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**Running head:** ADHERENCE BEHAVIOUR IN CHRONIC HEART FAILURE

**Title:** Psychological Factors and Treatment Adherence Behaviour in Patients with Chronic Heart Failure

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## Abstract

Chronic Heart Failure (CHF) adversely affects 300,000 Australians. Symptom stabilisation and prognosis are partially determined by the patient's adherence to medical and lifestyle recommendations. To test the hypothesis that depression, anxiety, and self-efficacy are independent predictors of adherence behaviour, 115 predominately male (70.6%) volunteers with a mean age of 63.57 were recruited from a major teaching hospital in Australia. Depression (33.3% scored > 10 on BDI) failed to predict adherence. Trait anxiety (31% scored > 40 on STAI) explained minimal variability regarding smoking and alcohol adherence. Self-efficacy strongly predicted adherence to most recommendations. Findings have implications for cardiac nurses regarding strategies to optimize adherence and quality of life, and minimise public health costs.

# Psychological Factors and Treatment Adherence Behaviour in Patients with Chronic Heart Failure

Chronic Heart Failure (CHF) is a progressively debilitating condition affecting approximately 300 000 Australians and accounting for over 40,000 hospital admissions in the year 2000 to 2001 (e.g., Krum, 2001). Patients may experience reduced quality of life (Blyth et al., 1997), restricted physical and social functioning (Moser & Worster, 2000), and frequent hospitalisation resulting in significant public health costs (Krum, 2001). Functional state and disease progression is partially determined by the CHF patient's adherence to self-maintenance protocols (Bellg, 2004). Despite prolific research regarding the association between psychological factors and cardiovascular disease, few studies have examined the association between psychological factors and treatment adherence.

## *Chronic Heart Failure and Adherence to Self-maintenance Recommendations*

Chronic heart failure occurs when the ability of the myocardium to effectively circulate blood throughout the body has been compromised, culminating in difficulty maintaining fluid and sodium homeostasis (Bellg, 2004). Symptoms may include: dyspnea, restricted exercise tolerance, orthopnea, lethargy, fatigue, oedema, pulmonary congestion, and fluid retention (Bellg, 2004) with detrimental consequences regarding activities of daily living, socialisation, general quality of life, and psychological distress.

Treatment is directed towards retarding disease progression, providing symptom relief and prolonging survival, with nursing staff playing a vital role in terms of individual cardiac nursing and health promotion. The Australian National Heart Foundation (ANHF) and Medical Research Council has established guidelines for non-pharmacological management which includes: ongoing medical support,

severely restricted or complete abstinence of alcohol and nicotine, restricting sodium intake, restricting daily fluid intake, regular exercise, daily weighing, and regular influenza and pneumonia vaccinations (Krum, 2001).

Research suggests that adherence levels fluctuate between recommendations and is influenced by factors other than knowledge. Reported adherence has been relatively high with regards to keeping medical appointments (95.7%), restricting nicotine (95.4%) alcohol restrictions (91.61%), and administering medications (91.4%) (Evangelista et al., 2003). Dietary and exercise adherence were considerably lower at 70.9% and 61.1% respectively with individuals under 65 years reporting lowest levels. Ni et al. (1999) reported lower levels of adherence regarding daily weighing (58%) and sodium restriction (38%) with less 30% of patients reporting that they never exercised (Ni et al., 1999). Interestingly a recent study based upon a small homogenous sample (i.e., all male, $n$ = 39), reported high levels of adherence with 78% of participants adhering to a home-based exercise program (Corvera-Tindel, Doering, Gomez & Dracup, 2004).

*Prevalence of Depression and the Relationship with Poor Outcomes and Adherence*

Havranek, Ware and Lowes (1999) found that 24.4% of CHF individuals experienced depression. A longitudinal study (Fulop, Strain & Stettin, 2003) found that on discharge, 36% of CHF patients reported depressive symptomatology with 22% meeting major depression criteria (DSM-III-R). Depression remained evident in 53% and 29% of participants, at 1 month and 6 months respectively. While divergent findings are evident, several CHF studies demonstrated a positive association between depression and poor outcomes (Moser & Worster, 2000). For instance, patients diagnosed with major depression were found to have a mortality rate twice that of

non-depressed patients and were three times more likely to be readmitted to hospital (Jiang, Krishnan & O'Connor, 2002).

The precise mechanism underlying the relationship between depression, cardiovascular disease and poor health outcomes remains inconclusive with pathological and behavioural factors nominated as potential influencing variables (Joynt, Whellan & O'Connor, 2003). The physiological sequela associated with depression, such as platelet aggregation, systemic and localised inflammatory responses, restricted heart rate variability or arrhythmias, and endocrine activation, may precipitate the development of cardiac conditions and compromise weakened cardiovascular functioning (Jiang et al., 2002). This association between depression and poor outcomes may be partly mediated by adherence behaviour (Joynt et al., 2003).

Depressed individuals are more likely to engage in behaviours, such as smoking, overeating and adopting a sedentary lifestyle (Gala, Galletti & Invernizzi, 1997). Depressive symptoms such as low energy levels, lack of motivation, and a sense of helplessness or despondency (Gala et al.), and cognitive dysfunction (e.g., attention and memory deficits) (Wang et al., 2002) may interfere with ability to perform self-maintenance recommendations. Depression is frequently associated with non-adherence in patients suffering from chronic illnesses (Katon, 2003), however, a recent study failed to show a relationship between depression and exercise adherence in individuals with CHF (Corvera-Tindel et al., 2004).

*Anxiety and Chronic Heart Failure*

According to Spielberger, trait anxiety refers to the personality disposition whereby an individual perceives stressful situations as being extremely threatening and will subsequently respond with intense fear, worry and/or nervousness (1983). A

recent study reported moderate levels of anxiety amongst CHF participants (Dracup et al., 2003). Anxiety and associated physiological reactions such as increased sympathetic nervous system activation, tachycardia, and increased respiratory rate (Edelmann, 1992), have been associated with cardiovascular disease development and a predictor of increased health care consumption and morbidity following myocardial infarction (Strik, Denollet, Lousberg & Honig, 2003). Anxiety sensitivity has shown strong positive associations with alcohol consumption (Stewart, Samoluk & MacDonald, 1999) suggesting that there may be an association between anxiety and high-risk behaviours.

*The Concept of Self-efficacy and its Relationship to Adherence*

Self-efficacy refers to the judgement individuals develop regarding their ability to successfully perform specific behaviours (Bandura, 1997). Bandura postulated that self-efficacy influences behavioural engagement, degree of expended effort, perseverance, resiliency and the level of achievement. Self-efficacy is used increasingly in health research as a predictor of behaviour. An association has been found between poor adherence and low levels of self-efficacy in the CHF population, however, self-efficacy was globally operationalised as confidence in maintaining health and controlling CHF symptomatology (Ni et al., 1999).

*Hypotheses*

This study will examine the prevalence of anxiety and depression in CHF patients and explore the level of adherence to self-maintenance recommendations. It is hypothesised that depression, anxiety, and self-efficacy will be significant independent predictors of adherence to seven self-maintenance behaviours after controlling for demographic and biological factors. With consideration towards previous findings, the potential influence of participant age and gender and their level

or functioning (physical and physiological) upon adherence behaviour were controlled for in order to identify the ability of target independent variables to explain adherence variability.

## Method

### *Participants*

Patients receiving treatment through an Australian hospital for diagnosed CHF were eligible for inclusion. Persons awaiting heart transplant surgery and patients with diagnosed dementia or severe communication deficits were excluded. In total, 115 patients were recruited from two sources: hospital admissions (81) and attendance at a specialist Outpatient Unit (34).

### *Materials*

The protocol included a demographic section, Beck Depression Inventory (BDI), State-Trait Anxiety Inventory - T (STAI-T), Self-Care of Heart Failure Index (SCHFI), the Heart Failure Compliance Questionnaire (HFCQ) and a measure of adherence.

The BDI assesses the intensity of 21 depressive symptoms and attitudes (Beck & Steer, 1993). Responses are made on a 4-point scale with larger scores with higher levels of depressive symptomatology. Scores of less than 10 indicate minimal depression, 10 to 16 indicate mild depression, 17 to 29 indicate moderate depression and scores greater than 29 indicate severe depression. A meta-analysis of internal consistency in non-psychiatric patients reported a Cronbach α of .81 and test-retest reliability of .83 (Lane, Carroll, Ring, Beevers & Lip, 2002).

The STAI-T (form Y), the second of two subscales, contains 20 items which assess trait anxiety (Spielberger, 1983). These statements are measured on a 4-point scale with potential scores ranging between 20 and 80. This scale has been used

extensively to assess clinical anxiety in patient and general populations. Spielberger (1983) reports that the STAI-T correlates highly with other trait anxiety scales and has high test-retest reliability and internal consistency (median coefficient = .90).

The SCHFI is a self-report measure comprising of three subscales with the first, self-care maintenance, being used within this study. This section consists of 6 items, rated on a four-point scale. Reported reliability for subscales ranges between .56 and .82 and construct validity ranges between .69 to .73 (Riegel et al., 2004). This scale was used to compare adherence with the recommended behaviours measured by the study-specific measure (see below).

The HFCQ assesses adherence to six recommended behaviours; keeping medical appointments, following dietary recommendations, exercising, administering medications, and the cessation of smoking and alcohol. The frequency and level of difficulty of individual behaviours, is measured on a 4-point scale with reasons for difficulty measured by fixed choice format. Patients reported level of adherence has been found to be significantly correlated with their adherence behaviour as rated by their family members and reported as ranging between .35 and .78 on assessed health behaviours (Evangelista et al., 2003). Internal consistency reliability (i.e., total adherence score) has been reported at .68. This measure was used for descriptive purposes and to identify reasons for non-adherence.

As the SCHFI did not assess adherence to all of the recommended behaviours included within this study, a study specific questionnaire, based upon ANHF recommendations, was developed measuring target behaviours: daily weighing, sodium restriction, 1500ml daily fluid restrictions, administering medications as prescribed, gentle and vigorous exercise, and avoidance of smoking and alcohol. Adherence to each of the aforementioned recommendations except smoking and

exercise was assessed on a 7-point scale ranging from never to every day. Smoking was measured on a 4-point scale from not at all to daily while exercise was assessed via a 6-point scale from never to more than once per day. Self-efficacy regarding individual behaviours was assessed according to two areas: the perceived level of difficulty experienced and the level of confidence regarding the ability to adhere to each recommendation. The two subscales were measured on a 5-point scale and then combined to form a total self-efficacy score for each recommendation. Please contact authors for a detailed explanation of this measure.

Functional status was ascertained using two measures. The New York Heart Association (NYHA) functional classification, assessed by the cardiologist, provided information regarding the degree of physical limitations according to four possible groups. Class I patients' lifestyle is not limited by CHF while Class IV patients are unable to perform any physical activity without experiencing discomfort. Left ventricular ejection fraction (LVEF) was obtained via an echocardiogram to assess the ability of the heart's left ventricle to expel blood with each contraction (Bellg, 2004).

*Procedure*

Participants were interviewed according to a structured format. Five outpatients completed these over a week period. The current LVEF and NYHA status was obtained from medical records by nursing staff.

*Statistical Analysis*

Patient characteristics and adherence behaviours were assessed via descriptive statistics. Gender and age differences were examined via independent sample *t* tests. A series of hierarchical regressions were performed to examine the relationship between independent variables and individual recommendations. The significance level was established at .05. Raw data was examined and missing data appeared

random. Fourteen cases with missing data (i.e., LVEF) were deleted, and 10 missing data cells substituted with the variable mean, leaving a total of 102 participants included within the analysis.

## Results

### *Demographic and Clinical Characteristics*

Demographical data and scores obtained on the psychometric measures were compared between the in-patient and outpatient groups via *t* test statistics. No between group differences were found regarding educational attainment, employment status, gender or age. More of the out-patient group were married compared with the in-patient group, $t(87.87) = 2.42$, $p < .05$. No differences were found between the in-patient group ($M = 46.68$, $SD = 6.41$) and outpatient groups ($M = 46.29$, $SD = 4.83$) regarding their level of trait anxiety as measured on the STAI. Similarly, no differences were found between the in-patient group ($M = 9.78$, $SD = 8.22$) and outpatient groups ($M = 9.23$, $SD = 5.85$) regarding their level of depression as measured by the BDI. The level of adherence on target behaviours was compared. Groups were found to differ significantly in only one adherence area, with the outpatient group adhering more frequently to the daily weighing recommendation than the in-patient group, $t(78.18) = -2.36$, $p < .05$. These two groups will be considered together in further analysis and the demographic characteristics of this combined sample are presented in Table 1. The participant group was relatively young ($M = 63.57$ years, $SD = 14.23$, Range = 26 to 98) and predominantly male (70.6%). Participants experienced moderate functional (NYHA $M = 2.63$, $SD = .68$) and physiological impairment (LVEF $M = 32.90\%$, $SD = 14.21$).

Participant reported depression appeared minimal but variable ($M = 9.61$, $SD = 7.65$). Minimal depressive symptoms (BDI < 10) were reported by 66.7% of

participants, 21.6% reported mild depression (10 to16), 6.9% reported moderate levels (17 to 29), and 5.9% experienced severe depression (BDI > 29). Based upon the criteria of a score greater than 10 being indicative of depression (Beck & Steer, 1993), 33.3% of participants reported depression. The overall mean trait anxiety score for the patient population was 35.47 although variability was noted (*SD* = 10.35) with 31.4% reporting significant anxiety (STAI–T > 40). No gender differences were found, however, participants under 70 years of age reported higher levels of depression than older patients ($t$ (90.1) = 1.90, $p$ <.05). Participants under 70 years of age also experienced higher levels of anxiety ($t$ (92.02) = 4.08, $p$ < .05).

Highest self-efficacy was reported regarding medications adherence (*M* = 9.81, *SD* = 1.10), followed by smoking (*M* = 9.37, *SD* = 1.83), daily weighing (*M* = 8.88, *SD* = 2.19) and alcohol adherence (*M* = 8.68, *SD* = 2.23). Lower self-efficacy was reported regarding sodium restrictions (*M* = 8.03, *SD* = 2.24) and exercise protocols (*M* = 7.00, *SD* = 2.65).

*Adherence Behaviour*

Self-reported adherence was comparatively high regarding medication (91.2%) and smoking restrictions (87.3%). Fluid adherence was reported by 47.9% of participants with 32.4% stating that fluid restriction was not at all or only somewhat important. Despite 79.4% of CHF patients reporting that daily weighing was important, only 34.3% performed this behaviour each day. One third of patients completely avoided alcohol despite 86.3% understanding the importance. Only 9.8% of participants adhered to daily sodium restrictions, despite 90.2% reporting such restrictions were important. No participants reported 100% adherence to exercise protocols with 10.8% of individuals exercising on five or more days per week. While 95.1% of patients stated that exercise was important, 47.1% reported a moderate

degree of difficultly following recommendations with 44.1% attributing non-adherence to physical symptoms. Individuals over the age of 69 years ($M$ = 6.67, $SD$ = 2.37) reported significantly higher levels of exercise adherence, $t$ (100) = 2.20, $p$ < .05, than younger patients ($M$ = 5.52, $SD$ = 2.66).

*Reliability of the Study Specific Questionnaire*

The three common behaviours measured by the validated SCHFI and study specific questionnaire were compared using the Pearson correlation coefficient. The relationship between scale scores was high regarding weighing behaviour ($r$ = .71, $p$ < .05), and moderate regarding sodium restrictions ($r$ = .52, $p$ < .05), and exercise adherence ($r$ = .40, $p$ < .05). This study specific questionnaire appeared to have reasonable concurrent validity.

*Correlation and Regression Statistics*

Hierarchial regression was used to examine the relationship between psychological factors (depression, anxiety and self-efficacy) and seven Australian Heart Foundation lifestyle recommendations. Gender, age and functional status (NYHA and LVEF) were included as biological covariates within the first model in each regression. Correlation coefficients and hierarchial regression summaries appear in Tables 2 and 3.

*Daily weighing regression models.* The covariates significantly explained 14% (Adjusted $R^2$ = .11) of the weighing variability, $F$ (4, 97) = 3.96, $p$ < .05. LVEF was the only significant predictor, $t$ = -3.24, $p$ < .05. Model 2 accounted for 27.6% of weighing variability, Adjusted $R^2$ = .22 ($F$ (7, 94) = 5.12, $p$ < .05). The three psychological variables accounted for 13.6% of variability in weighing behaviour, a significant proportion, after controlling for the effects of covariates, $F$ Change (3, 94) = 5.87, $p$ < .05. As in model 1, diminished cardiac performance remained a

significant predictor of behaviour within the full model. Consistent with the hypothesis, self-efficacy was a strong predictor ($t = 4.13$, $p < .05$), uniquely explaining 13.1% of variability ($sr = .36$). However, depression and anxiety failed to predict weighing behaviour.

*Sodium restriction regression models.* The covariates failed to account for salt restriction variability ($F$ (4, 97) = .48, $p > .05$). The linear combination of variables in model 2 accounted for 21.1% (Adjusted $R^2 = .15$) of salt intake variability, $F$ (7, 94) = 3.60, $p < .05$, representing a significant increase after accounting for covariate effects, $F$ Change (3, 94) = 7.63, $p < .01$. Contrary to the hypothesis, depression ($t = -.19$, $p > .05$) and anxiety ($t = -.93$, $p > .05$) failed to predict behavioural variability. As hypothesised, self-efficacy regarding salt restrictions predicted adherence behaviour, uniquely accounting for 15.5% of variability, $t = 4.31$, $p < .05$, $sr = .394$.

*Fluid intake restriction regression models*. Neither the combination of covariates, $F$ (4, 97) = 1.30, *n.s*., nor the linear combination of the entire group of variables, $F$ (7, 94) = 1.72, *n.s*., predicted variation regarding fluid restriction. However, self-efficacy ($t = 2.53$, $p < .05$) uniquely accounted for 6.1% ($sr = .25$) of the variation in fluid adherence. Contrary to the hypothesis, depression and anxiety failed to predict fluid adherence.

*Administration of medication regression models*. Model 1 failed to predict medication variability, $F$ (4, 97) = .26, *n.s*. Model 2 also failed to account for the self-medication variability ($F$ (7, 94) = .40, $p > .05$). No significant predictors for medication behaviour were demonstrated.

*Regular exercise regression model.* The covariates failed to account for exercise variability, $F$ (4, 97) = 2.30, $p > .05$. However, participant's age uniquely accounted for 5.9% of exercise variability, $t = 2.51$, $p < .05$. Model 2 accounted for 21.8%

(Adjusted $R^2$ = 15.9%) of the variability in exercise adherence, $F$ (7, 94) = 3.74, $p$ < .05. After controlling for covariate effects, psychological variables explained an additional 13.1% variability in exercise adherence, $F$ Change (3, 94) = 5.26, $p$ < .05. Participants functional status appeared to be a significant predictor, $t$ = -1.99, $p$ = .05, however, $\beta$ scores suggests that this finding may reflect the correlation between age and NYHA. As hypothesised, self-efficacy regarding exercise adherence significantly predicted reported behaviour, accounting for 11.8% of variability ($t$ = -3.76, $p$ < .05). Depression and anxiety failed to predict exercise adherence.

*Smoking restriction regression model.* The covariates were unable to significantly explain smoking variability, $F$ (4, 97) = 1.58, $p$ > .05. Model 2 significantly accounted for 22% (Adjusted $R^2$ = 16.2%) of variability, $F$ (7,94) = 3.78, $p$ < .05. The inclusion of psychological variables increased prediction by 15.9%, $F$ Change (3, 94) = 6.37, $p$ < .05. As hypothesised self-efficacy predicted smoking behaviour, explaining 14.2% of the variability in self-reported smoking restrictions, $t$ = 4.14, $p$ < .05. Anxiety accounted for 3.3% of variability ($t$ = -2.01, $p$ < .05) suggesting minimal practical predictive power while depression failed to predict smoking adherence.

*Alcohol restriction regression model.* The covariates failed to explain alcohol variability, $F$ (4,97) = 1.18, $p$ > .05. Model 2 accounted for 36.1% (Adjusted $R^2$ = .314) of variability in alcohol consumption, $F$ (7,94) = 7.60, $p$ < .05. After controlling for covariate effects, the inclusion of psychological variables increased prediction by 31.5%, *F Change* (3, 94) = 15.45, $p$ < .05. As hypothesised, anxiety predicted alcohol consumption (t = 2.24, $p$ < .05) but only uniquely accounted for 3.4% ($sr$ = .18) of variability while self-efficacy uniquely explained 24.3% of alcohol variability ($t$ = 5.98, $p$ < .001, $sr$ = .49). Depression failed to predict alcohol adherence.

## Discussion

Consistent with previous research, adherence regarding self-medication was high compared with the other lifestyle recommendations. It appears easier for patients to self-medicate than modify lifestyle behaviours. Sodium restrictions and regular exercise were the areas most vulnerable to non-adherence with almost half of the participants attributing exercise non-adherence to comorbid medical conditions. However, the fact that older participants demonstrated higher levels of exercise adherence is difficult to interpret, as this was the only area where age differences were detected and these older patients were more likely to have severe cardiac incompetence. Evangelista et al. (2003) also found older patients more compliant with exercise regimens. The speculation that younger individuals may experience more difficulty secondary to employment and family commitments was not supported in this instance, as less than 5% of non-adhering patients attributed their difficulty to inconvenience or time constraints. With more than half of CHF patients reporting non-adherence to fluid restrictions it was interesting to note that patient fluid intake knowledge appeared relatively poor. During interview, many patients stated that they drank the required six to eight glasses per day, thus appearing to confuse CHF recommendations with a commonly reported general health recommendation.

The levels of adherence reported by participants suggest that nurses should consider all individuals (particularly younger patients regarding exercise) at risk of non-adherence and highlight fluid recommendations within existing educational programs. However, the finding that patients' knowledge did not necessarily ensure strong adherence suggests that reliance upon self-maintenance education alone, may not be sufficient to promote and sustain optimal levels of adherence.

Consistent with previous research, one third of participants reported depressive symptomatology which exceeds the estimated 20% demonstrated by chronically ill patients (Faris et al., 2002), however, only 6% reported severe depression. Interestingly, almost one third of participants reported significant anxiety symptomatology. Anxiety was found to be highly comorbid with depression and younger patients (< 70) appear at greater risk of experiencing both disorders. The younger patient may experience more fundamental disruptions to vocational, social and general quality of life commonly associated with an early lifespan phase and greater apprehension about their future.

Depressed individuals did not appear to be at greater risk of non-adherence. Individuals reporting higher levels of anxiety were shown to be slightly more prone to non-adherence regarding alcohol and smoking restrictions. As proposed by Bellg (2004) and evidenced by the small negative relationship demonstrated between anxiety and the majority of recommended behaviours, a degree of anxiety may actually be beneficial to the promotion of adherence. Despite the failure to demonstrate a relationship between anxiety and depression and adherence, the high prevalence of both disorders within this cohort suggests that psychological assessment and care, would be an advantageous inclusion within routine nursing care.

Behaviour specific self-efficacy was found to be a moderate to strong predictor of adherence to all behaviours except fluid and medication adherence. It may therefore be hypothesised that interventions aimed at improving behaviour specific self-efficacy may improve adherence and health status. This remains an area to be evaluated. The Australian National Heart Foundation (ANHF) and Medical Research Council Bellg (2004) argued that health professionals are unable to predict adherence above the level of chance. Consequently, assessing individual's level of self-efficacy

towards specific recommendations (easily accomplished via questions concerning perceived difficulty and confidence) may provide a more accurate indication of actual adherence behaviour.

*Limitations*

Reliance upon self-report regarding psychological morbidity and adherence behaviour and the measurement of self-maintenance behaviours by an unvalidated study specific questionnaire, suggests that findings should be considered with caution.

Reliance upon the BDI, which includes a number of symptoms (eg., sexual incompetence and fatigue) common to both CHF and depression, and failure to assess the client's use of psychotropic agents or interventions, may have contributed to inaccuracies regarding depression measurement.

*Conclusion*

Patient adherence to prescribed lifestyle changes and medical regimens continue to pose a major challenge for health professionals. Expanding knowledge regarding the role and interplay of psychological predictors underlying adherence behaviour may help to more clearly discriminate between CHF patients who are at risk of rapid disease progression. This study provides substantial information regarding patterns of adherence behaviour and evidence of prevalent psychological distress. Despite depression and anxiety failing to significantly explain adherence behaviour, findings have implications for nursing staff regarding psychological screening and the implementation of interventions aimed at promoting self-efficacy.

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Table 1

*Demographic and Clinical Characteristics of Participants*

| Variable | Number | Percentage |
|---|---|---|
| Gender | | |
| Male | 72 | 70.6 |
| Female | 30 | 29.4 |
| Age | | |
| Up to 65 | 54 | 52.9 |
| Over 65 | 48 | 47.1 |
| Marital Status | | |
| Single | 13 | 12.7 |
| Married/Defacto | 68 | 66.7 |
| Divorced | 8 | 7.8 |
| Widow/Widower | 13 | 12.7 |
| Education | | |
| Primary/Secondary | 84 | 82.4 |
| Tafe/Apprenticeship | 8 | 7.8 |
| University | 10 | 9.8 |
| Employment Status | | |
| Employed | 18 | 17.6 |
| Unemployed | 4 | 3.9 |
| Retired/Pension | 80 | 78.4 |
| NYHA Classification | | |
| Class I | 6 | 5.9 |

| | | |
|---|---|---|
| Class II | 28 | 27.4 |
| Class III | 58 | 56.9 |
| Class IV | 10 | 9.8 |
| Left Ventricular Ejection Fraction | | |
| Up to 45 | 85 | 83.3 |
| Over 45% | 17 | 16.7 |

*Note*. $n = 102$

Table 2

*Bivariate Correlations between Study Variables*

*Common to each Hierarchial Regression*

| | Age | Gender | LVEF | NYHF | BDI |
|---|---|---|---|---|---|
| Age | | | | | |
| Gender | .04 | | | | |
| LVEF | .26** | .25** | | | |
| NYHF | .52*** | .09 | -.07 | | |
| BDI | -.20* | .12 | -.17* | .05 | |
| STAI | -.36*** | .18* | -.23* | -.11 | .67*** |

*$p < .05$. **$p < .01$. ***$p < .001$

Table 3

*Summary of Hierachial Regression Results for Each Target Behaviour*

| | | Weighing | | Sodium | | Fluid | | Medication | | Exercise | | Smoking | | Alcohol | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SE | β | SE | β | SE | β | SE | β | SE | β | SE | β | | |
| Model | Variable | | | | | | | | | | | | | | |
| 1 | Age | .02 | -.05 | .03 | -.06 | .02 | -.06 | .00 | .01 | .02 | .31* | .01 | -.25* | | |
| | Gender | .48 | -.07 | .79 | .03 | .54 | .11 | .11 | -.10 | .57 | .18 | .21 | .11 | | |
| | NYHA | .38 | .00 | .63 | .11 | .42 | -.03 | .08 | .01 | .45 | -.15 | .17 | .18 | .33 | .10 |
| | LVEF | .02 | -.34** | .03 | .11 | .02 | .17 | .00 | -.01 | .02 | -.07 | .01 | .03 | .01 | -.01 |
| 2 | Age | .02 | -.07 | .03 | -.07 | .02 | -.06 | .00 | -.04 | .02 | .20 | .01 | -.29* | .01 | .07 |
| | Gender | .46 | -.08 | .76 | -.01 | .54 | .13 | .11 | -.07 | .58 | .06 | .20 | .16 | .36 | .06 |
| | NYHA | .36 | .01 | .58 | .11 | .42 | -.03 | .09 | .01 | .43 | -.23* | .16 | .18 | .28 | .03 |
| | LVEF | .02 | -.27** | .03 | .11 | .02 | .16 | .00 | -.03 | .02 | -.06 | .01 | -.01 | .01 | .06 |
| | BDI | .04 | .04 | .06 | -.02 | .04 | .01 | .01 | -.03 | .04 | .00 | .02 | .21 | .02 | -.10 |
| | STAI-T | .03 | .07 | .05 | -.12 | .03 | -.02 | .01 | -.12 | .03 | .02 | .01 | .26* | .02 | .27* |
| | Self-Efficacy | .12 | .38*** | .15 | .42*** | .12 | .25* | .05 | .03 | .10 | -.41*** | .04 | .39*** | .07 | .51*** |

*Note.* *$p < .05$. ** $p < .01$. *** $p < .001$.

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