



Opportunities for Improving the Transplant Assessment and Education Process in British Columbia: Patient and Health Care Provider Perspective

Canadian Journal of Kidney Health and Disease
Volume 11: 1–10
© The Author(s) 2024
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/20543581241256735
journals.sagepub.com/home/cjk



Oshorenu Aiyegbusi¹ , Sharon Gradin², Yanchini Rajmohan²,
Bingyue Zhu³, Alexandra Romann⁴, Helen Chiu², Jagbir Gill¹,
Olwyn Johnston¹, and Micheli Bevilacqua¹ 

Abstract

Background: There are several steps patients and their health care providers must navigate to access kidney transplantation in British Columbia (BC).

Objective: We explored perceptions and experiences with the pretransplant process across BC to determine where process improvements can be made to enhance access to transplantation.

Design: Anonymous surveys were sent online and via post to health care providers (including nephrologists, registered nurses, and coordinators) and patients across BC.

Setting: Kidney care clinics, transplant regional clinics, and provincial transplant centers in BC.

Measurements: Surveys included Likert scale questions on the current pretransplant process and transplant education available in BC. The health provider survey focused on understanding the pretransplant process, knowledge, roles, and communication while the patient survey focused on patient education and experience of the pretransplant processes.

Results: A total of 100 health care providers and 146 patients responded. Seventy-six percent of health care providers understood their role and responsibility in the pretransplant process, while only 47% understood others' roles in the process. Fifty-nine percent of health care respondents felt adequately supported by the provincial donor and transplant teams. Seventy-one percent of registered nurses and 92% of nephrologists understood transplant eligibility. About 68% and 77% of nurses and nephrologists, respectively, reported having enough knowledge to discuss living donation with patients. Fifty percent of patients had received transplant education, of which 60% had a good grasp of the pretransplant clinical processes. Sixty-three percent felt their respective kidney teams had provided enough advice and tools to support them in finding a living donor. Fifty percent of patients reported feeling up to date with their status in the evaluation process.

Limitations: This analysis was conducted between December 2021 and June 2022 and may need to account for practice changes that occurred during the COVID-19 pandemic. Responses are from a selection of health care providers, thus acknowledging a risk of selection bias. Furthermore, we are not able to verify patients who reported receiving formal transplant education from their health care providers.

Conclusions: Exploring these themes suggests communication with regional clinics and transplant centers can be improved. In addition, patient and staff education can benefit from education on kidney transplantation and the pretransplant clinical processes. Our findings provide opportunities to develop strategies to actively address modifiable barriers in a patient's kidney transplantation journey.

Abrege

Contexte: En Colombie-Britannique (C.-B.), pour accéder à la transplantation, les patients et leurs prestataires de soins doivent traverser plusieurs étapes.

Objectif: Nous avons exploré les perceptions et expériences en lien avec le processus de pré-transplantation dans toute la Colombie-Britannique, afin de cibler les améliorations qui pourraient y être apportées pour faciliter l'accès à la transplantation.

Conception: Des sondages anonymes ont été envoyés en ligne et par la poste aux prestataires de soins de santé (notamment des néphrologues, des infirmières autorisées et des coordonnateurs) et aux patients de partout en Colombie-Britannique.

Cadre de l'étude: Cliniques de soins rénaux, cliniques régionales de transplantation et centres provinciaux de transplantation en Colombie-Britannique



Mesures: Les sondages comprenaient des questions à échelles de Likert portant sur le processus actuel de pré-transplantation et l'éducation offerte sur la transplantation en Colombie-Britannique. Le sondage destiné aux prestataires de soins portait sur leur compréhension du processus de pré-transplantation, leurs connaissances, leurs rôles et la communication; le sondage destiné aux patients portait sur l'éducation reçue et leur expérience des processus de pré-transplantation.

Résultats: En tout, 100 prestataires de soins et 146 patients ont répondu au sondage. Parmi les prestataires de soins, 76 % comprenaient leur rôle et leurs responsabilités dans le processus de pré-transplantation, mais 47 % seulement comprenaient le rôle des autres prestataires de soins dans le processus. Une proportion de 59 % des intervenants en santé se sentait adéquatement appuyée par les équipes provinciales de dons d'organes et de transplantation. Une grande majorité des infirmières autorisées (71 %) et des néphrologues (92 %) comprenaient les critères d'admissibilité à la transplantation. Les infirmières (68 %) et les néphrologues (77 %) estimaient avoir suffisamment de connaissances pour discuter du don vivant avec les patients. Quant aux patients, 50 % avaient reçu de l'éducation sur la transplantation et, de ceux-ci, 60 % avaient une bonne compréhension des processus cliniques de pré-transplantation. La majorité des patients (63 %) estimaient avoir reçu suffisamment de conseils et d'outils de la part de leurs équipes de soins rénaux pour les aider à trouver un donneur vivant. La moitié des patients (50 %) pensaient connaître leur statut dans le processus d'évaluation.

Limites: Cette étude a été réalisée entre décembre 2021 et juin 2022 et pourrait devoir tenir compte des changements de pratiques survenus pendant la pandémie de COVID-19. Les réponses provenant d'une sélection de prestataires de soins de santé, nous reconnaissons ainsi un possible biais de sélection. Enfin, nous ne sommes pas en mesure d'évaluer les patients qui ont déclaré avoir reçu de l'éducation formelle sur la transplantation de la part de leurs prestataires de soins.

Conclusion: L'exploration de ces thèmes a suggéré que la communication avec les cliniques régionales et les centres de transplantation peut être améliorée. De plus, les patients et le personnel soignant pourraient tirer profit d'éducation sur la transplantation rénale et les processus cliniques de pré-transplantation. Nos résultats offrent des occasions d'élaborer des stratégies pour s'attaquer activement aux obstacles modifiables dans le parcours de transplantation rénale d'un patient.

Keywords

kidney transplant, end-stage kidney disease, transplant evaluation, barriers

Received August 31, 2023. Accepted for publication April 16, 2024.

What was known before

Patients with chronic kidney disease in British Columbia take several steps to complete their transplant evaluation before kidney transplantation, including transplant education and support in finding living donors.

What this adds

This study identifies opportunities within our current pre-transplant processes to improve patients' journey to kidney transplantation in British Columbia.

Background

For patients with end-stage kidney disease (ESKD), kidney transplantation improves quality and length of life.^{1,2} In 2019, more than 3000 Canadians were on the kidney transplant waitlist; however, 45% were unable to receive kidney offers owing to inactive waitlist status.³ The process toward receiving a kidney transplant is complex, with several steps for patients and health care providers to navigate and complete. In British Columbia (BC), kidney transplant evaluation occurs at 2 tertiary transplant centers in Vancouver. Patients often require several visits for assessment and investigations while some travel long distances for these tests and

medical reviews. Medical factors such as patient co-morbidities and immunological compatibility can affect medical suitability and, thus, access to transplantation.⁴ Nonmedical (potentially modifiable factors) are considered multilevel health system factors.⁵ Suggested factors such as provider biases, lack of patient knowledge, and poor communication between care providers contribute to the barriers to receiving a kidney transplant.^{6,7} In addition to the breakdown in communication between transplant centers and regional clinics, inconsistent health care provider training and the financial burden on donors and recipients were cited as barriers to living donation in BC.⁸

Worldwide, there is no absolute measure of how and when patients should be referred for transplant evaluation. Kidney Disease Improving Global Outcomes (KDIGO) suggests

¹Division of Nephrology, The University of British Columbia, Vancouver, Canada

²BC Renal, Vancouver, Canada

³Providence Health Services Authority, Vancouver, BC, Canada

⁴Department of Statistics, The University of British Columbia, Vancouver, Canada

Corresponding Author:

Oshorenu Aiyegbusi, Division of Nephrology, The University of British Columbia, 1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada.

Email: oaiyegbusi@providencehealth.bc.ca

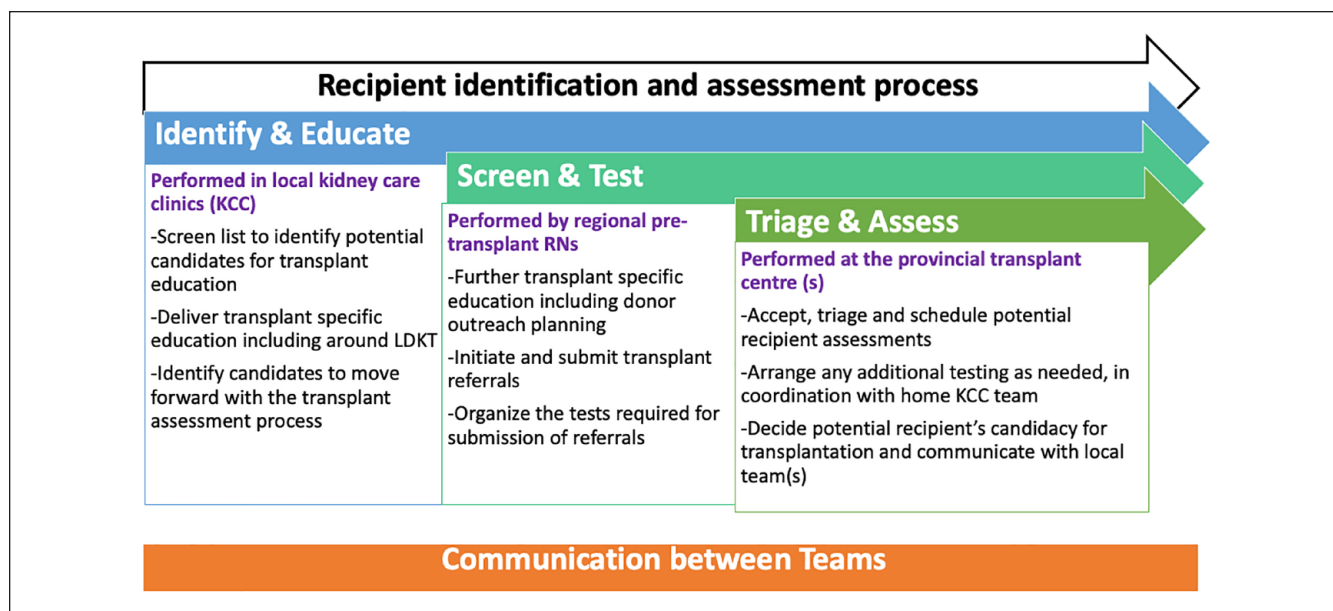


Figure 1. Pretransplant process in British Columbia.

potential kidney recipients should be referred for evaluation 6 to 12 months before anticipated dialysis initiation, emphasizing preemptive transplantation.⁹ To help achieve this goal in BC, BC Transplant and BC Renal, which, respectively, oversee the transplant processes and the rest of chronic kidney disease (CKD) care in BC, launched the Transplant First initiative. The Transplant First initiative aims to ensure every kidney care clinic (KCC) patient (estimated glomerular filtration rate [eGFR] < 25) in BC who is a potential kidney transplant candidate is considered, identified, assessed, and supported along the path toward transplantation as the treatment of choice, including assistance in finding a living donor.

To determine where process improvements can be made within the context of this provincial transplant program, we developed a survey to assess health care providers' and potential transplant recipients' perceptions and experiences with the current transplant pretransplant process. These key stakeholder perspectives will be integral in the identification of any potentially modifiable nonmedical barriers encountered by nondialysis-dependent CKD patients in the steps toward transplant evaluation within BC.

Methods

Study Setting

These surveys were conducted across the province of BC, Canada. In BC, there are 15 regional KCCs that care for over 13 000 patients living with nondialysis-dependent CKD. The recipient identification and assessment process is shown in Figure 1. The process of screening and identifying potential recipient candidates for education, and determining their

willingness and suitability to proceed is initiated in the KCCs with dedicated pretransplant registered nurses. Referral and initial testing process is also performed by KCC staff. The transplant referral is submitted to one of the transplant centers where the remaining of the requisite testing and assessments are completed. About 50% to 60% of all kidney transplantation performed annually in BC are from living donors.¹⁰ Between 2015 and 2019, there was a median of 272 (mean = 254) referrals per year submitted from the KCCs; a median of 100 living donor transplants was conducted per year, of which a median of 38 were preemptive living donor transplants.

Survey Design

A dedicated Evaluation Working Group was formed as part of a larger initiative in BC to promote living donor transplantation called Transplant First. This Evaluation Working Group included transplant nephrologists, general nephrologists, a methodologist, statisticians, and project managers. The Evaluation Working Group developed a multimodal evaluation framework containing goals and objectives for the Transplant First initiative. From this evaluation framework, metrics that would require direct feedback from recipients and health care providers were highlighted as the target for these surveys. A subgroup of the Evaluation Working Group then convened to design the survey questions; this included a subset of the members listed above, quality improvement specialist and a patient partner. These developments were initiated on September 13, 2021, initially focusing on the development of the health care provider survey, followed by the recipient survey. In addition to

communications with other groups in the transplant field, a literature search was conducted to identify any existing or validated tools that addressed these items. Where no tools were found, the Working Group developed questions in accordance with the evaluation framework.

Using this framework, the survey was designed to explore the following themes for health care providers; knowledge and understanding by interdisciplinary teams of the pretransplant process (including roles and responsibilities), interdisciplinary team communication across care settings and between health providers, potential recipients about their transplant journey, and provider perception of the patient experience in their transplant journey. For the patient survey, the themes we explored include knowledge and understanding of the pretransplant process, and experience in their transplant journey, including the capacity to approach donors.

Two surveys were developed: a health provider survey and a patient survey (supplementary file). Where relevant, efforts were made to ensure alignment between the 2 surveys.

Participants, Recruitment, and Survey Methods

For the clinician survey, all health care providers at KCCs, regional transplant clinics, and the 2 BC provincial transplant centers were invited to participate via broadcast emails to all these clinical groups, thus unable to capture a response rate. Health care providers include nephrologists, transplant nephrologists, registered nurses, social workers, unit, recipient, and donor coordinators. For the patient survey, a list of potential candidates was generated via PROMIS (Patient Records and Outcome Management Information System),¹¹ the bespoke renal database encompassing all renal and transplant care in BC. To identify potential participants who would be at a stage where transplant discussions would be expected, potential participants had to meet all of the following inclusion criteria: active KCC patients between >18 and ≤80 years of age, eGFR < 20, ≥1 KCC visit completed, and no absolute contraindications to transplant listed in the PROMIS modality assessment module. A list was then generated of patients who met all these criteria. These patients were invited to participate via a mailout containing the information to access the survey and a direct QR code linking to the online survey.

The clinician surveys were offered online and, for ease of use, hosted via Survey Monkey (Momentive Inc, San Mateo, California), supported by BC Renal. For the patient survey, a tool more tailored for this purpose was selected, in this case, Checkbox (Checkbox Survey Solutions Inc, Watertown, Massachusetts). The clinician survey was active for 4 weeks from December 2021 to January 2022, and the patient survey was active for 10 weeks from June to July 2022. All surveys were offered in English.

Data Analysis

Respondents were asked to indicate their agreement with statements in the survey using a 5-point Likert scale (see supplement). The Likert scale was combined into 2 dichotomous categories of “yes” and “no” for the analysis. The response “Yes” was an aggregate of “strongly agree” and “agree,” while “No” was an aggregate of “neutral,” “strongly disagree,” and “disagree.” Responses from the online surveys were exported into Microsoft Excel, and descriptive statistics were reported. Respondents with incomplete surveys were still included in the overall survey response rate. When calculating the proportions of responses for each question, only those who responded to the question of interest were included.

Microsoft Excel and R software were used to analyze responses. All *P* values were 2-sided and statistically significant at the *P* < .05 level.

Results

A total of 100 surveys were completed by health care providers working within KCCs, Regional Transplant Clinics, and Provincial Transplant centers across the province. Among the staff respondents, the majority were registered nurses, 33 (33%). Nephrologists (13 [13%]), unit coordinators (14 [14%]), and social workers (12 [12%]) had similar response rates. Two (2%) were donors and 3 (3%) were recipient coordinators. Fifty percent had worked in the clinic setting for more than 5 years. A total of 71 respondents worked within the KCC, 28 at a regional transplant clinic and 15 at a provincial transplant center (Table 1). Supplementary figures provide 5-scale Likert health care staff responses.

A total of 1705 mail-outs were sent, and 155 surveys were completed by patients for a response rate of 9%. Nine patient survey results were excluded from the analysis; 5 patients were not aware whether they had received transplant education and 4 patients did not respond to questions relating to transplant education.

Health Care Provider Survey Results

Forty-three percent of health care providers (23% of which are nephrologists) provided transplant education in advance of other renal replacement therapy options at their clinics across the province. This response was consistent at KCCs and regional transplant clinics (Table 2).

Understanding of the Pretransplant Process Including Roles and Responsibilities of Multidisciplinary Teams

Seventy-seven percent of nephrologists and 55% of nurses were aware of the patient criteria required for evaluation

Table 1. Participant Characteristics.

Patients		Health care staff	
Gender ^a		Experience in clinic (years)	
Men	85	≤ 5	49
Women	50	6 to 10	20
Gender diverse	1	11 to 15	10
Age (years) ^b		>15	20
<35	3	Role	
35-50	9	Nephrologist	13
51-75	79	Nurse	33
>75	43	Donor Coordinator	2
Race or Ethnicity ^c		Recipient Coordinator	3
Black	1	Unit Coordinator	14
East Asian	12	Social Worker	12
Southeast Asian	10	Dietician	11
Indigenous	2	Pharmacist	1
Latino	1	Clinic Setting	
Middle Eastern	2	Kidney care clinic	71
South Asian	6	Regional transplant clinic	28
White	107	Provincial transplant center	15
Multiracial	4	Other	6

Note. Missing data not included in count.

^a10.

^b12.

^c1 "don't know."

at the provincial transplant center (Table 2). About 64% and 62% of nurses and nephrologists, respectively, understood the tests required for their patients to proceed with a referral for transplant evaluation at the tertiary transplant center.

Seventy-six percent felt they understood their role and responsibility in the pretransplant process while 47% were aware of other members' roles and responsibilities. Sixty-two percent of staff felt patients' primary care providers were not adequately informed of the pretransplant process, and 76% thought primary care providers were unaware of their patients' stages in the transplant evaluation journey.

Communication During the Pretransplant Process

Fifty-nine percent of health care respondents felt able to contact the provincial donor and transplant teams for information and support (Table 3). Ninety-two percent of health care staff working in the provincial transplant centers could access information regarding patients' stages in the transplant evaluation journey, compared with 11% and 27% in KCCs and regional transplant clinics. Ten percent of staff working in KCCs and transplant clinics were able to obtain potential donor information in the evaluation process. When questions arose in the transplant process, 71% and 78% of health care staff working in these clinics, respectively, could readily access members of the multidisciplinary team involved in the transplant process.

Staff Knowledge About Pretransplant Process

Seventy-one percent of registered nurses and 92% of nephrologists reported having enough knowledge to educate patients about transplant eligibility (Table 4). About 68% and 77% of nurses and nephrologists, respectively, had enough knowledge to discuss living donation with patients. Forty-seven percent of health care workers knew the steps involved in the transplant evaluation process.

Eighty percent of staff who responded to the survey felt finding a living donor challenging to navigate and complete for patients. Forty-six percent of nephrologists and 48% of nurses reported having sufficient knowledge to support their patients in finding a living donor.

Staff Perception of the Patient Experience

Overall, 28% of health care respondents perceived their patients had a good grasp of all steps in the transplant process, and it was easy for them to navigate (Table 5). Nineteen percent of health care providers felt finding a donor was easy to navigate for their patients. All coordinators, however, felt their patients understood the process well, could navigate the evaluation system, and find a living donor.

Patient Survey Results

A total of 146 survey results were included in the analysis. Of these, 72 patients had received transplant education, while 74 patients were yet to receive transplant education. Overall, there were more positive responses from patients who had received transplant education than those yet to receive an education.

Patient Education and Understanding of the Transplant Process

Seventy-four percent of patients were satisfied with the transplant education, and 46% had transplant education preceding other forms of renal replacement therapy. Eighty-five percent of potential kidney recipients who received transplant education felt equipped with information to discuss family and social circle about living donation. Among those yet to receive transplant education, 35% were confident approaching family and friends regarding living donation. Sixty-three percent of patients reported their kidney teams had provided enough advice and tools to support them in finding a living donor (Figure 2). Some comments that are representative of patient education and understanding include the following:

"Honestly, my kidney team have not discussed about kidney transplant. I was being educated about going into dialysis."

"I am told that I will be automatically put on transplant waiting list once I start dialysis."

Table 2. Knowledge and Understanding of Pretransplant Process Including Roles and Responsibilities of Interdisciplinary Teams.

	Responses by role			Responses by center		
	Registered nurse %	Nephrologist %	Coordinator %	Kidney care clinic %	Regional transplant clinic %	Provincial transplant center %
<i>The criteria to identify a potential candidate for transplant education is clearly defined and easy to understand</i>	68	69	67	58	62	83
<i>I know who to contact through the pretransplant process when I have questions about my patients</i>	70	46	100	70	65	89
<i>Transplant education is provided in advance of other treatment options education in our clinic.</i>	52	23	100 ^a	38	29	83
<i>I understand the patient selection criteria for referral submission to the provincial transplant center</i>	55	77	33 ^a	47	72	50
<i>I understand what tests are required for my patients to proceed with referral submission</i>	64	62	67 ^a	56	73	88
<i>My patients' primary care providers are adequately informed about the transplant process in general.</i>	39	8	25	33	24	58

Note. Coordinators include donor and recipient coordinators.

^aRecipient coordinator only responses.

Table 3. Communication Across Care Settings and Between Health Providers.

	Responses by role			Responses by center		
	Registered nurse %	Nephrologist %	Coordinator %	Kidney care clinic %	Regional transplant clinic %	Provincial transplant center %
<i>I can easily access information to understand where my patients are at in the pretransplant process</i>	18	8	100	11	27	92
<i>I can obtain enough information about potential kidney donors and their progress in the pretransplant process to plan my patients' care and treatments</i>	6	15	100	10	10	78
<i>I can readily access other teams (KCC, transplant) when I have questions about my patients</i>	58	85	75	71	78	79
<i>I can contact the provincial donor and transplant teams for information and support when I need it</i>	58	62	100 ^a	48	71	100

Note. Coordinators include donor and recipient coordinators.

^aDonor coordinator only responses.

Table 4. Staff Knowledge.

	Responses by role			Responses by center		
	Registered nurse %	Nephrologist %	Coordinator %	Kidney care clinic %	Regional transplant clinic %	Provincial transplant center %
<i>I have enough knowledge to educate patients on their eligibility for kidney transplant</i>	71	92	100 ^a	60	75	100
<i>I have enough knowledge to educate patients on the risk and safety of living donation</i>	68	77	100 ^b	53	67	100
<i>I have enough knowledge to explain the steps of pretransplant process to my patients</i>	64	69	100 ^b	51	72	100
<i>I have enough knowledge to support my patients with finding a donor</i>	48	46	100	39	48	83

Note. Coordinators include donor and recipient coordinators.

^aRecipient coordinator only responses.

^bDonor coordinator.

Table 5. Staff Perception of the Patient Experience.

	Responses by role			Responses by center		
	Registered nurse %	Nephrologist %	Coordinator %	Kidney care clinic %	Regional transplant clinic %	Provincial transplant center %
<i>My patients have a good understanding of all the steps in the transplant process</i>	25	23	50	20	35	50
<i>The pretransplant process is easy to navigate and complete for my patients</i>	22	8	100 ^a	19	28	58
<i>The process of finding a living donor is easy to navigate and complete for my patients</i>	18	8	100 ^a	13	17	45

Note. Coordinators include donor and recipient coordinators.

^aDonor coordinator only responses.

Patient Experience of Transplant Process

Patients who received transplant education were more likely to understand the investigations required for the transplant evaluation process (66% vs 22%). Fifty-two percent of the patients who received education thought the investigations were easy for them to complete, and 61% said they were supported by their health care team throughout the testing process. Fifty-one percent of patients who received education responded they were updated regarding their status in the pretransplant process, while 75% of potential kidney recipients who had received transplant education were comfortable seeking information or questions about the transplant process compared with 44% of potential recipients yet

to receive transplant education. Some comments that are representative of patients' experience in the transplant evaluation process include the following:

“Have had blood work done for a possible donor and now haven't heard anything in months.”

“Most people I talk to are reluctant to commit to donation.”

Discussion

We conducted surveys for health care providers and patients to explore the perception of our current pretransplant process

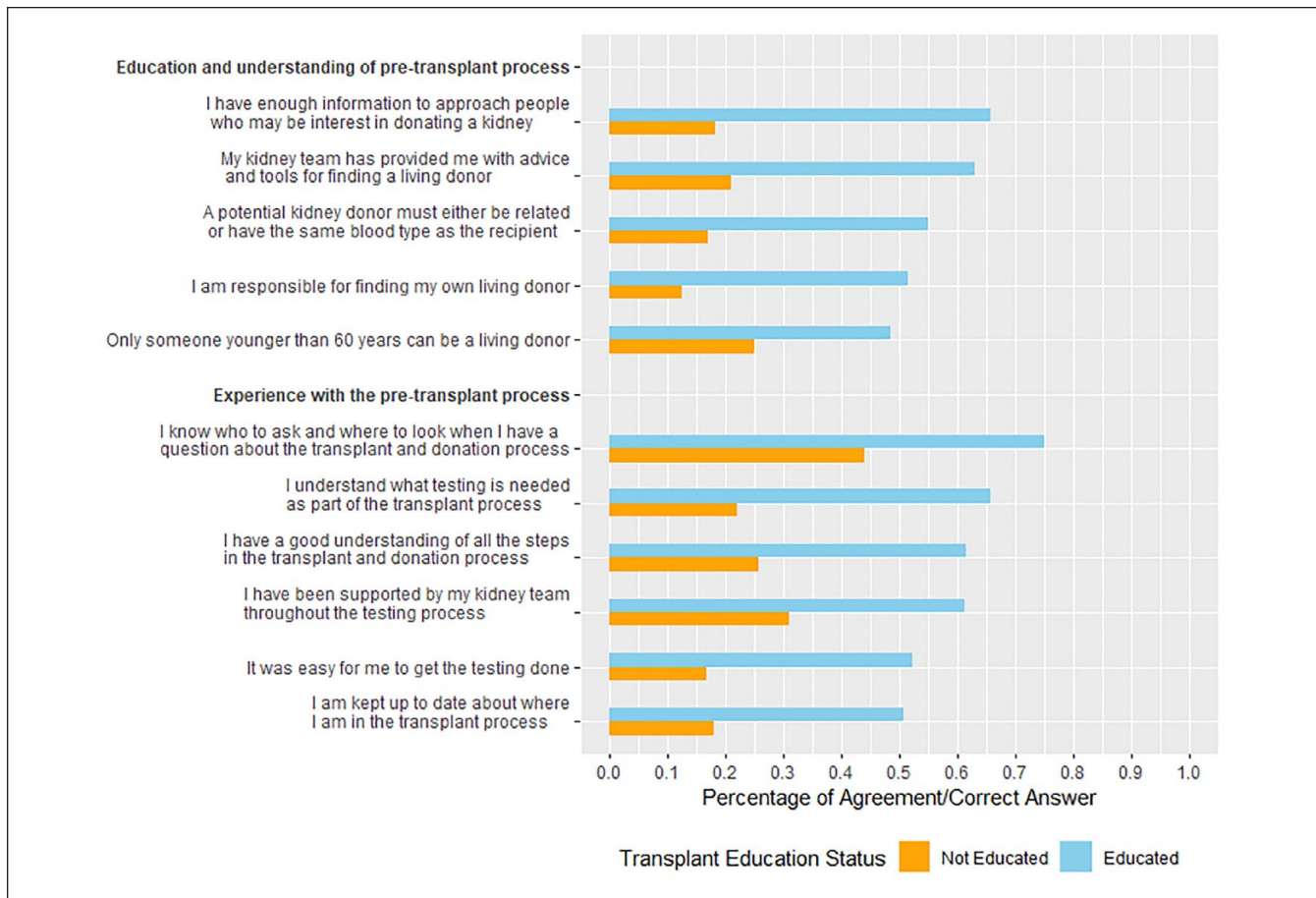


Figure 2. Bar chart showing patient survey responses.

across the province; the responses offer insight and provide an opportunity to identify and address barriers during the education and assessment phases of the kidney transplantation process.

In BC, the primary responsibility of determining the suitability of potential kidney recipients is served by the transplant nephrologist; however, general nephrologists play a vital role as their existing relationship with patients provides a platform to recognize patients who may benefit from kidney transplantation and initiate these conversations. Seventy-seven percent of nephrologists were aware of the patient referral criteria, while 62% were aware of tests required for transplant evaluation at the provincial transplant center. Health care staff in regional transplant clinics were more familiar with these referral criteria than those in KCCs (72% vs 47%). Similarly, less than half of the staff respondents were aware of the transplant evaluation process. Lack of awareness of the transplant process is reported as the third significant barrier to kidney transplantation by health care staff in the Southeastern United States.¹² Health care providers in BC previously expressed the need for formalized training sessions as they felt this was a barrier to preemptive live

donor kidney transplantation (LDKT).⁸ There are ongoing opportunities to enhance access to transplantation by focusing on improving the understanding and familiarity with the pretransplant process and candidate selection criteria among general nephrologists and other KCC staff.

Transplant education emerged as a major theme in staff and patient survey responses. Patients who begin transplant education within their dialysis centers or from their community nephrologists are more likely to complete transplant evaluation successfully, get on the transplant waiting list, and receive living donor kidney transplants.^{5,13-15} The KDIGO recommends commencing transplant education once eGFR is <30 mL/min/1.73 m² in all patients expected to reach ESKD and for transplant workup to begin at least 6 to 12 months before anticipated dialysis initiation.⁹ From our analysis, only 23% of nephrologists and 55% of nurses provided transplant education in advance of other renal replacement therapies (RRTs). About 38% and 29% provided transplant education prior to other RRTs at kidney care and regional transplant clinics, respectively, indicating that focusing on early transplant discussions may be another potential strategy to consider.

Educating patients on the donor's experiences, motivations, and benefits of living versus deceased transplantation may increase patients' comfort with LDKT. Our study shows that more than 60% of patients felt equipped with the knowledge, practical advice, and tools to approach a potential donor after transplant education. While this is a 3-fold increase compared with those who did not yet have education, the remaining 40% did not feel confident with the knowledge received to approach donors; indicating there are further opportunities to close the knowledge gap and improve transplant education.

Following the completion of transplant education, our analysis revealed that at least 60% of patients understood the pretransplant clinical processes and felt supported by their health care provider during the testing process. More than 70% of patients knew who to contact should questions arise during the process. Interestingly, there is a distinction between patient and staff responses. About 20% of health care staff indicated their patients had a good grasp of the transplant process and were easy to navigate. This discordance suggests longitudinal conversations with patients after the initial transplant education is necessary. The patient survey responses reveal less than half (40%) of patients received transplant education multiple times.

Communication emerged as another theme from our survey responses, a common concern from previous studies on nonmedical barriers to kidney transplantation.^{7,8,12} While 78% of health care providers in provincial transplant centers could obtain information on the progress of kidney donor evaluation, only 10% of KCC and regional transplant clinic health care providers felt updated with donor evaluation progress. This suggests there are opportunities to improve the current means of communication between provincial transplant centers and other clinics.

All health care providers acknowledged inadequate communication about the patient's journey and transplant processes with their primary care providers. Only one respondent (nephrologist) confirmed that primary care doctors were informed about the patient's journey in the pretransplant processes. Patients rely on their primary care physicians to help access specialized medical care¹⁶ and are likely to provide support and motivation for their patients with kidney disease, including donor outreach. Primary care is an underutilized resource, and understanding how best to integrate primary care providers into this process requires further exploration.

The strengths of this study are it captures a broad range of perspectives, including physicians, patients, nurses, and coordinators serving a diverse patient population as we have in BC. We explore staff and patient perceptions of the transplant evaluation process. Studies in this area typically focus on dialysis staff perception and are generally not presented with self-described patient perspectives on transplant evaluation. Our survey findings reflect the importance of communication on a patient level and among various health care staff involved in managing CKD.

Limitations must be considered in interpreting results. Given the requirement for participants to agree to participate in this study, we acknowledge the risk of selection bias. Interest for survey participation was sent via post to capture patients who do not have electronic means to assess information. Our findings may also be affected by patient and staff response bias; however, this was addressed by making the survey anonymous. Our results from the patient survey rely on self-reported education on kidney transplantation, thus subject to recall bias. Furthermore, we are not aware of which patients received formal transplant education.

Another limitation to consider is our survey is not exhaustive. Our survey allowed us to understand better the current state of BC's pretransplant processes, its complexities, and potential challenges. Our survey did not examine patient demographics; however, multiple studies continue to advance the discussions on racial, age, and sex disparities in kidney transplant referral, evaluation, and waitlisting.¹⁷⁻¹⁹

Finally, our survey was conducted during the COVID-19 pandemic and may need to account for practice changes that occurred during the pandemic. There was an increase in telehealth tools during the pandemic, likely impacting responses.

Conclusion

We have identified elements within our pretransplant practice that serve as an opportunity to improve access to transplantation in BC. Improvement strategies should prioritize communication between stakeholders, particularly provincial transplant centers and other kidney clinics, health care staff training on transplant processes, and timely (including reinforcement) transplant education for our patients. Future projects should focus on streamlining the current pretransplant process and quality improvement programs on transplant education.

Ethics Approval and Consent to Participate

The study protocol was reviewed by our institutional research ethics board and approved to proceed as a limited risk study exempt from full review. Informed consent was obtained from all patients and care providers who volunteered to participate in the surveys.

Consent for Publication

Consent for publication was obtained from all authors.

Availability of Data and Materials

Not applicable.

Acknowledgment

All authors thank the transplant first committee and working groups, BC renal CKD research groups for their feedback on our methodology and the PAAC project group, Alberta, on sharing their experience and survey questions in a similar project.



Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Oshorenu Aiyegbusi  <https://orcid.org/0000-0003-4300-3220>
 Micheli Bevilacqua  <https://orcid.org/0000-0001-8321-7413>

Supplemental Material

Supplemental material for this article is available online.

References

- Schnuelle P, Lorenz D, Trede M, Van Der Woude FJ. Impact of renal cadaveric transplantation on survival in end-stage renal failure: evidence for reduced mortality risk compared with hemodialysis during long-term follow-up. *J Am Soc Nephrol*. 1998;9(11):2135-2141. doi:10.1681/ASN.V9112135.
- Port FK, Wolfe RA, Mauger EA, et al. Comparison of survival probabilities for dialysis patients vs cadaveric renal transplant recipients. *JAMA*. 1993;270:1339-1343.
- Canadian Institute for Health Information. Annual statistics on organ replacement in Canada: dialysis, transplantation and donation, 2010 to 2019. <https://www.cihi.ca/en/annual-statistics-on-organ-replacement-in-canada-2011-to-2020>. Published 2020. Accessed January 11, 2023.
- Gallon LG, Leventhal JR, Kaufman DB. Pretransplant evaluation of renal transplant candidates. *Semin Nephrol*. 2002;22(6):515-525. doi:10.1053/snep.2002.35966.
- Waterman AD, Peipert JD, Hyland SS, McCabe MS, Schenk EA, Liu J. Modifiable patient characteristics and racial disparities in evaluation completion and living donor transplant. *Clin J Am Soc Nephrol*. 2013;8(6):995-1002. doi:10.2215/CJN.08880812.
- Navaneethan SD, Aloudat S, Singh S. A systematic review of patient and health system characteristics associated with late referral in chronic kidney disease. *BMC Nephrol*. 2008;9:3. doi:10.1186/1471-2369-9-3.
- Harding JL, Perez A, Snow K, et al. Non-medical barriers in access to early steps of kidney transplantation in the United States—a scoping review. *Transplant Rev (Orlando)*. 2021;35(4):100654. doi:10.1016/j.trre.2021.100654.
- Horton A, Nugus P, Fortin MC, Landsberg D, Cantarovich M, Sandal S. Health system barriers and facilitators to living donor kidney transplantation: a qualitative case study in British Columbia. *CMAJ Open*. 2022;10(2):E348-E356. doi:10.9778/cmajo.20210049.
- Chadban SJ, Ahn C, Axelrod DA, et al. Summary of the kidney disease: improving global outcomes (KDIGO) clinical practice guideline on the evaluation and management of candidates for kidney transplantation. *Transplantation*. 2020;104(4):708-714. doi:10.1097/TP.0000000000003137.
- BC Transplant. Organ donation & transplant statistics. <http://www.transplant.bc.ca/Documents/Statistics/2022-BC-Organ-Donation-Transplant-Summary.pdf>. Published 2022. Accessed May 12, 2022.
- BC Renal. PROMIS. <http://www.bcrenal.ca/health-professionals/professional-resources/promis>. Accessed April 11, 2023.
- Browne T, McPherson L, Retzlaff S, et al. Improving access to kidney transplantation: perspectives from dialysis and transplant staff in the Southeastern United States. *Kidney Med*. 2021;3(5):799-807.e791. doi:10.1016/j.xkme.2021.04.017.
- Kutner NG, Zhang R, Huang Y, Johansen KL. Impact of race on predialysis discussions and kidney transplant pre-emptive wait-listing. *Am J Nephrol*. 2012;35(4):305-311. doi:10.1159/000336891.
- Cankaya E, Cetinkaya R, Keles M, et al. Does a predialysis education program increase the number of pre-emptive renal transplantations? *Transplant Proc*. 2013;45(3):887-889. doi:10.1016/j.transproceed.2013.02.075.
- Waterman AD, Peipert JD, Xiao H, et al. Education strategies in dialysis centers associated with increased transplant wait-listing rates. *Transplantation*. 2020;104(2):335-342. doi:10.1097/TP.0000000000002781.
- Grumbach K, Selby JV, Damberg C, et al. Resolving the gatekeeper conundrum: what patients value in primary care and referrals to specialists. *JAMA*. 1999;282:261-266. doi:10.1001/jama.282.3.261.
- Lipford KJ, McPherson L, Hamoda R, et al. Dialysis facility staff perceptions of racial, gender, and age disparities in access to renal transplantation. *BMC Nephrol*. 2018;19:5. doi:10.1186/s12882-017-0800-6.
- Wesselman H, Ford CG, Leyva Y, et al. Social determinants of health and race disparities in kidney transplant. *Clin J Am Soc Nephrol*. 2021;16:262-274. doi:10.2215/CJN.04860420.
- Vinson AJ. Gender disparities in access to kidney transplant: inequities in the inequity. *Kidney Int Rep*. 2022;7(6):1145-1148. doi:10.1016/j.ekir.2022.03.034.