

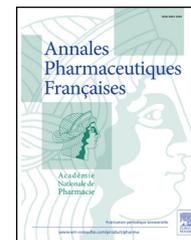


Disponible en ligne sur

**ScienceDirect**  
www.sciencedirect.com

Elsevier Masson France

**EM|consulte**  
www.em-consulte.com



ORIGINAL ARTICLE

## Illness representation and treatment beliefs in liver transplantation: An exploratory qualitative study

Les représentations de la transplantation hépatique et les croyances relatives aux médicaments associés : une étude qualitative exploratoire

J.-D. Bardet<sup>a,\*</sup>, B. Charpiat<sup>a,b</sup>, P. Bedouch<sup>a,c</sup>,  
M. Rebillon<sup>d</sup>, C. Ducerf<sup>e</sup>, A. Gauchet<sup>f</sup>,  
C. Tourette-Turgis<sup>d</sup>, B. Allenet<sup>a,c</sup>

<sup>a</sup> University Grenoble-Alps/CNRS/TIMC-IMAG UMR 5525/Themas, Grenoble 38041, France

<sup>b</sup> Pharmacy Department, Lyon University Hospital, Lyon 69229, France

<sup>c</sup> Pharmacy Department, Grenoble University Hospital, 38043 Grenoble, France

<sup>d</sup> Institut d'Éducation Thérapeutique, University Pierre-et-Marie-Curie Paris 6, 75634 Paris, France

<sup>e</sup> UCBL-Lyon 1, Surgeon, General digestive surgery and liver transplantation Department, Lyon University Hospital, 69229 Lyon, France

<sup>f</sup> University Grenoble-Alps, Inter-University Laboratory of Psychology (LIP), 38040 Grenoble, France

Received 10 February 2014; accepted 27 May 2014

### KEYWORDS

Illness representations;  
Medicine beliefs;  
Liver transplantation;  
Graft rejection;

### Summary

**Background.** – The objective of this study was to gain detailed insight concerning liver transplanted patients' representations about transplantation, graft rejection and immunosuppressive drugs to adapt the educational follow-up.

**Patients and methods.** – Semi-structured interviews were conducted with 8 patients. Each interview was recorded and fully transcribed. The verbatim was first coded according to the themes of the Common Sense Model and an inductive approach for the remaining text.

\* Corresponding author. Laboratoire TIMC-IMAG THEMAS, Domaine de la Merci, pavillon Taillefer, 38041 La Tronche, France.  
E-mail address: Jean-Didier.Bardet@imag.fr (J.-D. Bardet).

Immunosuppressive  
medicines

### MOTS CLÉS

Représentations en  
santé ;  
Croyances sur les  
médicaments ;  
Transplantation  
hépatique ;  
Rejet du transplant ;  
Immunosuppresseurs

*Results.* – Transplantation is perceived both as a recovery and a new chronic condition. Participants feel powerless in the face of the risk of graft rejection. This risk is perceived as out of control as it is not associated with specific symptoms and external causes. The individual knowledge gained about transplantation relies on real-life experience shared between patients. Many participants feel anxiety. It responds to stress caused by immunosuppressant medication intake, routine check-ups, potential side effects and chronicity of immunodepression. Messages stressing the importance of the tacrolimus in the medication therapy are strengthened by a pre-discharge pharmaceutical consultation.

*Discussion and conclusions.* – This study suggests that healthcare providers should systematically seek to determine illness representations to optimize the educational follow-up. The patient education program for liver transplanted patients should include three types of intervention: individualized education, behavioral intervention and psychological support. It should provide a support for stress management and acceptance of the new chronic condition. The involvement of a clinical pharmacist is relevant.

© 2014 Published by Elsevier Masson SAS.

### Résumé

*Introduction.* – Cette étude a pour objectif de décrire le contenu des représentations individuelles sur la transplantation, le rejet et les immunosuppresseurs de patients transplantés hépatiques afin d'adapter leur suivi en éducation thérapeutique.

*Patients et méthodes.* – Des entretiens semi-directifs ont été conduits auprès de 8 patients. Les entretiens ont été entièrement enregistrés puis retranscrits. L'analyse des verbatims a tout d'abord été réalisée suivant les thèmes du Common Sense Model puis selon une approche inductive pour le texte restant.

*Résultats.* – La transplantation est perçue à la fois comme une guérison et une maladie chronique. Face au rejet du transplant, les participants se sentent impuissants : il n'est défini par aucun symptôme spécifique. Il est associé à des causes externes et paraît hors de contrôle. Le partage d'expérience entre patients joue un rôle important dans la construction des connaissances. De nombreux participants se sentent anxieux. Cette anxiété répond aux stress induits par les immunosuppresseurs, les examens médicaux réguliers, les effets indésirables potentiels et l'immunodépression chronique. L'entretien pharmaceutique avant la sortie d'hospitalisation renforce les messages relatifs à l'importance du tacrolimus dans la thérapeutique médicamenteuse.

*Discussion et conclusions.* – Cette étude suggère l'utilité de l'exploration systématique des représentations des maladies afin d'optimiser le suivi des patients. Le programme d'éducation thérapeutique pour les patients transplantés hépatiques doit comprendre trois dimensions : un suivi éducatif individualisé, une intervention de type comportementale et un soutien psychologique. Il doit fournir un soutien dans la gestion du stress et dans l'acceptation de la chronicité de l'immunodépression. L'implication d'un pharmacien clinicien dans le suivi du patient transplanté est pertinente.

© 2014 Publié par Elsevier Masson SAS.

## Background

In 2012, 1161 liver transplantations (LTx) were performed [1]. In Tx, adherence is multifaceted: it includes adherence to IMS, co-prescribed drugs and lifestyle recommendations. Non-adherence to IMS drugs rates from 15% to 50% [2–4] and from 3% to 47% for clinical appointments [2,4]. Dhrancy et al. [5] reported that non-adherence to IMS reaches 60% in LTx in France. Poor adherence after Tx is associated with an increase of healthcare, late acute rejection episodes, graft loss, death and costs [3,6]. O'Carroll et al. [7] estimated that approximately 10% of liver transplanted patients died due to non-adherence. Reasons for non-adherence are diverse: misunderstanding of the objectives

of the treatment, complex medication regimen, insufficient information, side effects, unawareness of side effect management, treatment duration, beliefs and costs [8–10]. The French health care system fully reimburses the Tx-related costs. The mean cost of LTx is estimated at 52,000€ and the follow-up care amounts to 8400€ over three years [11]. Depending on dosage forms, tacrolimus costs between 0.98€ to 10.54€ per capsule per day [12].

In LTx, a relationship has been demonstrated between IMS adherence and beliefs; low adherence is related to the perceptions that patients hold about their transplant and medications [7,10,13]. Quantitative studies do not explain the patients' experiences of illness and the process underlying the patients' adherence to medicines. Some qualitative

studies have revealed patients' perspectives or beliefs in kidney Tx [14–20], but little is known about IMS beliefs, Tx and graft rejection (GR) perceptions in LTx.

An exploration of patients' beliefs is concerned with the patients' intention to take the medicine. Medicines are not always seen as something to be taken "as prescribed" but rather as a resource for use as they see fit. Beyond the potential reluctance to take medicines, medication beliefs could lead to distrust in information given about medicines [21]. A description of IMS beliefs, Tx and GR perceptions is essential in order to provide suitable educational support.

According to the social cognition models, patients' health-related decisions are based on perceived values and expectancies. Beliefs and common sense understanding are important determinant factors of adherence to medication and to advice given by healthcare professionals. Patient's initial decisions about treatment are influenced by their beliefs about its necessity and the perceived risk benefit analysis [22–24].

Various models, such as the Health Belief model [25], the Theory of Reasoned Action [26] and the Theory of planned behavior [27] have been developed to integrate health beliefs and to predict health behavior. According to these models, the patients' health-related decisions are based on perceived values and expectancies. Beliefs and common sense understanding are important determinant factors of adherence to medication and to advice given by healthcare professionals. Patient's initial decisions about treatment are influenced by their beliefs about its necessity and the perceived risk benefit analysis [22–24]. These models are useful to predict a behavior [28] but they do not provide a framework to explore individual representations of illness. The Common Sense Model (CSM), described by Leventhal et al. [29,30], and its adaptation to medication by Horne et al. [22,23], offers a theoretical foundation for understanding patient perceptions of illness and medication beliefs and the relationship with medication adherence.

The CSM suggests that individuals are active problem solvers and they are motivated to avoid and treat illness in accordance with the perceived threat associated with the illness. Adherence to treatment can be regarded as a specific way of coping with an illness [30]. The CSM describes a three-stage processing system. First, individuals interpret the information they have to develop their own illness representation. An illness representation is guided by three sources of information: the general pool of "lay" information (such as social communication, societal expectation or cultural knowledge of the illness), information from sources perceived as significant (such as doctors, parents or media), and their experience of symptoms. Illness representation consists of five perceptions: illness identity, the cause of the illness, the expected duration or the timeline, its consequences and controllability. An emotional reaction is also generated. Individuals then select coping procedures in the second stage and appraise them in the third. This last stage completes the feedback system. Illness representations are dynamic: they change with patients' experiences whether they are treatment-related or not. Illness representations do not reflect the objective reality: the interaction between representations, coping procedures and appraisal is guided by the person's need to maintain coherence [29]. An extended CSM has been put forward by Horne [22] who

has proposed links between illness perceptions and treatment perceptions. The four perceptions associated with medication beliefs include: the personal need for medicines, the potential negative consequences of taking medicines, of physician and medical practices and general beliefs about medicines.

The aim of this study was to gain detailed insight concerning liver transplanted patients' personal beliefs about LTx, GR and IMS and to explore how these beliefs are related to their self-reported level of adherence.

## Methods

Health perceptions and medication beliefs cover many different viewpoints, hence, describing and collecting them to develop beneficial health actions for each participant is necessary. An exploratory study was carried out to clarify patients' understandings about LTx and IMS. This study used patients' narratives of their experience of transplantation.

## Design

This study is based on the theoretical approach of the Common Sense Model (CSM) [29]. It is an explanatory model about health behavior, which is used to explore the medication-taking practice of patients [22]. Qualitative semi-structured interviews were conducted with liver transplanted patients.

## Context

When patients are registered on the organ transplant waiting list, they first meet the liver transplant surgeon and then the coordinating nurse. Both consultations aim to present the several steps of the transplant process, the average waiting time, the surgery, the chance of a success and the survival expectancy, the post-transplant follow-up care, the expected benefits, the potential risks, and IMS. After the transplant operation and a few days before discharge from hospital, patients meet the clinical pharmacist of the liver transplant department. The pharmacist provides them adapted information about treatments. The symptoms, the causes and the consequences of GR are also discussed with the patient [8].

## Participants

The coordinating nurse recruited participants from the LTx center of Croix-Rousse teaching hospital in Lyon, France. Inclusion criteria were:

- aged 18 or over;
- French speaker;
- LTx at least one year before.

The coordinating nurse confirmed the eligibility of the participants. In order to avoid any selection bias by the nurse, each patient who came to consult was given the choice to participate or not. But only patients with no surgical complications were contacted by the coordinating nurse, at clinical staff request.

**Table 1** Participants' characteristics.  
*Caractéristiques des participants.*

Participant	Sex	Age	Year of transplantation	Employment	Transplantation etiology	Pharmaceutical visit before discharge
1	F	32	2000, 2005	Manager	Autoimmune disease	Yes
2	F	32	2002	Shopkeeper	Caroli's disease	Yes
3	M	70	2007	Retired (worker)	Liver cancer and alcoholic cirrhosis	Yes
4	M	67	2007	Retired (worker)	Liver cancer and alcoholic cirrhosis	Yes
5	M	63	2007	Retired (manager)	Alcoholic cirrhosis	Yes
6	M	58	1990	Teacher	Viral hepatitis and alcoholic cirrhosis	No
7	M	57	1993	Disabled (worker)	Alcoholic cirrhosis	No
8	M	62	1998	Retired (artisan)	Alcoholic cirrhosis	No

## Data collection

The interviews were conducted by the first author in an office at the hospital or in the participants' homes according to their preference. The interview guide was based on the CSM and its adaptation to medicine. The interviews were audiotape recorded and subsequently fully transcribed.

## Ethical considerations

The interviewer had no access to the participants' clinical files. The participants were made aware that the interviewer was not a member of the clinical team. Participants were aware that the interviews were transcribed, anonymized and that none of the clinical staff would have an access to the transcripts. The participants were informed that they could ask to stop the audiotape recording during the interview or that they could refuse the transcription of some parts of the interviews. Then, the patients' written consent was obtained prior to interviewing.

## Data analysis

The interviews were transcribed as verbatim and analyzed by the first author. First, the verbatim was coded using a deductive approach. Categories were set up according to the 5 perceptions of the illness representation described in the CSM and the 4 themes associated with medicines beliefs of the extended CSM. The remaining text was coded using an inductive approach. The specific categories are derived from multiple readings of the verbatim. Categories were defined from actual meanings in specific text segments [31].

## Results

A purposive sample of 8 participants took part in the study (Table 1). No participants refused the transcription of some parts of the interviews. Quotations are presented in Table 2.

## Transplantation and graft rejection representations

### Transplantation identity

Prior to the operation, participants have the feeling that their life is suspended and LTx puts an end to this situation (Q1). Participants expect to lead the same life as before the Tx (Q2). LTx is perceived as a chance (Q3). LTx is a suitable opportunity to change one's lifestyle or to achieve one's desires (Q4, Q5). For one participant whose etiology was alcoholic cirrhosis, LTx was perceived as a rebirth (Q6). For two participants who had an autoimmune disease, Tx was first associated with recovery (Q7). Then, it is seen as one stage of the treatment (Q8).

### Transplantation consequences

The Tx is perceived as a curative act with morbid aspects. This new condition is not only due to the after-effects of the surgery but mainly to the side effects of the IMS (Q9). One participant considered his new condition as serious as before having surgery (Q10). Participants fail to keep the activity level they had before (Q11).

### Graft rejection (GR) identity

GR is viewed as an opaque, poorly identified and poorly identifiable risk, which makes it dangerous. Five of the eight participants said they had a GR and only one reported having symptoms. For the participants, GR passes unnoticed without any symptoms (Q12). Knowledge about GR is often constructed from an individual GR experience and it is derived from the context in which it was diagnosed or from shared experience (Q13). For the participants, medical examinations during the follow-up of the Tx are identified to be the only means to detect a GR (Q14). When the participants are specifically asked to describe symptoms associated with GR, they describe non-specific symptoms, such as fever, pain and tiredness. The absence of evocative and forewarning signs makes the GR brutal (Q15).

**Table 2** Verbatim of Participants' answers<sup>a</sup>.  
*Retranscription des réponses des participants.*

	Participant	Answers
Transplantation and graft rejection representations		
Transplantation identity		
Q1	8	"I had 3 months left to live when they did the transplant. I knew the date."
Q2	1	"In my mind, I would undergo a transplantation that would settle everything, in my mind, the organ would be transplanted and life would go on and I wouldn't have to worry."
Q3	8	"In my opinion, being transplanted is like winning a big lottery!"
Q4	8	"It changed everything; you try and have a balance in life."
Q5	7	"Well, before I used to be in cafes or out messing around with friends, whereas now I'm making a lot of miniatures, sculptures and other things like that."
Q6	7	"After all, It's a second life, that's all there is to it."
Q7	2	"We are not ill anymore; well I'm not ill anymore."
Q8	1	"And then all of a sudden, everything collapsed. I realized that I would be still ill."
Transplantation consequences		
Q9	5	"The lack of immunity which means that there are risks coming from every direction, isn't it."
Q10	4	"The surgery, it's as serious as before, he told me."
Q11	6	"I resumed work full-time. But I was able to hold no more than 6 months."
Graft rejection identity		
Q12	3	"Well, I think that a rejection can happen at any time, and anyhow but I won't notice it."
Q13	1	"Around 3 weeks ago I was a bit tired; given that my first, my big graft rejection started somewhat in this way, through tiredness. [...] So yes, I quickly called the doctor, I want a prescription to get a blood-test because you know, it's like straight away, I recalled what had happened at the time of my transplant, at the time of the first rejection."
Q14	6	"I came for a blood-test and an ultrasound which I do about every 6 months, at the moment it's rather often because I'm well, um they told me: it's ok, no rejection."
Q15	5	"I often think about these things like that that could happen to me, suddenly and with no warning, because, because, because I've got this exchanged organ."
Graft rejection causes		
Q16	4	"Or else, it could be that I get a good dose of flu, it could change things in my blood, and blood, you know, goes straight into the liver, it could happen in that way."
Q17	6	"I had a rejection, that's when they put me on a quite strong antibiotic."
Q18	1	"For me, whenever one changes things a little, it's not really appreciated."
Q19	7	"Ah well, I think that if I were to start drinking again ..."
Graft rejection consequences		
Q20	7	"It wouldn't really be a rejection, it would be a death sentence."
Q21	1	"I don't see what ... Between my hands, between the first and the second time, so I didn't see what's been going on at the same time and I that I haven't been able to control, except to say that this time I'm going to control them better, given that I didn't really control things (before), so I don't know what I'm going ...; me I could start doing so that it doesn't happen (again)."

Table 2 (Continued)

	Participant	Answers
Q22	8	“A healthy balance, someone who leads a disparate life. In my opinion, you need to have a hygienic lifestyle. Eating at the same time everyday for example.”
Q23	3	“The best way to . . . to avoid . . . that there’s a rejection, is to live a normal life, get involved in the community, and not to think about it.”
Time line		
Q24	2	“One knows that one will never be cured.”
IMS beliefs		
Necessity		
Q25	4	“There’s one of them, if I stop taking it, after 2 or 3 days, you wouldn’t be seeing me around!”
Q26	6	“it [GR] has never worried me [. . .] If I didn’t take them [IMS], my guess is that that, well, the liver, the transplant would not take.”
Q27	2	“They gave it to me because I had a kidney problem after which my creatine levels fell [. . .] But the thing is I consider that the Cellcept is for my kidneys really. I don’t consider it as an anti-reject drug. So if I don’t take it, there will be no consequences apart from on my kidneys.”
Q28	5	“They were telling me: take this correctly, and now don’t drink for an hour, and don’t eat etc. . . or maybe because it’s unusual, it’s not normal to be so careful when taking drugs.”
Q29	5	“Fasted, it’s not like, I hadn’t yet taken any drugs which were to be taken on an empty stomach.”
Q30	5	“It means that you leave it to diffuse throughout your body, digest and diffuse through your body, it must be very important.”
Q31	2	“They say you have to take it at fixed hours, it’s true that. . . I think this one is the most important one.”
Q32	5	“They really insisted on the Prograf . . . it just shows that you must take it.”
Q33	5	“The Cellcept isn’t as vital, as the Solupred, just like any other drug. At the beginning, I didn’t know Cellcept was an IMS.”
Q34	5	[Answering the question: which drug would you like to stop?] “Well, the Cellcept is the one we talked about the least although I wonder whether it’s the least effective one.”
General beliefs		
Q35	2	“It’s that taking medication is not . . . on one hand it helps but on the other it’s exhausting.”
Q36	4	“Sometimes, the medication it knocks you out, it kills.”
Q37	4	“When you take all of those, it can hurt your stomach.”
Q38	6	“I take homeopathic treatments because I tell myself I am taking enough toxic substances as it is, that damage the kidneys because all drugs damage the kidneys, whatever happens.”
Q39	5	“The more you take, the higher the risk of secondary effects, is that right? I mean, the more you pile on the doses, it is not all excreted.”
Q40	4	“I take them, and well, I feel that it . . . it lasts a bit less than half an hour, I already feel a bit unwell because it may be the moment when the medication takes effect.”
Q41	3	“I’m still on 2.5, because there’s a small problem.”
Complexity of IMS regimen		
Q42	5	“After all, I know that Advagraf lasts 24 h and therefore I foolishly believed that if it lasts 24 h and I am late by 2 hours, I will be, I’ll have, well, the next period would be shortened. That’s why I make an effort to take them at fixed hours.”

Table 2 (Continued)

	Participant	Answers
Q43	1	“When I’m invited out to dinner at someone’s house and that after a certain time I know that I have to stop (leave) because in two hours’ time I will need to take my medication, there’re some people who just don’t understand that.”
Q44	2	“So, It’s, it’s good. Afterwards, you’re not worried, you take your medication and afterwards for the rest of the day you’re not bothered anymore.”
Medication cost		
Q45	3	“Have you seen all that I take every day? I’m costing the social security a lot of money! As it’s approximately the equivalent of 10 old francs! Per pill! That’s a lot of cash!”
Q46	8	“Will the national healthcare insurance still reimburse Prograf still in a few years? It’s more unlikely than a graft rejection.”
Q47	1	“[whispering] I’ve made my own personal stock.”
Social dimension		
The patient–family relationship		
Q48	3	“You’re alone! This is not their business any more. You’re no longer ill.”
Q49	3	“It’s YOUR thing, not theirs!”
Q50	1	“It’s something else, um they’re somewhat out of this thing, they’re not with us even though they are there, around us, trying to help; however you can’t share with them what you’re going through, are you sure that they know what we lived through . . . so, therefore they can’t help.”
Q51	6	“I take my drugs out of everyone’s sight. I don’t like sitting at the table with my pile of pills and all.”
The patient–doctor relationship		
Q52	8	“B is like a father to me!”
Q53	6	“I trust the doctor, who treats me; the doctor prescribes me this or that medication, I bless his prescription.”
Q54	6	“Um, I have a GP yeah, in whom I have no trust.”
Q55	4	“I’m feeling so good that it’s as if they had saved my life and I don’t want to . . . no I don’t want to cause any more trouble to those who are doing a good job. I do what I was told.”
Q56	4	“From what they say, it [the liver] is super! So this is no time to have a rejection! So you have to strictly adhere to the treatment.”
Patient information source		
Q57	1	“It was really like that, every Thursday I got there with a list of things that I had done, like I’d had a glass of water even though I was not supposed to eat or drink after the medication; is that serious?”
Q58	6	“I’m immune-compromised [. . .] and I know it, and I can feel it, how do I feel it, well because I’m much more susceptible to illness. Someone opposite me who has a cold and who coughs, that is it for me, I get a cold [. . .] um, during the winter, someone who has gastroenteritis, I may not even need to shake his hand. I get it too. So I know that I’m very frail in this respect
Q59	6	“Um, the friends who received transplants at around the same time as me, um well, we don’t see one another anymore, they’ve disappeared and . . . for similar pathologies, I mean cirrhosis, well they don’t work anymore, they didn’t want to work anymore, and bit by bit it (seeing one another) stopped.”

Table 2 (Continued)

	Participant	Answers
Q60	2	“When they’re here, they have questions to ask, so when one has gone through it, one can answer them.”
The emotional response		
Q61	5	“Um, for me it’s a fear, it’s been a worry since the beginning.”
Q62	1	“At what point does being tired become dangerous?”
Q63	2	“Since I was transplanted, I don’t feel the same any more . . . whenever the slightest problem happens. . . well I panic a little more each time.”
Q64	2	“One month ago, I came back home, I started to have pain and well . . . I, well I thought it was a graft rejection.”
Q65	6	“It’s only during the consultations we go to, and which were terrible um, every 6 months, and well, you would be examined. And getting the results of the test. When one said and ah ah, I waited, I waited, well it’s as if you were waiting to know whether you had passed your baccalaureate or not[. . .] And after that, off you went for another 6 months even if it wasn’t going well, but the results were there and your head was empty, and round and round it went again.”
Q66	1	“When it came to the timings, there was the fear to not, to not miss them by 10 min, because I thought it would all suddenly go wrong.”
Q67	6	“What I am most worried about is the dialysis, the kidney transplant, um its [the body] ageing, and I don’t know if it is going to end up taking, little by little as they open me up.”
Q68	5	“That’s constant; and also the respite phenomenon, that’s painful. Um it’s painful yes.”
Q69	1	“Being transplanted was one event in the course of my life. It’s over and life is going on. . . I have a job, a social life and things are going well.”
Q70	1	“It was hard to get over it, to accept, to understand it, it was going to be part of my life and I would have to do with it. It took me a few months to accept it but once you’ve accept it, it’s part of your life.”

<sup>a</sup> Translated from original transcripts in French.

## Graft rejection causes

GR is often associated with external causes. The participants mentioned infections as possible causes. This knowledge was either clearly expressed by the participants or implicitly expressed with the description of the way they coped to control the GR (Q16, Q17). The second external cause mentioned concerned the IMS themselves. Modifications in the treatment (addition or interruption of a drug, change in dosage), which are not their initiative, are seen as factors that could unsettle the participants' balance and cause a GR (Q18). The causes of a GR are also associated with the etiology of the Tx. This could be highlighted by the description of coping used to control GR (Q19).

## Consequences and controllability of graft rejection

For participants, the perceived risks of GR are a new LTx or death (Q20). The absence of perceptible and identified symptoms associated with GR makes the participants feel powerless (Q21). With adherence to treatment, other means were identified to control the risk of GR. To have a healthy life style was identified by the participants as one of the strategies to avoid GR (Q22). Maintaining a professional or unpaid activity is essential for the success of the LTx too (Q23).

## Time line

Transplantation is associated to a chronic condition. Chronicity is not due to the life-long daily medication intake but to the risk of GR, which can happen at any time, and to iatrogenic diseases (Q24).

## IMS beliefs

### Necessity

The participants justify the IMS prescription by the perceived risk of not taking the drug. To discontinue IMS implies imminent death (Q25). However, even if participant 6 acknowledges the necessity of taking to survive and the risk of death associated with GR, he does not see the connection between GR and non-adherence (Q26).

The prescription adequacy is also associated with the circumstances around the prescription. Medical circumstances seem to be more important than knowing the treatment action to justify its prescription (Q27). The amount of information given about a medication reinforces its importance (Q28). Medication becomes essential when every member of the clinical staff give full information about it. For participants who met the clinical pharmacist, tacrolimus is perceived as important because its prescription leads to a visit with a healthcare provider who is never met at hospital.

Participants identified immediately tacrolimus thanks to its method of administration (Q29). Moreover, for participant 5, the need to take tacrolimus on an empty stomach is not a pharmacokinetics constraint. It is a willingness of clinicians to maximize the drug absorption (Q30). Taking tacrolimus at a fixed time reinforces the perception of its importance compared to other drugs too (Q31). This perception is confirmed by the attention given to it by the clinical staff (Q32). And the reverse implies the other drugs are less important (Q33, Q34).

## General beliefs

Medication is perceived to be toxic. The curative properties are offset by their aggression against the body (Q35). The participants felt asthenia (Q36). The participants were worried about the organs of input and exit: the stomach and kidneys (Q37, Q38). This fear is associated with the belief that drugs accumulate in blood over the years (Q39). Nevertheless, one participant evaluates the efficacy of IMS thanks to their side effects: a drug is active because the patient feels side effects (Q40). The posology of IMS is also associated with the success of the LTx: a decrease of the posology means a good condition of the transplant (Q41).

## Potential negative consequences

The side effects feared are in connection with the participants' main health concern. For example, participant 2 who was worried about having a myocardial infarctus was more sensitive to the hypertensive effect of tacrolimus.

## Complexity of regimen

Tacrolimus should be taken on an empty stomach (i.e. one hour before or two hours after a meal), at a fixed times, twice a day. This method of administration is uncomfortable for participants (Q42) and isolates them socially. Taking medicine can actually prevent or break off the conviviality of a meal with friends or family (Q43). The participants stressed the interest of the prolonged-release capsule of tacrolimus: with a single intake in the morning, they did not have to think about it in the evening. Mycophenolate mofetil is characterized among the participants by its lack of constraint concerning its administration (Q44).

## Medication cost

The cost of medicine is not a barrier. In France, IMS are reimbursed by the national health insurance system and patients do not advance money for medicines purchased in community pharmacies. Participants are aware of the costs of IMS (Q45) and feel dependent on the national health insurance system (Q46). One participant who stocks IMS in anticipation feels guilty (Q47).

## Social dimension

### The patient–family relationship

After recovering from the operation, the family behaves with the patient as with any healthy person (Q48). Moreover, life management after a LTx is something personal: for the participants, the close family circle cannot understand what they are going through because they do not experience it (Q49). It seemed that the participants would like to take away the LTx from their daily life (Q50, Q51).

### The patient–doctor relationship

The patient–doctor relationship appears to have an important affective dimension, characterized by the gratitude of the participants towards the surgeons in the case of transplantation, and even a profound admiration (Q52). It results in a total confidence of the participants in the prescription (Q53). This remarkable relation between participants and surgeons excludes the general practitioner (Q54) and

overshadows the donor who was rarely cited during the interviews. Participants feel indebted to the clinical staff: being adherent is a way of "paying off" this debt (Q55). They admitted complying with the prescriptions as well as possible in order not to disappoint the clinical staff (Q56).

### Patient information source

The clinical staff (physicians and nurses) is the first to be consulted in order to have information (Q57). Nevertheless, experiencing illness is still the major source of knowledge concerning LTx, GR and IMS. This knowledge is constructed from experience and confirmed by it too. So, if the participants do not experience one aspect of the illness, they have no knowledge about it (Q58). Knowledge can be gained from and/or confirmed by the observation of the other liver transplanted patients (Q59). Meeting other transplanted patients is an opportunity to share individual experiences and to ask questions they dare not ask the clinical staff (Q60).

### The emotional response

The risk of GR seemed to be the first cause for the emotional response. It results mainly in anxiety (Q61). The absence of specific identity of GR is the main cause (Q62). For participant 2, being worried about the risk of GR has a general impact (Q63). Faced with the absence of specific symptoms, various reactions were observed among the participants. For example, participant 2 overreacts to trivial symptoms (Q64) while participant 6 expresses anxiety when he has a check-up (Q65). IMS regimen and feared side effects are another cause of anxiety (Q66, Q67). The perception of chronicity of LTx results in weariness (Q68).

Participant 1 is the only participant who was transplanted twice. During the interview, she described a process to accept the second LTx (Q69, Q2, Q8, Q70).

## Discussion and conclusion

### Discussion

Regarding the limits of this study, the coordinating nurse of the transplant center recruited the participants. She may have contacted patients whose level of understanding she considered sufficient and whose answers would be likely to meet medical expectations. Moreover, only patients with no medical complications during the study were contacted by the nurse. Even if the participants were informed that the verbatim would be anonymous, a social desirability bias is possible because of the strong relationship patients have with the healthcare team. The recruitment took place in a single LTx center in Lyon. The results are contextualized and cannot be generalized to every liver recipient. In this LTx center, each patient has a consultation with a clinical pharmacist before discharge [8]. A further limitation is that all participants share the Western European culture therefore possible cultural differences are not taken into account. This may be important because illness representations are dependent on cultural norms [29]. This small number of participants may limit the generalizability of the findings. Nevertheless, this study validates the method of a

systematic exploration of individual illness representations by clinical pharmacists, according the CSM.

Describing the LTx and GR representations and IMS beliefs, some protective factors associated with IMS adherence have been highlighted. The IMS prescription adequacy is acquired: it is common sense knowledge. The importance of taking IMS is enhanced by their strict administration and by the importance, the healthcare team gives them. The relationship with the medical staff, characterized by a strong feeling of gratitude and indebtedness, is also a protective factor [14,15,32–34]. However, this relationship may have a negative aspect. In two qualitative studies carried out with kidney transplanted patients, it was observed that some patients fear being reprimanded for being non-adherent [15,20].

In our study, 5 participants keep their close family circle out of daily IMS management. Social support is identified as a factor associated to IMS adherence [16,35,36]. Chisholm-Burns et al. [35] showed that social support might be useful in combating forgetfulness. Also, to support the involvement of families, it is possible to invite patients to come to education group sessions on LTx and IMS with a person of their choice [37].

Individuals cope with health problems in particular according to their knowledge on the disease. The individual perception of the disease and its management should always guide healthcare providers [30,38,39]. The systemic exploration of patient's individual perceptions during the patient education process is one of the tools patient advocates have to adapt to the follow-up and to refer the patient to the most appropriate healthcare provider. The Common Sense Model has been used to build a tool to assess patients' information needs [40]. The extended Common Sense Model [41] does not seem adapted to predict the evolution of outcomes, such as depression, anxiety or quality of life that may change over the course of an illness [40,42]. It seems promising as a frame for eliciting and understanding illness and treatment perceptions as well as information needs for patients. By understanding their own framework of ideas about their illness, healthcare providers are more likely to help patients to find the most suitable methods to cope.

Patients consider that group sessions are useful for patient education [37]. In the current study, we highlighted that patients seek information from people sharing the same real-life experience as them. According to a constructivist approach, knowledge is constructed from individual experience but also through interacting with other persons of the same community [43]. So, the provision of knowledge or explanations and the search of effective copings can be performed in group sessions. It allows the confrontation of points of view. The questioning of the viability of individual knowledge is a necessary step in the construction of a new one [44,45]. Based on the CSM, this approach was used to implement some workshops in patient education programs [46]. These group sessions could give patients an adaptive understanding of their condition. GR and its lack of control are one of the main participants' concerns that we observed in this study. Discussing the causes GR, discussing the signs that may lead to medical consultation is required and helping patients to form action plans to manage anxiety could be the objectives of these sessions. Expert patients may be associated to their supervision [37,46].

In the patient education process, transplanted patients have to acquire some safety skills on IMS and GR. The complexity of IMS regimen appears to be a factor of non-adherence [47]. The intervention of a clinical pharmacist in the follow-up of transplanted patients showed a positive impact on IMS adherence and knowledge [48–50]. In these tested interventions, the activities associated with patient education, and the activities associated with clinical pharmacy are inseparable. During the follow-up, the clinical pharmacist provides information about the treatment, helps patients to establish a medication plan, performs medication reviews and takes part in the management of side effects [48,49]. Understanding how patients perceive the consequences of Tx and IMS should help medical teams to better understand the patients' problems and provide patient education that better meets their needs. Individual illness representations and medicine beliefs are contextualized and dynamic. So, it seems appropriate to explore them systematically and to organize a feedback from the clinical pharmacist. At the Croix-Rousse Hospital, a 5th year pharmacy student assists the clinical pharmacist during the pre-discharge pharmaceutical consultation. The student takes notes with the patient's agreement. The categorization of illness representations according the CSM facilitates the development of an interview guide and the data collection.

Anxiety is a symptom commonly experienced in post-Tx [51,52]. One year after LTx, studies have shown a negative effect of anxiety on long-term health and quality of life impairment [53,54]. De Bona and al. [55] detected the greater psychological distress from 7 to 12 months after LTx. Medical complication and IMS therapy did not influence it. The distress experienced by patients could be related to difficulties in adapting to the post-transplantation condition. The causes of anxiety can be distinguished from those related to the GR prevention and those related to the chronic condition.

The medical exams, laboratory tests and control biopsies, which are routine check-ups for healthcare providers, are stressful for patients [19,56]. This distress could be managed through a support group based on the Cognitive Behavioral Stress Management intervention [57]. This standardized program combines cognitive behavior therapy and relaxation techniques. It provides information on stress, its impact on the illness, the psychological reactions it can generate and the different copings that can be used to manage it. It encourages the expression of fears and anxieties by patients. It stimulates creativity to develop strategies for behavioral and cognitive adaptation [58]. This technique has also shown benefits in thought intrusions and anxiety, and in immune system improvement, particularly in breast cancer and HIV infection [59,60].

Participants are not immediately faced with the chronic nature of LTx. The grieving process described by Gueniche et al. [32] with French liver transplanted patients was observed with participant 1. The psychological process of acceptance of a chronic condition associated to LTx and of its consequences does not coincide with the biological acceptance of the graft faced with uncertain chances of survival and risks of imminent death, waiting for a transplant generates deep anxiety and implies dependence on the clinical staff for the patients. The feeling of anxiety does not

disappear after surgery. Even if transplantation makes healing possible from patients' perspective, the fear of dying persists due to the risk of GR. So, patients never recover their complete independence [55]. Supporting patients to help them accept their chronic condition is the basis of Assal and Lacroix's theory in patient education [44]. The long-term involvement of a psychologist appears necessary to support patients so that they accept to live with this new reality.

## Conclusion

This study enables us to better understand the liver transplanted patients' perspective on LTx, once the surgery has been performed and the recovery period completed. The long-term management of factors causing anxiety appears to be the main issue of patient education in LTx. Beyond the adherence support, patient education aims to improve quality of life. The contextual nature of these individual representations implies the necessity to explore them for each patient to help healthcare providers to define the content of information to give to patients and to optimize the educational follow-up. The Common Sense Model offers an appropriate framework: it explores not only the cognitive aspect, but also the real-life experience of LTx. Given the results of this current study, the patient education program should include three types of intervention: individualized education, behavioral intervention and psychological support. The objectives are to provide information ensuring the patient's safety, suitable knowledge to help the patients to choose methods to manage stress and accept their new chronic condition. The involvement of a clinical pharmacist and group sessions with expert patients seems relevant.

We confirm that all the patient's name have been removed or disguised so that the persons described would not be identifiable and identified through the details of the story.

## Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

## Acknowledgements

We thank Rosa Maar for recruiting participants, Brigitte Badoil for helping to transcript interviews and Martin Cusack for translating the verbatim.

## References

- [1] Agence de la biomédecine [2 mai 2014]; Available from: <http://www.agence-biomedecine.fr/annexes/bilan2012/accueil.htm>
- [2] Bertakovich GA, Langer F, Freundorfer E, Windhager T, Rockenschaub S, Sporn E, et al. General compliance after liver transplantation for alcoholic cirrhosis. *Transpl Int* 2000;13(2):129–35.
- [3] Laederach-Hofmann K, Bunzel B. Noncompliance in organ transplant recipients: a literature review. *Gen Hosp Psychiatry* 2000;22(6):412–24.

- [4] Burra P, Germani G, Gnoato F, Lazzaro S, Russo FP, Cillo U, et al. Adherence in liver transplant recipients. *Liver Transpl* 2011;17(7):760–70.
- [5] Dharancy S, Giral M, Tetaz R, Fatras M, Dubel L, Pageaux GP. Adherence with immunosuppressive treatment after transplantation: results from the French trial PREDICT. *Clin Transplant* 2012;26(3):E293–9.
- [6] Rabkin JM, de La Melena V, Orloff SL, Corless CL, Rosen HR, Olyaei AJ. Late mortality after orthotopic liver transplantation. *Am J Surg* 2001;181(5):475–9.
- [7] O'Carroll RE, McGregor LM, Swanson V, Masterton G, Hayes PC. Adherence to medication after liver transplantation in Scotland: a pilot study. *Liver Transpl* 2006;12(12):1862–8.
- [8] Brandon MT, Charpiat B. [Pharmaceutical consultation for liver transplant patients: a contribution to therapeutic education]. *Ann Pharm Fr* 2009;67(1):41–53.
- [9] Lehmann A, Aslani P, Ahmed R, Celio J, Gauchet A, Bedouch P, et al. Assessing medication adherence: options to consider. *Int J Clin Pharm* 2014;36(1):55–69.
- [10] Chisholm-Burns M, Pinsky B, Parker G, Johnson P, Arcona S, Buzinec P, et al. Factors related to immunosuppressant medication adherence in renal transplant recipients. *Clin Transplant* 2012;26(5):706–13.
- [11] Paillet C, Chamouard V, Nageotte A, Boillot O, Colin C, Dumortier J. [Liver transplantation for chronic liver disease: hospital costs]. *Press Med* 2007;36(2):203–10.
- [12] Gabarro J. The development of working relationships. In: Lorsch J, editor. *Handbook of organizational Behavior*. Englewood Cliffs: Prentice-Hall; 1987. p. 172–89.
- [13] Kung M, Koschwanez HE, Painter L, Honeyman V, Broadbent E. Immunosuppressant nonadherence in heart, liver, and lung transplant patients: associations with medication beliefs and illness perceptions. *Transplantation* 2012;93(9):958–63.
- [14] Russell CL, Kilburn E, Conn VS, Libbus MK, Ashbaugh C. Medication-taking beliefs of adult renal transplant recipients. *Clin Nurse Spec* 2003;17(4):200–8 [quiz 9–30].
- [15] Orr A, Orr D, Willis S, Holmes M, Britton P. Patient perceptions of factors influencing adherence to medication following kidney transplant. *Psychol Health Med* 2007;12(4):509–17.
- [16] Gordon EJ, Gallant M, Sehgal AR, Conti D, Siminoff LA. Medication-taking among adult renal transplant recipients: barriers and strategies. *Transpl Int* 2009;22(5):534–45.
- [17] Tong A, Sainsbury P, Carter SM, Hall B, Harris DC, Walker RG, et al. Patients' priorities for health research: focus group study of patients with chronic kidney disease. *Nephrol Dial Transplant* 2008;23(10):3206–14.
- [18] Ruppert TM, Russell CL. Medication adherence in successful kidney transplant recipients. *Prog Transplant* 2009;19(2):167–72.
- [19] Goldade K, Sidhwani S, Patel S, Brendt L, Vigliaturo J, Kasiske B, et al. Kidney transplant patients' perceptions, beliefs, and barriers related to regular nephrology outpatient visits. *Kidney Dis* 2011;57(1):11–20.
- [20] Tong A, Sainsbury P, Chadban S, Walker RG, Harris DC, Carter SM, et al. Patients' experiences and perspectives of living with CKD. *Am J Kidney Dis* 2009;53(4):689–700.
- [21] Pound P, Britten N, Morgan M, Yardley L, Pope C, Daker-White G, et al. Resisting medicines: a synthesis of qualitative studies of medicine taking. *Soc Sci Med* 2005;61(1):133–55.
- [22] Horne R. Representations of Medication and Treatment: Advances in Theory and Measurement. In: Petrie KJ, Weinman J, editors. *Perceptions of Health and Illness*. 2<sup>e</sup> ed. Amsterdam: Harwood academic publishers; 1997. p. 155–88.
- [23] Horne R. Treatment perception and self-regulation. In: Cameron LD, Leventhal H, editors. *The self-regulation of health and illness behaviour*. New York: Routledge; 2003. p. 138–53.
- [24] Horne R, Weinman J. Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *J Psychosom Res* 1999;47(6):555–67.
- [25] Rosenstock IM. Historical origins of the health belief model. *Health Educ Monographs* 1974;2:328–35.
- [26] Ajzen I, Fishbein M. *Understanding attitudes and predicting social behavior*. Englewood Cliffs NJ: Prentice-Hall Inc; 1980.
- [27] Ajzen I. From intentions to actions: A theory of planned behavior. In: Kuhl J, Beckman J, editors. *Action-control: From cognition to behavior*. Heidelberg: Springer; 1985. p. 11–39.
- [28] Ogden J. *Health Psychology: A textbook*. 3rd ed New York: Open University Press; 2004.
- [29] Leventhal H, Brissette I, Leventhal E. The Common-Sense Model of Self-Regulation of Health and Illness. In: Cameron LD, Leventhal H, editors. *The Self-Regulation of Health and Illness Behaviour*. Abingdon: Routledge; 2003. p. 42–65.
- [30] Leventhal H, Meyer D, Nerenz D. Illness cognition: using common sense to understand treatment adherence and affect cognition interactions. *Cognitive Ther Res* 1992;16(2):143–63.
- [31] Thomas DR. A general inductive approach for analyzing qualitative evaluation data. *Am J Evaluation* 2006;27(2):237–46.
- [32] Gueniche K, Hadengue A. [Plea for transplant recipients]. *Gastroenterol Clin Biol* 2000;24(11):1032–6.
- [33] Lamba S, Nagurka R, Desai KK, Chun SJ, Holland B, Koneru B. Self-reported non-adherence to immune-suppressant therapy in liver transplant recipients: demographic, interpersonal, and intrapersonal factors. *Clin Transplant* 2011;26(2):328–35.
- [34] Wainwright SP. The transformational experience of liver transplantation. *J Adv Nurs* 1995;22(6):1068–76.
- [35] Chisholm-Burns MA, Spivey CA, Wilks SE. Social support and immunosuppressant therapy adherence among adult renal transplant recipients. *Clin Transplant* 2010;24(3):312–20.
- [36] Tong A, Howell M, Wong G, Webster AC, Howard K, Craig JC. The perspectives of kidney transplant recipients on medicine taking: a systematic review of qualitative studies. *Nephrol Dial Transplant* 2011;26(1):344–54.
- [37] Wilson R, Brown DR, Boothe MA, Weng FL. Improving the delivery of patient education about kidney transplant in a transplant center. *Prog Transplant* 2012;22(4):403–12.
- [38] Giordan A. Éducation thérapeutique: mise en pratique des modèles en 5 dimensions. *Medecine* 2008;6(4):269–73.
- [39] Weinman J, Figuiers MJ. La perception de la santé et de la maladie. In: Fischer GN, editor. *Traité de Psychologie de la Santé*. Paris: Dunod; 2002. p. 117–33.
- [40] Glattacker M, Heyduck K, Meffert C. Illness beliefs, treatment beliefs and information needs as starting points for patient information – evaluation of an intervention for patients with chronic back pain. *Patient Educ Couns* 2012;86(3):378–89.
- [41] Horne R, Weinman J. Self-regulation and self-management in asthma: exploring the role of illness perceptions and treatment beliefs in explaining non-adherence to preventer medication. *Psychol Health* 2002;17(1):17–32.
- [42] Llewellyn CD, McGurk M, Weinman J. Illness and treatment beliefs in head and neck cancer: is Leventhal's common sense model a useful framework for determining changes in outcomes over time? *J Psychosom Res* 2007;63(1):17–26.
- [43] Glasersfeld VE. [Why constructivism must be radical?]. *Rev Sci Educ* 1994;20(1):21–8.
- [44] Lacroix A. [What are the theoretical foundations underpinning therapeutic education?]. *Sante Publique* 2007;19(4):271–81.
- [45] Giordan A, De Vecchi G. [The origins of knowledge: from learners' conceptions to scientific concepts]. Neuchâtel: Delachaux & Niestlé; 1987.
- [46] John H, Hale ED, Bennett P, Treharne GJ, Carroll D, Kitas GD. Translating patient education theory into practice: developing material to address the cardiovascular education needs of people with rheumatoid arthritis. *Patient Educ Couns* 2011;84(1):123–7.

- [47] Hansen R, Seifeldin R, Noe L. Medication adherence in chronic disease: issues in posttransplant immunosuppression. *Transplant Proc* 2007;39(5):1287–300.
- [48] Klein A, Otto G, Kramer I. Impact of a pharmaceutical care program on liver transplant patients' compliance with immunosuppressive medication: a prospective, randomized, controlled trial using electronic monitoring. *Transplantation* 2009;87(6):839–47.
- [49] Chisholm MA, Mulloy LL, Jagadeesan M, DiPiro JT. Impact of clinical pharmacy services on renal transplant patients' compliance with immunosuppressive medications. *Clin Transplant* 2001;15(5):330–6.
- [50] De Bleser L, Matteson M, Dobbels F, Russell C, De Geest S. Interventions to improve medication-adherence after transplantation: a systematic review. *Transpl Int* 2009;22(8):780–97.
- [51] Lumby J. Liver transplantation: the death/life paradox. *Int J Nurs Pract* 1997;3(4):231–8.
- [52] Pelgur H, Atak N, Kose K. Anxiety and depression levels of patients undergoing liver transplantation and their need for training. *Transplant Proc* 2009;41(5):1743–8.
- [53] Perez-San-Gregorio MA, Martin-Rodriguez A, Perez-Bernal J. Influence of the psychological state of relatives on the quality of life of patients at 1 year after transplantation. *Transplant Proc* 2008;40(9):3109–11.
- [54] Perez-San-Gregorio MA, Martin-Rodriguez A, Diaz-Dominguez R, Perez-Bernal J. The influence of post-transplant anxiety on the long-term health of patients. *Transplant Proc* 2006;38(8):2406–8.
- [55] De Bona M, Ponton P, Ermani M, Iemmolo RM, Feltrin A, Boccagni P, et al. The impact of liver disease and medical complications on quality of life and psychological distress before and after liver transplantation. *J Hepatol* 2000;33(4):609–15.
- [56] Nilsson M, Persson LO, Forsberg A. Perceptions of experiences of graft rejection among organ transplant recipients striving to control the uncontrollable. *J Clin Nurs* 2008;17(18):2408–17.
- [57] Antoni MH, Lechner SC, Kazi A, Wimberly SR, Sifre T, Urcuyo KR, et al. How stress management improves quality of life after treatment for breast cancer. *J Consult Clin Psychol* 2006;74(6):1143–52.
- [58] Gauchet A, Shanklanda R, Dantzerb C, Pelissier S, Aguerred C. Clinical applications in health psychology. *Psychol Fr* 2012;57:131–42.
- [59] Antoni MH, Cruess DG, Klimas N, Maher K, Cruess S, Kumar M, et al. Stress management and immune system reconstitution in symptomatic HIV-infected gay men over time: effects on transitional naive T cells (CD4(+)/CD45RA(+)/CD29(+)). *Am J Psychiatry* 2002;159(1):143–5.
- [60] Antoni MH, Wimberly SR, Lechner SC, Kazi A, Sifre T, Urcuyo KR, et al. Reduction of cancer-specific thought intrusions and anxiety symptoms with a stress management intervention among women undergoing treatment for breast cancer. *Am J Psychiatry* 2006;163(10):1791–7.