

Barriers to Adherence to Medical Care Programs in Liver Transplant Recipients: A Qualitative Study

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ABSTRACT

Background: Non-adherence to medical care programs in transplant recipients is considered one of the life-threatening factors in transplant recipients, which can prevent achieving the desired levels of health care.

Objective: To determine perceptions of liver transplant recipients about the barriers to their adherence to medical care programs.

Methods: This study was conducted based on a qualitative content analysis method using semi-structured interviews with 23 liver transplant recipients, their families, and the transplant teams. A purposive sampling method was used in liver transplant clinics affiliated to Tehran University of Medical Sciences, Tehran, Iran, from May to November 2017.

Results: Three main categories including factors related to therapeutic problems (educational problems and medication challenges), personal factors (self-management disability), as well as social problems (cultural conditions and passive family) were identified as the barriers to adherence to medical care programs.

Conclusion: Paying attention to barriers to adherence to medical care and planning for moderating them in a collaborative effort between transplant recipients and health care providers could increase the likelihood of survival and quality of life in these patients.

KEYWORDS: Medication adherence; Liver transplant; Qualitative research; Iran; Therapeutic misconception

INTRODUCTION

The short-term outcomes of liver transplantation, as the treatment of choice for liver failure, have been signifi-

cantly improved over the past three decades. However, figures and statistics indicate that the long-term consequences have not reached to an acceptable level yet [1]. Research studies have also shed light on the important and active roles of patients in terms of maintaining their health care and its impact on improving the results of transplant surgery. One of the post-transplant requirements is adherence to the medical care programs [2]. Lack of adherence to post-transplantation medical care programs is considered one of the challenges of

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health care system across the world causing mortality, reduced quality of life, as well as increased costs [3-6].

Despite the importance of the adherence to medical care provided after transplantation, several studies indicated the non-adherence rate among liver transplant recipients ranging from 22% to 62% [7]; non-adherence in attending post-operative appointments ranged from 3% to 47% [2]. Half of liver transplant recipients require re-admission within the first year of transplantation for non-adherence to the instructions provided. The therapeutic costs for these patients are estimated at US\$ 21,600 and more [8, 9].

Non-adherence to medical care by recipients is a behavior worth to be explored. Therefore, it is necessary to determine the factors underlying such a behavior [10]. Some researchers believe that prescribing numerous medications and supplements, and complicated medical care programs provided are among factors leading to the non-adherence [11]. Low levels of self-efficacy as well as having negative beliefs about medications can also result in non-compliance [12].

Liver transplant in Iran has a history of more than two decades [13]. The two most important active liver transplant centers are Avicenna Hospital in Shiraz, and Imam Khomeini Hospital Complex in Tehran [14]. The number of liver recipients is also rising due to improvements in transplant surgeries [15]. However, no study has so far been conducted on various factors affecting non-adherence to medical care programs provided post-transplantation. We therefore conducted a qualitative study to investigate this issue.

MATERIALS AND METHODS

This study was a qualitative research using a conventional content analysis method. Purposive sampling was used to maximize variation in the sample for the duration of transplantation, age, sex, occupation status, level of education, and cause of transplantation. The co-

ordinator physician identified the mentioned samples post-transplantation to achieve suitable key informants. To this end, 18 persons were selected out of the liver transplant recipients; two family members and three members of the transplant team were also chosen to triangulate the data sources.

The research context was the Liver Transplant Clinics affiliated to Imam Khomeini Hospital in Tehran. Data collection started from May and continued until data saturation was achieved in November 2017. After 20 interviews, data saturation was achieved but three more interviews were carried out, in which no new codes and categories were emerged.

The inclusion criteria of the study were recipients aged over 18 years with at least three months after transplantation, with no other disabilities. The family members were also living with the recipients and were informed of post-transplantation medical care procedures. The members of the transplant teams also had at least one-year experience in working in the team and were active at the time of the study [16].

Data collection instruments were in-depth semi-structured interviews lasting for 20-60 minutes. The main focus of the interviews was on the factors and the underlying conditions affecting the health care of recipients. Examples of key questions from the moderator guide for conducting interview with liver transplantation recipient are "What actions and factors can have a negative effect on the results of your liver transplant?"; "What problems are you facing in your care procedure?"; and "What factors do make you disappointed of implementation of treatment programs?" The questions also continued with raising exploratory questions. For example, "You said that some conditions make you worried or exacerbate your stress to continue your treatments. Can you explain the given conditions?"

The questions were asked with the changes about factors that affect the adherence to the medical care in liver transplant recipients from family and liver transplant team.

Data analysis was conducted using qualitative content analysis method developed by Elo and Kyngas [17]. The MAXQD software ver 10 was used to manage the data. The analysis consisted of three phases of preparation, organization, and reporting. The preparation could start with the determination of the semantic unit wherein the transcribed interviews were considered the unit of analysis. Immediately after the interviews, their transcriptions were repeatedly reviewed and was tried to grasp the general sense of the data and gain information about what was going on.

In the organization phase, the content of the transcriptions was determined based on checking and reviewing its consistency with the objectives and consequently a number of codes emerged. Codes with similar meanings were labeled with one category; the connected categories were placed under one main category. After the main categories were formed, they were presented as the results of the data analysis.

Raising the sense of acceptance (believability and credibility of the data) was performed through having maximum variation in sampling, collecting enough data, selecting appropriate semantic units, citing participants' quotes to specify differences among categories, dedicating sufficient time to data collection, as well as being frequently and iteratively involved with the data. Moreover, member checking, peer debriefing, and peer reviews were considered. Besides, the interviews were simultaneously coded by the researchers and the supervising professor. Reviews by an external observer were also taken into account. Likewise, the transferability of the data was achieved through providing rich descriptions [18].

The study was approved by the Research Council and the Ethics Committee of Hamedan University of Medical Sciences and also by the Liver Research Center of Tehran University of Medical Sciences. The clients were ensured about their voluntary participation and confidentiality of their data. All the participants were also informed about the re-

search objectives and signed written informed consent forms for all research steps.

RESULTS

The mean±SD waiting time for receiving liver transplant among the study participants was 31.2±27.0 (range: 4–120) months. The mean±SD duration of membership in the transplant team was 33.3±3.2 years. The mean duration of attendance and taking care of recipients by the family members was 30 months. Data analysis in this group of participants led to identification of three factors as barriers to adherence to medical care programs. The factors were associated with treatment problems (educational problems and medication challenges), personal factors (self-management disability), as well as social problems (cultural conditions and passive family) (Table 1).

Treatment Problems

Educational Problems

Educational problems, one of the most important factors in the non-adherence, can be categorized into “inhibitors of learning” and “educational shortcomings and deficits.”

Inhibitors of learning (bewilderment): Confusion in the implementation of care and treatment was one of the barriers extracted in the data analysis. Liver transplant recipients found controversial contents and guidelines provided by the treatment team confusing. A male transplant recipient after four months of transplantation said that “*I received a booklet. Once, my daughter had asked about it, but they had said that the booklet was not very important. I do not know whether the booklet was old or there were other ones. I do not know exactly what that booklet was; it was just a booklet including pieces of advice on having or not having beans or other stuff. A physician told my daughter to skip this booklet.*” (P. 19)

It was assumed that giving different instructions and advice during visits would result in lack of stability and continuity of treatment.

Table 1: Barriers to adherence to medical care programs in liver transplant recipients

Main category	Category	Subcategory 1	Subcategory 2
Therapeutic problems	Educational problems	Inhibitors of Learning	Bewilderment Lack of educated personnel
		Educational Shortcomings and Deficits	Deficits in educational content Unfamiliarity with and lack of knowledge about medications
	Medication challenges	Pharmacological complications Uncertainty in purchasing medications Costs of medications	
Individual factors	Self-management disability	Lack of habit management	Psychological dependence Cognitive disorders Depression-regret Fatigue
		Mood disorders	
Social Problems	Cultural conditions	Deficiency to perception sensitivity and importance Resistance and non-adherence Inability in problem-solving Failure to time management Limiting negative beliefs	
		To be rejected To be judged Stigma	
	Passive family	Lack of psychological support Lack of therapeutic support	

Educational shortcomings and deficits: Lack of educational personnel as well as absence of responses to the questions could lead to one of the barriers in the implementation of caregiving services in the eyes of a transplant recipient who needed to receive education. Transplant recipients considered unawareness and lack of knowledge about what they were required to do one of the factors inhibiting their learning. It is necessary to have access to someone informed in this domain who can answer various questions posed by recipients. For example, a liver recipient after five months of transplantation added that *“There is no one as a social worker to help you and give advice if some events happen or you need to have a long-distance travel. For example, I do not still know what time I can do exercises because there is no one to answer and help.”* (P. 2)

Providing rich educational contents about the essential information was among the needs demanded by the study recipients. A recipient after 36 months of transplantation stated that *“For example, if they provide a list of restrictions on medication use, we will not bother other friends. As an example, I know that co-amoxiclav tablet should not be taken. However, there are some friends who are less literate calling to ask about this medicine for the first times and then skip it which can lead to other problems.”* (P. 18)

Lack of knowledge about medications was one of the other essential issues raised in educating patients after transplantation. Knowledge about transplant medications by recipients and even their families is of utmost importance. Lack of knowledge about medications, dura-

tion of use, and how to use them, as well as symptoms and care associated with their use are all considered educational necessities; lack of knowledge about each of these cases can lead to acute life-threatening problems for patients. A female recipient after 20 months of transplantation added that *“Frankly speaking, I did not know about my medicine. I did not know that I had to take prednisolone tablets every day. I thought that was a reinforcing medication. So, one week had passed by and I had not taken it. My father said why I had not asked to buy it. I did not think that the given medication was very important. I even do not know how many days passed by until I felt bad.”* (P. 20)

Medication Challenges

Medication use in this group was of great importance. It was considered a guarantee for the survival of the transplant. The transplant recipients faced two major problems including severe complications of medications that would lead to their death, if not controlled, and difficulties with purchasing medications, as one of the cumbersome cases in this domain.

Pharmacological complications: Various complications associated with medication use were identified as one of the barriers to adherence to medical care programs spelled out by transplant recipients. One of the recipients after five months of transplantation said that *“I think that these are the side effects of medications because I was someone who did not mind others’ words. I did never care for them. But, now, I hit the ceiling as I hear the smallest words. I cannot control my nerves. I fight with everybody and this has affected what I do. I get angry, I suffer from lack of attention, I no longer eat them.”* (P. 6)

Uncertainty in the Purchase of Medications: The transplant recipients were suffering from lots of fluctuations in the medication market and lack of medications at different times as they were to purchase them. A recipient after seven months of transplantation reiterated that *“Sometimes, I go to buy my medicine; for example, the Red Crescent pharmacy has the imported Prograf tablet just for one month and it runs out of this medication for the next month. I do not know whether I can take Iranian ones or not?”* (P. 2)

Another recipient after 44 months of transplantation said that *“They prescribe the medications and we go to purchase them as the headquarters endorse them. When I receive the confirmation, I go to buy my medications. I used to take Cellsept, but they became scarce in the market. I suffered loads of problems but I took the tablet manufactured in Uruguay.”* (P. 5)

Costs of Medications: The high costs of medications were among the problems with the provision of medications and their use as noted by many study recipients. A female recipient after 36 months following her transplantation mentioned that *“The special care is associated with buying the medications. You need to purchase the medications on time; but there is nothing to take when there is no medication. If I have no Cellsept, I get upset. I think there is no need to talk about it and even my spouse might feel sad if I say that we sold our car to purchase the medications.”* (P. 12)

Individual Factors

Self-Management Disability

This is referred to the individual’s disability to manage the symptoms and physical and psychosocial consequences of the treatment and lifestyle changes inherent in living with a chronic condition.

Lack of Habit Management

Maintenance and survival of the transplanted liver requires to abandon many habits and to withdraw from dependencies that can be in conflict with the purposes of transplantation, if they persist or recur. Nevertheless, some problems can lead to repeated conditions. There were two subcategories in this domain including psychological dependence and mood disorders.

Psychological Dependence: Soon after transplantation, physical conditions change. Relative improvement occurs and the recipient returns to a nearly normal life. Although lots of things should be considered in screening stages to select appropriate recipients, they are continuously obsessive towards return to their previous habits and behaviors. A female member of the transplant team stated that *“She loves birds and keeps doves at home. Although*

she promises not to do it, she cannot adhere with this type of encounter and prevent it because of her previous dependence and habits.” (P. 22)

A transplant recipient, who had restarted smoking after 39 months of transplantation, also reiterated that *“I think I have lost something. I cannot make myself calm. Sometimes it seems that something is missing, so I smoke.” (P. 9)*

Cognitive Disorders: Among the other factors leading to return to previous habits were cognitive problems in transplant recipients, *i.e.*, having the notion like other people that use of something for one time or just for fun was not harmful. A recipient after seven months of transplantation added that *“I make some mistakes. I do not adhere and sometimes smoke or drink alcohol. I say that is not important and nothing happens if I do it once in a while.” (P. 2)*

A liver recipient after 39 months of transplantation said that *“Thanks God! I have not had any problems with my transplant during this time. Everything was OK. If my transplant was not successful, I would never smoke a cigarette.” (P. 9)*

Mood Disorders

Mental and psychological problems and disorders can be considered one of the barriers to adherence to medical care with its subcategories as follows.

Depression-Regret: Many recipients encounter a series of mental and psychological changes after transplantation although the severity of these changes varies from person to person. The occurrence of severe mood changes can act as a barrier to adherence to medical care. A recipient after five months after transplantation stated that *“I have a sense of depression. I talk and laugh less than ever before. I do not know it is for the medications, for my homestay, or something like that. My wife said that if she had known that I would feel like that, she would have never let me undergone the transplantation.” (P. 6)*

Fatigue: Prolonged and life-long medication use as well as long-term care can lead to fatigue and reduced motivation. A recipient after 48 months of transplantation stated that

“If something happens to me, I will stop treatment. Once, I assumed that if something happened to me, I would give it up and did not continue. I am really sick and tired of such pains and sufferings as well as looking for medications within these six years or so.” (P. 4)

Another recipient after 36 months of transplantation reiterated that *“During my visit, a female physician told me that considering my underlying illnesses, it was necessary to have colonoscopy, but I strongly disagreed and said no, I did not like to do colonoscopy again and asked her to postpone it to another time. So, the physician did not insist and pointed out that it was essential to do it to make her informed of my health conditions.” (P.12)*

Laches and Indifferent

One of the dimensions promoting the health behavior of transplant recipients is to understand the sensitivity and importance of implementing instructions and recommendations to increase longevity and improve their quality of life. If one does not attain this level of understanding, they will surely suffer from indifference and negligence in terms of care. A recipient added that *“They prescribed medicine for hepatitis C. I took them for two months. Once a time, I went to the city of Tehran to buy the medications for the next month, but I did not purchase them and decided to come back to my hometown and buy them if they were available.” (P. 14)*

Another participant also said that *“There is someone who is working here. We are approaching the new year, and he is really busy. He knows that it is necessary to buy the medications but he never thinks of its side-effects if he does not take them for one or two days. He never thinks of it. Maybe, he does not take it seriously or does not believe it. I may tell that if you do not take this medicine, you will die. You may think that I am making a mountain out of the hill. There have been two or more recipients who did not show any compliance due to their engagements.” (P. 23)*

Resistance and Non-Adherence

Non-adherence to medical care, even before transplantation, and making decisions about transplantation was associated with a high resistance to medication use and post-transplan-

tation care. A recipient added that *“Although I am getting better day by day, I feel that I cannot be someone to accept it easily. When I want to do something, I always say that I cannot do it; Should I use this medicine forever? I do not want this liver.”* (P. 6)

Inability in Problem-Solving

Failure to solve problems correctly was another barrier to adherence to medical care. One of the recipients said that *“I lost one of the cartons of Prograf tablets. They do not give you this medicine if you go to get it earlier, they say that you need to get it on due date. As I considered this situation and thought that would be really problematic if I do not take the medication for 10 days, I stopped taking them for one day and I took 4 or 5 tablets a day, I do not know.”* (P. 19)

Failure in Time Management

Failure to manage time was another barrier to delay or not to complete the instructions and recommendations given. One of the recipients said that *“As I come here and back home, it becomes late for my medication use. The times are disrupted. If I have a test, there is no need to take medications. I come here and see that it is noon and I have to skip eating; on the other hand, I suffer from diabetes. So, I cannot have a regular program.”* (P. 19)

Limiting Negative Beliefs

The existence of negative beliefs about the positive effects of transplantation can discourage recipients and lead them to non-adherence to medical care. A recipient stated that *“I had a transplant, but I got worse instead of getting better.”* (P. 6)

The spouse of one of the recipients added that *“You need to control your eating habits, but my husband always says that he cannot do it at all.”* (P.10)

Social Problems

Cultural Conditions

Culture within a society includes beliefs, values, ethics, and behaviors of the individuals in a community as well as the rituals, customs, and traditions. According to the participants, cultural conditions can also have a significant

role in their adherence to medical care programs.

To Be Rejected

Transplant recipients are subject to a number of limitations as well as observance. Therefore, they are either excluded from a community or exposed to judgments and stigmas. A recipient after 50 months of transplantation said that *“At first, I used to wear a pair of gloves or a mask; but I found that the gloves could make others stay away and think that I was sick. Spiritually and mentally, I felt upset and got annoyed.”* (P. 17)

A transplant team member added that *“The recipient got married after the transplant. After marriage, he avoided taking the medications in front of his wife and his transplanted organ was rejected.”* (P. 23)

To Be Judged

Some individuals lose their motivation for self-care because they are judged by others. One of the recipients believed that *“Yes, I am not in a good mood. Sometimes I think of going out but I do not have the mood, I ask myself what happens if I go out, people might say that I am feeling unwell but I am hanging out. Sometimes, I say that is not their business.”* (P. 3)

Another patient said that *“As soon as you put on a mask, other people think that you are suffering from a contagious disease and you do not want to transfer it to others.”* (P. 11)

Stigma

Considering that many liver transplant recipients have a history of diseases such as hepatitis B and C or they have suffered from drinking alcohol, abusing drugs, or having high-risk sexual relationships making them to end with end-stage liver disease and undergo transplantation, they may encounter a series of feedbacks from the society. A recipient after 26 months of transplantation said that *“People stay away, but I tell them that I am doing what the physician has advocated. I think that if I cut my hand, its bleeding cannot hurt and infect others. Now, at home, I have set apart all my personal items from those of others. People deprecate*

it when they realize it.” (P. 8)

Another recipient after seven months of transplantation reiterated that *“I see that those around have such their own views towards me. As they find that I suffer from hepatitis, they stay away, they run away, and even they feel frightened. For example, as my brother realized that I was affected with hepatitis, he told his children not to see and touch me.” (P. 2)*

Passive Family

Lack of Psychological Support

Although the transplantation has been completed, the recipients still require attention and their psychological needs should be met. A recipient after 48 months of transplant said that *“When you are sick, family provides the required supports, but when you get apparently healthier, you cannot expect such supports. For example, I used to take medications before transplant that could make me irritated but my family could get along with this issue very well. But, after recovery, they did not welcome my nervousness and I had to control it. The community does not mind this issue at all. In all cases, you yourself need to put it under control as much as possible” (P. 4)*

Following 18 months of his transplant, another recipient added that *“Others need to get along well with a person who has left such stages behind. For example, it takes time until my sutures get well. I get upset when I see my frailty, I see myself as a weak person. I expect others to give me enough strength and encourage me. Unfortunately, my family does not care about it. They say that I have improved my health because I have undergone a transplant and there is no worry at all.” (P. 13)*

Lack of Therapeutic Support

A number of recipients also expressed their concerns about being let down by their families after transplant event though they had been in dire need of their supports to continue treatments. A female recipient after four months of transplantation reiterated that *“I tell them that it is time to go and see a doctor, but they say that I am young enough and I can even hire a taxi because they all know you. I say that I do not have a good memory, I am 57 years old, I have just secondary school degree, I am absentminded, and I*

cannot keep looking for medications.” (P. 15)

DISCUSSION

Adherence to medical care programs provided continues to be one of the important issues raised in today's societies. Therefore, the results of this study could shed light on various aspects of this issue. These aspects were divided into three categories of weaknesses in management and treatment teams (educational problems and medication challenges), personal inabilities (failure in habit management and mood disorders), and social problems (cultural conditions and passive family). Therefore, they are considered complex problems with multiple dimensions in the domain of health care.

Educational problems were considered one of the subcategories of weakness in the care and treatment systems and have been shown to have a significant effect on adherence to the treatment [19]. It is also important to pay attention to the educational needs of patients at different stages post-transplantation. For example, awareness about caring their wound care and doing their daily and social activities during the first four months of transplantation, and having sufficient information about medicinal and nutritional regimes during 5–9 months post-transplantation are among the priorities of educational needs for patients [20]. Passage of time from transplantation was also considered one of the factors influencing adherence to care and treatment which highlighted the need for repeated evaluations after transplantation. The rate of non-adherence to medical care has increased significantly two years after transplantation [21, 22].

Despite the high levels of willingness in patients to reduce the number of their medications and the demand for doing so in this study, it was not mentioned as a barrier to the adherence to treatment. The recipients also referred to the care before and after taking medications as a harsh activity they had gotten accustomed to and considered it a barrier to adherence to medical care in several studies [7, 23, 24]. High costs of medications as well

as financial constraints were another barrier identified in this study. It was consistent with the findings of the investigation by Gonzalez where special attention to low-income patients has been underlined [25]. Although most people suspect that such non-compliance is related to forgetting or not having access to medications, it should be noted that there is a tendency not to receive the medications [26].

In this study, cognitive disorders were one of the barriers to adherence to medical care in the domain of personal disabilities. However, it is very important to be informed about a patient's cognitive status in terms of choices to get a transplant. Studies have also shown that liver transplant recipients can frequently experience cognitive disorders. These impairments can even progress despite improvements in the recipients' physiological functions [27, 28]. That is why one of the choices to get a transplant is related to psychological findings [29]. The results of the study were also confirmed by the findings by Componge using the EEG and paper-and-pencil tests before and after liver transplantation to do cognitive evaluation. The results of this study showed that recipients having a history of liver encephalopathy had significantly lower cognitive functions [30]. In addition to these underlying conditions, existence of problems in liver transplant recipients in terms of medications, can also lead to cognitive-emotional impairments as well as behavioral changes due to the effects of these medications, especially tacrolimus [31].

Depression was another barrier to the adherence identified in this study. It should be noted that depression has been mentioned as a common problem in chronic diseases [32, 33]. The prevalence of stable depression and anxiety among liver recipients were 29%–30%, and 23%–26%, respectively. Delirium as well as post-traumatic stress disorder and psychosis have also been reported in 23%–26% and 7.5% of recipients, respectively [34, 35].

Due to the side-effects of immunosuppressive medications and lack of self-control, use of emotional coping methods, no disclosure

of transplantation, as well as depression and anxiety can not only have adverse impacts on treatments but also lead to a lower quality of life [36]. Therefore, screening for diagnosing depression and use of therapeutic counseling as well as improvement of treatment-based relationships with these patients can result in an increase in their eligibility [37, 38]. Psychosis and social support are also considered two predictors of post-liver transplantation mortality. Therefore, active adjustment is a guarantee for survival post-transplantation [39].

Failure to managing habits was considered one of the barriers in this qualitative study. Transplant recipients forget about the obligations and agreements they had with themselves and treatment teams as preconditions for transplant after a period and thus demonstrate or repeat behaviors that either lead to underlying illnesses or disrupt care. Therefore, pre-transplantation screening and need to withdraw alcohol or drugs to prevent returning to such habits are items to be obtained before liver transplantation.

The precise choice of patients to perform liver transplant is a type of social acceptance within this type of treatment which requires careful attention before and after liver transplantation. Thus, abandoning alcohol use before transplantation as well as post-transplantation attention and examinations are considered a way for checking the level of adherence to treatment and functional recovery in these patients [40]. In fact, it is necessary to provide treatment and screening interventions supervised by specialists and special care centers in liver transplant clinics [41]. It should be noted that return to alcoholism has been reported in 5.6%–29% of recipients [34, 42].

In line with the results of this study, it has been argued that negative beliefs about medications and treatment compared with positive beliefs and satisfaction with treatment could have a significant impact on the adherence to medical care [43].

According to the results of this study, individual disabilities can lead to non-compliance. The

results of a systematic review show that self-care, autonomous performance, and dynamicity of liver transplant recipients can have long-lasting positive effects on various aspects of functional activities [44].

Receiving services by support-social groups can also have a significant impact on improving physiological, psychological, and social adjustment among transplant recipients [45]. In addition, the cultural structure of communities and the system of care and treatment can have a great impact on the level of adherence and the conditions for its development [46]. Nonetheless, in this study, culture and infrastructure of beliefs and behaviors were not positive towards the causes of liver transplantation such as hepatitis and alcoholism.

In general, a high proportion of the results of this study were in line with the findings of the investigations which had evaluated the causes of non-adherence in this group of patients quantitatively. Mood disorders, passive lifestyle, history of drug or alcohol abuse, lack of social support [47, 48], divorce and separation, as well as forgetfulness were also considered major factors affecting non-adherence [49].

Although qualitative or quantitative research about barriers to adherence to medical care in liver transplant recipients in Iran is lacking to compare the results of this study with, the present study was endowed with a unique nature.

In conclusion, attention to and awareness about the causes of non-adherence to medical care in liver transplant recipients are of utmost importance for researchers and professional treatment teams. Therefore, providing conditions for collaborative actions and efforts can promote planning by individuals, families, as well as health care professionals and also lead to their positive interactions that increase the survival rate, improve quality of life, and reduce financial burden. Family education and professional supports, culture-building in society, and education based on recipients' needs, can all be among the solutions to address the

barriers to adherence to medical care, which is better to be practiced all together.

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REFERENCES

1. Durand F. How to improve long-term outcome after liver transplantation? *Liver International* 2018;**38**:134-8.
2. Germani G, Lazzaro S, Gnoato F, et al. Nonadherent Behaviors after Solid Organ Transplantation. *Transplant Proc* 2011;**43**:318-23.
3. Marcelino CAG, Diaz LJR, da Cruz DM. The effectiveness of interventions in managing treatment adherence in adult heart transplant patients: a systematic review. *JBI Database System Rev Implementation Rep* 2015;**13**:279-308. doi: 10.11124/jbis-rir-2015-2288.
4. Telles-Correia D, Barbosa A, Mega I, et al. Adherence in transplanted patients. *Acta Médica Portuguesa* 2007;**20**:73-85.
5. Bethany JF, Ahna L. Adherence in Adolescent and Young Adult Kidney Transplant Recipients. *Open Urol Nephrol J* 2014;**7**:133-43.
6. McCarthy R. The price you pay for the drug not taken. *Business and health* 1998;**16**:27.
7. Lieber SR, Volk ML. Non-adherence and graft failure in adult liver transplant recipients. *Dig Dis Sci* 2013;**58**:824-34.

8. Serper M, Van Wagner L, Kang R, *et al.* Burden of Readmission Following Liver Transplantation: Results from US Academic Medical Centers: Abstract# B1213. *Transplantation* 2014;**98**:832.
9. Pinsky B, Takemoto S, Lentine K, *et al.* Transplant outcomes and economic costs associated with patient noncompliance to immunosuppression. *Transplantation* 2009;**9**:2597-606.
10. Tielen M, van Exel J, Laging M, *et al.* Attitudes to medication after kidney transplantation and their association with medication adherence and graft survival: a 2-year follow-up study. *J transplant* 2014;2014:675301. doi: 10.1155/2014/675301.
11. Dharancy S, Giral M, Tetaz R, *et al.* Adherence with immunosuppressive treatment after transplantation: results from the French trial PREDICT. *Clin Transplant* 2012;**26**:E293-E9.
12. De Geest S, Dobbels F, Fluri C, *et al.* Adherence to the Therapeutic Regimen in Heart, Lung, and Heart-Lung Transplant Recipients. *J Cardiovasc Nurs* 2005;**20**:S88-S98.
13. Malek Hosseini SA, Nikeghbalian S, Salahi H, *et al.* Evolution of Liver Transplantation Program in Shiraz, Iran. *Hepat Mon* 2017;**17**:e60745.
14. Jafarian A, Nassiri-Toosi M, Najafi A, *et al.* Establishing a Liver Transplantation Program at Tehran University of Medical Sciences, Iran: A Report of Ten Years of Experience. *Arch Iran med* 2014;**17**:81-3.
15. Khosravi B, Pourahmad S, Bahreini A, *et al.* Five Years Survival of Patients After Liver Transplantation and Its Effective Factors by Neural Network and Cox Proportional Hazard Regression Models. *Hepat Mon* 2015;**15**:e25164. doi: 10.5812/hepatmon.25164.
16. Moayed MS, Ebadi A, Khodaveisi M, *et al.* Factors influencing health self-management in adherence to care and treatment among the recipients of liver transplantation. *Patient Prefer Adherence* 2018;**12**:2425-36. doi: 10.2147/PPA.S180341.
17. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs* 2008;**62**:107-15.
18. Elo S, Kääriäinen M, Kanste O, *et al.* Qualitative content analysis: A focus on trustworthiness. *Sage Open* 2014;**4**:2158244014522633.
19. Asavakarn S, Sirivatanauksorn Y, Promraj R, *et al.*, editors. Systematic Pharmaceutical Educational Approach to Enhance Drug Adherence in Liver Transplant Recipients. *Transplant Proc* 2016;**48**:1202-7. doi: 10.1016/j.transproceed.2015.12.100.
20. Ko D, Lee I, Muehrer RJ. Informational needs of liver transplant recipients during a two-year post-transplant period. *Chronic illness* 2016;**12**:29-40.
21. Rodrigue JR, Nelson DR, Hanto DW, *et al.* Patient-reported immunosuppression non-adherence 6 to 24 months after liver transplant: association with pre-transplant psychosocial factors and perceptions of health status change. *Progress in Transplantation* 2013;**23**:319-28.
22. Promraj R, Dumronggittigule W, Sirivatanauksorn Y, *et al.*, editors. Immunosuppressive medication adherence in liver transplant recipients. *Transplant Proc* 2016;**48**:1198-201. doi: 10.1016/j.transproceed.2015.12.097.
23. Eberlin M, Otto G, Krämer I. Increased Medication Compliance of Liver Transplant Patients Switched From a Twice-Daily to a Once-Daily Tacrolimus-Based Immunosuppressive Regimen. *Transplantation Proc* 2013;**45**:2314-20.
24. Oliveira RA, Turrini RNT, Poveda VdB. Adherence to immunosuppressive therapy following liver transplantation: an integrative review. *Rev Lat Am Enfermagem* 2016;**24**:e2778. doi: 10.1590/1518-8345.1072.2778.
25. González B, Librero J, Peña-Logobardo LM, *et al.* Effect of Drug Cost-Sharing Change on Non-Adherence to Essential Medications for Acute Coronary Syndrome: A Population Based Natural Experiment. *Value in Health* 2016;**19**:A659. doi: https://doi.org/10.1016/j.jval.2016.09.1800
26. Brown MT, Bussell J, Dutta S, *et al.* Medication Adherence: Truth and Consequences. *Am J Med Sci* 2016;**351**:387-99. doi: 10.1016/j.amjms.2016.01.010. Review.
27. Lin W-C, K-HC, C-LC, Hsiu-Ling Chen, *et al.* Longitudinal Brain White Matter Alterations in Minimal Hepatic Encephalopathy before and after Liver Transplantation. *PLoS ONE* 2014;**9**:e105887.
28. Carmen Pantiga, Luis R. Rodrigo, Marcelino Cuesta, *et al.* Cognitive Deficits in Patients with Hepatic Cirrhosis and in Liver Transplant Recipients. *J Neuropsychiatry Clin Neurosci* 2003;**15**:84-9.
29. Rovira A, Mínguez B, Aymerich FX, *et al.* Decreased white matter lesion volume and improved cognitive function after liver transplantation. *Hepatology* 2007;**46**:1485-90.
30. Kuntz K, Weinland SR, Butt Z. Psychosocial Challenges in Solid Organ Transplantation. *J Clin Psychol Med Settings* 2015;**22**:122-35.
31. Campagna F, Montagnese S, Schiff S, *et al.* Cognitive impairment and electroencephalographic alterations before and after liver transplantation: What is reversible? *Liver Transplantation* 2014;**20**:977-86.
32. Martínez-Sanchis S, Bernal MC, Montagud JV, *et al.* Effects of immunosuppressive drugs on the cognitive functioning of renal transplant recipients: A pilot study. *J Clin Exp Neuropsychol* 2011;**33**:1016-24. doi: 10.1080/13803395.2011.595396.
33. Cruz LN, de Almeida Fleck MP, Polanczyk CA. Depression as a determinant of quality of life in patients with chronic disease: data from Brazil. *Soc Psychiatry Psychiatr Epidemiol* 2010;**45**:953-61.
34. Telles-Correia D, Barbosa A, Mega I, *et al.* Importance of depression and active coping in liver transplant candidates' quality of life. *Progress in Transplantation* 2009;**19**:85-9.
35. Telles-Correia D, Barbosa A, Barroso E, *et al.* Psy-

- chiatric approach of liver transplant. *Acta médica portuguesa* 2006;**19**:165-79.
36. Annema C, Drent G, Roodbol PF, et al. Trajectories of anxiety and depression after liver transplantation as related to outcomes during 2-year follow-up: a prospective cohort study. *Psychosom Med* 2018;**80**:174-183. doi: 10.1097/PSY.0000000000000539.
 37. Annema C, Roodbol PF, Stewart RE, et al. Prevalence of psychological problems and associated transplant-related variables at different time periods after liver transplantation. *Liver Transpl* 2015;**21**:524-38. doi: 10.1002/lt.24075.
 38. Jeon MK, Park YH. [Structural Equation Modeling of Self-Management of Liver Transplant Recipients]. *J Korean Acad Nurs* 2017;**47**:663-675. doi: 10.4040/jkan.2017.47.5.663. [in Korean]
 39. Telles-Correia D, Barbosa A, Mega I, et al. Psychiatric and psychosocial predictors of medical outcome after liver transplantation: a prospective, single-center study. *Transplantation proc* 2011;**43**:155-7. doi: 10.1016/j.transproceed.2010.12.006.
 40. Tsoulfas G, Agorastou P. The role of liver transplantation in the treatment of alcoholic liver disease. Trends in Alcoholic Liver Disease Research – Clinical and Scientific Aspects. Aristotle University of Thessaloniki Greece. Press; 2012 p.205-220. Available from www.intechopen.com/books/trends-in-alcoholic-liver-disease-research-clinical-and-scientific-aspects/the-role-of-liver-transplantation-in-the-treatment-of-alcoholic-liver-disease. (Accessed April 10, 2019)
 41. Dom G, Peuskens H. Addiction specialist's role in liver transplantation procedures for alcoholic liver disease. *World j hepatol* 2015;**7**:2091-9. doi: 10.4254/wjh.v7.i17.2091. 2015;7:2091.
 42. Stillely CS, DiMartini AF, Vera MEd, et al. Individual and Environmental Correlates and Predictors of Early Adherence and Outcomes after Liver Transplantation. *Prog Transplant* 2010;**20**:58-66.
 43. Hugon A, Roustit M, Lehmann A, et al. Influence of intention to adhere, beliefs and satisfaction about medicines on adherence in solid organ transplant recipients. *Transplantation* 2014;**98**:222-8.
 44. Yang LS, Shan LL, Saxena A, et al. Liver transplantation: a systematic review of long-term quality of life. *Liver Int* 2014;**34**:1298-313. doi: 10.1111/liv.12553.
 45. Ordin Y, Karayurt Ö. Effects of a Support Group Intervention on Physical, Psychological, and Social Adaptation of Liver Transplant Recipients. *Exp Clin Transplant* 2016;**14**:329-37. doi: 10.6002/ect.2014.0220.
 46. Antshel KM. Integrating culture as a means of improving treatment adherence in the Latino population. *Psychology, Health & Medicine* 2002;**7**:435-49.
 47. Rodrigue J, Nelson D, Reed A, et al. Prevalence and Predictors of Immunosuppression Non-adherence Following Liver Transplantation: 591. *Transplantation* 2012;**94**:S134.
 48. Eftekar M, Pun P. Psychiatric risk factors predicting post-liver transplant physical and psychiatric complications: a literature review. *Australasian Psychiatry* 2016;**24**:385-92.
 49. Lamba S, Nagurka R, Desai KK, et al. Self-reported non-adherence to Immune-suppressant therapy in liver transplant recipients: demographic, interpersonal, and intrapersonal factors. *Clin Transplant* 2012;**26**:328-35.