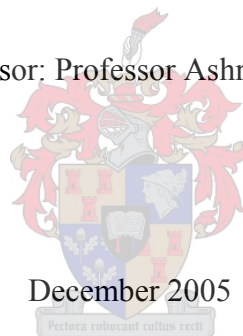


Predicting dietary and fluid adherence in hemodialysis: An application and extension  
of the Theory of Planned Behaviour

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Thesis presented for the degree of Master of Arts (Psychology) at the  
University of Stellenbosch

Supervisor: Professor Ashraf Kagee



December 2005

## DECLARATION

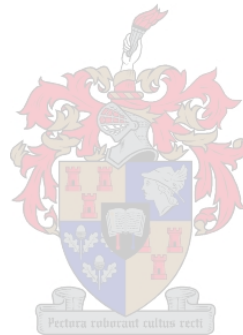
I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

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Signature

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## ABSTRACT

The first objective of the present study was to determine whether the Theory of Planned Behaviour (TPB) could predict dietary and fluid adherence among in-centre hemodialysis patients attending government hospitals in the Western Cape. The second objective was to determine whether the TPB could be significantly strengthened by the inclusion of Health literacy and Perceived social support as additional predictor variables.

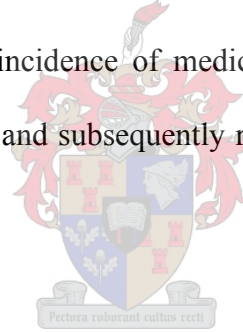
Hierarchical multiple regression analyses revealed that the TPB was able to significantly explain 15.5% of the variance in Self-reported dietary and fluid adherence. Furthermore, Perceived behavioural control was able to significantly explain 5.5% of the variance in Self-reported dietary and fluid adherence when the effects of Attitude towards adherence and Subjective norms were held constant.

When Health literacy and Perceived social support were added to the TPB, the model significantly explained 20.7% of the variance in Self-reported dietary and fluid adherence. Moreover, Perceived behavioural control significantly accounted for 5.6% of the variance when the effects of Attitude towards adherence, Subjective norms, Health literacy, and Perceived social support were held constant.

The TPB was unable, however, to significantly account for variance in the biochemical indicators of dietary adherence (Potassium levels and Phosphate levels) or fluid adherence (Interdialytic Weight Gain). When Health literacy and Perceived social support were added to the TPB, the model was still unable to significantly explain variance in any of the biochemical indicators of dietary and fluid adherence. Nonetheless, Perceived social support significantly accounted for 8.1% of the variance in Phosphate levels when the effects of Attitude towards adherence,

Subjective norms, Perceived behavioural control, and Health literacy were held constant.

The findings of the present study suggest that interventions aimed at improving dietary and fluid adherence among in-centre hemodialysis patients attending government hospitals in the Western Cape should aim to promote positive attitudes towards dietary and fluid adherence among patients, should aim to increase normative pressure and motivate patients to comply with this pressure, should aim to increase patients' perceptions of their own capacity to be adherent with the dietary and fluid restrictions, should aim to increase patients' perception of social support and increase patients' knowledge of their diet and of the medical consequences of dietary and fluid non-adherence. Improved dietary and fluid adherence among hemodialysis patients is likely to result in the reduced incidence of medical complications associated with dietary and fluid non-adherence and subsequently reduce the End-stage renal disease (ESRD) mortality rate.



## OPSOMMING

Hierdie studie het eerstens gepoog om vas te stel of die Teorie van Beplande Gedrag (waarna in die studie as die TPB verwys word) dieet- en vloeistofinname-getrouheid onder interne hemodialise-pasiënte by Wes-Kaapse staatshospitale kan voorspel. Die tweede doelwit was om vas te stel of die TPB aansienlik versterk kan word deur die insluiting van gesondheidsgeletterdheid en waargenome sosiale ondersteuning as bykomende voorspellingsveranderlikes.

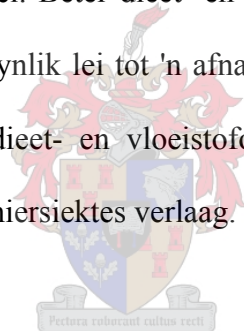
Ontledings van hiërargiese veelvuldige regressie het getoon dat die TPB 15.5% van die verandering in selfgerapporteerde dieet- en vloeistofinname-getrouheid akkuraat kon voorspel. Waargenome gedragsbeheer kon ook 5.5% van die verandering in selfgerapporteerde dieet- en vloeistofinname-getrouheid verklaar toe die uitwerking van houding teenoor getrouheid en subjektiewe norme konstant gehou is.

Toe gesondheidsgeletterdheid en waargenome sosiale ondersteuning by die TPB gevoeg is, kon die model 20.7% van die verandering in selfgerapporteerde dieet- en vloeistofinname-getrouheid voorsien. Waargenome gedragsbeheer kon boonop 5.6% van die verandering verklaar toe die uitwerking van houding teenoor getrouheid, subjektiewe norme, gesondheidsgeletterdheid en waargenome sosiale ondersteuning konstant gehou is.

Die TPB kon egter nie 'n verduideliking bied vir die verandering in die biochemiese aanduiders van dieetgetrouheid (kalium- en fosfaatvlakke) of vloeistofinname-getrouheid (interdialitiese gewigstoename) nie. Toe gesondheidsgeletterdheid en waargenome sosiale ondersteuning by die TPB gevoeg is, was die model steeds nie daartoe in staat om die verandering in enige van die biochemiese aanduiders van dieet- en vloeistofinname-getrouheid te verklaar nie. Nietemin kon waargenome sosiale ondersteuning 8.1% van die verandering in fosfaatvlakke verklaar toe die

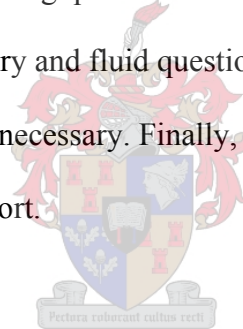
uitwerking van houding teenoor getrouheid, subjektiewe norme, waargenome gedragsbeheer en gesondheidsgeletterdheid konstant gehou is.

Die bevindinge van hierdie studie doen aan die hand dat intervensies vir die verbetering van dieet- en vloeistofinname-getrouheid onder interne hemodialise-pasiënte by Wes-Kaapse staatshospitale daarop gemik moet wees om positiewe houdings teenoor dieet- en vloeistofinname-getrouheid onder pasiënte te bevorder; normatiewe druk te verhoog en pasiënte te motiveer om aan hierdie druk te voldoen; pasiënte se siening van hulle eie kapasiteit te verbeter ten einde gehoor te gee aan dieet- en vloeistofbeperkings; pasiënte se siening van sosiale ondersteuning te verbeter; en pasiënte se kennis van hulle dieet en van die mediese gevolge van dieet- en vloeistofvoortredings uit te brei. Beter dieet- en vloeistofinname-getrouheid onder hemodialise-pasiënte sal waarskynlik lei tot 'n afname in die voorkoms van mediese komplikasies geassosieer met dieet- en vloeistofvoortredings, en sal gevolglik die sterftesyfer weens Eindstadium-niersiektes verlaag.



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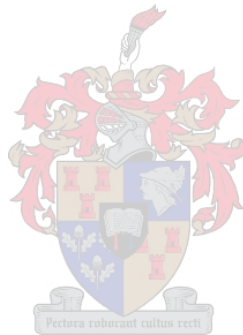


DS Fincham

December 2005

## DEDICATION

Writing this thesis was a very long and solitary process. If it wasn't for my cat Lilo I probably would have gone insane. For this reason, I dedicate this thesis to her.





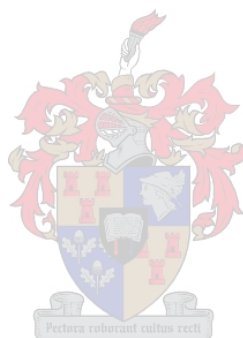
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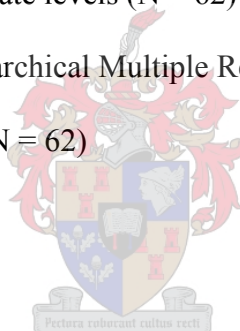
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## CHAPTER 1

### INTRODUCTION

#### 1.1 End-stage renal disease and hemodialysis

End-stage renal disease (ESRD) is the result of a progressive deterioration in kidney function over a prolonged period of time (Christensen & Ehlers, 2002).

Although kidney transplantation is considered the treatment of choice (Martin & Thompson, 2000), the limited number of organ donors means that the majority of patients need to be treated with a compensatory method of treatment (Hailey & Moss, 2000). Hemodialysis has been developed as a viable, safe, and efficient method for the maintenance of patients with ESRD (Boyer, Friend, Chlouverakis & Kaloyanides, 1990). Among patients receiving hemodialysis, solutes and excess fluid are removed from the blood by being passed through a semipermeable membrane within a dialysis machine (Hailey & Moss, 2000). The procedure may take place within the home (out-centre patients) or in a hospital setting (in-centre patients) and requires patients to be dialyzed three times per week for approximately four hours per session.

The rigours of such treatment are not only taxing on patients, but are a great financial burden as well. For example, although dialysis patients comprised only 0.02% of the population in the United Kingdom in 1994, a disproportionately large 0.7% of the total health care budget was spent on dialysis treatment (Hailey & Moss, 2000). Furthermore, total ESRD spending in the United States for 1996 was estimated at 14.55 billion dollars (Hailey & Moss, 2000). No estimates of total governmental expenditure in South Africa are currently available but due to the high cost of hemodialysis, The National Health Department (NHD) developed a protocol for the management of ESRD that asserts that government facilities will offer treatment only to patients who are eligible for a transplant (Naicker, 2003). The economic burden

that hemodialysis treatment poses is therefore a major barrier that prevents many patients from receiving treatment.

America and Japan, with rates of 1113 patients per million population and 1397 patients per million population undergoing kidney dialysis respectively, have the highest prevalence rates of ESRD in the world (Hailey & Moss, 2000). A report of the South African Dialysis and Transplant Registry (SADTR) showed that in 1994, South Africa had a rate of 99 patients per million population (Naicker, 2003). Unfortunately, no recent statistics are available from the SADTR due to inadequate funding since 1994 (Nephrology Report, n.d.).

Although ESRD is a treatable condition, the United States had an ESRD mortality rate of 23.6% in 1992 (Treating End Stage Renal Disease, 2004). France and Germany had mortality rates of 11.0% and 10.0% respectively and Japan had a mortality rate of 9.7% (Treating End Stage Renal Disease, 2004). In South Africa there are no recorded data of patients who have died as a direct result of ESRD.

In order to reduce the ESRD mortality rate, patients undergoing hemodialysis are required to be adherent with various prescriptions. The term adherence is preferred to compliance. 'Compliance', historically, implies coercion and paternalistic control on the part of the doctor. 'Adherence', however, implies that patients will co-operate with their dialysis treatment regime (in a more self-determining manner) if they choose to do so (Ogden, 2000). The latter term therefore acknowledges an empowering component in doctor-patient communication. One hemodialysis prescription requires that patients adhere with strict dietary restrictions (which include limiting potassium and phosphate intake) and fluid restrictions (Manley & Sweeney, 1986).

## 1.2 Potassium, phosphate, and fluid in hemodialysis

A patient undergoing hemodialysis is limited to approximately 2000mg of potassium a day and must keep their potassium levels between 1.02 and 1.53 mmol/ℓ (Hansen, 2000). Excessive dietary potassium intake may lead to hyperkalemia<sup>1</sup> and fatal cardiac rhythm abnormalities (Christensen & Ehlers, 2002). Hemodialysis patients are also limited to approximately 1000mg of phosphate a day and must keep their phosphate levels between 1.13 and 1.77mmol/ℓ (Hansen, 2000). Elevated serum phosphate levels or phosphate retention can lead to renal osteodystrophy<sup>2</sup> and may contribute to cardiovascular disease (Christensen & Ehlers, 2002). Furthermore, patients are limited to approximately 700ml to 1000ml of fluid per day and must keep their fluid weight gains between 0.5kg and 1kg per day (Karalis, 2001). Excess fluid, or edema, can result in fluid build-up around the lungs causing shortness of breath and high blood pressure (Karalis, 2001). Prolonged fluid overload is associated with hypertension<sup>3</sup>, pulmonary edema<sup>4</sup>, congestive heart failure, and shortened patient survival (Wolcott, Maida, Diamond, & Nissenson, 1986). To this end, it is pertinent that behavioural scientists understand the psychosocial factors that are predictive of dietary and fluid adherence.

## 1.3 Predicting dietary and fluid adherence

A psychosocial theory that has been shown to predict behavioural intentions and actual behaviour is the Theory of Planned Behaviour (TPB) (Ajzen & Fishbein, 1980). For example, the TPB has been used to predict a variety of health-related behaviours such as clinical glove use (e.g.: Watson & Myers, 2001) and testicular

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<sup>1</sup> An excess of potassium in the blood (Dorland's Pocket Medical Dictionary, 2001).

<sup>2</sup> Abnormal bone development (Dorland's Pocket Medical Dictionary, 2001).

<sup>3</sup> Persistently high arterial blood pressure (Dorland's Pocket Medical Dictionary, 2001).

<sup>4</sup> An accumulation of fluid around the lungs (Dorland's Pocket Medical Dictionary, 2001).



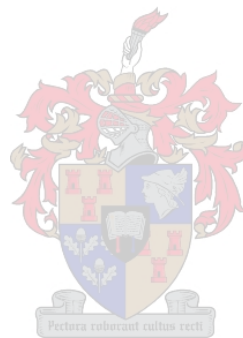
self-examination (e.g.: Brubaker & Wickersham, 1990). It has also been used successfully to predict treatment adherence in various populations. For example, the TPB was able to significantly explain 65% of the variance in psychiatric patients' intentions to adhere with prescribed medication (Conner, Black, & Stratton, 1998) and was able to significantly explain 63.7% of the variance in intentions to consume a low-fat diet (Povey, Conner, Sparks, James, & Shepherd, 2000). However, few studies (both international and within the South African context) have sought to determine whether the TPB can predict dietary and fluid adherence among hemodialysis patients. As such, the ability of the TPB to predict dietary and fluid adherence among hemodialysis patients attending government hospitals in the Western Cape is uncertain and requires investigation.

#### 1.4 Health literacy and Perceived social support

Health literacy and Perceived social support have been shown to be significant predictors of dietary and fluid adherence (Zimet, Dahlem, Zimet, & Fareley, 1988). Consequently, the aforementioned predictor variables were included in the present study to determine whether or not the TPB could be significantly strengthened by their inclusion.

In sum then, the first objective of the present study was to determine whether the TPB could predict dietary and fluid adherence among in-centre hemodialysis patients attending government hospitals in the Western Cape. The second objective of the present study was to determine whether or not the TPB could be significantly strengthened by the inclusion of Health literacy and Perceived social support as additional predictor variables. As a result, the following research questions were derived:

1. How much variance in dietary and fluid adherence by in-centre hemodialysis patients can be significantly accounted for by the TPB?
2. How much variance in dietary and fluid adherence by in-centre hemodialysis patients can be significantly accounted for by the TPB with Health literacy and Perceived social support as additional predictor variables?

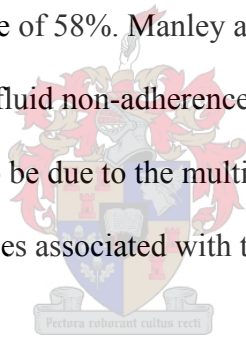


## CHAPTER 2

### LITERATURE REVIEW AND THEORETICAL FRAMEWORK

#### 2.1 Dietary and fluid adherence in hemodialysis

Despite being a serious health condition, hemodialysis patients consistently exhibit poor dietary and fluid adherence (Bame, Petersen, & Wray, 1993; Christensen et al., 1992; Friend, Hatchett, Schneider, & Wadhwa, 1997; Moran, Christensen, & Lawton, 1997; Schneider, Friend, Whitaker, & Wadhwa, 1991). However, reports of low levels of dietary and fluid adherence diverge with regard to the extent of non-adherence. For example, whereas Shapiro, Deshetler, and Stockard (1994) reported that 80% of the participants in their sample were non-adherent, Brown and Fitzpatrick (1988) report a much lower figure of 58%. Manley and Sweeney (1986) report an even lower figure of dietary and fluid non-adherence of approximately 40%. Such inconsistent findings are likely to be due to the multidimensional and multifaceted nature of adherence and difficulties associated with the accurate measurement of adherence.



#### 2.2 Measuring dietary and fluid adherence among hemodialysis patients

Manley and Sweeney (1986) discuss various approaches that have been used to measure dietary and fluid adherence. One approach has been to measure adherence using staff and patient self-report assessments of dietary and fluid adherence (e.g.: Brown & Fitzpatrick, 1988). However, self-report measures of adherence are often compromised by patients' inflated estimates of their adherent behaviour (Gross, Bilker, Friedman, Coyne, & Stom, 2002) and recall bias (Hennekens, Buring, & Mayrent, 1987). Recall bias arises when patients undergoing hemodialysis remember and report their adherent behaviour incompletely, inaccurately, or differently from

those who do not undergo hemodialysis. Therefore, self-report measures should be accompanied by more objective biochemical indicators independent of staff/ patient evaluation and bias. Measurements of predialytic serum potassium levels, predialytic phosphate levels, and Interdialytic Weight Gain (IWG) have served to objectively demonstrate dietary and fluid adherence (e.g.: Boyer et al., 1990; Manley & Sweeney, 1986).

### 2.3 The Theory of Planned Behaviour

Adherence to dietary and fluid restrictions in hemodialysis patients has been extensively researched using various theoretical frameworks. One widely used theory is the TPB (Ajzen & Fishbein, 1980). The TPB postulates that an individual's behaviour is a product of an antecedent behavioural intention to engage in the behaviour. A behavioural intention represents an individual's commitment to act and is the outcome of a combination of several variables (see Appendix A). The variables that predict behavioural intentions are the individual's Attitude towards the behaviour (which includes the individual's beliefs about the outcomes of the behaviour as well as the evaluations of these outcomes), the individual's perception of existing Subjective norms concerning the behaviour (which includes the individual's perception of the behaviour of others towards the behaviour as well as the individual's motivation to comply with others), and the individual's Perceived behavioural control (which includes an evaluation of internal factors such as perceived capacity to engage in the behaviour and external factors such as existing resources).

The TPB also states that Perceived behavioural control can have a direct effect on behaviour without the mediating effect of Attitudes towards the behaviour and Subjective norms. Consequently, if one believes (upon a consideration of perceived barriers) that one can adhere with one's dietary and fluid restrictions, one might do so

without the mediating effect of one's Attitude towards the restrictions, or perceptions of Subjective norms regarding the behaviour.

#### 2.4 Predicting treatment adherence

The TPB has been used to predict various health behaviours other than dietary and fluid adherence in hemodialysis. Conner et al. (1998) used the TPB to predict medication adherence in a psychiatric population. It was found that intentions to adhere to the drug regimen (explained by Attitudes towards the drug regimen, Subjective norms and Perceived behavioural control) were able to explain 65% of the observed variance of non-adherence. These authors concluded that beliefs about the outcomes, normative pressure, and control factors reliably distinguished between good and poor adherence and that these factors may form the basis for the development of an intervention to enhance the likelihood of adherence. Carroll and Whyte (2003) used the TPB to predict chronic back pain sufferers' intention to exercise. The authors concluded that "in order to maximize adherence, interventions should focus on increasing positive attitudes towards exercise and increasing the normative pressure and motivation to comply with such exercises" (p. 58). Watson and Myers (2001) used the TPB to predict clinical glove use among nurses at a London teaching hospital. Multiple regression analyses revealed that Attitudes towards clinical glove use and Perceived behavioural control were significant predictors of the nurses' intentions to wear clinical gloves. Furthermore, the nurses' intention to wear clinical gloves was a significant predictor of glove-wearing behaviour.

## 2.5 Predicting dietary and fluid adherence in hemodialysis

Few (if any) studies have applied the TPB to predict dietary and fluid adherence in hemodialysis. Nonetheless, some studies have examined the role of Perceived behavioural control in hemodialysis dietary and fluid adherence. For example, Brady, Tucker, Alfino, Tarrant, and Finlayson (1997) as well as Christensen, Wiebe, Benotsch, and Lawton (1996) reported that Perceived health behavioural control (health competence) was related to fluid-intake adherence. Similarly, Eitel, Friend, Griffin, and Wadhwa (1998) found that high Perceived behavioural control significantly predicted future fluid adherence. Even so, Perceived behavioural control failed to predict dietary adherence. The paucity of research highlights the need for the TPB to be applied to the prediction of dietary and fluid adherence in hemodialysis. Doing so would elucidate the utility of the theory within the present context.

The present study sought to determine whether or not the TPB could predict actual dietary and fluid adherence – not intentions to adhere with dietary and fluid restrictions. Similarly, Health literacy and Perceived social support were included in the present study to determine whether these additional predictor variables could significantly strengthen the TPB's ability to predict actual dietary and fluid adherence. Therefore, intentions to adhere with dietary and fluid restrictions were not measured in the present study (see Appendix B).

## 2.6 Health literacy

An important aspect in understanding dietary and fluid adherence is Health literacy (Durose, Holdsworth, Watson, & Przygodzka, 2004). Health literacy refers to a patient's knowledge of their diet and knowledge of the medical consequences of dietary and fluid non-adherence (Durose et al., 2004). Poor knowledge of one's

treatment regimen has been shown to be an important predictor of non-adherence (Anderson, Cambell, & Sheperd, 1993; Herek, Levy, Maddi, Taylor, & Wertlieb, 1990; Schlatter & Ferrans, 1998). In a similar vein, Lee and Molassiotis (2002) found that patients with lower dietary knowledge levels were more likely to perceive and report higher numbers of barriers to adherence.

## 2.7 The relationship between Health literacy and dietary and fluid adherence in hemodialysis

Enhanced patient education (aimed at increasing patient knowledge in areas such as diet and the importance of adherence) has been reported to play a role in slowing the progression of renal failure and delaying the need to initiate renal dialysis (Devins & Binik, 1996). However, few (if any) studies have assessed the Health literacy of hemodialysis patients or the relationship between health literacy and dietary and fluid adherence among this population.

## 2.8 Perceived social support

Zimet et al. (1988) demonstrated that supportive relationships with others may aid in health maintenance and recovery by helping to promote healthy behaviours such as adherence with prescribed medical care. Put differently, the better one perceives one's social support to be, the more likely one is to adhere with one's prescribed treatment recommendations.

A much debated issue, however, concerns how Perceived social support operates. Some have argued that Perceived social support may produce helpful effects directly by providing necessary advice and encouragement (e.g.: Broadhead, Kaplan, & James, 1983). Others argue that Perceived social support acts primarily as a protective buffer against the effects of stress resulting in better adherence (e.g.:

Hitchcock, Brantley, Jones, & McKnight, 1992). As a result, various definitions of Perceived social support have been derived. The debate is beyond the scope of the present study and therefore Perceived social support within the context of treatment adherence is defined simply as “the encouragement from family and friends for the patient to co-operate with the recommendations and prescriptions of a health professional” (Williams & Bond, 2002, p.127).

## 2.9 The relationship between Perceived social support and dietary and fluid adherence in hemodialysis

While some evidence suggests that Perceived social support is not related to dietary and fluid adherence (Cummings, Becker, Kirscht, & Levin, 1982; Hitchcock et al., 1992), it has been widely reported that Perceived social support is positively correlated with dietary and fluid adherence (e.g.: Christensen et al., 1992; Kulik & Mahler, 1993; O’Brien, 1980). Furthermore, Sherwood (1983) found that patients who showed good adherence reported their families to be understanding and supportive. Similarly, Boyer et al. (1990) found that patients were non-adherent with potassium and phosphorus restrictions when they perceived their families and medical staff as being either non-supportive or supporting them out of a sense of duty.

## 2.10 Demographic characteristics

### 2.10.1 Age

While some evidence suggests that age is not related to adherence (Hitchcock et al., 1992; Kaveh & Kimmel, 2001), it has been consistently reported that younger patients are more likely than older patients to be non-adherent with dietary and fluid restrictions (Bame et al., 1993; Boyer et al., 1990; Brown & Fitzpatrick, 1988; Hailey & Moss, 2000; Ifudu et al., 1996; Kutner, Zhang, McClellan, & Cole, 2002; Leggat et



al., 1998). Possible reasons for this phenomenon provided by researchers include a sense of invincibility among younger people and that younger people are less likely to accept their physical ailments when compared to older people.

### 2.10.2 Race

Research done in the United States of America shows that although African Americans have much higher rates of ESRD than Whites and Asians (Hailey & Moss, 2000), African American patients are more likely than either White or Asian patients to be non-adherent (Bame et al., 1993; Boyer et al., 1990; Curtin, Svarstad, & Keller, 1999; Kutner et al., 2002; Leggat et al., 1998). Rovelli et al. (1989) as well as Takemoto and Terasaki (1989) suggest that a possible reason for lower adherence among African American patients compared to White and Asian patients may be lower socioeconomic status resulting from historical economic suppression. Poor access to reliable methods of transportation (such as personal motor vehicles) to and from hemodialysis sessions may result in skipped dialysis sessions and subsequent non-adherence among African Americans (White, 2004). Moreover, White people in South Africa have historically had greater access to quality medical care (Marais, 2001). Subsequently, superior doctor-patient communication may have resulted in a greater understanding of the importance of being adherent with prescribed treatment regimens.

### 2.10.3 Socioeconomic status

Much evidence suggests that lower income patients are more likely than higher income patients to be non-adherent (Bame et al., 1993; Brownbridge & Fielding, 1994; Kutner et al., 2002). Similarly, Frazier, Davis-Ali, and Dahl (1994) as well as Kiley, Lam, and Pollak (1993) found that non-adherence was more common

among unemployed patients. Possibly, the higher cost of eating permissible foods relative to non-permissible foods may be a barrier for lower income patients.

#### 2.10.4 Gender

Although some evidence suggests that there is no relationship between gender and adherence (Brown & Fitzpatrick, 1988; Hitchcock et al., 1992; Leggat et al, 1998) and one study even reports that men are more adherent with phosphate restrictions than women (Kaveh & Kimmel, 2001), it has been widely documented that women are more adherent than men. For example, Boyer et al. (1990) found that women were more adherent with potassium restrictions than men. Studies by Carmack, Brantly, Jones, and McKnight (1993), Everett et al. (1993), and Safdar, Baakza, Kumar, and Naqvi (1995) yielded comparable results. Furthermore, Bame et al. (1993) as well as Ifudu et al. (1996) found that men had higher IDW levels than women, indicating greater fluid consumption and therefore poorer fluid adherence.

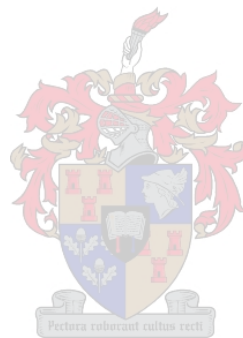
Chan, Knutsen, Blix, Lee, and Fraser (2002) suggest that one reason why women are more adherent than men with fluid restrictions may be that women typically have lower blood volumes and subsequently do not become dehydrated as quickly as men. Furthermore, evidence suggests that women regulate their body temperatures at lower sweat rates and subsequently require less fluid (Chan et al., 2002).

#### 2.10.5 Marital status

De Geest et al. (1995) as well as Somer and Tucker (1992) found that more favorable marital adjustment among in-centre hemodialysis patients and their spouses was related to better adherence with dietary restrictions. Furthermore, married patients have been shown to be more adherent with phosphorus restrictions than non-married

patients (Boyer et al., 1990). In a similar vein, being a widow (Bame et al., 1993) and being single (Safdar et al., 1995) has been shown to be related to non-adherence.

To recapitulate then, the better one perceives one's spousal support to be, the more likely one is to adhere with one's prescribed treatment recommendations. These findings add force to the hypothesis that Perceived social support is an important predictor of adherent behaviour.



## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 Research design

The present study was a research survey with a cross-sectional design. Participants were asked to complete a battery of instruments on a single occasion.

#### 3.2 Selection of cases

Sixty-two in-centre hemodialysis patients were selected by means of convenience sampling from the renal units of Tygerberg and Groote Schuur government hospitals in the Western Cape. After each patient received treatment, he or she was informed of the study by the doctor or nursing staff and introduced to the researcher and/ or the research assistants. The researcher or research assistants then privately explained the study to the patient and invited him or her to participate. Upon agreement, the patient was asked to sign an informed consent form (see Appendix C) and received R20 in gratitude of their participation. Those patients who declined to participate were thanked for their time. Ethical clearance and permission to conduct research were first obtained from the relevant Internal Review Boards.

#### 3.3 Measuring instruments

All measures were administered in English and Afrikaans.

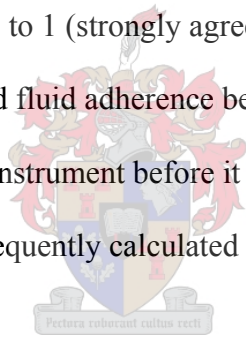
##### 3.3.1 Attitudes towards dietary and fluid adherence

To measure patients' Attitudes towards dietary and fluid restrictions, the Renal Adherence Attitudes Questionnaire (RAAQ) developed by Rushe and McGee (1998) was used (see Appendix D). The questionnaire consists of 26 items (with four Likert scale responses ranging from "strongly disagree" to "strongly agree"). The items form four subscales: 'attitude towards social restrictions' (six items,  $\alpha = 0.88$ ), 'attitudes

towards wellbeing' (seven items,  $\alpha = 0.77$ ), 'attitudes towards self-care/support' (four items,  $\alpha = 0.68$ ), and 'acceptance' (nine items,  $\alpha = 0.86$ ). Higher scores indicate a more positive patient attitude towards dietary and fluid restrictions.

### 3.3.2 Subjective norms

Using questionnaire construction guidelines provided by Neuman (2000), a scale with eight items (with four Likert scale responses ranging from "strongly disagree" to "strongly agree") was constructed (see Appendix E). Items such as "my doctor makes me feel guilty if I do not follow my diet properly" were scored from 1 (strongly disagree) to 4 (strongly agree). Reverse scored items, such as "I do not feel guilty if other patients find out that I have not been following my diet properly", were scored from 4 (strongly disagree) to 1 (strongly agree). Higher scores indicate a stronger perception of dietary and fluid adherence being the norms. A panel of experts reviewed the newly constructed instrument before it was used. Cronbach alpha reliability coefficients were subsequently calculated and are reported in the Results section.



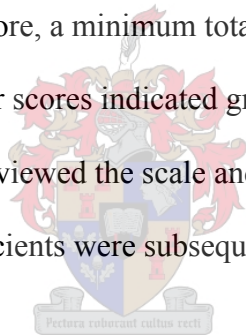
### 3.3.3 Perceived behavioural control

Using questionnaire construction guidelines provided by Neuman (2000), a scale with eight items (with four Likert scale responses ranging from "strongly disagree" to "strongly agree") was constructed (see Appendix F). Items, such as "following my diet does not require a lot of effort", were scored from 1 (strongly disagree) to 4 (strongly agree). Reverse scored items, such as "it is too expensive to buy the proper food all the time" were scored from 4 (strongly disagree) to 1 (strongly agree). Higher scores indicate a stronger perception of behavioural control over dietary and fluid restrictions. A panel of experts reviewed the newly constructed

instrument prior to its usage. Cronbach alpha reliability coefficients were subsequently calculated and are reported in the Results section.

#### 3.3.4 Health literacy

A scale with thirty-eight items was constructed with “true” and “false” as possible response categories (see Appendix G). Twelve items measured potassium knowledge and knowledge of medical complications associated with potassium non-adherence; thirteen items measured phosphate knowledge and knowledge of medical complications associated with phosphate non-adherence; and thirteen items measured fluid knowledge and knowledge of medical complications associated with fluid non-adherence. The questionnaire was scored by giving a 1 for a correct response and a 0 for an incorrect response. Therefore, a minimum total score of 0 and a maximum total score of 39 were possible. Higher scores indicated greater dietary and fluid health literacy. A registered dietician reviewed the scale and certified the correct responses. Cronbach alpha reliability coefficients were subsequently calculated and are reported in the Results section.



#### 3.3.5 Perceived social support

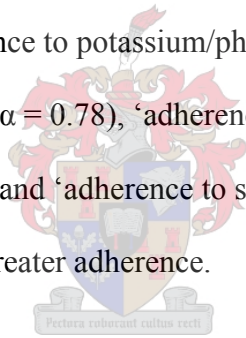
To measure Perceived social support, the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. (1988) was used (see Appendix H). The questionnaire consists of 12 items (with four Likert scale responses ranging from “strongly disagree” to “strongly agree”). The items form three subscales, each relating to a source of the support: ‘family’ (four items,  $\alpha = 0.87$ ), ‘friends’ (four items,  $\alpha = 0.85$ ), and ‘significant other’ (four items,  $\alpha = 0.91$ ). The total scale exhibits high internal consistency ( $\alpha = 0.88$ ). Higher scores indicate higher levels of Perceived social support.

### 3.3.6 Demographic variables

Age, length of time on dialysis, gender, ethnicity, marital status, educational level, number of people in household, household income, diabetic status, and hypertension status were assessed by a self-administered questionnaire (see Appendix I).

### 3.3.7 Self-reported dietary and fluid adherence

The Renal Adherence Behaviour Questionnaire (RABQ) developed by Rushe and McGee (1998) was used to measure Self-reported adherence (see Appendix J). The questionnaire consists of 25 items (with five Likert scale responses ranging from “never” to “always”) which form five subscales: ‘adherence to fluid restrictions’ (eleven items,  $\alpha = 0.80$ ), ‘adherence to potassium/phosphate medication’ (five items,  $\alpha = 0.70$ ), ‘self-care’ (two items,  $\alpha = 0.78$ ), ‘adherence in times of particular difficulty’ (five items,  $\alpha = 0.56$ ), and ‘adherence to sodium restrictions’ (two items,  $\alpha = 0.68$ ). Higher scores indicate greater adherence.



### 3.3.8 Biochemical measures of dietary and fluid adherence

Predialytic serum potassium levels (measured in mmol/l) and predialytic serum phosphate levels (measured in mmol/l) served as biochemical indicators of dietary adherence and IWG levels (measured in kg) served as a biochemical indicator of fluid adherence. The mean of three consecutive monthly predialytic serum potassium levels and three consecutive monthly predialytic serum phosphate levels most proximal to the time of questionnaire administration were calculated retrospectively for each patient. The mean of twelve consecutive dialysis session measurements of IDW most proximal to the time of questionnaire administration was

also calculated retrospectively for each patient (Christensen, Wiebe, & Lawton, 1997). Measurements of IDW were corrected for average weight.

### 3.4 Data analysis

All statistical procedures were performed using the Statistical Package for the Social Sciences (SPSS) with  $\alpha$  set at 0.05.

Frequencies ( $f$ ), percentages (%), means (M), standard deviations (SD), and ranges were calculated for the various independent variables. Before any inferential statistics were computed, case summaries were examined to screen for data-capturing errors. Boxplots were requested to reveal the presence of outliers. To test whether outliers were significantly influential, Studentized deleted residuals, Cook's distance, and leverage values were assessed. Thereafter, the assumptions of parametric statistics were assessed.

Firstly, univariate normality of the dependent variable distributions was assessed using the Kolmogorov-Smirnov ( $D$ ) test of normality. Base 10 and natural base logarithmic transformations were performed in an attempt to normalise skewed distributions. Secondly, multicollinearity between predictor variables was assessed using the Variance Inflation Factor (VIF) statistic. Thirdly, the assumption of independence of errors was assessed using the Durbin-Watson test. Finally, list-wise deletion of cases with missing values was deemed unsuitable because this would have dramatically reduced the sample size, which may have introduced sampling bias (Du Toit & Du Toit, 2001). Therefore, missing values were replaced with the mean. After that, four linear hierarchical multiple regression analyses were performed – one for each of the four criterion variables.



#### 3.4.1 Predicting Self-reported dietary and fluid adherence

At step 1 in the first linear hierarchical multiple regression analysis, Attitudes towards adherence, Subjective norms, and Perceived behavioural control were entered into the analysis to determine how much variance the TPB could account for in Self-reported dietary and fluid adherence. At step 2, the additional predictor variables of Health literacy and Perceived social support were entered into the analysis to determine whether or not they could explain further variance in Self-reported dietary and fluid adherence.

#### 3.4.2 Predicting Potassium levels

At step 1 in the second linear hierarchical multiple regression analysis, Attitudes towards adherence, Subjective norms, and Perceived behavioural control were entered into the analysis to determine how much variance the TPB could account for in predialytic potassium levels. At step 2, the additional predictor variables of Health literacy and Perceived social support were entered into the analysis to determine whether or not they could explain further variance in predialytic potassium levels.

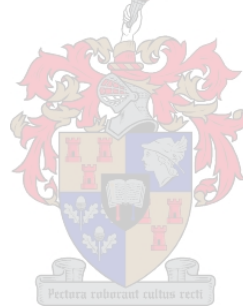
#### 3.4.3 Predicting Phosphate levels

At step 1 in the third linear hierarchical multiple regression analysis, Attitudes towards adherence, Subjective norms, and Perceived behavioural control were entered into the analysis to determine how much variance the TPB could account for in predialytic phosphate levels. At step 2, the additional predictor variables of Health literacy and Perceived social support were entered into the analysis to determine whether or not they could explain further variance in predialytic phosphate levels.

#### 3.4.4 Predicting Interdialytic Weight Gain (IDW)

At step 1 in the fourth linear hierarchical multiple regression analysis, Attitudes towards adherence, Subjective norms, and Perceived behavioural control were entered into the analysis to determine how much variance the TPB could account for in IDW levels. At step 2, the additional predictor variables of Health literacy and Perceived social support were entered into the analysis to determine whether or not they could explain further variance in IDW levels.

The regression analyses described above were performed to indicate how much variance in dietary and fluid adherence could be accounted for by the TPB and to indicate whether the TPB is significantly strengthened by the inclusion of Health literacy and Perceived social support as additional predictor variables.



## CHAPTER 4

### RESULTS

#### 4.1 Demographic characteristics of the sample

Of the 62 participants, 19 (30.6%) were recruited from Tygerberg Hospital and 43 (69.4%) were recruited from Groote Schuur Hospital. The participants were, on average, 40 years of age ( $M = 40.3$ ,  $SD = 9.4$ ), with the youngest participant being 21 years of age and the oldest being 60 years of age. The amount of time spent undergoing hemodialysis by participants ranged from 0.5 a month to 340 months (28.3 years). The majority of the participants were Coloured (64.5%) and Black (19.4%). Therefore, 83.9% (64.5% + 19.4%) of the participants were from a previously disadvantaged background. This increased confidence that the sample was representative of the population of interest. There were more females (58.1%) than males (41.9%) and most of the participants were either single (40.3%) or married (48.4%). Of the participants who had completed high school (29%), only 3.2% had completed some form of tertiary education (a degree or diploma). This result may indicate that many of the participants did not have the financial capacity to study after school. This supposition is supported by the fact that 64.6% of the participants had a household income of R3000 a month or less which needed to financially support three adults ( $M = 3.1$ ,  $SD = 1.5$ ) and one child ( $M = 1.1$ ,  $SD = 1.3$ ) on average. A vast majority of the participants did not suffer from diabetes (80.6%) but many did suffer from hypertension (58.1%). These results are summarised in Table 1.

Table 1

*Demographic Characteristics of the Sample*

	N	f	(%)	M	SD	Range
Hospital	62		(100)			
Tygerberg		19	(30.6)			
Groote Schuur		43	(69.4)			
Age (years)	60		(96.7)	40.3	9.4	21-60
Time on dialysis (months)	56		(90.3)	91.1	87.1	0.5-340
Race	62		(100)			
White		4	(6.5)			
Black		12	(19.4)			
Coloured		40	(64.5)			
Asian		4	(6.5)			
Other		2	(3.2)			
Sex	62		(100)			
Male		26	(41.9)			
Female		36	(58.1)			
Marital status	62		(100)			
Single		25	(40.3)			
Living together		0	(0)			
Married		30	(48.4)			
Divorced		3	(4.8)			
Other		4	(6.5)			
Educational status	59		(95.1)			
Standard 5 or lower		21	(33.9)			
Standard 8		18	(29)			
Standard 10		18	(29)			
Degree or diploma		2	(3.2)			
Adults per household	61		(98.3)	3.1	1.5	1-10

	N	f	(%)	M	SD	Range
Children per household	61		(98.3)	1.1	1.3	0-5
Household income (per month)	51		(82.2)			
Under R1000		20	(32.3)			
R1000-R3000		20	(32.3)			
R4000-R7000		6	(9.7)			
R8000 or higher		5	(8.1)			
Diabetes status	60		(96.7)			
Yes		10	(16.1)			
No		50	(80.6)			
Hypertension status	60		(96.7)			
Yes		36	(58.1)			
No		24	(38.7)			

#### 4.2 Data screening and tests of parametric assumptions

Univariate normality was assessed using the Kolomogorov-Smirnov test of normality (see Table 2). Results indicate that all the dependent variables were normally distributed except for Health literacy,  $D(62) = 0.16$ ,  $p < 0.00$ , and Potassium levels,  $D(62) = 0.11$ ,  $p < 0.05$ . According to Field (2000), possible causes of non-normality include data-capturing errors and non-declared missing values. However, careful examination of case summaries revealed no such errors. Another possible cause of non-normality is the presence of outliers (Field, 2000).

Although boxplots revealed the presence of outliers in both the Health literacy and Potassium levels distributions, the Studentized deleted residuals of each of the individual outliers were small. Also, analyses of Cook's distance for each of the

outliers revealed that none of the outliers were able to exert a significant influence on any of the regression models as a whole. Furthermore, none of the outliers' leverage values exceeded three times the average leverage value for each regression analysis<sup>5</sup>, the cut-off point proposed by Stevens (1992). As a result, the outliers were retained in subsequent analyses.

Base 10 and natural base logarithmic transformations were performed in an attempt to normalise the skewed Potassium levels and Health literacy distributions. The distribution of Potassium levels scores was normalised,  $D(62) = 0.10$ ,  $p = 0.06$ , but the distribution of Health literacy scores remained significantly skewed,  $D(62) = 0.18$ ,  $p < 0.05$ .

Correlations between predictor variables were assessed using the Variance Inflation Factor (VIF) statistic. No VIF values exceeded 10. Therefore, no significant multicollinearity was present (Myers, 1990).

To test the assumption of independence of errors, Durbin-Watson test statistics were computed for all regression analyses. All of the computed values were greater than or equal to 1 and less than or equal to 3 ( $1 \leq x \leq 3$ ) indicating independence of errors (Field, 2000).

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<sup>5</sup> The average leverage value is defined as  $(k+1)/n$  in which  $k$  is the number of predictors in the model and  $n$  is the number of subjects (Field, 2000).

Table 2

*Normality Tests for Dependent Variables*

Variable	Kolmogorov-Smirnov		
	Statistic	df	p
Attitude towards adherence	0.10	62	0.09
Subjective norms	0.08	62	0.20
Perceived behavioural control	0.06	62	0.20
Health literacy	0.16	62	0.00**
Perceived social support	0.10	62	0.18
Self-reported adherence	0.08	62	0.20
Phosphate levels	0.07	62	0.20
Potassium levels	0.11	62	0.04*
Interdialytic Weight Gain	0.07	62	0.20

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

#### 4.3 Internal consistency of measurement instruments constructed for the present study

##### 4.3.1 Subjective norms

A Cronbach alpha reliability coefficient revealed that the measure of Subjective norms had modest internal consistency ( $\alpha = 0.51$ ). However, once item number 4 (“I do not feel guilty if other patients find out that I have not been following my diet properly”) was removed from the analysis, the internal consistency improved ( $\alpha = 0.61$ ). The internal consistency could not be further improved.

#### 4.3.2 Perceived behavioural control

A Cronbach alpha reliability coefficient revealed that the measure of Perceived behavioural control had acceptable internal consistency ( $\alpha = 0.70$ ). Once item number 3 (“following my diet does not require a lot of effort”) was removed from the analysis, the internal consistency improved ( $\alpha = 0.75$ ). The internal consistency could not be further improved.

#### 4.3.3 Health literacy

The internal consistency of the potassium knowledge and knowledge of medical complications associated with potassium non-adherence subscale was modest ( $\alpha = 0.57$ ). However, the internal consistency of the subscale improved once item number 5 (“dried fruit is high in potassium”) was removed from the analysis ( $\alpha = 0.62$ ). The internal consistency of the subscale could not be further improved.

The internal consistency of the phosphate knowledge and knowledge of medical complications associated with phosphate non-adherence subscale was also modest ( $\alpha = 0.57$ ). However, the internal consistency of the subscale improved once item number 8 (“too much phosphate makes my body retain water”) was removed from the analysis ( $\alpha = 0.65$ ). The internal consistency of the subscale could not be improved any further.

The fluid knowledge and knowledge of medical complications associated with fluid non-adherence subscale was fairly consistent ( $\alpha = 0.65$ ). The internal consistency of the subscale could not be improved by removing any items.



#### 4.4 Demographic variables

Pearson product-moment correlation coefficients were calculated to determine the nature of any relationships between age and Self-reported adherence, age and Phosphate levels, age and Potassium levels, as well as age and IDW.

Multivariate Analysis of Variance (MANOVA) tests were performed to assess whether or not there were significant race, gender, or marital status differences in Self-reported adherence, Phosphate levels, Potassium levels, or IDW. MANOVA tests were performed as omnibus tests followed by one-way Analysis of Variance (ANOVA) tests or independent samples t-tests in order to reduce familywise error rates<sup>6</sup>.

##### 4.4.1 Age

No significant correlations were found between age and Self-reported adherence ( $r = 0.15$ ,  $p = 0.32$ ), between age and Phosphate levels ( $r = -0.01$ ,  $p = 0.92$ ), between age and Potassium levels ( $r = 0.02$ ,  $p = 0.82$ ), or between age and IDW ( $r = -0.11$ ,  $p = 0.37$ ).

##### 4.4.2 Race

No significant race differences were found,  $\Lambda = 0.70$ ,  $F(16, 165) = 1.25$ ,  $p = 0.22$ . Separate one-way Analysis of Variance (ANOVA) tests confirmed this finding.

##### 4.4.3 Gender

The omnibus test statistic revealed the presence of a gender difference in IDW,  $\Lambda = 0.73$ ,  $F(4, 57) = 5.09$ ,  $p = 0.00$ . Thereafter, an independent samples t-test was performed which confirmed a gender difference in IDW. Males ( $M = 2.68$ ,  $SD = 0.67$ ) had significantly higher IDW than females ( $M = 2.09$ ,  $SD = 0.51$ ),  $t(60) = 3.96$ ,

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<sup>6</sup> The probability that a family of comparisons contains at least one Type I error (Howell, 2004).

$p = 0.00$ . This finding indicates that males were significantly more non-adherent with fluid restrictions than women. No other significant gender differences in terms of adherence were found.

#### 4.4.4 Marital status

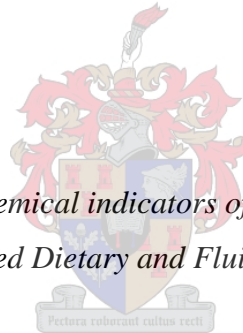
With regard to marital status, no significant differences were found,  $\Lambda = 0.78$ ,  $F(12, 145) = 1.14$ ,  $p = 0.32$ . Separate one-way ANOVA tests confirmed this finding.

#### 4.5 Intercorrelations between Phosphate levels, Potassium levels, IDW, and Self-reported adherence

No significant correlations were found between Phosphate levels, Potassium levels, IDW, and Self-reported dietary and fluid adherence (see Table 3).

Table 3

*Intercorrelations Between Biochemical indicators of Dietary and Fluid Adherence and Self-reported Dietary and Fluid Adherence*



	Phosphate levels	Potassium levels	IDW	Self-reported adherence
Phosphate levels	1			
Potassium levels	0.23	1		
IDW	0.20	0.21	1	
Self-reported adherence	-0.02	0.15	-0.05	1

#### 4.6 Predicting Self-reported adherence

In the first hierarchical multiple regression analysis (see Table 4), Attitude towards adherence,  $\beta = 0.13$ ,  $t(61) = 0.85$ ,  $p = 0.39$ , Subjective norms,  $\beta = 0.01$ ,  $t(61) = 0.09$ ,  $p = 0.92$ , and Perceived Behavioural control,  $\beta = 0.30$ ,  $t(61) = 1.94$ ,  $p = 0.04$ , were entered together in the first step and could significantly account for 15.5% ( $R^2 = 0.15$ ) of the variance in Self-reported dietary and fluid adherence,  $F(3, 58) = 3.54$ ,  $p = 0.02$ . Furthermore, Perceived behavioural control was able to significantly explain 5.5% ( $sr = 0.23$ ) of the variance in Self-reported dietary and fluid adherence when the effects of Attitude towards adherence and Subjective norms were held constant. In the second step, Health literacy,  $\beta = -0.15$ ,  $t(61) = -1.30$ ,  $p = 0.19$ , and Perceived social support,  $\beta = 0.17$ ,  $t(61) = 1.38$ ,  $p = 0.17$ , were added to Attitude towards adherence,  $\beta = 0.10$ ,  $t(61) = 0.38$ ,  $p = 0.70$ , Subjective norms,  $\beta = -0.06$ ,  $t(61) = -0.33$ ,  $p = 0.74$ , and Perceived behavioural control,  $\beta = 0.30$ ,  $t(61) = 2.09$ ,  $p = 0.04$ . The second step significantly explained 20.7% ( $R^2 = 0.20$ ) of the variance in Self-reported dietary and fluid adherence,  $F(3, 56) = 2.91$ ,  $p = 0.02$ . Moreover, Perceived behavioural control was able to significantly account for 5.5% ( $sr = 0.23$ ) of the variance in Self-reported dietary and fluid adherence when the effects of Attitude towards adherence, Subjective norms, and Perceived social support were held constant.

Table 4

*Summary of Hierarchical Multiple Regression  
Analysis for Variables Predicting Self-reported  
Adherence (N = 62)*

Step and predictor variable	R <sup>2</sup>	ΔR <sup>2</sup>	sr	β	p
Step 1	0.15	0.15			0.02*
Attitude towards adherence			0.10	0.13	0.39
Subjective norms			0.01	0.01	0.92
Perceived behavioural control			0.23	0.30	0.04*
Step 2	0.20	0.05			0.02*
Attitude towards adherence			0.07	0.10	0.70
Subjective norms			-0.05	-0.06	0.74
Perceived behavioural control			0.23	0.30	0.04*
Health literacy			-0.15	-0.15	0.19
Perceived social support			0.15	0.17	0.17

\*p < 0.05

#### 4.7 Predicting Potassium levels

In the second hierarchical multiple regression analysis (see Table 5), Attitude towards adherence,  $\beta = 0.23$ ,  $t(61) = 1.41$ ,  $p = 0.16$ , Subjective norms,  $\beta = -0.08$ ,  $t(61) = -0.59$ ,  $p = 0.55$ , and Perceived Behavioural control,  $\beta = -0.22$ ,  $t(61) = -1.37$ ,  $p = 0.17$ , were entered together in the first step but could not explain significant variance in Potassium levels,  $F(3, 58) = 0.80$ ,  $p = 0.49$ . Health literacy,  $\beta = -0.04$ ,  $t(61) = -0.30$ ,  $p = 0.76$ , and Perceived social support,  $\beta = 0.09$ ,  $t(61) = 0.64$ ,  $p = 0.52$ , were added to

Attitude towards adherence,  $\beta = 0.20$ ,  $t(61) = 1.15$ ,  $p = 0.25$ , Subjective norms,  $\beta = -0.11$ ,  $t(61) = -0.79$ ,  $p = 0.43$ , and Perceived behavioural control,  $\beta = -0.22$ ,  $t(61) = -1.29$ ,  $p = 0.19$ , in the second step. However, this step also failed to explain significant variance in Potassium levels,  $F(5, 56) = 0.57$ ,  $p = 0.71$ .

Table 5

*Summary of Hierarchical Multiple Regression  
Analysis for Variables Predicting Potassium levels (N = 62)*

Step and predictor variable	R <sup>2</sup>	$\Delta R^2$	sr	$\beta$	p
Step 1	0.04	0.04			0.49
Attitude towards adherence			0.18	0.23	0.16
Subjective norms			-0.07	-0.08	0.55
Perceived behavioural control			-0.17	-0.22	0.17
Step 2	0.04	0.00			0.71
Attitude towards adherence			0.15	0.20	0.25
Subjective norms			-0.10	-0.11	0.43
Perceived behavioural control			-0.16	-0.22	0.19
Health literacy			-0.03	-0.04	0.76
Perceived social support			0.08	0.09	0.52

#### 4.8 Predicting Phosphate levels

In the third hierarchical multiple regression analysis (see Table 6), Attitude towards adherence,  $\beta = -0.11$ ,  $t(61) = -0.69$ ,  $p = 0.49$ , Subjective norms,  $\beta = 0.04$ ,  $t(61) = 0.28$ ,  $p = 0.77$ , and Perceived Behavioural control,  $\beta = 0.01$ ,  $t(61) = 0.10$ ,  $p =$

0.91, were entered together in the first step but could not explain significant variance in Phosphate levels,  $F(3, 58) = 0.22$ ,  $p = 0.87$ . Health literacy,  $\beta = 0.08$ ,  $t(61) = 0.63$ ,  $p = 0.52$ , and Perceived social support,  $\beta = 0.32$ ,  $t(61) = 2.25$ ,  $p = 0.02$ , were added to Attitude towards adherence,  $\beta = -0.25$ ,  $t(61) = -1.46$ ,  $p = 0.14$ , Subjective norms,  $\beta = -0.04$ ,  $t(61) = -0.30$ ,  $p = 0.76$ , and Perceived behavioural control,  $\beta = 0.06$ ,  $t(61) = 0.38$ ,  $p = 0.70$ , in the second step. Although this step also failed to explain significant variance in Potassium levels,  $F(5, 56) = 1.21$ ,  $p = 0.31$ , Perceived social support was able to explain 8.1% ( $sr = 0.28$ ) of the variance in Phosphate levels when the effects of Attitude towards adherence, Subjective norms, Perceived behavioural control, and Health literacy were held constant.

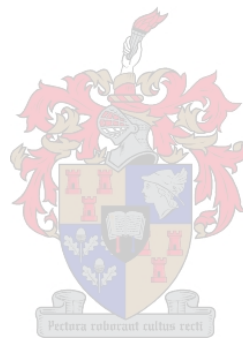


Table 6

*Summary of Hierarchical Multiple Regression**Analysis for Variables Predicting Phosphate levels (N = 62)*

Variable	R <sup>2</sup>	ΔR <sup>2</sup>	sr	β	p
Step 1	0.01	0.01			0.87
Attitude towards adherence			-0.09	-0.11	0.49
Subjective norms			0.03	0.04	0.77
Perceived behavioural control			0.01	0.01	0.91
Step 2	0.09	0.08			0.31
Attitude towards adherence			-0.18	-0.25	0.14
Subjective norms			-0.03	-0.04	0.76
Perceived behavioural control			0.04	0.06	0.70
Health literacy			0.08	0.08	0.52
Perceived social support			0.28	0.32	0.02*

\* p &lt; 0.05

## 4.9 Predicting Interdialytic Weight Gain (IDW)

In the fourth hierarchical multiple regression analysis (see Table 7), Attitude towards adherence,  $\beta = -0.21$ ,  $t(61) = -1.37$ ,  $p = 0.17$ , Subjective norms,  $\beta = 0.02$ ,  $t(61) = 0.15$ ,  $p = 0.87$ , and Perceived Behavioural control,  $\beta = -0.16$ ,  $t(61) = -1.01$ ,  $p = 0.31$ , were entered together in the first step but could not explain significant variance in IDW levels,  $F(3, 58) = 2.50$ ,  $p = 0.07$ . Health literacy,  $\beta = 0.13$ ,  $t(61) = 1.09$ ,  $p = 0.27$ , and Perceived social support,  $\beta = 0.16$ ,  $t(61) = 1.20$ ,  $p = 0.23$ , were added to Attitude towards adherence,  $\beta = -0.31$ ,  $t(61) = -1.84$ ,  $p = 0.07$ , Subjective norms,  $\beta =$

-0.00,  $t(61) = -0.05$ ,  $p = 0.95$ , and Perceived behavioural control,  $\beta = -0.12$ ,  $t(61) = -0.80$ ,  $p = 0.42$ , in the second step. However, this step also failed to explain significant variance in IDW levels,  $F(5, 56) = 2.02$ ,  $p = 0.09$ .

Table 7

*Summary of Hierarchical Multiple Regression  
Analysis for Variables Predicting IDW (N = 62)*

Variable	R <sup>2</sup>	ΔR <sup>2</sup>	sr	β	p
Step 1	0.11	0.11			0.07
Attitude towards adherence			-0.17	-0.21	0.17
Subjective norms			0.01	0.02	0.87
Perceived behavioural control			-0.12	-0.16	0.31
Step 2	0.15	0.03			0.09
Attitude towards adherence			-0.22	-0.31	0.07
Subjective norms			-0.00	-0.00	0.95
Perceived behavioural control			-0.09	-0.12	0.42
Health literacy			0.13	0.13	0.27
Perceived social support			0.14	0.16	0.23



## CHAPTER 5

### DISCUSSION AND CONCLUSION

#### 5.1 Predicting dietary and fluid adherence in hemodialysis

The first objective of the present study was to determine whether the TPB could predict dietary and fluid adherence among in-centre hemodialysis patients attending government hospitals in the Western Cape. The TPB has been used to assess a variety of health-related behaviours such as clinical glove use (e.g.: Watson & Myers, 2001) and testicular self-examination (e.g.: Brubaker & Wickersham, 1990). It has also been used successfully to predict treatment adherence in various populations. For example, the TPB was able to significantly explain 65% of the variance in psychiatric patients' intentions to adhere with prescribed medication (Conner et al., 1998) and was able to significantly explain 63.7% of the variance in intentions to consume a low-fat diet (Povey et al., 2000).

With regard to the present study, the TPB was able to significantly explain 15.5% of the variance in Self-reported dietary and fluid adherence. Furthermore, Perceived behavioural control was able to significantly explain 5.5% of the variance in Self-reported dietary and fluid adherence when the effects of Attitude towards adherence and Subjective norms were held constant. When Health literacy and Perceived social support were added to the TPB, the model significantly explained 20.7% of the variance in Self-reported dietary and fluid adherence. Once again, Perceived behavioural control significantly accounted for 5.5% of the variance when the effects of Attitude towards adherence, Subjective norms, Health literacy, and Perceived social support were held constant. The TPB was unable, however, to significantly account for variance in the biochemical indicators of dietary adherence (Phosphate levels and Potassium levels) or fluid adherence (IDW).

One major criticism of the TPB is that although the theory incorporates individuals' representations of their social world by measuring normative beliefs, it still assumes that individuals are rational information processors (Ogden, 2000). Consequently, adherence to dietary and fluid restrictions is assumed to result largely from a rational weighing up of the potential costs and benefits of adhering. However, socioeconomic barriers (that surpass rational decision-making) often prohibit adherence to treatment regimens. According to Kagee, Dick, and LeRoux (2005, p.6):

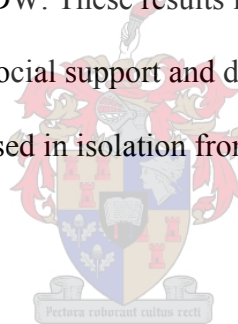
poverty in itself is likely to affect adherence as financial resources may need to be directed elsewhere, funds for travel to [hemodialysis sessions] may not be available, and child-care may not be readily accessible. The competing demands of several responsibilities such as work or family life, along with and the stresses associated with poverty and difficult life circumstances, obviate an acknowledgement of the importance of complying with treatment regimens.

## 5.2 Health literacy as a predictor of dietary and fluid adherence in hemodialysis

Although much evidence suggests that knowledge of one's treatment regimen is an important predictor of adherence (Anderson et al., 1993; Herek et al., 1990; Schlatter & Ferrans, 1998), Health literacy did not predict variance in Self-reported adherence, Potassium levels, Phosphate levels, or IDW. This finding that Health literacy is not predictive of dietary and fluid adherence is congruent with those of Cummings et al. (1982) and Durose et al. (2004). The distribution of Health literacy scores were significantly negatively skewed even after the distribution of scores were transformed using base 10 and natural base logarithmic transformations. The subsequent non-normality of the distribution of Health literacy scores may have resulted in poor external validity which may have contributed to the null findings.

### 5.3 Perceived social support as a predictor of dietary and fluid adherence in hemodialysis

Perceived social support was able to significantly account for 8.1% of the variance in Phosphate levels when the effects of Attitude towards adherence, Subjective norms, Perceived behavioural control, and Health literacy were held constant. The finding that Perceived social support is a significant predictor of variance in Phosphate levels is congruent with those of Christensen et al. (1992), Boyer et al. (1990), Kulik and Mahler (1993), O'Brien (1980), as well as Sherwood (1983). Analogous to findings of Cummings et al. (1982) as well as Hitchcock et al. (1992), Perceived social support did not, however, predict variance in Self-reported adherence, Potassium levels or IDW. These results indicate that the nature of the relationship between Perceived social support and dietary and fluid adherence is complex and should not be assessed in isolation from other social determinants on behaviour.



### 5.4 Social capital

Recently, much attention has been given to the concept of 'social capital'. Social capital refers to civic engagement in local community networks that generate increased levels of trust between community members, reciprocal help and support between community members, and positive local identities (Campbell, 2003). Therefore, communities rich in social capital may provide an integrative framework for conceptualizing those features of a community that are most likely to enable and support health-enhancing behaviours such as adherence to treatment regimens (Campbell, 2003).

A critical conceptualization of social capital takes into account the patriarchal relationship between marginalized local communities and more powerful groups such

as the public health care system (Campbell, 2003). As a result, disadvantaged communities are given agency and may feel empowered and more in control of their own health outcomes. As previously mentioned, strong perceptions of behavioural control have been shown to be positively correlated with health-enhancing behaviour such as treatment adherence (e.g.: Brady et al., 1997; Christensen et al., 1996; Eitel et al., 1998).

#### 5.5 The lack of association between Self-reported adherence and biochemical indicators of adherence

There were no significant correlations between any of the biochemical measures of dietary and fluid adherence and Self-reported dietary and fluid adherence. The lack of association between self-report measures of dietary and fluid adherence and biochemical indicators of dietary and fluid adherence is well documented (e.g.: Armitage & Conner, 1999a, 1999b; Loghman-Adham, 2003; Norwich & Rovoli, 1993; Pellino, 1997) and suggests that dietary and fluid adherence is multifaceted and its measurement therefore complex.

A possible reason for the lack of association may be the present study did not control for length of time of dialysis per hemodialysis session of each participant. As a result, a participant who was dialysed for longer periods of time per session relative to other participants may falsely appear to be more adherent with dietary and fluid restrictions. A further reason may be that while some participants completed their battery of questionnaires independently, other participants had their battery of questionnaires read to them. Their responses were ticked off by the researcher or a research assistant which may have resulted in response bias due to social desirability responding. Finally, there may have been natural fluctuations between patients in Potassium levels, Phosphate levels, and IDW that were not of direct consequence of

dietary and fluid non-adherence. To this end, there may be a curvilinear relationship between biochemical indicators of dietary and fluid adherence and actual dietary and fluid adherence.

## 5.6 Demographic characteristics

### 5.6.1 Age

While it has been previously reported that younger patients are more likely than older patients to be non-adherent with dietary and fluid restrictions (Bame et al., 1993; Boyer et al., 1990; Brown & Fitzpatrick, 1988; Hailey & Moss, 2000; Kutner et al., 2002; Ifudu et al., 1996; Leggat et al., 1998), the results of the present study indicate that age is not related to dietary and fluid adherence. This finding is congruent with the findings of Hitchcock et al. (1992) as well as Kaveh and Kimmel (2001).

The null finding suggests that the relationship between age and adherence may be complex and multifaceted. For example, age correlated significantly with Perceived behavioural control ( $r = 0.43$ ,  $p = 0.00$ ) suggesting that older patients experience stronger perceptions of behavioural control regarding their dietary and fluid adherence. This finding supports the findings of Brady et al. (1997) who also found that Perceived behavioural control was significantly related to adherence. However, as previously discussed, Perceived behavioural control did not account for significant variance in any of the biochemical indicators of dietary and fluid adherence in the present study. Therefore, the lack of association between Perceived behavioural control and adherence may be confounding the relationship between age and adherence.

### 5.6.2 Race

Previous studies report that African Americans are more likely than either Whites or Asians to be non-adherent (Bame et al., 1993; Boyer et al., 1990; Curtin et al., 1999; Kutner et al., 2002; Leggat et al., 1998). The results of the present study indicate no racial differences in terms of adherence to dietary and fluid restrictions. The null findings may, in part, be a result of disproportionately low numbers of White, African American, and Asian participants relative to Coloured participants. Therefore, the MANOVA performed to assess for significant between-group differences may have been underpowered, resulting in an increased probability of Type II errors.

### 5.6.3 Socioeconomic status

Considerable evidence suggests that lower income patients are more likely than higher income patients to be non-adherent (Bame et al., 1993; Brownbridge & Fielding, 1994; Kutner et al., 2002). However, the present study found that household income was unrelated to Phosphate levels, Potassium levels, or IDW.

A large majority of the participants (82.2%) had a household income of less than R4000 per month. Considering also that each household (on average) had three adult dependents ( $M = 3.1$ ,  $SD = 1.5$ ) and one child dependent ( $M = 1.1$ ,  $SD = 1.3$ ), the majority of participants can be considered to be of low income. Therefore, higher income patients may have been under-represented, resulting in a positively skewed distribution. The skewed distribution may have contributed to the null findings.

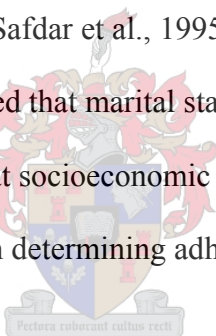
### 5.6.4 Gender

The present study found that men had significantly higher IDW than females. As high IDW is indicative of high fluid intake, women were more adherent with fluid

restrictions than men. This finding is congruent with those of Bame et al. (1993) as well as Ifudu et al. (1996). One reason for women being more adherent with fluid restrictions than men may be that women typically have lower blood volumes and subsequently do not become dehydrated as quickly as men (Chan et al., 2002). Furthermore, evidence suggests that women regulate their body temperatures at lower sweat rates and subsequently require less fluid (Chan et al., 2002). The warm South African climate may have exacerbated these possible reasons.

#### 5.6.5 Marital status

It has been well documented that married patients are more adherent with dietary and fluid restrictions than non-married patients (e.g.: Bame et al., 1993; Boyer et al., 1990; De Geest et al., 1995; Safdar et al., 1995; Somer & Tucker, 1992). However, the present study indicated that marital status was not a significant predictor of adherence. It seems therefore that socioeconomic barriers, such as poverty and unemployment, play a larger role in determining adherence to dietary and fluid restrictions than spousal support.



#### 5.7 Implications and social relevance

The findings of the present study suggest that interventions aimed at improving dietary and fluid adherence among in-centre hemodialysis patients attending government hospitals in the Western Cape should aim to promote positive attitudes towards dietary and fluid adherence among patients, should aim to increase normative pressure and motivate patients to comply with this pressure, should aim to increase patients' perceptions of their own capacity to be adherent with the dietary and fluid restrictions, should aim to increase patients' perception of social support and increase patients' knowledge of their diet and of the medical consequences of dietary

and fluid non-adherence. Improved dietary and fluid adherence among hemodialysis patients is likely to result in the reduced incidence of medical complications associated with dietary and fluid non-adherence and subsequently reduce the ESRD mortality rate.

#### 5.8 Limitations and directions for future research

Firstly, Stevens (1992) states that a minimum of fifteen participants per predictor variable are required to yield sufficient power in multiple regression analyses. At step one of each of the hierarchical multiple regression analyses, the three components of the TPB were entered as predictor variables. Therefore, the data obtained from the sixty-two participants in the present study's sample were able to derive enough power. However, at step two of each of the hierarchical multiple regression analyses, the three components of the TPB as well as the additional predictor variables of Health literacy and Perceived behavioural control were entered together requiring seventy-five participants to yield sufficient power. The shortage of participants poses the possibility of inadequate power to support the regression analyses.

Secondly, the Health literacy distribution of scores was significantly skewed even after performing a base 10 and natural base logarithmic transformation. The lack of normality violates a critical assumption of regression analysis and other parametric procedures employed in the present study. Consequently, the extent to which the derived sample statistics can be generalized to the associated population parameters is uncertain.

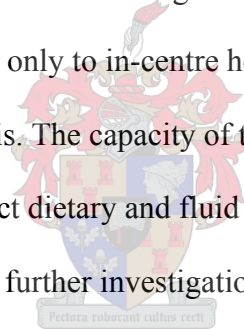
Thirdly, a possible reason for the many null findings may be a lack of variability in subjects' responses on the Likert scales. Many participants reported anecdotally that they were unsure as to differences between response categories such



as “strongly agree” and “agree”. Likert responses mimic school examination conditions but owing to the fact that many of the participants have been out of school for several years, the Likert responses categories are likely to have been difficult for the participants to answer. Therefore, future research should consider supplementing qualitative interviews with quantitative methods.

Finally, future studies should assess possible correlates of dietary and fluid non-adherence that were not addressed in this study. Among these are quality of life (Christensen & Ehlers, 2002), depression (Kimmel, 2002), patient dissatisfaction with dialysis care (Kutner et al., 2002), and absence of symptoms (Logham-Adham, 2003).

To qualify the findings of the present study, the sample of patients surveyed were willing participators who were well enough to participate. Furthermore, the results of the present study apply only to in-centre hemodialysis patients, not ESRD patients undergoing home dialysis. The capacity of the TPB, Health literacy, and Perceived social support to predict dietary and fluid adherence in hemodialysis within the South African context awaits further investigation.



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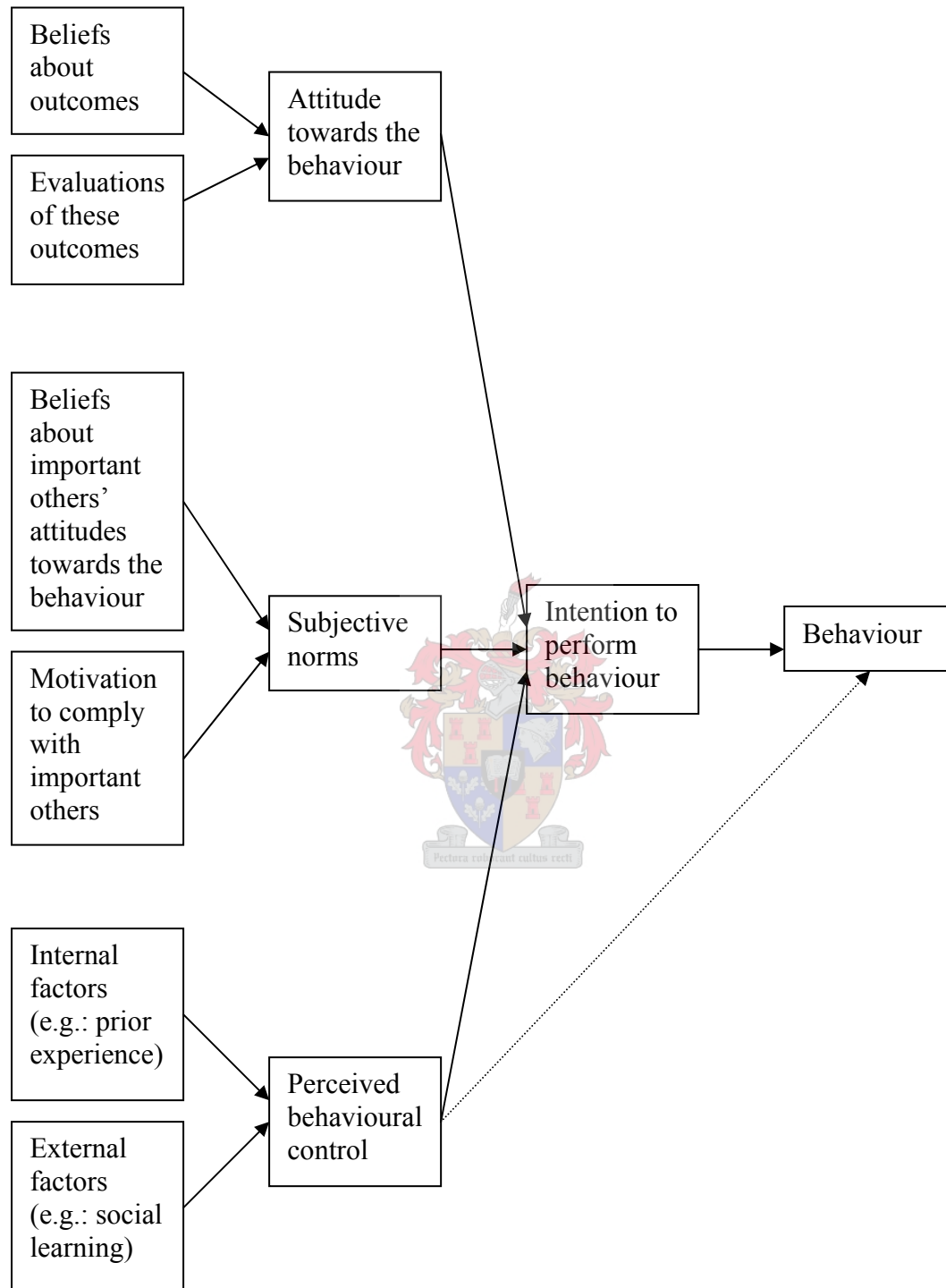
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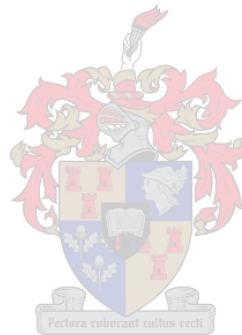
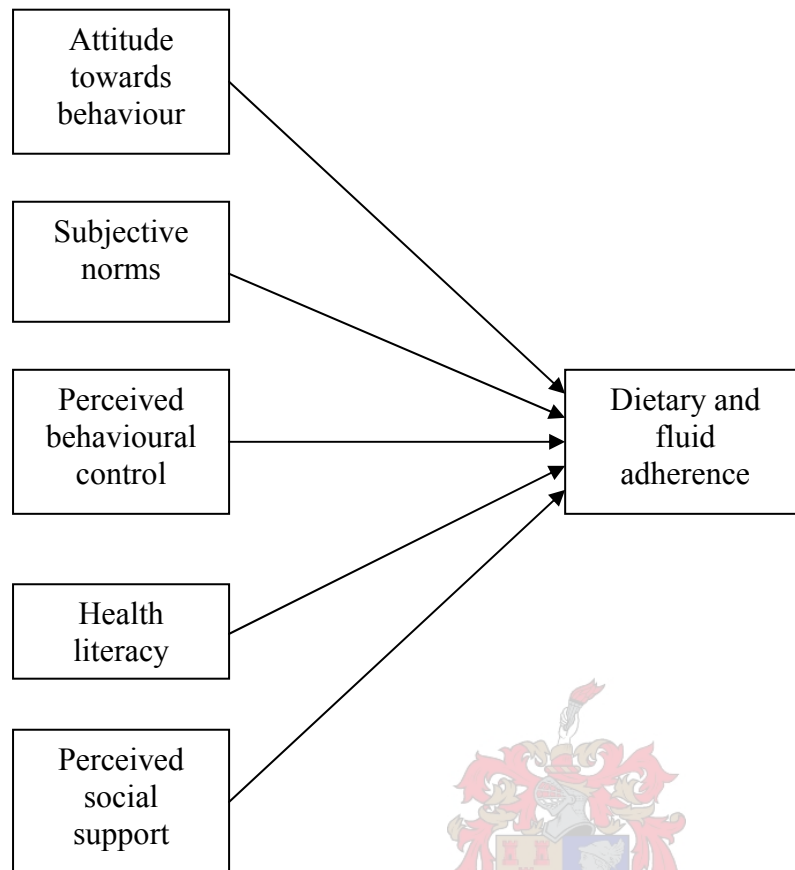


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## APPENDIX A



**APPENDIX B**

## APPENDIX C

### STELLENBOSCH UNIVERSITY

Dylan Fincham, Principal Investigator  
Department of Psychology  
Telephone Number: 083 402 2675

### CONSENT FORM

#### Dietary and fluid adherence among in-centre hemodialysis patients

##### INVITATION TO PARTICIPATE

You are being asked to take part in this research study because you have been identified as a patient suffering from kidney disease who is undergoing hemodialysis. Patients with this condition are the focus of this study.

##### PURPOSE

The purpose of this research is to understand the psychological and behavioural influences on nutrition and fluid intake among hemodialysis patients.

##### PROCEDURES

As a participant, you will be part of the study and asked to complete a questionnaire packet asking about your attitude towards your dietary and fluid restrictions, your knowledge of your diet and possible medical consequences of not following your diet and drinking too much fluid, and the support you receive from loved ones. Information from your medical records will also be made available.

##### RISKS

Some of the questions on the questionnaires you will be completing may touch on sensitive areas. However, every effort will be made to minimize your discomfort. Should you feel distressed as a direct result of taking part in the study, a referral to a psychotherapist will be made. You are encouraged to discuss with the researchers and/or coordinator any negative or difficult feelings or experiences you have as a result of taking part in this research project. *If at anytime you feel you would like to stop taking part in the research study you will be free to do so.*

##### COSTS AND FINANCIAL RISKS

There are no financial costs directly associated with taking part in this project.

##### BENEFITS

There is no guarantee that you will benefit directly from the study. However, it is believed that it is important to understand why hemodialysis patients eat food they should not and drink too much fluid.

##### COMPENSATION

By agreeing to take part in this research study, you will be compensated with R20 for traveling costs.

**ALTERNATIVES**

Participation in this research project is entirely voluntary and you may choose not to take part.

**CONFIDENTIALITY**

Every attempt will be made to keep all information collected in this study strictly confidential, except as may be required by court order or by law. If any publication results from this research, you will not be identified by name.

**ADDITIONAL INFORMATION**

Your participation in this study is completely voluntary, and you are free to refuse to take part. You may stop taking part at any time without your treatment being effected in any way or putting at risk the future care either of yourself or your family members. If you stop taking part in the project, you may ask that we not use the information already given us. You are encouraged to ask questions about the study at any time as they occur to you during the programme. Any important new findings developed during the course of the study that may relate to your willingness to continue taking part will be given to you.

**DISCLAIMER/ WITHDRAWAL**

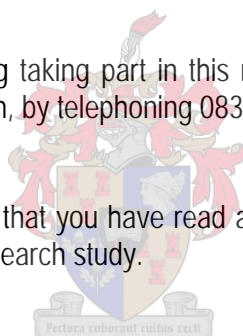
You agree that taking part in this study is completely voluntary and that you may stop at any time without prejudicing your standing within Groote Schuur Hospital.

**SUBJECT RIGHTS**

If you have any questions regarding taking part in this research study, you may contact the Principal Investigator, Dylan Fincham, by telephoning 083 402 2675.

**CONCLUSION**

By signing below you are indicating that you have read and understood the consent form and that you agree to take part in this research study.



\_\_\_\_\_

Subject's signature

\_\_\_\_\_

Date

\_\_\_\_\_

Interviewer's signature

\_\_\_\_\_

Date

\_\_\_\_\_

Witness's signature

\_\_\_\_\_

Date

## UNIVERSITEIT STELLENBOSCH

Dylan Fincham, Hoofnavorsers  
Departement Sielkunde  
Kontaknommer: 083 402 2675

### TOESTEMMINGSVORM

#### Dieet- en vloeistofinname-getrouheid onder interne hemodialise-pasiënte

#### UITNODIGING OM DEEL TE NEEM

Jy is genader om aan hierdie navorsingstudie deel te neem omdat jy geïdentifiseer is as 'n nierpasient wat tans hemodialise ondergaan. Pasiënte met dié toestand is die fokus van hierdie studie.

#### DOEL

Die doel van hierdie navorsing is om die sielkundige en gedragsinvloede op die voedsel- en vloeistofinname van hemodialise-pasiënte te verstaan.

#### PROSEDURE

As deelnemer aan die studie sal jy vraelyste moet beantwoord oor jou houding teenoor jou dieet- en vloeistofbeperkings, jou kennis van jou dieet, maontlike mediese gevolge as jy nie jou dieet volg nie en te veel vloeistof inneem, en die ondersteuning wat jy van geliefdes ontvang. Inligting uit jou mediese rekords sal ook beskikbaar gestel word.

#### RISIKO'S

Sommige vrae in die vraelyste kan sensitiewe kwessies aanraak. Alles maontlik sal egter gedoen word om jou ongemak tot 'n minimum te beperk. Indien jy as 'n direkte gevolg van jou deelname aan die studie angstig voel, sal jy na 'n psigoterapeut verwys word. Bespreek gerus met die navorsers en/of koördineerder enige negatiewe of moeilike emosies of ervarings wat jy ervaar as gevolg van jou deelname aan hierdie navorsingsprojek. *Indien jy te eniger tyd voel dat jy nie meer aan die navorsingstudie wil deelneem nie, staan dit jou vry om op te hou.*

#### KOSTE EN FINANSIËLE RISIKO'S

Daar is geen finansiële koste wat direk met deelname aan hierdie projek geassosieer word nie.

#### VOORDELE

Daar is geen waarborg dat jy direk by hierdie studie sal baat vind nie. Daar word egter geglo dat dit belangrik is om te verstaan hoekom hemodialise-pasiënte kos eet wat hulle nie mag nie, en te veel vloeistof inneem.

#### VERGOEDING

Deur in te stem om aan hierdie navorsingstudie deel te neem, sal jy met R20 vergoed geword.

#### VRYWILLIGHEID

Deelname aan hierdie navorsingsprojek is heeltemal vrywillig; jy kan kies om nie deel te neem nie.

**VERTROULIKHEID**

Elke moontlike poging sal aangewend word om alle inligting wat in hierdie studie ingewin word streng vertroulik te hou, tensy 'n hofbevel of wetsbepaling die inligting vereis. Indien hierdie navorsing tot enige publikasie sou lei, sal jou naam nie bekend gemaak word nie.

**BYKOMENDE INLIGTING**

Jou deelname aan hierdie studie is heeltemal vrywillig, en dit staan jou vry om te weier om deel te neem. Jy kan te eniger tyd ophou deelneem sonder dat jou behandeling op enige manier beïnvloed word, of jou of jou gesinslede se toekomstige mediese sorg benadeel word. Indien jy ophou om aan die projek deel te neem, kan jy vra dat ons nie die inligting wat ons reeds ontvang het, gebruik nie. Vra gerus te eniger tyd vrae oor die studie wat tydens die program by jou opkom. Enige belangrike nuwe bevindinge in die loop van die studie wat verband kan hou met jou bereidwilligheid om steeds deel te neem, sal aan jou bekend gemaak word.

**VRYWARING/ONTTREKKING**

Jy stem daartoe in dat deelname aan hierdie studie heeltemal vrywillig is, en dat jy te eniger tyd kan ophou sonder om jou posisie by Groote Schuur-hospitaal te benadeel.

**DEELNEMERREGTE**

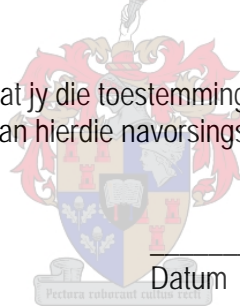
Indien jy enige vrae het oor deelname aan hierdie navorsingstudie, kan jy die hoofnavorsers, Dylan Fincham, by selfoonnommer 083 402 2675 skakel.

**GEVOLGTREKKING**

Deur hieronder te teken, dui jy aan dat jy die toestemmingsvorm gelees het en verstaan, en dat jy daartoe instem om deel te neem aan hierdie navorsingstudie.

\_\_\_\_\_

Handtekening van deelnemer



\_\_\_\_\_

Datum

\_\_\_\_\_

Handtekening van onderhoudvoerder

\_\_\_\_\_

Datum

\_\_\_\_\_

Handtekening van getuie

\_\_\_\_\_

Datum



## APPENDIX D

**INSTRUCTIONS:** Please put an '**X**' in the appropriate block. **Please answer all the questions.** Choose only **ONE** answer for each question. Thank you very much for your cooperation!

**INSTRUKSIES:** Plaas asseblief 'n '**X**' in die blok wat van toepassing is. **Beantwoord asseblief al die vrae.** Kies net **EEN** antwoord by elke vraag. Baie dankie vir jou samewerking!

	Strongly Agree/ Stem Sterk Saam	Agree/ Stem Saam	Disagree/ Verskil	Strongly Disagree/ Verskil Sterk
1. My diet fits into my lifestyle: <i>My dieet pas in by my lewenstyl:</i>				
2. Patients should make up their own minds regarding their diet: <i>Pasiente moet hulle eie besluite neem met betrekking tot hulle dieet:</i>				
3. Restricting my fluid intake is vital for my physical well-being: <i>Om my vloeistel inname beperk is lewensbelangrik vir my fisiese welstand:</i>				
4. My diet prevents me from enjoying social functions: <i>My dieet keer my om sosiale funksies te geniet:</i>				
5. The doctor is overly concerned with fluid: <i>Die dokter is te bekommerd oor vloeistof:</i>				
6. I can feel the benefits of my diet: <i>Ek voel die voordele van my dieet:</i>				

	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
7. I am able to drink fluids today like I have always done: <i>Ek is vandag soos altyd instoot om vloeistof te drink:</i>				
8. I worry about gaining weight because of my diet: <i>Ek is bekommerd om gewig op te tel as gevolg van my dieet:</i>				
9. My doctor is overly concerned with food: <i>My dokter is te bekommerd oor kos:</i>				
10. My diet becomes easier to follow over time: Met verloop van tyd vind ek dit makliker om by my dieet te kom:				
11. I do not feel the benefits of my diet: <i>Ek ervaar nie die voordele van my dieet nie:</i>				
12. I do not worry about gaining weight because of my diet: <i>Ek bekommer my nie om gewig op te tel as gevolg van my dieet nie:</i>				
13. I feel the benefits of restricting salt: <i>Ek voel die voordele om sout te beperk:</i>				
14. My diet makes me feel better: <i>My dieet laat my beter voel:</i>				

	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
15. Restricting fluids prevents me from enjoying myself: <i>Die beperking van vloeistof keer my om myself te geniet:</i>				
16. My diet is too much trouble: <i>My dieet is te veel moeilikheid:</i>				
17. My diet severely disrupts my life: <i>My dieet ontwrig my lewe ernstig:</i>				
18. My diet is expensive: <i>My dieet is duur:</i>				
19. My diet has no impact on my social life: <i>My dieet het geen impak nie op my sosiale lewe:</i>				
20. It is important to me that my family and friends help me with my diet: <i>Dit is vir my belangrik dat my familie en vriende my help met my dieet:</i>				
21. Breaking my diet isn't bad for me: <i>'n Onderbreking in my dieet is nie sleg vir my nie:</i>				
22. I just cannot accept having to restrict what I eat: <i>Ek kan net nie die beperkinge in my dieet aanvaar nie:</i>				

	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
23. Over time, my diet becomes more difficult: <i>My dieet word mettertyd al hoe moeiliker:</i>				
24. I feel guilty when I break my diet: <i>Ek voel skuldig wanneer ek my dieet onderbreek:</i>				
25. My diet fits easily into my life: <i>My dieet pas maklik aan by my lewe:</i>				
26. I am frustrated because of my diet: <i>Ek is gefrusteer as gevolg van my dieet:</i>				



## APPENDIX E

	Strongly Agree/ Stem Sterk Saam	Agree/ Stem Saam	Disagree/ Verskil	Strongly Disagree/ Verskil Sterk
1. I feel pressured by the nurses who care for me to follow my diet: <i>Ek voel onder druk deur die verpleegsters wat vir my sorg om my dieet te volg:</i>				
2. My doctor makes me feel guilty if I do not follow my diet properly: <i>My dokter laat my skuldig voel as ek nie my dieet behoorlik volg nie:</i>				
3. I feel I am letting people down when I eat foods I should avoid: <i>Ek voel dat ek mense in die steek laat wanneer ek kos eet wat ek moet vermy:</i>				
4. I do not feel guilty if other patients find out that I have not been following my diet properly: <i>Ek voel nie skuldig nie indien ander pasiente uitvind dat ek nie my dieet behoorlik gevolg het nie:</i>				
5. My friends say I should not worry about drinking less fluids: <i>My vriende sê dat ek moet nie bekommer wees om minder vloeistof te drink:</i>				

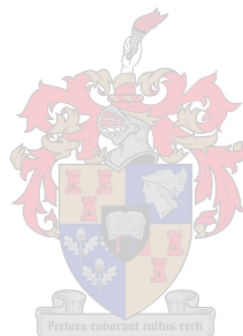
	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
<p>6. My family gets annoyed with me if I eat food that I should not: <i>My familie word kwaad met my indien ek kos eet wat ek moet vermy:</i></p>				
<p>7. None of the other patients stick to their diets properly: <i>Nie een van die ander pasiente volg hulle dieete na behore:</i></p>				
<p>8. The special person in my life gets upset with me if I drink too much fluid: <i>Die spesiale persoon in my lewe raak kwaad met my indien ek te veel vloeistof drink:</i></p>				



## APPENDIX F

	Strongly Agree/ Stem Sterk Saam	Agree/ Stem Saam	Disagree/ Verskil	Strongly Disagree/ Verskil Sterk
1. I find it difficult to drink less fluids: <i>Ek vind dit moeilik om minder vloeistof te drink:</i>				
2. It is too expensive to buy the proper food all the time: <i>Dit is te duur om behoorlike kos al die tyd te koop:</i>				
3. Following my diet does not require a lot of effort: <i>Om my dieet te volg vereis nie baie moete nie:</i>				
4. It takes too much time to ensure that I eat the proper foods: <i>Dit vat te veel tyd om seker te maak dat ek behoorlike kos eet:</i>				
5. Nothing gets in the way of my sticking to my diet properly: <i>Niks kom in my pad om behoorlik by my dieet te hou:</i>				
6. It is difficult to avoid food I should not eat when my family eats those foods: <i>Dit is moeilik om kos te vermy wat ek nie moet eet nie indien my familie daai disse:</i>				

	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
<p>7. I have no problem getting to shops to buy my food: <i>Ek het geen probleem om by die winkels te kom om my kos te koop nie:</i></p>				
<p>8. I find it nearly impossible to drink less fluids: <i>Ek vind dit amper onmoontlik om minder vloeistof te drink:</i></p>				





## APPENDIX G

The following 12 questions are about **potassium**/  
Die volgende 12 vrae handel oor **kalium**

	True/ Waar	False/ Onwaar
1. Potato crisps are high in potassium <i>Aartappelskyfies bevat baie kalium</i>		
2. Too much potassium is harmful to my heart <i>Te veel kalium is skadelik vir my hart</i>		
3. Bananas are high in potassium <i>Piesangs bevat baie kalium</i>		
4. Too much potassium will damage my bones <i>Te veel kalium sal my beendere beskadig</i>		
5. Dried fruit is high in potassium <i>Droëvrugte bevat baie kalium</i>		
6. Too much potassium will increase my blood urea level <i>Te veel kalium sal die ureum-vlakke in my bloed verhoog</i>		
7. Mushrooms are high in potassium <i>Sampioene bevat baie kalium</i>		
8. Too much potassium will raise my blood cholesterol level <i>Te veel kalium sal die cholesterol-vlakke in my bloed verhoog</i>		
9. Boiled sweets are high in potassium <i>Harde lekkers bevat baie kalium</i>		
10. Too much potassium makes my body retain water <i>Te veel kalium veroorsaak dat my liggaam water terughou</i>		

	<b>True/ Waar</b>	<b>False/ Onwaar</b>
11. Apples are high in potassium <i>Appels bevat baie kalium</i>		
12. Too much potassium further damages my kidneys <i>Te veel kalium beskadig my niere nog meer</i>		

The following 13 questions are about **phosphate/**  
*Die volgende 13 vrae handel oor fosfaat*

13. Eggs are high in phosphate <i>Eiers bevat baie fosfaat</i>		
14. Too much phosphate further damages my kidneys <i>Te veel fosfaat beskadig my niere nog meer</i>		
15. Yogurt is high in phosphate <i>Jogurt bevat baie fosfaat</i>		
16. Too much phosphate will increase my blood urea level <i>Te veel fosfaat sal die ureum-vlakke in my bloed verhoog</i>		
17. Oranges are high in phosphate <i>Lemoene bevat baie fosfaat</i>		
18. Too much phosphate will raise my blood cholesterol level <i>Te veel fosfaat sal die cholesterol-vlakke in my bloed verhoog</i>		
19. Cottage cheese is high in phosphate <i>Maaskaas bevat baie fosfaat</i>		
20. Too much phosphate makes my body retain water <i>Te veel fosfaat veroorsaak dat my liggaam water terughou</i>		

	<b>True/ Waar</b>	<b>False/ Onwaar</b>
21. Cheddar cheese is high in phosphate <i>Cheddarkaas bevat baie fosfaat</i>		
22. Too much phosphate will damage my bones <i>Te veel fosfaat sal my beendere beskadig</i>		
23. Oily fish is high in phosphate <i>Olierige vis bevat baie fosfaat</i>		
24. Too much phosphate is harmful to my heart <i>Te veel fosfaat is skadelik vir my hart</i>		
25. Chocolate is high in phosphate <i>Sjokolade bevat baie fosfaat</i>		

The following 13 questions are about **fluid**/  
*Die volgende 13 vrae handel oor vloeistof*



26. Yogurt contains a lot of fluid <i>Jogurt bevat baie vloeistof</i>		
27. Too much fluid is harmful to my heart <i>Te veel vloeistof is skadelik vir my hart</i>		
28. Gravy contains a lot of fluid <i>Sous bevat baie vloeistof</i>		
29. Too much fluid can cause breathing difficulties <i>Te veel vloeistof kan asemhalingsprobleme veroorsaak</i>		
30. Ice cream contains a lot of fluid <i>Roomys bevat baie vloeistof</i>		

	<b>True/ Waar</b>	<b>False/ Onwaar</b>
31. Too much fluid can make my body weight increase <i>Te veel vloeistof kan lei tot 'n toename in my liggaamsmassa</i>		
32. Custard contains a lot of fluid <i>Vla bevat baie vloeistof</i>		
33. Too much fluid can raise my blood pressure <i>Te veel vloeistof kan my bloeddruk laat toeneem</i>		
34. Bananas contain a lot of fluid <i>Piesangs bevat baie vloeistof</i>		
35. Too much fluid can damage my bones <i>Te veel vloeistof kan my beendere beskadig</i>		
36. Cakes contain a lot of fluid <i>Koek bevat baie vloeistof</i>		
37. Too much fluid can further damage my kidneys <i>Te veel vloeistof kan my niere nog verder beskadig</i>		
38. Soup contains a lot of fluid <i>Sop bevat baie vloeistof</i>		

## APPENDIX H

	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
<p>1. There is a special someone who is around when I need their help: <i>Daar is 'n spesiale iemand beskikbaar wanneer ek in nood verkeer:</i></p>				
<p>2. There is a special someone around with whom I can speak to when I am happy or sad: <i>Daar is 'n spesiale iemand beskikbaar saam met wie ek my blydsappe en verdriete kan deel:</i></p>				
<p>3. I have a special person who is a real source of comfort to me: <i>Ek het 'n spesiale persoon wie vir my 'n ware bron van gerusstelling is:</i></p>				
<p>4. There is a special person in my life who cares about my feelings: <i>Daar is spesiale persoon in my lewe wie om gee vir my gevoelens:</i></p>				
<p>5. My family really tries to help me: <i>My familie probeer regtig hard om my te help:</i></p>				
<p>6. I get the emotional help and support I need from my family: <i>Ek kry die emosionele hulp en ondersteuning wat ek nodig van my familie:</i></p>				

	<b>Strongly Agree/ Stem Sterk Saam</b>	<b>Agree/ Stem Saam</b>	<b>Disagree/ Verskil</b>	<b>Strongly Disagree/ Verskil Sterk</b>
7. I can talk about my problems with my family: <i>Ek kan oor my probleme gesels met my familie:</i>				
8. My family is willing to help me make decisions: <i>My familie is bereid om my te help om besluite te neem:</i>				
9. My friends really try to help me: <i>My vriende probeer regtig om my te help:</i>				
10. I can count on my friends when things go wrong: <i>Ek kan op my vriende staatmaak wanneer dinge verkeerd gaan:</i>				
11. I have friends with whom I can share my joys and sorrows: <i>Ek het vriende saam met wie ek my blydsappe en verdriet kan deel:</i>				
12. I can talk about my problems with my friends: <i>Ek kan oor my probleme met my vriende gesels:</i>				

## APPENDIX I

Patient number: .....

Date: / / 2004

**Please put an 'X' in the appropriate block.**  
***Merk asseblief die gepaste antwoord met 'n 'X'***

Name/ *Naam*: .....Age/ *Ouderdom*: .....How long have you been on dialysis?  
*Hoe lank is jy op dialise?*Years/  
Jare.....Months/  
*Mande*.....Gender/ *Geslag*Male/ *Manlik* Female/ *Vroulik* Population group/ *Bevolkingsgroep*White/ *Blank* Black/ *Swart* Colored/ *Kleurling* Asian/ *Asiaat* Other/ *Ander* Marital status/ *Huwelikstaat*Single/ *Ongetroud* Living together/ *Bly saam* Married/ *Getroud* Divorced/ *Geskei* Specify other/  
*Spesifiseer ander*.....Education/ *Opleiding*Standard 5 (Grade 7) or lower/  
*Standerd 5 (Graad 7) of laer* Standard 8 (Grade 10)/  
*Standerd 8 (Graad 10)*

Standard 10 (Grade 12)/  
*Standaard 10 (Graad 12)*

Degree or diploma/  
*Graad of diploma*

Household/ *Huisgesin*

How many people live in your household? (Include yourself)  
*Hoeveel mense bly in jou huisgesin? (Jouself inbegryp)*

a) Adults/ *Grootmense*.....

b) Children under 18/ *Kinders onder 18*.....

Household income/ *Huisgesin inkomste*

Below/ *Onder R1, 000 per month/ per maand*

R1, 000 – R3, 000 *per month/ per maand*

R4, 000 – R7, 000 *per month/ per maand*

R8, 000 per month or higher/ *per maand of hoër*



Do you suffer from diabetes? Yes/ *Ya*  No/ *Nee*   
*Is jy 'n lyer van suikersiekte/ diabetes?*

Do you suffer from hypertension? Yes/ *Ya*  No/ *Nee*   
*Is jy 'n lyer van hipertensie?*



## APPENDIX J

	Never/ Nooit	Rarely/ Skaars	Some of the time/ Soms van die tyd	Most of the time/ Meeste van die tyd	Always/ Altyd
1. I follow my doctor's dietary instructions: <i>Ek volg my dokter se dieet instruksies:</i>					
2. I cannot resist drinking beer or wine: <i>Ek kan dit nie weerstaan om bier en wyn te drink nie:</i>					
3. I cannot resist eating forbidden food: <i>Ek kan dit nie weerstaan om verbode kos te eet nie:</i>					
4. Sometimes I allow myself to eat forbidden food: <i>Ek laat myself somtyds toe om verbode kos te eet:</i>					
5. I feel no different if I eat food I should not: <i>Ek voel nie anders nie as ek kos eet wat ek moet nie:</i>					
6. I am careless about food when I feel upset: <i>Ek gee nie om oor kos nie wanneer ek ontstel voel:</i>					

	Never/ Nooit	Rarely/ Skaars	Some of the time/ Soms van die tyd	Most of the time/ Meeste van die tyd	Always/ Altyd
7. I drink fluids today as always: <i>Ek drink vandag vloeistof soos van tevore:</i>					
8. My family helps me to eat the proper food: <i>My familie help my om die regte kos te eet:</i>					
9. When I eat out, I eat food that I should not: <i>Wanneer ek uit eet, eet ek kos wat ek nie moet eet nie:</i>					
10. I drink more fluids when I am upset: <i>Ek drink meer vloeistof wanneer ek ontsteld is:</i>					
11. I avoid foods containing salt: <i>Ek vermy kos wat sout bevat:</i>					
12. I am careful not to drink too much fluid: <i>Ek is versigtig om nie te veel vloeistof te drink nie:</i>					
13. I drank a lot of fluid in the past: <i>Ek het in die verlede baie vloeistof gedrink:</i>					

	<b>Never/ Nooit</b>	<b>Rarely/ Skaars</b>	<b>Some of the time/ Soms van die tyd</b>	<b>Most of the time/ Meeste van die tyd</b>	<b>Always/ Altyd</b>
14. I am preoccupied with food: <i>Ek is behep met kos:</i>					
15. I take my prescribed medication: <i>Ek neem my voorgeskrewe medisyne:</i>					
16. I am careful to weigh my food: <i>Ek is versigtig wanneer ek my kos weeg:</i>					
17. It is difficult to drink less fluid in summer: <i>Dit is moeilik om minder vloeistof in somer te drink:</i>					
18. I weigh myself regularly: <i>Ek weeg myself gereeld:</i>					
19. I get away with drinking lots of fluid: <i>Ek kom weg daarmee deur baie vloeistof te drink:</i>					
20. I decide what food I eat: <i>Ek besluit watter kos ek eet:</i>					
21. I always eat salt with my food: <i>Ek neem altyd sout in my kos:</i>					

	<b>Never/ Nooit</b>	<b>Rarely/ Skaars</b>	<b>Some of the time/ Soms van die tyd</b>	<b>Most of the time/ Meeste van die tyd</b>	<b>Always/ Altyd</b>
22. I restrict the amount of potassium I eat: <i>Ek beperk die hoeveelheid kalium wat ek eet:</i>					
23. I restrict the amount of salt I eat: <i>Ek beperk die hoeveelheid sout wat ek eet:</i>					
24. I always take my medication: <i>Ek neem altyd my medikasie:</i>					
25. I restrict the amount I drink: <i>Ek beperk die hoeveelheid wat ek drink:</i>					