Severity of Chronic Pain Affects Health Care Utilization After Kidney Transplantation

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ABSTRACT

Background. While the association between chronic pain and high health care utilization is a known issue in the general population, this relation has not been well studied among kidney transplantation patients.

Methods. The subjects were first-time kidney transplant recipients engrafted between 2003 and 2006 and 6 months to 5 years postoperatively. Using SF-36 Bodily Pain Scale, patients were categorized in three groups: group I, those with scores over 66.6; group II, between 66.6 and 33.3; and group III, over 33.3. The subjects' health care utilization was prospectively assessed by recording the number of hospital admission days and the frequency of home nurse visits, outpatient physician visits, and emergency department visits for any medical reason in a 6-month period.

Results. A stepwise increase in the frequency of patients admitted to the hospital ($P = .017$), and those referred to emergency departments ($P = .007$) was correlated with greater severity of pain in the three groups. However, the frequency of patients having outpatient physician visits ($P = .30$) or home nurse visits ($P = .387$) did not vary significantly. Similarly, with increased pain severity, an increase was observed in the number of emergency department visits ($P = .005$) and duration of hospital stays ($P = .049$), but not in the number of home nurse ($P = .890$) or physician visits ($P = .112$).

Conclusion. The severity of pain seems to increase the amount of health care use among kidney transplant patients. To minimize associated costs, appropriate pain rehabilitation programs are suggested.

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CHRONIC PAIN is associated with high direct and indirect costs for health care systems. It is among the primary reasons for patients seeking health care.[1] The direct medical costs caused by pain amount to over $100 billion per year in the United States.[2] There is evidence showing that health care utilization is independently associated with chronic pain in the general population.[3,4] The high-utilization patients are found to be more focused on their bodily symptoms such as pain.[5] It is also known that chronic pain frequency influences health care utilization in a society with universal access to health care.[6]

The high prevalence of pain among end-stage renal disease (ESRD) patients decreases after kidney transplantation.[7–9] However, some patients continue to suffer from chronic pain, and pain has been reported to be a cause of morbidity among kidney transplant recipients.[10,11] In fact, some studies have reported that chronic bodily pain in these patients is as severe as among those undergoing chronic hemodialysis.[12]

Considering that the impact of chronic pain on health care utilization has rarely been previously studied in kidney transplantation, as evidenced by the authors' search in PubMed, and in particular, there are scanty data from developing countries, this study sought to assess the correlation between the severity of pain and health care utilization among kidney transplant patients.

MATERIALS AND METHODS

In this cross-sectional study, we studied an Iranian population who had undergone kidney transplantation between 2003 and 2006. Informed consent was obtained from each patient; the patients were assured that their private information would be kept confidential.

Inclusion criteria were first-time kidney transplantation patients who were clinically stable, had a functional graft as evidenced by a serum creatinine ≤1.2 mg/dL in women or ≤1.4 mg/dL in men, and had coverage by a medical insurance package.[13] Only patients who received their kidney transplant at least 6 months and at most 5 years before enrollment were included in the study. This criterion was based on previous evidence showing that yearly health care costs stabilized at 6 months after kidney transplantation and remained in a steady state for several years thereafter.[14] We excluded patients who died before the end of the follow-up period. We recorded demographic data (age, sex, and level of education), monthly family income, etiology of ESRD, history of dialysis (before and after transplantation), and rejection.

The two-item Bodily Pain Scale from SF-36 (SF-36 BP) was used as the measure of pain severity.[15] This scale includes a six-level categorical scale of pain intensity (ranging from "none" to "very severe"), and a five-level categorical scale of pain interference with normal work (ranging from "not at all" to "extremely"), which are combined into a single composite score of pain severity transformed to a 0 to 100 scale, with lower scores indicating higher levels of pain severity. SF-36 BP score has been previously used as a pain measurement tool.[16] Based on SF-36 BP score, patients were categorized into three groups: group I, a BP score over 66.6; group II, between 66.6 and 33.3; and group III, less than 33.3.

During a 6-month period, the subjects were interviewed monthly on the phone, and their health care utilization was prospectively assessed by recording the number of hospital admission days and the frequency of outpatient physician-visits, home nurse visits, and emergency department visits for any medical reason. The frequencies of patients in each of the three patient groups having used each of the aforementioned health care services were compared. Alternatively, the three patient groups were compared in terms of the duration of hospitalization and the number of home nurse, physician, and emergency department visits.

Statistical analysis was performed using SPSS version 13. The frequencies of categorical variables in the three study groups were compared using chi-square test. Kruskal Wallis test was used for comparison of ordinal variables (eg, no. of hospitalization days and physician visits) among the three groups. *P* values less than .05 were considered statistically significant.

RESULTS

Overall, 122 patients finished the study. The mean value ± SD of patient age was 44.17 ± 14.00 years (range, 18 to 73 years). Demographic and some ESRD-related clinical data of the patients are shown in Table 1. Of the 122 patients, 53, 26, and 43 fell into the pain-related groups I, II and III, respectively (see Methods). Table 2 shows the frequency of the utilization of each measured health service among the three groups of the patients. A stepwise increase in the

Table 1. Demographic and ESRD-Related Clinical Data of 122 Iranian Renal Transplant Patients Studied for Health Care Utilizations Associated With Chronic Pain

	No. (%)
Gender	
Male	81 (66.39%)
Female	41 (33.61%)
Marital status	
Married	85 (70.00%)
Single	30 (24.17%)
Widowed	3 (2.50%)
Divorced	4 (3.33%)
Education level	
Illiterate	8 (6.09%)
Primary school	21 (17.39%)
Not finished high school	34 (27.83%)
High school diploma	37 (30.43%)
University/college degree	22 (18.26%)
Monthly family income (US$)	
<200	57 (46.22%)
200–300	49 (40.34%)
300–400	9 (7.56%)
>400	7 (5.88%)
Etiology of ESRD	
Diabetes	12 (9.57%)
Hypertension	41 (33.91%)
Urological disease	1 (0.87%)
Congenital disease	9 (6.96%)
Glomerulonephritis	24 (20.00%)
APCKD	4 (3.48%)
Others	12 (9.56%)
Unknown	19 (15.65%)
Dialysis before transplantation	95 (77.87%)
Dialysis after transplantation	12 (9.62%)

APCKD, adult polycystic kidney disease.

frequency of patients admitted to hospital ($P = .017$) and those referred to emergency departments ($P = .007$) was seen as the severity of pain increased in the three groups of the patients. However, the frequency of patients having had outpatient physician visits ($P = .30$) or home nurse visits ($P = .387$) did not vary significantly among the three groups.

Table 3 shows the difference in the length of hospital stay and the number of home nurse visits, outpatient physician visits, and patients' emergency department visits in the three groups. As the severity of pain increased in the three groups, a significant increase was observed in the number of emergency department visits ($P = .005$). Though the duration of hospital stays also increased with a marginally significant statistical difference ($P = .049$), no significant change was observed in the number of home nurse visits ($P = .890$) or physician visits ($P = .112$) with increased severity of pain.

DISCUSSION

Our study showed that an increase in the severity of chronic bodily pain after kidney transplantation was accompanied by an increase in the utilization of some health care services, such as hospital admissions days and emergency department visits. Though the authors could not find any other study reporting a correlation between the severity of chronic pain and health care utilization among transplant patients in PubMed indexed literature, several studies have reported the impact of pain on health care utilization.[17–21]

In our study, 56% of posttransplantation patients reported chronic bodily pain, of whom 62% reported severe pain. In one study, 50% of the kidney transplant group and 46% of the liver transplant group complained of more than one pain location.[22] Egfjord and Ladefoged found significantly higher consumption of narcotic analgesics among a group of kidney transplant patients compared to controls.[23]

A possible reason for the high prevalence of chronic pain after transplantation may be maintenance immunosuppressive or antirejection therapies.[22] Several retrospective studies have reported severe pain, restriction of movement, transient musculoskeletal pain, and leg bone pain syndrome among kidney transplant patients treated with cyclosporine.[24–27]

Table 2. The Frequencies of 122 Renal Transplant Patients in Each of the Three Pain-Related Patient Groups Having Utilized Each of the Four Assessed Health Care Service Categories

Health Care Service	Group I ($n = 53$), No. (%)	Group II ($n = 26$), No. (%)	Group III ($n = 43$), No. (%)	*P* Value
Home nurse visit	1 (1.9)	3 (11.5)	4 (9.3)	.387
Hospital admission	19 (36.0)	15 (57.7)	27 (63.8)	.017
Physician visit	51 (96.2)	24 (92.3)	40 (93.0)	.300
Emergency department visit	12 (22.6)	9 (34.6)	22 (51.2)	.007

Table 3. The Difference in the Length of Hospital Stay, and the Number of Home Nurse Visits, Outpatient Physician Visits, and Patients' Emergency Department Visits Among the Three Pain-Related Groups of 122 Iranian Patients After Renal Transplantation

	Group I ($n = 53$), No. (%)	Group II ($n = 26$), No. (%)	Group III ($n = 43$), No. (%)	*P* Value
Home nurse visits				
No use	52 (98.1)	23 (88.5)	39 (90.6)	
<10 visits	1 (1.9)	0 (0)	2 (4.7)	.890
≥10 visits	0 (0)	3 (11.5)	2 (4.7)	
Hospitalization days				
No use	34 (64.2)	11 (42.3)	16 (37.2)	
<10 days	11 (20.8)	9 (34.6)	7 (16.3)	.049
≥10 days	8 (15.0)	6 (23.1)	20 (46.5)	
Physician visits				
No use	2 (3.8)	2 (7.7)	3 (7.0)	
<10 visits	34 (64.2)	15 (57.7)	24 (55.8)	.112
≥10 visits	17 (32.1)	9 (34.6)	16 (37.2)	
ED visits				
No use	41 (77.4)	17 (65.4)	21 (48.8)	
<10 visits	12 (22.6)	9 (34.6)	21 (48.8)	.005
≥10 visits	0 (0)	0 (0)	1 (2.4)	

ED, emergency department.

Our study showed a correlation between the severity of bodily pain and the frequency of emergency department visits. This is consistent with previous reports demonstrating that a high proportion of patients referred to emergency departments have chronic pain as their chief complaint.[28]

Pain is known to be costly for the health care system. The direct health care costs related to chronic pain may even exceed the combined costs of treating patients with coronary artery disease, cancer, and AIDS.[29] These high costs may be caused by expensive medications, devices, or surgeries used for pain control.[30] In addition, the indirect costs, including loss of work days as well as reductions in work productivity and well-being (which are believed to be several times larger than the direct costs), should also be added to the pain-related costs.[31]

In conclusion, this study showed that a considerable proportion of kidney recipients report experiencing some forms of chronic pain and that the severity of pain affects their health care use. Therefore, it is suggested that high costs of post–renal transplantation care might be decreased through appropriate pain rehabilitation programs.

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