

Organ transplantation during the COVID-19 pandemic – impact on deceased organ donor referrals and consent rates in the Western Cape, South Africa

H Bookholane,  T du Toit,  E Muller,  D Thomson 

Department of Surgery, Faculty of Health Sciences, Groote Schuur Hospital, University of Cape Town, South Africa

Corresponding author, email: hbookhol1@alumni.jh.edu

Background: The impact of the COVID-19 pandemic on transplantation is multifactorial. This study reports on its influence on deceased donation for transplantation in the Western Cape.

Methods: The volume of referrals and those who were consented for organ donation in the province in the pre-pandemic period of May 2017 to February 2020 were compared to those of the initial pandemic period (March through December 2020).

Results: Prior to the pandemic, there were 201 deceased donor referrals in the Western Cape province – 152 (75.6%) and 49 (24.4%) in public and private sectors, respectively. The mean referral rates ranged between 59–69 referrals per year, translating into a monthly rate of 4.8 (range 2.8–5.8). During the first 10 months of the pandemic, there were 18 referrals – 12 (66.7%) and six (33.3%) in the public and private sectors; a decrease of 63%, with a mean monthly referral rate of 1.8. The overall consent rate prior to the pandemic in the public and private sectors was 36.6% (38% and 27%, respectively) with an increase to 44.4% (37.5% and 62.5%) during the pandemic.

Conclusion: Despite a 10% increase in consent rate for deceased donation during the COVID-19 pandemic, there was a significant decrease in the number of potential donors referred. Strategies to improve organ donation and transplantation during and after the COVID-19 pandemic are required.

Keywords: transplant, organ donation, COVID-19

Introduction

The organ donation pathway is dependent on adequate health care resources allowing patients to access high level medical care (ventilator support) and their clinicians to take the time to counsel families at the end of life, and then to refer on to the transplant coordinator to make an approach for consent.¹ Organ transplants in South Africa (SA) are from either living or deceased donors for liver and kidney, or exclusively from deceased donors for heart, lung, pancreas, cornea and tissue transplantation. As such, a single deceased donor has the potential to benefit multiple patients across various waiting lists. A reduction in deceased donation and organ retrieval activity results in a decrease in transplantation activity as seen in Brazil, where a 68% decrease in deceased donation and an 89% decrease in transplantation activity occurred.²

During the COVID-19 pandemic in 2020 in South Africa, hospital and personnel resources were balanced against the burden of COVID-19 patients with resources being reallocated in the healthcare system.³⁻⁵ In this paper, we present the referral and consent rates in the Western Cape comparing the 3-year period prior to the pandemic, to the first 10-months of the COVID-19 pandemic.

Methods

Data were reviewed from 1 May 2017 to 31 December 2020 from an ongoing longitudinal study using prospectively collected data to review deceased donation consent rates. All medically suitable potential donor referrals resulting in a family approach for consent were recorded by transplant coordinators working for state (Groote Schuur Hospital and Red Cross War Memorial Children's Hospital) and private (Netcare) hospitals in the Western Cape. All private hospitals in the Western Cape and state hospitals in the MetroWest area of Cape Town were covered. Data were prospectively entered on a structured data collection sheet after the transplant coordinator made a standard approach for consent.

The following data points were reviewed: location of referral (hospital and unit), whether consent was granted, and which organs were consented for. Data were analysed in a password-secured Microsoft Excel (Microsoft, USA) database. Categorical data were summarised as frequencies and proportions. No comparative statistical analysis was performed owing to low sample size and inadequate power.

Table I: Proportion of public and private referrals, consented donors and consent rate between March 2017 and December 2020

Year	Public referrals (n, %)	Private referrals (n, %)	Total referrals (n, %)	Public consented donors (n, %)	Private consented donors (n, %)	Total consented donors (n)	Public consent rate %	Private consent rate %	Overall consent rate %
2017	52 (77.6%)	15 (22.4%)	67 (100%)	13 (81.3%)	3 (18.7%)	16	25%	20%	23.88%
2018	49 (71%)	20 (29%)	69 (100%)	22 (75.9%)	7 (24.1%)	29	44.90%	35%	42.03%
2019	46 (78%)	13 (22%)	59 (100%)	11 (61.1%)	7 (38.9%)	18	23.90%	53.8%	30.51%
2020 – pre-pandemic	5 (83.3%)	1 (16.7%)	6 (100%)	3 (100%)	0 (0%)	3	60%	0%	50.00%
2020 – pandemic	12 (66.7%)	6 (33.3%)	18 (100%)	3 (37.5%)	5 (62.5%)	8	25%	62.5%	44.44%

Results

Referrals

Between 2017 and 2020, prior to the pandemic, there were 201 deceased donor referrals in the Western Cape. Of these, 152 (75.6%) were from public hospitals and 49 (24.4%) from private hospitals (Table I). The average number of referrals prior to the pandemic was 4.8 per month with a high of 5.8 and a low of 2.8 referrals per month (Figure 1). This ranged from 59–69 deceased donor referrals per year in the 3 years prior to the pandemic. During the initial period of the COVID-19 pandemic, there were 18 referrals received between March and December 2020, with an average of 1.8 referrals per month. These referrals resulted in eight consented donors for this period. In the months of April and May 2020 there were no referrals. Of the referrals received during the pandemic, 12 (66.7%) were from public hospitals and six (33.3%) were from private hospitals (Table I).

Consent rate

The overall consent rate prior to the pandemic was 36.6% (38% in public hospitals and 27% in private hospitals) with total consented deceased donors ranging between 16 and 29 donors annually in the 3 years before the pandemic (between 11 and 22 consented deceased donors in public hospitals, and between 3 and 7 consented deceased donors in private hospitals). During the pandemic, the consent rate was 44.4% (37.5% in public and 62.5% in private) with eight consented

Table II: Proportion of organs consented for in consented deceased donors May 2017 to December 2020

Organ	Pre-COVID-19	During COVID-19
Kidneys	59 (89.4%)	6 (75%)
Heart	44 (66.7%)	5 (62.5%)
Lungs	43 (65.2%)	5 (62.5%)
Liver	42 (63.6%)	5 (62.5%)
Eyes	31 (47%)	4 (50%)
Corneas	30 (45.5%)	4 (50%)
Bone	25 (37.9%)	4 (50%)
Skin	25 (37.9%)	3 (37.5%)

donors in this 10-month period (three in public hospitals and five in private hospitals) (Table I). Organ-specific consent rates were recorded, but not the retrieval and utilisation rates as per the study methodology. Prior to the pandemic, the most donated organ was the kidneys, followed by the heart, lungs and liver. This distribution was maintained in the pandemic period. Consent rates for eye, cornea and tissue donation remained at or under 50% in consented deceased donors (Table II).

Discussion

The need for organ donation and transplantation has not reduced because of the COVID-19 pandemic. In the initial

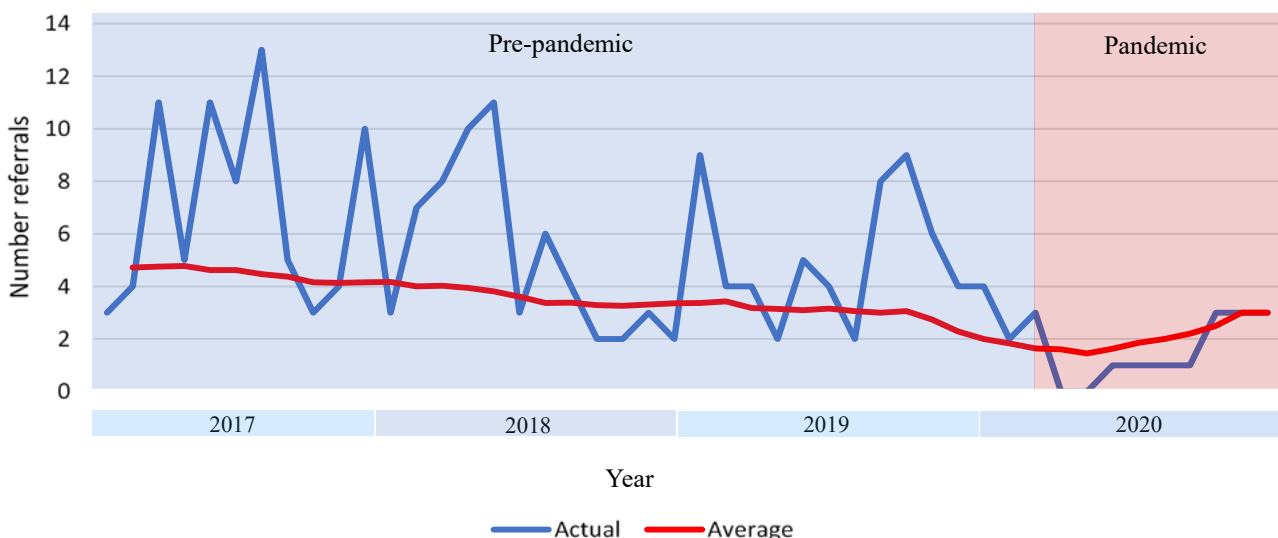


Figure 1: Monthly deceased donor referrals March 2017–December 2020

10-month period from the start of the official national COVID-19 lockdown in South Africa, there were only 18 referrals of potential donors for consent in the Western Cape from March to December 2020. Of these referrals, only eight donors were consented to support organ transplantation. Most of these referrals came from public hospitals, which was consistent with referral trends in the province. This is the lowest number of referrals recorded as we enter the fourth year of recording this data in the Western Cape. The reasons for this are likely multifactorial and difficult to formally assess, such as alterations in healthcare seeking behaviour,³ a decrease in trauma admissions,⁶⁻⁸ limited family visitation, and COVID-19 positivity in potential donors excluding their referral. Other local factors varied between hospitals, with surgeons and anaesthetists among those seconded to ICU and COVID-19 medical wards, with a resultant and expected decrease in operating theatre capacity.⁹ Additionally, some centres used anaesthetic machines as ventilators for COVID-19 patients, further limiting the available resources for managing transplantation patients. Intensive care unit (ICU) capacity was expanded significantly for COVID-19 patients with a reduction in resources allocated to non-COVID-19 patients. This diversion of personnel also resulted in some transplant coordinators (of which there were only 22 reported nationally in 2015)¹⁰ working in ICU for periods of the COVID-19 pandemic.⁹

There was no formal national hold on transplantation operations in the pandemic, but unfortunately, with the deferment of elective surgery^{11,12} (which included living related non-urgent renal transplantation) the perception was that transplantation was on hold, and therefore donor referrals would not be considered. This was to the detriment of programmes who were able to continue offering urgent liver, heart and lung transplantation for priority-one patients and routinely send surgical teams to the referral hospitals if local capacity does not allow local recovery.

These results are consistent with the experience of other countries. In the United Kingdom (UK), when specialist nurses in organ donation were redeployed, deceased donor referrals decreased by 39%, and the number of transplants performed dropped nearly 70%.¹³ In France and in the United States (US), there was a strong temporal relationship identified between an increase in the COVID-19 infections and reductions in solid-organ transplants.¹² This reduction was over 90% in France and over 50% in the US. In Australia, currently a country with low prevalence of COVID-19, transplantation rates were also impacted, with kidney transplantation rates dropping nearly 30%.¹⁴ In Brazil, deceased donor transplantation dropped by 89%, with a 68% reduction in deceased donors compared to the previous year.²

In the Western Cape, there was a drop of 68% in the number of referrals. During the period 27 March to 26 June 2020 there were no solid organ transplants performed in the Western Cape from deceased donors. This coincided with the period of the strictest lockdown from 27 March to 1 May 2020. In this period, the organ transplant unit at Groote Schuur Hospital was repurposed as a neurosurgical high care unit allowing the neurosurgical area to become a dedicated COVID-19 ICU for mechanically ventilated COVID-19 patients. In a study reporting on 85 hospitals in SA, de-escalation in response to the pandemic and the hard lockdown greatly reduced access to surgical care and

services, with 34.1% of hospitals reallocating surgical staff to work in non-surgical COVID-19 services.⁷

The pandemic has highlighted the lack of good quality information on various aspects of medical care in South Africa. That 110 000 excess deaths have been reported by the South African Medical Research Council during the COVID-19 pandemic highlights the scale and need for significant improvement in data capture to inform health care spending in South Africa.¹⁵ The data we report here exists only as part of an ongoing research project, however there is a need for such data to be maintained as an ongoing national clinical audit in order to allow continued quality assurance and improvement of donor referral and approaches for consent.¹⁶ Basic national statistics are reported through the South African Transplantation Society to the World Health Organization – Global Observatory on Donation and Transplantation – but this is not audited or of sufficient detail to allow for targeted quality improvement. The most recent data available from South Africa on this platform is from 2018.¹⁷ It is a limitation of this study that we are not able to comment whether the decrease in deceased donors during the pandemic has resulted in a more rapid growth of the waiting list than normal as there is no national or provincial collation of the various waiting lists for organ transplants.

Conclusion

COVID-19 has highlighted the need for better data to inform decisions made in the name of health for the population at large. Despite a marginal increase in the consent rate for deceased donation during the COVID-19 pandemic, a significant decrease in the number of potential donors referred has reduced the total number of consented donors. Organ donation and transplantation has shown itself to be sensitive to disruptions caused by a pandemic such as COVID-19. The general public and health professionals need to be made aware that transplantation is ongoing from deceased donors (for both organs and tissues) during the COVID-19 pandemic.

Acknowledgements

Fiona McCurdie BSc (Nursing), RN, RM, Dip ICU; Luke Steenkamp RN, Dip Crit Care TE; Babalwa Gili, BCur (Basic), Dip ICU, Dip Nursing Management; Alexia Michaelides RN, RM, Dip ICU, Dip TPM (U Barcelona); Louisa Human RN, Dip ICU; Lettie Prins RN, RM, Crit Care Honours, Nursing Pharmacol; Ronel Yeats BCur, Crit Care Honours, and Kathryn Manning, MSc, MPH.

Conflict of interest

The authors declare no conflict of interest.

Funding source

No funding was required.

Ethical approval


The study was approved by the Human Research Ethics Committee of the University of Cape Town (ref. no HREC 837/2016). The need for informed consent was waived as the study was felt to be of minimal risk, in the public interest and not practicable without the waiver.

ORCID

H Bookholane  <https://orcid.org/0000-0002-9746-7330>

T du Toit  <https://orcid.org/0000-0002-8840-9032>

E Muller  <https://orcid.org/0000-0003-4891-5296>

D Thomson  <https://orcid.org/0000-0003-2433-3611>

REFERENCES

1. Domínguez-Gil B, Delmonico FL, Shaheen FA, et al. The critical pathway for deceased donation: reportable uniformity in the approach to deceased donation. *Transpl Int.* 2011;24(4):373-8. <https://doi.org/10.1111/j.1432-2277.2011.01243.x>.
2. Araújo AY, Almeida ER, Lima LK, Sandes-Freitas TV, Pinto AG. Fall in organ donations and transplants in Ceará in the COVID-19 pandemic: a descriptive study, April-June 2020. *Epidemiol Serv Saúde.* 2020;30:e2020754. <https://doi.org/10.1590/s1679-49742021000100016>.
3. Chu KM, Smith M, Steyn E, et al. Changes in surgical practice in 85 South African hospitals during COVID-19 hard lockdown. *S Afr Med J.* 2020;110(9):916-9. <https://doi.org/10.7196/SAMJ.2020.v110i9.15014>.
4. Jensen C, McKerrow NH. Child health services during a COVID-19 outbreak in KwaZulu-Natal Province, South Africa. *S Afr Med J.* 2021;111(2):114-9. <https://doi.org/10.7196/SAMJ.2021.v111i2.15243>.
5. Hofman K, Madhi S. The unanticipated costs of COVID-19 to South Africa's quadruple disease burden. *S Afr Med J.* 2020;110(8):689-99. <https://doi.org/10.7196/SAMJ.2020.v110i8.15125>.
6. Bookholane H, Michaelides A, Prins L, et al. Factors influencing consent rates of deceased organ donation in Western Cape Province, South Africa. *S Afr Med J.* 2020;110(3):204-9. <https://doi.org/10.7196/SAMJ.2020.v110i3.14227>.
7. Navsaria PH, Nicol AJ, Parry CD, et al. The effect of lockdown on intentional and non-intentional injury during the COVID-19 pandemic in Cape Town, South Africa: a preliminary report. *S Afr Med J.* 2021;111(2):110-3. <https://doi.org/10.7196/SAMJ.2021v111i2.15318>.
8. Goga A, Feucht U, Pillay S, et al. Parental access to hospitalised children during infectious disease pandemics such as COVID-19. *S Afr Med J.* 2021;111(2):100-5. <https://doi.org/10.7196/SAMJ.2021.v111i2.15388>.
9. Mendelson M, Boloko L, Boutall A, et al. Clinical management of COVID-19: experiences of the COVID-19 epidemic from Groote Schuur Hospital, Cape Town, South Africa. *S Afr Med J.* 2020;110(9):973-81. <https://doi.org/10.7196/SAMJ.2020.v110i9.15157>.
10. Muller E, Thomson D, McCurdie F. Transplantation in South Africa. *Transplantation.* 2015;99(4):643-5. <https://doi.org/10.1097/TP.0000000000000712>.
11. Nepogodiev D, Bhangu A, Glasbey JC, et al. Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study. *Lancet.* 2020;396(10243):27-38.
12. Nahshon C, Bitterman A, Haddad R, Hazzan D, Lavie O. Hazardous postoperative outcomes of unexpected COVID-19 infected patients: a call for global consideration of sampling all asymptomatic patients before surgical treatment. *World J Surg.* 2020;44:2477-81. <https://doi.org/10.1007/s00268-020-05575-2>.
13. Manara AR, Mumford L, Callaghan CJ, Ravanan R, Gardiner D. Donation and transplantation activity in the UK during the COVID-19 lockdown. *Lancet.* 2020;396(10249):465-6. [https://doi.org/10.1016/S0140-6736\(20\)31692-5](https://doi.org/10.1016/S0140-6736(20)31692-5).
14. Chadban SJ, McDonald M, Wyburn K, et al. Significant impact of COVID-19 on organ donation and transplantation in a low-prevalence country: Australia. *Kidney Int.* 2020;98(6):1616-8. <https://doi.org/10.1016/j.kint.2020.10.007>.
15. SAMRC. Report on weekly deaths in South Africa 2021 [cited 2021]. Available from: <https://www.samrc.ac.za/reports/report-weekly-deaths-south-africa?bc=254>.
16. Centre for Clinical Practice at NICE (UK). Organ donation for transplantation: improving donor identification and consent rates for deceased organ donation. Manchester: National Institute for Health and Clinical Excellence (UK); 2011.
17. World Health Organization and Organizacion Nacional de Transplantes (WHO-ONT). Data of the WHO-ONT Global Observatory on Donation and Transplantation. Available from: <http://www.transplant-observatory.org/>.