Validation of the Dutch self-efficacy scale for fluid-restriction adherence of haemodialysis patients

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Status	Definitief
Datum	Juli 2011
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Publicatie tijdschrift	Journal of Renal Care Referentie stijl: Harvard style
Totaal aantal woorden	4261
Samenvatting	182
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Summary

Self-efficacy is an influencing factor on the adherence to the fluid restriction of haemodialysis patients. By supporting self-efficacy, behaviour changes and the adherence improves, therefore insight in patients self-efficacy is necessary. The Swedish 'Fluid Intake Appraisal Inventory' (FIAI) is translated into Dutch, by forward and backward-translation, and has been validated. Respondents were recruited from one dialysis centre from the Netherlands. Thirty-three patients participated. Good content validity, and a significant negative correlation between interdialytic weight gain and self-efficacy, were found. The internal consistency was high (Cronbach's alpha = 0.982) as was the stability (0.823 Spearman's rho). These findings indicate that the Dutch FIAI can be used in clinical practice as self-efficacy screening instrument for adult haemodialysis patients with a fluid restriction. Further research is recommended, to validate the FIAI for peritoneal dialysis patients and haemodialysis patients from other countries.

Key words: Self-efficacy – fluid intake appraisal inventory – Fluid restriction – validity/reliability

Samenvatting

Self-efficacy (SE) is een van de beïnvloedende factoren op de mate van trouw zijn aan een vochtbeperking van hemodialysepatiënten. Door het ondersteunen van de self-efficacy, verandert het gedrag van de patiënt en verbetert het kunnen houden aan de vochtbeperking. Adequate ondersteuning kan alleen als de mate van self-efficacy bekend is. De Zweedse 'Fluid Intake Appraisal Inventory' is vertaald naar het Nederlands met hulp van de forward-backward procedure. Informatie over bruikbaarheid van de schaal werd gegeven door zeven experts en vier expertpatiënten. Vanuit één dialyse centrum zijn patiënten geworven; 33 hemodialysepatiënten participeerden bij het valideren van de Nederlandse versie. Een significant negatieve correlatie is aangetoond tussen self-efficacy en de interdialytic gewichtstoename, welke de mate van vochtinname impliceert. De interne consistentie (Cronbach's alpha = 0.982) en de stabiliteit (0.823 Spearman's rho) van de vragenlijst zijn hoog. Deze resultaten indiceren dat de vertaalde vragenlijst, in de Nederlandse praktijk gebruikt kan worden voor het meten van self-efficacy van hemodialysepatiënten met een vochtbeperking. Het valideren van de D-FIAI voor peritoneaal dialysepatiënten en voor hemodialysepatiënten in andere landen wordt aanbevolen.

Sleutelbegrippen: Self-efficacy, vochtbeperking, hemodialysepatiënten, validiteit en betrouwbaarheid

Introduction

In the Netherlands there are approximately 5.155 haemodialysis patients. In the past 10 years, the number of patients has increased with 3.2% each year (Registratie Nierfunctievervanging Nederland 2010). These patients suffer from the consequences of end stage renal disease (ESRD). ESRD occurs when at least 95% of normal kidney functioning has been lost. The most common form of dialysis is haemodialysis, which is performed by a machine that connects through the patient's veins to filter the blood, removing waste and excess fluid (Cvengros, Christensen & Lawton 2004). Haemodialysis treatment includes dialysis sessions (three days a week for 3-5 hours), medication regime and mostly dietary and fluid restriction. There are different sorts of haemodialysis treatment, for example an active form, where patients controls the dialysis machine, in a dialysis centre or at home, and a passive form at a dialysis centre, where the dialysis nurse has an active role.

At least 50% of all haemodialysis patients do not adhere to the fluid restriction (Bame, Petersen & Wray 1993, Leggat et al. 1998, Kugler 2005), because it is difficult to live with (Goverde & Grypdonck 1998). Drinking is a necessity of life and a social activity, so these haemodialysis patients are continuously struggling against the drinking temptation. Failing fluid restriction can lead to a large interdialytic weight gain (IWG). IWG is the difference between a patient´s weight at the end of one dialysis session and his or her weight at the beginning of the next session, this corresponds to the amount of fluid that the patient consumes between two sessions (Leggat et al. 1998). A larger IWG results in a higher risk for cardiovascular comorbidity (Leggat et al. 1998) and increased hospitalization (Saran et al. 2003). Compared with compliant patients, the estimated risk of death is 35% higher, for patients with an IWG of greater than 5.7% (4 kg in a 70-kg patient) (Leggat et al. 1998). To reduce these risks, it is necessary to improve fluid-restriction adherence of haemodialysis patients by identifying and improving the influential factors on the fluid-restriction adherence.

Research studies about the fluid-restriction adherence presented demographical and psychosocial influential factors, as self-efficacy (SE) (Schneider et al. 1991; Brady et al. 1997; Lee & Molassiotis 2002; Takaki & Yano 2006). SE is based on Bandura's social cognitive theory (Bandura 1977) and it concerns the confidence in one's capacity, to live a lifestyle necessary to reach a desired goal (Bandura 1997). Patients' SE is also associated with changes in health behaviour and health status (Lorig & Holman 2003). SE differs from other psychosocial factors, because it can be influenced by sources of information, for example by practicing and earlier experiences, observation of others, verbal persuasion and physiological information like self-evaluation or emotional states (Bandura 1977).

Furthermore, SE can predict behavioural outcomes like fluid-restriction adherence
(Schneider et al. 1991, Holloway & Watson 2002).

For comparing results of research studies, they should been used similar methods for
measuring a concept. According to Frei et al. (2009) measurement of self-efficacy requires
carefully developed and validated instruments, however, in the articles about influencing
factors on the fluid-restriction adherence, SE was measured in several different ways and
limited attention has been spend on validation. In the article of Welch (2001), the Health
Belief Model (Champion 1984) was used as SE measurement for haemodialysis patients, but
it was tested for patients with breast cancer. Takaki & Yano (2006) used the Self-efficacy of
Health-Related Behaviour Scale. This scale was tested for a population of other chronic
patients instead of haemodialysis patients. For the 50-item scale of Brady et al. (1997), only
the test-retest reliability data was available.

Only one study described the development and validation of a SE scale for haemodialysis
patients with a fluid restriction (Lindberg, Wikström & Lindberg 2007). The Fluid Intake
Appraisal Inventory (FIAI) is developed in Sweden and can be used as a screening
instrument or evaluation tool, by estimating SE of these patients. The FIAI reported
satisfactory psychometric properties (Lindberg, Wikström & Lindberg 2007) and has recently
been translated into Portuguese (Lindberg & Fernandes 2010).

Nurses providing continuous care and contact with haemodialysis patients, are in an ideal
situation to support/influence patients SE and thereby patients behaviour and the adherence
to the fluid restriction. The measurement of SE is therefore important for planning nursing
interventions e.g. patient education programs, because the identification of situations where
patients have a low level of SE, helps targeting support to the individual patient. Furthermore,
measuring changes in SE over time are important to evaluate the impact of nursing
interventions (Frei et al. 2009).

Problem statement
Many haemodialysis patients have problems with restricting the intake of fluids. This non-
adherence results in a higher risk for cardiovascular problems and mortality. SE is an
influencing factor on the fluid-restriction adherence and can be influenced by internal and
external sources of information. Because of this character, health care professionals as
nurses and nephrologists, can influence patients SE and thereby patient's health behaviour
to improve the IWG and reduce mentioned risks. For adequate and individual support, the
SE of these haemodialysis patients should be known. In the Netherlands no validated and

reliable SE scale for haemodialysis patients is available. Consequently, these patients cannot be supported adequately to improve the adherence to their fluid restriction.

Aim

In this study the Swedish FIAI (S-FIAI) will be translated into Dutch and evaluated on reliability and validity. The Dutch Fluid Intake Appraisal Inventory (D-FIAI) can then be used for assessing the SE of haemodialysis patients with a fluid restriction in the Netherlands. By gaining insight in SE, the support can be adjusted to individual needs in order to improve adherence to the fluid restriction and, reduce the risk for e.g. cardiovascular problems and mortality.

Research question

What is the reliability and validity of the translated FIAI for adult haemodialysis patients with a fluid restriction in the Netherlands?

Methods

Design

In this study a specific SE measurement for adult haemodialysis patients with a fluid restriction, was translated into Dutch and evaluated on validity and reliability. The study can be characterized as validation study (Polit & Beck 2008). The first part of this study is the translation of the S-FIAI into Dutch and the second part consists of examining the content validity, construct validity, internal consistency and stability of the D-FIAI.

S-FIAI

The 33 items of the S-FIAI are based on four theoretical factors, namely physiological, affective, social and environmental (Figure 1). Items are scored on a 11-point scale ranging from 0 (not at all confident) to 10 (totally confident) based on the general question: 'how confident are you that you can avoid fluid intake on the following occasions?' Scores are divided into a total SE score (sum of the scores on each item) and scores on the four subscales. The internal consistency of the S-FIAI, measured by Cronbach's alpha coefficient is 0.96. This study population consists of Swedish adult haemodialysis patients (Lindberg Wikström & Lindberg 2007).

> Figure 1 <

Ethics

Approval was obtained from the local Medical Ethical Review Committee (METC).

Sample

For the translation and validation of the D-FIAI, three populations were used. The first
population of this study consists of four independent native translators. Two Dutch native
speakers were requested by the researcher, to translate the S-FIAI into Dutch, and two
Swedish native speakers were requested by the developer of the S-FIAI, for the back-
translation.

The second population consists of a panel of seven experts with knowledge of SE and/or
haemodialysis patients. Four experts are researchers and three experts are working at the
dialysis centre in the Netherlands as nurse practitioner (NP) or nephrologist. These experts
were asked by email, to criticize the first version of the D-FIAI for providing information about
appropriateness, clarity and content validity of the scale.

The third population consists of haemodialysis patients with a fluid restriction, who are
dialyzing in a dialysis centre of a top clinical hospital in the middle of the Netherlands. In this
dialysis centre, active and passive forms of haemodialysis treatment are provided and all
forms could be presented in the study. Five haemodialysis patients, out of the total of 160
patients, were selected by the NP of the dialysis centre and were asked to participate in the
translation part of the study. These patients were asked as expert-patients/representatives of
the study population, to criticize the first version of the D-FIAI. After applying the inclusion
criteria and excluding the five earlier mentioned patients, 74 patients were selected at
random by a computer, and asked for informed consent, by the researcher. The sample
should include at least 50 patients (Terwee et al. 2007), to ensure the reliability of the results
of the analysis procedures. The inclusion criteria were: patients had to be at least 18 years
old, had sufficient knowledge of the Dutch language and had to be able to answer the
questions themselves. They also must have haemodialysis treatment (three-four sessions
per week), for at least six months.

Translation procedure

Following the steps of the cross-cultural adaptation procedure (Beaton et al. 2000) the S-FIAI
was translated into Dutch. Two goals of this procedure are: realizing cultural adaptation and
equivalence between the S-FIAI and the target version of the questionnaire (Beaton et al.
2000). Therefore, four types of equivalence, namely conceptual, semantic, idiomatic and
experiential equivalence, were reviewed (Beaton et al. 2000). *Conceptual equivalence*
concerns the question: 'Do people in the two cultures look at SE in the same way?' (Beaton
et al. 2000). *Semantic equivalence* concerns the translation of each item, whether it is the

same in the target culture after translation, as it was in the original (Polit & Beck 2008). Both types of equivalence were reviewed by the translators in completing the forward and backward-translation procedure. The fact that in a different culture, a given task may not be experienced, is the concern of experiential equivalence (Beaton et al. 2000). *Experiential equivalence* was reviewed by the researcher, as was *idiomatic equivalence*, where idioms should be evaluated for translation. The researcher and the original developer discussed by mail with the translators, and made decisions in order to achieve equivalence between the source and target version. After finishing the translation, five haemodialysis patients were asked to fill-in the first version of the D-FIAI in the pretesting phase. These patients and a panel of seven experts were asked to give suggestions for appropriateness and clarity of the scale. Information from the pretesting phase was used as comparison material for the validation part.

Validation procedure

The 74 haemodialysis patients were asked by the researcher to complete the adjusted D-FIAI twice, during two of their dialysis sessions in January or February, with one till two weeks in between. The dialysis nurses collected the completed questionnaires. The scores on the D-FIAI were used to evaluate the construct validity, internal consistency and the stability of the scale. The relevance judgments of the panel of experts, were used for establishing the content validity of the D-FIAI, by the method of Lynn (1986). Demographical and physical characteristics of the participants, were collected from patients file, by the researcher. Data as age, gender, treatment form, time on dialysis (years), IWG (kg) and systolic and diastolic blood pressure (mm Hg) were collected.

Analysis: content validity

The panel of experts were asked to evaluate the item-relevance of the D-FIAI, on a 4-point scale: 4 = highly relevant, 3 = quite relevant, 2 = somewhat relevant and 1 = not relevant. The Content Validity Index (CVI) is the number of items judged relevant in proportion to the total number of items (Lynn 1986). It is recommended that the CVI, for each item should be .78 or higher. To compute scale content validity (S-CVI), the average of the sum of I-CVIs was calculated. A scale with excellent content validity should have a S-CVI of 0.90 or higher (Polit & Beck 2008).

Analysis: construct validity

The construct validity was evaluated by testing the following hypothesis: patients with greater SE are thought to achieve greater adherence to the fluid restriction, which means a lower IWG, thus SE is negative related to IWG. The *mean IWG* was calculated for each patient, by

using the total weight gain between two dialysis sessions of one month, divided by the number of available IWGs. *Self-efficacy* was measured by using the total score on the D-FIAI. The total score is the sum of the scores on each item, with a maximum of 330. Only the scores of the first measuring moment were used. Pearson correlation coefficient (*r)* was calculated by SPSS 15.0 and used to assess the relationship between haemodialysis patients' IWG and SE. The hypothesis is confirmed when the Pearson correlation coefficient is between -1 and 0 ($P<0.05$).

Analysis: internal consistency

Internal consistency was examined by calculating the Cronbach's alpha for the total scale as well as for each subscale. The scores of the first measuring moment were used. This scale is internally consistent if all items measure SE. Cronbach's alpha should be >0.70 (Streiner & Norman 2008). For information about the homogeneity of the scale, the mean inter-item correlation should be calculated. A homogeneous scale ensures that all items measure only one concept. An average inter-item correlation of 0.29 is needed for a 10-item scale (Polit & Beck 2008). All items should be between 0.15 and 0.50 (Clark & Watson 1995) for the scale to be considered homogeneous.

Analysis: stability

The stability (test-retest reliability) of the D-FIAI, was calculated with Spearman rho correlation coefficient (*r*) by SPSS 15.0. The participants, who completed the D-FIAI were asked to complete it again, after one to two weeks. This time period has been recommended, considering enough time between repeated administrations, to prevent recall and to ensure that clinical change has not occurred (Terwee et al. 2007). Scores of each respondent on the first and second measurement were compared. The higher the coefficient, the more stable the measurement. Reliability coefficient above 0.70 usually are considered good for psychosocial variables as SE (Polit & Beck 2008).

Missing values

All missing scores were calculated by the mean of scores on corresponding subscale and named by the researcher as 'occasional' or 'deliberately' missed. Deliberately missed items were compared with information from the experts and patients from the pretesting phase, to explore reasons for missing scores.

Results

Results of translation procedure

Forward and backward translation was realized by two independent native speakers for each part and the first version of the D-FIAI was conducted. No differences were found between the meaning of the concept and items between the Swedish and Dutch culture. Consensus was reached for conceptual and semantic equivalence. Concerning absence of idioms and situations which could not be experienced by the Dutch haemodialysis patients in the S-FIAI, no items had to be replaced.

The first version of the D-FIAI was used for the pretesting phase. In the pretesting phase four out of five haemodialysis patients completed the questionnaire and provided information about appropriateness and clarity. The mean age of the patients was 58 years and one of them was a female. One of them completed the D-FIAI in 30 minutes and three in 10 minutes. Several items were not relevant for one patient, because of absence of a fluid restriction, however the patient did not explain which items. A question about the amount of the fluid restriction was added to the general part of the D-FIAI. Based on patients comment, no items/situations had to be deleted or added.

A panel of seven experts provided information about appropriateness and clarity of the first version of the D-FIAI. Experts suggested to insert an example about how/when to circle a number behind the items, and suggested to combine two items, delete two items and refine the description of ten items. They also made suggestions for changing lay-out and introduction to make it easier to understand. In the final version of the D-FIAI (Appendix 1), an example was added and improvements were made on lay-out and introduction, without changing the original content of the items and the scoring model.

Results of validation procedure

Descriptive data

Of the 74 haemodialysis patients approached to participate in the study, 33 patients (47,1%) were in the sample for the validation part (Figure 2 & Table 1). Reasons for not participating were physically disability (13), absence of a fluid restriction (6), cognitive disability (2) being compliant to the fluid restriction (3) and one patient died before informed consent was asked. There were also patients, who lost to follow-up (6). Four patients did not see the surplus value of completing the same questionnaire twice. The mean age of all participants was 66.5 years. They were on average 3.3 years on dialysis. Twenty-three patients (69.7%) were treated by the passive form of dialysis.

> Figure 2 <

> Table 1 <

Validity and reliability

Six experts (85,7%) returned, besides information about the appropriateness and clarity of the scale, relevance-judgments of the D-FIAI. The CVI was calculated for each item (I-CVI) and ranged from 0.38 to 1.00. Fifteen (45,5%) of the 33 items showed an I-CVI lower than the 0.78. Based on the agreement of the experts per item, six items (10, 16, 19, 20, 29 and 30) were noticed as not relevant by three or more experts. The CVI of the total scale (S-CVI), by using the averaging approach, was 0.79. As predicted a significance and negative relationship was found between SE and IWG (Table 2). Negative relationships were also found between each subscale and IWG.

> Table 2 <

In table 2 the Cronbach's alpha coefficient (=0.982) of the D-FIAI and subscales are presented. The impact of removing an item from the total scale, did not result in an increased internal consistency. If the items 3, 4 and 28 were removed from the D-FIAI, the Cronbach's alpha coefficient of three subscales improved. The alpha of the physiological subscale improved from 0.945 to 0.947 when item 3 was deleted, the alpha of the affective subscale improved from 0.947 to 0.969 when item 28 was deleted and the alpha of the environmental subscale improved from 0.927 to 0.937 when item 4 was deleted. The mean inter-item correlation of the total scale was 0.631 (range 0.258 - 0.938).

Twenty-seven (81.8%) haemodialysis patients, including 22 males, completed the D-FIAI twice. The stability/reliability coefficient (Spearman's rho) of the total scale was 0.823 (p<0.01). Items were also individually tested for stability and showed significant correlation between the scores on each item of one patient. Item 3 showed a non-significant correlation (p=0.084). Nineteen (57,6%) items scored a correlation coefficient ≥ 0.70.

Discussion

This validity study evaluated psychometric characteristics of the D-FIAI and shows satisfied results. Equivalence between the original FIAI and the D-FIAI was realized, whereby the D-FIAI is specified for the Dutch culture and the content of the scale has not been changed, thus cross-cultural comparisons can be done.

The hypothesis 'patients with greater SE are thought to achieve greater adherence to the fluid restriction' was supported, as was the negative correlation between the separate

subscales of the D-FIAI and IWG. Similar results were presented for the S-FIAI (r = -0.246 p =0.003) (Lindberg, Wikström & Lindberg 2007), whereby expectations of the researchers were confirmed. Good results were found for the content validity of the D-FIAI. Twenty-seven items (81,8%), were scored as relevant/highly relevant by at least four of the six experts. An adequate content validity is the most important measurement property, considering the use of a questionnaire (Terwee et al. 2007). The high Cronbach's alpha coefficient (0.982) suggest that the D-FIAI is internal reliable and suitable for clinical applications, however the inter-item correlations cannot confirm the homogeneity of the scale. Comparable alphas are found in other studies (Lindberg, Wikström & Lindberg 2007; Lindberg & Fernandes 2010). The original developer of the FIAI gave an explanation for the heterogeneity of the scale, namely that some items are redundant and measuring another concept than SE, but necessary to ensure that variances between individuals can be discovered (Lindberg, Wikström & Lindberg 2007). The stability test resulted in a high correlation coefficient. All correlations between each item are significant, except for item 3 (consuming medication). Individuals need to drink for consuming medication and probably cannot ideally restrict the intake. Additionally the medication regime is another difficult part of the haemodialysis treatment, where non-adherence is often presented (Kutner 2001; Cvengros, Christensen & Lawton 2004). This continuous struggling of haemodialysis patients against the fluid and medication regime can pretend the instability of this item.

Strengths

The translation procedure of Beaton et al. (2000), is an appropriate method for establishing equivalence between the two FIAIs, because of the combination of included techniques as forward and backward translation (Cha, Kim & Erlen 2007). Information from patients and experts in the pretesting phase, provided insight in appropriateness and clarity of the D-FIAI and act as background information for interpretation of the results of the validation part. Current study presents the translation and validation of a SE measurement for haemodialysis patients in the Netherlands, and this has never been done before. The D-FIAI is also tested for several forms of validity and reliability, whereby supportive information is available for the using-purpose of this instrument (Frei et al. 2009). The aim of the FIAI is to find differences in SE between persons (discriminative), thus it was appropriate to review the test-retest reliability, the internal consistency and the cross-sectional validity (Frei et al. 2009) of the D-FIAI.

Limitations

The method of Beaton et al. (2000) recommended a review of all translations by an expert committee, consisted of the developer, a methodologist, all translators and health and

language professionals. Based on shortage of time, decisions were made in discussions between the researcher and the developer, in close contact with the translators. Occasional missing items were calculated, however several items were deliberately missed, due to absence of these situations in patients' daily living. For example, not every haemodialysis patient visits restaurants (item 9) , cafés (item 8), or has a television (item 25). To decline deliberate-missing items, the possibility to circle 'not applicable' could be considered for at least these items. Why this possibility is not added to the original FIAI is unclear, although one expert mentioned that the option 'not applicable' could better be omit. The validation part of the study gave no reasons for deleting or changing these items. The response rate (44.6%) of current study is lower compared to other SE studies. They presented response rates above 65% (Lindberg, Wikström & Lindberg 2007; Lindberg & Fernandes 2010). A reason for low response for haemodialysis patients in general, is that many patients are physically disabled to participate in a study. They feel tired and have to deal with issues as cardiovascular problems, which seems to make great demands on patient's lives. Furthermore, in current study, only 31% of the study population (n=70) was treated by the active haemodialysis-treatment form. It is reasonable that these patients has more capacity than the 'passive' patients. When the patients are energetic enough to control the dialysis machine, they seems to have a more active life, are more willing to participate and able to complete a self-reported questionnaire. In other SE study this partition of treatment forms were not described. Another reason for this low response rate is that some haemodialysis patients had no fluid-restriction at all, and did not have reasons for participating in the study. It is unclear why some haemodialysis patients denied the presence of the fluid restriction.

The total population of the Dutch dialysis centre, consists more males than females (34.5%), this explains the imbalanced proportion males-females in this study.

Recommendations

First of all the D-FIAI should be implemented and used in daily practice. Than interventions should be developed to improve patients' SE, and tested on its positive effect on IWG. Only than the surplus value of supporting the SE of haemodialysis patients' can be proved. The effect of using a 'not applicable' option should be tested, when patients have too much missed-scores in using the D-FIAI in the future. Additionally, qualitative research should be done, to identify reasons for denying the presence of a fluid restriction by haemodialysis patients.

To gain insight in the validity and reliability of the D-FIAI for other patients with a fluid restriction, as peritoneal dialysis patients, further research is necessary. Some patients did

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not have the possibility to fill-in the questionnaire themselves and were excluded from the study. However, these patients are presented in practice, so further research is recommended when the D-FIAI will be used and filled-in by dialysis nurses. The D-FIAI was not tested after a long-term period and for responsiveness, this should be done, when the measurement will be used as evaluation tool for haemodialysis patients in the Netherlands. For comparisons between patients' SE from different European countries, the FIAI should be translated and validated for those populations.

Conclusion

Adherence to the fluid restriction is problematic for many haemodialysis patients. Self-efficacy is a psychosocial variable which can predict and influence the adherence to the fluid restriction. The level of SE should be known for all haemodialysis patients. The results of current study confirm that the D-FIAI can be used as valid and reliable SE measurement by adult haemodialysis patients with a fluid restriction in the Netherlands, and in daily practice for an individual analysis aimed to identify situations that are problematic for the patients. The SE-scores should be used in conversations between the patients and the nurses/nephrologists, to select interventions in supporting individuals, to improve the fluid-restriction adherence. Finally, the use of the same questionnaire in different countries will enhance the comparability of the results of, for example, randomized clinical trials published in the international literature.
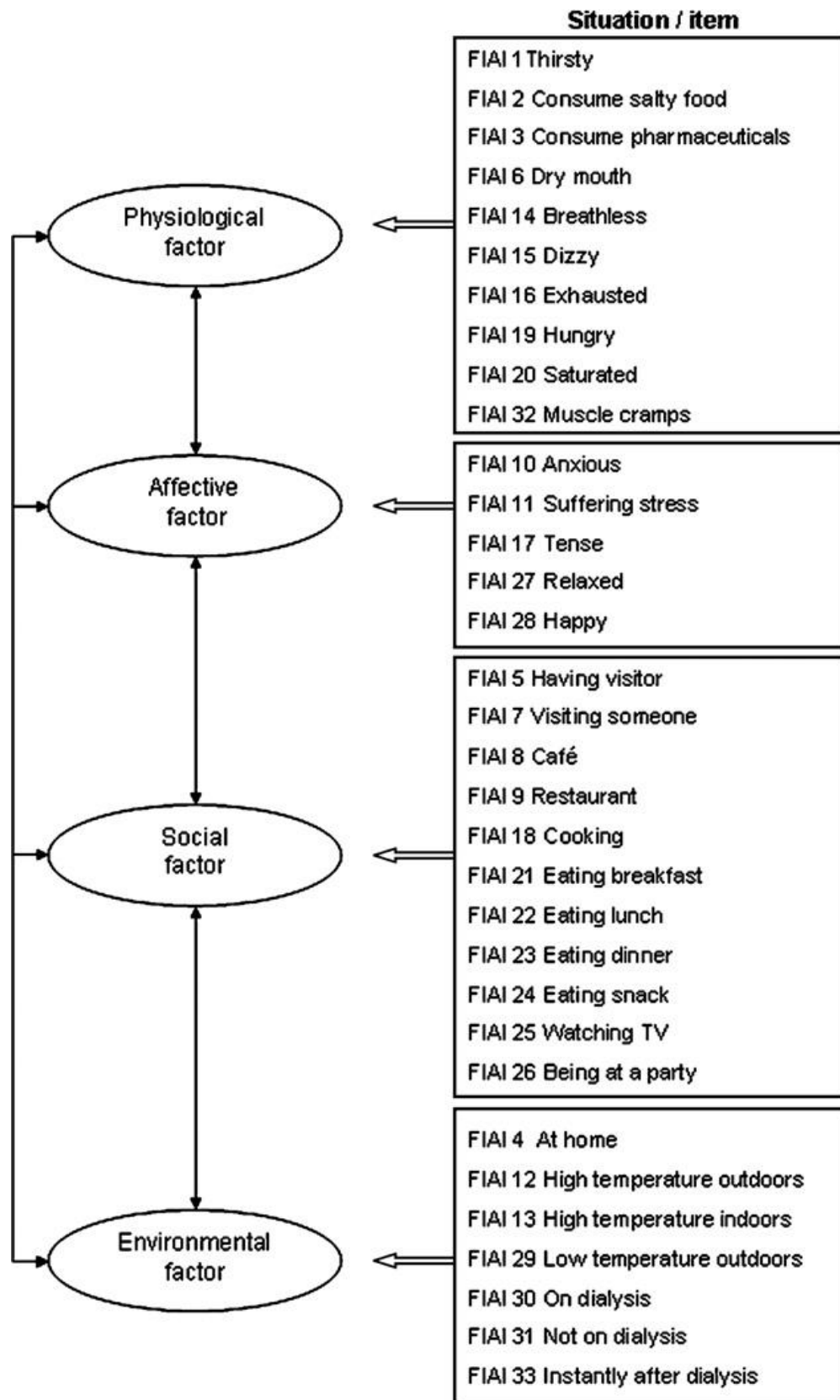
References

Bame S.I., Petersen N. & Wray N.P. (1993). Variation in hemodialysis patient compliance according to demographic characteristics. *Social science & medicine (1982)* 37, 1035-1043.

Bandura A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, (84), 191-215.

Bandura A. (1997). *Self-efficacy: the exercise of control*, New York: W.H. Freeman and Company.

Beaton D.E., Bombardier C., Guillemin F. & Ferraz M.B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine* 25, no. 24, 3186-3191.

Brady B. A., Tucker C. M., Alfino P. A. et al. (1997). An investigation of factors associated with fluid adherence among hemodialysis patients: a self-efficacy theory based approach. *Annals of Behavioral Medicine: A publication of the society of Behavioral Medicine, 19*(4), 339 – 343.

Cha E.S., Kim K.H. & Erlen J.A. (2007). Translation of scales in cross-cultural research: issues and techniques. *Journal of advanced nursing* 58, no. 4, 386-395.

Clark L.A. & Watson D. (1995). Constructing validity: basic issues in objective scale development. 7, 309-319.

Cvengros J.A., Christensen A.J. & Lawton W.J. (2004) The role of perceived control and preferences for control in adherence to a chronic medical regimen. Annals of Behavioral Medicine 27(3), 155-161.

Frei A., Svarin A., Steurer-Stey C. et al. (2009). Self-efficacy instruments for patients with chronic diseases suffer from methodological limitations--a systematic review. *Health and quality of life outcomes* 7, 86.

Goverde K. & Grypdonck M. (1998). Living with dialysis: A study of the experience of patients treated in a passive dialysis center. 13, 217-225.

Holloway A. & Watson H.E. (2002). Role of self-efficacy and behaviour change. International journal of nursing practice 8, 106-115.

Kugler C., Vlaminck H., Haverich A. et al. (2005). Nonadherence with diet and fluid restrictions among adults having hemodialysis. *Journal of nursing scholarship : an official publication of Sigma Theta Tau International Honor Society of Nursing / Sigma Theta Tau* 37, 25-29.

Kutner N.G. (2001). Improving compliance in dialysis patients: Does anything work? Seminars in Dialysis 14(5), 324-327.

Lee S. H. & Molassiotis A. (2002). Dietary and fluid compliance in Chinese hemodialysis patients. *International Journal of Nursing Studies 39*(7), 695 –704.

Leggat J.E. Jr, Orzol S.M., Hulbert-Shearon T.E. et al. (1998). Noncompliance in hemodialysis: predictors and survival analysis. *American Journal of Kidney Diseases: The Official Journal of the National Kidney Foundation* 32, 139-145.

Lindberg M. & Fernandes M.A. (2010). Self-efficacy in relation to limited fluid intake amongst portuguese haemodialysis patients. *Journal of renal care* 36, 133-138.

Lindberg M., Wikstrom B. & Lindberg P. (2007). Fluid Intake Appraisal Inventory: Development and psychometric evaluation of a situation-specific measure for haemodialysis patients' self-efficacy to low fluid intake. *Journal of psychosomatic research* 63, 167-173.

Lorig K.R. & Holman H. (2003). Self-management education: history, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine* 26, 1-7.

Lynn M.R. (1986). Determination and quantification of content validity. *Nursing research* 35, 382-385.

Polit D.F. & Beck C.T. (2008). *Nursing Research: generating and assessing evidence for nursing practice.* 8th edn, Wolters Kluwer | Lippincott Williams & Wilkins.

Psychology, 51(2), 357 – 364.Psychology, 51(2), 357 – 364.Saran R., Bragg-Gresham J.L., Rayner H.C. et al. (2003). Nonadherence in hemodialysis: associations with mortality, hospitalization, and practice patterns in the DOPPS. *Kidney international* 64, 254-262.

Registratie Nierfunctievervanging Nederland (2010). *Verdeling over behandelvormen op 1 januari 2010.* https://www.renine.nl/static?id=prev_distr&render=png Accessed 1 February 2011.

Schneider M.S., Friend R., Whitaker P. et al. (1991). Fluid noncompliance and symptomatology in end-stage renal disease: cognitive and emotional variables. *Health psychology : official journal of the Division of Health Psychology, American Psychological Association* 10, 209-215.

Streiner L.D. & Norman G.R. (2008). *Health Measurement Scales. A practical guide to their development and use,* fourth edition edn, Oxford University Press, New York.

Takaki J. & Yano E. (2006). Possible gender differences in the relationships of self-efficacy and the internal locus of control with compliance in hemodialysis patients. *Behavioral medicine (Washington, D.C.).* 32, 5-11.

Terwee C. B., Bot S. D., de Boer M. R. et al. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology 60*(1). 34-42.

Welch J. L. (2001). Hemodialysis patient beliefs by stage of fluid adherence. *Research in Nursing & Health, 24*(2), 105-112.

Tables and Figures

Figure 1: Subscales of the FIAI

Situation / item

Physiological factor
- FIAI 1 Thirsty
- FIAI 2 Consume salty food
- FIAI 3 Consume pharmaceuticals
- FIAI 6 Dry mouth
- FIAI 14 Breathless
- FIAI 15 Dizzy
- FIAI 16 Exhausted
- FIAI 19 Hungry
- FIAI 20 Saturated
- FIAI 32 Muscle cramps

Affective factor
- FIAI 10 Anxious
- FIAI 11 Suffering stress
- FIAI 17 Tense
- FIAI 27 Relaxed
- FIAI 28 Happy

Social factor
- FIAI 5 Having visitor
- FIAI 7 Visiting someone
- FIAI 8 Café
- FIAI 9 Restaurant
- FIAI 18 Cooking
- FIAI 21 Eating breakfast
- FIAI 22 Eating lunch
- FIAI 23 Eating dinner
- FIAI 24 Eating snack
- FIAI 25 Watching TV
- FIAI 26 Being at a party

Environmental factor
- FIAI 4 At home
- FIAI 12 High temperature outdoors
- FIAI 13 High temperature indoors
- FIAI 29 Low temperature outdoors
- FIAI 30 On dialysis
- FIAI 31 Not on dialysis
- FIAI 33 Instantly after dialysis

Table 1: Characteristics of haemodialysis patients (N=33)

Variables	Mean	min – max
Age (years)	66.5	32 - 85
Gender	**N (%)**	
Male	26 (78,8)	
Female	7 (21,2)	
Time on dialysis (years)	3.3	0.5 - 12.5
Interdialytic weight gain (kg)	1.73	0 - 7.4
Fluid restriction per day (ml)	**N (%)**	
0 – 500	2 (6,1)	
501 – 1000	16 (48,5)	
1001 – 1500	10 (30,3)	
1501 – 2000	2 (6,1)	
2000 <	3 (9,0)	
Sort dialysis	**N (%)**	
Active	6 (18.2)	
Passive	23 (69.7)	
Night	4 (12.1)	
Systolic blood pressure (mmHg)	141	64 - 218
Diastolic blood pressure (mmHg)	80	43 - 118

Table 2: Descriptive statistics, construct validity and internal consistency of the D-FIAI

| D- FIAI Scale/subscale	Mean score	min - max	Pearson's correlation 'between IWG & the SE score' (sign.)	Cronbach's α	Inter-item correlation min - max
Total	249.4	85 - 330	- .349 (.047)	.982	.258 - .938
Physiological factor	75.7	20 - 100	- .348 (.048)	.945	.295 - .874
Affective factor	38.9	8 - 50	- .302 (.078)*	.947	.562 - .938
Social factor	83.1	30 - 110	- .396 (.023)	.951	.289 - .937
Environmental factor	54.7	27 - 70	- .352 (.045)	.927	.379 - .936

* $p > 0.05$
D-FIAI: Dutch Fluid Intake Appraisal Inventory
IWG: Interdialytic Weight Gain
SE: Self-efficacy

Figure 1: Sample flow chart of haemodialysis patients
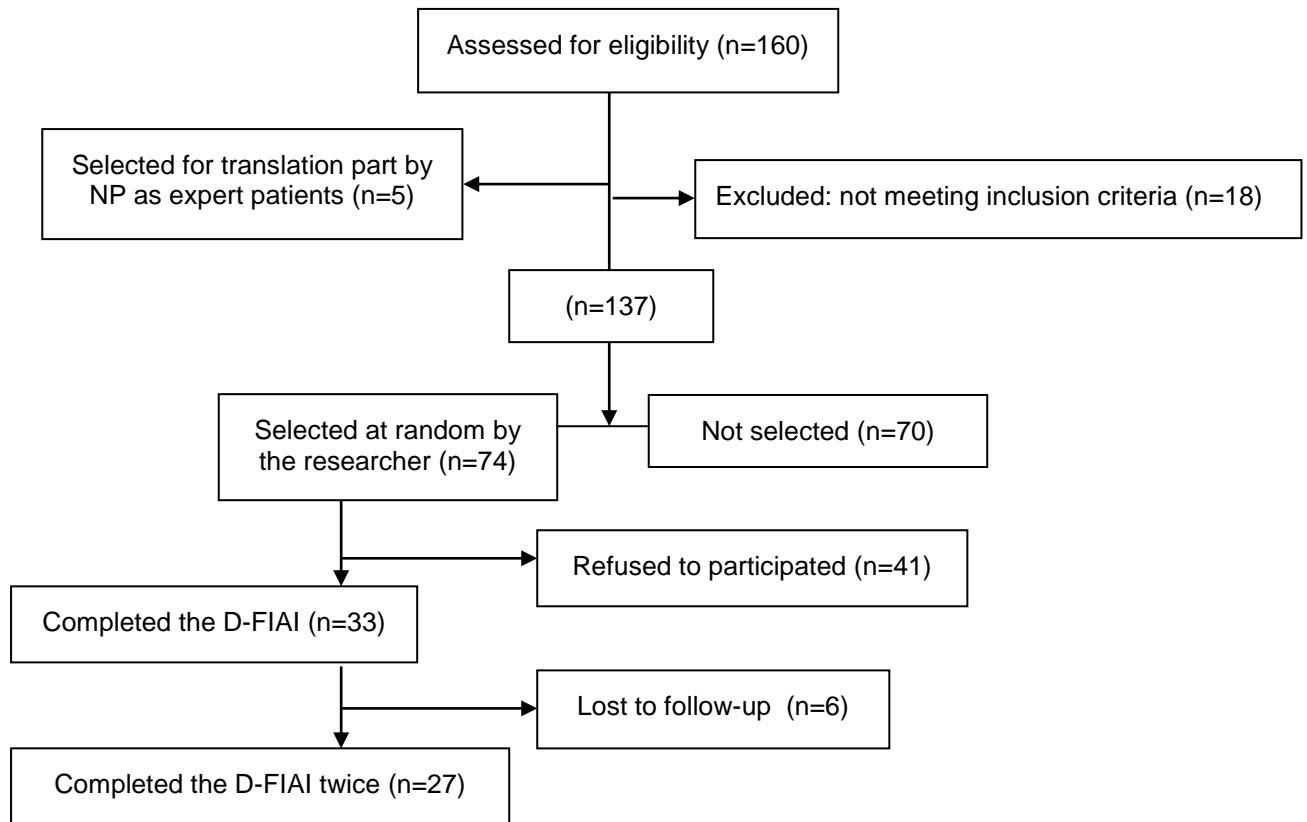
Appendix 1: Dutch Fluid Intake Appraisal Inventory

Vochtbeperking bij dialysepatiënten

Datum invullen: |__|__| |__|__| |__|__|__|__|

                             d d   m m   j j j j

Geboortedatum deelnemer: |__|__| |__|__| |__|__|__|__|

                             d d   m m   j j j j

Geslacht   Man ☐   Vrouw ☐

Vochtbeperking |__|__|__|__| **cc per dag**

Mensen met nierfalen waarvoor dialyse noodzakelijk is, kunnen zich onzeker voelen over de mate waarin zij zich kunnen houden aan hun vochtbeperking. Er bestaan situaties waarin het moeilijker is dan in andere om de inname van vocht te beperken. In deze vragenlijst zijn een aantal van die situaties beschreven.

Bepaal in welke mate **u denkt zeker van uzelf te zijn, in een bepaalde situatie om de inname van vocht/drinken te beperken.**

Voorbeeld:

Hoe zeker bent u van uzelf dat u in de volgende situatie de inname van vocht/drinken kunt beperken?

Wanneer u koorts hebt?	0____1____2____3____4____5____6____7____8____9___⟨10⟩

Als u er zeer zeker van bent dat u in staat bent om u aan uw vochtbeperking te houden als u koorts hebt, omcirkel dan het cijfer 10, zoals in bovenstaand kader, waarmee u aangeeft dit 'zeer zeker wel' te kunnen.

U zult gemiddeld 15 minuten nodig hebben om deze vragenlijst in te vullen.

Hoe zeker bent u van uzelf dat u in de volgende situaties de inname van vocht/drinken

kunt beperken?

Omcirkel het cijfer dat overeenstemt met uw inschatting:

    0_____1_____2_____3_____4_____5_____6_____7_____8_____9_____10
    Onzeker   Zeker

---

1. Wanneer u dorst hebt   0___1___2___3___4___5___6___7___8___9___10

2. Wanneer u zout eten eet   0___1___2___3___4___5___6___7___8___9___10

3. Wanneer u uw medicijnen inneemt   0___1___2___3___4___5___6___7___8___9___10

4. Wanneer u thuis bent   0___1___2___3___4___5___6___7___8___9___10

5. Wanneer u thuis visite heeft   0___1___2___3___4___5___6___7___8___9___10

6. Wanneer u een droge mond heeft   0___1___2___3___4___5___6___7___8___9___10

7. Wanneer u bij iemand op bezoek bent0___1___2___3___4___5___6___7___8___9___10

8. Wanneer u een restaurant bezoekt   0___1___2___3___4___5___6___7___8___9___10

9. Wanneer u een café bezoekt   0___1___2___3___4___5___6___7___8___9___10

10. Wanneer u zich ongerust voelt   0___1___2___3___4___5___6___7___8___9___10

11. Wanneer u zich gestrest voelt   0___1___2___3___4___5___6___7___8___9___10

12. Wanneer het buiten warm is   0___1___2___3___4___5___6___7___8___9___10

13. Wanneer het in huis warm is   0___1___2___3___4___5___6___7___8___9___10

14. Wanneer u buiten adem bent   0___1___2___3___4___5___6___7___8___9___10

Hoe zeker bent u van uzelf dat u in de volgende situaties de inname van vocht/drinken kunt beperken?

Omcirkel het cijfer dat overeenstemt met uw inschatting:

0____1____2____3____4____5____6____7____8____9____10
Onzeker   Zeker

---

15. Wanneer u zich duizelig voelt   0___1___2___3___4___5___6___7___8___9___10

16. Wanneer u zich moe/uitgeput voelt   0___1___2___3___4___5___6___7___8___9___10

17. Wanneer u zich gespannen voelt   0___1___2___3___4___5___6___7___8___9___10

18. Wanneer u eten kookt   0___1___2___3___4___5___6___7___8___9___10

19. Wanneer u hongerig bent   0___1___2___3___4___5___6___7___8___9___10

20. Wanneer u verzadigd bent   0___1___2___3___4___5___6___7___8___9___10

21. Wanneer u ontbijt   0___1___2___3___4___5___6___7___8___9___10

22. Wanneer u luncht   0___1___2___3___4___5___6___7___8___9___10

23. Wanneer u dineert   0___1___2___3___4___5___6___7___8___9___10

24. Wanneer u een tussendoortje eet   0___1___2___3___4___5___6___7___8___9___10

25. Wanneer u TV kijkt   0___1___2___3___4___5___6___7___8___9___10

26. Wanneer u op een feest bent   0___1___2___3___4___5___6___7___8___9___10

27. Wanneer u zich ontspannen voelt   0___1___2___3___4___5___6___7___8___9___10

28. Wanneer u zich blij/gelukkig voelt   0___1___2___3___4___5___6___7___8___9___10

Hoe zeker bent u van uzelf dat u in de volgende situaties de inname van vocht/drinken

kunt beperken?

Omcirkel het cijfer dat overeenstemt met uw inschatting:

0____1____2____3____4____5____6____7____8____9____10
Onzeker   Zeker

---

29.   Wanneer het buiten koud is   0___1___2___3___4___5___6___7___8___9___10

30.   Wanneer u dialyseert   0___1___2___3___4___5___6___7___8___9___10

31.   Wanneer u geen dialyse heeft   0___1___2___3___4___5___6___7___8___9___10

32.   Wanneer u spierkrampen heeft   0___1___2___3___4___5___6___7___8___9___10.

33.   Wanneer u net thuis gekomen bent

van de dialysebehandeling   0___1___2___3___4___5___6___7___8___9___10