurdistan region of Iraq. *Hepat Mon* 2020;20(5):e104643.
- [7] Hussein NR, Naqid IA, Saleem ZSM, Almizori LA, Musa DH, Ibrahim N. A sharp increase in the number of COVID-19 cases and case fatality rates after lifting the lockdown in Kurdistan region of Iraq. *Ann Med Surg (Lond)* 2020;57:140–2.
- [8] Naicker S, Yang C-W, Hwang S-J, Liu B-C, Chen J-H, Jha V. The Novel Coronavirus 2019 epidemic and kidneys. *Kidney Int* 2020;97(5):824–8.
- [9] Hussein NR, Saleem ZSM. An Outbreak of hepatitis C virus at a renal dialysis unit: a lesson from a war zone. *Int J Infect* 2016;4:e39763.
- [10] Saleem ZSM, Naqid IA, Hussein NR, et al. The prevalence of hepatitis B and C virus in patients with end-stage kidney disease on regular hemodialysis in Duhok, Iraq: a brief report. *Avicenna J Clin Microbiol Infect* 2020;7(1):31–3.
- [11] Hussein NR, Saleema ZS, Abd QH. Direct acting antiviral treatment for patients with end-stage kidney disease with acute HCV infection. *Mediterranean J Hematol Infect Dis* 2019;11(1).