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## Original Articles

# The Illness Representation and Treatment Adherence of Patients with End Stage Renal Disease Receiving Hemodialysis in Malaysia

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### Abstract

**Objectives:** *This study aimed to explore the Illness Representation and Treatment Adherence of patients with end stage renal disease (ESRD) receiving hemodialysis (HD).*

**Method:** *Ninety patients with ESRD receiving HD were recruited from one public hospital in Kelantan, Malaysia. Questionnaires consisted of three parts: 1) Demographic Data Questionnaire (DDQ), 2) the modified Brief Illness Perception Questionnaire (B-IPQ), and 3) the Treatment Adherence Questionnaire (TAQ). The questionnaires were validated by three experts. The questionnaires were translated from English to Malay language using the back translation technique. The test-retest reliability was tested for the stability of the modified B-IPQ with the result of correlation coefficient of 0.90. The TAQ was tested for internal consistency yielded value of Cronbach's alpha coefficient of 0.83. The data were analyzed using descriptive statistics and Spearman's rho correlation statistic.*

**Results:** *The results revealed that the patients with ESRD receiving HD had the illness representation total mean score of 37.02 (SD = 4.17). The analysis also showed that the patients had a median score of 48 (IQR = 6) for the treatment adherence. The results also showed that illness representation has a negative correlation with treatment adherence, which was statistically significant as shown by Spearman's rho correlation statistic ( $r_s = -0.33, p < 0.01$ ).*

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**Conclusion:** *This study identified the negative correlation between illness representation and treatment adherence of patients with ESRD receiving HD, implying that patients with more negative illness representation were more likely to have difficulty in following their treatment adherence. Therefore, it is recommended that an experimental study should be developed and tested the illness representation promoting program to enhance treatment adherence for patients with ESRD receiving HD.*

**Keywords:** end stage renal disease; hemodialysis; illness representation; treatment adherence

## Background

In the past two decades, the number of patients diagnosed with end-stage renal disease (ESRD) has increased greatly in Malaysia. There were an estimated 28,590 people living with ESRD in Malaysia at the end of 2012, which shows an increase from a mere 1,396 patients in 1993.<sup>1</sup> ESRD is the final stage of kidney failure, where congenital or inherited diseases have progressively destroyed the normal structure and function of the kidney.<sup>2</sup> At the end stage of renal insufficiency, kidney function has declined to less than 10% of normal function and renal replacement therapy (RRT) has become a necessity.<sup>2</sup> RRT including hemodialysis (HD) can be used to replace some of the functions of the non-working kidneys. HD involves the circulation of the body's blood through a machine that cleans the blood of waste products, which takes 3-5 hours and is performed three times per week.<sup>3-4</sup> In 2012, the most common form of RRT in Malaysia was HD (92%).<sup>1</sup>

Illness representation is a person's thoughts or beliefs or ideas about illness.<sup>5</sup> A few studies have shown that illness representation contributes to a patient's treatment adherence.<sup>6-7</sup> ESRD patients did not have appropriate representation of their illness and felt that adherence to their treatment was both a physical and emotional burden.<sup>6</sup> Most ESRD patients believed that receiving HD weakened their body and health.<sup>6</sup> Moreover, most of them viewed their lives as being controlled by the treatment.<sup>6</sup>

Treatment adherence can prevent the progressive worsening of ESRD and recurrent hospitalization. Treatment adherence includes adherence to HD, adherence to medication, and adherence to fluid and dietary restrictions.<sup>8</sup> Patients with ESRD are at higher risk in developing complications such as hypertension and cardiovascular disease if they do not adhere to prescribed fluid restrictions and other treatment regimens over time.<sup>9</sup> For patients with ESRD receiving HD, serious consequences can occur if they fail to adhere to medications, fluid and dietary restrictions.<sup>10-11</sup> In Malaysia, previous study identified adherence to fluid restriction was prevalent among patients undergoing HD in a single center.<sup>9</sup> High proportion of HD patients in Malaysia had difficulty in

adherence of fluid and dietary restrictions.<sup>12</sup>

The treatment adherence of ESRD patients receiving HD are related to several factors such as age, gender, marital relationship, durations of experience in HD, social support, knowledge about the advantages of treatment adherence and illness representation. Therefore, to enhance treatment adherence, these related factors need to be controlled and manipulated. A few studies have shown that illness representation contributes to a patient's treatment adherence.<sup>6-7</sup>

Despite the fact that illness representation has been shown to contribute to a patient's treatment adherence, the previous studies did not cover all of the components of treatment adherence in patients with ESRD receiving HD. The description of illness representation, treatment adherence, and the relationship between illness representation and treatment adherence, particularly in Malaysia are also not clearly described. Therefore this study explored the illness representation and treatment adherence, and assessed the relationship between illness representation and treatment adherence in patients with ESRD receiving HD in Malaysia.

### **Objectives**

The objectives of this study were to 1) describe illness representation among patients with ESRD receiving HD, 2) examine treatment adherence among patients with ESRD receiving HD, and 3) explain the relationship between illness representation and treatment adherence among patients with ESRD receiving HD.

### **Conceptual Framework**

The conceptual framework used in this study was the Common Sense Model (CSM).<sup>5</sup> The CSM consists of three major constructs: Illness representation (cognitive illness representation and emotion illness representation), coping and appraisal. The cognitive illness representation is regarded as an individual's beliefs.<sup>5</sup> The primary functions of cognitive illness representation is used as a guide for selecting coping strategies. Treatment adherence can be considered as a coping that is one of the major construct of CSM. While the appraisal component is not included in this conceptual framework since the outcome variable in this study is the treatment adherence.

There are five dimensions in cognitive illness representation as the individual's idea, which are identity, cause, timeline, consequences and cure/controllability of illness.<sup>5</sup> In this study, identity of illness refers to the belief about the individual's label of his or her ESRD and the symptoms that he or she has experienced. Cause of illness refers to the belief about how the individual gets the ESRD. Timeline of illness refers to the belief about the course of the ESRD and the time scale of ESRD symptoms. Consequences of illness refers to the belief about the impact of the ESRD and HD on the individual's life. Cure or controllability of illness refers to the belief about the efficacy of HD including the medication, and personal coping to alter the illness. In this study,

the focus was only on the cognitive representation which has treatment adherence as the outcome.

It has been suggested that the key to the successful management of ESRD and its related treatment relies on a patient's continuous adherence to the four components of the therapeutic regimen.<sup>8</sup> Treatment adherence of patients on HD consists of the following four components: 1) adherence to HD, 2) adherence to medications, 3) adherence to fluid restriction, and 4) adherence to dietary restriction.<sup>8</sup>

## Methods

In this study, the sample was comprised of patients with ESRD who regularly receive HD for at least three months prior to this study at Kota Bharu, Kelantan. Convenience sampling was used as the sampling procedure of this study. The patients who met the inclusion criteria were approached to determine their willingness to participate in the study.

This study was part of the research project testing the effect of the illness representation promoting program on treatment adherence among ESRD patients receiving HD.<sup>13</sup> The sample size was calculated according to the main project. Therefore, 90 patients involved in this study who completed the questionnaires.

The criteria for selecting patients for this study were as follows: 1) aged 18 and above, 2) able to speak Malay, 3) had been receiving HD three times per week for at least three months prior to the study since it is the appropriate time for the patients to develop their illness representation.<sup>14</sup>, and 4) willingly participate in the study throughout the course of the study.

## Instruments

The following instruments were used in this study: 1) the Demographic Data Questionnaire (DDQ), 2) the modified Brief Illness Perception Questionnaire (B-IPQ), and 3) the Treatment Adherence Questionnaire (TAQ). The explanation of each instrument is as follows:

1) The Demographic Data Questionnaire (DDQ). The DDQ was used to collect a patient's demographic data. Data about patient's age, gender, marital relationship, religion, educational level, occupation, total monthly income, and the duration of having ESRD and receiving HD were collected from the questionnaire.

2) The Modified Brief Illness Perception Questionnaire (B-IPQ). The modified B-IPQ was used to assess a patient's illness representation along with the dimension of identity of the illness, causal, timeline, control and consequences. The questionnaire was adapted from previous study.<sup>15</sup> The original B-IPQ consisted of eight items plus part of the causal scale. Three items were excluded in this study as they measure emotional representation and comprehensibility which were not the focus of this study. The five items assessed four dimension of cognitive illness representations which were identity, timeline, consequences, and cure/controllability rated using a 0 to 10 response

scale with 0 indicated inappropriate representation and 10 indicated appropriate representation. The causal representation was assessed by an open-ended question which asked patients to list the three most important causal factors of their illness. The total possible scores ranged from 0 to 50. Higher score reflected a more appropriate representation. Regarding the causal representation, patients' answers were grouped into categories. The test-retest reliability was tested for the stability of the modified B-IPQ with the result of correlation coefficient of 0.90.

3) The Treatment Adherence Questionnaire (TAQ). The TAQ was developed by the researcher based on previous questionnaires regarding adherence.<sup>16-18</sup> The TAQ was used to assess treatment adherence. The TAQ consists of four dimensions of treatment adherence in patients with ESRD receiving HD including adherence to HD, adherence to medication, adherence to fluid and dietary restrictions. The total items of TAQ were 15 items. The response option range for this questionnaire is 4-point Likert scales from 1 (never) to 4 (all the time). The total possible scores range from 15 to 60. A higher score of TAQ indicates higher treatment adherence. The TAQ was tested for internal consistency yielded value of Cronbach's alpha coefficient of 0.83.

### **Ethical Consideration**

This study was approved by the Research Ethics Committee of Faculty of Nursing, Prince of Songkla University, Thailand, and Medical Research and Ethics Committee (MREC), Ministry of Health, Malaysia (NMRR-14-753-21772, November 11th 2014). The purpose of the study was explained to the potential patients by the researcher, participation in this study was voluntary, and their anonymity was ensured; the data would remain confidential and they had the right to refuse to participate in the study or withdraw at any time without any negative consequences. Patients who agreed to participate signed the consent form before starting data collection. There was no known risk or harm to the patients who participated in this study.

### **Data Collection**

Data collection was conducted from January 2015 to April 2015 after this study was approved by the Research Ethics Committee of the Faculty of Nursing, Prince of Songkla University (PSU) and obtained official permission for data collection from the Medical Research and Ethics Committee (MREC), Ministry of Health, Malaysia. In this study, a research assistant (RA) was recruited for collecting the data. The RA was a nurse who has graduated with a Bachelor's Degree in Nursing. The patients with ESRD who met the inclusion criteria were approached by the head nurse and the researcher and the RA were introduced. They were invited to participate in this study and received a letter of informed consent from the researcher. They signed it to state that they agreed to participate in this study. Before that, the researcher provided an explanation of the study including the purpose, benefits, confidentiality, and the procedures to the patients. The researcher also informed

the patients that they had the right to withdraw from this study at any time without any negative consequences. After the patient signed the informed consent form, the RA collected the data using the DDQ, the modified B-IPQ, and the TAQ. The questionnaires were administered during the patient's dialysis therapy sessions by the RA to ensure accuracy and completeness, as well as to standardize the method of data collection. The questionnaire took about 10-15 minutes to be completed.

### Data Analysis

The researcher used descriptive and inferential statistics to analyze the data. Descriptive statistics were used to analyze and describe the demographic and clinical characteristics of the patients by using frequencies, percentages, mean, range, median, interquartile range, and standard deviation. For the inferential statistics, the researcher planned for Pearson's product-moment correlation to examine the relationship between illness representation and treatment adherence among patients with ESRD receiving HD. Before the appropriate statistical analysis was performed, the researcher examined the assumptions of normality and linearity. The assumption of normality was examined using skewness and kurtosis divided by its standard error values. Testing assumption showed that the data sets of illness representation were normally distributed with the values were within the range of  $\pm 3$ .<sup>19</sup> While the data sets of treatment adherence were not normally distributed, determined by the values which were not in the range of  $\pm 3$ . The linearity was checked between the variables. Therefore, Spearman's rho correlation statistic was calculated to examine the relationship between illness representation and treatment adherence among patients with ESRD receiving HD.

### Results

#### Demographic and Clinical Characteristics

The demographic and clinical characteristics of patients are presented in Table 1. The majority of the patients were aged less than 59 years old (83.3%), men (56.7%) and married (72.2%). More than half of the patients had secondary school education (58.9%) and were unemployed (62.3%). Most of the patients had a monthly income of less than 1,500 Malaysian Ringgit (MYR) (52.2%). For the clinical characteristics, the majority of the patients had diagnosed with renal disease for more than 5 years (54.4%) while 45.6% of them had been receiving HD for more than 5 years.

**Table 1** Frequency, percentage, means, standard deviations, and min-max of the patients classified by demographic and clinical characteristics (N = 90)

Characteristic	n	%
<b>Age (years)</b> M = 47.69, SD = 12.76, Min-Max = 20-77		
< 59 years	75	83.3
> 60 years	15	16.7
<b>Gender</b>		
Male	51	56.7
Female	39	43.3
<b>Marital status</b>		
Single	19	21.1
Married	65	72.2
Divorced/separated/widowed	6	6.7
<b>Education level</b>		
No formal education	2	2.2
Primary school	10	11.1
Secondary school	53	58.9
Tertiary level and above	25	27.8
<b>Employment status</b>		
Employed	34	37.8
Unemployed	56	62.2
<b>Monthly income (MYR, MYR 1 = 14,000 baht)</b>		
< 1,500	47	52.2
1,501-3,500	32	35.6
> 4,501	11	12.2
<b>Length of diagnosis with renal disease (years)</b> M = 89.28, SD = 66.19, Min ; Max = 7; 288 months		
< 1 year	7	7.8
1-3 years	15	16.7
4-5 years	19	21.1
> 5 years	49	54.4
<b>Length of receiving HD (years)</b> M = 74.00, SD = 60.48, Min ; Max = 4 ; 276		
< 1 year	12	13.3
1-3 years	13	14.4
4-5 years	24	26.7
> 5 years	41	45.6

### Illness Representation of Patients with ESRD receiving HD

Illness representation scores of patients are summarized in Table 2. Mean scores were higher in the dimension of timeline and cure/controllability than scores from other dimension. The high mean scores on the dimension of timeline and cure/controllability indicate that most of the study patients understood their ESRD was likely to be permanent rather than temporary and believed they could control the disease course by pursuing treatment to some extent. The total illness representation mean score was 37.02 (SD = 4.17). For the causal dimension, the most common answers were hypertension, diabetes mellitus and foods.

**Table 2** Possible score range, min-max, mean, and standard deviations of the BIPQ (N = 90)

Dimension	Possible Score Range	Min-Max	M	SD
Total	0-50	9.00-47.0	37.02	4.17
Identity	0-10	3.00-10.0	6.41	1.59
Timeline	0-10	10.0-10.0	10.00	0.00
Consequences	0-10	0.00-9.00	3.73	2.63
Cure/controllability	0-20	13.0-20.0	16.88	1.38

### Treatment Adherence of Patients with ESRD receiving HD

Table 3 shows that the patients had a median score of 48 (IQR = 6) for the total of treatment adherence. The majority of the patients perceived the importance of adherence to HD with the median score 7 (IQR = 1). Most of the patients also perceived the importance of adherence to medication as prescribed with the median score of 15 (IQR = 1). This study also found that most of the patients had difficulty following fluid and dietary restrictions with a median score of 13 (IQR = 3) and 15 (IQR = 3) respectively.

**Table 3** Possible score range, median, interquartile range, and min - max of the TAQ (N = 90)

Dimension	Possible Score Range	Min-Max	Mdn	IQR
Total	15-60	28-59	48	6
Adherence to HD	2-8	5-8	7	1
Adherence to Medications	4-16	6-16	15	1
Adherence to Fluid Restriction	4-16	5-16	13	3
Adherence to Dietary Restriction	5-20	10-20	15	3

### Correlation between Illness Representation and Treatment Adherence

The results of the bivariate correlational analysis using Spearman's rho correlation statistic are presented in Table 4. The results show that illness representation had a negative correlation with treatment adherence, which was statistically significant ( $r_s = -0.33, p < 0.01$ ). The timeline dimension cannot be computed because at least one of the variables was constant. This was because there were no variances in the patients answer. Cure/controllability dimension had a positive correlation with treatment adherence, which was also statistically significant ( $r_s = 0.38, p < 0.01$ ) while identity had a statistically significant negative correlation with treatment adherence ( $r_s = -0.26, p < 0.05$ ). Cure/controllability dimension also had a statistically significant positive correlation with adherence to medications ( $r_s = 0.30, p < 0.01$ ) and fluid restrictions ( $r_s = 0.42, p < 0.01$ ).

**Table 4** Correlation ( $r_s$ ) between illness representation and treatment adherence among patients with ESRD receiving HD (N = 90)

Variable	1	2	3	4	5	6	7	8	9
1. Illness Representation									
2. Identity	0.76**								
3. Consequences	0.87**	0.48**							
4. Cure/controllability	-0.43**	-0.35*	-0.06						
5. Treatment Adherence	-0.33**	-0.26*	-0.19	0.38**					
6. Adherence to HD	-0.13	-0.19	0.02	0.20	0.53**				
7. Adherence to medications	-0.12	-0.09	-0.05	0.30**	0.55**	0.17			
8. Adherence to fluid restriction	-0.41**	-0.48**	-0.20	0.42**	0.71**	0.43**	0.13		
9. Adherence to dietary restriction	-0.05	0.17	-0.08	0.12	0.69**	0.12	0.29**	0.26**	

\* $p < 0.05$ , \*\* $p < 0.01$

### Discussion

This study was conducted to describe illness representation and treatment adherence among patients with ESRD receiving HD and to assess the relationships between their illness representation and treatment adherence. The majority of the patients were men and aged less than 59 years old. This data is supported by previous study who reported that the majority of patients with ESRD receiving HD in Malaysia were in the age group less than 59 years old and most of the patients were males.<sup>1,20</sup> They also found that most of the patients were married, which is the same as this study. The majority of the patients in this study had been receiving HD for more than 5 years which is congruent with a previous study.<sup>12</sup> From the demographic

findings, most of the patients had a low socioeconomic status as evidenced by low educational levels, low monthly incomes, and the high percentage of unemployed.

Previous study used the BIPQ to observe illness representation in patients with ESRD receiving HD.<sup>21</sup> There were similar mean scores of consequences and the timeline dimension from 161 patients in their study to those in the current study. While for other dimensions, the mean scores were lower than their findings. In this study, the mean scores of illness representation indicated that the patients understood that their illness will last forever (timeline) and they believed that their illness disrupted their daily life most of the time (consequences). The cure/controllability was found to be at very high levels and patients believed that their illness can be controlled by the treatment they received.

The adherence rate from previous studies have been extremely varied;<sup>16</sup> therefore the measured treatment adherence rates in this study are difficult to compare to the previous studies. Overall treatment adherence rates in this study population are higher than the previous study. This result perhaps was related to the different study setting and measurement instruments of the treatment adherence. This study found that the adherence to HD and medications were higher than adherence to fluid and dietary restrictions. This finding was similar to the previous study.<sup>16</sup> and consistent with the findings by other study.<sup>12</sup> These results might be related to the difficulty in following the treatment recommendations for fluid and dietary since this required more willpower from the patients.<sup>16</sup>

Illness representation were negatively correlated with treatment adherence and more specifically with adherence to fluid restriction, implying that patients with more negative illness representation were more likely to have difficulty in following treatment adherence. Interestingly, this finding was different from the study done by previous researchers.<sup>16</sup> Adherence to dietary restriction was the only item that negatively correlated with illness representation in their findings. Previous studies also found that illness representation affected adherence behavior in patients with ESRD receiving HD.<sup>7,22</sup>

Findings from the current study are limited even though the sample size was determined through a power analysis, thus a larger sample may be needed to describe illness representation and treatment adherence among patients with ESRD receiving HD adequately. Finally, the TAQ that was used for this study is a newly developed questionnaire and may require further adjustment depending on future studies, such as its application to a more diverse population in different experimental settings even though its validity and reliability were supported.

## Conclusion and Recommendation

Illness representation was found to have a correlation with treatment adherence in certain areas. The nurses need to explore and understand a patient's representation about the illness and the treatment, change the misconception, gaps, and/or confusion, and motivate the patient to accept the new representation in order to enhance the adherence behavior of the patient. This program has several process components that can be applied to nursing practice to improve adherence behavior. Thus, approaches to enhance treatment adherence should be extensively studied in patients with ESRD receiving HD such as illness representation promoting program.

## References

1. Lim YN, Goh BL, Ong LM. (eds.) 20 th Report of the Malaysian dialysis and transplant 2012. Kuala Lumpur, Malaysia: National Renal Registry; 2013.
2. Cheema B, Singh M. Exercise training in patients receiving maintenance hemodialysis: A systematic review of clinical trials. *Am J Nephrol.* 2005; 25(4): 352-64.
3. Bevan MT. Dialysis as “deus ex machina”: A critical analysis of haemodialysis. *J Adv Nurs.* 2000; 31(2): 437-43.
4. Starzomski R, Hilton A. Patient and family adjustment to kidney transplantation with and without an interim period of dialysis. *Nephrol Nurs J.* 2000; 27(1): 17-32.
5. Leventhal H, Meyer D, Nerenz D. The common sense representation of illness danger. In: Rachman S, editor. *Medical Psychology* [Internet]. 1980 [cited 2014 Jun 4]. Available from: <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:The+Common+Sense+Representation+of+Illness+Danger#0>
6. Krespi R, Bone M, Ahmad R, et al. Haemodialysis patients' beliefs about renal failure and its treatment. *Patient Educ Couns.* 2004; 53(2): 189-96. doi: 10.1016/S0738-3991(03)00147-2.
7. Welch JL, Perkins SM, Evans JD, et al. Differences in perceptions by stage of fluid adherence. *J Ren Nutr.* 2003; 13(4): 275-81.
8. Denhaerynck K, Manhaeve D, Dobbels F, et al. Prevalence and consequences of nonadherence to hemodialysis regimens. *Am J Crit Care.* 2007; 16(3): 222-35.
9. Barnett T, Li Yoong T, Pinikahana J, et al. Fluid compliance among patients having haemodialysis: can an educational programme make a difference? *J Adv Nurs.* 2008; 61(3): 300-6. doi: 10.1111/j.1365-2648.2007.04528.x.
10. Kutner NG. Improving compliance in dialysis patients: Does anything work? *Semin Dial.* 2001; 14(5): 324-7.
11. Tsay SL. Self-efficacy training for patients with end-stage renal disease. *J Adv Nurs.* 2003; 43(4): 370-5.

12. Chan YM, Zalilah MS, Hii SZ. Determinants of compliance behaviours among patients undergoing hemodialysis in Malaysia. *PLoS One*. 2012; 7(8): e41362. doi: 10.1371/journal.pone.0041362.
13. Ali AMR. The effect of illness representation promoting program on treatment adherence among patients with end stage renal disease receiving hemodialysis [Thesis]. [Songkhla]: Prince of Songkla University; 2015. 135 p.
14. Kim Y. Relationship between illness perceptions, treatment adherence and clinical outcomes in maintenance hemodialysis patients [Internet]. University of California, Los Angeles; 2009 [cited 2014 Jul 13]. Available from: <http://gradworks.umi.com/33/74/3374953.html>
15. Broadbent E, Petrie KJ, Main J, et al. The brief illness perception questionnaire. *J Psychosom Res*. 2006; 60(6): 631-7.
16. Kim Y, Evangelista LS. Relationship between illness perceptions, treatment adherence, and clinical outcomes in patients on maintenance hemodialysis. *Nephrol Nurs J*. 2010; 37(3): 271-80.
17. Novitayani S. The effect of the illness representation based education program (IRBEP) on medication adherence among Muslim patients with schizophrenia in the Psychiatric Hospital Banda Aceh, Indonesia [Thesis]. [Songkhla]: Prince of Songkla University; 2012. 180 p.
18. Rushe H, Gee HMM. Assessing adherence to dietary recommendations for hemodialysis patients: The renal adherence attitudes questionnaire (Raaq) and the renal adherence behaviour questionnaire (Rabq). *J Psychosom Res*. 1998; 45(2): 149-57.
19. Polit DF, Beck CT. Designing and conducting quantitative studies to generate evidence for nursing. In: *Nursing research: generating and assessing evidence for nursing practice*. Lippincott Williams & Wilkins; 2012.
20. Ibrahim N, Desa A, Chiew-Tong NK. Illness perception and depression in patients with end-stage renal disease on chronic haemodialysis. *The Social Sciences*. 2011; 6(3): 221-26.
21. Jansen D, Heijmans M, Rijken M, et al. Illness perceptions and treatment perceptions of patients with chronic kidney disease: different phases, different perceptions? *Br J Health Psychol*. 2013; 18(2): 244-62.
22. Karamanidou C, Weinman J, Horne R. Improving haemodialysis patients' understanding of phosphate-binding medication: A pilot study of a psycho-educational intervention designed to change patients' perceptions of the problem and treatment. *Br J Health Psychol*. 2008; 13(Pt 2): 205-14. doi: 10.1348/135910708X288792.