

Impact of Insurance Status on Outcomes After Kidney Transplant Among Out-of-state Recipients

Marcia Garcia, LCSW; Francis L. Weng, MD, MSCE; Tracy Grogan, MS; Lisandra D. Achaibar, MPH, Saint Barnabas Medical Center, Livingston, NJ

Patients with end-stage renal disease (ESRD) who wish to get a kidney transplant must have adequate insurance in order to be considered suitable candidates. States are not required to accept patients with out-of-state Medicaid coverage and are free to impose restrictions on coverage (Ehlers, 2002; Preussler, Farnia, Denzen, & Majhail, 2014). This study sought to determine, among out-of-state recipients who received kidney transplants at Saint Barnabas Medical Center between 2010 and 2014, the impact of having Medicaid as a secondary insurance provider. We also examined the relationship between patient outcomes and psychosocial variables. Patients with Medicaid as a secondary insurance plan had similar one-year allograft survival and similar rates of readmissions compared to patients with other insurance types.

INTRODUCTION

End-stage renal disease (ESRD) has been defined as complete and permanent kidney failure treated with either a kidney transplant or dialysis. ESRD is a chronic illness that requires patients to select the treatment modality that best fits their lifestyle. As of December 31, 2014, more than 650,000 people were suffering from ESRD, 70.3% of people with ESRD were receiving some type of dialysis, and 29.7% had a functioning kidney transplant (United States Renal Data System (USRDS), 2016). Patients who receive a diagnosis of ESRD are encouraged by their renal team to seek kidney transplantation as an alternative treatment to dialysis. Patients who select kidney transplantation as a treatment modality commit to taking medications for the rest of their lives to support the transplanted kidney. Transplant recipients also need reliable access to medical care, as they are closely followed by the transplant team for the life of the transplanted kidney (Organ Procurement Transplant Network (OPTN) Minority Affairs Committee, 2014).

Kidney transplantation is usually the optimal treatment for ESRD, but the wait times for kidneys vary throughout the country for this procedure (Mathur, Ashby, Sands, & Wolfe, 2010; OPTN Minority Affairs Committee, 2014). “The median wait time for a person’s first kidney transplant is 3.6 years, and can vary, depending on health, compatibility, and availability of organs” (National Kidney Foundation (NKF), 2017). In an effort to reduce wait time, patients may choose to list themselves at centers in other donation service areas, a process referred to as “multiple listing.” Out of the 65,383 people active on the United Network for Organ Sharing (UNOS) national kidney transplant waiting list, 4,762 are listed at multiple centers as of May 21, 2017 (OPTN, 2017).

To be listed for a kidney transplant at a center, ESRD patients must have an acceptable form of insurance to pay for the costs of transplantation. ESRD patients who are receiving treatment for their renal disease are deemed Medicare eligible. To qualify for Medicare benefits, ESRD patients must have a work history inclusive of 40 work quarters. In 2007, approximately 209,000 people received Medicare coverage as a result of ESRD. Part B of Medicare covers 80% of outpatient services, including dialysis treatments and outpatient medical care that post-transplant patients receive (Paradise & Garfield, 2013). The cost of Medicare Part B premiums is determined by the income of the recipient. Out of the 209,000 ESRD Medicare beneficiaries, less than 1 in 10 rely solely on Medicare for healthcare coverage. This means that only 18,100 people have Medicare and some form of supplemental insurance coverage to fully cover outpatient healthcare expenses. To be fully insured under Medicare benefits, patients need to obtain a secondary policy that picks up the 20% of what Medicare Part B does not cover. This includes 20% of transplant patients’ immunosuppressive medications and 20% of the cost of the patient’s post-transplant clinic visits (Umans & Nonnemaker, 2009).

To qualify for Medicaid, an individual needs to be a resident of the state where they are applying for the entitlement, 65 years or older, blind, or permanently disabled and must meet specific financial criteria that vary from state to state. Nationally, the Medicaid program finances over 16% of all personal healthcare spending in the U.S. (Paradise, 2017). Most Medicaid beneficiaries would be uninsured or underinsured without this entitlement.

Insurance type influences a patient’s access to healthcare providers. ESRD patients with private insurance have a greater likelihood of being assessed for transplant and being

Corresponding author: Marcia Garcia, Renal and Pancreas Transplant Division, Saint Barnabas Medical Center, 94 Old Short Hills Road, Livingston, NJ 07039; Marcia.Garcia@rwjbh.org

deemed suitable candidates than patients with Medicare or Medicaid (Johansen, Zhang, Huang, Patzer, & Kutner, 2012). Medicaid patients who cross state lines have less access to kidney transplant centers compared to patients with private insurance (Mathur et al., 2010). There have been few studies specifically examining barriers faced by out-of-state Medicaid recipients attempting to access kidney transplant services (Dubay et al., 2016). Since Medicaid is jointly administered through the federal government and individual states, coverage for medical services differs from state to state (OPTN Minority Affairs Committee, 2014). Additionally, centers are not required to accept patients with out-of-state Medicaid coverage (Preussler, Farnia, Denzen, & Majhail, 2014). States are also free to impose restrictions on coverage for Medicaid patients who travel out-of-state (Ehlers, 2002). The healthcare advocacy organization, Families USA, states, “providers have little incentive to enroll in another state’s Medicaid program if this would entail accepting a reimbursement rate that is lower than the Medicaid rates in the provider’s home state” (Families USA, 2003).

Our study sought to determine, among out-of-state recipients who received kidney transplants at our center, the impact of having Medicaid as a secondary insurance provider. A retrospective chart review was used to compare outcomes. We looked specifically to see if these patients have worse outcomes (graft loss), required more readmissions, have greater financial need, and needed more staff involvement post-transplant, compared to out-of-state recipients who did not have Medicaid as their secondary insurance.

METHODS

Sample

A retrospective chart review was performed on 79 patients. This study was approved for human subjects by the Institutional Review Board at Saint Barnabas Medical Center (SBMC). Informed consent was not required for completing a retrospective chart review.

Inclusion criteria

Patients were included in data collection if they were adults (over 18 years old), received a kidney transplant between January 1, 2010, and December 31, 2014, and had a home address in a state other than New Jersey. This resulted in 81 medical charts to review. Only patients who received a transplant from SBMC and had a legal home address in a state other than New Jersey were included. Two patients were excluded due to missing information regarding post-transplant outcomes.

Study setting

Saint Barnabas Medical Center is a large kidney transplant center located in north-central New Jersey. Since 2007, SBMC has performed more than 200 kidney transplants annually.

Our center uses a multidisciplinary approach when evaluating a patient’s suitability for kidney transplant listing. On evaluation day, pre-transplant patients and their families receive formal education about our transplant program, including the benefits of multiple listing. Patients and their families then meet with the transplant physician, nurse, social worker, and dietitian. The social work assessment is comprehensive. The purpose of this assessment is to identify certain psychosocial variables that are considered to be low, moderate, or high risk factors that contribute to poor patient outcomes. The initial assessment provides the transplant social worker with the opportunity to educate patients about their potential financial responsibilities following a transplant, including copays for medications and cost of insurance premiums. Patients are also educated about the restrictions they will have post-transplant, including crowd avoidance and no driving for several weeks after surgery.

During the pre-transplant evaluation, the social worker asks the patient to identify their support system, the people closest to them who will provide transportation and assist them with some of their activities of daily living after transplant. The social worker also collects self-reported information about a patient’s compliance with medical care and medications.

The social work team at our center recognizes that patients who present with adequate insurance coverage, an intact support system, and access to viable transportation have less risk for poor outcomes, compared to patients who have transportation issues, a limited support system, and inadequate insurance coverage for transplant costs. The latter of these two patient groups are considered to have moderate risk factors and would be required to meet with the transplant social worker every six months after activation on the transplant waiting list to ensure psychosocial stability.

VARIABLES

Patients were stratified into three insurance categories for analysis. This included people with private insurance as their primary insurance (referred to as private insurance patients). Patients with Medicare as their primary insurance and Medicaid as their secondary insurance were referred to as Medicaid patients. Patients with Medicare as their primary insurance and with no secondary insurance or a secondary insurance besides Medicaid were referred to as patients with other insurance.

Demographic information abstracted from patients’ charts included date of transplant, type of transplant donor (deceased or living), primary and secondary medical insurance at the time of transplant, home state of the patient, barriers to post-transplant care (including access to lab services and transportation), and transplant outcomes. This information is available to the public on the Centers for Medicare & Medicaid Services (CMS) website.

To determine patient outcomes, hospital readmission data was collected. This was separated into two categories 1) readmissions within 1 year post-transplant, and 2) readmissions within 1 to 3 years post-transplant. Patients who required hospitalization for treatment of rejection and infection episodes signify a poor outcome (Uysal et al., 2016).

The next outcome abstracted was subacute rehabilitation. This is required when patients have been hospitalized for an extended period of time and are unable take care of themselves independently. Therefore, it is unsafe to discharge them home, especially if they reside alone. As this outcome required an additional short-term institutional stay, this was considered a poor outcome (Allen et al., 2011).

Lastly, the graft function variable was abstracted. "Graft function" means the kidney (graft) was still functioning at the time of data abstraction. Those who no longer had graft function were considered to have graft failure and needed dialysis. For analysis, this has been divided into time intervals: 1) graft failure within 1 year post-transplant; 2) graft failure between 1 year and the patient's last visit; and 3) no graft failure which means the transplanted kidney was still functioning at the time of data collection.

Analysis

Descriptive statistics and chi square tests were used to summarize the data. Analyses were completed by two trained researchers. Analyses were performed in IBM SPSS Statistics (23.0). Regression analyses were not run on outcomes because of the small sample size and the limited amount of outcomes data available.

RESULTS

Baseline characteristics (Table 1A and Table 1B)

This study included 79 kidney transplant recipients who lived outside of New Jersey (where our transplant center is located). Of those, 25 patients (31.6%) had primary private insurance at the time of transplant (private insurance patients). Forty patients (50.6%) had Medicare as their primary insurance and a secondary insurance provider other than Medicaid (other patients). Fourteen patients (17.7%) had Medicare as their primary insurance and Medicaid as the secondary insurance (Medicaid patients) at the time of transplant. Patients were followed for a mean of 3.3 years, within a range of 1–6 years and for a median of 4 years. More than half of the sample was over 50 years old at the time of transplant (65.8%), white (58.2%), or male (73.4%). Most of the participants were married (78.5%) or living with someone (89.95%). More than half of the sample was disabled (60.8%) or unemployed (57.5%) at the time of transplant. A little

more than half of the sample received a deceased donor renal transplant (DDRT) (57%) as compared to 43% who received a living donor renal transplant (LDRT). Overall, 29.1% of our sample required extra staff support/interventions after transplant took place. We found that more than half of the total sample (62%) did not require readmission within the first year after transplant surgery. 92.4% of patients did not require readmission 1–3 years post-transplant. Only three of the 79 patients required subacute rehabilitation. 92.4% of the sample had a functioning kidney at the end of data abstraction (Table 1A and Table 1B).

Characteristics of Medicare & Medicaid Patients Post-Transplant (Table 2A and Table 2B)

Of particular interest to our study were patients who lived outside of New Jersey and had Medicare as their primary insurance and Medicaid as their secondary insurance. We categorized the 79 patients into three insurance groups: private insurance ($n = 25$), Medicare with Medicaid secondary ($n = 14$), and Medicare with other non-Medicaid secondary insurance ($n = 40$). Of the Medicaid patients, 71.4% were unemployed and 92.9% were disabled. 21.4 percent of the Medicaid patients were living alone at the time of transplant. Almost half of Medicaid patients required extra staff support after transplant (42.9%) (Table 2A). 14.3% of Medicaid patients also utilized financial grants provided by outside charitable organizations to assist with a variety of their post-transplant out-of-pocket costs (referred to as the "extra funding given" variable, Table 2A). Although it was not guaranteed that Medicaid would cover annual checkups out-of-state, 92.9% of Medicaid patients opted to receive their post-transplant care at SBMC despite the possibility of incurring additional medical costs (Umans & Nonnemaker, 2009). Compared to the other two insurance groups, patients with Medicaid received more deceased donor renal transplants (85.7%) than living donor renal transplants (14.3%, $p < 0.01$).

In terms of post-transplant outcomes, patients in the Medicaid insurance group did not have the worst outcomes out of the three different insurance categories. When comparing all outcome variables designated in Table 2B, Medicaid patients did not have the worst results of each category. Private insurance patients had the same percentage of readmissions within 1 year post-transplant as Medicaid patients (44.0% private, 43.9% Medicaid, $p > 0.6$). The Medicaid group had the highest frequency of readmissions 1–3 yrs. post-transplant (21.4% Medicaid, 8.0% private, 2.5% other, $p < 0.07$). Ninety-three percent of Medicaid patients had a functioning kidney at the time of data collection completion (92.9%). This was similar to the allograft survival of patients in the private insurance group (88.0%) and other insurance group (95%) which can be found in Table 2B ($p > 0.47$).

Table 1A. Sociodemographic characteristics of out-of-state patients who received a kidney transplant at SBMC between 2010–2014

Total, n = 79 (100), n (%)		
Age at transplant (years old)	< 40	6 (7.6)
	40–49.99	21 (26.6)
	50–59.99	21 (26.6)
	< 60	31 (39.2)
Sex	Male	58 (73.4)
	Female	21 (26.6)
Race	White	46 (58.2)
	Non-white	33 (41.8)
Race (expanded)	Asian	6 (7.6)
	Black	19 (24.1)
	Hispanic	8 (10.1)
	White	46 (58.2)
Home state	NY	46 (58.2)
	PA	23 (29.1)
	Other	10 (12.7)
Marital status	Married	62 (78.5)
	Not married	17 (21.5)
Lives alone	Yes	8 (10.1)
	No	71 (89.95)
Disabled	Yes	48 (60.8)
	No	31 (39.2)
Driver's license	Yes	24 (30.4)
	No	2 (2.5)
	Unknown	53 (67.1)
Employment	Full time	7 (17.5)
	Part time	2 (5.0)
	Retired	8 (20)
	Unemployed	23 (57.5)
U.S. citizen	Yes	76 (96.2)
	No	3 (3.8)
Type of transplant	DDRT	45 (57.0)
	LDRT	34 (43.0)
Number of prior kidney transplants	No prior kidney transplants	60 (75.9)
	1 prior kidney transplant	17 (21.5)
	2 prior kidney transplants	2 (2.5)
Utilized Post-Transplant Surveillance (PTS*)	Yes	23 (29.1)
	No	56 (70.9)
Received patient grants **	Yes	5 (6.7)
	No	74 (93.2)
Labs completed outside of SBMC	Yes	20 (25.3)
	No	59 (74.7)

continued...

Table 1A. Sociodemographic characteristics of out-of-state patients who received a kidney transplant at SBMC between 2010–2014 continued...

Received psych evaluation post-transplant	Yes	2 (2.5)
	No	77 (97.5)
Transfer-of-care to local transplant center***	Yes	4 (5.1)
	No	75 (94.9)
Insurance type	Private	25 (31.6)
	Medicare & Medicaid	14 (17.7)
	Medicare & non-Medicaid	40 (50.6)

79 patients were included in the study who received a kidney transplant from Saint Barnabas Medical Center (SBMC) and lived outside of New Jersey.

* Post-Transplant Surveillance (PTS) Team involves an intervention by one or several members of the multidisciplinary team for high-risk patients in need of extra support to promote a positive outcome.

**Received patient grants; includes funding by private organizations given to patients who need help obtaining medication, transportation, or insurance payment.

***Some patients preferred to receive post-transplant care in their own home state, which would be covered by Medicaid, instead of out-of-state coverage at SBMC.

Table 1B. Post-transplant characteristics of out-of-state patients who received a kidney transplant at SBMC between 2010–2014

Variables	Total n = 79 (100%), n (%)	
Readmissions within 1 year post-transplant	Yes	30 (38.0)
	No	49 (62.0)
Readmissions 1–3 years post-transplant	Yes	6 (7.6)
	No	73 (92.4)
Subacute rehabilitation*	Yes	3 (3.8)
	No	76 (96.2)
Graft function	Yes	73 (92.4)
	No	6 (7.6)
Graft failure	Within 1 year post-transplant	2 (2.5)
	Between 1 year and last visit	4 (5.1)
	No graft failure	73 (92.4)
Patient deaths	Yes	8 (10.1)
	No	71 (89.9)

79 patients were included in the study who received a kidney transplant from Saint Barnabas Medical Center (SBMC) and lived outside of New Jersey.

*Subacute rehabilitation is required when patients cannot independently take care of themselves post-transplant.

Table 2A. Sociodemographic characteristics of out-of-state patients who received a kidney transplant at SBMC between 2010–2014 by insurance type

		Private, <i>n</i> = 25 <i>n</i> (%)	Medicare + Medicaid, <i>n</i> = 14 <i>n</i> (%)	Medicare + Other Secondary /None, <i>n</i> = 40 <i>n</i> (%)	<i>p</i> -value
Age at transplant (years old)	< 40	1 (4.0)	2 (14.3)	3 (7.5)	.51
	40–49.99	5 (20.0)	6 (42.9)	10 (25.0)	
	50–59.99	9 (36.0)	2 (14.3)	10 (25.0)	
	> 60	10 (40.0)	4 (28.6)	17 (42.5)	
Sex	Male	20 (80.0)	9 (64.3)	29 (72.5)	.56
	Female	5 (20.0)	5 (35.7)	11 (27.5)	
Race	White	18 (72.0)	5 (35.7)	23 (57.5)	.09
	Non-white	7 (28.0)	9 (64.3)	17 (42.5)	
Race (expanded)	White	18 (72.0)	5 (35.7)	23 (57.5)	.18
	Black	2 (8.0)	7 (50.0)	10 (25.0)	
	Hispanic	3 (12.0)	1 (7.1)	4 (10.0)	
	Asian	2 (8.0)	1 (7.1)	3 (7.5)	
Home state	NY	15 (60.0)	12 (85.7)	19 (47.5)	.10
	PA	8 (32.0)	2 (14.3)	13 (32.5)	
	Other	2 (8.0)	0 (0.0)	8 (20.0)	
Marital status	Married	23 (92.0)	7 (50.0)	32 (80.0)	.01
	Not married	2 (8.0)	7 (50.0)	8 (20.0)	
Lives alone	Yes	3 (12.0)	3 (21.4)	2 (5.0)	.20
	No	22 (88.0)	11 (78.6)	38 (95.0)	
Disabled	Yes	10 (40.0)	13 (92.9)	25 (62.5)	< .01
	No	15 (60.0)	1 (7.1)	15 (37.5)	
Driver's license	Yes	4 (16.0)	7 (50.0)	13 (32.5)	.11
	No	0 (0.0)	1 (7.1)	1 (2.5)	
	Unknown	21 (84.0)	6 (42.9)	26 (65)	
Employment	Full time	9 (36.0)	0 (0.0)	7 (17.5)	.14
	Part Time	2 (8.0)	1 (7.1)	2 (5.0)	
	Retired	6 (24.0)	3 (21.4)	8 (20.0)	
	Unemployed	8 (32.0)	10 (71.4)	23 (57.5)	
U.S. citizen	Yes	25 (100.0)	12 (85.7)	39 (97.5)	.07
	No	0 (0.0)	2 (14.3)	1 (2.5)	
Type of transplant	DDRT	8 (32.0)	12 (85.7)	25 (62.5)	< .01
	LDRT	17 (68.0)	2 (14.3)	15 (37.5)	
Number of prior kidney transplants	No prior kidney transplants	17 (68.0)	10 (71.4)	33 (82.5)	.24
	1 prior kidney transplant	8 (32.0)	4 (28.6)	5 (12.5)	
	Two prior kidney transplants	0 (0.0)	0 (0.0)	2 (5.0)	
Utilized post-transplant surveillance (PTS*)	Yes	3 (12.0)	6 (42.9)	14 (35.0)	.06
	No	22 (88.0)	8 (57.1)	26 (65.0)	

continued...

Table 2A. Sociodemographic characteristics of out-of-state patients who received a kidney transplant at SBMC between 2010–2014 by insurance type *continued...*

Received patient grants**	Yes	2 (8.0)	2 (14.3)	1 (2.5)	.27
	No	23 (92.0)	12 (85.7)	39 (97.5)	
Labs completed outside of SBMC	Yes	7 (28.0)	1 (7.1)	12 (30.0)	.22
	No	18 (72.0)	13 (92.9)	28 (70.0)	
Received psych evaluation post-transplant	Yes	0 (0.0)	2 (14.3)	0 (0.0)	.01
	No	25 (100.0)	12 (85.7)	40 (100.0)	
Transfer-of-care to local transplant center***	Yes	0 (0.0)	1 (7.1)	3 (7.5)	.38
	No	25 (100.0)	13 (92.9)	37 (92.5)	

79 patients were included in the study who received a kidney transplant from Saint Barnabas Medical Center (SBMC) and lived outside of New Jersey.

* Post-Transplant Surveillance (PTS) Team involves an intervention by one or several members of the multidisciplinary team for high-risk patients in need of extra support to promote a positive outcome.

**Received patient grants; includes funding by private organizations given to patients who need help obtaining medication, transportation, or insurance payment.

***Some patients preferred to receive post-transplant care in their own home state, which would be covered by Medicaid, instead of out-of-state coverage at SBMC.

Table 2B. Post-transplant characteristics of out-of-state patients who received a kidney transplant at SBMC between 2010–2014 by Insurance type

		Private, <i>n</i> = 25 <i>n</i> (%)	Medicare + Medicaid, <i>n</i> = 14 <i>n</i> (%)	Medicare + Other Secondary/ None, <i>n</i> = 40 <i>n</i> (%)	<i>p</i> -value
Readmissions within 1 year post-transplant	Yes	11 (44.0)	6 (43.9)	13 (32.5)	.60
	No	14 (56.0)	8 (57.1)	27 (67.5)	
Readmissions 1–3 years post-transplant	Yes	2 (8.0)	3 (21.4)	1 (2.5)	.07
	No	23 (92.0)	11 (78.6)	39 (97.5)	
Subacute rehabilitation*	Yes	0 (0.0)	1 (7.1)	2 (5.0)	.46
	No	25 (100.0)	13 (92.9)	38 (95.0)	
Graft function	Yes	22 (88.0)	13 (92.9)	38 (95.0)	.58
	No	3 (12.0)	1 (7.1)	2 (5.0)	
Graft failure	Within 1 year post txp	0 (0.0)	1 (7.1)	1 (2.5)	.24
	Between 1 year and last visit	3 (12.0)	0 (0)	1 (2.5)	
	No graft failure	22 (88.0)	13 (92.9)	38 (95.0)	
Patient deaths	Yes	1 (4.0)	1 (7.1)	6 (15.0)	.33
	No	24 (96.0)	13 (92.9)	34 (85.0)	

79 patients were included in the study who received a kidney transplant from Saint Barnabas Medical Center and lived outside of New Jersey.

*Subacute Rehabilitation is required when patients cannot independently take care of themselves post-transplant.

DISCUSSION

This study sought to determine the impact of Medicaid as a secondary insurance provider among out-of-state recipients who received kidney transplants. Previous studies have examined social support and specific financial needs/barriers that Medicaid beneficiaries face after transplant. Several studies report that Medicaid patients often lack access to adequate transportation (Allen et al., 2011; Davis et al., 2014; DuBay et al., 2016; Evans et al., 2010; Mathur et al., 2010). In our study, patients with Medicare and out-of-state Medicaid did not have worse outcomes than patients in the other insurance categories. Almost all of Medicare and out-of-state Medicaid patients had a functioning kidney at the time of follow-up (92.9%). The United States Renal Data System (USRDS) reports, nationally, the percentage of patients with functioning kidneys 3 years after transplant in 2013 was 95.1% for living donor transplants and 91.1% for deceased donor transplants (USRDS, 2016). The results of our study indicated that Medicaid patient outcomes are comparable to the national average.

In this study, 92.9% of patients with Medicaid were deemed disabled at the time of transplant and 71.4% were unemployed (**Table 2A**). Both of these patient subsets faced financial challenges with affording their post-transplant care. Our center has access to two privately funded charitable organizations which provide limited funding resources to transplant recipients who meet specific psychosocial criteria. Medicaid patients were deemed eligible to receive and utilize grants from outside private charitable organizations (14.3%). These grants were used toward the cost of a variety of post-transplant expenses, including patients' primary insurance premiums, copays on medications, and transportation services. Supermarket gift cards and gas cards were given to recipients as needed. In short, patients with Medicaid required some financial support from our center, as compared to patients with other types of insurance. Transplant centers are concerned that patients with Medicaid as secondary insurance are more likely to miss their post-transplant appointments due to lack of access to paid transportation services (Evans et al., 2010). In previous studies, a lack of transportation may serve as a significant barrier for Medicaid patients (Davis et al., 2014). Despite Medicaid patients' lack of access to transportation in past studies, 92.9% of patients continued to receive care at SBMC and did not transfer to a center closer to home (**Table 2A**). Given that almost all patients received pre- and post-transplant medical care at our center, a lack of access to transportation was not an issue for Medicaid patients.

In 2010, our center recognized that specific subsets of our post-transplant recipients have a higher chance of developing psychosocial complications immediately after transplant. Our center assembled a team of our own practitioners to provide these patients with extra support. The Post-Transplant

Surveillance (PTS) Team consists of a nurse practitioner, social worker, registered dietitian, registered nurse, financial coordinator, and pharmacist. Our PTS program has become a useful internal resource for our patients and has helped to improve outcomes. We had hypothesized that Medicaid patients would require additional staff support. Our results revealed that almost half (42.9%) of these patients were referred to and utilized the PTS program. This finding, in particular, reinforced the significance of the patient-identified support system and impact on patient outcomes.

Patients with out-of-state Medicare and secondary Medicaid had outcomes that are comparable to patients in the other insurance groups. When measuring allograft function, patients with secondary Medicaid fared better than patients with private insurance (**Table 2B**).

LIMITATIONS

This study should be interpreted in light of the following limitations. This study had a small sample size. This was a result of the majority of our center's transplant recipients living in New Jersey. Only 18% of our sample had Medicare and out-of-state Medicaid insurance. Despite these limitations, patient histories obtained from charts reviewed contained sufficient detail to create a larger picture of the barriers out-of-state patients face with multiple listing in other areas.

The acceptable short-term and medium-term outcomes for the out-of-state kidney transplant recipients in our study may not be applicable to other transplant centers. These acceptable outcomes partially stem from our PTS program, which provides extra support to patients, post-transplant. The size of our transplant program allows for sufficient staffing to provide extra support to patients who meet the criteria for either referral to the PTS program or for outside funding resources. Additionally, our center has established relationships with two privately funded charitable organizations that provide grants to transplant recipients who meet predetermined criteria. In order to understand the influence of the PTS program on patient outcomes, an in-depth study examining patient outcomes before and after the implementation of the PTS program would add comparable data.

Future studies could examine a larger sample of out-of-state transplant recipients at other centers to allow for sufficient power to run regression analyses on outcomes. This could determine statistically significant relationships between provision of home care services, for example, and insurance providers and its impact on graft survival. Since a number of patients included in the study utilized our PTS program (**Table 2A**) a larger study examining insurance outcomes on centers without a PTS program could determine whether our findings resembled those of other centers.

CONCLUSION

Our study sought to determine the impact of Medicaid as a secondary insurance provider among out-of-state recipients who received kidney transplants. While small in sample size, the study has shown that patients with Medicaid as a secondary insurance provider required additional staff interventions and extra funding resources. Additionally, our PTS program addressed some of the post-transplant psychosocial issues we identified amongst Medicaid patients. Fortunately, the out-of-state transplant recipients with secondary Medicaid benefits did not have worse outcomes as compared to patients in the two other specified insurance categories. Our study determined that there are psychosocial risk factors, such as the early identification of a patient's support system, which holds significant value in determining patient outcomes. Based upon the results of our study, transplant centers can carefully consider patients who live out-of-state and have Medicaid as their secondary insurance coverage as potentially suitable transplant candidates.

AUTHOR NOTE

Marcia Garcia, LCSW, Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. Marcia Garcia is now at Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. This research was not financially supported.

Francis Weng, MD, Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. Francis Weng is now at Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. This research was not financially supported.

Lisandra Achaibar, MPH, Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. Lisandra Achaibar is now at Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. This research was not financially supported.

Tracy Grogan, MS, Renal and Pancreas Transplant Division, Saint Barnabas Medical Center. Tracy Grogan was with the Renal and Pancreas Transplant Division, Saint Barnabas Medical Center from March 2016 to August 2016 while the study was active. This research was not financially supported.

REFERENCES

- Allen, J. G., Arnaoutakis, G. J., Orens, J. B., McDyer, J., Conte, J. V., Shah, A. S., & Merlo, C. A. (2011). Insurance status is an independent predictor of long-term survival after lung transplantation in the United States. *The Journal of Heart and Lung Transplantation*, 30(1), 45–53.
- Davis, A. E., Mehrotra, S., McElroy, L. M., Friedewald, J. J., Skaro, A. I., Lapin, B., ... & Ladner, D. P. (2014). The extent and predictors of waiting time geographic disparity in kidney transplantation in the United States. *Transplantation*, 97(10), 1049–1057.
- DuBay, D. A., MacLennan, P. A., Reed, R. D., Shelton, B. A., Redden, D. T., Fouad, M., ... & Locke, J. E. (2016). Insurance type and solid organ transplantation outcomes: A historical perspective on how Medicaid expansion might impact transplantation outcomes. *Journal of the American College of Surgeons*, 223(4), 611–620.
- Ehlers, S. E. (2002). Financial aspects of organ transplantation. *Nephrology Nursing Journal*, 29(3), 285.
- Evans, R. W., Applegate, W. H., Briscoe, D. M., Cohen, D. J., Rorick, C. C., Murphy, B. T., & Madsen, J. C. (2010). Cost-related immunosuppressive medication nonadherence among kidney transplant recipients. *Clinical Journal of the American Society of Nephrology*, 5(12), 2323–2328.
- Families USA. (2003). *Interstate Medicaid billing problems: Helping Medicaid beneficiaries who get care out of state*. Retrieved from http://familiesusa.org/sites/default/files/product_documents/Interstate%20Medicaid%20Billing%20Problems.pdf
- Johansen, K. L., Zhang, R., Huang, Y., Patzer, R. E., & Kutner, N. G. (2012). Association of race and insurance type with delayed assessment for kidney transplantation among patients initiating dialysis in the United States. *Clinical Journal of the American Society of Nephrology*, 7(9), 1490–1497.
- Mathur, A. K., Ashby, V. B., Sands, R. L., & Wolfe, R. A. (2010). Geographic variation in end-stage renal disease incidence and access to deceased donor kidney transplantation. *American Journal of Transplantation*, 10(4p2), 1069–1080.
- National Kidney Foundation (NKF). (2017). *Organ donation and transplantation statistics*. Retrieved from <https://www.kidney.org/news/newsroom/factsheets/Organ-Donation-and-Transplantation-Stats>
- Organ Procurement and Transplant Network (OPTN) Minority Affairs Committee. (2014). *Educational guidance on patient referral to kidney transplantation*. Retrieved from <https://optn.transplant.hrsa.gov/resources/guidance/educational-guidance-on-patient-referral-to-kidney-transplantation/>

Organ Procurement and Transplantation Network (OPTN). (2017). *National data* [Data file]. Retrieved from <https://optn.transplant.hrsa.gov/data/view-data-reports/national-data/#>

Paradise, J. (2017). *10 things to know about Medicaid: Setting the facts straight*. Henry J. Kaiser Foundation. Retrieved from <https://www.kff.org/medicaid/issue-brief/10-things-to-know-about-medicaid-setting-the-facts-straight/>

Paradise, J., & Garfield, R. (2013). *What is Medicaid's impact on access to care, health outcomes, and quality of care? Setting the record straight on the evidence*. Henry J. Kaiser Foundation. Retrieved from <https://www.kff.org/medicaid/issue-brief/what-is-medicaids-impact-on-access-to-care-health-outcomes-and-quality-of-care-setting-the-record-straight-on-the-evidence/>

Preussler, J. M., Farnia, S. H., Denzen, E. M., & Majhail, N. S. (2014). Variation in medicaid coverage for hematopoietic cell transplantation. *Journal of Oncology Practice*, 10(4), e196–e200.

Umans, B., & Nonnemaker, K. L. (2009). *The Medicare beneficiary population*. AARP Public Policy Institute. Retrieved from https://assets.aarp.org/rgcenter/health/fs149_medicare.pdf

United States Renal Data System (USRDS). (2016). *USRDS annual data report: Epidemiology of kidney disease in the United States*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases.

Uysal, E., Dokur, M., Bakir, H., Ikidag, M. A., Kirdak, T., & Kazimoglu, H. (2016). The reasons of renal transplant recipients' admission to the emergency department; A case series study. *Emergency*, 4(4), 207–210.