

Editorial

Impact of COVID-19 pandemic in Spanish Nephrology Services Servicesservices impact of the pandemic on COVID-19 Spanish Nephrology Services[☆]

Impacto de la pandemia COVID-19 en los Servicios de Nefrología Españoles

María José Soler^{a,b,*}, Manuel Macia Heras^c, Alberto Ortiz^{a,d},
María Dolores del Pino y Pino^e, Mercedes Salgueira Lazo^f

^a Servicio de Nefrología, Hospital Universitari Vall d'Hebron, Universitat Autònoma de Barcelona, Nephrology Research Group, Vall d'Hebron Research Institute (VHIR), Barcelona, Spain

^b Red de Investigación Renal (REDINREN), Instituto Carlos III-FEDER, Spain

^c Servicio de Nefrología, Hospital Universitario Nuestra Señora de Candelaria, Santa Cruz de Tenerife, Spain

^d Servicio de Nefrología, IIS-Fundación Jiménez Díaz, Department of Medicine, School of Medicine, Universidad Autónoma de Madrid, Madrid, Spain

^e Servicio de Nefrología, Hospital Universitario Torrecárdenas, Almería, Spain

^f Servicio de Nefrología, Hospital Universitario Virgen Macarena, Sevilla, Spain

ARTICLE INFO

Article history:

Received 9 July 2020

Accepted 13 August 2020

Keywords:

Basic research

Clinical nephrology

Chronic kidney disease

Diabetes

ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, has required a rapid and drastic transformation of hospitals, and consequently also of Spanish Nephrology Units, to respond to the critical situation. The Spanish Society of Nephrology conducted a survey directed to the Heads of Nephrology Departments in Spain that addressed the reorganisation of Nephrology departments and activity during the peak of COVID-19 pandemic. The survey focused on the integration of nephrologists in COVID-19 teams, nephrology inpatient care activities (elective admissions, kidney biopsies), the performance of elective surgeries such as vascular accesses or implantation of peritoneal catheters, the suspension of kidney transplantation programmes and the transformation of nephrology outpatient clinics. This work details the adaptation and transformation of nephrology services during the COVID-19 pandemic in Spain. During this period, elective admissions to Nephrology Services, elective surgeries and biopsies were suspended, and the kidney transplant programme was scaled back by more than 75%. It is worth noting that outpatient nephrology consultations were carried out largely by telephone. In conclusion, the pandemic has clearly impacted clinical activity in Spanish Nephrology departments, reducing elective activity and kidney

DOI of original article:

<http://dx.doi.org/10.1016/j.nefro.2020.08.002>.

[☆] Please cite this article as: Soler MJ, Heras MM, Ortiz A, del Pino y Pino MD, Lazo MS. Impacto de la pandemia COVID-19 en los Servicios de Nefrología Españoles. *Nefrología*. 2020;40:579–584.

* Corresponding author.

E-mail address: mjsoler01@gmail.com (M.J. Soler).

<https://doi.org/10.1016/j.nefro.2020.12.004>

2013-2514/© 2020 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

transplants, and modifying activity in outpatient clinics. A restructuring and implementation plan in Nephrology focused on telemedicine and/or virtual medicine would seem to be both necessary and very useful in the near future.

© 2020 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Palabras clave:

Investigación básica
Nefrología clínica
Enfermedad renal crónica
Diabetes

R E S U M E N

La pandemia de la infección por el coronavirus tipo 2 del síndrome respiratorio agudo grave o SARS-CoV-2 causante de la enfermedad por coronavirus de 2019 (COVID-19) ha precisado de una transformación drástica de los hospitales y por consiguiente de los servicios de Nefrología de España. Desde la Sociedad Española de Nefrología se ha realizado una encuesta a los Jefes de Servicios de Nefrología de España abordando la reorganización de los servicios de Nefrología y actividad en la época de mayor afectación por COVID-19. Hemos preguntado por la integración de los nefrólogos en equipos COVID-19, la actividad asistencial de hospitalización de Nefrología (ingresos programados, biopsias renales), la realización de cirugías programadas como los accesos vasculares o implantación de catéteres peritoneales, la suspensión o no del programa de trasplante renal y la transformación de las consultas externas de nefrología. En el trabajo actual se detalla la adaptación y transformación de los servicios de nefrología en la pandemia COVID-19 en España. Durante dicho periodo se han suspendido los ingresos programados en los Servicios de Nefrología, la realización de cirugías/biopsias programadas y ha disminuido en más de un 75% el programa de trasplante renal. Es de interés mencionar que las consultas externas de nefrología se han realizado mayoritariamente telefónicamente. En conclusión, la pandemia ha impactado claramente en la actividad clínica en los servicios de Nefrología españoles disminuyendo la actividad programada y los trasplantes renales y modificando la actividad en consultas externas. Un plan de transformación asistencial e implementación de telemedicina en Nefrología parece necesario y de gran utilidad en un futuro próximo.

© 2020 Sociedad Española de Nefrología. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The pandemic of the severe acute respiratory syndrome coronavirus infection type 2 or SARS-CoV-2, which causes the coronavirus pandemic of 2019 (COVID-19), has changed our lives drastically and has transformed hospital care activity, mainly in the most affected areas at the peak time of the pandemic starting in Madrid on March 11 and a week later in other areas of Spain. Among the hospital transformations stand out, the cessation of programmed interventions, including arteriovenous fistulas for hemodialysis, the cessation of the kidney transplant program and the restructuring of hospitals.

COVID-19 is discovered in late 2019 in Wuhan, China. On March 11, 2020, the World Health Organization (WHO) declared a state of pandemic due to SARS-CoV-2.¹ The first case in Spain was confirmed on January 31 in La Gomera, Canary Islands. Until mid-May, Spain became the third country in the world in number of cases and the first in deaths per million inhabitants, and recently surpassed after the increase in infection in North America, South America, Russia and the United Kingdom, moving to occupy the seventh in number of infections in June 24, 2020.² Hospitals in Spain underwent an unprecedented transformation, especially in the most affected autonomous communities, increasing the number of hospital beds (mainly

intensive care), creating field hospitals in fairgrounds and sports centers, transforming hotels into centers for patients with less severe clinical disease and health professionals from other areas.³

Nephrology services had to change and modify their activity. Part of the physicians and house staff of the Nephrology services began to join the new COVID-19 care teams, and another part of the doctors focused on the organization and supervision of COVID-19 patients on hemodialysis, transplants and acute kidney failure. Given the complete transformation in many centers during an average period of 2 months, part of the healthcare activity was deactivated, including kidney transplantation, performance of arteriovenous fistulas (AVF), and others. The outpatients visits were transformed into telephone inquiries, completing the adaptation of the services. In the present work, led by the Spanish Society of Nephrology, we conducted a survey of the heads of the Nephrology service in Spain in order to know and estimate the magnitude of the changes that occurred in our Nephrology Services during the COVID-19 pandemic, based on mainly in three main aspects activities: 1) organization and transformation of nephrologists to integrate into COVID-19 care teams; 2) activities specific to the nephrology specialty that were ceased, and 3) activities that were carried out by telephone vs. virtually by our specialty.

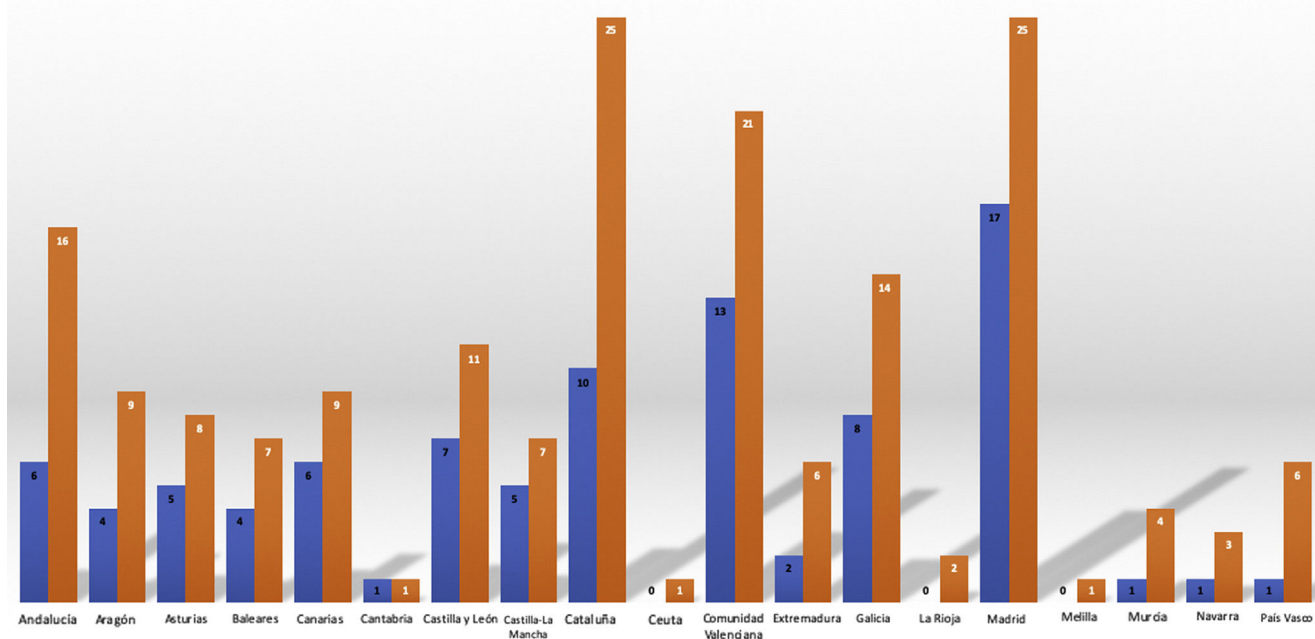


Fig. 1 – Participation of the Nephrology services in Spain separated according to the autonomous community. The participation percentages according to the autonomous community in the survey of the impact of the COVID 19 pandemic on the care of kidney patients are shown. The orange bars indicate the number of Nephrology services in each community and the blue bars the number of services that participated in the survey.

Material and methods

A survey was sent to the Heads of the Nephrology service in Spain. There were a total of 176 hospitals, and the answers were received between May 11 and May 29, 2020. The survey asked relevant data on the organization of the nephrology service and the care for kidney patients during the COVID-19 pandemic.

The questions regarding the integration of nephrologists to COVID-19 teams were: Have members of your service become part of COVID-19 Teams? What percentage of the Nephrology service?. In relation to the care activity of the Nephrology services: a) Hospitalization: Have the anticipated and therefore programmed admissions in Nephrology been suspended (not COVID-19)? Has kidney biopsies been discontinued? b) Dialysis (hemodialysis / peritoneal dialysis) and advanced chronic kidney disease (ACKD): Has the implantation of permanent catheters for hemodialysis been suspended? Has implantation of peritoneal catheters been discontinued? Has the AVF / vascular prosthesis program been suspended? Has the follow-up of ACKD patients been suspended? Has the follow-up of patients on peritoneal dialysis been suspended? c) Kidney transplant: Has the kidney transplant program been suspended? Has the follow-up of transplant patients been suspended? d) Outpatient consultations (CCEE): Has the care in CCEE of Nephrology been suspended? Has the outpatient activity been carried out by phone calls? Have outpatient follow-up tests been withdrawn?

Results

Participation in the survey

The participation in the survey was 91/176 Nephrology services throughout Spain, which corresponds to 51.7%. Thus, more than half of the Nephrology services participated in the survey in relation with regarding the impact of the COVID-19 pandemic on the care of kidney patients. The Fig. 1 shows the percentage of participation according to the number of Nephrology services in the autonomous community. La Rioja, Melilla and Ceuta were not represented.

Of the centers that participated, 27 (30%) were non-transplant centers and the rest had a kidney transplant program.

Integration of nephrologists in newly created COVID-19 teams

The survey shows that more than half of the Nephrology services required the integration of members of their service in the newly created COVID-19 teams (Fig. 2). Some services comment that this incorporation was primarily in the emergency Room and others, by house-staff in training. In those services that were incorporated into COVID-19 team, there were more than 25% as indicated in the bar figure. It is important to mention that a couple of services explicitly comment on their preparation to join these teams and finally it

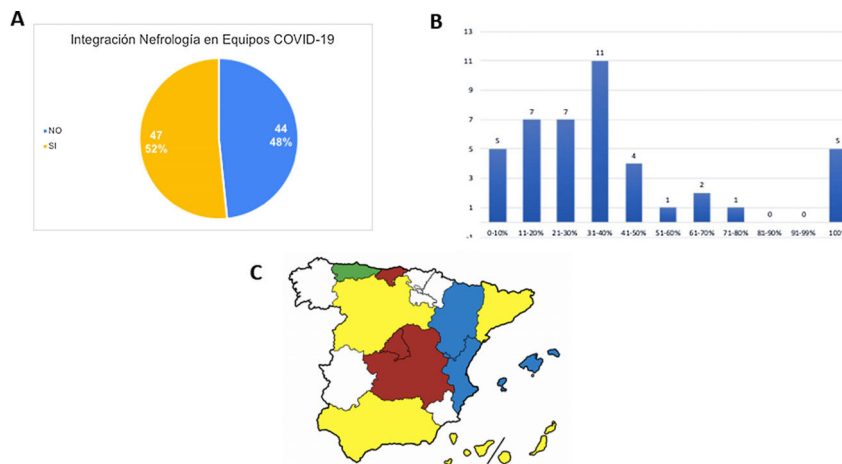


Fig. 2 – Integration of part of the Nephrology service in the new COVID-19 care teams. A) Integration of services in percentage yes or no. B) Integration of services in percentage (%) of nephrologists integrated in the COVID-19 team; vertical axis (number of Nephrology services), horizontal axis (percentage of integration in COVID-19 equipment). C) Integration according to autonomous community: red > 75% (of services); yellow 50-75%; blue 25-49%; green < 25%; white 0% or unknown.

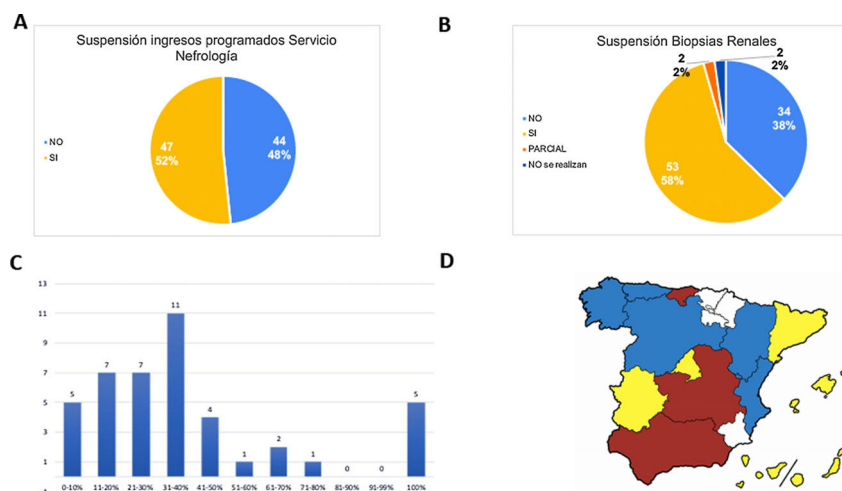


Fig. 3 – Scheduled admissions and kidney biopsies during the COVID-19 pandemic. A) Suspension of scheduled admissions to the Nephrology service. B) Suspension of kidney biopsies in the Nephrology service. C) The horizontal axis of the bar chart shows the percentage (%) of suspended biopsies and the vertical axis the number of nephrology services. D) Suspension of kidney biopsies according to autonomous community: red > 75% (of services); yellow 50-75%; blue 25-49%; green < 25%; white 0% or unknown.

was not necessary, indicating the clear accessibility of the Nephrology teams and the awareness of the need to help our society.

Hospitalization in nephrology. Kidney biopsies

During the COVID-19 pandemic, more than half of the services - 51.6% of them - suspended scheduled admissions to the Nephrology service (Fig. 3 A). Furthermore, 58% of the services suspended scheduled biopsies, only urgent kidney biopsies were performed. In 27 (30%) services all renal biopsies were suspended. Renal biopsy was not performed in two nephrology departments (Fig. 3).

Dialysis (hemodialysis / peritoneal dialysis) and advanced chronic kidney disease

The pre-scheduled placement of AVF / vascular prostheses in the operating room was suspended in 70 nephrology centers, representing 77%. This value could be that high due to the suspension of most of the programmed admissions and, therefore, of the elective surgery. However, the surgeries and emergency visits of the AVF were maintained in some of the centers. The implantation of permanent catheters for hemodialysis was suspended in only 21% of centers, this suggests that permanent catheters was chosen as vascular access in some patients who required the initiation of dialysis during the COVID-19 pandemic.

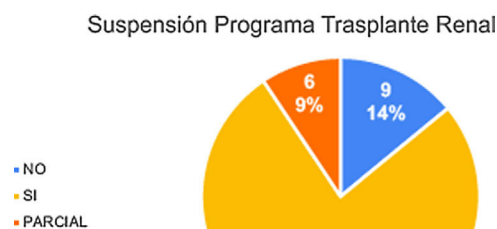


Fig. 4 – Suspension of the kidney transplant program.

Regarding the implantation of peritoneal catheters, 7 of the centers did not perform peritoneal dialysis; In the 84 centers that performed peritoneal dialysis, in 48 (57%) the implantation of catheters was suspended. In one center, two catheters could not be placed and in another center they did not need implantation of any during the period of the COVID-19 pandemic. The follow-up of patients on a peritoneal dialysis program was continued in 90% of the centers.

Follow-up of patients in ACKD units was suspended in 15.4% of nephrology services.

Kidney transplant program

Of the 64 centers with a kidney transplant program, in 49 centers (76.6%) the kidney transplant program was suspended, the activity was reduced in 6 centers (9.4%) and it was not suspended in 9 centers (14%). Limitation of activity is understood as exceptional activity such as emergency, children, optimal young donors and the PATHI (hyperimmunized) program (Fig. 4). Follow-up of kidney transplant patients has been maintained in 87.9% of patients.

Nephrology outpatient consultations

The activity of presential care in outpatient Nephrology consultations was suspended in 47% of the services, carrying out activity through telephone calls in 98.9%, that is, in the majority of hospitals (Fig. 5). In 16.5% of the centers, telemedicine was the only form of external clinical visits. In 57% of the centers, outpatient follow-up tests were stopped during the pandemic.

Discussion

Between March and May 2020 the COVID-19 pandemic forced a drastic change in the hospital organization, mainly in the areas most affected.^{4,5} This change affected all services and specialties, both medical and surgical, including Nephrology services. In this manuscript we present the results of the survey in more than half of the heads of the Nephrology services in relation to the impact of the COVID-19 pandemic on the Nephrology services in Spain.

More than half of the services participating in the survey were integrated, at least partially, in the COVID-19 care teams, and they were totally involved in 5 services. The

non-integrated part of the service has cared for non-COVID-19 patients or has performed tasks on patients who have required renal replacement therapy, both patients on a chronic hemodialysis program and patients with acute renal failure secondary to COVID-19.^{6,7} The survey data suggests that availability and teamwork have been key in many of the hospitals with a high burden of patients with COVID-19 infection.

Survey results also show that activity for scheduled admissions, scheduled (non-urgent) kidney biopsies, and scheduled interventions dropped significantly in the COVID-19 pandemic. The performance of AVF / vascular prostheses was discontinued by more than 75%, so in the near future the need for the placement of a greater number of both permanent and temporary catheters is expected to perform renal replacement therapy. Given this possibility and the risk of new pandemics, the referral of these surgeries to other outpatient centers should be considered, which could avoid delays in interventions and possible infections of patients who go to hospitals in times of pandemic.

The kidney transplant program was suspended in more than 75% of the centers, limiting the activity to exceptional cases, emergencies, children, optimal young donors and the PATHI (hyperimmunized) program. However, it is of interest to mention that in kidney transplant patients, follow-up has been maintained in almost 90% of the centers, although at the height of the pandemic it was mostly carried out by telephone follow-up.

In order to avoid travelling of patients with kidney disease from their homes to hospitals, most of the outpatient consultations were by telephone (more than 98%). However, in more than half of the centers that participated in the survey, it was not possible to carry out the tests on an outpatient basis, indicating the need to avoid patient travel and. In the future, it would be advisable an alternative plan to able to carry out such complementary tests when necessary. It is surprising that in the 21st century it took a pandemic to become aware that telemedicine and virtual visits are possible, both in the framework of Nephrology and in other specialties. However, we have turned and relied more on phone calls than on telemedicine itself. The ability to adapt to telework and telemedicine in Nephrology opens a way to organize in a future virtual medicine in Nephrology, with cameras, webcam, apps and programs that facilitate a medical visit adapted to our patients with kidney disease.⁸⁻¹⁰ The COVID-19 pandemic is probably the beginning of a paradigm shift in this regard. For many frail patients and their families, the trip to the hospital requires considerable effort and shows their clear preference for telemedicine even after the pandemic.

In conclusion, as the survey carried out shows, the global pandemic due to COVID-19 has had a great impact on the Nephrology services of Spain both at the level of hospitalization and the activity of outpatient consultations, the kidney transplant program and care of patients in the hemodialysis program. The results presented suggest that a transformation and adaptation plan based on the optimization of resources, the implementation of telemedicine and the reorganization of our healthcare activity is necessary.

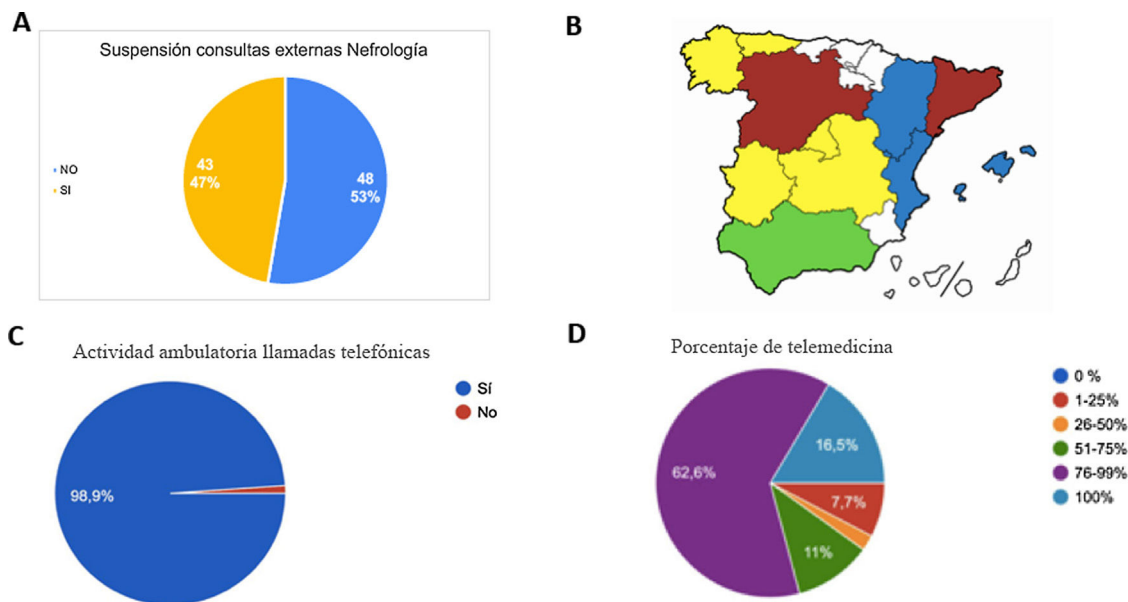


Fig. 5 – Outpatient clinical visits in Nephrology services in the COVID-19 pandemic. A) Suspension of consultations. B) Suspension of external consultations according to autonomous community: red > 75% (of the services); yellow 50-75%; blue 25-49%; green < 25; white 0% or unknown. C) Performing out telephone inquiries. D) Carrying out telemedicine.

In a health system like ours, where ensuring accessibility and equity in health care should be a priority, and with a fragile population like the one we serve, it is necessary to learn from what has been experienced and for Nephrology Units to work on developing both contingency plans and action plans in crisis situations that guarantee the continuity of the necessary care in the population we serve.

Thanks

Thanks to Sandra Gómez for the logistical support at work.

REFERENCES

- Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet*. 2020;395:1054–62.
- Nuevo coronavirus 2019 [Internet]. Available from: <https://www.who.int/es/emergencias/diseases/novel-coronavirus-2019> [cited 2020 Jul 6].
- Herranz-Alonso A, Rodríguez-González CG, Sarobe-González C, Álvarez-Díaz A, Sanjurjo-Sáez M. Pharmacy Department management and organization. *Farmacia hospitalaria : organo oficial de expresion científica de la Sociedad Espanola de Farmacia Hospitalaria* [Internet]. 2020;44:5–10. Available from: <https://pubmed.ncbi.nlm.nih.gov/32533661/> [cited 2020 Jul 6].
- Sánchez-Álvarez JE, Pérez Fontán M, Jiménez Martín C, Blasco Pelicano M, Cabezas Reina CJ, Sevillano Prieto ÁM, et al. Situación de la infección por SARS-CoV-2 en pacientes en tratamiento renal sustitutivo. Informe del Registro COVID-19 de la Sociedad Española de Nefrología (SEN). *Nefrología* [Internet]. 2020;40. Available from: <https://pubmed.ncbi.nlm.nih.gov/32389518/> [cited 2020 Jul 6].
- Albalade M, Arribas P, Torres E, Cintra M, Alcázar R, Puerta M, et al. Alta prevalencia de COVID-19 asintomático en hemodiálisis. Aprendiendo día a día el primer mes de pandemia de COVID-19. *Nefrología* [Internet]. 2020;40. Available from: <https://pubmed.ncbi.nlm.nih.gov/32456944/> [cited 2020 Jul 6].
- Goicoechea M, Sánchez Cámara LA, Macías N, Muñoz de Morales A, González Rojas Á, Bascañana A, et al. COVID-19: Clinical course and outcomes of 36 maintenance hemodialysis patients from a single center in Spain. *Kidney International* [Internet]. 2020;0. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0085253820305093> [cited 2020 May 19].
- Batlle D, Soler MJ, Sparks MA, Hiremath S, South AM, Welling PA, et al. Acute Kidney Injury in COVID-19: Emerging Evidence of a Distinct Pathophysiology. *Journal of the American Society of Nephrology : JASN* [Internet]. 2020;31. Available from: <https://pubmed.ncbi.nlm.nih.gov/32366514/> [cited 2020 Jul 6].
- Singh K, Diamantidis CJ, Ramani S, Bhavsar NA, Mara P, Warner J, et al. Patients' and nephrologists' evaluation of patient-facing smartphone apps for CKD. *Clinical Journal of the American Society of Nephrology* [Internet]. 2019;14:523–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/30898873/> [cited 2020 Jul 6].
- Oliva-Damaso N, Oliva-Damaso E, Rodríguez-Perez JC, Payan J. Improved nephrology referral of chronic kidney disease patients: potential role of smartphone apps. *Clin Kidney J*. 2019;12(6):767–70.
- Oliva-Damaso N, Oliva-Damaso E, Rivas-Ruiz F, et al. Impact of a phone app on nephrology referral. *Clin Kidney J*. 2018;12(3):427–32.