

# Exploring beliefs about heart failure treatment in adherent and nonadherent patients: use of the repertory grid technique

William Neil Cottrell<sup>1</sup>  
Charles P Denaro<sup>2,3</sup>  
Lynne Emmerton<sup>1,4</sup>

<sup>1</sup>School of Pharmacy, University of Queensland, Brisbane, Qld, Australia;

<sup>2</sup>Department of Internal Medicine and Aged Care, The Royal Brisbane and Women's Hospital, Brisbane, Qld, Australia; <sup>3</sup>School of Medicine, University of Queensland, Brisbane, Qld, Australia; <sup>4</sup>Curtin Health Innovation Research Institute, School of Pharmacy, Curtin University, Perth, WA, Australia

**Purpose:** Beliefs about medicines impact on adherence, but eliciting core beliefs about medicines in individual patients is difficult. One method that has the potential to elicit individual core beliefs is the “repertory grid technique.” This study utilized the repertory grid technique to elicit individuals’ beliefs about their heart failure treatment and to investigate whether generated constructs were different between adherent and nonadherent patients.

**Methods:** Ninety-two patients with heart failure were interviewed using a structured questionnaire that applied the repertory grid technique. Patients were asked to compare and contrast their medicines and self-care activities for their heart failure. This led to the generation of individual constructs (perceptions towards medicines), and from these, beliefs were elicited about their heart failure treatment, resulting in the generation of a repertory grid. Adherence was measured using the Medication Adherence Report Scale (MARS). Patients with a MARS score  $\geq 23$  were categorized as “adherent” and those with a score  $\leq 22$  as “nonadherent.” The generated grids were analyzed descriptively and constructs from all grids themed and the frequency of these constructs compared between adherent and nonadherent patients.

**Results:** Individual grids provided insight into the different beliefs that patients held about their heart failure treatment. The themed constructs “related to water,” “affect the heart,” “related to weight,” and “benefit to the heart” occurred more frequently in adherent patients compared with nonadherent patients.

**Conclusion:** The repertory grid technique elicited beliefs of individual participants about the treatment of their heart failure. Constructs from self-reported adherent patients were more likely to reflect that their medicines and self-care activities were related to water and weight, and affect and benefit to the heart. Providing clinicians with better insight into individuals’ beliefs about their treatment may facilitate the development of tailored interventions to improve adherence.

**Keywords:** adherence, heart failure, repertory grid, beliefs, treatment

## Introduction

Adherence to medication in patients with chronic disease is an acknowledged global problem, with the World Health Organization reporting that up to 50% of these patients do not adhere to their medication.<sup>1</sup> Factors that have been suggested to affect adherence relate to the disease, the patient, the social and economic context, behaviors, the physician, and the healthcare system.<sup>1-4</sup> Nonadherence can be regarded as either unintentional, relating to issues of cognition (eg, forgetfulness), health literacy and dexterity; or intentional, where beliefs about a medicine (eg, concerns about side effects) or costs of the medicine result in a conscious decision not to take the medication.<sup>5</sup>

Correspondence: Neil Cottrell  
School of Pharmacy, University  
of Queensland, Pharmacy Australia  
Centre of Excellence, Level 4,  
20 Cornwall Street, Woolloongabba,  
Qld, 4102, Australia  
Tel +61 7 3346 1977  
Fax +61 7 3346 1999  
Email n.cottrell@uq.edu.au

Reminders and dosing aids may help those with unintentional nonadherence.<sup>2,3</sup> However, less is understood about intentional nonadherence, particularly where beliefs about medicines impact on nonadherence behaviour.<sup>1,2</sup>

Questionnaires have been developed to identify individuals' beliefs about medicines. These include the Belief about Medicines Questionnaire (BMQ),<sup>6</sup> the Beliefs and Behaviour Questionnaire,<sup>7</sup> the Adherence Estimator,<sup>8</sup> and ASK-20.<sup>9</sup> The most widely used, the BMQ, is based on a necessity–concerns framework, whereby patients with a high “necessity” score and low “concerns” score are more likely to be adherent.<sup>10–13</sup> Other studies have demonstrated that a high “concerns” score and a low “necessity” score is likely to result in low adherence.<sup>14–19</sup> The necessity–concerns framework helps to identify patients at potential risk of nonadherence but does not elucidate patients' individual beliefs that fall outside this framework and that may also impact on adherence.

“Beliefs” can be considered assumed truths and are defined in the philosophy literature as propositional attitudes, ie, declarative statements that say something about the world and can be either true or false.<sup>20</sup> Examples of propositions are “it rained yesterday,” “the sky is orange,” and “perindopril is for my heart.” When an individual takes the proposition to be true or sufficiently likely to be true so as to influence decisions, it is considered a *belief*. One method that could be utilized to elicit beliefs is the “repertory grid technique,” developed from George Kelly's personality theory published in “The Psychology of Personal Constructs” in 1955.<sup>21</sup> In this theory, Kelly proposed that all individuals are scientists and as such, form hypotheses in response to events in life, test these hypotheses, and then further refine them depending on the good or bad experience that results. In essence, this is then how individuals understand (construe) their world and as they pass through life, develop a system of personal constructs in response to events. When individuals are confronted with a new event, they use their construct system to make a judgment and then act. Thus, a construct is a way that an individual understands, perceives, or makes sense of something. Kelly developed the repertory grid technique as a method of eliciting an individual's construct system in a particular area of interest. In this technique, individuals compare and contrast objects of interest (elements) to generate highly individual bipolar statements (constructs) reflecting the way they perceive their world. An interval scale can be placed between the poles of the statements and the individual asked to rate the objects of interest on the scale. In essence, when individuals do this, they generate four propositions and then, through the rating of the object of interest, pick

the proposition that is true and therefore reflects their belief about that particular object. Therefore, the repertory grid allows individuals to articulate their own views or opinions to generate their own propositions, rather than responding to a set of predetermined statements that may or may not have relevance to them individually. The repertory grid technique has been utilized in exploring consumers' beliefs in heart failure,<sup>22</sup> the evaluation of complementary medicines,<sup>23</sup> treatment decisions in patients with angina,<sup>24</sup> and perceptions of medication information sources.<sup>25</sup>

Individuals with heart failure have to manage the combination of a complex medication regimen and self-care activities (such as exercising, reducing salt and fluid intake, and regular weighing) to reduce mortality and morbidity.<sup>26–28</sup> Due to the complexity of the management regimen, it is not surprising that the common reasons reported for acute exacerbations of heart failure are nonadherence to medications<sup>29–32</sup> and self-care activities.<sup>32–34</sup> Eliciting individuals' beliefs about medicines and self-care activities, in patients with heart failure, may provide an opportunity to develop interventions to change these, which in turn, could improve adherence. However, before an intervention can be developed, the potential of the repertory grid in eliciting beliefs must first be established.

The aim of this study was to utilize the repertory grid technique as a method to elicit individuals' beliefs about their heart failure management. A further aim was to investigate whether the constructs generated by patients with heart failure were different between adherent and nonadherent patients.

## Method

### Study design

Data were collected via a structured interview that used the repertory grid technique. Patients were included if they were over the age of 18 years and attended the Heart Failure Service outpatient clinic, Heart Failure Service Programs, or were Heart Failure Service patients admitted to the medical wards at the Royal Brisbane and Women's Hospital in Brisbane, Australia, between June 2007 and November 2008.

Informed consent was obtained from all participants, and ethical approval was obtained from the Human Research Ethics Committee of the Royal Brisbane and Women's Hospital.

### Interview

The structured interview was based on the repertory grid technique, as described by Fransella et al,<sup>35</sup> Jankowicz,<sup>36</sup> and Percival et al.<sup>22</sup> The interview was divided into five parts.

The first three parts involved an adaptation of the repertory grid technique for individuals with heart failure. Part Four of the interview ascertained the participants' self-reported adherence to their medicines. The fifth part of the interview collected demographic data. The data collection is explained in each of the sections below.

### Part one – the elements (objects of interest)

Up to three currently prescribed medicines and four self-management activities (weighing, exercise, and reduction in fluid and salt intake) for heart failure were utilized as the elements. This resulted in a minimum of five (four self-care activities and one medicine) and a maximum of seven elements (four self-care activities and three medicines) used within the repertory grid interviews.

### Part two – generating the constructs

Individuals were then presented with series of three elements (a triad) and asked to identify “some important way in which two of them are alike and different from the third.” Thus, two statements were obtained: one for the way the two were alike (termed the “emergent pole”) and one for the way the third one was different (termed the “implicit pole”).<sup>35</sup> These two statements helped identify the individual's construct. Repeating this process with the different triads resulted in the identification of a series of constructs (Figure 1).

This process was repeated for further sets of triads until a maximum of twelve had been presented to the participant, until a range of constructs were produced that covered the topic, or until the participant was not generating any new constructs. The elements selected within the triads were chosen arbitrarily by using a balanced incomplete block design, as described by Leach et al.<sup>37</sup> The triads could be composed of only medicines (eg, angiotensin converting enzyme-inhibitor (ACE) or angiotensin receptor blocker, beta-blocker, diuretic), only self-care activities (eg, exercise, weighing, decreasing salt), or a combination of medicines and self-care activities (eg, beta-blocker, decreasing salt, reducing fluid).

### Part three – eliciting beliefs

Participants were then shown a list of their generated constructs that consisted of the two opposing poles, eg, “for the heart” and “reducing water” (Figure 1). A scale numbered 1 to 5 was placed between the opposing poles (Figure 1). The participants were then given a card listing one of their elements and asked to rate the element against each of the generated constructs using this scale. Consider, in Figure 1,

the participant rating the ramipril against the construct “for the heart – reducing water.” The participant could produce four propositions: ramipril is for the heart (rated as 4 or 5); ramipril is for reducing water (rated 1 or 2); ramipril is both for the heart and reducing water (rated as 3); or ramipril is neither for the heart nor reducing water (rated as 0). Therefore, the participants, by rating the medicine, identified which proposition they thought to be true, generating their beliefs. In Figure 1, the patient rated ramipril as 5, and therefore, his/her belief was that ramipril is for the heart.

### Part four – self-reported adherence

Participants were asked to complete the Medication Adherence Report Scale (MARS). The MARS has been used as a self-reported measure of adherence in a number of chronic diseases, including chronic obstructive pulmonary disease,<sup>38</sup> asthma,<sup>39</sup> chronic pain management in cancer,<sup>40</sup> bipolar disorder,<sup>17</sup> and inflammatory bowel disease.<sup>41,42</sup> The MARS includes a preamble encouraging honest responses. This is followed by a series of five statements that reflect adherent behavior. The individual selects one of five options ranging from “never” (scored as 5 by the researcher) to “always” (scored as 1) to reflect how often he/she adopts this behavior. It is then possible to calculate an overall adherence score and to dichotomize this based on a predefined cut-off score (good or poor adherence). A higher score (maximum 25) reflects more adherent behavior.

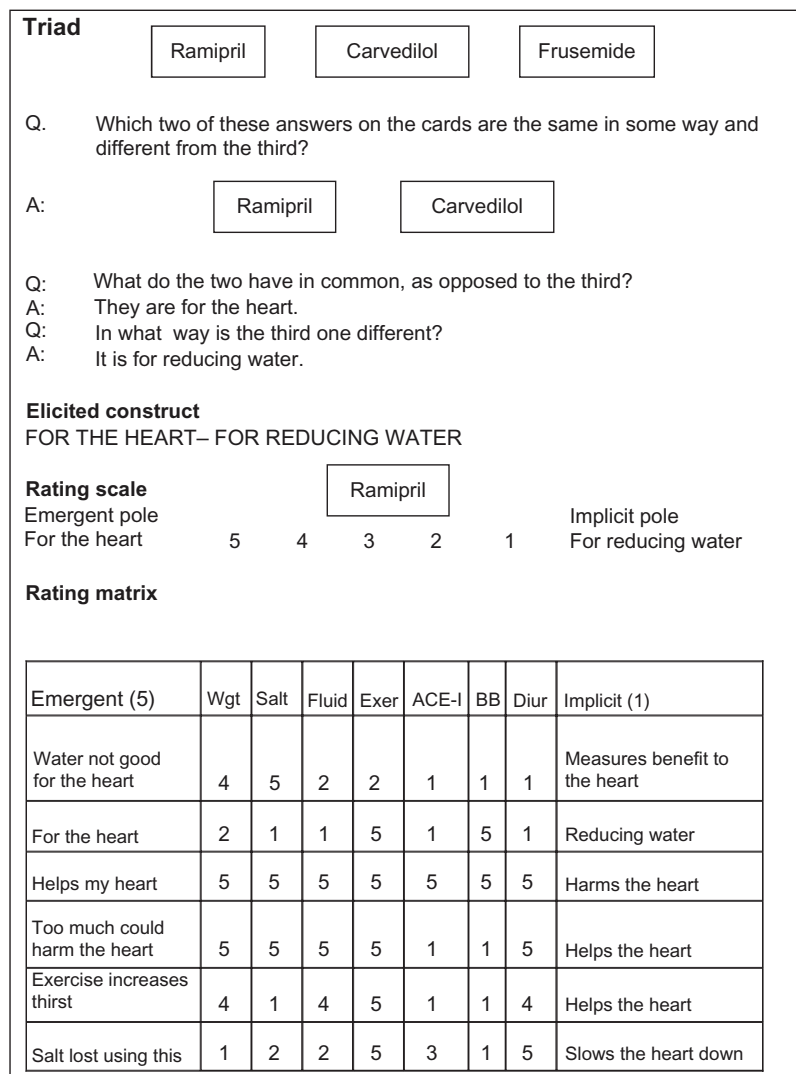
### Part five – demographic data

The final part of the interview recorded participants' demographic details: age, gender, concurrent medical complaints, and regular prescription medicines. These details, including their age, were confirmed and ambiguities clarified by reference to their medical notes.

### Analysis

The demographic data were analyzed descriptively using SPSS® Version 13 (IBM, Armonk, NY, USA). Those participants with a MARS score  $\geq 23$  were categorized as “adherent” and those with a score  $\leq 22$  as “nonadherent.” The use of a MARS score of 23 to dichotomize the self-reported adherence has been described by others,<sup>19,43</sup> and reflects the answers of “sometimes” to one question and “rarely” to two questions.

The repertory grids that were generated for the participants were analyzed qualitatively on an individual basis to explore whether the technique elicited individuals' beliefs about their heart failure management. Four grids (two from patients



**Figure 1** Repertory grid process, generating constructs and rating information.  
**Abbreviations:** Wgt, weight; Exer, exercise; ACE-I, angiotensin converting enzyme-inhibitor (ramipril); BB, beta-blocker (carvedilol); Diur, diuretic (frusemide).

categorized as adherent and two from patients categorized as nonadherent) have been included in the Results section of this paper to illustrate that the technique elicited individuals’ beliefs about management of their heart failure.

Comparison of the constructs elicited between the adherent and nonadherent participants was undertaken utilizing content analysis, as described by Jankowicz.<sup>36</sup> The first construct was reviewed by one of the researchers and themed according to the meaning that it appeared to be expressing. The next construct was reviewed, and if its meaning appeared to differ from that of the first construct, it was labeled with another theme. This process was repeated for all of the constructs, and a number of themes were developed until fewer than 5% of the constructs were compiled into a “miscellaneous” category. Once all the constructs had been assigned a theme by the first researcher, a second researcher

reviewed the original constructs and the themes to which they were allocated. Where there was disagreement about placing the original construct into a theme, discussion took place to reach consensus. The frequency of the generated constructs was compared between the adherent and nonadherent groups, using the Fisher’s exact test.

## Results

During the study period, 97 patients were approached to participate, of whom 92 agreed. The mean (±SD) age of the study participants was 67.4 (±14.5) years (minimum age 22 years, maximum 88 years), and 35 (38.0%) were female. Further demographics, including prescribed medicines and comorbidities, are shown in Table 1.

There were 82 (89.1%) of the participants that were categorized as adherent (MARS score ≥ 23), and the

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**Table 1** Participant demographics

	Total (n = 92) n (%)
Mean age ( $\pm$ SD)	67.4 ( $\pm$ 14.5)
Gender	
Male	57 (62.0)
Female	35 (38.0)
Heart failure medication	
Beta-blocker	74 (80.4)
Diuretic	68 (73.9)
ACE-Inhibitor	65 (70.7)
Digoxin	30 (32.6)
Spironolactone	23 (25.0)
ARB	19 (20.6)
<b>Ejection</b>	
Fraction	
<40%	48 (52.2)
$\geq$ 40%	41 (44.6)
Unknown	3 (3.2)
Co-morbidities	
IHD	51 (55.4)
Hypertension	45 (48.9)
AF	37 (40.2)
Hyperlipidaemia	31 (33.7)
Diabetes	30 (32.6)
COAD	16 (17.4)
Kidney disease	15 (16.3)
PVD	14 (15.2)
Depression	13 (14.1)
Stroke	13 (14.1)
Osteoarthritis	11 (12.0)
GORD	11 (12.0)
Heart failure program	
Enrolled in heart failure program	71 (77.2)
Completed program	61 (66.3)
In maintenance program	41 (44.6)
Mean number admissions in previous 12 months	1.21 ( $\pm$ 1.1)

**Note:** \*Expressed as mean  $\pm$  SD.

**Abbreviations:** SD, standard deviation; ACE-Inhibitor, angiotensin converting enzyme-inhibitor; ARB, angiotensin receptor blocker; IHD, ischemic heart disease; AF, atrial fibrillation; COAD, chronic obstructive pulmonary disease; PVD, peripheral vascular disease; GORD, gastroesophageal reflux disease.

remaining 10 were categorized nonadherent (MARS score  $\leq$  22).

A total of 88 grids were generated from the participants. The remaining four patients were unable to generate a grid, as they could not distinguish between their medicines and self-care activities. An example of two grids generated by participants categorized as adherent is shown in Figure 2 and a further two, by patients categorized as nonadherent, in Figure 3, along with an interpretation of the grids reflecting the beliefs held by the individuals about their medicines and self-care activities.

A total of 482 constructs were generated from the 88 grids, and from these, 21 themes were identified. Examples of the

constructs and the themes to which they were allocated are shown in Table 2. The six most common themed constructs were “related to water,” “affect the heart,” “related to weight,” “remove fluid,” “necessary,” and “benefit to the heart.” Four constructs, “related to water,” “affect the heart,” “related to weight,” and “benefit to the heart,” occurred more frequently in the adherent group (MARS score  $\geq$  23) than in the nonadherent group (MARS score  $\leq$  22); however, this was not a significant difference (Table 3).

## Discussion

In a sample of patients with heart failure, use of the repertory grid technique allowed patients to articulate their beliefs about their medicines and self-care activities, reflecting the management of their heart failure. The frequencies of the generated statements were not significantly different between adherent and nonadherent patients. However, the four constructs, “related to water,” “affect the heart,” “related to weight,” and “benefit to the heart,” occurred more frequently in the adherent group.

The repertory grid provided a unique insight into individuals’ beliefs about the management of their heart failure. The two grids represented in Figure 2, from patients categorized as adherent (MARS = 25), reflect the belief that their medicines and exercise were “for the heart” (benefit or helping) and “important.” Their remaining self-care activities and the diuretic were believed to be related to fluid and water but also to have an “effect on the heart” and were important. The interpretation of these two grids illustrates these patients’ beliefs about their heart failure management and relates to findings from other studies of heart failure that have reported knowledge of medicines and disease symptoms, and the integration of this knowledge, improves overall adherence to medicines and self-care activities in the management of heart failure.<sup>30,34,44–46</sup>

The two grids in Figure 3, from patients categorized as nonadherent (MARS = 22), illustrate visually different findings from Figure 2. In Figure 3A, the patient’s ACE-inhibitor, beta-blocker, and exercise were believed to affect the heart, with the diuretic and the remaining self-care activities affecting water and breathing. At first, there appears to be no obvious link between the beliefs and the lower self-reported adherence score. However, on more detailed inspection of the original grid, there is one construct of particular interest. On the construct “affect the heart—affects how you feel,” the ACE-inhibitor and beta-blocker are aligned with the “affects how you feel” pole. In this example, during the interview, the patient

A	Emergent pole (5)							Implicit pole (1)	
		Weighing	Dec salt	Red fluid	Exercise	ACE-I	Beta-blocker	Diuretic	
	Related to weight	5	2	4	4	4	2	4	Not related to weight
	Related to fluid	4	4	2	2	2	2	5	Better for your breathing
	Benefit to me	4	4	4	4	4	4	4	Measure
	Important to do	4	5	5	5	5	5	5	Not an issue for me
	Help your heart	5	4	4	4	4	5	4	Less important for me
	Related to water or weight	2	4	2	2	2	2	5	For my heart
	Help your heart	2	2	2	5	5	4	2	Reduce fluid
	For my heart	2	2	2	4	4	5	5	For my general well being
	For my heart	4	4	2	5	5	4	5	Measure

B	Emergent pole (5)							Implicit pole (1)	
		Weighing	Dec salt	Red fluid	Exercise	ACE-I	Beta-blocker	Diuretic	
	Reduce fluid	0	5	5	2	0	0	5	Not directly reducing fluid
	Helps heart	1	5	5	4	5	5	5	A measure
	Reduce fluid	4	5	3	2	1	1	5	For heart
	Management of fluid	4	5	3	2	1	1	5	For heart
	Health management	5	5	5	5	1	1	5	Medication for heart
	Direct effect on heart	4	1	3	5	5	5	3	Reduces fluid

**Figure 2** Repertory grid for two participants categorized as adherent (MARS  $\geq$  23). Both participants (A) and (B) had MARS score = 25.

**Notes:** Rating of 5: elements closer to the emergent pole; rating of 1: elements closer to the implicit pole; rating of 3: suggests both poles equally apply to the element; rating of 0: neither construct applies to the element. (A) This individual held the beliefs that reducing sodium, reducing fluid and weighing related to fluid, were for the heart, were a benefit to the individual, and were important to do. Reducing fluid was also believed to help with breathing. For exercise, ACE-I, and beta-blocker, the patient held the belief that these were for the heart, a benefit to the individual, important to do, help breathing, and affect weight. The beta-blocker was believed not to affect weight. The diuretic was believed to be related to fluid, for the heart, a benefit to the individual, and important to do but was believed not to affect breathing. In summary, the beliefs this individual had about his/her heart failure management may be considered to have been: "benefit to me," "benefit to the heart," "important or necessary," and "related to weight or water." (B) This individual held the beliefs that the ACE-I and beta-blocker help the heart and that this was a direct effect. Although reducing salt and the diuretic were believed to help the heart, neither were believed to have a direct effect; yet they were believed to affect fluid. Exercise was believed to help the heart and this is a direct effect on the heart. Reducing fluid was believed to help the heart and affect fluid. Weighing was believed to be related to fluid but to have a direct effect on the heart. In summary, the beliefs this individual had about his/her heart failure management may be considered to have been: "affect the heart," "benefit to the heart," and "related to fluid or water."

**Abbreviations:** MARS, Medication Adherence Report Scale; Dec, decreasing; Red, reducing; ACE-I, angiotensin converting enzyme-inhibitor.

was asked to clarify what he/she meant by "affects how you feel," to ensure that the meaning implied in this pole of the construct was understood. The patient responded with the answer that he/she felt "overmedicated," and this may account for the lower self-reported adherence score. A lack of belief in medication is related to withdrawal from medication,<sup>47</sup> and patient-perceived barriers to medication have been reported to result in lower levels of adherence in heart failure.<sup>48-51</sup> For this patient, "affect me" may have contributed to a "concerns" belief about his/her medicines, which could account for the reduced self-reported adherence to medication. In Figure 3B, the patient believed his/her

ACE-Inhibitor and beta-blocker to be "necessary" and "important," whereas reducing fluid and decreasing salt were believed to be unimportant, and this was reflected in that he/she did not "do" these. This patient was not prescribed a diuretic, which may account for this belief. This patient believed that his/her medication was "necessary," but despite this, he/she had lower self-reported adherence. However, a potential explanation arose during the interview when it was found that this patient held the belief that "nothing" would happen if the medicine was "unable to be taken." For this individual, although he/she held the belief that the medicines were "necessary," this was not transferring into behavior.

A	Emergent (5)							Implicit (1)
	Weighing	Dec salt	Red fluid	Exercise	ACE-I	Beta-blocker	Diuretic	
Related to water	4	5	5	2	0	0	5	Measure
Affect water	2	5	5	1	0	1	5	No affect on water
Affect weight a lot	1	2	5	1	0	1	5	Affects weight a little
Affects how you feel	0	2	4	5	4	5	4	Affects heart
Affects weight	0	5	4	3	1	1	5	Doesn't affect weight
Affects heart	3	2	1	5	5	5	3	Affects fluid/breathing
Heart pumps stronger	0	2	1	5	5	5	3	Affects fluid/breathing
Heart pumping	0	2	1	5	5	5	3	Remove fluid

B	Emergent (5)						Implicit (1)
	Weighing	Dec salt	Red fluid	Exercise	ACE-I	Beta-blocker	
Necessary	3	1	1	5	4	4	Not important for me
Related to weight	5	0	0	5	1	1	Helps with symptoms
More important	3	1	1	4	4	4	Less important
Specific for me	3	1	1	5	5	5	Less specific for me

**Figure 3** Repertory grid for two participants categorized as nonadherent (MARS  $\leq$  22). Both participants (A) and (B) had MARS score = 22.

**Notes:** Rating of 5: elements closer to the emergent pole; rating of 1: elements closer to the implicit pole; rating of 3: suggests both poles equally apply to the element; rating of 0: neither construct applies to the element. (A) This individual held the beliefs that the diuretic, salt, and reducing fluids were related more to losing water, affecting weight, and breathing. Exercise was aligned with ACE-I and beta-blocker, and these were believed to affect the way this person felt and to affect the heart. In summary, the beliefs this individual had about his/her heart failure management may be considered to have been: "affect the heart," "affect me," and the self-care activities "affecting fluid and water". (B) This individual held the beliefs that exercise, the ACE-I, and beta-blocker were necessary, more important, and were specifically for him/her. The ACE-I and beta-blocker were believed to help with symptoms whilst exercise to be related to weight. Weighing was believed to be important or necessary and specific to the individual (score of 3 on all of these constructs). Reducing salt and reducing fluid were believed to be unimportant and less specific for this individual. It is worth noting that this participant was not taking a diuretic, and this may account for this belief about reducing salt and reducing fluid. In summary, the beliefs this individual had about his/her heart failure management may be considered to have been: "important or necessary," with reducing fluid and decreasing salt less important for this individual.

**Abbreviations:** MARS, Medication Adherence Report Scale; Dec, decreasing; Red, reducing; ACE-I, angiotensin converting enzyme-inhibitor.

The beliefs elicited from the repertory grids described above reflect beliefs elicited from qualitative interviews with patients with heart failure. The beliefs (in our study) that identified something to do with water, removing fluid, or related to weight appear consistent with the benefit belief "taking water pills lessens my swelling" used in the Beliefs about Medicines Compliance Scale (BMCS), a validated questionnaire that uses prepared statements to identify beliefs about heart failure medicines.<sup>45,50,52</sup> Conversely, beliefs that identify effect on the heart and benefit to the heart appear to be related to "taking my medicines improves my quality of life" from the BMCS.<sup>45,50,52</sup> Percival et al<sup>22</sup> utilized the repertory grid to interview patients with heart failure and then related the generated constructs to the BMQ. The results found a limited relationship between the BMQ and the constructs from the repertory grid; however, our study was different in that it focused on elicitation and description of the beliefs from individual grids.

In reviewing the beliefs elicited using the repertory grid technique, it is important to consider how "beliefs" and "knowledge" are related. As described in the introduction,

when an individual takes the proposition to be true or sufficiently likely to be true so as to influence decisions, it is considered a "belief." A common analysis of "knowledge" is that this is "justified true belief." For an individual to be said to have knowledge of a proposition, the following three must hold: the proposition is true; an individual believes the proposition is true; and the individual is justified in believing the proposition is true.<sup>20</sup> If one of these three does not hold, the individual would not be regarded as having "knowledge" of the proposition.

The most common underlying themes from the 482 constructs generated by the sample patients were "related to water," "affect the heart," "related to weight," "remove fluid," "necessary," and "benefit to the heart." When reflecting on the generated constructs categorized into the themes (examples in Table 2), these suggest that the patients in this sample held the perception that their self-care activities and medicines were for fluid management, related to weight, and had beneficial effects on the heart. The perceptions generated by this sample of patients with heart failure are not dissimilar to perceptions of importance,<sup>34,45</sup> necessity,<sup>53</sup> and benefit<sup>47</sup> in

**Table 2** Examples of some of the individual generated constructs for the six most common themed constructs

Themed construct	Individual constructs (examples)
Related to water	Related to water
	Related to fluid
	For fluid
	Management of fluid
Affect the heart	For my heart
	Related to heart
	Direct affect on heart
	Affect on my heart
Related to weight	Related to weight
	Directly related to weight
	For weight
Remove fluid	Reducing water
	Reduces fluid
	Removal of water
Necessary	More important for me
	Necessary
	Something I must do
	Something I have to do
Benefit to the heart	Help my heart
	Improve heart
	Helping the heart

qualitative interviews of patients with heart failure. Although there was not a statistical significant difference in the frequency of the elicited perceptions between adherent and nonadherent patients, there was a trend towards “related to water,” “affect the heart,” “related to weight,” and “benefit to the heart” occurring more frequently in those with higher levels of self-reported adherence. Therefore, this difference may be applied clinically for individual patients who are nonadherent to their heart failure treatment. This suggests that the adherent patients were more likely to hold the perception that their medicines and self-care activities were related to water and weight (both are important in managing heart failure), and affect and benefit the heart. Those with a lower level of adherence were less likely to hold this perception about their heart failure management. This can be related to studies reporting that those patients with a better knowledge of their disease and management (self-care activities and medicines) in relation to fluid and weight were more likely to be adherent.<sup>34,45,54</sup>

There are limitations that should be considered in interpreting the findings of our study. Not all patients were prescribed three medications; some were prescribed two medications for their heart failure. Therefore, for example, a patient who was not prescribed a diuretic might not have discussed salt and fluid, and might have been less likely to hold the belief that these were important for his/her heart failure management.

**Table 3** Comparison between levels of self-reported adherence (from dichotomized MARS score) and the generated themed constructs

Themed construct (n)	MARS score	
	≤22 (n = 46) n (%)	≥23 (n = 436) n (%)
Related to water (90)	7 (15.2)	83 (19.0)
Affect the heart (89)	8 (17.4)	81 (18.6)
Related to weight (50)	3 (6.5)	47 (10.8)
Remove fluid (38)	5 (10.9)	33 (7.6)
Necessary (35)	6 (13.0)	29 (6.7)
Benefit to the heart (31)	2 (4.4)	29 (6.7)
Medicine (21)	1 (2.2)	20 (4.6)
Related to blood pressure (20)	4 (8.7)	16 (3.7)
Affect weight (18)	4 (8.7)	14 (3.2)
Benefit to me (15)	0 (0.0)	15 (2.4)
Affect me (12)	1 (2.2)	11 (2.5)
Affect water (9)	1 (2.2)	8 (1.8)
I control (8)	0 (0.0)	8 (1.8)
Intake (7)	1 (2.2)	6 (1.4)
Something to do (7)	0 (0.0)	7 (1.6)
Understanding (7)	0 (0.0)	7 (1.6)
Retain fluid (6)	1 (2.2)	5 (1.2)
Easy to do (5)	1 (2.2)	4 (0.9)
Reducing intake (4)	0 (0.0)	4 (0.9)
Affect salt (4)	0 (0.0)	4 (0.9)
Miscellaneous (6)	1 (2.2)	5 (1.2)

The patient sample was dominated by those with high self-reported adherence, probably consequential to their motivation to attend the Heart Failure Service programs/clinic on a regular basis. Whilst a nonsignificant trend was observed in this study, it is likely this would have reached clinical and statistical significance with a more general heart failure population. Further, the measurement of adherence was by self-report; this is not ideal due to the risk of overestimation of adherence but is still regarded as the most practical method.<sup>2</sup>

A further point to note is that the repertory grid generates highly individualized data for each patient, and this may be of value clinically in eliciting beliefs to understand how an individual conceptualizes his/her heart failure management. It may allow clinicians to individualize education to a particular patient, based on his/her beliefs, with the hope of reducing nonadherence. Use of the repertory grid to elicit individual beliefs may help clinicians to identify a belief that is linked to nonadherence for that individual. Discussing and addressing this belief may result in a change in the belief and a resultant change in adherence. For example, consider the patient in Figure 3A who was reported to be nonadherent due to a belief that he/she was “overmedicated.” Discussing the importance of his/her medication may lead to a change in this belief and a change in adherence.



This is the first application of the repertory grid in exploring whether there is an association between individuals' beliefs about their treatment for a condition and adherence. Although heart failure was the condition explored in this study, use of the repertory grid technique should be transferable to other chronic conditions, providing a unique insight into the understanding individuals have for the management of their condition.

## Conclusion

The repertory grid technique elicited beliefs that individual participants held toward their medicines and self-care activities undertaken to manage their heart failure. There was a nonsignificant trend in the frequency of generated constructs between adherent and nonadherent patients. Patients who were adherent were more likely to hold the perception that their medicines and self-care activities were related to water and weight and to affect and benefit the heart. The repertory grid technique offers a novel method by which clinicians can gain insight into patients' beliefs about their medications, which in turn, could lead to the development of interventions tailored to improve adherence.

## Disclosure

The authors have no conflicts of interest to disclose in regards to the contents of the manuscript.

## References

- World Health Organization. *Adherence to Long-Term Therapies: Evidence for Action*. Geneva: World Health Organization; 2003. Available from: <http://whqlibdoc.who.int/publications/2003/9241545992.pdf>. Accessed January 10, 2013.
- Vermeire E, Hearnshaw H, Van Royen P, Denekens J. Patient adherence to treatment: three decades of research. A comprehensive review. *J Clin Pharm Ther*. 2001;26(5):331–342.
- Krueger KP, Berger BA, Felkey B. Medication adherence and persistence: a comprehensive review. *Adv Ther*. 2005;22(4):313–356.
- Haynes RB, Taylor DW, Sackett DL, editors. *Compliance in Health Care*. Baltimore: John Hopkins University Press; 1979.
- Nunes V, Neilson J, O'Flynn N, et al. *Medicines Adherence: Involving Patients in Decisions About Prescribed Medicines and Supporting Adherence*. London: National Collaborating Centre for Primary Care and Royal College of General Practitioners; 2009. Available from: <http://www.nice.org.uk/nicemedia/pdf/CG76FullGuideline.pdf>. Accessed January 10, 2013.
- Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol Health*. 1999;14(1):1–24.
- George J, Mackinnon A, Kong DC, Stewart K. Development and validation of the Beliefs and Behaviour Questionnaire (BBQ). *Patient Educ Couns*. 2006;64(1–3):50–60.
- McHorney CA. The Adherence Estimator: a brief, proximal screener for patient propensity to adhere to prescription medications for chronic disease. *Curr Med Res Opin*. 2009;25(1):215–238.
- Hahn SR, Park J, Skinner EP, et al. Development of the ASK-20 adherence barrier survey. *Curr Med Res Opin*. 2008;24(7):2127–2138.
- Barber N, Parsons J, Clifford S, Darracott R, Horne R. Patients' problems with new medication for chronic conditions. *Qual Saf Health Care*. 2004;13(3):172–175.
- Nicklas LB, Dunbar M, Wild M. Adherence to pharmacological treatment of non-malignant chronic pain: the role of illness perceptions and medication beliefs. *Psychol Health*. 2009;25(5):601–615.
- Byer B, Myers LB. Psychological correlates of adherence to medication in asthma. *Psychol Health Med*. 2000;5(4):389–393.
- Conn KM, Halterman JS, Lynch K, Cabana MD. The impact of parents' medication beliefs on asthma management. *Pediatrics*. 2007;120(3):e521–e526.
- Byrne M, Walsh J, Murphy AW. Secondary prevention of coronary heart disease: patient beliefs and health-related behaviour. *J Psychosom Res*. 2005;58(5):403–415.
- Brown C, Battista DR, Bruehlman R, Sereika SS, Thase ME, Dunbar-Jacob J. Beliefs about antidepressant medications in primary care patients: relationship to self-reported adherence. *Med Care*. 2005;43(12):1203–1207.
- Russell J, Kazantzis N. Medication beliefs and adherence to antidepressants in primary care. *N Z Med J*. 2008;121(1286):14–20.
- Clatworthy J, Bowskill R, Parham R, Rank T, Scott J, Horne R. Understanding medication non-adherence in bipolar disorders using a Necessity-Concerns Framework. *J Affect Disord*. 2009;116(1–2):51–55.
- Phatak HM, Thomas J 3rd. Relationships between beliefs about medications and nonadherence to prescribed chronic medications. *Ann Pharmacother*. 2006;40(10):1737–1742.
- Mårdby AC, Akerlind I, Jorgensen T. Beliefs about medicines and self-reported adherence among pharmacy clients. *Patient Educ Couns*. 2007;69(1–3):158–164.
- Schwitzgebel E. Belief. In: Zalta EN, editor. *The Stanford Encyclopedia of Philosophy* (Winter 2011 ed). Stanford: Stanford University; 2011. Available from: <http://plato.stanford.edu/archives/win2011/entries/belief/>. Accessed January 10, 2013.
- Kelly GA. *The Psychology of Personal Constructs. Vol One: A Theory of Personality*. New York: Norton; 1955.
- Percival M, Cottrell WN, Jayasinghe R. Exploring the beliefs of heart failure patients towards their heart failure medicines and self care activities. *Int J Clin Pharm*. 2012;34(4):618–625.
- Lewith GT, Chan J. An exploratory qualitative study to investigate how patients evaluate complementary and conventional medicine. *Complement Ther Med*. 2002;10(2):69–77.
- Rowe G, Lambert N, Bowling A, Ebrahim S, Wakeling I, Thomson R. Assessing patients' preferences for treatments for angina using a modified repertory grid method. *Soc Sci Med*. 2005;60(11):2585–2595.
- Tio J, LaCaze A, Cottrell WN. Ascertaining consumer perspectives of medication information sources using a modified repertory grid technique. *Pharm World Sci*. 2007;29(2):73–80.
- Foody JM, Farrell MH, Krumholz HM. beta-Blocker therapy in heart failure: scientific review. *JAMA*. 2002;287(7):883–889.
- Garg R, Yusuf S. Overview of randomized trials of angiotensin-converting enzyme inhibitors on mortality and morbidity in patients with heart failure. Collaborative Group on ACE Inhibitor Trials. *JAMA*. 1995;273(18):1450–1456.
- Wright SP, Walsh H, Ingleby KM, et al. Uptake of self-management strategies in a heart failure management programme. *Eur J Heart Fail*. 2003;5(3):371–380.
- Cline CM, Björck-Linné AK, Israelsson BY, Willenheimer RB, Erhardt LR. Non-compliance and knowledge of prescribed medication in elderly patients with heart failure. *Eur J Heart Fail*. 1999;1(2):145–149.
- Rogers A, Addington-Hall JM, McCoy AS, et al. A qualitative study of chronic heart failure patients' understanding of their symptoms and drug therapy. *Eur J Heart Fail*. 2002;4(3):283–287.
- Schiff GD, Fung S, Speroff T, McNutt RA. Decompensated heart failure: symptoms, patterns of onset, and contributing factors. *Am J Med*. 2003;114(8):625–630.

32. Tsuyuki RT, McKelvie RS, Arnold JM, et al. Acute precipitants of congestive heart failure exacerbations. *Arch Intern Med.* 2001;161(19):2337–2342.
33. Carlson B, Riegel B, Moser DK. Self-care abilities of patients with heart failure. *Heart Lung.* 2001;30(5):351–359.
34. Riegel B, Carlson B. Facilitators and barriers to heart failure self-care. *Patient Educ Couns.* 2002;46(4):287–295.
35. Fransella F, Bell R, Bannister D. *A Manual for Repertory Grid Technique*, 2nd ed. Chichester: John Wiley & Sons Ltd; 2004.
36. Jankowicz D. *The Easy Guide to Repertory Grids*. Chichester: John Wiley & Sons; 2003.
37. Leach C, Freshwater K, Aldridge J, Sunderland J. Analysis of repertory grids in clinical practice. *Br J Clin Psychol.* 2001;40(Pt 3):225–248.
38. George J, Kong DC, Thoman R, Stewart K. Factors associated with medication nonadherence in patients with COPD. *Chest.* 2005;128(5):3198–3204.
39. Menckeborg TT, Bouvy ML, Bracke M, et al. Beliefs about medicines predict refill adherence to inhaled corticosteroids. *J Psychosom Res.* 2008;64(1):47–54.
40. Jacobsen R, Møldrup C, Christrup L, Sjøgren P, Hansen OB. The Danish version of the Medication Adherence Report Scale: preliminary validation in cancer pain patients. *Pain Pract.* 2009;9(1):1–7.
41. Ediger JP, Walker JR, Graff L, et al. Predictors of medication adherence in inflammatory bowel disease. *Am J Gastroenterol.* 2007;102(7):1417–1426.
42. Horne R, Parham R, Driscoll R, Robinson A. Patients' attitudes to medicines and adherence to maintenance treatment in inflammatory bowel disease. *Inflamm Bowel Dis.* 2009;15(6):837–844.
43. Hedenrud T, Jonsson P, Linde M. Beliefs about medicines and adherence among Swedish migraineurs. *Ann Pharmacother.* 2008;42(1):39–45.
44. Horowitz CR, Rein SB, Leventhal H. A story of maladies, misconceptions and mishaps: effective management of heart failure. *Soc Sci Med.* 2004;58(3):631–643.
45. van der Wal MH, Jaarsma T, Moser DK, Veeger NJ, van Gilst WH, van Veldhuisen DJ. Compliance in heart failure patients: the importance of knowledge and beliefs. *Eur Heart J.* 2006;27(4):434–440.
46. Wu JR, Moser DK, Chung ML, Lennie TA. Objectively measured, but not self-reported, medication adherence independently predicts event-free survival in patients with heart failure. *J Card Fail.* 2008;14(3):203–210.
47. Ekman I, Andersson G, Boman K, et al. Adherence and perception of medication in patients with chronic heart failure during a five-year randomised trial. *Patient Educ Couns.* 2006;61(3):348–353.
48. George J, Shalansky SJ. Predictors of refill non-adherence in patients with heart failure. *Br J Clin Pharmacol.* 2007;63(4):488–493.
49. van der Wal MH, Jaarsma T. Adherence in heart failure in the elderly: problem and possible solutions. *Int J Cardiol.* 2008;125(2):203–208.
50. van der Wal MH, Jaarsma T, Moser DK, van Gilst WH, van Veldhuisen DJ. Unraveling the mechanisms for heart failure patients' beliefs about compliance. *Heart Lung.* 2007;36(4):253–261.
51. Wu JR, Moser DK, Chung ML, Lennie TA. Predictors of medication adherence using a multidimensional adherence model in patients with heart failure. *J Card Fail.* 2008;14(7):603–614.
52. Bennett SJ, Perkins SM, Lane KA, Forthofer MA, Brater DC, Murray MD. Reliability and validity of the compliance belief scales among patients with heart failure. *Heart Lung.* 2001;30(3):177–185.
53. Artinian NT, Magnan M, Sloan M, Lange MP. Self-care behaviors among patients with heart failure. *Heart Lung.* 2002;31(3):161–172.
54. Ni H, Nauman D, Burgess D, Wise K, Crispell K, Hershberger RE. Factors influencing knowledge of and adherence to self-care among patients with heart failure. *Arch Intern Med.* 1999;159(14):1613–1619.

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