Compliance with Recommended Life Style Behaviors in Kidney Transplant Recipients

Does It Matter in Living Donor Kidney Transplant?

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Introduction. Lifestyle after transplantation is the key link between transplantation and its outcome, and it is crucial to comply with the recommended life style behaviors. Our aim was to assess the compliance of kidney transplant recipients to the recommended life style behaviors in Mansoura, Egypt.
Materials and Methods. One hundred kidney transplant patients were surveyed on their compliance with the recommended lifestyle behaviors including transplant medications, preventing from infections, diet, exercise, regular medical visits, personal hygiene, sexual activity, and cancer prevention.
Results. Most of the kidney recipients were compliant with the immunosuppressants. One-third of the participants were compliant with low-salt diet. Noncompliance with annual dental and eye checkup was reported in the majority of the subjects 94.0%. Compliance with infection prevention was partial. Half of the patient had a poor compliance with exercise or were not complying the recommendations at all. Only 9.0% of the patients were avoiding sun exposure. The majority of women were not compliant with breast self-examination. One-third of the patients consulted with their nephrologists about their sexual problems, and only half of the women were compliant with family planning program. The women were less compliant than men with medications (P = .02), and poor compliance with medications was more frequent among those with living unrelated donors (P = .04).
Conclusions. Our kidney transplant patients had good compliance with immunosuppressive medications, but not with most of the recommended behaviors. Intensive assessment of patients before and after transplantation should be done to identify their needs which help planning to improve their compliance.

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INTRODUCTION

The number of patients undergoing kidney transplantation is increasing every year.[1] Compliance is a very important issue in medical and nursing care of kidney transplant recipients.[2,3] Shafeek reported that in Philadelphia, noncompliance occurred in about 50% of all adults for whom long-term medication regimen had been prescribed.[4] Kyngas and lahdenpera classified compliance into 3 degrees including good, average, and poor.[5] In addition, they divided the factors associated with compliance into internal and external factors. The

internal factors are patient's characteristics such as age, social background, values, attitudes, and emotions caused by the disease. External factors include impact of education, the relationship between the patient and the healthcare personnel, and the support from the family. The interview method has been described as a reliable method for non-compliance assessment.[6]

The Nurse must consider many issues facing the transplant recipient such as medication management, infection prevention, chronic disease management, fluid balance, urine output, and many psychological issues that surround receiving a transplant.[7] In addition, the nurse is in a unique role to identify noncompliance as well as risk factors of developing these behaviors and to construct methods for intervening and supporting those patients.[8] This requires knowledge of the compliance patterns of kidney transplant recipients in each community. We aimed to identify the compliance of kidney transplant patients to the recommended life style behaviors.

MATERIALS AND METHODS

Patients

The present study was conducted at the Urology and Nephrology Center, in Mansoura, Egypt and comprised 100 kidney transplant patients. The study design was approved by the local ethics committee. We randomly selected these patients using their serial transplant code with the following inclusion criteria: age of 18 years or more, first kidney transplant, posttransplant follow-up of 6 months or longer, and written informed consent to enroll in the study. Eligible patients were interviewed to collect the necessary data by a special questionnaire. Physical examination was also done with special stress on measurement of body weight, temperature, blood pressure, and urine output.

Questionnaire

The questionnaire consisted of 2 parts. Part I included demographic data (age, sex, marital status, children, occupation, education, and income) and medical history (duration of dialysis and transplantation, medications, and laboratory tests). Part II was concerned with the knowledge and attitude on the recommended lifestyle behaviors of the kidney transplant patients. This part included 9 items:

(1) medications: (a) questions on the patient's knowledge on the prescribed drugs' names and their dosage (compared with the patient's file); (b) questions related to the patient's behaviors including regularities of taking the drugs, causes of irregularity in taking them, and dealing with cases of forgetting a dose of a drug and facing adverse effects;
(2) nutrition: patients behaviors toward the recommended nutrition which included the number of main meals per day, eating candy food, eating snakes, type of diet, and following the recommended diet such as including dairies in the diet and removing the chicken's skin and meat's fat;
(3) monitoring body weight, temperature, blood pressure, and fluid intake and output: patient's behavior toward the respective recommendations including regular daily measuring of these factors, using specific container for daily measurement, and dealing with diarrhea or vomiting;
(4) follow-up visits: patient's attending at the recommended time, measurements in case of missing a follow-up visit, and visits for checking up the eyes or teeth;
(5) prevention of infections: patient's behavior towards the recommendations on daily hygiene, use of crowded public transportation facilities, mouth care, dealing with infected persons, and consulting with the physician before going to a dentist;
(6) physical activity: patient's behaviors towards the recommendations on occupational physical efforts, consulting the physician about the type of work or exercise, daily hiking or other types of exercises, and regularity of exercises;
(7) smoking: type of smoking, number of cigarettes per day, attempts to decrease or stop smoking, and attending smoky places;
(8) sun exposure and cancers: exposure to mid-day sun rays, using prescribed sun screen, and regular breast self-examination (in female patients).
(9) sexual activity and social relationships: sexual counseling before marriage, consultation for sexual dysfunction, and using contraceptive methods or pregnancy monitoring (in female patients), and behaviors towards isolation,

visiting relatives or friends, preference to participate in social activities, going to open places, and consultation for marriage and sexual problem.

The questions were rated on a 4-point scale ranging from zero (never) to 3 (always) to determine the level of compliance of the kidney transplant patients to the recommended lifestyle behaviors.

Methods

The questionnaire was created under the supervision of the faculty senior staff members with experience in nursing research and medical and surgical nursing. The questions were tested to evaluate clarity, relevance to the studied problem, and adequacy in electing responses to cover the variables under study. Responses of the jury were incorporated in the list of questions and the final interview schedule was developed. A pilot study was carried out to get a preliminary idea about the developed tool. The interview schedule was tested on 10 volunteer kidney transplant patients who had been transplanted more than 6 months before and were selected by convenient sampling.

Collection of Data

Collecting the data was carried out at the outpatient clinic. Every patient was interviewed individually by the same nursing staff. The researcher explained the purpose of the study to every patient and written consent was obtained. The sheet was completed in 45 to 60 minutes for every patient. Three or 4 patients were interviewed on each day, and the data were collected over a month between January 6 and January 30, 2005. Data on laboratory studies and physical examination were also collected. Blood chemistry investigations were done prior to the interview, and physical examination was done with special stress on measurement of body weight, temperature, blood pressure, and urine output.

The participants were divided into 3 groups according to their level of compliance (good, partial, or poor) indicated in their responses. This level was determined by the total scores, which were recoded to a scale between zero and 100.[9] Scores less than 50 were defined as never or noncompliant; 51 to 70, poor compliant; 71 to 95, partial compliant; and 96 to 100, good compliant.

Statistical Analyses

Statistical analyses were carried out using the SPSS software (Statistical Package for the Social Sciences, version 11.5, SPSS Inc, Chicago, Ill, USA). All values were expressed as mean ± standard deviation for continuous parametric data. The chi-square test was used for dichotomous and categorical data. Values of P less than .05 were considered significant.

RESULTS

The mean age of the participants was 32.9 ± 97.0 years old. Twenty-five kidney recipients were between 20 and 30 years old, 50 were between 31 and 40 years, and 20 were between 40 and 60 years. The majority of patients were men in their third decade of life, with increased percentage of marriage after transplantation. Table 1 shows the marital status and number of children of the studied patients before and after transplantation. The rate of bearing children after transplantation was the same among the men and the women. The education level was primary school, secondary school, and university degree in 13, 28, and 53 patients, respectively, and 6 were illiterate. Although most of the patients (53.0%) were highly educated, 39.0% of them had no jobs.

Biomedical characteristics of the patients are summarized in Table 2. Most of the patients (68.0%) were on hemodialysis for less than 1 year. The most irritating posttransplant complication was graft rejection (26.0%). Hypertensive patients represented 20.0% of the cohort, while 12.0% were diabetic. More than half of the men did not suffer any sexual dysfunction, and more than half of the

Table 1. Marital and Child Bearing Characteristics of 100 Kidney Transplant Recipients*

Characteristics	Kidney Transplant Recipients	
	Men	Women
Number of participants	77	23
Marital status before transplant		
Single	48 (62.3)	16 (69.6)
Married	29 (37.7)	7 (30.4)
Marital status after transplant		
Single	25 (32.5)	12 (52.2)
Married	52 (67.5)	11 (47.8)
Number of children		
Before transplant	29	7
After transplant	52	11

*Values in parentheses are percents.

Table 2. Biomedical Characteristics of 100 Kidney Transplant Recipients

Characteristics	Patients (%)
Dialysis modality	
Hemodialysis	84 (84.0)
Peritoneal dialysis	7 (7.0)
Both	5 (5.0)
None	4 (4.0)
Dialysis duration*	
< 1 year	68 (70.8)
> 1 year	28 (29.2)
Donor source	
Living related	88 (88.0)
Living unrelated	12 (12.0)
Posttransplant follow-up	
< 5 years	67 (67.0)
5 to 10 years	16 (16.0)
> 10 years	17 (17.0)
Posttransplant complications	
Hypertension	20 (20.0)
Diabetes mellitus	12 (12.0)
Atherosclerosis	3 (3.0)
Hepatitis infection	3 (3.0)
Graft rejection	
Once	18 (18.0)
Twice	8 (8.0)
Male sexual problems	
Erectile dysfunction	9 (11.7)
Premature ejaculation	8 (10.4)
Both	5 (6.5)
Females' return of menstrual cycle	
Within 2 month	7 (30.4)
After 2 to 3 months	12 (52.2)
After 4 to 6 months	4 (17.4)

*Four patients with preemptive transplantation were not included.

women regained menstruation after 2 to 3 months posttransplantation.

Most of the kidney recipients, especially men (97.0%), were compliant with the prescribed immunosuppressants. Patients who were compliant with other drugs varied from 75% (to antihypertensives) to 100% (to vitamins) (Table 3). The reported causes of noncompliance with the prescribed medications were forgetfulness in 90.9 %, feeling better in 50.0%, perceiving low importance of a medication in 31.8%, and medication's side effects in 18.1%.

Regarding compliance with the recommended diets, two-thirds of the participants were compliant with low-fat diet, about half of patients were compliant with high-calcium diet and low-carbohydrate diet, and only 31.0% were compliant with low-salt diet (Table 3). The reported causes of noncompliance with the recommended diets included disliking the prescribed diet in 60.5%, lack of knowledge of prescribed diet in 39.5%, financial problems in 34.9%, and uncooperative family in 20.9%. We found that different degrees of compliance with the recommended diet were comparable in patients with variable dialysis

Table 3. Distribution of Kidney Transplant Recipients According to Level of Compliance with Prescribed Medications and Recommendations on Diet, Prevention of Infection, and Exercise*

Parameters	Patients' Level of Compliance				Total
	Good	Partial	Poor	Noncompliant	
Medication					
Immunosuppressants	97	0	3	0	100
Antihypertensives	15	5	0	0	20
Antidiabetics	12	0	0	0	12
Vitamins	78	8	14	0	100
Recommended diets					
Low-fat diet	73	5	17	5	100
High-calcium diet	42	16	32	10	100
Low-carbohydrate diet	42	18	25	15	100
Low-salt diet	31	15	11	43	100
Prevention of infection					
Daily summer bath	89	8	3	0	100
Daily winter bath	57	29	14	0	100
Avoiding overcrowded transport facilities	53	23	24	0	100
Avoiding infected persons	41	33	19	7	100
Teeth brushing					
After meal	41	10	47	2	100
Before sleep	34	6	49	0	100
Women's hygiene					
Menstrual hygiene	22	0	1	0	23
Perineal hygiene	16	0	7	0	23
Exercise (walking)	23	25	13	39	100

*The total number of the patients equals to 100 except for antihypertensives, antdiabetics, and women's hygiene parameters.

Table 4. Effect of Age, Sex, and Marital Status on Patients' Compliance with Recommended Medications

	Age, y			Sex			Marital Status		
Level of Compliance	18 to 40	41 to 60	*P*	Male	Female	*P*	Single	Married	*P*
Good	33 (41.3)	10 (50.0)		35 (45.5)	9 (39.1)		14 (36.8)	30 (48.4)	
Partial	39 (48.7)	10 (50.0)		39 (50.6)	9 (39.1)		21 (55.3)	27 (43.5)	
Poor	8 (10.0)	0	.31	3 (4.0)	5 (21.7)	.02	3 (7.9)	5 (8.0)	.74

modalities, kidney donor sources, rejection episodes, and posttransplant follow-up duration.

Compliance with daily monitoring of fluid intake, blood pressure, temperature, urinary output, and body weight measuring was reported in 12.0%, 10.0%, 7.0%, 6.0%, and 2.0% of the participants, respectively. Eighty-one percent of the kidney allograft recipients attended nephrology clinics at the proper dates. Conversely, noncompliance with annual dental and eye checkup was reported in the majority of the subjects 94.0%. The reported causes of noncompliance with follow-up attendance were "missmatched follow-up time with work time" in 47.3%, "enough drugs for additional days" in 36.8%, "expensive transportation" in 10.5%, and "crowded transportation" in 5.3%.

Compliance with measures to avoid infection was partial (Table 3); 89% of the participants had a good compliance with daily bath in summer and 57% with bathing daily in winter. Less than half of patients avoided overcrowded transportation and less than half were brushing their teeth after eating and avoided contact with infected person. On the other hand, the majority of the women were compliant with menstrual hygiene (95.7%) and proper perennial hygiene after toileting or intercourse (69.6%). Compliance with regular exercise (walking) was not satisfactory as 13.0% of the patients had poor compliance and 39.0% were not compliant at all.

Only 9.0% of the patients were avoiding sun exposure and 8.0% used sun screen to prevent skin cancer. The unmarried patients were better compliers with measures of prevention of skin cancer and early detection of breast cancer than the married patients ($P = .03$). The majority of women were not compliant with breast self-examination. Regarding smoking cessation, only 29.4% of the smokers were compliant with cessation after transplantation.

We found that more than two-thirds of the patients were compliant with the recommended marrying time. However, 30.0% of the patients consulted with their nephrologists about their sexual problems. Only half of the women were compliant with family planning program, while 91.6% of them were compliant with pregnancy follow-up.

We found no significant impact of sociodemographic factors (age, marital status, occupation, educational level, and income), dialysis modality, or transplantation characteristics on the participants' compliance with the recommended medications (Tables 4 to 8). Similarly, these factors had no impact on the compliance of the kidney transplant recipients to the recommended marital and social relations, behaviors towards avoiding infections, physical exercise, daily monitoring, follow-up visits in outpatient clinics, prevention of skin cancers and early detection of breast cancer and smoking cessation. However, the women were less compliant than men with medications ($P = .02$; Table 4). In addition, poor compliance with medications was

Table 5. Effect of Education Level on Patients' Compliance with Recommended Medications

	Education Level				
Level of Compliance	Illiterate	Primary School	Secondary School	University Degree	*P*
Good	4 (66.7)	5 (41.7)	13 (48.1)	23 (41.8)	
Partial	2 (33.3)	6 (50.0)	12 (44.4)	26 (47.3)	
Poor	0	1 (8.3)	2 (7.4)	6 (10.9)	.79

Table 6. Effect of Occupation and Income on Patients' Compliance with Recommended Medications

	Occupation						Income		
Level of Compliance	Unemployed	Employee	Professional Work	Commercial Work	Primary	*P*	High	Low	*P*
Good	15 (38.5)	6 (54.5)	13 (50.0)	9 (42.9)	1 (33.3)		22 (44.9)	22 (43.1)	
Partial	19 (48.7)	4 (36.4)	12 (46.2)	11 (52.4)	2 (66.7)		23 (46.9)	25 (49.1)	
Poor	5 (12.8)	1 (9.1)	1 (3.8)	1 (4.8)	0	.88	4 (8.2)	4 (7.8)	.79

Table 7. Effect of Dialysis and Donor on Patients' Compliance with Recommended Medications

Level of Compliance	Dialysis Modality				Donor Source			
	Hemodialysis	Peritoneal Dialysis	Both	*P*	First Degree Relative	Relative	Unrelated	*P*
Good	38 (45.2)	3 (42.9)	1 (20.0)		30 (39.5)	7 (58.3)	7 (58.3)	
Partial	38 (45.2)	4 (57.1)	4 (80.0)		42 (55.2)	4 (33.3)	2 (16.6)	
Poor	8 (9.5)	0	0	.74	4 (5.3)	1 (8.3)	3 (25.0)	.04

Table 8. Effect of Transplantation on Patients' Compliance with Recommended Medications

Level of Compliance	Rejection			Posttransplant Follow-up, mo				
	No	Yes	*P*	1 to 12	13 to 60	61 to 120	> 120	*P*
Good	34 (45.9)	10 (38.5)		1 (4.8)	2 (5.3)	3 (12.5)	2 (11.8)	
Partial	35 (47.3)	13 (50.0)		11 (52.4)	19 (50.0)	12 (50.0)	6 (35.3)	
Poor	5 (6.8)	3 (11.5)	.66	9 (42.9)	17 (44.7)	9 (37.5)	9 (52.9)	.83

more frequent among those with living unrelated donors (P = .04; Table 7).

DISCUSSION

Compliance with the treatment regimen is a major problem for many transplant patients. Noncompliance with immunosuppressive drugs may cause late acute rejection episodes, graft loss, and even death. Moreover, it causes financial burden upon the healthcare system.[10,11] Chisholm and colleagues[12] illustrated that predicting compliance of kidney transplant patients with their recommended lifestyle behaviors is useful for 2 reasons: first, it may be argued that it is undesirable to transplant an organ into a patient who is prone to serious noncompliance. Second, identifying such high-risk patients allows supportive patient education to be designed, which optimizes self-care, and hopefully, promotes compliance. The present study shedded light on compliance with the recommended lifestyle behaviors of living donor kidney transplant recipients in Urology and Nephrology Center of Mansoura University in Mansoura, Egypt. The majority of our patients (88%) had received their grafts from living related donors. It is believed that transplants are most successful when the kidney comes from a living related donor.[13]

Noncompliance with therapy is one possible explanation for lower long-term graft survival in spite of the advanced immunosuppression.[14] In the present study, most of the subjects (97%) were compliant with immunosuppressive medications (noncompliers were defined as those who missed doses of immunosuppressant). Ranging from 22% to 48%, higher percentages of noncompliance with immunosuppressive medications have been reported.[15,16] The difference in the degree of compliance may be attributed to length of time posttransplantation, age, gender, and the nature of our donors, who were almost living and mostly related compared to cadavers in other studies. Causes of noncompliance reported by our patients included forgetfulness, lack of knowledge about new drug modifications, and patient's beliefs about the effectiveness of immunosuppressives and their concerns about their side effects. Patients' compliance with drugs other than immunosuppressants was lower and ranged from 75% to 100%. However, these were higher than that reported by Douglas and coworkers[17] who found that up to 18% of their subjects were noncompliant. The lower compliance with drugs other than immunosuppressants may be due to concerns regarding their lower importance, forgetfulness, filling better, and the patient's beliefs about their side effects.

Martins and colleagues[18] noted that compliance with the recommended diet for kidney transplant recipients was an important part for outcome optimization. Some possible complications may be prevented through early nutritional intervention. Two-thirds of our patients were compliant with low-fat diet, half of them were compliant with high-calcium diet and low carbohydrate diet, and only one-third were compliant with low-salt diet. This is matched with that reported by Kiley and colleagues[19] who found that 75.2% of their subjects were compliant with dietary recommendations. The relatively high level of noncompliance may be due to lack of knowledge, low socioeconomic

status, and lack of family cooperation in providing the recommended diet.

The transplant physicians strongly recommend avoidance of smoking.[20,21] Yavuz and associates[21] found that 42% of their patients were smokers at the time of transplantation and 12% continued thereafter. However, of our 19% of our patients who were cigarette smokers at the time of transplantation, 17% continued smoking after transplantation. Moreover, only 29.4% of the smokers succeeded in smoking cessation, while 35.3% were trying to do so. This could be explained by the lack of health education program among our patients.

Skin cancers are 10 to 500 times more common in transplant patients than the general population.[22] Therefore, it is essential to limit exposure to the sun and to use proper clothing and sunscreens. Mahe and colleagues[23] found that 63% of their subjects were compliant with both protective measures. In contrast, only 71% of our patients would rarely avoided sun exposure and 61% did would not use sunscreen. The difference in behavioral response may be due to lack of knowledge of our patients about potential risk of sun exposure, while protecting the skin from sun rays is a common behavior in the Western culture. There is also greater risk of other neoplastic processes such as breast cancer.[24] The American Society for Transplantation guidelines recommend monthly breast self-examination.[25] The majority of the women in our study (78.2%) were noncompliant with breast self-examination. Talas and colleagues[26] found that only 26.8% of their female participants did regular breast self-examination. This high percentage of noncompliance with breast self-examination is simply due to lack of knowledge. Finally, the unmarried patients were better compliers with measures of prevention of skin cancer and early detection of breast cancer than the married patients ($P = .03$), a finding which was supported by De Geest and coworkers[11] who emphasized similar results. In contrast, Yavuz and colleagues[2] reported that compliance was not related to marital status.

Transplant patients need to consult nephrologists for prescription of an antibiotic when they have dental procedures.[27] In the present study, 7% to 33% were noncompliant with teeth brushing and consulting nephrologists before going to a dentist, possibly due to lack of knowledge delivered to patients by nursing staff. Women using immunosuppressant medications can develop urinary tract infections with intercourse because they are more prone to infection, and because of the proximity of the vagina, the urethra, and the anus.[25] Our results revealed that 95.7% of the women were compliant with menstrual hygiene, but 69.6% of them were compliant with proper hygiene after toileting or intercourse.

Nearly half of the women participated in this study were not using contraceptive methods after transplantation, while 91.6% of them had regular visits by an obstetrician and the transplant physician after pregnancy. Lack of knowledge about potential risks of pregnancy at improper time, in addition to urgent need of some women to form a family after transplantation, both can explain poor compliance with contraception. However, their anxiety about the new baby may explain good compliance with follow-up after conception.

Kasiske and colleagues[27] emphasized that many complications after kidney transplantation can be prevented if they are detected early. Nineteen percent of our patients were partially complied with nephrology follow-up visits. Similar results were reported by Yavuz and colleagues[2] and Kiley and associates.[19] This could be explained by interference with daily routines or having enough medication for additional time. This survey also revealed that the majority of the subjects were noncompliant with annual eye checkup, which could be explained by lack of knowledge about its importance and this raise the importance of nursing in this respect.

Transplant programs recommend daily 15- to 20-minute walking and gradually increase the time as tolerated. Only 23% of the studied patients were practicing regular exercise which was much lower than that reported by Talas and coworkers[26] who found that 56% of their subjects were practicing exercise regularly. This might be due to lack of knowledge about importance of exercise and absence of proper places for exercise.

Nearly, 60% to 80% of kidney transplant patients suffer from hypertension.[14] We found that 20% of patients were hypertensive, 40% of whom were noncompliant with regular monitoring of blood pressure. This noncompliance is due to lack of knowledge about the risks of uncontrolled hypertension, importance of monitoring blood

pressure, how they can measure their blood pressure, possible side effects of antihypertensives, and finally, lack of accurate ways to monitor blood pressure at home.

The men in our study were significantly more complier with medications (P = .02), while the women were more complier with the recommended diets (P = .03). In contrast, Kiley and colleagues[19] illustrated that men were more likely to be noncompliant with medication, whereas women were more likely to be noncompliant with diet. The difference might be attributed to the differences in socioeconomic status and the dependency of women in our society. Of other influencing factors on compliance was donor source; our patients with living related donors were more compliant with immunosuppressive medications than those with unrelated donors (P = .04), which is not matched with that reported by Yavuz and colleagues[2] who mentioned lower compliance with similar patients. The difference might be due to that all our donors were living, and mostly related, with potential role of the encouragement of the family to comply with the recommended behaviors.

CONCLUSIONS

Our kidney transplant patients, especially the men, had good compliance with the prescribed immunosuppressive medications. On the other hand, the women were more likely to be compliant with diet. Intensive assessment of patients before and after transplantation should be done to identify their needs which help the plan to improve their compliance. The nurse must provide the kidney transplant patients with the necessary knowledge of the recommended life style behaviors.

CONFLICT OF INTEREST

None declared.

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