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Barriers to Post-Kidney Transplant Treatment during the COVID-19 Pandemic and Associated Conditions

Barreiras no tratamento pós-transplante renal durante a pandemia da COVID19 e condições associadas

Jéssica de Oliveira Teutschbein[1], Kelli Borges dos Santos[2], Helady Sanders-Pinheiro[3], Aline Rios Freitas de Almeira[4], Priscilla Aparecida Batista de Aquino Noé[5], Elisa Oliveira Marsicano de Souza[6]

[1] Master's Student at the Nursing School of the Federal University of Juiz de Fora – UFJF, Juiz de Fora (MG), Brazil. [2] Professor at the Nursing School of the Federal University of Juiz de Fora – UFJF, Juiz de Fora (MG), Brazil. [3] Professor at the Medicine School of the Federal University of Juiz de Fora – UFJF, Juiz de Fora (MG), Brazil. [4] Nurse at the University Hospital of the Federal University of Juiz de Fora – UFJF, Juiz de Fora (MG), Brazil. [5] Psychologist at the University Hospital of the Federal University of Juiz de Fora – UFJF, Juiz de Fora (MG), Brazil. [6] Professor at the Nursing School of the Federal University of Juiz de Fora – UFJF, Juiz de Fora (MG), Brazil.

Corresponding author: Jéssica de Oliveira Teutschbein – Email*:* jessicateutschbein@gmail.com

ABSTRACT:
The coronavirus disease (COVID-19) pandemic changed the routine of transplant programs, creating challenges for the continuity of treatment. Thus, this study aimed to describe the barriers kidney transplant (KT) recipients reported following treatment during the COVID-19 pandemic. It is a cross-sectional observational study with 88 patients. The data were collected from October to November 2021 at the University Hospital of the Federal University of Juiz de Fora (HU-UFJF). Descriptive data analysis and a chi-square test were performed. The barriers identified were psychosocial: increased level of worry (76.2%) and fear of graft loss (36.5%). There was a change in the consultation schema for 59.1%; 63.4% reported difficulty adapting to telemedicine; and 49.8% needed family assistance to follow the treatment. Difficulties were more frequent among men (51.2%). The findings may help the multidisciplinary team in understanding where to act and creating strategies to ensure the continuity of treatment.

Keywords: Kidney Transplant. COVID-19 pandemic. Psychosocial Impact. Continuity of Patient Care.

RESUMO
A pandemia da doença do coronavírus (COVID-19) alterou a rotina dos programas de transplante criando desafios para a continuidade do tratamento. Deste modo, o estudo buscou descrever as barreiras encontrados por transplantados renais em seguir o tratamento na pandemia da COVID-19. **É um estudo** transversal, observacional, com 88 pacientes e com coleta de dados de outubro a novembro de 2021 no Hospital Universitário da Universidade Federal de Juiz de Fora (HU-UFJF). Foi feita análise descritiva dos dados e teste Qui-quadrado. As barreiras encontradas foram as psicossociais: aumento do nível de preocupação (76,2%) e medo de perda do enxerto (36,5%). Houve mudança no regime de consultas em 59,1%, 63,4% relataram dificuldade de adaptação à telemedicina e 49,8% necessitavam de ajuda familiar para seguir o tratamento. As dificuldades foram mais frequentes em homens (51,2%). Os achados poderão auxiliar a equipe multiprofissional a compreender onde atuar e criar estratégias para garantir a continuidade do tratamento.

Palavras-chaves: Transplante Renal. Pandemia COVID-19. Impacto psicossocial. Continuidade da Assistência ao Paciente.

INTRODUCTION

Kidney transplant (KT) is considered an effective treatment for chronic kidney disease (CKD) in stages of functional failure because it improves patient´s quality of life but also promotes better survival and reduces health costs.[1,2,3] KT is not synonymous with a cure, it is one of the treatments for CKD that requires continuous outpatient follow-up through the care of a multidisciplinary team.[4]

Outpatient care of patients post-kidney transplant allows for clinical-laboratory monitoring of the patient, graft function, and adherence to immunosuppressive therapy.[5,6] This follow-up includes, in addition to appointments, laboratory testing focusing on the management of immunosuppressive therapy to increase graft survival and avoid nephrotoxic effects, as well as ensuring continuity of the treatment of pre-existing morbidities that are highly prevalent in this population, such as systemic arterial hypertension and diabetes mellitus.[7,8]

The multidisciplinary approach post-KT may include doctors, nurses, psychologists, pharmacists, and nutritionists, among others, and one of its main functions is to assist the patient in adapting to a new routine of care through health education. [8]

COVID-19 is caused by the severe acute respiratory syndrome coronavirus 2 (SARSCoV-2), identified in 2019.[9] It is a highly contagious acute respiratory syndrome transmitted via respiratory droplets or contact with asymptomatic and symptomatic individuals. The disease typically causes flu-like symptoms, such as fever, non-productive cough, myalgia, dyspnea, and fatigue, and can range from mild to severe manifestations.[10]

The clinical spectrum of COVID-19 infection is broad and progresses rapidly; however, older people, individuals with comorbidities, or those who are immunocompromised who present a higher risk of complications.[11] Indeed, transplant recipients are more vulnerable to infections due to the suppression of the immune system by immunosuppressive medications.[12] Patients affected by immune-mediated inflammatory diseases such as lupus, rheumatoid arthritis, Crohn's disease, hemolytic anemia, spondyloarthritides, psoriatic arthritis, inflammatory myopathies, and vasculitis, among others, are also exposed to immunosuppressive medications, leading to reduced immunological responses with an increased risk of infections.[13]

In KT, COVID-19 may present atypically with the absence of fever, respiratory symptoms, and radiological findings of pneumonia, creating a challenge in diagnosing or ruling out the disease. Furthermore, a mortality rate between 6% and 50%, higher than that of the general population, has been observed.[12] The greater severity for KT recipients when compared to the general population is related to immunosuppression and the comorbidities of this population.[14] In addition, COVID-19 can affect the renal system through different mechanisms; one way the SARS-CoV-2 virus infects host cells is by utilizing the angiotensinconverting enzyme 2 (ACE2) receptor. This enzyme is expressed in the urinary system almost 100 times more than in the respiratory system. Another mechanism is through entry into the transmembrane serine protease (TMPRSS), which is also expressed in podocytes and proximal tubule cells of the kidneys. [15]

Consequently, owing to the increased risk posed by the disease to KT recipients, these individuals were considered a priority by national health authorities for COVID-19 vaccination, which began in Brazil at the start of 2021.[16] The pandemic had unfavorable consequences for transplant programs due to restrictions or suspensions of their activities, impacting the waiting list for transplants and post-transplant patient care.[17] According to the Brazilian Transplant Registry (RBT) by the Brazilian Organ Transplant Association (ABTO), in 2021, the total number of kidney transplants performed was 4,750, with 581 from living donors and 4,169

from deceased donors. Compared to 2020, kidney transplants decreased by 2%, and compared to the period before the Coronavirus pandemic, there was a 26% reduction in the performance of KT. A more significant drop was observed in the rate of living donor transplants, which was 48% below the rate obtained in 2019. This is related to the COVID-19 pandemic because of the suspension of elective surgeries during the period.[18]

Several challenges were imposed by the pandemic context on KT patients, such as psychological stress from social distancing, increased sense of danger, and exacerbation of uncertainties. Thus, it is expected that negative responses to frequent stress, constant alertness, insomnia, anxiety, depression, and worsening of pre-existing disorders would be present.[19]

Other challenges can also be described, for example, difficulty in accessing and adhering to medication, adaptation to changes in clinical practices at transplant centers, and difficulties to regular appointment attendance due to transportation or socioeconomic limitations, which in turn could also prevent acquisition of cleaning and individual protection supplies.[14,20] Another obstacle to highlight is the lack of technological expertise necessary for using telemedicine as an alternative to maintaining contact with the transplant team.[21] As the COVID-19 pandemic brought significant changes to the daily lives of KT patients, the present study aimed to describe the barriers found by KT recipients in following treatment during the COVID-19 pandemic.

METHODS

STUDY TYPE AND SAMPLE

The present study had a cross-sectional observational design, conducted at the University Hospital of the Federal University of Juiz de Fora. Participants were included by convenience among those who agreed to participate and were in post-KT followup from October to November 2021, resulting in 88 patients—94.6% of the population of 93 in follow-up. The study was approved by the Human Research Ethics Committee of HU – UFJF, protocol number 4.945.589 and register number 44659021.5.0000.5133, and participants who agreed to take part signed an informed consent form.

DATA COLLECTION

Data were collected during regular appointments at the post-transplant outpatient clinic. For patients who did not have an appointment scheduled during this period, the researchers did the interview via telephone call through the transplant service's WhatsApp®. As data collection took place during the pandemic, the safety norms for social distancing from HU-UFJF to combat COVID-19 were observed.

Demographic data collected were age (years), sex (male and female), and city of origin (Juiz de Fora or other cities); and clinical data: time post-KT. A questionnaire containing 18 questions was administered to participants to evaluate the proposed objective of the current study. The questionnaire was divided into two categories: operational difficulties, which included questions about difficulties in using a mask (yes or no), changes in consultation schedules (to telemedicine or increased interval between appointments), need for extra help for treatment (picking up immunosuppressors, attending appointments, and economical); and the second category related to psychosocial difficulties, asking about an increased level of worry due to the pandemic (yes or no), the reason for this increased level of worry, and the greatest fear regarding the transplant during this period.

Statistical Analysis

Descriptive data analysis was performed, expressed as mean ± standard deviation, median, or percentage according to the

characteristics of each variable. The chi-square test and 95% confidence interval ($p<0.05$) were used to compare the level of worry and the need for assistance from family or friends during the pandemic with demographic and clinical data such as sex, age, and time since transplant. Analyses were conducted using SPSS 19.0 (Statistical Package for Social Science, Armonk, NY: IBM Corp).

RESULTS

Table 1 presents the demographic and clinical data of the 88 research participants. There was more male individuals (67%), with a mean age of 52 years and a standard deviation of ±13 years, and a mean post-KT time of 15 years with a standard deviation of ±5 years. Additionally, 58% of participants reported being retired.

Table 1. Clinical and demographic data of participants enrolled in this study

Variables	% (N)	95% CI
Sex		1,5-1,7
Male	67 (59)	
Female	33 (29)	
Age	52±13	49.3-55.4
Retired	58 (51)	1.3-1.5
Time since KT (years)	15±5	14.3-16.7

Legend: Table 1 describes the demographic and clinical data expressed as mean or standard deviation or in percentage and frequencies. CI: 95% confidence interval. Source: the authors

Table 2 shows the operational challenges assessed: 20.5% reported difficulty adapting to wearing a facial mask. Among those who experienced changes in consultation frequency (59.1%), the main difficulty was the introduction of telemedicine appointments (63.4%). The 20.5% who did not attend appointments during the pandemic cited the main reasons as fear of virus exposure (33.4%) or operational issues such as lack of transportation or the nonperformance of laboratory tests, which are indispensable for the consultation. Another frequently mentioned difficulty was the need for extra help in post-KT treatment (48.9%), primarily to pick-up the immunosuppressors at the pharmacy (81.4%).

Table 2. Operational challenges of the population in this study

Variables	%, N	95% CI
Difficulty using facial mask due to discomfort	20.5 (18/88)	4.2-4.7
Changes in the consultation scheme	59.1 (52/88)	1.3-1.5
Telemedicine	63.4 (33/52)	1.4 - 2.4
Increased interval between consultations	36.6 (19/52)	1.4 - 2.4
Missed consultations	20.5 (18/88))	1.7-1.8
Fear of virus exposure	33.4 (6/18)	2.6-4.1
Lack of transportation	11 (2/18)	2.6-4.1
Did not undergo tests	27.8 (5/18)	2.6-4.1
Personal reasons	27.8 (5/18)	2.6-4.1
Help from family/friends	48.9 (43/88)	1.4-1.6
Picking up immunosuppressors	81.4 (35/43)	1.0 -1.7
Attendance at consultation	11.6 (5/43)	1.0 -1.7
Economical	4.6 (2/43)	1.0 -1.7
Other	2.4 (1/43)	1.0 -1.7

Legend: Data are expressed as percentages and frequencies. CI: 95% confidence interval. Source: the authors.

Table 3 addresses the psychosocial challenges. About three-quarters of patients reported worry or fear regarding continuing post-KT treatment during the COVID-19 pandemic. The most common causes of increased worries were fear of individual (58.4%) and family members' (13.4%) exposure and infection by the virus. Specifically regarding KT, despite a third denying worries, fear of graft loss was the greatest challenge (36.5%).

Table 3. Psychosocial challenges of participants enrolled in this study

Variables	%, N	95% CI
Increase in worry level	76.2 (67/88)	1.1-1.3
Fear of COVID-19 exposure	58.4 (39/67)	3.2-3.8
Fear of family contamination	13.4 (9/67)	3.2-3.8
Lack of disease knowledge	8.9 (6/67)	3.2-3.8
Anxiety	10.4 (7/67)	3.2-3.8
Other	8.9 (6/67)	3.2-3.8
Fears related to the transplant		
No fears	34.2 (30/88)	3.1-4.1
Graft loss	36.5 (32/88)	3.1-4.1
Illness	12.6 (11/88)	3.1-4.1
Lack of immunosuppressors	9.2 (8/88)	3.1-4.1
Death	4 (4/88)	3.1-4.1
Other	3.5 (3/88)	3.1-4.1

Legend: Data are expressed in percentages and frequencies; CI: confidence interval of 95%. Source: the authors.

Regarding the association between the variables of sex and time since KT with the challenges the need for help from a family member or friend during the pandemic and the increase in worry level due to the COVID-19 pandemic, we found the likelihood of needing help was higher among men (OR=4.4, 95% CI: 1.67–11.65, p=0.02), and a trend toward increased worry was also higher among men (OR=1.78, 95% CI: 0.58-5.48, p=0.22). On the other hand, only the time since KT longer than 15 years showed a tendency for association with this difficulty (Table 4).

Table 4. Association of the need for help and the increase worry with the variables of sex, time since KT, and age

Variables	Extra Help Needed	p-value	OR 95% CI	Increase in Worry	p-value	OR 95% CI
Sex						
Female	48.8%			35.8%		
Male	51.2%	0.02	4.41(1.67-11.65)	64.2%	0.22	1.78(0.58-5.48)
Time since KT						
2 to 15 years	52.4%			47%		
+ 15 years	47.6%	0.53	1.05(0.45-2.44)	53%	0.09	0.44(0.15-1.23)
Age						
Up to 59 years	74.4%			65.7%		
+ 60 years	25.6%	0.07	2.12(0.86-5.25)	34.3%	0.57	0.95(0.33-2.70)

Legend: Table 4 presents the bivariate descriptive analysis showing the association between psychosocial variables and clinical and demographic variables through the chi-square test. Data are expressed in percentage, 95% confidence interval ($p<0.05$), and odds ratio (OR) obtained in the statistical test. CI: confidence interval of 95%. Source: the authors.

DISCUSSION

In this study, it was found that the main barriers to following treatment during the pandemic for the interviewed individuals were both operational and psychosocial, with the main ones being the change in the consultation scheme from in-person to telemedicine and the increase in worries.

In the study sample, some individuals did not attend appointments during the pandemic because of isolation measures. The non-attendance of patients with chronic diseases to outpatient care generates several consequences for health, as, besides services related to health maintenance, outpatient clinics work to strengthen adherence to treatment and the adoption of healthy behaviors, and non-attendance at appointments hinders communication of patients with the health team, compromising the bond built before the pandemic scenario.[22]

Telemedicine was an alternative implemented by outpatient centers to face the pandemic emergency since these platforms aim to mitigate the new challenges by facilitating access to the multidisciplinary team.[23] Additionally, this strategy reduces overcrowding in healthcare facilities by providing necessary guidance to individuals, thereby reducing exposure to infectious diseases and ensuring that care coordination is directed toward patients in greatest need. The COVID-19 pandemic has highlighted the importance of this tool, in how it can assist in outbreaks of new diseases and in bringing patients closer to the transplant center,

necessitating measures that facilitate the broader adoption of telemedicine. [24]

The regulation that governs telemedicine in Brazil is Law No. 13.989,[25] which highlights that the use of this resource has limitations. The professional must follow the norms and ethical standards as in an in-person consultation. However, the Brazilian population does not yet have universal access to the internet, demonstrating a fragility in its implementation and the difficulty of accessing this tool by the population, since internet availability is indispensable for its use. Therefore, better structuring and regulation, as well as adequate supervision, are necessary for its proper implementation.[26]

Regarding operational challenges, this study reported difficulty in using a mask this individual protective equipment, which became commonly used and required in community settings owing to its effectiveness in preventing COVID-19 infection. A systematic review compiled data on the effectiveness of mask use and showed a 20% reduction in the likelihood of developing respiratory infections compared to those who do not use them, especially N95 and surgical masks, revealing the importance of their use, especially by immunosuppressed individuals.[27]

The need for help from friends and family by approximately half of the interviewees during this period demonstrates the importance of an effective support network and the potential of family support as a facilitator in adherence to the treatment of chronic diseases, thereby facilitating the maintenance of health and prevention of complications. Thus, the influence of the family in the life of the chronic patient has a social character as it helps establish a path of strategies that can assist the patient and the family in dealing with the disease process, adapting, and living with it.[28]

In this study, the increase in worry was higher among male individuals, as well as a greater need for assistance from friends and family. Although the incidence of COVID-19 is similar in both sexes,[29] in the general population, men have a higher mortality rate when affected by the infection, which could increase the level of worry during the pandemic and dependence on relatives and friends. However, there are no findings of significant differences in COVID-19-related mortality among male and female kidney transplant recipients.[30]

The findings of this research showed that individuals with a longer time post-transplant (over 15 years) expressed greater worry during the pandemic period. Contrary to this finding, a cross-sectional study with 185 kidney transplant recipients demonstrated that frailty, and consequently a greater need for support post-KT, usually affects those who have a longer posttransplant period and are of advanced age.[31]

Although recipients of KT up to 59 years of age in this study expressed a higher level of worry, it is the older people who have been associated with more severe cases of COVID19 requiring hospitalization, thus having a more devastating impact on the health of older adults, especially older men.[32] The results showed that participants up to 59 years old had a greater need for support from friends and family, although vulnerability in renal patients occurs earlier and more frequently than in the general population. When age factor is added, the dependence on family support is crucial for managing chronic conditions, indicating that any intervention supporting self-management practices needs to be focused on the main family members, suggesting that major interventions should target family members to ensure better adherence practices. [33]

The support network can also help mitigate the psychosocial challenges that were significant in this study since most had their level of worry increased, mainly as a result of the fear of contracting COVID-19. This demonstrates the impact of the pandemic was not only on physical health but also significantly affected the psychological dimension, as there was an information storm broadcast by

the media, especially alerts about high risk to immunocompromised individuals and adjustments to changes in routine.[34]

Indeed, it was reported that about 50% of kidney transplant recipients observed a change in their perception of their general health status related to their emotional state and psychophysical well-being during the COVID-19 pandemic, with a high level of stress related to poor sleep quality, insomnia, and depression.[35] Despite the increase in mental health problems in the general population during this period, transplant recipients seem to have managed this phase satisfactorily because of previous experience with transplantation, which required greater attention to hygiene, mask usage, and avoiding crowds to prevent various infections, which contributes to a more reasonable adaptation.[36]

However, previous studies have already shown that psychological distress and perceived stress negatively affect treatment adherence.[37] Consequently, they can potentially increase morbidity and mortality among kidney transplant recipients, highlighting the need for greater attention and quick identification and early intervention in the psychological dimension to protect graft function and maintain treatment adherence in transplant patients. [38]

The COVID-19 pandemic not only posed challenges to transplant recipients but also impacted transplant policies, donation chains, and the timely and safe conduct of transplant surgeries.[39] Hence, it can be stated that the SARS-CoV-2 virus was a significant threat to patients and transplant programs.[40] Knowing the challenges during the pandemic period underscored in this study for this population can be a facilitating factor to assist the multidisciplinary team in managing treatment in future emergency contexts.

CONCLUSION

In this study, we identified the main barriers encountered by KT recipients at a transplant outpatient clinic in the interior of Minas Gerais in following treatment during the COVID-19 pandemic. In this sample, it was evident that the pandemic imposed changes, with the most frequent challenges in this population being psychosocial (worries and fears) and the change in the consultation regime.

As this is an observational, single-center study with a small sample size, it consequently limits the generalization of the results to other populations. On the other hand, we studied almost the entirety of the patients followed by the service in question. Few studies in the literature address a similar theme; therefore, the inclusion of variables might not have covered all relevant points. However, especially because of the scarcity of publications, the array of challenges studied can serve as a starting point for similar studies.

These findings can also assist the multidisciplinary team in understanding where to act and creating strategies to mitigate difficulties in future emergency contexts to ensure the continuity of treatment. For this purpose, continuing education of professionals to assist the patient and family in managing the disease in the face of challenges would be pertinent.

Furthermore, the data presented can contribute to understanding the real needs for public sector investment in supplies to maintain contact between these individuals and the outpatient center, for example, through telemedicine, which requires investments for better structuring and implementation.

Thus, considering that the present study exposes the barriers faced by these patients in maintaining treatment through the pandemic context, future research in services from different regions is important for more representative data.

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