

THE UNIVERSITY OF HULL

**ADJUSTMENT TO CHRONIC HEART FAILURE: A
BIOPSYCHOSOCIAL APPROACH.**

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the requirements for the Degree of
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By

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ABSTRACT

The prevalence of Chronic Heart Failure (CHF) is increasing and recent studies outside of the UK suggest that psychological adjustment to this disease can be poor. The present study aimed to: – 1) Determine the prevalence of anxiety and depression disorders in a UK sample. 2) Explore the validity of the Hospital Anxiety and Depression Scale (HADS) against a structured clinical interview (SCID-I). 3) Identify the predictors of depression and anxiety. 4) Identify the predictors of hospitalisation and mortality.

PARTICIPANTS AND METHODS – A postal survey of 118 patients from a specialist CHF unit in the UK was followed by a face-to-face interview with 100 patients. Measures used included those of depression, anxiety, social support, cognition, biomedical status and previous physical and mental health history. **RESULTS** – Prevalence rates of anxiety ranged from 18.4 – 42.3% and depression ranged from 15.3 – 37.8% dependent on the type of measure used (HADS or SCID-I). The HADS had adequate discriminatory ability. Both psychosocial and biomedical predictors of anxiety and depression were identified, although these differed depending on the scale used as the dependent variable. Associations were found between depression, anxiety and hospitalisations although these were not significantly strong to survive in the regression analysis. **CONCLUSIONS** – Prevalence rates of anxiety and depression are high in this population. The results were discussed according to their contribution to theory, clinical practice and future biopsychosocial research with this population.

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CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Current interest in Coronary heart Disease.

Heart Disease, particularly Coronary Heart Disease (CHD) is currently receiving a great deal of attention. For example, the government launched a “radical and far-reaching ten year programme” (Boyle 2000) in March 2000 to set out standards and goals for all aspects of CHD. The current interest in CHD is also reflected in health psychology literature. Carroll in 1992 noted that CHD was one of the most well-researched areas in health psychology and the situation has not changed as the wider research community has started to look beyond the physiological aspects of illness by acknowledging the importance of psychosocial factors to explain, predict and reduce hospital readmission and mortality figures in patients with heart disease.

Although the present thesis is related specifically to chronic heart failure (CHF), much of the research into psychological adjustment in cardiac disease has been carried out in patients with CHD, in particular those who have experienced a myocardial infarction (MI). Therefore the introduction will begin by outlining the biology behind CHD as well as the current prevalence figures. The relevant literature on psychological adjustment in MI patients will be briefly reviewed, in order to introduce the concepts in cardiac psychology, before the lack of research in other cardiac disorders is considered. The focus will then remain on adjustment to CHF, firstly outlining the definition, biology and epidemiology of CHF and secondly the prevalence and prognosis. Thirdly there is an in-depth review of papers assessing psychological adjustment to CHF followed by the theoretical models underpinning this adjustment process, with a particular focus on the

role of social support. Fourthly the literature that has identified predictors of psychological morbidity in CHF patients is reviewed. Fifthly the literature focusing on the influence of psychosocial factors on physical morbidity and mortality in CHF patients is reviewed followed by consideration of the proposed mechanisms for this link. The theoretical model underpinning this study is then discussed and finally the rationale for this present thesis is outlined followed by the specific aims and hypotheses.

The heart has the vital task of supplying the body with oxygen-rich blood and transferring the oxygen-depleted blood for further enrichment in the lungs. To fulfil this role, the heart must have adequate supplies of oxygenated blood itself (through the coronary arteries) and changes in these vessels that result in insufficient delivery of blood to the heart result in coronary heart disease (CHD) or coronary artery disease (CAD) (Langosch 1989). Changes can occur due to the deposit of fatty material, atheroma, and the build up of this in the arteries is known as atherosclerosis. The atheroma reduces the diameter of the artery and therefore restricts blood flow (Alimo 1990). Manifestations of CHD include angina pectoris and myocardial infarction (MI) (Langosch 1989). Angina is commonly felt as tightness or cramp-like pain across the chest, sometimes also spreading to the arms and neck. It is caused by part of the heart becoming ischaemic (deprived of blood) as a result of the reduced blood flow through the arteries narrowed by atheroma. It is however relieved by rest, enabling the heart to recover. MI is a sudden blockage of one of the coronary arteries (possibly due to a blood clot) at a point where atheroma is present. This causes a similar pain to angina but rest does not relieve it. Lewin (1989) stated that in 30-50% of cases, death will occur because of the disruption of the orderly contractions of heart by a strong electrical signal produced by the dying tissue, resulting in cardiac arrest. In those who survive, the damaged heart muscle is replaced by scar tissue and it is as a

result of this that CHD is the commonest cause of Heart Failure. Coronary artery surgery is performed to literally 'bypass' the narrowed or blocked arteries to allow more blood and oxygen to reach parts of the heart that have previously been receiving an insufficient supply (Alimo 1990).

The extent of attention that CHD receives is hardly surprising given its status as the major cause of premature death. CHD kills more than 110,000 people a year in England alone and more than 41,000 of these are under the age of 75 (Department of Health 2000). Furthermore as mean life expectancy continues to rise, the prevalence of all heart disease is set to simultaneously increase (Saner 1998). Currently it is estimated that 150,000 people experience and survive an MI every year in the UK (British Heart Foundation 1997) and with continuing developments in the field of medicine, the percentage of those surviving is ever increasing.

There is a mass of literature on people who have experienced an MI, perhaps because this group is easily defined and because there has been a strong emphasis on rehabilitation with these patients. Indeed research with this patient group has led to the highlighting of psychosocial factors as being important in cardiac disease. Therefore the main findings of research with post-MI patients will be reviewed before considering other groups of cardiac patients.

1.1 LITERATURE RELATING TO POST-MI PATIENTS.

1.1 (i) Psychological morbidity post-MI.

The experience of an MI is a frightening one and it is therefore unsurprising that adjustment following an MI is difficult for patients. They are often faced with a need to

make significant lifestyle changes, a possible threat to the financial well-being of themselves and their family and an increased fear of premature death (Lewin 1997). A number of studies have looked at psychological functioning in patients who have experienced an MI. Major depression has been detected in varying levels in studies; the percentage was quoted at 15-30% in a recent review (NHS Centre for Reviews and Dissemination 1998). The range of values reported could be due to the time-point that the measurement of depression was taken following the MI and also the type of measure used to detect depression. The significance of these findings is that this percentage of depression is higher than that found in the general population and that the level of depression is not significantly related to the level of residual damage following an MI or the severity of the disease (Ladwig et al 1994). Depression has a significant effect on quality of life in post-MI patients and it also carries a more sinister threat of an increased risk of death, independent of traditional post-MI risk factors (Frasure-Smith et al 1993).

Anxiety has been found to be more prevalent than depression in post-MI patients with figures of up to 50% of patients (six months after their MI) showing anxiety levels above that found in the general population (NHS Centre for Reviews and Dissemination 1998). Langosch (1994) found that this anxiety can be persistent and even progressive, with some patients feeling more nervous at seven years after their MI than at two months post-MI.

In summary depression and anxiety levels in post-MI patients have been found to be significantly higher than those found in the general population and it is these psychological components that lead to undue illness behaviour and increased (and potentially unnecessary) use of health resources (Lewin 1998). Frequently it is these

psychological and social barriers that prevent patients from recovering from an MI, not physical ones (Lewin 1997) and this is why there has been a surge of interest in the psychosocial components of cardiac rehabilitation programmes. Factors that have been found to be linked to depression and anxiety in post-MI patients are individual factors (e.g. sex and prior psychiatric history, e.g. Lloyd & Cawley 1983), cognitive factors (e.g. specific incorrect beliefs termed 'cardiac misconceptions' and causal attributions, see Petrie & Weinman 1997), behavioural factors (e.g. avoidance of activity) and factors relating to the partners of post-MI patients (see NHS Centre for Reviews and Dissemination 1998).

1.1 (ii) Psychosocial factors associated with physical morbidity and mortality in post-MI patients.

A number of studies have shown the importance of psychosocial factors in predicting future physical morbidity in post-MI patients. For example, at a 12-month follow-up 77.8% of patients who were defined as depressed at an angiography 12 months previously, had experienced at least one cardiac event compared to only 34.9% of the non-depressed group (Carney et al 1988). The effect of depression has also been shown to be an important determinant of current poor physical functioning (Ades 1999). For example, depressed patients have been found to walk less far on an exercise test and develop earlier symptoms of angina (Channer et al 1988). Also Denollet (1993) found fatigue to be related to negative affect and not cardiorespiratory fitness.

As noted previously researchers have also linked psychological variables to survival. Post-MI depression has been shown to be a significant predictor of 18-month post-MI cardiac mortality (Frasure-Smith et al 1995). Indeed Lewin (1989) summarises the

growing number of studies that have linked anxiety and depression with early death. Other factors such as being social isolated and a high degree of life stress, have also been shown to increase the risk of death, post-MI (Ruberman et al 1984). Therefore as noted previously this research has raised the profile of psychological factors in cardiac disease and allowed psychologists to contribute to the planning and implementation of holistic cardiac rehabilitation.

In summary, research with post-MI patients has identified a high prevalence of psychological distress in terms of anxiety and depression in patients following a MI. Furthermore it has highlighted the importance of psychosocial factors in predicting hospitalisation, the use of medical care and mortality.

1.1 (iii) Lack of research with other cardiac populations.

The cardiac population is diverse and research with other cardiac patients such as, cardiac surgical patients, has begun although they have not yet received attention to the same extent as MI patients. Chronic Heart failure (CHF) patients have received little attention from health psychology researchers. Some of the reasons suggested for this have included: the difficulty of diagnosis and definition of CHF (even cardiologists fail to agree on a definitive diagnosis) and hence accuracy relating to the point of onset; the difficulty with quantifying the symptoms associated with CHF; and the fact that CHF is often associated with other chronic diseases. It may even arise as a consequence of other underlying medical conditions, making it difficult to partial out the effects of the CHF from the other conditions (Profant & Dimsdale 2000). These authors highlight the poor attention given to this topic by psychosocial investigators in their review of the number of papers on cardiovascular disease in behavioural medicine journals in 1996. They illustrate

the complete lack of papers on CHF (see Profant & Dimsdale 2000: 250, Table 2). They conclude that, “behavioural medicine coverage of this topic has been conspicuous by its absence” (Profant & Dimsdale 2000: 249). Given this and the growing knowledge base about other cardiac populations such as post-MI patients, the present research was developed to fill in the gap on the psychological factors associated with CHF.

1.2 CHRONIC HEART FAILURE (CHF): DEFINITION, BIOLOGICAL ASPECTS AND EPIDEMIOLOGY.

“There is no universally agreed definition of heart failure” (Cowie et al 1997: 208). CHF is a syndrome characterised by a constellation of signs and symptoms produced by the circulatory and neurohormonal responses to cardiac dysfunction (Cowie et al 1997). Put more simply, Profant and Dimsdale (2000: 236) define the syndrome of CHF as, “ a chronic inadequate contraction of the heart muscle resulting in insufficient cardiac output”. CHF is frequently the end-point of a number of disease processes, e.g. coronary artery disease (as discussed earlier), hypertension, defects of the valves within the heart (e.g. damage to the heart valves from rheumatic fever in childhood), alcohol misuse or viral infection (Cowie et al 1997). Patients commonly develop oedema, (less efficient blood circulation results in blood pooling in veins and fluid accumulation in the surrounding tissue) frequently in the legs (causing swelling) and in the lungs (causing congestion and shortness of breath). The biological aspects of CHF will now be considered.

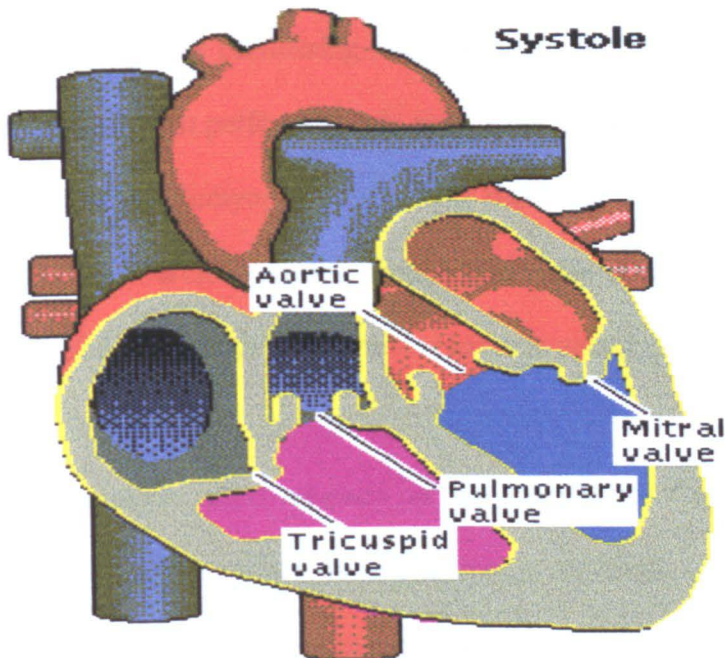


Figure 1.1 illustrates the four chambers of the heart, the upper two chambers, the atria and the lower two chambers, the ventricles. The right side of the heart receives deoxygenated blood from the body and pumps it to the lungs for oxygenation. The left side of the heart receives oxygenated blood from the lungs and pumps it around the body. During diastole, the atria are filled with blood from the veins, the valves leading to the lower chambers (tricuspid and mitral valves) then open and the atria contract, thus emptying the blood into the ventricles (i.e. atrial systole). During ventricular systole the ventricles contract, these valves close and the exit valves into the arteries (pulmonary and aortic valves) open, thus ejecting blood into the arteries (Cleland 1999a). These contractions are controlled by electrical signals with an area of the heart (i.e. sinoatrial node), acting as a pacemaker to ensure regular and even contraction of the heart. In a heart that is not working efficiently, blood will continue to return to the heart thus increasing the pressure and possibly causing the heart to enlarge (Cleland 1999a). Damage to the valves resulting in leaks or

narrowing, thickening of the heart muscle (due to prolonged high blood pressure), scar tissue in the heart muscle (as a result of an MI) and irregularities with the heart rhythm all result in the heart performing less effectively and therefore can all cause heart failure. The heart muscle can perform poorly even when patients have normal coronary arteries, this is known as cardiomyopathy of which there are a number of causes including inherited conditions. Cardiomyopathy accounts for only about one in fifty cases of CHF, but it is responsible for a high proportion of cases in young people (Cleland 1999a).

One commonly used measure of the severity of CHF is the left ventricular ejection fraction (LVEF), which is a percentage of total volume pumped out from the left ventricle. This is often measured using an echocardiogram. In healthy people the average LVEF is 70% and frequently used cut-off of 35% is used to indicate heart failure. The New York Heart Association (NYHA) class is another common measure, which is an index of functional impairment, based on the symptoms that the patient is experiencing.

The diagnosis of CHF is also problematic since no one investigation is considered the 'gold standard' for confirming the diagnosis (Cowie et al 1997). Symptoms and signs, Echo Doppler cardiography, nuclear studies, cardiac catheterisation, exercise testing and measures of neurohormonal activation can all be used to achieve a diagnosis of CHF and the various merits and drawbacks to these approaches to diagnosis are discussed in Cowie et al (1997).

The incidence and prevalence of CHF has increased and whilst the mortality and morbidity from most cardiovascular diseases have decreased, the mortality and morbidity from CHF have dramatically increased (Massie & Shah 1997). These are linked to the

greater percentage of patients who now survive a cardiovascular disease and then go on to develop CHF, the increased longevity of life, the increase in the prevalence of diabetes mellitus in older adults (Massie & Shah 1997) and the improvement in imaging techniques for the diagnosis of CHF. A study in Liverpool estimates prevalence rates at 15 cases per 1000 population and 80 cases per 1000 population in those over the age of 65 years old (Mair et al 1996). Clearly this figure changes according to diagnostic criteria, methodology and timing (Cowie et al 1997). But overall the evidence is that the prevalence of CHF will increase (Cleland 1999b) and is set to be “one of our greatest public health problems of the future” (Eriksson 1996:35). Already CHF is a public health problem in terms of cost with CHF patients having the highest reported hospital readmission rates for all patients groups (Hawthorne & Hixon 1994). Massie and Shah (1997: 710) report a summary of the exorbitant costs to the health service associated with CHF.

The prognosis for patients with CHF is poor and is associated with a marked reduction in life expectancy at any age (Cowie et al 1997). MacMahon and Lip (2002) report a 1-year mortality rate of approaching 40% for patients with advanced heart failure. Five-year mortality rates from CHF have been put at 75% in men and 62% in women (Ho et al 1993), which are actually higher than mortality rates for all forms of cancer (Berry & McMurray 1999). For those patients with less severe CHF, it is possible to live many years, although many have impaired quality of life (see Moser & Worster 2000 for a review).

1.3 ADJUSTMENT TO CHRONIC HEART FAILURE.

1.3 (i) Chronic Heart Failure and Depression.

At the conception of this research, there were only a handful of articles to review since, as noted earlier, researchers had ignored this area. However in the past two years there has been a proliferation of research, to such an extent that two review articles have been recently written on psychological factors in heart failure (MacMahon & Lip 2002; Profant & Dimsdale 2000). Those studies relating specifically to the prevalence of depression are illustrated in the table 1.1.

KEY FOR MEASURES IN THE TABLE.

BDI	Beck Depression Inventory (Beck et al 1961).
CBA 2.0	Cognitive Behavioural Assessment Battery 2.0 (Bertolotti 1990).
CES-D	Center for Epidemiologic Studies Depression Scale (Radloff 1977).
DIS	National Institute of Mental Health Diagnostic Interview Schedule (Robins et al 1981.)
GDS	Geriatric Depression Scale (Brink & Yesavage 1982)
HDRS	Hamilton Rating Scale for Depression (Hamilton 1967).
MINI	Mini International Neuropsychiatric Interview (Lecrubier et al 1997)
PRIME-MD	A screening questionnaire for mental disorders in primary care settings (Spitzer et al 1994).
Zung SDS	Zung Self-rating Depression Scale (Zung 1965).

Table 1.1: Summary of the main findings of studies assessing the prevalence of depression in CHF patients.

Article	N in study.	Prevalence of depression	In-patient or out-patient. Age exclusion (years)***	CHF status of participants	Measure of depression
Freedland et al (1991)	60	17% Major depressive disorder.	In-patient. Age > 70	Radiographic or clinical evidence	Modified version of DIS
Zuccala et al (1995)	53	85% Severe depressive symptoms	Not stated. Mean age = 72	Echo. evidence	CES-D scale
Fraticeilli et al (1996)	50	Mod. dep. – 18% Severe dep. – 8%	In-patient Age > 60	Clinical findings, chest X-ray and response to med.	GDS scale
Hodges et al (1998)	738*	32.8% dep.	In-patient Mean age = 77	Not stated.	GDS scale
Koenig (1998)	542* (107)	26.0% Major dep. 32.0% Minor dep.	In-patient. Age > 60	Not stated.	1) CES-D Scale. 2) Dep. disorders section of DIS. 3) HDRS
Krumholz et al (1998)	292	23.2% dep.	In-patient Age => 65	Symptoms of CHF and radiographic evidence	CES-D
Murberg et al (1998a).	119	27% Mild dep. 11% Mod.-marked dep. 2% Severe dep.	Out-patient Mean age = 66	1.7% NYHA I 59.7% NYHA II 36.1% NYHA III 2.5% NYHA IV	Zung SDS

*Not all participants had CHF. (N of CHF participants, if given)
 **Patients had cardiomyopathy
 *** Mean age used when no exclusion

Article	N in study.	Prevalence of depression	In-patient or out-patient. Age exclusion (years)***	CHF status of participants	Measure of depression
Havranek et al (1999).	76* (45)	CHF patients had higher CES-D scores than controls.	Out-patient. Age > 18	LVEF < 40% and dyspnea + Clinical exam or Radiographic evidence	1) CES-D 2) PRIME-MD
Majani et al (1999)	152	Depressive behaviours sig. higher than control group	In-patient Age > 70	12 % NYHA I 47.3 % NYHA II 40.7% NYHA III 0% NYHA IV	CBA 2.0 Battery
Griez et al (2000)	93* (50)**	12% Major dep.** 4 % Dsythymia**	In-patient Age 20-69	LVEF < 45 %	MINI
Skotzko et al (2000)	33	42% dep.	Out-patients Age > 60	LVEF=<40%and NYHA II or III and symptoms for 3 mths and taking ACE-inhibitors	CES-D
Jiang et al (2001)	374	35% dep. on BDI 13.9% Major dep. disorder.	In-patient Age > 18	LVEF < 35% and NYHA =>II	1) BDI 2) Modified DIS
Nelson & Jordan (2001).	54	21% Clinical dep. 41% Mild dep.	Out-patient Age not stated	Not stated.	Zung Depression Inventory.
Vaccarino et al (2001)	391	9% Severe dep. 33.5% Mod. dep. 35% Mild dep.	In-patient. Age = > 50	Prior diagnosis or radiologic signs and met criteria for symptoms.	GDS Short-form
Rozzini et al (2002)	800* (86)	45% dep.	In-patient Mean age = 78.6	NYHA =>III	GDS Short-form

Table 1.1 – continued.

*Not all participants had CHF. (N of CHF participants, if given)
 **Patients had cardiomyopathy
 *** Mean age used when no exclusion

The results of these studies generally seem to indicate a high level of depression in CHF patients. However clearly the prevalence varies according to the measure, participants and time point of measurement. Each study will be briefly reviewed with an analysis of the strengths and weaknesses.

Freedland et al (1991) appear to be one of the first studies looking at the prevalence of depression in CHF patients. The use of the DIS (see page 11) seemed appropriate and the high inter-rater agreement between the resident and senior clinician increases the reliability of the diagnosis of depression. Furthermore because these authors analysed the participants' diagnoses to evaluate depression even when the co-morbid symptoms of depression and CHF were excluded (i.e. fatigue and insomnia), this increases the reliability of the diagnosis of depression. Interestingly these researchers found that a significantly greater number of white patients met the criteria for major depression than black patients, i.e none of the black patients were clinically depressed. They concluded that there was a higher prevalence of depression in CHF patients than the general population. However the study could also be criticised for its pre-selection of an in-patient population and this criticism could be applied to a number of the above studies. It could be argued that the measurement of depression during an in-patient stay is not an accurate reflection of the patient's usual state. Many researchers have commented on the distress that hospitalisation involves, so assessment at this point could augment the usual level of distress felt by patients. Measurement of in-patient distress in CHF patients is useful for clinical practice, but the results cannot be generalised to community-dwelling CHF patients.

Zuccala et al (1995)' s letter to the Editor of the Journal of American Geriatric Society gave a brief summary of a study that examined the role of depression in determining functional health status and health perception. The assessment of depression relied on a self-report measure (the CES-D, see p 11) that includes the somatic complaints of psychomotor retardation, loss of appetite and sleep disorders. This questionnaire is completed by the participant as an evaluation of symptoms experienced over the last week. The use of this questionnaire in the study has several problems associated with it. Firstly, the somatic items may overestimate the prevalence of depression in medically ill patients such as patients with CHF. Secondly, the authors do not share the cut-off score that they used to select the 'severely' depressed patients that they report on. Thirdly, McDowell & Newell (1996) warn against using screening questionnaires to diagnose depression and suggest that once patients with high levels of depression have been identified then a further assessment should take place to confirm a diagnosis of depression. Fourthly, one of the major criticisms of the CES-D is that it tends to assess 'non-specific demoralisation' rather than symptoms specific to depression and it therefore it has a high false positive rate (McDowell & Newell 1996). Finally the restriction of assessment of symptoms experienced over the previous week alone would not fulfil the Diagnostic and Statistical Manual Fourth Edition (DSM-IV) (American Psychiatric Association 1994) criteria for the diagnosis of depression where the symptoms of depression have to have been present for at least a fortnight. These criticisms suggest that the high prevalence reported by Zuccala et al (1995) may in fact be an overestimate of depression.

Krumholz et al (1998) examined the prognostic importance of emotional support for elderly patients hospitalised with heart failure. They assessed depression using the CES-D

directly before the hospitalisation for heart failure. In addition to the previously discussed difficulties with the CES-D, the time point that the measure was taken may have influenced the level of psychological distress, which may have inflated the depression scores.

Skotzko et al (2000) set out to study the effect of depression on accurate assessment of functional status and as part of this study, assessed the prevalence of depression in 33 CHF patients. They concluded that there was a high prevalence of depression in ambulatory CHF patients. The strict medical inclusion criteria ensured the homogeneity of the CHF group. However the limitations of diagnosing depression in CHF with the CES-D have already been highlighted and this limits the conclusions that can be drawn from this study.

Hodges et al (1998) compared the prevalence rates of self-reported depressive symptoms in patients with systemic and nonsystemic diseases whilst Fraticelli et al (1996) studied just patients with CHF. Both studies used the GDS (see page 11) with the commonly used and accepted cut-off of 11 points (McDowell & Newell 1996). However as argued previously, there are problems with only using a self-report measure that focuses on the past week, since a follow-up clinical interview would also be necessary for a diagnosis of depression. Again these studies suffered from the limitation of selecting an in-patient population only and therefore the reported prevalence may have been inflated.

Koenig (1998)'s study compared prevalence rates of depression in three in-patient populations: patients with CHF, cardiac patients without CHF and patients with other medical diseases. He found that the rate of major depression was significantly higher in

patients with CHF (36.5%: 25.5%) compared to cardiac patients without CHF but rates of minor depression were similar in both groups. The CES-D (used with a cut-off of 16) was followed up with the DIS (see page 11), which is an effective way of diagnosing depression. However one (unblinded) psychiatrist conducted all of the interviews so the reliability of the diagnosis could be questioned, as there was no corroboration of diagnosis. The Hamilton Depression rating Scale (HDRS) was used additionally to diagnose depression. Koenig (1998) used the “inclusive” method of counting all symptoms (regardless of aetiology) towards the diagnosis of depression and there are limitations associated with this, such as including somatic symptoms more reflective of functional state rather than depressive mood. However the other stringent criteria that were used for the diagnosis of depression make it unlikely that depression was overestimated in this study (see Koenig 1998:31). The MMSE was also used to assess cognitive impairment in patients. The inclusion of the assessment of prior psychiatric history (using structured questions) was another strength of this research because the higher prevalence of major depression in CHF patients than in other cardiac patients was regardless of past psychiatric history. Interestingly when Koenig controlled for the severity of illness the difference in major depression between CHF patient and cardiac patients without CHF was reduced to the 10% probability level, indicating that the severity of illness should be controlled for when assessing the prevalence of depression in CHF patients. One criticism of this study would be its exclusion criteria for the study. Koenig (1998: 30) describes the full exclusion criteria but notably he excluded patients admitted from Nursing Homes and patients from Coronary Care Unit (CCU), which in effect excludes some of the main patient groups with CHF and so the sample in this study may be biased towards slightly healthier patients with CHF. In addition this study suffered from the aforementioned limitations of using in-patients for assessing prevalence

rates. A further clinically interesting result from Koenig's extensive study was that the majority of depressed CHF patients did not receive treatment for their depression.

Murberg et al (1998a) examined out-patients with CHF, who were invited to participate in the study by a letter. They had a fairly good response rate for this postal study i.e 57.9% responded. They concluded that a 13% prevalence rate of moderate-severe symptoms of depression was not significantly higher than that found in the elderly community dwelling population when consideration is given to the fact that some scores on the Zung SDS (see page 11) may have been inflated by the somatic symptoms of CHF. McDowell and Newell (1996) note that recent reviews of the Zung SDS have generally been negative since it evaluates frequency of symptoms but not severity and has lower sensitivity and specificity when compared to other self-report measures. Therefore the reliability of Murberg et al (1998a)'s depression prevalence figures may be limited. MacMahon and Lip (2002) also suggested that the recruitment of participants for this study might have resulted in a bias towards a healthier (only 2.5% of patients were in NYHA class IV) and younger population, i.e. a restricted sample. Furthermore they argued that patients who were experiencing anxiety and depression may not have volunteered for the study because of a fear that the study may exacerbate symptoms (by answering questions on these issues). Therefore, they conclude that this study may have underestimated depression.

Havranek et al (1999)'s study compared the prevalence of depression in CHF patients to controls with hypertension but with no evidence of heart disease by history, physical examination or electrocardiogram. They concluded that the CES-D scores for CHF patients were significantly higher than the scores for the control group. Interestingly they argue that the CES-D was not influenced by the somatic items related to CHF because patients

with more severe CHF did not have higher scores of depression. However as they note themselves, the CES-D was not backed up with any form of diagnostic interview. Also a relatively small number of participants were recruited to each group (CHF participants: controls = 45:31) and there was no mention of any matching between CHF participants and controls. A further limitation that the authors also note is the failure to consider the confounding effects of medications.

Majani et al (1999) studied only male patients under the age of 70 years who were waiting assessment for Heart Transplants. There are limitations with these exclusion criteria because a bias towards a younger (and therefore more healthy) and male patient group ignores some of the main people who make-up the CHF population. The use of patients awaiting assessment for heart transplants is already a selected group and there are separate issues relating to the possibility of being accepted for the transplant that may have influenced the psychological state (Cleland & Wang 1999). The study compared CHF patients with healthy participants matched for age and sex. The reliability and the validity of the CBA 2.0 (see page 11) are not clear from the study. The authors concluded that when CHF patients in the age group 41-60 years were compared with the controls, they showed significantly higher levels of depression. However as well as the limitations already noted for this study, Cleland and Wang (1999) highlight that only 38% of patients completed their questionnaires. Therefore these results from a small selected group of patients with CHF cannot be generalised.

Griez et al (2000) examined the association between panic disorder and cardiomyopathy but their design was such that all psychiatric diagnoses were considered in a group of patients with cardiomyopathy and a group of patients with left ventricular dysfunction but

no cardiac failure. The assessment was with the MINI (see page 11), which diagnoses according to the DSM-IV scale, by experienced clinicians blind to the cardiac diagnosis. Therefore the diagnosis of depression appears to be valid. There is however one methodological flaw with this study since some of the participants were undergoing screening for heart failure and some of them were actually cardiac transplant candidates. This, as discussed previously, possibly makes this group of participants healthier than most CHF patients and also the separate issues involved in cardiac transplantation may influence the psychiatric diagnoses. Also the focus of the research on cardiomyopathy patients with active exclusion of patients with cardiac failure caused by any other medical condition limits the extent to which the results can be generalised.

Jiang et al (2001) initially screened patients with the BDI (see page 11) and only interviewed participants who scored over ten points on the BDI. The BDI is inflated by somatic symptoms common to CHF. However the use of the structured interview to diagnose depression overcomes any over-estimation problems. Furthermore McDowell & Newell (1996) argue that the BDI is one of the best depression screening tools available. The medical inclusion criteria for this study also seem to be appropriately rigorous combining the functional status (NYHA class greater than or equal to II) and physiological severity (LVEF less than or equal to 35%). Therefore this study's depression prevalence figures appear to be valid and representative for in-patients. The same problems apply when trying to generalise these results to outpatients.

Nelson and Jordan (2001) ran a pilot study to assess the results of a pilot program on depression in patients with CHF. A measure of depression was taken prior to starting the programme with the Zung SDS and a high percentage of patients with CHF scored

positive for depression. However the authors do not describe the medical criteria for CHF inclusion in their study or the cut-off score used for the Zung SDS. The study also has small numbers and no indication of the variability of disease status amongst this number. Therefore only very limited conclusions can be drawn from this study.

Vaccarino et al (2001) prospectively followed patients, who had met criteria for compensated heart failure on admission, over a six-month period. They initially took a measure of depression with the GDS and they found that depressive symptoms were frequently noted. The inclusion criteria for the study were strict and the authors report no refusal. The GDS, as the authors note, is well suited to assessing depression in older adults with medical problems because it does not focus on somatic symptoms. Rozzini et al (2002) also used the GDS short-form with a series of patients consecutively admitted onto an elderly medical unit. They found that the percentage of participants with CHF and depression (using a cut-off of 5) was high, although the medical criteria for inclusion as a CHF patient was not as strict as Vaccarino et al (2001) with only functional status being considered. However there are still several limitations common to both these studies, firstly, the GDS was given on an in-patient basis. Secondly there was no follow-up with an interview to confirm the classification following the use of the screening questionnaire. Finally, participants were not screened for cognitive impairment and as McDowell and Newell (1996: 262) note, “the GDS is less valid in assessing cognitively impaired patients”.

In summary several studies have now, either directly or indirectly, assessed the prevalence of depression in CHF patients. However there are many methodological weaknesses with these studies that limit the extent of generalization that is possible. A

common limitation with the methodological design is the exclusion (e.g. Griez et al 2000) or sole inclusion (e.g. Freedland et al 1991) of older adults. CHF occurs across the age span (albeit less frequently in younger adults) and a representative sample should reflect this. Furthermore the researcher could not find any studies looking at the prevalence of depression in a sample of CHF patients in the UK. Therefore there is a need to determine the prevalence of depression in a sample of UK patients and in addition, validate a tool sensitive to depression in this group of patients (Freedland et al 1991).

1.3 (ii) Chronic Heart Failure and anxiety.

Although there has been an upsurge in interest in the relationship between CHF and depression, the same cannot be said for the anxiety disorders. Profant and Dimsdale (2000) could find no studies specifically looking at anxiety disorders. Majani et al (1999)'s study did include a measure of state and trait anxiety (The State-Trait Anxiety Inventory (STAI)) (Spielberger et al 1970) but no significant differences were found between scores on these measures for the CHF patients and healthy subjects. This indicates that CHF patients do not experience significantly higher levels of anxiety than healthy participants. However as noted earlier there are limitations with this study because of the inclusion criteria and therefore this study does not provide a reliable prevalence of anxiety. Furthermore as MacMahon and Lip (2002) note, the authors do not report if participants were aware of their diagnosis and the prognosis associated, which may influence their psychological adjustment.

Hawthorne and Hixon (1994) assessed anxiety as part of a global assessment of psychological disturbance with the Profile of Mood States (POMS) in CHF patients. They found that one of the domains with the highest disturbance was the tension-anxiety

scores. However overall the mood disturbance in this sample was lower than reported normative values. Also the authors do not report the full results for the tension-anxiety domain therefore no further conclusions can be drawn. It is also worth noting the sample size for this study was small (N = 29).

As discussed previously Griez et al (2000) designed a study specifically to look at the prevalence of panic disorder in patients with idiopathic cardiomyopathy. They found a prevalence rate of 12% for panic disorder, 6% for agoraphobia, 16% for generalized anxiety disorder and 4% for social phobia in patients with idiopathic cardiomyopathy. Rates of panic disorder were also high in the control group (left ventricular ejection equal to or less than 45%, but no cardiac failure). This is a useful start in the assessment of anxiety disorders in patients with CHF however as this is restricted to patients with idiopathic cardiomyopathy then the results cannot be generalised.

In summary, “anxiety appears to be an over-whelmingly neglected area of study in heart failure” (MacMahon & Lip 2002: 515). A systematic study of anxiety disorders in CHF patients and the validation of a screening tool seems an important area to be followed in this field, particularly because in CHF patients anxiety can negatively affect cardiac output (MacMahon & Lip 2002).

This present review of the literature relating to psychological morbidity in CHF patients is the most comprehensive review conducted, to this researcher’s knowledge. MacMahon and Lip (2002) were selective in their review, excluding articles that did not sufficiently distinguish disease co-morbidity and articles in which other factors (such as impending surgery) were an issue. Their review also included literature covering social support and

coping styles so not all of the studies were related to the psychological factors of anxiety and depression. In total they reviewed 12 articles. The other review in this area examined all psychosocial factors in relation to CHF including aspects such as stress, adherence and the impact of CHF on relationships (Profant & Dimsdale 2000). Only one section of their review was devoted to the review of articles examining psychological morbidity in CHF patients and this section reviewed only two articles. Profant and Dimsdale (2000) did also discuss studies conducted on CHF patients awaiting heart transplants but as discussed earlier this is a slightly different patient population.

It must be highlighted that not all patients with chronic illnesses (such as CHF) experience clinically significant psychological distress. Therefore theories have been proposed to explain the individual differences in adjustment to chronic illness. These theories and models will now be reviewed.

1.4 THEORETICAL UNDERPINNINGS OF ADJUSTMENT TO CHRONIC ILLNESS.

1.4 (i) Why do people have an emotional response to illness?

Illness has been conceptualized as a threat to self that represents a crisis because of the basic assumptions that individuals hold about themselves and the world. Janoff-Bulman (1985, 1989, 1992) has argued that individuals believe in personal invulnerability so whilst they accept that disease, crimes and accidents happen to other people they cannot believe that these misfortunes can happen to themselves. A health threat shatters this assumption so the individual feels vulnerable, which damages their self-esteem and self-image, and furthermore has to face a number of changes in identity, role, future plans and possibly environment (if the patient has to be hospitalised) and therefore changes in

social support (Moos and Schaefer 1984). Several aspects associated with the nature of illness exacerbate these crisis perceptions, e.g. limited prior experience of coping with illness, the uncertainty associated with illness (it is not always possible to predict how an individual will react to physiological changes, treatment or how long they have to live), and changes in appearance and bodily functioning (Ogden 1996). Most chronic illnesses also require lifestyle change and possibly adherence to a medical regime, which many individuals find threatening. In summary it is the threat of illness, the shattering of basic assumptions and the nature of illness that have been theorised to explain why individuals respond emotionally to illness.

1.4 (ii) What influences the emotional response to illness?

One of the major influences perceived to influence the emotional response to illness has been termed the representation of health threat. Leventhal and colleagues (Leventhal et al 1980; Leventhal & Nerenz 1985) argued that individuals held beliefs about their illness (illness cognitions) that determined the perceived health threat. The dimensions of these beliefs were proposed to be identity (the name of the illness and the symptoms), perceived cause of illness, time line (beliefs about the duration of illness), consequences (perceived effects on life) and curability or controllability of illness (Ogden 1996). Different combinations of these beliefs influence the emotional response to the illness, e.g. if one has lung cancer attributed to smoking and has an understanding that approximately six months of life with the possibility of continued pain is all that remains, then the emotional response is understandably very different from an individual who has an acute flu. Turk et al (1986) have suggested that there are four dimensions to the individuals' model of illness: seriousness, personal responsibility, controllability and changeability (Marteau 1995).

These theories of explaining individuals' response to illness by their understanding of the threat posed by illness have been criticized for ignoring the broader environmental influences on behaviour (e.g. Winett 1985). For example, individuals are influenced by the perceptions of friends, family and colleagues and their beliefs about the threat posed by the illness (Ogden 1996). Furthermore there are social norms that describe how one should react to illness depending on age, sex and culture.

1.4 (iii) The role of social support in depression with patients with chronic illness.

Social support has been categorized into three types, social networks (network size and density, etc), social relationships (the quantity and type of existing relationship) and social support (type of support, quantity and quality) (as defined in Cohen 1988). Within the psychiatric and psychological literature the research linking depression and social support is "voluminous" (Hammen 1997:121). In general however social support has either been argued to be a buffer against depression in the face of distress (when social support is high) or has been proposed as a main direct predictor of depression (when social support is low) (Hammen 1997). For example, perceived availability of support has been shown to be a protective factor against psychological distress during high levels of stressful life events (see Cohen 1988). Within the realm of chronic illness, social support has been used to explain the variability of the psychological response to the impact of chronic illness (Pennix et al 1998). When investigating various chronic diseases, Pennix et al (1998) found that having a partner and having many close friends had a direct favorable effect on depressive symptoms. Researchers have also considered the various subtypes of social support and their individual effects on depression within specific types of diseases. For example, as Pennix et al (1998) discuss, emotional support

protects against depression in patients with a life threatening disease (Ell et al 1989) whereas instrumental support appears to influence depression more in functionally disabled patients (Fitzpatrick et al 1991). To summarise, it appears that, whatever the mechanism, social support is a protective factor against depression. However it has been suggested that research has not addressed the possible negative or unexpected outcomes of social support (Lewis et al 1994).

1.4 (iv) Models to predict how an individual will adjust to illness.

Various models have been developed to explain factors that contribute to adjustment to chronic illness and they have all focused on the need for the individual to restore a sense of balance after the initial crisis. Moos and Schaefer (1984)'s model of coping with the crisis of illness is represented below:

Figure 1.2: Coping with the crisis of illness (Moos & Schaefer 1984).

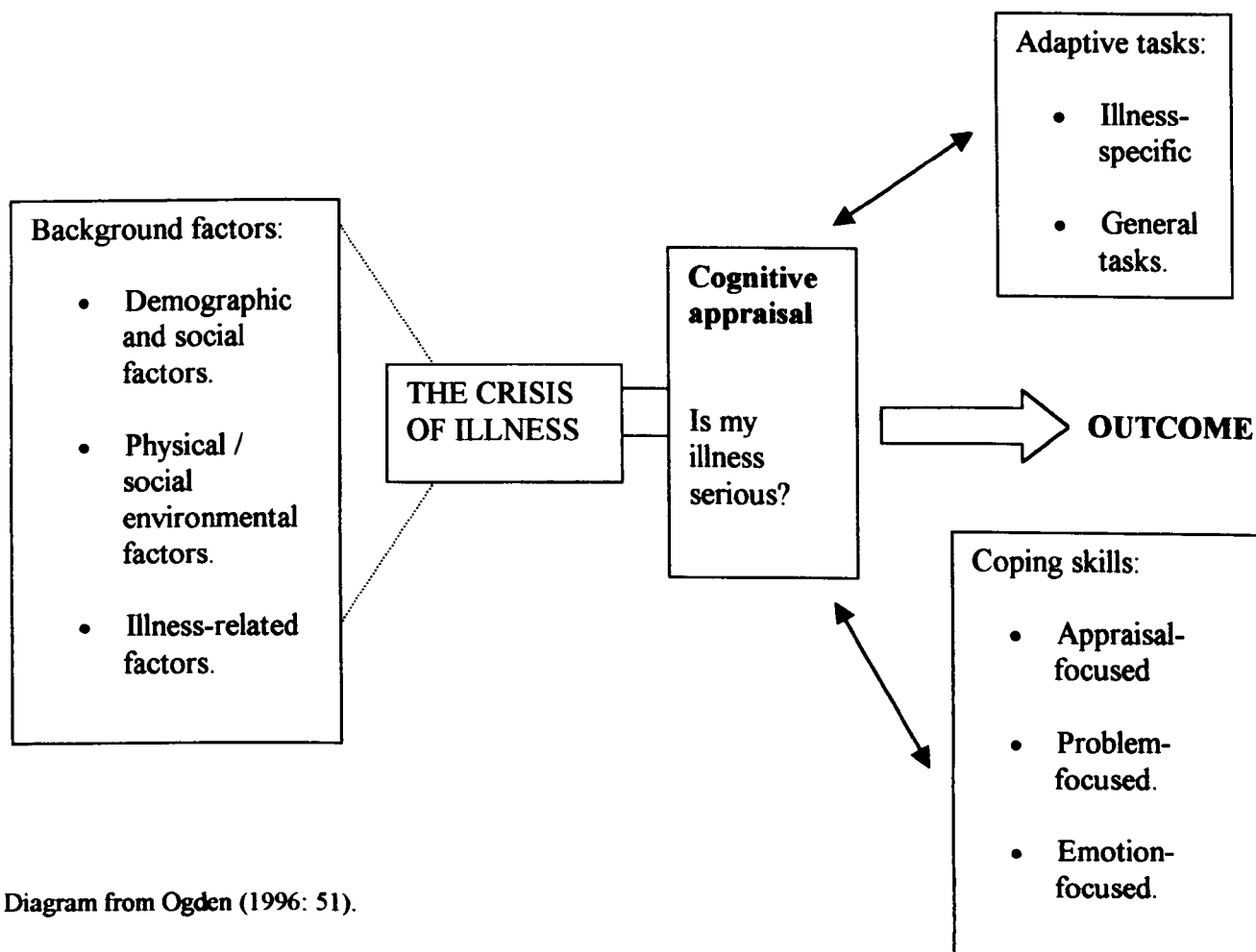
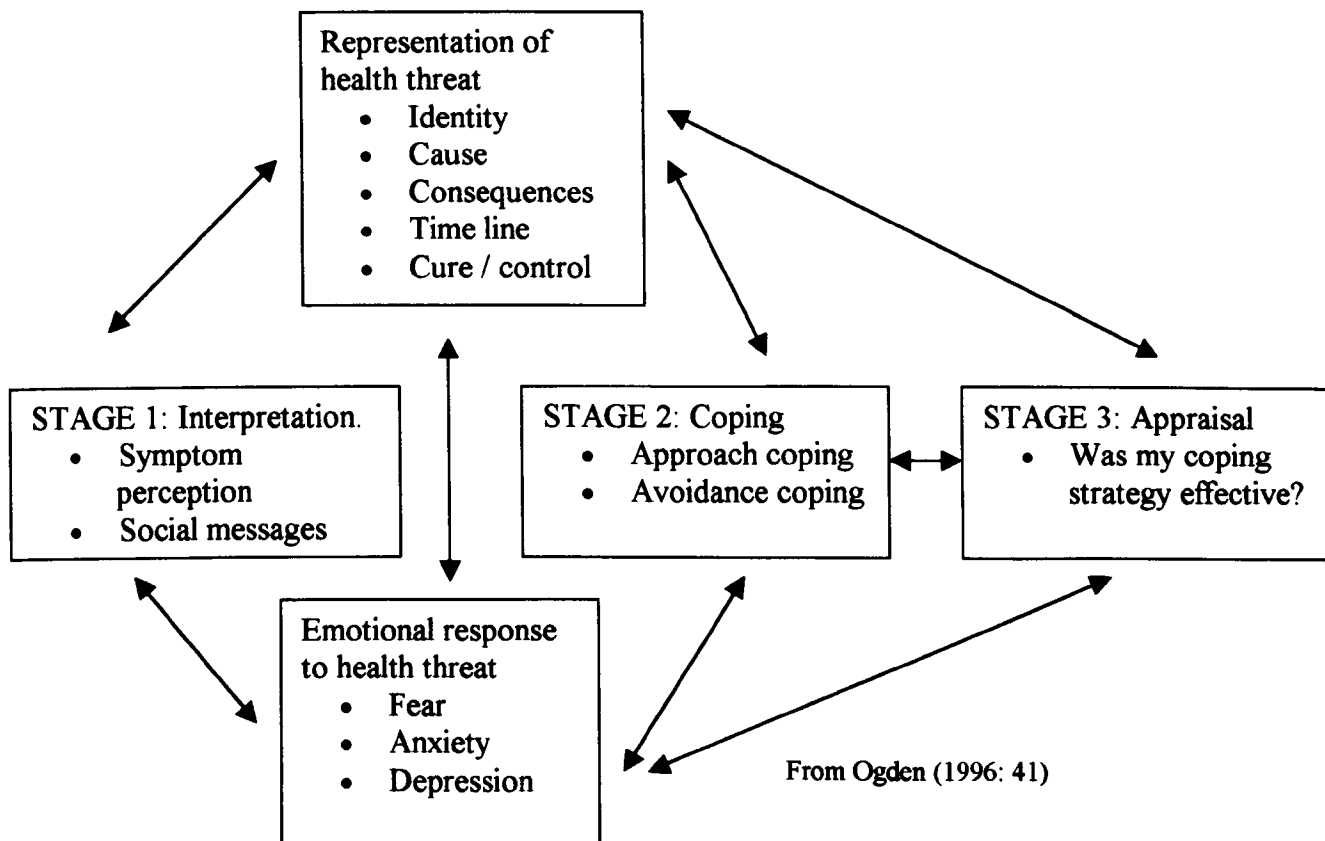


Diagram from Ogden (1996: 51).

The individual brings a range of personal qualities to the crisis point of illness and this determines their unique reaction. These qualities are grouped into demographic and social factors (such as age and sex), physical / social and environmental factors (such as the amount of social support available to the individual) and finally illness-related factors (such as the prognosis, treatment options, etc). As the system is driven to maintain homeostasis then after the initial threat from the illness, an appraisal needs to take place to consider the seriousness and the significance of the illness - similar to the representation of the health threat discussed earlier (Ogden 1996). After this appraisal, individuals are said to undertake adaptive tasks that are either illness-specific (such as dealing with pain and other symptoms) or general tasks (such as preserving an emotional balance). Following this individuals are said to access coping skills that are appraisal-focused, problem-focused or emotion-focused. Appraisal-focused coping involves the individual's attempts to understand and give meaning to the illness (Ogden 1996). Problem-focused coping involves defining the problems and generating strategies to overcome the problems. Finally emotion-focused coping involves maintaining an emotional homeostasis and dealing with emotional reactions (Ogden 1996). A combination of the appraisal, the engagement in adaptive tasks and the use of coping skills determine the outcome for the individual in terms of psychological adjustment. The strengths of this model are its inclusion of factors such as demographic and environmental factors that allow for individual responses to illness to be explained. The limitation of this model is its failure to include emotional state in the model, assuming that the individual is a rational information processor uninfluenced by emotions.

Leventhal's self-regulatory model of illness behaviour is similar to Moos and Schaefer (1984)'s model of coping with the crisis of illness but it overcomes the weakness in Moos and Schaefer's model by including emotional response in adaptation. The model is represented in the diagram below:

Figure 1.3: Self-regulatory model of illness behaviour (Leventhal).



The first stage of this model is the onset of symptoms and/or a social message that something is wrong (e.g. a diagnosis from a doctor or a message from a lay person). Leventhal argues that one is motivated to restore the sense of balance and return to 'normal' health (which explains why patients will take medications, etc) and this requires a cognitive representation of the health threat before a coping plan can be formed (Pitts & Philips 1998). The dimensions of the health threat have been discussed previously. The model's strength however is its recognition of the importance of the

emotional state influencing the development of these beliefs and vice-versa, the impact of these beliefs on emotional state. Stage two is the use of coping strategies, which again, are dependent on the health threat belief and current emotional state. These are divided into approach coping (e.g. seeking medical attention, adhering to medication regimes and discussing the problems with others) and avoidance coping (e.g. denial and distraction from the problem). Finally stage three focuses on the appraisal of the coping strategy. The model's main strength in this researcher's view is the consideration that all aspects of the model are all interlinked in a bi-directional way. It not only explains individual response to adjusting to illness but also explains the variability within an individual over time. A criticism that could be levelled at the model is its failure to consider individual factors such as demographic, social and cultural factors, although this is almost implicit within the 'representation of health threat' and 'stage one' components. A further criticism is that it has not been amenable to testing (Pitts 1998).

In summary theorists have tried to explain adjustment to chronic illness through a number of models. However researchers have focused upon identifying factors to predict psychological maladjustment rather than adjustment to chronic illness. The evidence base relating to the prediction of psychological morbidity in CHF patients will now be reviewed.

1.5 PREDICTORS OF PSYCHOLOGICAL MORBIDITY IN CHF PATIENTS.

As demonstrated recently there are very few studies that have assessed anxiety in CHF patients and furthermore none of these have looked at predictor variables of anxiety. Therefore this section will focus only on the predictors of depression. The predictors of psychological morbidity studied by researchers can be grouped under the following

headings: predictors relating to CHF, predictors relating to social support and other predictors.

1.5 (i) Predictors of depression relating to CHF.

Many researchers have found that disease severity is not related to the level of depression. For example, Havranek et al (1999) found that participants with more severe CHF did not have higher scores of depression and Zuccala et al (1995) found no correlation between left-ventricular ejection fraction (LVEF) and depression. Similarly Murberg et al (1998a) found a weak association between New York Heart Association (NYHA) class and scores on depression and no significant correlation between an indicator of severity of dyspnea and depression scores. This suggests that the severity of illness is not a predictor for depression. However by contrast, Koenig (1998) found that a measure of severity of medical illness (Cumulative Illness Rating Scale that assesses organ impairment for each of the 12 major body systems) and impaired Activities of daily Living (ADL) were significant contributors to a logistic regression model when predicting depression. However it could be argued that this measure of illness severity is not specific to CHF and therefore not measuring the same aspect of severity of illness as in the research discussed above. Murberg et al (1998a) also found that there was a strong association between perceived limitations and depression, possibly indicating that psychological distress (depression) is caused because of a decline in functional ability. Therefore it could be argued that it is not the physiological severity of the disease that is related to depression but the loss of functional ability (and therefore impairment in ADLs) that causes greater depression. However there are clearly issues relating to the directionality of this relationship. Participants who are depressed may be more likely to rate their functional ability as poor (Murberg et al 1998a) and equally it may be the depression that

is influencing their functional status (as will be discussed later). Therefore it is not possible to directly suggest functional status as a cause of depression (particularly in cross-sectional studies) although it is possible to use this as a variable to predict depression. Clearly there needs to be further research in this area before any firm conclusions can be drawn.

1.5 (ii) Predictors of depression relating to social support.

Social support has frequently been linked with the development and outcome of depression in the psychiatric literature (Krishnan et al 1998) and researchers have begun to look at social support in relation to medical illness and depression in medical illness. For example, Krishnan et al (1998) found that subjective social support was a significant predictor for the presence of depression even when the effect of demographics had been controlled for in elderly patients with heart disease. However studies specifically relating to CHF in this area are fairly sparse. Murberg et al (2001a) looked at intimate social network support (spouses) and primary social network (close family) in 119 patients with symptomatic heart failure. A scale was developed by the researchers to measure social support in terms of perceived intimate network support, primary network support and secondary network support (see Murberg et al 1998b for a description of the factor analysis involved). Social isolation was assessed using four items relating to how difficult it is to have CHF and see family or participate in social events. They found that a poor intimate network support was significantly positively associated with depression. However this sample had a larger number of males than females (85 to 43 respectively) and so this may reflect results from a male perspective only. Koenig (1998) used the Duke Social Support index (DSSI – 11 item) to assess social support in his study. Although this scale assesses two aspects of social support (social network and subjective

support) Koenig only reported a general variable of social support. He found that the depressed participants were more likely to have lower social support than non-depressed participants. However when this variable was entered into a multivariate analysis (logistic regression) it did not retain its significance when predicting depression. Freedland et al (1991) noted that depressed patients were less likely to be married and 30% had no family or friends living nearby. However the numbers in the study were too small for them to rule out a sampling error for these findings. A limitation common to all these studies is again relating to the direction of the relationship between social support and depression. When the study is cross-sectional it is not possible to say that poor social support is the cause of depression because depressed participants may perceive their social support at that time as being poor because of their negative style of thinking. However it is not necessarily the case that perceptions are distorted by depression e.g., some researchers have found that even when no longer symptomatic, previously depressed individuals have been shown to report restricted social networks or less support (e.g. Billings & Moos, 1985a, Billings et al 1983). It seems important to continue research into this area to investigate the possibility that poor social support is a predictor of depression in CHF patients.

1.5 (iii) Other predictors of depression in CHF patients.

Koenig (1998) had one more predictor variable in his logistic regression for predicting depression that retained its significance when controlling for covariates. He found that the presence of co morbid psychiatric disorders was a significant predictor of depression.

In summary the research reviewed above indicates that investigation into the predictive factors for psychological morbidity is still at an exploratory stage. It is clear that many

factors have still to be considered in terms of predicting psychological morbidity (particularly anxiety disorders) with CHF patients. As well as considering the prediction of psychological morbidity in CHF patients, researchers have assessed the role of psychosocial factors in the prediction of physical morbidity. This is discussed below.

1.6 THE INFLUENCE OF PSYCHOSOCIAL FACTORS ON PHYSICAL MORBIDITY AND MORTALITY IN PATIENTS WITH CHF.

Researchers have begun to look beyond the medical model of illness to explain and try to reduce the frequent use of health care resources, high re-hospitalisation rate and mortality rate in patients with CHF. As Friedman et al (1995: 509) argued, “The use of medical services is a function of several interacting psychological and social variables as well as a function of physical malfunction.” Researchers have been successful in linking a number of psychosocial variables with the use of health care resources and mortality. These studies will be reviewed below under each psychosocial variable.

1.6 (i) Depression.

One of the first reported studies in this area hinted at a relationship between depressive symptoms and functional ability; however when entered into a multiple regression analysis, depression was no longer a significant predictor of functional ability (Zuccala et al 1995). A later cross-sectional study supported this suggestion with depression being an independent predictor of six-minute walk test performance, NYHA class and dyspnea / fatigue score (Reschke 2001). Vaccarino et al (2001)’s prospective study provided evidence of a significant relationship between severity of depressive symptoms and subsequent functional decline over a six-month period even after adjustment for demographic factors, medical history, baseline functional status and clinical severity.

These results suggest that depression is predictive of functional status and decline in functional status over time. Limitations with these studies and their measurement of depression have been discussed in a previous section (1.3 (i)).

Researchers have also investigated the relationship between depression, use of medical facilities and the occurrence of cardiovascular events. Freedland et al (1991) reported a trend towards an increased number of in-patient days at 3 months for depressed participants. However as only 10 participants were actually classed as depressed in this study this limits the significance of the results (Koenig 1998). A similar trend was reported by Koenig (1998); readmission rates were significantly higher at the 3-6 and 6-9 month periods for depressed participants. However he concluded that the association was explained by the greater illness severity in the depressed group. By contrast Krumholz et al (1998) found no strong association between depressive symptoms and the occurrence of cardiovascular events. However Moser and Worster (2000) suggest that depression was not associated with adverse outcomes because of the high correlation between psychological and social variables that were measured as part of the study. Jiang et al (2001) also suggested a major limitation with this study, the assessment of depression occurred long before the diagnosis of CHF was made. More conclusive evidence came from Jiang et al (2001) who linked major depression with increased readmissions at one year even when controlling for age, NYHA class and ejection fraction in the multiple regression modelling. Similarly Rozzini et al (2002) wrote in support of Jiang and colleagues with their study reporting a significantly higher re-hospitalisation rate for patients with CHF and depression.

Several of the above studies also looked at the effect of depression on mortality on CHF patients. One study noted a trend of increased mortality rates in depressed patients with CHF but it failed to reach statistical significance (Koenig 1998), whereas two studies found that the association between depressive symptoms and mortality was no longer statistically significant after adjustment for factors such as disease severity and age. (Jiang et al 2001; Vaccarino et al 2001). Similarly in Konstam et al (1996)'s study depression was a significant predictor of mortality when ejection fraction, age, treatment and NYHA class were controlled in a univariate analysis. However in a multivariate analysis depression was no longer associated with mortality. The measure of depression in this study was part of a quality of life measure and therefore is not as specific as a specialized depression measure, which limits the validity of the depression score. The first major study in this area to report depressed mood as a significant predictor of mortality even when controlling for disease severity was a two-year follow-up study conducted by Murberg et al (1999). They found that a ten-point increase on their depression scale (the Zung SDS – assessed when participants were out-patients) was associated with a 2.08 increase in relative mortality risk. The study also looked at subjective health, which was found not to be associated with mortality risk, so the authors concluded that it was depressed mood, not subjective somatic symptoms that is the important predictor of mortality risk. Murberg et al (1999) also concluded that as the study initially used postal recruitment then more depressed patients may not have participated and therefore this may have underestimated the relationship between depression and mortality. Rozzini et al (2002) also found depressed mood to significantly predict mortality at 6-months. However the study included patients with and without CHF so the numbers of patients with CHF were lower than the number in Murberg et al

(1999)'s study. Also as the assessment of depression was taken at the point when participants were in-patients then this also limits the validity of the depression score.

In summary there is evidence to suggest that depression predicts functional status and functional decline at 6 months, as well as increased hospitalization and mortality rates. However there are limitations with the studies in these areas, in particular on the measurement of depression, as discussed earlier and they have differed in the measurement point of depression (in-patient or out-patient). Therefore MacMahon and Lip (2002: 512) conclude that, "the link between depression and mortality is unclear". Furthermore none of these studies have been conducted on UK CHF patients. Therefore there is a need to assess the predictive nature of depression in a sample of UK CHF patients.

The relationship between depression and CHF morbidity is confounded by the evidence that depression has also been shown to be independently associated with an increased risk of developing CHF in older patients with isolated systolic hypertension (Abramson et al 2001). This raises the question of whether it is depression experienced prior to or post the onset of CHF that is related to later cardiac morbidity. Future studies would need to assess previous psychiatric history as well as current depression to address this question. As far as this researcher is aware this has not been analysed in this way in this CHF population although studies have looked at previous psychiatric history in relation to depression (e.g. Koenig 1998).

1.6 (ii) Anxiety.

Bennett et al (1997) concluded that increased anxiety precipitated hospitalization in CHF patients. However there was no specific measure of anxiety from which this conclusion could have been drawn as the researchers assessed symptoms impact with the Minnesota Living with Heart Failure Questionnaire (LHFQ), which gives only an overall measure of the emotional impact of CHF symptoms. Reschke (2001) found that when added to multivariate analyses, anxiety did not explain additional variance above that already explained by depression when predicting functional impairment. Similarly Konstam et al (1996) found that anxiety was not a significant predictor of mortality or rehospitalisation.

In summary, very few studies have systematically looked at anxiety as a predictor for functional status, rehospitalisation or mortality with specific assessment tools for anxiety. Therefore further research into this area needs to be conducted.

1.6 (iii) Social Support.

Bennett et al (1997) were among the first to look at social support in a sample of CHF patients, which they measured using the Medical Outcomes Study Social Support Survey (Sherbourne & Stewart 1991). They compared CHF patients who had and had not been hospitalized over a six-month period and found no significant difference in the social support score taken at the baseline point. They attributed this result to the fact that 73% of patients were married and that the mean score of social support indicated that patients believed that they had support available most of the time. MacMahon and Lip (2002) suggested that an effect may be seen in a more varied sample. The study also did not use any multivariate analysis to look at social support as a predictor variable. Krumholz et al (1998) found that lack of emotional support was significantly associated with a 1-year

risk of fatal and non-fatal outcomes even after adjustment for demographic factors, clinical severity, comorbidity, functional status, social ties and instrumental support. In a multivariate analysis they found that this relationship was significant for women but not for men. However they did not use a standardized measure to assess social support and instead relied upon one question for each of the sub-sets of social support that they were measuring (emotional support and instrumental support). This limits the validity of their social support results and therefore the significant association (in women) that they found.

Murberg and Bru (2001a) assessed perceived social support and social isolation as part of a large study on 119 patients with CHF with a follow-up period of 2 years (as discussed previously – see section 1.5 (ii)). They found a “marginal significant association” (2001a: 524) between intimate network support and mortality when depression score, heart failure severity, functional status and age were entered as covariates. They argued that this suggested that social support from a partner was a more critical factor in mortality than social support from relatives, friends and neighbours. This concept is supported by Chin and Goldman (1997)’s study. They found that single marital status was an independent predictor of hospital readmission and death even when controlling for medical risk factors. Murberg and Bru (2001a) reported a Cox regression analysis that showed social isolation to be a significant predictor of mortality in their CHF patients when the same covariates mentioned above were also controlled for. As mentioned previously the authors argued that because they used postal recruitment then the most healthy and people less prone to social isolation were likely to have participated in the trial. Therefore the relationship between social isolation and mortality as well as social support and mortality are likely to have been underestimated.

In summary, there are indications that social support and lack of social isolation are important factors for survival in CHF patients. However as there are limitations with some of the studies in this area then it would seem important to investigate this relationship further before drawing any firm conclusions.

1.6 (iv) Other psychosocial factors.

Variables other than those discussed above have been shown to be associated with hospitalization and mortality in CHF patients. For example, Struthers et al (2000) found social deprivation (assigned by postcode) to be significantly associated with increased numbers of hospital admissions (for cardiac causes) independent of disease severity (assessed on 3 variables) and non-adherence with treatment. Poor quality of life (Moser and Worster 2000), coping style (Murberg & Bru 2001b) and personality (Murberg et al 2001; Denollet and Brutsaert 1998) have all been associated with either higher rehospitalisation or mortality rates or both. However there are methodological limitations with these studies, for example Murberg and colleagues have identified a number of predictors of mortality all from the same sample of patients, which does limit the extent to which the results can be generalized. More studies, involving larger numbers of clearly defined CHF patients must be conducted before any definite conclusions can be drawn. Additionally the consideration of factors such as gender-specific risk factors should be explored further to predict risk for particular sub-groups of the CHF population.

1.7 MECHANISMS SUGGESTED FOR PSYCHOSOCIAL FACTORS INFLUENCING PHYSICAL MORBIDITY AND MORTALITY.

1.7 (i) Depression and anxiety.

Proposed mechanisms for the links between depression and changes in physical morbidity and mortality have been grouped into behavioural and physiological explanations (Moser & Worster 2000). It has been suggested that depressed patients may be less likely to adhere to medical or physical regimes because of their psychological state, which may in turn predispose patients to a greater likelihood of cardiac event and death. Indeed, studies have shown the importance of adherence to medical and physical regimes to outcomes in CHF patients (Bellardinelli et al 1999; Erhardt & Cline 1998). Lack of motivation is a common symptom of depression and this could explain a failure to adhere to medical regimes, adopt changes in lifestyle and seek medical attention when appropriate (Moser & Worster 2000). Similarly hopelessness is also a common feeling in depressed patients and this has been shown to be a strong predictor of mortality independently of depression (although this study was not with CHF patients) (Everson et al 1996). It has also been suggested that depressed people may alienate those providing them with social support because of their excessive demands (Coyne et al 1987). This may reduce the extent of social support that these patients receive, which may in turn affect their health-related behaviours. Therefore there are a number of proposed behavioural mechanisms that link depression with physical morbidity and mortality.

Physiological mechanisms are complex and it is beyond the scope of this study to investigate these fully. However the mechanisms proposed involve distress (experienced as depression or anxiety) producing an alteration in neuroendocrine functioning that results in increased sympathetic activity and increased circulatory catecholamine levels.

These physiological changes affect both immune and cardiac function and can increase the risk of ischemia, infarction, malignant ventricular dysrhythmias and sudden death (See Musselman et al 1998 for a more detailed review of these processes). Further research at biochemical and molecular levels is needed to further understand the interactions between mental and cardiac health (Shabetai 2002).

1.7 (ii) Social support.

As discussed previously, researchers have explained the link between social support and physical morbidity in terms of social support influencing health-related behaviours such as adherence, lifestyle change and appropriate search for medical attention (Murberg & Bru 2001a). However it has also been suggested that emotional support buffers the potentially adverse effects of distress on physiological functioning (described above) (Krumholz et al 1998). Others have argued that supportive relationships influence perceptions of health with e.g. emotional support being associated with more positive ratings of health (Snow & Crapo 1982). As positive health perceptions have been associated with positive health outcomes then this could also explain the association between poor social support and physical morbidity through the mediating factor of health perception (Idler & Kasl 1991). These mechanisms remain at a theoretical level at present and it may be important to differentiate between the various types of social support when analysing their predictive nature.

1.7 (iii) Coping styles.

It has been suggested that coping styles predict health-related behaviour that in turn predicts physical morbidity and mortality. For example, a coping mechanism of denial may be associated with non-adherence to medication (MacMahon & Lip 2002). Similarly

Murberg and Bru (2001b) attributed their finding of mortality being associated with the coping style 'behavioural disengagement' to behavioural factors such as adherence to medical and physical regimes.

In summary the behavioural and physiological mechanisms that link psychosocial factors to an increased risk of physical morbidity and mortality have been explored only at a theoretical level at present. They deserve further study so that appropriate interventions can be designed to reduce physical morbidity and mortality. The theoretical model underpinning the interactions between biological, psychological and social factors discussed above will now be discussed.

1.8 THE BIOPSYCHOSOCIAL MODEL: A THEORETICAL MODEL TO UNDERPIN THIS STUDY.

The medical world has traditionally used a model of cause and effect to explain illness, one becomes ill as a result of exposure to external organisms or involuntary changes internally and this has an effect that is predictable in its course and end-point (the medical model). This model considers the mind and the body to be entirely separate, with changes in the physical matter being unrelated to changes in state of mind (Ogden 1996). However the increasing evidence base suggests that this distinction between cause and effect, mind and body is not so clear-cut and this has led researchers to question the validity of the medical model. The biopsychosocial model, first developed by Engel (1977, 1980) still recognises the importance of the biological component of illness (externally - viruses and bacteria and internally – genetics and structural defects) but also includes psychological (cognitions, emotions and behaviours) and social (social support, social norms, social class, etc) components. Health or ill-health in individuals is proposed

to be a result of the interaction of these three components (Curtis 2000). The distinction between mind and body is no longer as polarised since this model recognises the interrelationships between mind and body, as the evidence reviewed above suggests. The adoption of this model has advantages for patients as Cardiologists recognise the importance of quality of life (which in turn may prolong life) instead of prolongation of life at any cost. This study is based on the foundations of the biopsychosocial model, with an investigation into the interrelationships between biological, psychological and social factors in CHF patients.

1.9 SUMMARY AND RATIONALE FOR THIS STUDY.

CHD is highly prevalent and the major cause of premature death in this country. Within the CHD population, research with patients who have experienced a myocardial infarction (MI) has indicated the prevalent nature of depression and anxiety in these patients and their role in physical morbidity and mortality post-MI. However it was clear that further research was necessary with other cardiac populations, such as chronic heart failure, in order to assess the importance of these issues.

1.9 (i) Adjustment to Chronic Heart Failure.

Although previous studies have attempted to establish a prevalence of depression in CHF patients, their choice of measures, participants and timing of assessment have all limited the extent to which the results can be generalised. Similarly in the few studies that have assessed anxiety, the same problems apply. Furthermore no studies have assessed the prevalence of anxiety and depression in a sample of UK CHF patients. It therefore seems important to establish prevalence, using appropriate methods, to understand adjustment to CHF in UK patients. In addition, the validation of a specific tool to measure anxiety

and depression is essential not only to accurately assess prevalence rates but also for future clinical use. Theoretical models have highlighted the importance of factors such as the interpretation of the health threat in adjustment to chronic illness such as CHF. However this present thesis aims to understand the emotional response to CHF as a first step in understanding the adjustment to CHF.

1.9 (ii) Predicting psychological morbidity in CHF patients.

Several factors have been linked to depression in CHF patients such as, loss of functional ability, low social support and co-morbid psychiatric disorders. However many of the studies investigating these relationships have methodological flaws or the relationships have been demonstrated in only one study. There is a gap in the literature on the predictors of anxiety in CHF patients. It is critical therefore that the predictors of psychological distress in CHF patients are investigated so that appropriate interventions can be developed in the clinical field. Consideration must also be given to the role of prior mental health history in adjustment to CHF. Particular attention should be focused on the relationships between severity of CHF, functional status, social support and depression because of the research that has found some support for these relationships.

1.9 (iii) The association of psychosocial factors with physical morbidity and mortality.

Studies have demonstrated the predictive nature of depression for functional status, functional decline at six months, rehospitalization and mortality. However the studies investigating these relationships cannot be considered conclusive because of methodological limitations. A handful of studies have considered the role of anxiety in predicting physical morbidity and mortality but no definite conclusions have been able to

be drawn from such a small number of studies. Similarly social support and social isolation have been linked to mortality but the small number of studies in this area makes it difficult to draw final conclusions. No known study has considered these factors in a sample of UK CHF patients. It is clear therefore that further investigation is needed into the predictive nature of psychosocial factors for physical morbidity and mortality in order to develop appropriate interventions to ultimately improve quality of life (by reducing physical morbidity) and survival for patients with CHF. Particular attention should be paid to the relationship between depression, social support and physical morbidity and mortality because of the prior research that has indicated a link between these factors.

1.10 AIMS AND HYPOTHESES.

AIM 1: To determine the prevalence of anxiety and depression disorders in a UK CHF population.

Hypothesis 1 – The prevalence of anxiety and depression will be higher in CHF when compared to studies investigating the prevalence of anxiety and depression in the general population (as based on previous studies on non-UK populations).

AIM 2: To validate the Hospital Anxiety and Depression Scale (HADS) against a Structured Clinical Interview for DSM-IV (SCID-I) with the CHF population.

Hypothesis 2 – Patients who are categorised with a mood disorder (i.e. anxious or depressed) on the SCID will be significantly different on the equivalent domains (i.e. anxiety or depression) on the HADS.

AIM 3: To identify the predictors of depression and anxiety in CHF participants.

Hypothesis 3 – Severity of CHF (Left ventricular ejection fraction) will have no association with depression scores, as based on previous research such as Zuccala et al (1995).

Hypothesis 4 – Lower Functional status (Higher NYHA classes) will be significantly associated with higher depression scores, as based on previous research, such as Koenig (1998).

Hypothesis 5 – Perceived low social support will be significantly associated with higher depression scores, based on the significant extent of evidence for this relationship demonstrated in mental health and other chronic disease literature (e.g. Krishnen et al, 1998).

AIM 4: To identify the predictors of mortality and re-hospitalisation in CHF participants.

Hypothesis 6 – Depression will be a significant factor in the prediction of mortality and number of days in hospital in the period following the initial postal contact (as based on previous research, e.g. Murberg et al 1999 and Jiang et al 2001, respectively).

Hypothesis 7 – Perceived social support will be a significant factor in the prediction of mortality, as based on previous research such as, Murberg and Bru (2001a).

Hypothesis 8 – Old age will be a significant factor in prediction of mortality.

CHAPTER 2

METHODOLOGY

2.1 DESIGN.

A cross-sectional postal point prevalence survey was used to examine the prevalence of depression and anxiety disorders in a population of CHF patients. A control group was not used in this study because prevalence rates were compared to rates found in post-MI patients and the general population in previous studies. Exploration of the validity of the HADS was achieved using a face-to face structured interview survey with all consenting participants from the postal survey, in their home. Structured interviewing is thought to be the most reliable way of diagnosing depression and anxiety disorders and the inclusion of this interview overcame a limitation common to many other studies in this area (reliance on a screening instrument to diagnose mood disorders). The predictors of anxiety, depression, re-hospitalisations and mortality used data from the structured interview survey and from a collateral bio-medical database.

2.2 PROCEDURE.

2.2 (i) Ethical Approval.

The Local Research Ethics Committee approved this study prior to its commencement. Primarily consent from Consultant Cardiologists was given for access to their patients and those patients' medical records. Patients' agreement was obtained with written consent forms (see Appendix I), these included:

- Consent form for participation in the postal and interview stages of the study (at the Postal stage).
- Consent form for granting access to medical notes (at the Interview stage).

2.2 (ii) Inclusion & Exclusion Criteria.

Inclusion criteria were as follows:

Participants were included if they had a confirmed diagnosis of CHF. This was made by an academic Consultant Cardiologist who used the following criteria: eligibility for treatment with diuretics and a mild – severe impairment in left ventricular ejection fraction. Participants also had to be over the age of 18 years.

Exclusion criteria for the structured interview only were:

1. MMSE score of less than 24 points because it is suggested that this is indicative of probable cognitive impairment (e.g. Kay et al 1985). This cut-off was used because it was thought that patients with probable cognitive impairment may require different criteria for consent and also that the reliability of recall of past events may be reduced.
2. Not wanting to take part.

2.2 (iii) The Postal Survey.

Firstly, all patients who had attended the Heart Failure Unit (HFU) at Academic Cardiology between the dates of January 2000 and July 2001 and who met the inclusion criteria (see above) were contacted in a postal survey. This sample in itself is 'selected' since General Practitioners and Ward staff are less likely to refer patients into the HFU if they live in Residential Homes in the community (presumably since it is thought that care staff would not be prepared to escort patients to appointments that may be for research purposes only). Therefore the 'base' sample had already excluded one of the groups of patients who are likely to have CHF, i.e. those living in residential homes. However, this

did ensure that this sample of participants for the present research were somewhat more homogenous.

Patients in this postal survey were sent a questionnaire pack (See Appendix II), which included the following:

- A cover letter from their Consultant asking the patients to read the patient information sheet.
- A help sheet explaining what to do if wanting to participate.
- A patient information sheet including a description of the study.
- A written consent sheet for both the postal and the interview stages of the study.
- The Hospital Anxiety and Depression Scale (HADS) (see measures section)
- The MOS Social Support questionnaire (see measures section)

2.2 (iv) The structured interview survey.

Secondly, the first one hundred participants who responded to the questionnaire pack and agreed to be interviewed were contacted by telephone to arrange a suitable time for the face-to-face home interview to occur. For a sample of 100 subjects, if assuming a moderate relationship between CHF and depression of 0.3, the expected power is calculated at 86%. In other words if the study has 100 subjects then there is an 86% probability of detecting the relationship between CHF and depression (Cohen, 1977, pp. 92-93). All but one participant agreed to be interviewed at home; this participant was interviewed in the department of Academic Cardiology at the hospital and the travel expenses for this participant were refunded.

The interviews were conducted using a pack containing (see Appendix III) the following:

- the basic information sheet (including demographics, occupational history, medical history, mental health history and information about the current situation)
- the Mini Mental State Examination (MMSE)
- sections A and F of the Structured Clinical Interview for DSM-IV (SCID-I)
- the HADS
- the Geriatric Depression Scale (GDS)
- a consent form for obtaining medical information from the patient files

Prior to starting the interview, the content was explained and participants were told that they could withdraw from the interview at any point and refuse to answer any questions that they did not wish to answer.

The interview was conducted in the following order: demographic information, occupational history, medical history, MMSE, mental health history and information about the current situation, sections A and F of the SCID-I, HADS, GDS and completion of the consent form. The MMSE was conducted early in the interview because it was decided to discontinue the interview if this score was less than 24 points. However, this occurred on two occasions and on both of these occasions it was felt that the interview should continue for face validity because the content of the interview had already been explained. The HADS was completed after the structured interview, to ensure that these were completed during the same time period for the purpose of validation. It was considered important that the HADS was completed after the structured interview in order to prevent the researcher being biased by the results of the HADS, when completing the clinical interview. The GDS was only used with participants over the age of 55 years

(91.8% of the sample). The HADS and the GDS were administered verbally to speed up the interview time.

The interview lasted on average one hour and fifteen minutes, however this was variable and was shorter if participants were not depressed or anxious on the SCID-I because there are discontinuation criteria. After completion of the interview, participants were assured that the study would be written up, their identifying information (names, addresses) would be removed so that no-one would know that they had taken part in the study and that the information would be confidential. Any questions were answered and finally they were thanked for taking part.

It was decided that if a patient was considered to be at risk while being interviewed (e.g., suicidal ideation) then their consent would be sought to let their GP know of the situation. This did not occur during the study. Similarly if any participants were found to be suffering from one of the disorders as defined by the SCID-I then their consent was sought to write to their GP to make them aware of this. Participants in this situation were also asked to go and see their GP to discuss the options available to them. There were exceptions to this, for example if a participant was already taking anti-depressant medication and being monitored by a psychiatrist then it was not suggested that they visit their GP.

The mean time from postal send-out date to interview was 8.7 weeks but this ranged from 2 weeks to 6 months and 3 weeks. However 80% of the sample was interviewed within 15 weeks of the send-out date. Two interviews (at weeks 26 and 29) were significantly later

than the other interviews, which may have influenced the mean time. The delay in these interviews was for practical reasons only.

2.2 (v) The predictor analyses.

Thirdly, in order to examine factors associated with adjustment and those that predicted depression and anxiety in this population the following data was collected either directly from the participant during the structured interview or with their consent (See Appendix I), from a collateral bio-medical research database or, as with one measure, from the postal survey:

- medical history
- mental health history
- current prescription of psychotropic medication (for anxiety or depression) and other prescribed medication.
- number of days as an in-patient in hospital in the calendar year prior to the postal point and in the nine months following the postal point (collected for consenting participants from electronic medical records)
- physiological measures of functioning (collected for consenting participants from a collateral bio-medical research database)
- perceived social support - see measures section (this was used from the postal survey)
- a measure of social deprivation - see measures section (based on postcode)

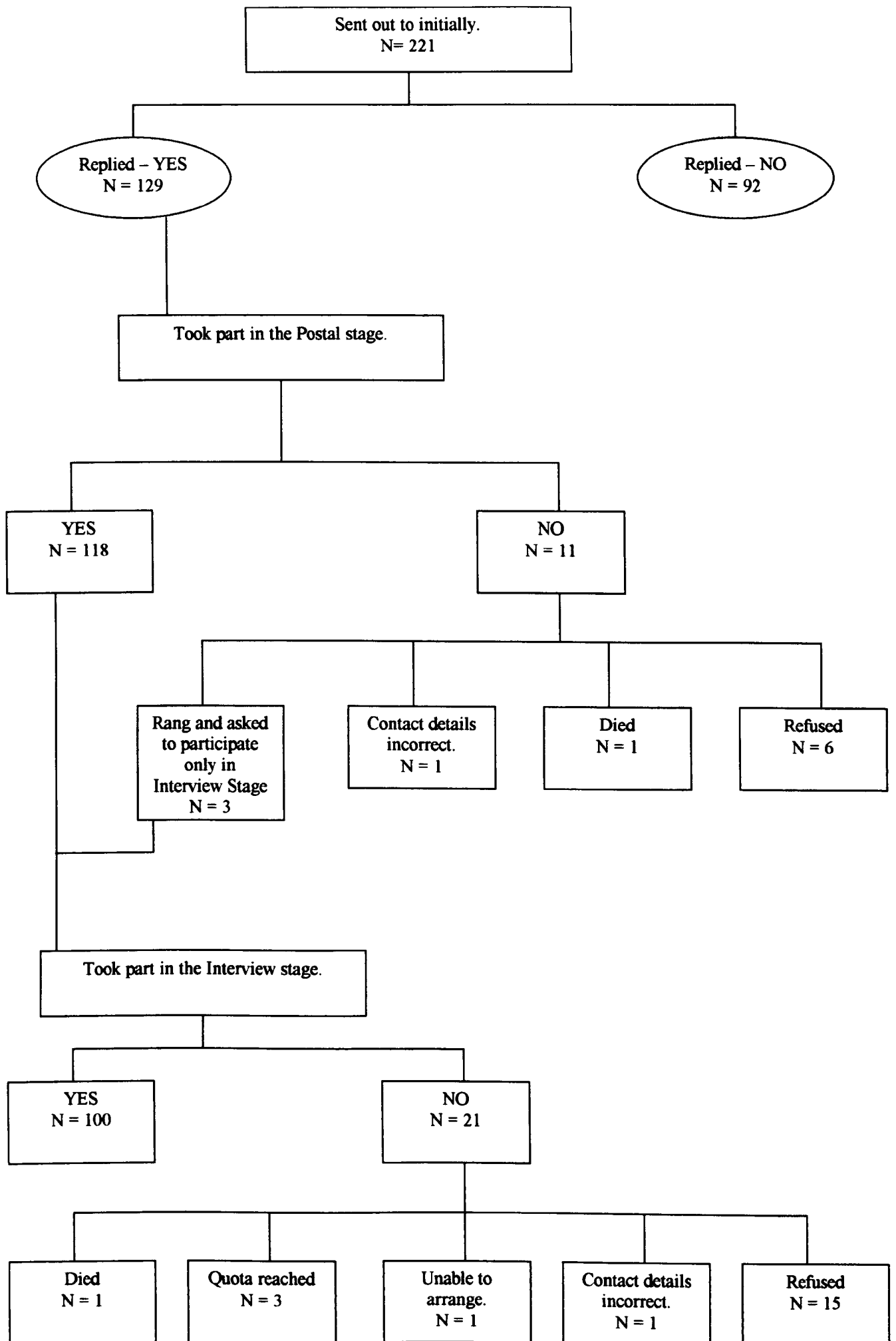
Fourthly to examine the relationship between mood, physical morbidity and mortality, the number of days in hospital in the nine months following the postal questionnaires send-out date and all deaths within the research period were recorded.

2.3 PARTICIPANTS.

The initial postal survey was sent out to 221 CHF patients (165 male and 56 female). Of this sample 118 returned their questionnaires (95 male and 23 female), 3 telephoned the researcher and consented to be interviewed but did not wish to complete the postal questionnaires (2 male and 1 female), 6 replied but did not want to participate (4 male and 2 female), one reply informed the researcher that the participant had died (male) and one postal survey was returned because the contact details were incorrect (male). Therefore in total 92 CHF patients did not reply (62 male and 30 female). In summary the participation rate was 54.8%.

In total 105 participants agreed to be interviewed (87 male and 18 female), a participation response rate of 47.5%. One participant (male) was unable to be contacted, one participant (male) was unable to fit the interview in within the time period and three participants (two male and one female) agreed to be interviewed after the quota of 100 had been reached. Therefore a total of 100 participants were interviewed – 83 male and 17 female. This information is summarised in a flow chart (figure 2.1).

FIGURE 2.1: FLOW CHART TO ILLUSTRATE PARTICIPATION.



2.4 MEASURES.

2.4 (i) Demographic Information. (taken at Interview point)

The following variables were recorded for each participant:

- Age
- Sex
- Marital status
- Number of children
- Living situation
- Age when left school
- Qualifications
- Occupational status
- Occupation
- Post code – for calculating a social deprivation score based on the 1991 census data.

Social deprivation score was calculated using the Townsend Scale (Townsend et al 1988). A rank of 1-5 (with one being the most deprived category) is calculated for the local election ward enumeration district based on 1) Unemployment of the principle householder, 2) Car ownership of household, 3) Overcrowding (>1 person to a room), 4) Housing tenure. This index of social deprivation has been shown to correlate highly with health in general and other variables such as mortality and health care service usage (Townsend et al 1988).

2.4 (ii) Measures of physiological functioning and aspects of CHF (taken for participants who consented at structured interview or at the postal survey).

The following information was gained for each participant either in the face-to face structured interview survey or from a co-lateral bio-medical research database:

- Left ventricular ejection fraction (LVEF) – a percentage of total ventricle volume pumped out from the left ventricle (the ratio between stroke volume and end-diastolic volume). This is measured by echocardiography.
- Severity rating of cardiac dysfunction – as assessed by Cardiologists during echocardiography.
- Cause of CHF.
- Approximate date of onset of CHF.

The mean time between the medical assessment and the Interview was 31.18 weeks (SD = 16.03 weeks, range = 3 – 76 weeks). For participants who only took part in the postal survey, the mean time from medical assessment to postal survey point was 26 weeks (SD = 18.14 weeks, range = 6 – 83 weeks).

2.4 (iii) Measure of functional impairment (taken for all participants who consented either at the structured interview survey or the postal survey).

This information was collected from a co-lateral bio-medical research database.

- New York Heart Association functional impairment rating (NYHA Class). This is a measure of functional impairment based on the symptoms that the patient is experiencing. This measure is widely used in clinical trials of CHF (Bowling 2001). The classification has poor inter-rater reliability and it correlates poorly with exercise testing, indicating poor discriminative ability

(Bowling 2001). It has been suggested that the NYHA measurements do not necessarily reflect how a patient feels about their day-to-day life but rather highlights important clinical changes (Bowling 2001).

Table 2.1: The criteria for each NYHA classification scale (From Bowling 2001: 255-256).

NYHA Class	Criteria
Class I	No limitations on activities; suffers no symptoms from (performance of) ordinary activities.
Class II	Slight limitation on activities; comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnoea or anginal pain.
Class III	Marker limitation on activities; comfortable only at rest. Less than ordinary physical activity causes fatigue, palpitation, dyspnoea or anginal pain.
Class IV	Discomfort with any physical activity; should be completely rested or confined to bed.

2.4 (iv) Previous medical and mental health history (collected during the structured interview survey).

Participants were asked questions about their medical history and co-morbid medical problems (See Appendix III). In particular this focused upon:

- Number of previous Myocardial Infarctions (MIs) and date of last MI.
- Details of any cardiac surgery including dates of surgery.
- Details of any other major illnesses or major surgery, such as strokes.
- Presence or absence of co-morbid problems such as: angina, diabetes, hypertension, arthritis and respiratory disease.

Participants were asked exploratory questions about their mental health history (See Appendix III). These questions were adapted from Koenig (1998) (because he used the questions with patients with CHF in a similar study) and focused upon:

- Previous episodes of mental health problems including depression and anxiety.
- Previous contact with mental health services and experience of mental health treatments.
- Previous experience of suicidal ideation and its management.

2.4 (v) Self-report measures of depression and anxiety.

2.4 v (a) The Hospital Anxiety and Depression Scale (HADS). (Zigmond & Snaith 1983)- used in the original postal survey and following the structured interview.

The HADS is a fourteen-item self-rating scale used to screen for depression and anxiety in medical out-patients. Each item is rated on a four-point scale and these scores are summed to yield a depression score (from seven items) and an anxiety score (from the remaining seven items) ranging from 0 – 21, with higher scores indicating higher levels of depression and anxiety. The recommended cut-offs by the authors are 0 - 7 no impairment, 8 – 10 borderline cases and scores of eleven or over as definite cases. The scale has good internal consistency with a Cronbach's alpha of 0.93 for anxiety and 0.90 for depression (Moorey et al 1991). The authors have also reported good face validity and good concurrent validity (Zigmond and Snaith 1983). Moorey et al (1991) confirmed the construct validity of the scale measuring two separate factors. This scale was chosen not only because of its psychometric properties but also because of its extensive use with

other medical populations, its ability to be not influenced by physical symptoms (which was a limitation in previous studies) and finally the short time that it takes to complete.

2.4 v (b) *The Geriatric Depression Scale-Short form (GDS)*. (Brink & Yesavage 1982)- used during the structured interview survey.

The GDS short-form is a fifteen item self-report questionnaire designed to screen for depression in older adults (over the age of 55 years). It was chosen because it is said to perform better than most self-rating instruments when applied to elderly people (McDowell & Newell 1996). It has a yes-no response format and is said to de-emphasise the somatic symptoms of depression (Scogin 1994). The suggested cut-offs are scores less than and equal to 4 are considered normal, 5 to 9 indicate mild depression and 10 to 15 indicate moderate to severe depression (Alden et al 1989). The GDS has high internal consistency, with an alpha coefficient of 0.94 reported by Yesavage et al (1983). A split-half reliability of 0.80 was obtained by Rule et al (1989) and inter-rater reliability has been reported as 0.85 by Brink et al (1982). In terms of validity, several studies have evaluated the validity of the GDS (see McDowell & Newell (1996) for a review). However Olin et al (1992) compared the GDS to diagnoses based on DSM-III-R Axis I disorder and found that the GDS had 96% sensitivity and 96% specificity. The short form of the GDS was chosen to reduce the burden on participants and keep the interview as short as possible. The long and short forms have been found to be significantly correlated ($r=0.84$, Sheikh & Yesavage, 1986). A large percentage (91.8%) of the participants were the appropriate age to complete this questionnaire.

**2.4 (vi) Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I).
(First et al, 1997) (used during the interview survey).**

This is a semi-structured interview based on DSM-IV (American Psychiatric Association 1994) diagnostic criteria for depression and anxiety disorders – it is generally viewed as the ‘gold standard’ for diagnosing mood disorders (e.g. Booth et al 1998). Reliability studies on an earlier version of the SCID have produced kappas ranging from 0.70 to 1.00 (Segal et al, 1993, 1994, 1995; Strakowski et al, 1993, 1995; Stukenburg et al, 1990). Segal et al (1995) also concluded that the SCID-I can be effectively administered by relatively inexperienced clinicians to reliably diagnose disorders in older adults. Validity studies on the SCID-I are limited because as mentioned previously, it is generally described as the ‘gold standard’ and therefore other measures tend to be validated against the SCID-I and not vice-versa. However Kranzler et al (1995) found that SCID diagnoses demonstrated “superior validity when compared with the standard clinical interview” (First et al 1997: 46). Only sections A (depressive disorders) and F (anxiety disorders) were administered because the study was focusing on identifying these disorders and it was felt inappropriate to firstly, make the interview any longer than necessary and secondly, to ask questions not relevant to this research study.

2.4 (vii) Measure of Social Support –The Medical Outcomes Study Social Support Survey. (Sherbourne & Stewart 1991) (taken during the postal survey).

This is a 19-item self-report questionnaire designed to assess the availability of four categories of social support. There is also an initial question about the number of close

friends or relatives available to the participant, for which they are asked to record a number for friends and a number for relatives. Items contributing to the categories of social support are rated on a five point rating scale. These categories are tangible support, affectionate support, positive social interaction and emotional or informational support. Subscale scores are re-scaled to the 0-100 range. Internal consistency for the questionnaire was high ($\alpha = 0.97$) with subscale values ranging from $\alpha = 0.91$ to 0.96 . The scale also has impressive validity (McDowell & Newell 1996). The four subscales were shown to be internally consistent and distinct from each other. The scale was chosen because it was designed for use with chronic disease patients.

2.4 (viii) Measure of cognitive impairment – the Mini-Mental State

Examination (Folstein et al 1975). DIS version (used to screen participants prior to the structured interview).

The MMSE is a brief 19-item questionnaire that is administered to give an assessment of the person's orientation to time and place, recall ability, short-term memory, calculation and language. It was used in this study to screen out patients with cognitive impairment, which was indicated by a score below 24 points. Many studies have looked at the reliability and validity of the MMSE, just a few of these will be reported here. The MMSE has been found to have an internal consistency α of 0.96 (Foreman 1987), test-retest reliability of 0.89 with a time lapse of 24 hours (Folstein et al 1975) and O'Connor et al (1989) have found a κ of 0.97 for inter-rater reliability. McDowell & Newell (1996) concluded that the validity results for the MMSE are as good as, or even better than those of other scales.

2.5 STATISTICAL ANALYSIS.

Statistical analysis was conducted using the statistical package SPSS for Windows version 10.0. Frequency analysis formed the descriptive results, along with tests for normality (Kolmogorov-Smirnov test) when appropriate.

2.5 (i) Prevalence analysis.

The prevalence results were calculated using simple frequencies. Paired sample t-tests were used to test the difference between scores at the two time points of the study, whereas independent sample t-tests were used to look for a difference between the interview group and the postal only group.

2.5 (ii) Validation analysis.

Two-by-two tables were used to calculate the validity co-efficients (specificity, sensitivity, misclassification rate, positive predictive value, negative predictive value and kappa) when comparing various combinations of HADS scores with SCID-I diagnoses. Receiver Operating Characteristics (ROC) curves were plotted to determine the optimal cut-off point for the HADS when using this instrument as a screen for depression and anxiety disorders. The differences between those categorised as depressed / non-depressed and anxious / non-anxious were also calculated using an independent samples t-test. The correlation between HADS scores and GDS scores were calculated using the Pearson product moment correlation coefficient. Finally, a ROC curve was plotted for the GDS against the SCID-I to determine this scale's optimal cut-off.

2.5 (iii) Predictor analysis.

Linear regression was planned to be used to determine the significant predictor variables of the anxiety and depression HADS scores. Pearson product moment correlations were calculated between all variables theoretically linked with the anxiety and depression scores and only those with significant correlations ($p < 0.05$) were included in the regression analysis. Potential predictor variables were entered in blocks for the step-wise linear regression. The variables chosen for each block were theoretically linked, e.g. block 1 were demographic variables such as age and sex. This method was chosen so that firstly, predictor variables could be entered into the regression in a logical manner that was theoretically driven. Secondly as Tabachnick & Fidell (1996) argue, the number of cases to potential predictor variables has to be substantial otherwise the solution will be perfect but only as an artefact of the ratio of participants to predictor variables (i.e. it will be meaningless). All variables that were making a significant independent contribution to the blocks' models were entered into a final stepwise linear regression analysis to produce a final model explaining the highest percentage of variance in the dependent variable. This method of analyses was planned to be used separately for the prediction of HADS anxiety and depression scores. However the HADS depression scale was not normally distributed (even when it was transformed) so the analysis could not be carried out with this as the dependent variable.

The same method of linear regression was used to predict the number of days as an in-patient in the nine months following the postal survey point. The dependent variable was transformed to ensure that it was normally distributed. Variables that have been linked to hospitalisation include depression, anxiety, social support and social deprivation. Therefore only these variables were included in the correlation analysis (Pearson product

moment correlations). All significantly correlated variables ($p < 0.05$) were then entered into a step-wise linear regression model with a log of the number of days as an inpatient as the dependent variable. The variables sex, age, NYHA class and LVEF were also entered into the stepwise regression to control for their effect.

Logistic regression was chosen to analyse the significant predictor variables of the SCID-I diagnoses of anxiety and depression because these variables are binary. Significant differences were analysed between the group with a diagnosis and the group without, for all theoretically linked variables and only those with significant differences ($p < 0.05$) were included in the regression analysis. Potential predictor variables were entered in blocks for the manual step-wise logistic regression. Any variables with a significance of less than 0.1 were manually excluded from the model and the step-wise logistic regression was re-run with the remaining variables. As a result, a model was formed that explained the most variance and had the highest percentage accuracy in classification. These analyses were separate for the anxiety predictors and the depression predictors.

A similar process was planned to be performed with mortality as the dependent variable in a logistic regression. However too few participants had died to carry out this analysis.

CHAPTER 3

RESULTS

3.1 DESCRIPTIVE STATISTICS.

3.1 (i) Age.

Table 3.1: The age categories of the participants in the Postal-only group, the Interviewed participants and the non-responders.

Age range in years	Frequency in Postal only participants	Frequency in Interviewed participants	Frequency in non-responders.
< 55 years	2	10	7
55 - 64 years	6	22	12
65 - 74 years	4	43	31
75 - 85 years	9	22	37
85 - 94 years	0	3	12
> 94 years	0	0	1
N	21	100	100
Mean (years)	69.52	67.47	73.6
Median (years)	71	69	74.5
Range (years)	51-83	35 - 92	39 - 96

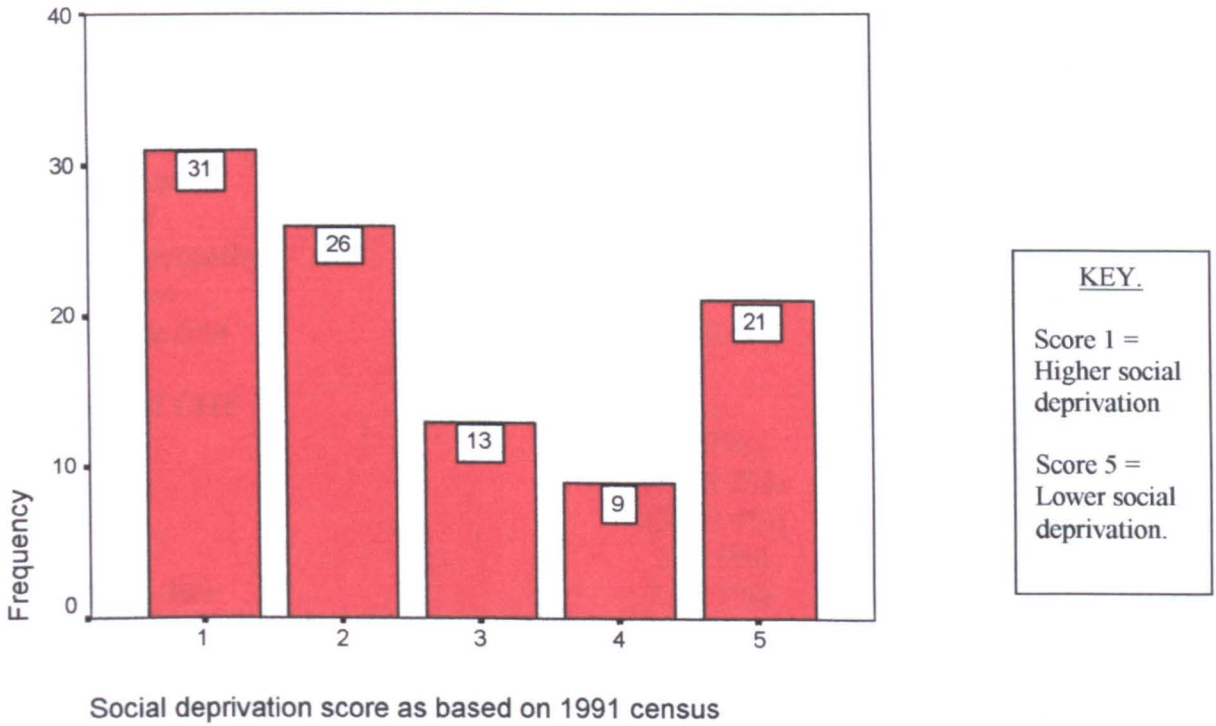
The participants (in both the postal and interview groups) were significantly younger than the non-responders ($t = 4.102$, p (2-tailed) = 0.000).

3.1 (ii) Sex.

More males participated in both stages of the study (postal, 95 males: 23 females; interview, 83 males: 17 female) and this partially reflects the greater number of males who were initially sent the postal questionnaires (165 males: 56 females). However there is still a response bias from the male patients even when this is accounted for (4:1 ratio of response compared to 3:1 ratio sent out to).

3.1 (iii) Social Deprivation.

Figure 3.1: Bar chart showing the distribution of social deprivation scores of all participants in the Postal stage and Interview stage of the study (n = 121, Missing data = 21) calculated from the 1991 census data.



As the above bar chart shows the social deprivation scores are not distributed uniformly with lower numbers in class 3 and 4.

Further demographic data were available for the Interviewed group. For example 74% of this group were married or living with someone, twenty percent of the group lived alone and 6% lived with their children. Eighty-eight percent were retired with only 9% in full-time employment, 2% in part-time employment and 1% unemployed.

3.1 (iv) Aspects of Chronic Heart Failure.

Table 3.2: The type/cause of CHF, severity of CHF, NYHA class and time since diagnosis for the Interviewed group (n=98, 2 exclusions because of MMSE score) and the Postal group (n=21).

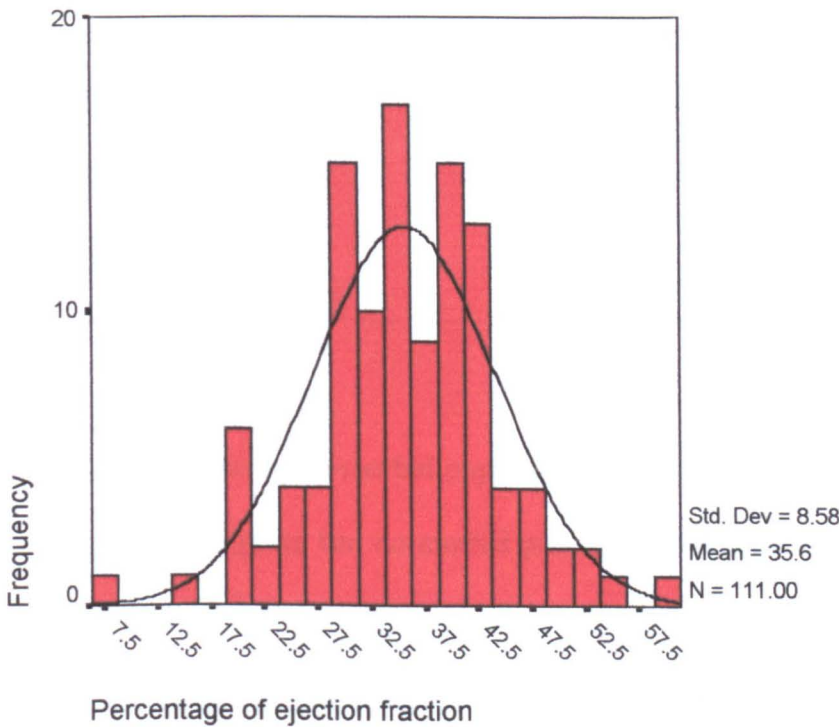
	Frequency (%) Interviewed (n=98)	Frequency (%) Postal (n=21)
Cause of CHF		
Ischaemic	41 (41.8%)	7 (33.3%)
Hypertension	3 (3.1%)	1 (4.8%)
Valvular	4 (4.1%)	1 (4.8%)
Cardiomyopathy	8 (8.2%)	1 (4.8%)
Unknown	12 (12.2%)	2 (9.5%)
*Missing data	30 (30.6%)	10 (47.6%)
NYHA Class of CHF		
I	7 (7.1%)	1 (4.8%)
II	61 (62.2%)	9 (42.9%)
III	22 (22.4%)	6 (28.6%)
IV	1 (1.0%)	0 (0%)
Missing data	7 (7.1%)	5 (23.8%)
Severity rating:		
Mild	5 (5.1%)	1 (4.8%)
Mild - Moderate	18 (18.4%)	6 (28.6%)
Moderate	48 (49%)	9 (42.9%)
Moderate – Severe	15 (15.3%)	2 (9.5%)
Severe	12 (12.2%)	3 (14.3%)
Time since diagnosis		
Mean	3 years, 9 months	N/A
Standard deviation (SD)	3 years, 7 months	N/A
Minimum	4 months	N/A
Maximum	19 years, 6 months	N/A
*Missing data	14 (14.3%)	N/A

*Significant missing data.

For both groups, the most common cause of CHF was Ischaemic, the most common rating of functional impairment of CHF was Class II and the most common rating of severity was ‘moderate’. The distribution of these variables across the Postal-only and the Interview group are similar. When the Postal-only group is combined with the interview

group then the percentage in the mild and mild-moderate categories is 25.2%. Interestingly this percentage is exactly the same percentage as the participants with a LVEF > 40%. When the severity ratings for the participants and the non-participants were compared, there was no significant difference between the ratings ($t = -0.89$, $p = 0.929$). Only one participant was on the heart transplant list.

Figure 3.2: Histogram showing the Left Ventricular Ejection Fraction percentage (LVEF) for all participants in Postal and Interview groups ($n=121$) (Missing data = 10).



The Kolmogorov-Smirnov test confirms a normal distribution ($K-S Z = 0.715$, p (2-tailed = 0.687)) for the left ventricular ejection fraction percentages (LVEF) (mean = 35.6, standard deviation = 8.58). A two sample Kolmogorov-Smirnov test shows that the Postal group and the Interview group are from the same distribution ($K-S Z = 1.042$, p (2-tailed = 0.227)). It is of significance that 25.2% of the Interviewed group had an ejection fraction percentage of more than 40%. The severity rating of cardiac dysfunction as rated by Cardiologists correlated significantly with the LVEF ($p = -0.700$, $P = 0.000$). The

correlation between severity rating of cardiac dysfunction and LVEF is negative because the severity score was coded as increasing integers as severity increases whereas the LVEF has a decreasing percentage as severity increases. The significant correlation indicates that the cardiologists' ratings are reliable.

3.1 (v) Prevalence of co-morbid physical problems.

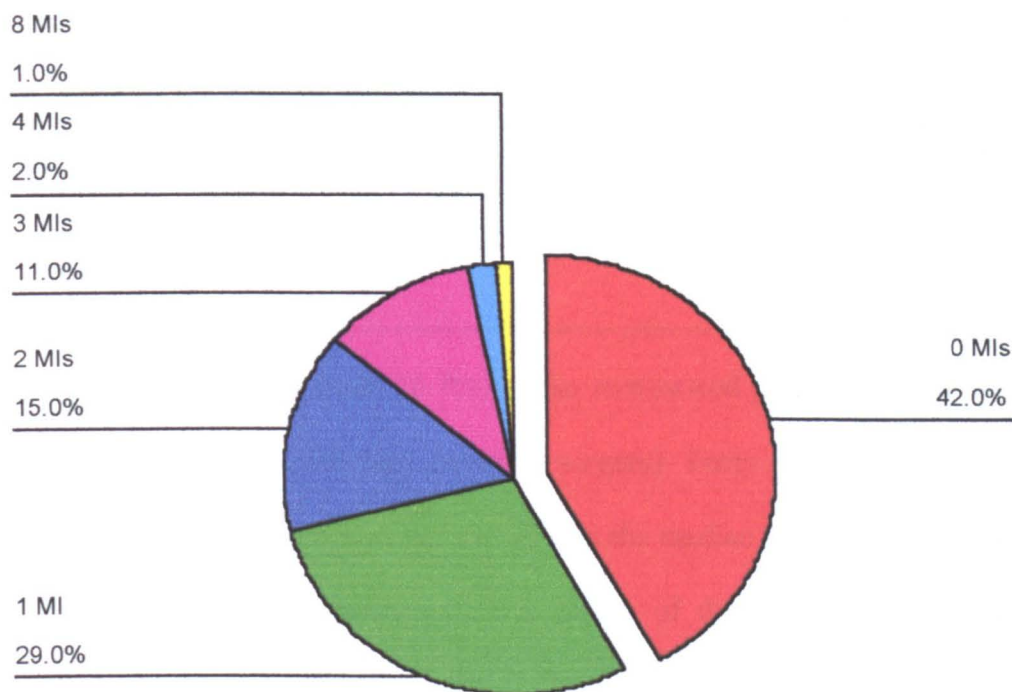
Table 3.3: The frequency of co-morbid factors in Interviewed participants (n=98).

Type of co-morbid problem	Present in x%
Diabetes	15.3
Hypertension	32.7
Arthritis	53.1
Respiratory disease	15.3
Angina	15.3
Arrhythmias	13.3
Other co-morbid problems	51

As the above table shows co-morbid physical problems were common in the Interviewed group. 51% of participants had co-morbid problems other than those specified and these ranged from side effects of medication (for example, gout was a common side effect) to cancer (3 participants had cancer). See Appendix IV for a full table of other co-morbid problems. In total only 13.3% of the interviewed group did not have any co-morbid physical problems.

3.1 (vi) Previous cardiac and cardio-vascular events.

Figure 3.3: Pie chart showing the percentage of participants in the Interviewed group (n=98) who had experienced different numbers of Myocardial Infarctions (MIs).



As the chart above shows 58% of participants had suffered at least one myocardial infarction (MIs) with eight MIs being the maximum number experienced by the Interviewed group. The mean time since last MI was 5 years, 6 months (SD= 5 years, 7 months, range = 2 months -27 years, 9 months).

Eleven percent of participants had experienced at least one stroke, with the maximum number of strokes being two. The mean time since last stroke was 7 years, 8 months (SD = 6 years, 3 months, range = 1 month - 20 years, 9 months).

3.1 (vii) Surgery and other interventions.

Table 3.4: The percentage of participants in the Interview group (n=98) who had undergone various surgical and cardiac interventions.

Type of intervention	% of participants	Mean time since intervention (SD)
Cardiac surgical intervention	36.7%	N/A
Cardiac bypass	28.6%	7 years, 8 months (5 yrs, 5 mths)
Pacemaker fitted	39.8%	4 years, 1 months (3 yrs, 0 mths)
Valve surgery	11.2%	N/A
Other cardiac interventions (angioplasty / stent)	14.3%	N/A

As the table shows, over a third (36.7%) of the interviewed participants had undergone a major surgical intervention (bypass or valve surgery). Forty percent of participants had had a pacemaker fitted – this was not included in the cardiac surgical intervention bracket but if this information is summarised then 76.5% of the interviewed participants had undergone major or minor surgery.

3.1 (viii) Mental Health.

HISTORY

Nearly forty percent (39.8%) of the interviewed participants had a previous history of mental health problems. Of these 56.4% had received some form of treatment for their previous mental health problems. Therefore it is possible that only 22.5% of participants had a history of clinically significant mental health problems.

CURRENT

Table 3.5: The percentage of participants in the Interview group taking medication for mood disorders at the time of the interview (n = 98).

Type of medication	Percentage of participants on this medication
Antidepressants	12.2%
Hypnotics	8.2%
Anxiolytics	2.0%

Table 3.5 shows the point prevalence of prescribed psychotropic medication usage at the time of the interview and illustrates that 12.2% of participants were taking an anti-depressant, in contrast to only 2% of participants taking an anxiolytic. Participants were unable to report when they had first received this prescription. However when the results were analysed it was apparent that 4.1% were taking a prescribed hypnotic but had not reported any previous history of mental health problems. Similarly 1% of participants were taking an anti-depressant but had not reported a previous history of mental health problems. In total 81.6% had no prescriptions for psychotropic medication, 14.2% were taking one psychotropic medication and 4.1% were taking two psychotropic medications. See Appendix IV for frequencies of participants on other prescribed medication.

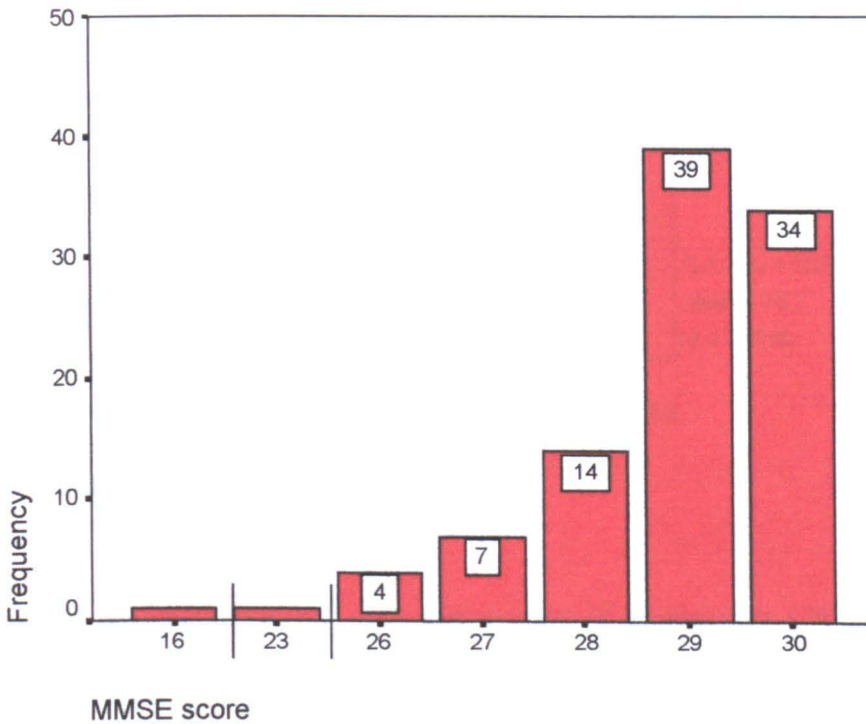
3.1 (ix) Participation in other trials.

The Academic Cardiology department were also running other trials at the time of this study therefore participants were asked if they were involved in any other trials. Six percent of the interviewed participants were participating a double-blind randomised controlled drug trial called WATCH. This drug trial randomised participants to either an anti-platelet drug (aspirin) or an anti-coagulant (warfarin). Nine percent of the interviewed participants were also involved in a randomised control trial where they were either taking a vitamin pill or a placebo. Six percent thought that they were participating

in a trial but they were unsure which trial this was and they did not have any medication for this. Therefore the risk of this sample being contaminated by an experimental drug with a side effect of causing depression or anxiety is low.

3.1 (x) Cognitive impairment.

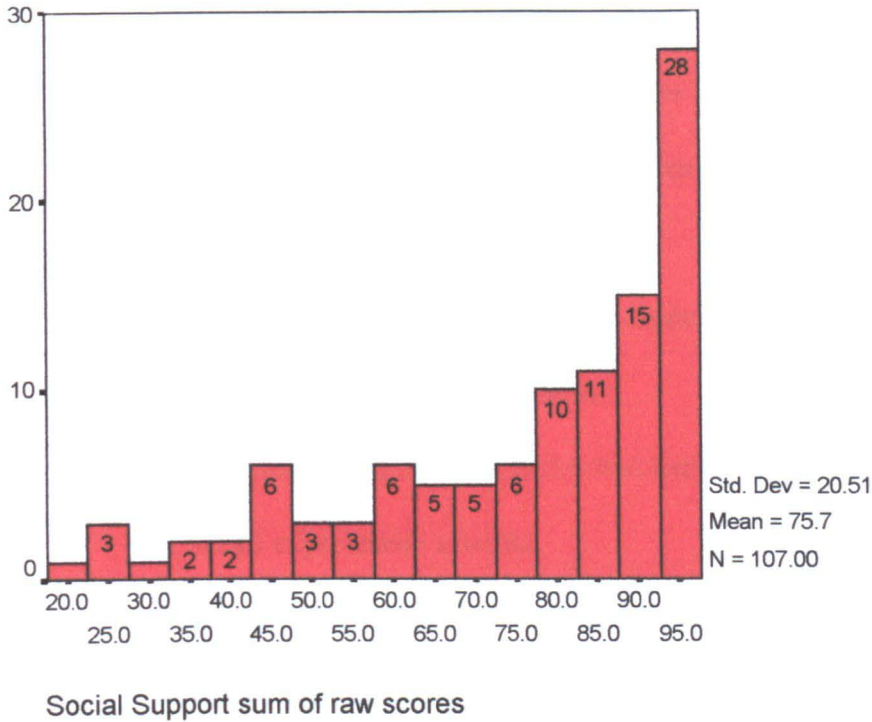
Figure 3.4: Bar chart showing the Mini-mental state examination (MMSE) scores for all interviewed participants (n=100).



As the above graph shows two participants scored below the cut-off for cognitive impairment (MMSE score <24 points) and so these participants were excluded from the any further analyses. The mean score of 28.75 (SD=1.77) shows that most participants did not have significant cognitive deficits.

3.1 (xi) Social support.

Figure 3.5: Bar chart showing the distribution of social support scores for all participants who returned the postal questionnaires (n=107, Missing data =14).



The graph above shows that over one quarter of participants (26.2%) rated their social support as being high (mean score =79.7%). Only 14% of participants perceived that they were receiving less than half (score less than 47.5). A breakdown of the individual subscales can be found in Appendix IV.

3.1 (xii) SUMMARY OF DESCRIPTIVE RESULTS.

- The participants in the study were significantly younger than the non-participants.
- There was a response bias from male patients.
- There were greater numbers of participants from groups Social Deprivation groups 1, 2 and 5 based on the 1991 census.

- The most common cause of CHF was ischaemic, the most common severity of CHF was NYHA class II and the mean time since diagnosis was 3 years, 9 months.
- The left ventricular ejection fraction (LVEF) percentages were normally distributed with a mean of 35.6%.
- The significant correlation between the cardiologists' rating of severity of cardiac dysfunction and LVEF indicates the reliability of the cardiologists' ratings.
- Co-morbid physical problems were common in participants with only 13.3% not having any co-morbid problems.
- A high percentage of participants had experienced a myocardial infarction and 11% had experienced a stroke.
- Over one third of participants had undergone a major surgical intervention with this figure rising to 76.5% if including minor surgery.
- Nearly 40% of participants had a previous history of mental health problems however only 22.5% had received treatment.
- The point prevalence of psychotropic medication was 18.4%.
- The risk of the sample being contaminated by an experimental drug with the side effect of depression or anxiety is low.
- Only two of the interviewed participants had MMSE scores below the cut-off for probable cognitive impairment.
- One quarter of participants indicated that they were receiving a high amount of social support.

3.2 PREVALENCE OF ANXIETY AND DEPRESSION.

3.2 (i) Prevalence of mood disorders with the Structured Clinical Interview for DSM-IV (SCID-I).

Table 3.6: The prevalence of mood disorders diagnosed by the SCID-I in the interviewed participants (n= 98).

	Frequency	Percent
Depressive disorders:	28	28.6
Major depressive episode	14	14.3
Dysthymic disorder	3	3.1
Minor depressive disorder	2	2.0
Brief depressive disorder	6	6.1
Adjustment disorder with depression	2	2.0
Panic disorder (PD)	8	8.2
Generalised Anxiety Disorder (GAD)	11	11.2
Mixed anxiety-depression disorder	1	1.0

The above table shows that over one quarter (28.6%) of the interviewed participants had a diagnosable depressive disorder and half of these were diagnosed with Major depressive disorder. The different depressive disorders are mutually exclusive; however this is not the case for Panic disorder (PD) and Generalised Anxiety disorder (GAD), which can co-occur. Two percent of the participants received a diagnosis of both PD and GAD. Therefore the number of participants with at least one anxiety disorder was 18.4%. There was overlap with the diagnosis of depressive disorders and PD and GAD with 6.1% receiving a diagnosis of a depressive disorder and PD and 9.2% receiving a diagnosis of a depressive disorder and GAD. Similarly one participant was diagnosed with mixed anxiety and depression disorder. There were no diagnoses of Manic episodes, Obsessive – compulsive disorder, Post-traumatic stress disorder or Social phobia in the participant group.

3.2 (ii) Prevalence of anxiety and depression using the Hospital Anxiety and Depression Scale (HADS).

The HADS measured at the postal point will be used to illustrate prevalence because a greater number of participants completed the measure at this point.

Table 3.7: The prevalence of anxiety and depression as measured by the Hospital Anxiety and Depression Scale (HADS) for all participants who completed the postal questionnaires (n=116).

	HADS Anxiety prevalence		HADS Depression prevalence	
	N	%	N	%
Non-cases (<8)	67	57.8%	73	62.9%
Borderline (8-10)	22	19.0%	27	23.3%
Cases (>10)	27	23.3%	16	13.8%

The traditional cut-offs for the HADS are 8 and 11, however Zigmond and Snaith (1983) also categorized patients scoring in the 8-10 range as 'borderline' and those above 10 points, as 'cases'. The table above illustrates the higher prevalence of anxiety (23.3% with a cut-off of 11, 42.3% with a cut-off of 8) than depression (13.8% with a cut-off of 11, 37.1% with a cut-off of 8) in the participants who returned the postal questionnaires. Of the 23.3% falling above the cut-off score for clinically significant anxiety (11 points), 55.6% of this group was in the severe range (HADS score of 15 – 21 points). Similarly of the 13.8% who were suffering from clinically significant depression (11 points), 18.8% of this group was in the severe range.

Table 3.8: The prevalence of co-occurrence of anxiety and depression at borderline and case significance expressed as percentages for all participants who completed the postal questionnaires (n=116).

Frequency of HADS Anxiety scores (%).		Frequency of HADS depression scores (%)		
		Non-cases	Borderline	Cases
Non-cases (<8)		50.9	6.9	-
Borderline (8-10)		7.8	8.6	2.6
Cases (>10)		4.3	7.8	11.2

Table 3.8 shows that 11.2% or 30.2% of the participants who completed the postal questionnaires had clinically significant anxiety and depression (cut-off of 11 or 8, respectively). Interestingly, none of the participants with clinically significant depression were without symptoms of anxiety with 2.6% having anxiety symptoms at a borderline level. Conversely 4.3% of participants had clinically significant anxiety with no symptoms of depression.

Table 3.9: The differences between the group of participants who only returned the questionnaires (n= 21) and the interviewed group of participants (n= 95) on the HADS questionnaires returned at the postal point.

	Mean	Standard Deviation	t score	df	Sig. (2-tailed)
HADS anxiety – postal only (n=21)	7.19	6.36	-0.067	114	0.946 - NS
HADS anxiety – interview (n= 95)	7.27	4.81			
HADS depression – postal only (n= 21)	6.90	4.89	1.185	114	.238 - NS
HADS depression – interview (n=95)	5.64	4.31			

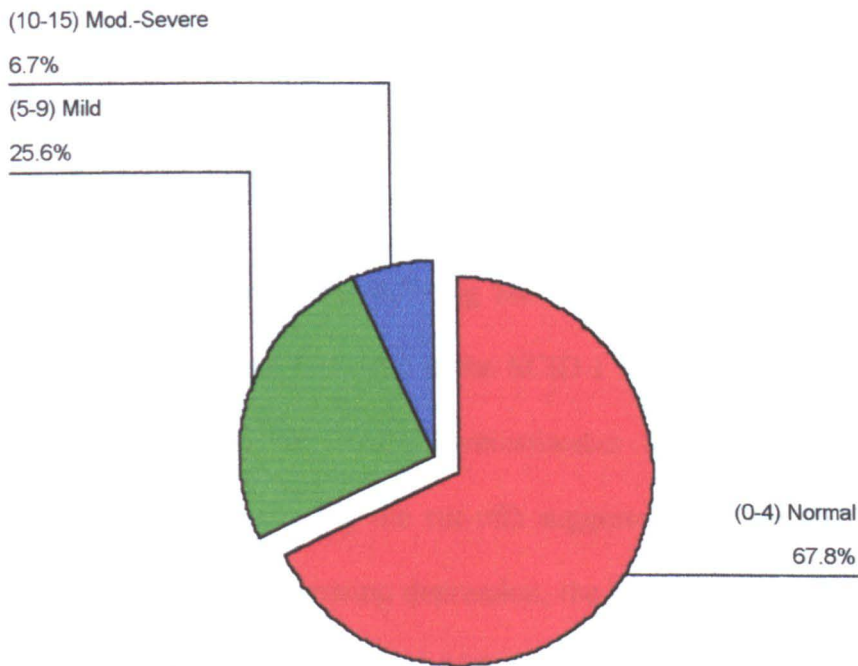
As the independent samples t-test shows, there was no significant difference between the group that did not participate in the interview and the group that was interviewed when comparing HADS scores at the postal point.

3.2 (iii) Differences between demographic groups.

The only significant gender difference on the HADS was the anxiety score at the postal point ($t = 2.138$, p (2-tailed)= 0.035) with females having a higher mean anxiety score. When social deprivation was split into two groups (Group 1 = SD 1 and 2, Group 2 = SD 3 to 5) then there were no significant differences between the HADS anxiety and depression scores at the two time points (See Appendix V for results). However when two age groups were compared (Group 1 = under age 65 years, Group 2 = over age 65 years) then there was a significant difference between the age groups for anxiety scores at the both stages (Postal $t = 2.250$, p (2-tailed)= 0.026; Interview $t = 2.760$, p (2-tailed)= 0.007) with 55 % (postal) and 31.3% (interview) case prevalence in Group 1 compared to a 35.5% (postal) and 16.7% (interview) case prevalence in Group 2 (using a cut-off of 8 points).

3.2 (iv) Prevalence of depression with the Geriatric Depression Scale (GDS).

Figure 3.6: Pie chart showing the prevalence of depression as classified by the Geriatric Depression Scale (GDS) in the Interview group of participants (n= 90) (Missing data = 8 – because of age exclusions).



When compared to the HADS depression score at the Interview point, it is apparent that the GDS and the HADS find the same percent of participants as having clinically significant depression (HADS – 6.1%, GDS – 6.7%). However the percentage of participants classified as ‘mild’ depression is higher with the GDS than the HADS ‘borderline depression’ (25.6% cf. 9.2% respectively).

3.2 (v) Comparing the different prevalence rates with the different measuring tools.

Table 3.10: Summary of the prevalence rates of depression and anxiety with the different measures.

Measure and measurement point	Anxiety prevalence	Depression prevalence	N
HADS postal (Cut-off 8)	42.3	37.1	116
HADS interview (Cut-off 8)	21.4	15.3	98
HADS interview (ROC cut-offs)	30.6	37.8	98
SCID-I	18.4	28.6	98
GDS interview (Cut-off 5)	-----	32.3	90

The above table illustrates the differing estimates for anxiety and depression prevalence assessed by the different methods. If the SCID-I is used as the ‘gold standard’ measure then it is clear that the HADS overestimates the prevalence of anxiety at both measurement points and using the cut-offs suggested with the ROC curves (see section 3.3). Conversely when estimating depression, the HADS underestimates depression at the interview time point. The GDS (which only gives a measure of depression) slightly overestimates depression in comparison to the SCID-I. However it must be noted that the GDS was only completed by participants over the age of 55 years (91.8% of the sample).

Table 3.11: The differences between the HADS anxiety and depression scores at the time of the postal return and these scores at interview (n= 93 – missing data = 5 due to non-return or incomplete postal questionnaires).

	Mean	Standard Deviation	*t score	df	Sig. (2-tailed)
HADS anxiety - postal	7.27	4.86	7.835	92	0.000
HADS anxiety - interview	4.74	3.85			
HADS depression - postal	5.68	4.34	6.676	92	0.000
HADS depression - interview	3.78	3.70			

*Transformed data for HADS due to skewing.

The paired samples t-test shows a significant difference between the HADS anxiety and depression scores at the postal return point and the interview point. When the means are analysed one can see that the anxiety and depression scores were higher at the postal return point, indicating higher amounts of depression and anxiety. Indeed as shown in Table 3.10, the prevalence rates of cases (cut-off of 8) at the interview point are 21.4% for anxiety (cf. 42.3% at the postal return point) and 15.3% for depression (cf. 37.1% at the postal return point).

3.2 (vi) SUMMARY OF PREVALENCE RESULTS.

- Prevalence rates of psychological morbidity are high and range from 18.4 – 42.3% for anxiety and 15.3 – 37.8% for depression.
- Each method of assessment provides a different estimate of depression and anxiety.
- Psychological morbidity was significantly higher at the postal time point.

3.3 VALIDATION OF THE HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS).

3.3 (i) Validity co-efficients and Cohen’s kappa for the traditional HADS cut-offs.

Validity co-efficients were calculated for both of the traditional HADS cut-offs, scores of 11 and 8. Classification matrices (2x2 tables) obtained by these cut-offs in comparison to the SCID-I can be found in Appendix VI.

Table 3.12: The validity coefficients when comparing the SCID with the HADS scores (at interview) for the interviewed participants (n=98).

	SCID depressive disorders vs. HADS cases (cut-off = 11)	SCID depressive disorders vs. HADS cases (cut = off 8)	SCID anxiety disorders vs. HADS cases (cut-off = 11)	SCID anxiety cases vs. HADS cases (cut-off 8)
% of cases				
Specificity	100	97	100	91
Sensitivity	21	46	33	78
Misclassification rate	22	17	12	11
Positive predictive value	100	87	100	67
Negative predictive value	76	82	87	95
Kappa	0.280	0.506	0.449	0.648

Where:

SPECIFICITY = Proportion of true normals correctly identified.

SENSITIVITY = Proportion of true cases correctly identified.

MISCLASSIFICATION RATE = Proportion of participants for whom the assessments disagree.

POSITIVE PREDICTIVE VALUE = Probability that a respondent who scores above the cut-off point on the questionnaire is a true case.

NEGATIVE PREDICTIVE VALUE = Probability that a respondent whose score is below the cut-off point is confirmed to be a ‘true normal’ at interview.

(As defined by Goldberg & Williams 1988:46)

Table 3.12 shows if a cut-off of 11 points is used with the HADS, it has high specificity, i.e., it identifies 100% of true normals. This cut-off also produces a 100% probability that a respondent who scores above the cut-off point on the questionnaire is a 'true case'. However both the HADS depression and anxiety scales at this cut-off have low sensitivity to identifying true cases (21% to 33% respectively). The HADS depression scale had a higher misclassification rate i.e. the SCID and the HADS depression scale disagree on a higher number of participants than the HADS anxiety scale and the SCID. The HADS depression scale also has a lower probability that a respondent whose score is below the cut-off point is confirmed to be a 'true normal' at interview than the HADS anxiety scale.

If a cut-off of 8 points is used with the HADS (i.e. the borderline cases are also classified as cases) then the specificity is lowered, i.e. fewer true normals identified. However as expected when lowering the cut-off score, the negative predictive values of the scales are increased as the probability that the respondent is a true normal when scoring below the cut-off is increased. Similarly this raises the sensitivity of the scales so that for example the HADS anxiety scale identifies 78% of true cases. As expected, this also lowers the positive predictive values of the scales because the cut-off scores are lowered so some non-cases will be included above the threshold.

The kappa scores (Cohen 1960) show the degree of agreement between the two methods of diagnosing depression or anxiety with a correction for chance measures of agreement. The kappa scores for both depression and anxiety HADS scores using a cut-off of 11 points are worse than chance in their agreement. Using a cut-off of 8 points with the HADS scores increases the agreement between the two methods with the anxiety scale having better agreement than the depression scale. However none of the measures of agreement are particularly high.

Table 3.13: The validity coefficients when comparing the SCID with the HADS scores (at postal point) for the interviewed participants (n=93).

	SCID depressive disorders vs. HADS cases (cut-off 11)	SCID depressive disorders vs. HADS cases (cut = off 8)	SCID anxiety disorders vs. HADS cases (cut-off 11)	SCID anxiety cases vs. HADS cases (cut-off 8)
% of cases				
Specificity	100	79	91	69
Sensitivity	41	70	72	89
Misclassification rate	17	24	13	27
Positive predictive value	100	58	65	41
Negative predictive value	80	87	93	96
Kappa	0.494	0.461	0.603	0.403

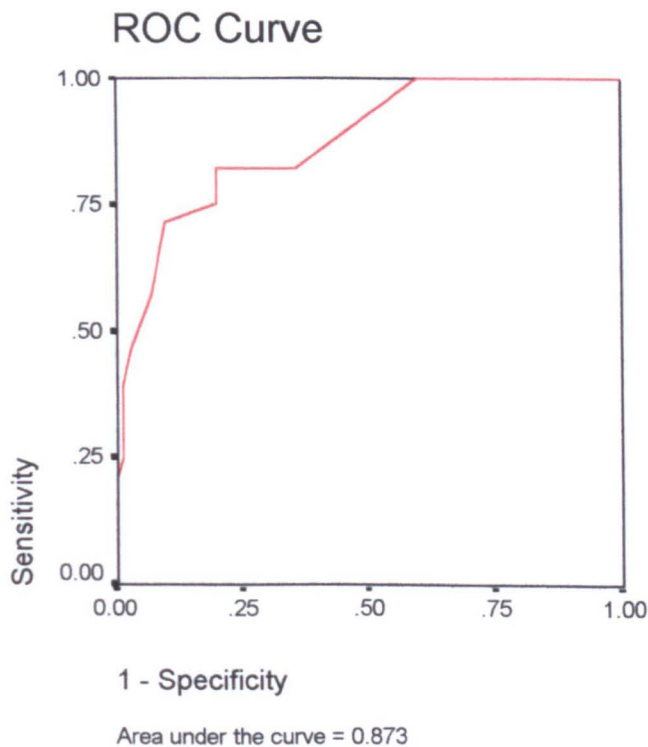
The sensitivity of the HADS at the postal time point is far greater for all cut-offs in comparison to the HADS at the interview time point. However this increase in sensitivity is at a cost to the specificity, which drops for all comparisons of the HADS and the SCID-I at this time point, with the exception of the SCID-I comparison to the HADS (postal) with a cut-off of 11. Similarly the extent of agreement between the two measures is lowered for the cut-off of 8 when using the HADS at the postal point. Although, perhaps surprisingly, the agreement is increased for a HADS cut-off of 11 at the postal point in comparison to the HADS at the interview point.

3.3 (ii) Receiver Operating Characteristic (ROC) Curves.

ROC curves are obtained by plotting sensitivity against the false positive rate (1 – Specificity). The area under the curve is an index of the discriminating ability of the test (in this case the HADS). This index can range from 0.5 (indicating only chance association between the HADS and the SCID-I) to 1.0 (indicating perfect discrimination between cases and normals) (Goldberg & Williams 1988).

ROC curves were plotted only for the HADS at the interview measurement point for methodological reasons that will be addressed in the Discussion section of this study.

Figure 3.7: ROC curve of the HADS depression score at interview against the SCID-I.



The area under the curve suggests that the HADS depression scale has fairly good discriminating ability. Goldberg & Williams (1988) suggest that areas of greater than 0.8 indicate that the scale has adequate discriminating ability. The optimal cut-off on the

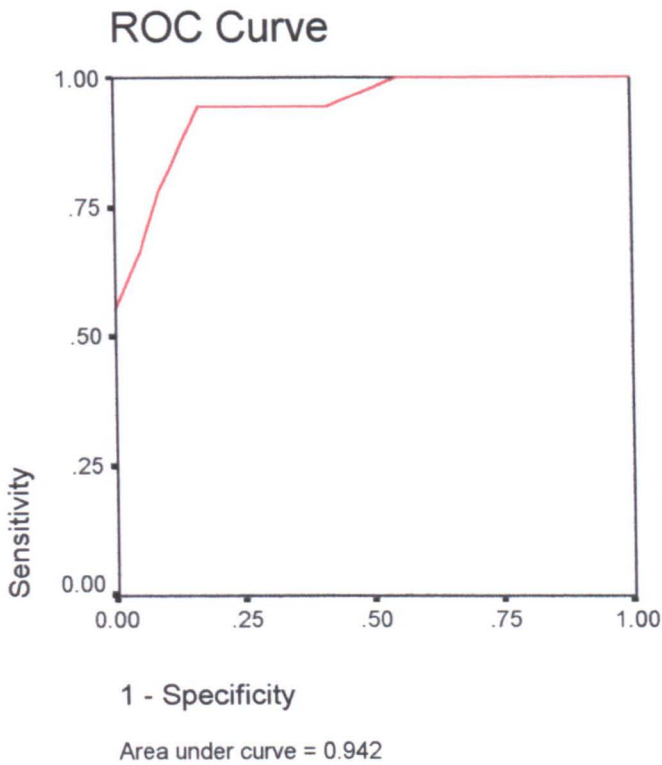
HADS depression is the point on the curve nearest to the upper left corner (where both sensitivity and specificity are equal to one) as this results in the smallest overall error rate (Streiner & Norman, 1995). For this sample, the optimal cut-off is 4 HADS points, which gives a sensitivity of 82.1% and a specificity of 80%. The table below illustrates the classification matrix if this cut-off is applied.

Table 3.14: The classification of participants with depression or no depression when using the SCID-I and the HADS with the cut-offs suggested by the ROC curve (N = 98).

		SCID-I Diagnosis	
		No Depression	Depression
HADS categorisation	No depression	56	5
	Depression	14	23

As can be seen in table 3.14, using the cut-offs suggested by the ROC curve the HADS depression scale correctly identifies 56 (80%) of true normals and 23 (82.1%) of true cases (as shown by the sensitivity and specificity). In this sample, using this cut-off would have missed 5 depressed cases (5.1% of the sample). Furthermore it would have incorrectly classified 14 (14.2%) participants as depressed. The extent of agreement between the two measures is 0.567 (kappa).

Figure 3.8: ROC curve of the HADS anxiety score at interview against the SCID-I.



The value for the area under the curve for this ROC curve indicates the good discriminatory ability of the HADS anxiety scale. The optimal cut-off highlighted by the ROC curve is 7, which gives a sensitivity of 94.4% and a specificity of 83.8%. The table below illustrates the classification matrix if this cut-off is applied.

Table 3.15: The classification of participants with anxiety or no anxiety when using the SCID-I and the HADS with the cut-offs suggested by the ROC curve (N = 98).

		SCID-I Diagnosis	
		No anxiety	Anxiety
HADS categorisation	No anxiety	67	1
	Anxiety	13	17

Using the cut-off suggested by the ROC curve the HADS anxiety scale correctly classifies 67 participants (83.8%) as true normals and 17 (94.4%) participants as true cases (as indicated by the specificity and sensitivity values). This cut-off would have incorrectly classified 13 participants but would only have missed one participant with a true anxiety disorder. The extent of agreement between the two measures is 0.621 (kappa).

3.3 (iii) Differences between mean scores.

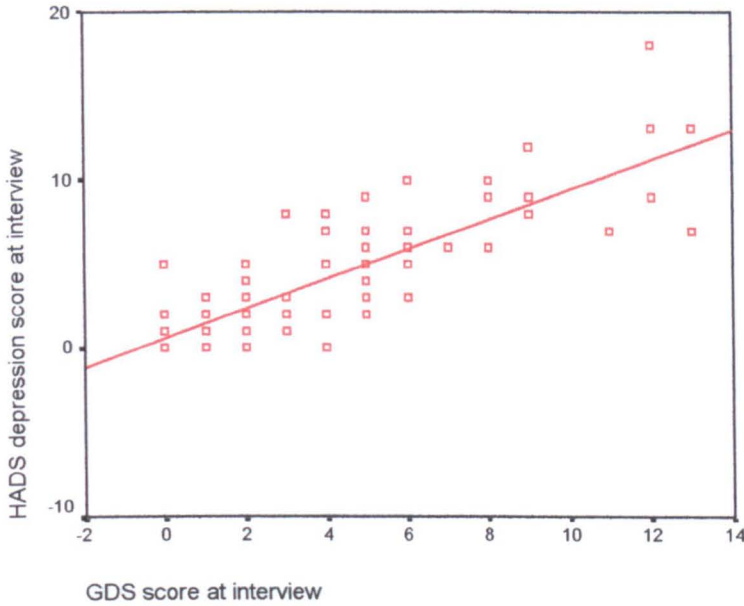
Table 3.16: The differences between the HADS scores at interview point of depressed / anxious and non-depressed / non-anxious groups with an independent samples t test.

	Mean	Standard Deviation	t score	df	Sig. (2-tailed)
HADS depression score – No depression on the SCID-I	2.41	2.20	-7.990	96	0.000
HADS depression score – Depression on the SCID-I	7.57	4.16			
HADS anxiety score – No anxiety on the SCID-I	3.46	2.64	-9.108	96	0.000
HADS anxiety score – Anxiety on the SCID-I	10.11	3.43			

In support of the HADS scales differentiating between depressed / anxious and non-depressed / non-anxious cases the table above shows the significant differences between the mean scores for each group. When the scores are looked at, it is clear that the depressed group have the higher mean score on the HADS depression scale and similarly those classed as anxious by the SCID-I have the higher mean score on the HADS anxiety scale.

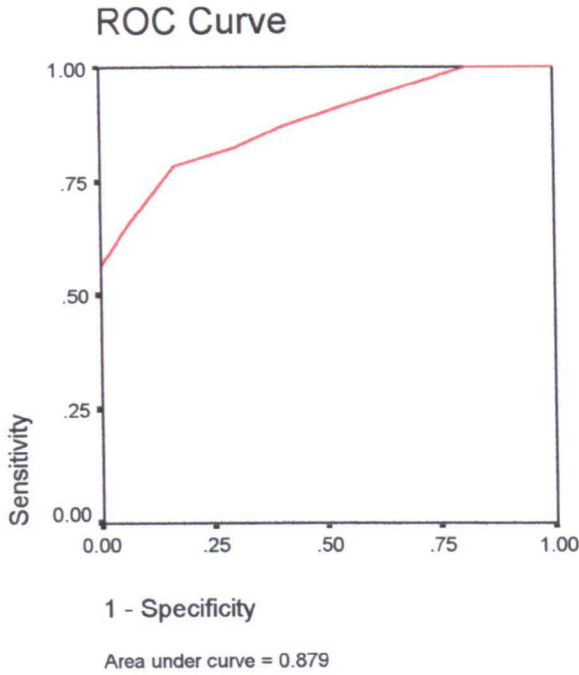
3.3 (iv) Comparisons between the GDS, the HADS depression scale and the SCID-I depression diagnoses.

Figure 3.9: Scatterplot showing the correlation between the HADS depression scores and the GDS scores at the interview point.



The GDS and the HADS depression scale at the interview point were significantly correlated (Pearson $r = 0.823$, p (2-tailed) = 0.000) indicating that both measures provide similar ratings of depression.

Figure 3.10: ROC curve of the GDS – Short form score at interview against the SCID-I.



The discriminative ability of the GDS – Short form is indicated by the high value for the area under the curve. The optimal cut-off for the GDS with this sample is the same as the traditional cut-off for this scale, 5 GDS points. This cut-off gives a sensitivity of 78.3% and a specificity of 83.6%. The classification matrix produced by this cut-off is represented below.

Table 3.17: The classification of participants with depression or no depression when using the SCID-I and the HADS with the cut-offs suggested by the ROC curve (N = 90).

		SCID-I Diagnosis	
		No Depression	Depression
GDS categorisation	No depression	56	5
	Depression	11	18

As the specificity and sensitivity values suggest, using a cut-off of 5 classifies 83.6% of true normals (56 participants) and 78.3% of true cases (18 participants). The cut-off incorrectly classifies 11 (12.2%) of participants as depressed and fails to identify 5 participants (5.5%) as depressed. The extent of agreement between the two measures is 0.570 (kappa).

3.3 (v) SUMMARY OF VALIDATION RESULTS.

- The HAD scales have adequate discriminatory ability and the optimal cut-offs calculated by the ROC curves are 7 (anxiety) and 4 (depression).
- Participants diagnosed with a mood disorder on the SCID-I have significantly higher HADS scores on the corresponding scale than participants without a diagnosis.

3.4 PREDICTORS OF ANXIETY AND DEPRESSION.

The same procedure was used for each of the regression analyses, this procedure can be found in Appendix VII.

3.4 (i) Linear regression for HADS scores.

Linear regression was chosen to analyse the predictor variables for the HADS scores. For this, categorical data was recoded into dummy binary variables (e.g. recoding social deprivation scores into two groups) to be included in the linear regression.

It was decided that the postal HADS scores should be used in the predictor analysis because of concerns that the HADS at the interview point may have been contaminated by the structured interview. As seen in a previous section, the postal HADS was more sensitive and specific when compared to the gold standard (the SCID-I).

The correlations between the HADS scores and the variables above were calculated as an initial step. Only significantly correlated variables were then included in the regression analysis.

Table 3.18: The correlations per block (see appendix VII) for the anxiety and depression HADS scores for each significant variable (n=98).

BLOCK	VARIABLE	ANXIETY Pearson r (p)	DEPRESSION Pearson r (p)
Block 1 (Demographic factors)		-----	-----
Block 2 (Social support factors)	Tangible SS	-----	-0.234 (p = 0.026)
	Affectionate SS	-0.217 (p = 0.038)	-0.276 (p = 0.008)
	Positive SS	-0.275 (p = 0.008)	-0.392 (p = 0.000)
	Em. And Inf. SS	-0.292 (p = 0.005)	-0.349 (p = 0.001)
	Sum SS	-0.269 (p = 0.011)	-0.353 (p = 0.001)
Block 3 (CHF factors)	Class of CHF	0.230 (p = 0.031)	0.326 (p = 0.002)
Block 4 (Physical health history)		-----	-----
Block 5 (Co-morbid physical problems)	Respiratory Dis.	0.238 (p = 0.022)	-----
	Angina	0.221 (p = 0.033)	-----
Block 6 (Cardiac interventions)	Undergone surgery	-----	0.260 (p = 0.012)
	No. of pacemakers	0.232 (p = 0.025)	-----
Block 7 (Cognitive Impairment)	MMSE score	-0.272 (p = 0.008)	-0.339 (p = 0.001)
Block 8 (Current medications)	Anti-depressants	0.338 (p = 0.001)	0.228 (p = 0.028)
	Diuretics	0.212 (p = 0.041)	0.286 (p = 0.005)
	Pain meds	0.258 (p = 0.013)	0.296 (p = 0.004)
	K+ Channel Activ.	0.214 (p = 0.040)	-----
	Anxiolytics	0.314 (p = 0.002)	-----
	Nitrates	0.211 (p = 0.042)	-----
Block 9 (Mental Health History)	History dep.	0.376 (p = 0.000)	0.335 (p = 0.001)
	MHH 1	0.352 (p = 0.001)	0.269 (p = 0.009)
	MHH 2	0.319 (p = 0.002)	-----

Table 3.18 shows that demographic factors such as age, sex and social deprivation score (recoded into binary) have no significant correlations with the HADS scores. It is interesting that the anxiety and the depression scales shared a number of common correlations. However the depression score is correlated significantly less with the

medications. The social support sub-scales were all significantly correlated with the HADS depression scores, these relationships are all negative correlations so as the amount of social support decreases then the HADS depression score increases. This is also the case for the anxiety scores.

The significantly correlated variables were entered for each block in a separate step-wise linear regression.

3.4 (ia) Predictors of HADS anxiety scores.

Table 3.19: The variables making significant contribution to the block models when using multiple linear regression for HADS anxiety scores.

BLOCK	VARIABLE	B	t	p	R ²	Adjusted R ²
Block 2	Em. And Inf. SS	-0.0469	-2.762	0.007	0.081	0.071
Block 3	Class of CHF	1.394	2.193	0.031	0.053	0.042
Block 5	Respiratory Disease	3.204	2.378	0.020	0.105	0.085
	Angina	3.073	2.211	0.030		
Block 6	No. of pacemakers	1.147	2.280	0.025	0.054	0.044
Block 7	MMSE score	-0.191	-2.667	0.009	0.073	0.062
Block 8	Anti-depressants	4.086	2.894	0.005	0.278	0.245
	Anxiolytics	8.700	2.835	0.006		
	K+ channel activators	5.458	2.800	0.006		
	Pain meds/anti-inflam.	2.050	2.049	0.043		
Block 9	History of depression	3.919	3.866	0.000	0.141	0.132

In Block 2 four variables were entered into the step-wise multiple regression but only one of these variables made a significant independent contribution to explaining the variance of the HADS anxiety scores. This may be explained by the high inter-correlations between the social support subscales. In Blocks 3, 7 and 9 there was only

one variable remaining therefore only these variables were entered into the regression. It is interesting that functional impairment (class of CHF) makes a significant contribution to the model.

The remaining significant variables were then entered in a step-wise method into a multiple linear regression model and any non-significant variables ($p < 0.05$) were excluded automatically from the model.

Table 3.20: The best model for predicting HADS anxiety scores.

STEP	VARIABLE	B	t	p	R²	Adjusted R²
1	History of dep.	2.562	2.629	0.010	0.402	0.364
2	K+ Channel Act.	5.723	3.178	0.002		
3	Anxiolytics	9.174	3.189	0.002		
4	MMSE	-1.158	-2.795	0.007		
5	Pain Med./Anti-inf.	2.487	2.507	0.014		

The above model demonstrates the strong influence of medication in the prediction of HADS anxiety scores. These predictor variables explain 36.4% of the variance.

3.4 (ib) Predictors of HADS depression scores.

The HADS depression scores were not normally distributed (K-S $Z = 1.508$, $p = 0.021$) and even when they were transformed, they were not normally distributed (K-S $Z = 1.381$, $p = 0.044$). Therefore as the dependent variable needs to be normally distributed for multiple linear regression, this could not be carried out with the HADS depression scale.

3.4 (ii) Logistic regression for SCID-I diagnoses.

Logistic regression was used to analyse the predictive variables for depressed/non-depressed and anxious/non-anxious groups as diagnosed by the SCID-I. Again a large number of variables were considered for this predictive analysis and therefore they were grouped in to the blocks outlined in Appendix VII.

The significant differences on the variables in Appendix VII between the presence or absence of a SCID-I diagnosis were calculated as an initial step. Only those variables that were significantly different between the presence or absence of a SCID-I diagnosis were then included in the regression analysis.

Table 3.21: The appropriate tests of difference per block for the anxiety and depression diagnoses for each significant variable (n=98).

BLOCK	VARIABLE	ANXIETY	DEPRESSION
Block 1: (Demographic factors)		-----	-----
Block 2: (Social support factors)	Tangible SS	-----	t = 2.822, (p = 0.006)
	Affectionate SS	-----	t = 2.502, (p = 0.014)
	Em. And Inf. SS	-----	t = 2.138, (p = 0.035)
	Sum SS	-----	t = 2.397, (p = 0.019)
Block 3: (CHF factors)	Class of CHF	t = -2.423, (p = 0.017)	t = -2.586, (p = 0.011)
Block 4: (Physical health history)		-----	-----
Block 5: (Co-morbid physical problems)	Diabetes	$\chi^2 = 9.460$, (p = 0.002)	-----
	Angina	$\chi^2 = 9.460$, (p = 0.002)	-----
Block 6: (Cardiac interventions)		-----	-----
Block 7: (Cognitive Impairment)		-----	-----
Block 8: (Current medications)	Anti-depressants	$\chi^2 = 9.126$, (p = 0.003)	$\chi^2 = 26.675$, (p = 0.000)
	Anti-platelet	-----	$\chi^2 = 5.310$, (p = 0.021)
	Diuretic	-----	$\chi^2 = 4.023$, (p = 0.045)
	Pain med.	$\chi^2 = 8.664$, (p = 0.003)	$\chi^2 = 6.999$, (p = 0.008)
	Proton pump	$\chi^2 = 4.036$, (p = 0.045)	$\chi^2 = 12.141$ (p = 0.000)
	Hypnotics	-----	$\chi^2 = 4.914$, (p = 0.027)
	Anxiolytics	-----	$\chi^2 = 5.104$, (p = 0.024)
	Nitrates	$\chi^2 = 4.961$ (p = 0.026)	-----
Block 9: (Mental Health History)	History dep.	$\chi^2 = 14.671$, (p = 0.000)	$\chi^2 = 9.668$, (p = 0.002)
	MHH 1	$\chi^2 = 17.445$, (p = 0.000)	$\chi^2 = 9.813$, (p = 0.002)
	MHH 2	$\chi^2 = 9.614$, (p = 0.002)	$\chi^2 = 12.947$, (p = 0.000)

Table 3.21 shows the significant differences between the two groups, diagnosis of depression or not, in terms of their social support scores. It is interesting that none of the social support scores are significantly associated with the anxiety diagnosis. It is only the anxiety diagnosis that is significantly different in terms of the presence of certain co-

morbid physical problems. A number of the medications at the time of the interview are significantly associated with the anxiety and depression diagnoses. The diagnoses also share a number of common variables that are significantly associated.

The variables that were significantly different for the group with a diagnosis were entered for each block in a separate logistic regression.

3.4 (iia) Predictors of SCID-I anxiety diagnoses.

Table 3.22: The variables making significant contribution to the block models when using logistic multiple regression for anxiety diagnoses.

BLOCK	VARIABLE	B	S.E.	p	R²	PAC
Block 3:	Class of CHF	0.673	0.323	0.037	0.051	82.8
Block 5:	Diabetes	0.634	0.272	0.020	0.125	85.7
	Angina	1.631	0.642	0.011		
Block 8:	Anti-depressants	1.601	0.691	0.021	0.125	81.6
	Pain med.	1.373	0.571	0.016		
Block 9:	MHH 1:	2.457	0.678	0.000	0.166	81.6

The exclusion of Block 7, the MMSE score from the above table illustrates that this variable did not significantly contribute to the model. Similarly the omission of ‘proton-pump inhibitors’ and ‘nitrates’ from Block 8 indicates that these variables did not significantly contribute to the model. In Block 9, MHH 1 (any reported history of mental health problems) was the only significant variable contributing to the model. The remaining significant variables were then entered in a step-wise method into a logistic multiple regression and any non-significant variables ($p > 0.1$) were excluded from the model.

Table 3.23: The best model for predicting SCID-I diagnosis of anxiety.

STEP	VARIABLE	B	S.E.	p	R ²	PAC
1	MHH 1	2.610	0.802	0.001	0.287	86.0
2	Diabetes	0.746	0.363	0.040		
3	Angina	1.354	0.806	0.093		
4	Class of CHF	0.641	0.355	0.071		

The above model was chosen because it explained the most variance (had the highest R²) and had the highest percentage accuracy in classification (PAC). These four variables explained 28.7% of the variance.

3.4 (iib) Predictors of SCID-I depression diagnoses.

Table 3.24: The variables making significant contribution to the block models when using logistic multiple regression for depression diagnoses.

BLOCK	VARIABLE	B	S.E.	p	R ²	PAC
Block 2:	Sum SS	-0.25	0.011	0.023	0.055	71.7
Block 3:	Class of CHF	0.739	0.335	0.027	0.064	72.0
Block 8:	Anti-depressants	4.136	1.177	0.000	0.345	83.7
	Anti-platelets	-1.648	0.695	0.018		
	Proton-pump inhibs.	2.718	0.839	0.001		
Block 9:	MHH 2	1.771	0.521	0.001	0.115	75.5

The relationship between Block 2 (social support variables) and depression diagnosis was hypothesised to be significant. However when all variables that were significantly different for the presence or absence of a SCID-I depression diagnosis were entered into the regression analysis, none of them significantly added to the model. It was thought that this may be related to the significant correlation between the social support variables, (all were significantly correlated at the 0.001 level – see Appendix VII). It made theoretical sense to use the sum of social support scores to represent the social support variables and on its own in the regression this explained a significant amount of the variance. Similarly,

from Block 9 MHH2 was chosen to represent the previous mental health category because when used in a multiple regression alone it explained the most variance and had the highest percentage accurately calculated. It is interesting that the anti-platelet medication is the only negative predictor of depression out of Block 8.

The remaining significant variables were then entered in a step-wise method into a logistic multiple regression and any non-significant variables ($p > 0.1$) were excluded from the model.

Table 3.25: The best model for predicting SCID-I diagnosis of depression.

STEP	VARIABLE	B	S.E.	p	R ²	PAC
1	Sum SS	-0.054	0.018	0.003	0.443	89.1
2	Anti-depressants	5.427	1.467	0.000		
3	Anti-platelets	-2.454	0.915	0.007		
4	Proton-pump inhibs	2.932	1.060	0.016		

This model was chosen because it explained the most variance (had the highest R²) and had the highest percentage accuracy in classification (PAC). These four variables explained 44.3% of the variance.

3.4 (iii) SUMMARY OF PREDICTORS OF ANXIETY AND DEPRESSION.

This study found that the significant predictors of anxiety were:

- History of depression (HADS)
- Any reported history of mental health problems (SCID)
- Potassium channel activators (HADS)
- Anxiolytics (HADS)
- MMSE (HADS)
- Pain medication / anti-inflammatories (HADS)
- Diabetes (SCID-I)
- Angina (SCID-I)

- Functional impairment in terms of Class of CHF (SCID-I)

The significant predictors of depression for the SCID-I were:

- Sum of social support
- Anti-depressants
- Anti-platelet drugs
- Proton-pump inhibitors.

3.5 PREDICTORS OF HOSPITALISATION AND MORTALITY.

3.5 (i) Predictors of hospitalisation.

Hospitalisation was looked at in terms of number of days in hospital in the nine months following the postal point and linear regression was chosen to analyse the predictor variables. Prior research in the area indicated that depression, anxiety, social support and social deprivation may be linked to hospitalisations in this population. Therefore the following variables were entered into a correlation analysis:

- HADS depression scores at the postal point and interview point,
- HADS anxiety scores at the postal point and the interview point,
- All social support subscales (affectionate, tangible, positive, emotional and informational, number of close friends and relatives),
- Social deprivation score.

The variable 'number of days in hospital in hospital in the nine months following the postal point' was not normally distributed (Kolmogorov-Smirnov $Z = 3.958$, $p = 0.000$) so a log was taken of this variable and this new variable was normally distributed (Kolmogorv-Smirnov $Z = 0.690$, $p = 0.728$). The correlations between these variables and those discussed above were computed using the Pearson product moment correlations. The significant correlations are represented in the table below:

Table 3.26: The variables significantly correlated with the log of the variables number of days in hospital in the nine months following the postal point.

VARIABLE	N	P	SIGNIFICANCE
HADS Depression score (postal)	43	0.398	0.008
NYHA Class of CHF	39	0.317	0.050

As can be seen in the table above, the HADS depression score from the postal point was the only psychosocial variable to be significantly associated with the number of days in hospital. It is interesting that the measure of functional status (NYHA class) is significantly associated with hospitalisation but not the variables measuring cardiac impairment (LVEF and Severity ratings). It is also noteworthy that anxiety is not significantly correlated with the log of the number of days in hospital although it was significantly correlated directly with the number of days in hospital (Pearson $r = 0.297$, $p < 0.001$).

The HADS depression score at the postal point was entered into a stepwise linear regression preceded by age, sex, LVEF and NYHA class (in block one) to control for these variables. The outcome model for this stepwise linear multiple regression is illustrated below.

Table 3.27: The model for predicting number of days in hospital for all participants that took part in the postal survey.

VARIABLE	B	t	p	R²	Adjusted R²
NYHA Class of CHF	0.553	2.175	0.037	0.129	0.102

The model indicates that the HADS depression score at the postal point did not make a significant contribution to the prediction of the number of days in hospital above that already explained by the NYHA class. The model above explains 10.2% of the variance. However it must be noted that this model was formed from data from 33 participants only.

3.5 (ii) Predictors of mortality.

Table 3.28: The number of deaths for each patient group over the nine month period.

	Postal-only group (N = 21)	Interview group (N = 100)	Non-participants (N = 100)
Number of deaths	2	2	7

The table above illustrates the small number of participants who died over the nine-month period from the postal point. It is interesting that a greater number of patients died in the group that did not participate. As so few participants died, it was not possible to analyse the data with any multiple regression.

3.5 (iii) SUMMARY OF PREDICTORS OF HOSPITALISATION AND MORTALITY.

- Functional impairment (measured by NYHA class) was the only predictive variable of hospitalisations.
- Too few participants had died to produce valid statistical predictors.

CHAPTER 4

DISCUSSION

OVERVIEW.

This study focused on a CHF population and had four main aims: to assess the prevalence of anxiety and depression in this population, to validate a screening tool for these psychological disorders and determine their predictors and finally to determine the effect of psychosocial variables on physical morbidity (in terms of rehospitalisation) and mortality. This discussion will firstly address each of these aims in turn, with reference to each of the hypotheses proposed for these aims. Then it will discuss the descriptive qualities of the CHF population, in particular considering the representativeness of the sample of CHF patients used in this study. The limitations of the study will then be reviewed followed by the possible theoretical and clinical implications of the study. Finally possibilities for future research will be highlighted.

4.1 PREVALENCE OF ANXIETY AND DEPRESSION IN CHF PATIENTS.

Many of the previous studies in this area have been criticised for their reliance on screening instruments to diagnose mood disorders in CHF patients (see chapter 1). Therefore this study used the 'gold standard' for diagnosing mood disorders, the SCID-I, which demonstrated that over one in four CHF patients had a diagnosable depressive disorder (28.6%). This prevalence rate for depression is similar to one study (Koenig 1998) and slightly higher than three studies (Freedland et al 1991; Jiang et al 2001; Griez et al 2000) that have all used an interview procedure with participants. The sample population may explain the differences because this study used out-patients whereas all the previous studies used in-patients. Alternatively, certain studies may have only

assessed for major depression (Freedland et al 1991; Jiang et al 2001) whereas this study assessed for all depression diagnoses in DSM-IV, which may have increased the prevalence of depression in this sample.

The screening questionnaire (the HADS) suggested that over one in three (37.1%) CHF patients experience clinically significant depression., which is similar to that found in previous studies using other screening measures (e.g. Skotzko et al 2000; Jiang et al 2001).

Over one in six CHF patients had a diagnosable anxiety disorder with the SCID-I. The prevalence rates for Panic Disorder (PD) and Generalised Anxiety Disorder (GAD) (8.2% and 11.2% respectively) were slightly lower than the rates found by Griez et al (2000) in their study of patients with idiopathic cardiomyopathy (12% and 16% respectively). This may be explained by the sole inclusion of patients with idiopathic cardiomyopathy in Greiz et al's study (2000), whereas this study included all patients with CHF regardless of cause. The HADS data in this study suggested that over two out of five (42.3%) CHF patients experience clinically significant anxiety. Both this study and Griez et al's study indicate that the prevalence of anxiety disorders in CHF is high and therefore needs to be addressed, particularly because, as noted earlier, in CHF patients anxiety can negatively affect cardiac output (MacMahon & Lip 2002).

If the prevalence figures are compared to those estimated for the general population then it is clear that the prevalence figures are higher in patients with CHF. For example, in a review of depression prevalence in the community in older adults (aged 55 years and older) the average prevalence rate was 13.5% (Beekman et al 1999). Prevalence rates of

anxiety disorders are more difficult to find in a sample of UK older adults but one prevalence rates for PD and GAD have been estimated at 0.5 – 3% and 3 – 6%, respectively, in adults (Weissman & Merikangas 1986). Psychological models have explained this higher prevalence of psychological disorders (such as anxiety and depression) in patients with chronic medical illnesses in terms of a response to the threat or crisis of illness, as discussed in the introduction section of this thesis. There are of course several limitations to drawing comparisons to general population figures in this way. Firstly, the studies have used different tools to measure depression and anxiety. Secondly, psychological morbidity has been looked at in a different population, in a different geographical location and at a different time point. To make a direct comparison, for example between patients with and without CHF, the best method of doing this would be to have a control group as part of the study that are matched with the CHF group in terms of age, sex and socio-economic status.

If the prevalence figures generated by a screening instrument (HADS) are compared to those quoted in a recent paper on psychological morbidity in post-MI patients (at 12 months) in the UK, which also used screening instruments, then both the anxiety and depression prevalence figures found in this study are strikingly similar to those found in post-MI patients. For example, they found clinically significant anxiety in 40.0% (compared to 42.3% in this study) and clinically significant depression in 37.2% of their sample (cf. 37.1%) (Lane et al 2002). This, it could be argued, could be expected because of the large percentage of CHF patients who are also post-MI patients. The level of co-morbidity of anxiety and depression was higher in post-MI patients than CHF patients (51% compared to 30.2%) which indicates that a higher percentage of patients with CHF experience some form of psychological morbidity. This has important implications for

service provision and it could be suggested has the inverse relationship with the current psychological service provision for these patients.

In summary, with reference to hypothesis 1, the prevalence of anxiety and depression does appear to be higher in patients with CHF when compared to studies investigating the prevalence of these psychological disorders in the general population. Furthermore when compared to another cardiac patient group (MI patients) it appears that a greater percentage of CHF patients experience psychological distress.

4.1 (i) Comparison of the prevalence rates generated by the HADS and the SCID-I.

The prevalence rates for the SCID-I are lower than the prevalence rates given by the HADS (postal). This, it could be argued, is expected because the HADS only screens for the presence of depressive symptoms whereas the SCID-I requires not only the presence of depression or anxiety symptoms but these symptoms must have been present for a specified time period (e.g. most of the day) for a specified duration (e.g. nearly every day over the last 2 weeks) for a diagnosis to be made. The differing prevalence rates may also be explained by the inclusion of somatic elements of depression in the SCID-I (although a diagnosis of depression cannot be made on the presence of these somatic symptoms alone), the focus on the last month in the SCID-I (compared to the last week in the HADS) and also the different time period in which the interview may have been conducted (as explained earlier, for some participants, the interview may have occurred up to six months after the HADS assessed at the postal point).

It could be argued that the SCID-I underestimates the prevalence of milder depressive disorders because, as stated previously, the feeling of being “depressed or down” has to be present for “most of the day, nearly every day” for a diagnosis of Major depression to be made. Even for the diagnoses of ‘Minor depression’ or ‘Brief depression’ these feelings had to last most of the day, even if a fewer number of the other criteria had to be met (‘Minor depression’) or the criteria were present over a shorter duration (‘Brief depression’). It was apparent that many participants met all of the other criteria for major depression but only described feeling low in mood for a portion of the day. It is possible that depression in patients with CHF, or even general medical disorders, is slightly quantitatively or qualitatively different to depression in patients with no medical conditions. Therefore it may be that slightly different criteria are necessary for a diagnosis of depression or that the creation of an additional diagnostic entity may be necessary. Clearly this study is not able to make these sweeping conclusions but it is an area that deserves further consideration and exploration.

One further criticism of the SCID-I that could explain the lower prevalence of anxiety disorders in this study is the lack of standardised questions for the diagnosis of ‘Generalised Anxiety Disorder’ (GAD) in the Clinician Version of the SCID-I. The researcher did have the DSM-IV criteria for the diagnosis of GAD along with the standard questions on the SCID-I but the questions asked about the symptoms were not standardised. This not only limits the validity of the GAD diagnosis but also possibly underestimates the prevalence of GAD because of a failure to address the specific symptoms of GAD in a standardised way. It could be suggested that the researcher should have developed standard questions about the symptoms of GAD. However it has been suggested that the diagnostic category of GAD is an ill-defined disorder that serves as, “a

receptacle for those disorders that cannot be fitted into one of the existing categories” (Rachman 1997:150) and therefore it may be that it is not possible to develop standard questions for the specific symptoms for the diagnosis of a disorder which itself is ill-defined.

4.1 (ii) Further results from the HADS.

Analysis of group differences in terms of HADS prevalence of depression and anxiety showed no significant difference between the postal and the interview group, males and females (except on the anxiety scores at one time point) and the social deprivation classes (when dividing these classes into two groups). This indicates that the interview group is representative of all those who participated in the study. The lack of difference between males and females may have been related to the greater number of males in the population and it is therefore not possible to conclude that there is no significant difference between the males and females, until a greater proportion of females are included in a study. Younger participants (under the age of 65 years) appeared to have a significantly higher level of anxiety prevalence when compared to the older participants (those over 65 years). However there was double the number of participants in the older age group and therefore there would need to be greater numbers of younger participants in a study before this conclusion could be seen as definitive.

The prevalence rates given by the HADS at the two time points were significantly different. There are three possible explanations for this result. Firstly the prevalence of depression and anxiety may have spontaneously dropped in this population. Secondly, from anecdotal evidence, it was apparent that the relatively long interview, during which the interviewer was attentive and empathic, had some influence on the participants who

appeared to report fewer and less severe symptoms when completing the HADS after the interview. Thirdly, the HADS at the interview time point was administered in a slightly different way (it was read to the participant whilst they held a copy to choose a response from), which may have altered participants' responses. This researcher would argue that the second of these explanations is most likely and therefore prevalence rates produced by the HADS at the interview point are not valid and not a true measure of prevalence.

4.1 (iii) Prevalence with the GDS.

The GDS provided an alternative measure of the prevalence of depression but only in participants over the age of 55 years (91.8% of the sample). This scale had a similar prevalence of depression to the SCID-I. Other studies that have used the short-form of the GDS have found slightly higher rates of prevalence of depression using the same cut-off, e.g. 77.5% (Vaccarino et al 2001) and 45% (Rozzini et al 2002) compared to 32.3% in this study. This may indicate that fewer UK CHF patients may experience depression than their European counter-parts. However the more likely explanation of this difference is that both of these studies have used in-patients, which as described in the introduction, may give different prevalence rates.

4.2 VALIDATION OF THE HADS.

The validity co-efficients calculated for the HADS (interview) at the traditional cut-off points showed that although the specificity is high, the sensitivity is generally low. Using a cut-off of 8 on the HADS (interview) increases the sensitivity of the scale but at the expense of the specificity. However the co-efficients indicate that a lower cut-off is needed, particularly for the depression scale, for identifying psychiatric disorders in CHF patients. The extent of agreement between the HADS (interview) and the SCID-I is poor,

being no better than chance at a cut-off of 11 points and only slightly better than chance with a cut-off of 8 points. From this evidence the preliminary indication would be that the HADS at the interview point does not correspond well with the SCID-I.

Validity co-efficients were also calculated for the HADS measured at the postal point. There are methodological problems with drawing the comparison between the HADS at this time point and the SCID-I because as described previously, the time from the postal point to the interview point ranged from 2 weeks to 6 months and 3 weeks. Therefore as the HADS screens for anxiety and depression symptoms over the last week, it was not possible to compare this result with a SCID-I administered six months later. A number of events could have occurred to influence mood in the intervening period. With this in mind, it is only possible to view the validity coefficients calculated for the HADS (postal) with some caution. For example, it is expected that the extent of agreement between these two measures will be poor. However it is interesting that the sensitivity of the HADS at this time point is significantly better than at the Interview time point. This re-introduces an argument that the HADS at the interview point was not a valid measure of anxiety and depression, which explains the poor sensitivity. There are several suggestions for this time point not being reliable, which have already been discussed in the prevalence section. In summary it was suggested that the HADS is influenced by situational factors (because of the influence of the SCID-I) and its method of administration.

However the ROC curves plotted for the HADS at the interview point suggest that the HADS has at least adequate discriminating ability because for both the anxiety and depression scales the area under the curve was greater than 0.8 (Goldberg & Williams 1988). The optimal cut-off suggested by the ROC curve for the depression scale was 4,

which as discussed previously suggest that the traditional cut-offs are not sensitive enough for detecting depression in this sample. With this cut-off, the percentage of false negatives (5.1%) and the percentage of false positives (14.3%) underscores the importance of reinforcing the screening with a clinical interview. Furthermore it is better to have a screening instrument that produces more false positives (Type I errors) than false negatives (Type II errors) because it is more important not to miss patients that may be depressed than to interview participants that are not depressed. This is particularly important because depression has been independently linked to mortality in this population and furthermore because clinical interviews frequently have discontinuation criteria (e.g. the SCID-I) so that an interview with a false positive patient need not be particularly long.

The ROC curve for the anxiety scale of the HADS (postal) indicated that this sub-scale had good discriminatory ability because of the value for the area under the curve. The optimal cut-off suggested for this sample was 7 points, which is closer to the lower of the two traditional cut-offs. Using this cut-off would have only missed one participant with a diagnosable anxiety disorder, which reflects the high sensitivity of the scale at this cut-off. The specificity of the scale at this cut-off is comparatively low, but as discussed previously, it could be argued that this is preferable in a screening instrument.

It is also possible to question the reliability of the SCID-I because it was administered by a researcher who was not blind to the postal questionnaire data and no measures were taken to increase the reliability of the diagnoses. Some steps were taken to avoid the researcher being biased by the results from the questionnaire data, for example, the HADS and the GDS were completed following the SCID-I. However no specific steps

were taken to ensure that the researcher was not blind to the scores on the postal questionnaires. However as the reliability of the SCID-I has not been investigated by this study then the a priori assumption that the SCID-I is the 'gold standard' must be adhered to.

In summary the analysis with this sample indicates that the HADS has adequate discriminatory ability and the t-test provides additional evidence for the significant difference in HADS scores between those who have a diagnosable depression or anxiety disorder and those who do not. Therefore there is evidence to support hypothesis two. The ROC curve analysis has indicated that the traditional cut-offs for the HADS are not suitable for this CHF population. However methodological limitations with this study curtail the extent of generalisation that can be applied. These limitations have involved the possible contamination of the HADS by the structured interview conducted before its completion and the alternative method of administering the HADS. Furthermore, it has been argued that it is not possible to compare the SCID-I with the HADS at the postal time point because of the varying and lengthy intervening period between the administration of the two measures (hence why ROC curves were not constructed for the postal HADS). Therefore the conclusions about the HADS and the optimal cut-offs are currently sample-bound although suggestions for utilising the HADS in a clinical setting will be discussed in the 'Clinical implications' section of this discussion.

The ROC curve analysis for the GDS (short-form) for this sample also suggested that it had adequate discriminatory ability and the optimal cut-off was the same as the traditional cut-off suggested for this questionnaire. This indicates that the GDS is a valid measure for screening for depression in older CHF patients (over the age of 55 years). However it is

possible that, as suggested previously, the timing and method of administration of the GDS may have altered the responses on this questionnaire, although this was not as readily apparent as with the HADS (which may indeed show that the GDS is less influenced by situational factors). The significant correlation with the HADS indicates that both measures were identifying the same extent of depressive symptoms in the participants. However as the GDS appears to provide no additional benefits over the HADS (in fact, at the optimal cut-off it has lower sensitivity than the HADS) then its utilisation over the HADS in a clinical setting would be futile, particularly because the HADS has additional benefits over the GDS as it can be used with all ages of CHF patients and it also provides a measure of anxiety.

4.3 PREDICTORS OF ANXIETY AND DEPRESSION.

As the hypotheses relating to the prediction of psychological morbidity were all concerned with the prediction of depression (because of the evidence from previous research) then this will be discussed initially. Evidence was found to support Hypothesis 3 because severity of CHF (represented by two variables, LVEF and severity rating by cardiologists) was not significantly correlated with the HADS depression score and not significantly associated with a diagnosis of depression with the SCID-I. Furthermore, severity of CHF was not included in the model for predicting the SCID-I diagnosis of depression (logistic regression). This indicates that depression is independent of disease severity in CHF, as has been found in post-MI patients (e.g. Ladwig et al 1994).

Evidence was also found to support Hypothesis 4; functional status (as represented by the NYHA class) was significantly associated with the HADS depression score and the SCID-I diagnosis of depression. The direction of this relationship appeared to be, the

higher the NYHA class (the lower the functional ability), the higher the depression score on the HADS or, in terms of those with a diagnosis of depression with the SCID-I, those with a diagnosis had a higher mean NYHA class. However the NYHA class of CHF did not make a significant independent contribution to the prediction of a SCID-I depression diagnosis. This evidence provides some support for the idea discussed in section 1.5 (i) of the introduction, that rather than disease severity, it is the loss of functional ability that is related to depression. As this was a cross-sectional study then it is not possible to conclude on the direction of this relationship (i.e. whether lower functional ability causes depression or vice-versa) but it does provide further evidence of the presence of this relationship. The direction of this association is an area for further study.

Evidence was also found to support hypothesis 5; perceived low social support was significantly associated with higher depression scores. All the sub-scales of perceived social support had a negative linear relationship with the scores on the HADS depression scale. Similarly the mean score on the social support subscales was significantly lower in those that received a diagnosis of depression (see Appendix VII). Furthermore one social support sub-scale was used in the predictive model of the diagnosis of depression with the SCID-I. This provides further support for the link between low social support and depression that has been demonstrated widely in the field of mental health. In addition it provides indication for using this model in patients with a general medical condition.

The influence of social support was also evident in the prediction of HADS anxiety scores. Again many of the social support sub-scales had a negative linear relationship with the scores on the HADS anxiety scale but these variables did not make a significant independent contribution to the two predictive models. However this does provide

preliminary evidence for the relationship between low social support and anxiety in CHF patients.

4.3 (i) Predictors of anxiety.

The predictors of anxiety included the variables, history of depression (for the HADS model), any history of mental health problems (SCID-I model), medications such as potassium-channel activators, anxiolytics, pain medications or anti-inflammatories (HADS), cognitive impairment (HADS), co-morbid physical illness such as diabetes and angina (SCID-I) and NYHA class of CHF (SCID-I). A history of mental health problems (whether specific to depression or not) appears to predispose CHF patients to anxiety problems. For example, in both the HADS and the SCID-I model a history of mental health problems explained the most variance of all the predictor variables (15.8% for the HADS model and 16.8% for the SCID-I model). Koenig (1998) also found a history of mental health problems to be associated with current psychological distress in CHF patients. However his study associated a history of depression with current depression because he did not study anxiety. Studies on post-MI patients have also found that patients with a premorbid history of mental health problems find it more difficult to adjust following an MI (Lloyd & Cawley 1983). However the association in this study between prior mental health history and later development of anxiety as a CHF patient must be viewed with caution because the variables relating to history of mental health problems were constructed from patient self-report and as not all of the patients that reported a history, received treatment, it is possible that some of them did not experience clinically significant mood disorders.

Alternatively the association between a history of mental health problems and current psychological disorders could be interpreted to mean that there were some participants who had a history of mental health problems, which had not abated. Interestingly, if a two-by-two table is constructed then it is apparent that 83.3% of the participants diagnosed with an anxiety disorder reported a prior history of mental health problems (whether or not treatment was received) (See Appendix VII). This data does not allow one to conclude that patients had an unremitting anxiety disorder because, firstly the variable 'prior history of mental health problems' is not specific to anxiety and secondly, because participants have not been asked about the course of their mental health problems. It is also important to note that 61.5% of those who reported a history of mental health problems did not receive a diagnosis of an anxiety disorder. This suggests that a history of mental health problems does not necessarily lead to anxiety disorders as a CHF patient. Furthermore 37.5% of the participants that received a diagnosis with the SCID-I did not report a history of mental health problems, suggesting that psychological distress with chronic medical conditions, such as CHF, can occur without a history of mental health problems.

The presence of anxiolytics as a predictive variable for anxiety may be explained since these patients may have been prescribed these medications because of an anxiety disorder. The predictive nature of the presence of potassium-channel activators may be explained because the possible side effects of potassium-channel activators include dizziness, flushing, and headaches (British Medical Association 1999). These are similar to some of the symptoms of anxiety or the presence of these symptoms themselves may cause concern and anxiety. Similarly pain medication or anti-inflammatories may produce

symptoms similar to anxiety as a side effect of their action or alternatively the presence of pain itself may make patients feel more anxious.

Reduced cognitive function was also a predictive variable of anxiety. This may be because patients with reduced cognitive function may be aware that they are failing and become anxious as a result. Alternatively, because it is not possible to infer the direction of this relationship, it may be that anxiety is actually reducing their cognitive functioning.

It is interesting that the presence of two specific co-morbid physical conditions (diabetes and angina) predicts anxiety. It is possible to explain this in terms of the psychological models discussed in the introduction (section 1.4 (iv)); additional physical illnesses may be represented as a greater threat to health and cause a greater emotional response. Alternatively these additional physical illnesses may cause greater anxiety because of the symptoms that individuals have to cope with or because of the lifestyle changes that must be made. The inclusion of NYHA class of CHF in the model to predict anxiety provides further evidence for the idea that functional impairment is related to psychological distress.

4.3 (ii) Predictors of depression.

The predictors for depression were all identified through the model for predicting the diagnosis of depression with the SCID-I because linear regression was not possible with the HADS depression scores as the dependent variable. The predictor variables included 'sum of social support', presence of anti-depressants and proton-pump inhibitors and the absence of anti-platelets. The importance of low social support being predictive of depression has been discussed above. It is possible to explain the predictive nature of the

presence of anti-depressants because it is likely that these patients are prescribed them because of low mood. The presence of proton-pump inhibitors may explain depression because one of the listed side effects is depression (British Medical Association 1999). The predictive nature of the absence of anti-platelet medication is more difficult to explain; one tentative explanation may be that patients not taking anti-platelet medication may be experiencing uncontrolled symptoms, which may influence their mood. It is possible that these patients require a review of their medication.

In summary models for predicting which patients may develop mood disorders may be useful in clinical practice because cardiologists can be aware of the predictive factors (such as low social support) and specifically assess these factors in patients. Ideally this will allow better identification of psychological disorders, such as depression and anxiety and therefore allow these patients to receive appropriate treatment. This is especially important in those patients who are depressed because depression has been shown to be an independent predictor of mortality in CHF patients (Murberg et al 1999).

4.3 (iii) Limitations of the Regression analysis.

The regression analysis and the models formed to predict anxiety and depression must be viewed as exploratory because of the limited numbers involved in the analysis. It has been argued that 40 participants are needed for each predictor variable for step-wise regression analysis to be accurate (Tabachnick & Fidell 1996). Furthermore for logistic regression, sample sizes should be larger, with 50 cases per predictor variable suggested as a minimum (Wright 1995). Although care was taken to limit the number of predictor variables used in each model by only using variables that were significantly associated with the dependent variable, it is possible to say that this criterion was not reached for this

study. This limits the extent to which the results and the models constructed will generalize to larger samples. This study is also susceptible to problems inherent in all regression analysis; ideally the model must contain all relevant predictors and no irrelevant predictors because if it does then the model produced and the population coefficients for variables will not be correct (Wright 1995). However it is noted by Wright (1995) that this assumption is rarely met. This study used a large number of predictor variables and although care was taken to ensure that they were relevant, it is possible that some variables were included erroneously. Furthermore because of the large amount of association analysis conducted prior to the regression analysis there is a greater likelihood of a Type I error occurring, which may have included predictor variables inaccurately in the model.

In summary, because of the large number of predictor variables in relation to the sample size, the results of the regression analysis should be viewed as exploratory at this stage. However they provide an important start in the prediction of anxiety and depression in CHF patients and have provided a base to build upon with future research.

4.4 PREDICTIONS OF HOSPITALISATIONS AND MORTALITY.

4.4 (i) Predictors of hospitalisations.

No evidence was found to support Hypothesis 6 because depression was not found to make a significant contribution to the prediction of number of days in hospital post-send-out. The only variable found to predict number of days in hospital post-send-out was functional impairment (NYHA class). This relationship, it could be argued is expected because patients with greater functional impairment (e.g. breathlessness at rest) will require more hospitalisation to control these symptoms. In contrast to previous research

(e.g. Jiang et al 2001) depression did not make a significant contribution to the prediction of variance already explained by NYHA class. This may have been because only 32.7% of the sample were actually admitted to hospital over the nine-month period of follow-up. This low percentage may be explained by the presence of an expert heart failure unit in Hull or by the fact that this sample was slightly healthier than those used in previous CHF studies (see section 4.6 (ii)). As such a small percentage of patients were admitted then the regression analysis might not be accurate for reasons discussed above. Depression was significantly correlated with the number of days in hospital post-send-out so it is possible that this variable may have made a significant contribution if the sample size was larger. Similarly anxiety was significantly correlated directly with the number of days in hospital so this may also be a predictive factor of hospitalisation in a larger sample size. Clearly this requires further investigation and it may be that follow-up over a longer period may provide some interesting results.

4.4 (ii) The predictors of mortality.

Only a small number of participants died over the follow-up period and therefore it was not possible to carry out the planned regression analysis. As a result no evidence was found to support hypotheses 6 to 8 so they remain to be investigated in future studies. A longer follow-up period may have provided some evidence for these hypotheses.

It was interesting that so few participants died over the follow-up period; this may be due to the excellent treatment received from the specialist heart failure unit in Hull, which is only one of three in the country. Therefore it is likely these CHF patients in the Hull and East Yorkshire area received better treatment than most CHF patients in the UK and this may explain the low mortality rate over the follow-up period. Alternatively it may be

because approximately one quarter of participants were healthier than participants included in most CHF studies (see section 4.6 (ii)).

The higher mortality rate in the non-participant sample is another interesting aspect to the mortality data. The mortality rate in the non-participant sample was double that in the participant sample (7% cf. 3.3%, respectively). It could therefore be suggested that this study may have underestimated the prevalence of depression because depression has been independently linked to mortality (Murberg et al 1999) and as more non-participants died then they could have been more depressed. It is also suggested that very depressed patients are unlikely to volunteer to participate in a study such as this and therefore this may have underestimated the prevalence of depression in this sample.

In summary a longer follow-up period is required before any conclusions can be drawn from the mortality data in this study.

4.5 SUMMARY OF RESULTS IN RELATION TO THE AIMS AND HYPOTHESES.

The first aim was met as the prevalence of anxiety and depression was calculated for this sample of UK CHF patients. Evidence was also found to support Hypothesis 1 - the prevalence of anxiety and depression was higher in CHF patients when compared to studies investigating the prevalence of anxiety and depression in the general population.

The second aim was partially met; an exploration of the validity of the HADS with the CHF sample was investigated but because of methodological limitations, it is not possible to conclude that the HADS is valid with the CHF population as a whole. However support

was found for hypothesis 2 - there was a significant difference between those who are categorised as depressed/anxious or non-depressed/non-anxious with the SCID-I on the HADS scores.

The third aim was met in that predictors of anxiety and depression were identified for this sample of CHF patients. However these predictor variables and models have to be considered exploratory because of the relatively small sample size. Support was found for hypothesis 3 - severity of CHF (Left ventricular ejection fraction) had no association with depression scores; hypothesis 4 – lower Functional status (Higher NYHA classes) was significantly associated with higher depression scores, and hypothesis 5 - perceived low social support was significantly associated with higher depression scores. The analysis also highlighted the importance of prior mental health history and social support in predicting psychological adjustment.

Due to the short follow-up period, it was not possible to explore aim four, the predictors of hospitalisation and mortality in CHF patients. However some evidence was found against hypothesis 6 – depression was not a significant factor in the prediction of the number of days in hospital. Conversely there was some evidence linking hospitalisations with anxiety and depression scores.

4.6 DESCRIPTIVE INFORMATION.

4.6 (i) Demographic information.

It was shown that non-participants in this study were significantly older than those who participated. This, it could be argued, is expected with an aging population such as this because older people find it difficult to cope with additional burdens such as a research

study. The sample did include a wide range of ages suggesting that it did represent the CHF population across the full age spectrum (over the age of 18 years). There were a greater percentage of males than females in the study and it is suggested that this is not representative of the CHF population. This is because although the prevalence of CHF in younger patients (less than 65 years) may be higher in men than women (Cowie et al 1997), as women survive longer than men then this increases the prevalence in older women. Therefore it is suggested that women are underrepresented in this study.

The social deprivation score was chosen to represent the socio-economic status of the participants because it was felt that other measures were not suitable. For example, most of this group did not have education beyond secondary school, however this was expected for most people from this generation and does not necessarily reflect socio-economic status. Similarly, the majority of the sample (88%) were retired and had been for some time, mostly due to medical reasons, therefore it was felt that their previous occupation would not necessarily reflect socio-economic status. The sample was not evenly distributed across the social deprivation classes; this may have been due to a number of reasons. Firstly, the social deprivation score was not available for all participants because data was only available for certain areas of East Yorkshire (such as Hull, Bridlington, etc), therefore the missing data may have made up the social deprivation scores to an even distribution. Secondly classes one and two (higher social deprivation) may have had greater representation because of the greater prevalence of cardiovascular disease and hypertension in this population sub-group (Department of Health 2000), which are risk factors for CHF. Thirdly the participants may have come from a biased sample, however as the social deprivation score was not calculated for the non-participants (for ethical reasons, as they had chosen not to participate) then this conclusion cannot be drawn.

4.6 (ii) Current medical status and medical history.

The most common cause of CHF was due to ischaemic causes and this is as expected with the CHF population (Cowie et al 1997). Most participants were in NYHA classes II and III for this study; this was also expected because most patients in NYHA class I would have been excluded due to their lack of cardiac dysfunction. In addition it is possible that patients in class IV generally felt too unwell to participate in a research study. The distribution of participants across the NYHA classes is similar to another study in this area (Murberg et al 1998a). The mean time since diagnosis was not an excessive amount of time as expected for this group because of their prognosis. Only one participant was on the heart transplant list so this increases the homogeneity of the sample. It could be argued that this participant's responses should have been excluded from the study because of his/her status as a heart transplant candidate. However this participant was not excluded because it was thought that the results would not be changed significantly by the responses from this one participant. In hindsight, it would have been more appropriate to exclude this participant from the analysis.

The measures of disease severity included measures of left ventricular ejection fraction (LVEF) and a rating of cardiac impairment from a cardiologist. Both measures indicated that 25% of the sample was slightly healthier than most CHF patients because they had a LVEF of greater than 40% (and this percentage of participants also had a rating of mild or mild to moderate). This cut-off has been used to define CHF in many other studies (e.g. Havranek et al 1999; Skotzko et al 2000) so it is suggested that 25% of this study's sample is less impaired in terms of cardiac function than other studies of CHF patients. As no significant difference was found between the severity ratings of the participants and

non-participants, this indicates that the participants were representative of this CHF sample in terms of cardiac dysfunction.

A large percentage of the participants reported co-morbid medical problems. This is to be expected in this population, not only because they are an ageing population but also because CHF can aggravate co-morbid medical problems, e.g. chronic obstructive lung disease and chronic renal failure (Fraticegli et al 1996). Other studies have also reported this high prevalence of co-morbid disorders in the CHF population (e.g. Fraticelli et al 1996).

In terms of medical history, a considerable number of participants reported previously experiencing a MI. Again this is to be expected from this population because MIs can be a precipitating or causative factor for CHF. One participant reported experiencing eight MIs, which is not thought to be physically possible. However it is interesting that he/she had this perception and again illustrates the degree of understanding held by some patients. Previous studies have found a range of percentages of participants reporting MIs and the percentage from this study does not fall outside this range (e.g. 28% - 64.7%, Fraticelli et al 1996; Murberg & Bru 2001a, respectively). The percentage of patients who had undergone surgery is as expected for this population. In summary, the CHF sample used in this study appears to be similar to other CHF populations in terms of CHF status, co-morbid physical problems and medical history.

4.6 (iii) Mental Health History.

Nearly 40% of the interviewed participants reported a prior history of mental health problems but only 56.4% of these received treatment. This can be interpreted in two

ways. Firstly, these figures may illustrate that just under half of those reporting mental health problems may not have been experiencing them to a clinically significant level (which is why they did not receive treatment). Secondly, the figures may illustrate the under-diagnosis of mental health problems in the past, which may have been related to the social stigma attached to mental health problems or to limitations within the mental health services (in terms of reliable diagnostic tools, available personnel, etc). If these lifetime prevalence figures are correct then their high percentage may be explained by the evidence that depression has been shown to be an independent risk factor for CHF (Abramson 2001). The questions about past mental health history were based on a study by Koenig (1998) who found a similar percentage of CHF participants with a past psychiatric history in his study (44.8%). Data for current prescribed psychotropic medication was collected from participants' prescription list and is therefore a reliable source of prescribed medication; however it does not consider aspects such as adherence to the medication. Just over twelve percent of participants were prescribed an anti-depressant. Other studies have not reported on this aspect so it is not possible to compare this percentage to other studies in the area.

4.6 (iv) Cognitive Impairment.

A screening measure for cognitive impairment (the MMSE) was used primarily in this study to exclude participants with probable cognitive impairment. This was because the study relied so heavily on self-report and it was hypothesised that the reliability of the self-report from patients with cognitive impairment may have been limited. Only two participants scored below the cut-off score used for cognitive impairment (24 points). Furthermore the mean MMSE score was relatively high for this sample of patients, at 28.75. This is higher than the mean MMSE score found in other studies of CHF patients,

for example, Koenig (1998) found a mean score of 23.9 points in his study. Similarly, Zuccala et al (1997) found that over half of their participants scored below a cut-off of 24 points on the MMSE. This indicates that the participants in this study had less cognitive impairment than other CHF participants. This may be for several reasons. Firstly, this may have been as a result of the indirect selection procedure for patients to be seen at the Academic Cardiology department. As explained in the methodology section, General Practitioners and Ward staff are less likely to refer patients into the Heart Failure Academic Unit if they are living in Residential Homes in the community. Therefore it is reasonable to suggest that these patients are more likely to suffer from cognitive impairment and so as they have been excluded from the study then this influences the mean MMSE score. Secondly, it may have been due to the recruitment process of this study. It is possible that patients with more cognitive impairment may not have been able or willing to participate in a study that involves a measure of their cognitive impairment and so may not have responded. Indeed one response was from the son of a patient who thought that his mother would not be able to participate in the study because of her, “variable memory recall...and also her understanding of the questions”. Steps were taken to overcome this anticipated problem as patients were offered the option of not completing the postal questionnaires and just participating in an interview. However this may not have been sufficient reassurance for some patients who may have anticipated an interview to be too daunting. Thirdly, as it has been shown that cognitive impairment is independently associated with lower LVEF (Zuccala et al 1997), the low amount of cognitive impairment may have been explained by the non-participation of patients with more severe illness (and as a result more severe cognitive impairment). Therefore in summary, this sample had less cognitive impairment than other studies on CHF patients and this may have been due to the methods by which participants were recruited.

4.6 (v) Social Support.

The social support survey was the least well-completed measure. Firstly two participants did not want to complete the survey, one stating, “I don’t think that the social support survey really applies to me”. The second participant felt that the questionnaire was “framed in such a way as to induce a feeling of self-pity, or that reliance on the support of others is a necessary pre-requisite to solving a problem.” Therefore it is worth noting for future studies that questionnaires such as this can be unacceptable to participants. Secondly many participants left some responses blank, which indicates that this questionnaire was not easy to complete, possibly because of its lay-out because nearly 20% failed to fill in a response to the first question. It would be worth redesigning the layout of this questionnaire if it was to be used in the future.

4.6 (vi) Summary.

In summary those who participated in the study were slightly younger than those who did not participate. In respect of cause of CHF, NYHA class, severity of CHF, time since diagnosis, extent of co-morbid physical problems and previous cardiovascular problems, the participants in this sample were similar to those reported in similar studies. However this study’s participants may have been slightly healthier in terms of the severity of their CHF. A large percentage reported previous mental health problems as was also reported in another study (Koenig 1998). It was thought that the small number of participants taking trial medication would not have influenced the outcome of this study. Finally the social support measure was not well-completed.

4.7 METHODOLOGICAL LIMITATIONS.

Methodological limitations specific to each section of this study have been discussed in the appropriate section above. Therefore this section will start with discussing general limitations affecting most sections of the study before summarising the limitations specific to each section.

4.7 (i) General limitations.

The representativeness of the sample in this study could be questioned because of the lower prevalence of females, the participants who were slightly healthier in terms of their LVEF and the implicit exclusion of patients not involved with Academic Cardiology. This suggests that the sample may not be truly representative of a CHF population and therefore the extent that the results can be generalised is limited.

The sample of patients that participated in the study was also diverse in terms of illness duration, course, treatment and prognosis. Furthermore the inclusion of younger patients (often excluded in other studies) increased the diversity of the sample. This diversity can prevent general conclusions being drawn about the population being studied. However it could be argued that the CHF population is diverse by nature and therefore this study could not have controlled for certain variables without changing the population being studied.

Awareness of diagnosis was not measured as part of this study, which is a methodological limitation. The variable was not measured because it was thought that participants would be aware of their diagnosis but when they were interviewed it was apparent that this was not the case. This also influenced the variable to assess the point of onset of CHF because

if they were unaware of their diagnosis then they would not have been aware of its date of onset. In some cases, participants were able to give a date when they began experiencing heart problems and therefore this date was used. It is necessary therefore to treat this variable (time since diagnosis) with caution because of its weak construct validity. Both of these variables should ideally be assessed in a study such as this because both duration of illness and awareness of illness have important implications for psychological adjustment. In addition to certain variables not being measured, some medical variables were not available for the entire sample, such as LVEF and NYHA class. Similarly the social support questionnaire was not completed fully by a relatively large number of participants, which gives a higher frequency of missing data. This missing data is a limitation with this study particularly because these variables were used in regression analysis.

There were also limitations with variables that were measured in this study. The medical factors (such as LVEF and NYHA class) were measured at a different time point to the psychosocial factors and therefore may not have been accurate at the psychosocial measurement point. Krumholz et al (1998) also had a similar problem. Furthermore as the time gap differs for each participant then this further limits the reliability of the data. Therefore there are limitations with certain variables measured as part of this study. In future studies, if funding was available, it would be more appropriate to take all measures at the same time point.

Information for the variables relating to medical history and co-morbid medical problems was gathered by self-report from the participants. Although it could be argued that this limits the reliability of this information, it can be viewed as a strength in that it provides

the patient's perspective on what they have experienced and understood from their interaction with the medical world. Furthermore a study compared the self-reports of chronic disease to data collected from General Practitioners and found that agreement to be reasonably high with kappa values ranging from 0.60 – 0.85 (Pennix et al 1998). In addition, with reference to this study, they found that depressive symptoms did not influence the agreement between patient's self-report and the data from the General Practitioners. Therefore, the data provided by the participants is not only a useful source of information about participants' experiences within a medical setting but also likely to be a reliable account of medical history.

The study did also not control a procedural factor, whether or not a partner was present at the interview. This is important because participants may make light of their psychological distress in front of others because they do not want to upset them. Therefore the assessment of psychological state may not have been accurate if a partner was present in the room. However this is a difficult variable to control, particularly because most of the interviews were conducted in the participants' homes. It would be unethical and inappropriate to ask a partner to leave their own room particularly if the participant wanted them to be present. It may have been appropriate to record the presence of another person so that this variable could have been analysed.

Another limitation of this study was the cross-section design because it does not allow for causal assumptions to be made, e.g. in the prediction of anxiety and depression. The relationships detected between variables cannot be interpreted as causal; a different design is necessary for this to occur. Furthermore the relationships between variables may be due to the influence of an unmeasured variable rather than due to a direct association

(Tabachnick & Fidell 1996). Therefore there are limitations with this study because of its design.

4.7 (ii) Limitations specific to the prevalence study.

It is important for a study of prevalence to be representative of the population being studied. In many ways this sample was representative but, as discussed previously, there are also certain limitations with the sample population, which limits the reliability of the prevalence results.

The major limitation with the prevalence study was the lack of a control group with which to compare the prevalence rates. Ideally the prevalence of anxiety and depression disorders should have been assessed in a group of out-patients (without CHF) matched for age, sex and socio-economic status with the same assessment tool (the HADS) at the same time point. This would have allowed a conclusion about the rates of depression and anxiety in CHF patients in comparison to a sample from the general population to be drawn. Instead this study has had to rely on comparisons with other studies that have not used the same assessment tools or time point. This is a major limitation with this section of the study.

This study relied upon the SCID-I as the 'gold standard' for diagnosing anxiety and depression. However there are limitations with this a priori assumption because in practise the SCID-I had some problems when being administered with CHF patients. These have been discussed more fully in section 4.1; however they include the appropriateness of the criteria for diagnosing depression in patients with chronic medical illness and the lack of standardised questions for the diagnosis of GAD. It has been

suggested that these problems with the SCID-I actually underestimated the prevalence of depression and anxiety in this sample. These problems with the SCID-I lead to methodological limitations with the prevalence and validation sections of the study.

4.7 (iii) Limitations specific to the validation study.

The major limitation with the validation study was the timing of the HADS administration at the Interview point and the method of administration. It has been argued that the timing and method of administration influenced the validity of the HADS at this time point. This could be overcome in future studies by randomising the order of the SCID-I and the HADS at the interview point (because the HADS appears to be influenced by situational factors, which could occur prior to and after the interview). In addition the HADS could be given to the participant to complete alone so that the method of administration is not altered. This would overcome these methodological weaknesses.

Two further weaknesses relate to the administration of the SCID-I. Firstly no procedure was put in place to ensure that the researcher was blind to the results of the postal questionnaire before administering the HADS. Therefore it is possible that the researcher was biased by the results of the postal survey when making a diagnosis, which limits the reliability of the diagnosis. A procedure could be easily put in place to ensure this limitation was overcome in future studies. Secondly, there was no measure of the reliability of the diagnosis made by the researcher. This could be overcome by randomly audio-taping / videotaping a certain percentage of the interviews (with participant consent) and asking a second clinician to make a diagnosis based on the information from the SCID-I. If this was carried out then an analysis of the reliability of the diagnosis could be made.

4.7 (iv) Limitations specific to the predictors of anxiety and depression.

The major limitation with this predictor study was the small sample size. This was because of the use of stepwise multiple regression, which requires large sample sizes, particularly when conducting logistic regression. This has been discussed in more detail in section 4.3 (iii). A further statistical limitation with this study was the high chance of a Type I error because of the multiple associations tested. To overcome these limitations, in future studies, it would be advantageous to have a larger sample size and to limit the number of associations being tested by having greater theoretical assumptions about the associations being tested.

4.7 (v) Limitations specific to the prediction of hospitalisations and mortality.

The hospitalisation and mortality analyses suffered from the same methodological limitation; the follow-up period of nine months was too short. Additional follow-ups in the future may provide some interesting data.

4.8 STRENGTHS OF THE STUDY.

Although there are limitations associated with this research, there are also significant strengths, which overcame several of the limitations of other studies in this area. The strengths included:

- A relatively large sample size and a good response rate.
- Selection of out-patients only.
- Measurement of anxiety.
- Use of a mood screening instrument that is not influenced by somatic elements.
- Addressing the validity of the screening instrument.

- Use of a structured clinical interview to diagnose mood disorders rather than relying on a screening instrument alone.
- Assessment of previous mental health history to address its impact on current mental status.
- Initiation of predictive model building through regression analysis.

4.9 IMPLICATIONS.

4.9 (i) Theoretical Implications.

This study was not specifically designed to contribute to theoretical models of adjustment to chronic illness. However the high prevalence of psychological disorders in patients with CHF provides support for the emotional response aspect of Leventhal's self-regulatory model of illness behaviour (see Fig. 1.3). Furthermore it could be argued that individuals who are anxious and depressed cope less well with their illness and its symptoms and this results in more hospitalisations for these groups (because an association was found between anxiety and depression scores and hospitalisations). However in terms of Leventhal's model, further work needs to be carried out to investigate CHF patients' belief systems (i.e. the representations of the health threat) when diagnosed with CHF in addition to an investigation of coping mechanisms in this population.

Additional evidence was found to support the link between low social support and greater psychological maladjustment (in terms of anxiety and depression). Theoretical mechanisms proposed to link low social support with depression have suggested that social support either buffers the effects of stressful life events or low support

independently predicts depression (Hammen 1997). Further research is needed to assess the mechanism linking low support with psychological maladjustment in CHF patients.

This study provides evidence for the biopsychosocial model of illness; factors from the biological subset (medications, class of CHF and co-morbid physical illness), psychological subset (mental health history) and social support subset all contributed to the prediction of psychological adjustment. Furthermore biological and psychological factors were related to future physical morbidity in terms of rehospitalisation. This study was unable to conclude on the effects of social support on physical morbidity and mortality because the follow-up period was too short. However these interrelationships all provide evidence for the biopsychosocial approach to illness, and highlight the importance of considering each component in patients with a chronic medical illness.

4.9 (ii) Clinical Implications.

The high prevalence rates of anxiety and depression identified in this study of UK CHF patients indicate that these patients should be routinely screened for psychological disorders and provided with appropriate treatment. This is particularly important because psychological disorders, such as depression, have been linked to physical morbidity (e.g. Jiang et al 2001) and mortality (e.g. Murberg et al 1999) in this group of patients. Therefore it is proposed that early detection of these psychological disorders may not only improve quality of life but also survival, although clearly research is needed to identify appropriate treatments for depression and anxiety to be able to test this proposed link. Researchers have begun to evaluate psychological interventions with CHF patients (see Lip & Lane 2002 for a review) but these studies are in their early stages at present. Bowman et al (1998) discuss the possibility of involving CHF patients in cardiac

rehabilitation but conclude that further evaluation of the effectiveness of cardiac rehabilitation with these patients is needed before programmes can be implemented. In summary, it is clear that CHF patients are not being routinely screened for psychological disorders at present and that for this to change there needs to be recognition of this necessity at governmental level in order for resources to be allocated for this to take place.

It is possible to conclude that the HADS has adequate discriminatory ability for depression and anxiety in this sample of CHF patients and therefore it can be used in clinical practice. However because of the methodological limitations in this study and the inconclusive results about the appropriate cut-offs to use with this population then the HADS should be used with caution. Furthermore this study has shown that the HADS is influenced by situational factors and therefore clinicians using this scale should also be aware of this. In addition, this study has highlighted the need to follow-up screening tools with a clinical interview to confirm or reject a diagnosis of depression and anxiety. In clinical practice, it could be suggested that clinicians should use a cut-off of 8 on the HADS to identify possible cases of anxiety and depression and then refer these patients onto a mental health professional for a full assessment. However this is an ideal solution that does not match the resources currently available in this area.

The GDS was also found to have adequate discriminatory ability. However as the HADS has additional benefits above those provided by the GDS (e.g. the HADS can be used with all patients without age restrictions and it also provides a measure of anxiety) then using the GDS would not be recommended over the HADS.

Exploratory analyses found certain factors to be predictive of anxiety and depression. Therefore there appear to be preliminary models for the prediction of psychological disorders, which cardiologists could be aware of in clinical practice. In particular it appears that premorbid mental health history is important in the development of anxiety in CHF patients. Similarly low social support appeared to be related to the development of depression. Therefore screening of patients' mental health history and social situation may be important to identify patients who are most at risk of developing a mood disorder. However because of the methodological limitations of this study, in particular the small sample size in relation to the predictor variables, then these models at this stage remain only exploratory. Further research is needed to test the models constructed from this sample of CHF patients.

At the time of this write-up there were no specific conclusions regarding the relationship between psychosocial factors and physical morbidity and mortality. However the literature review in the Introduction chapter does provide convincing evidence for this link in non-UK populations and Cardiologists should be aware of this. This evidence again highlights the importance of assessing psychological disorders in this CHF population.

4.10 DIRECTIONS FOR FUTURE RESEARCH.

Clearly with this sample further follow-ups can be carried out to address the hypotheses regarding the effects of psychosocial factors on physical morbidity (in terms of hospitalisations) and mortality. This longitudinal follow-up may also allow some causal relationships to be suggested.

This study also needs to be repeated with a larger sample size and with specific changes (suggested above) to control for the methodological limitations incurred in this study. In addition it would be appropriate to conduct a study over several centres in the UK and Europe using the same methodology so that findings can be generalised beyond East Yorkshire and comparisons can be drawn.

As this study has been unable to conclusively argue that the HADS is an appropriate screening tool for anxiety and depression in this group of patients, then further research is needed to determine the validity of the HADS. It may be necessary to develop screening tools specific to this group of cardiac patients, which would require detailed research.

Research is also needed to go beyond the identification of psychological disorders to begin to address issues such as cardiac misconceptions, assumptions about their illness and the perceived threat of having CHF in this group of cardiac patients. Furthermore research needs to identify the relationship between these factors and psychological disorders. Research in CHF appears to be where post-MI research was 20 years ago so attempts need to be made to learn from the MI literature and identify factors and mechanisms common to both cardiac groups and identify those aspects specific to CHF. This research should lead to the development and adaptation of psychological models of adjustment to chronic illness.

4.11 CONCLUSIONS.

This study has identified the high prevalence of anxiety and depressive disorders in a sample of UK CHF patients. To the researcher's knowledge this is the first study to identify these prevalence rates in a UK sample and the inclusion of all consenting CHF

patients over a specified time period is a significant strength of the study. In comparison with other studies that have generated prevalence results, these prevalence rates appear to be similar to those in post-MI patients and significantly greater than those in the general population. The study also demonstrated the adequate discriminatory ability of the HADS with this sample of CHF patients and indicated that further research is needed to provide conclusive evidence about the validity of the HADS with this population. Exploratory analyses revealed potential predictors of anxiety and depression from biological, psychological and social spheres. The study indicated that further research with a larger sample size is needed to test the validity of these predictor variables and models. Finally it was demonstrated that it is too early to draw conclusions about the relationships between psychosocial factors and physical morbidity and mortality but preliminary indications of a relationship between psychological factors and physical morbidity were present.

In conclusion, as with many other chronic diseases, the importance of biopsychosocial factors in chronic illness has been demonstrated in this study with CHF patients. The high prevalence rates of anxiety and depression indicate the need for these disorders to be identified in patients and appropriately treated. This need has to be recognised by governmental bodies in order for appropriate resources to be allocated to address the need. The interrelationships demonstrated between biological, psychological and social aspects highlights the need to take a holistic approach to the treatment and management of chronic illness, which is summarised so eloquently by Plato:

“The great error of our day, that physicians separate the soul from the body. The cure of the part should not be attempted without the treatment of the whole” (Plato cited in Harvey 1988:1).

REFERENCES

Abramson, J., Berger, A., Krumholz, H.M. & Vaccarino, V. (2001). Depression and risk of heart failure among older persons with isolated systolic hypertension. *Archives of Internal Medicine*, 161: 1725-1730.

Ades, P.A. (1999). Cardiac rehabilitation in older coronary patients. *Journal of the American Geriatrics Society*, 47: 98-105.

Alden, D., Austin, C. & Sturgeon, R. (1989). A correlation between the Geriatric Depression Scale long and short forms. *Journal of Gerontology*, 44: 124-125.

Alimo, A., Goodband, L. & Hannah, D. (1990). Heart plan. A comprehensive guide to cardiac rehabilitation. UK: Heartplan Ltd.

American Psychiatric Association (1994) Diagnostic and Statistical Manual of Mental Disorders. Fourth Edition. (DSM-IV) Washington DC: American Psychiatric Association.

Beck, A.T., Ward C.H., Mendelson, M., Mock J. & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4: 561-571.

Beekman, A.T.F., Copeland, J.R.M. & Prince, M.J. (1999). Review of community prevalence of depression in later life. *British Journal of Psychiatry*, 174: 307-311.

Bellardinelli, R., Georgiou, D., Cianci, G. & Purcarco, A. (1999). Randomized, controlled trial of long-term moderate exercise training in chronic heart failure: Effects on functional capacity, quality of life, and clinical outcome. *Circulation*, 99: 1173-1182.

Bennett, S.J., Pressler, M.L., Hays, L., Firestine, L.A. & Huster, G.A. (1997). Psychosocial variables and hospitalisation in persons with Chronic Heart Failure. *Progress in Cardiovascular Nursing*, 12: 4-11.

Berry, C. & McMurray, J. (1999). A review of Quality-of-life evaluations in patients with Congestive Heart Failure. *Pharmacoeconomics*, 16: 247-271.

Bertolotti, G., Zotti, A.M., Michielin, P., Vidotto, G. & Sanavio, E. (1990). A computerized approach to cognitive behavioural assessment: an introduction to CBA 2.0 primary scales. *Journal of Behaviour Therapy and Experimental Psychiatry*, 21: 21-27.

Billings, A.G., Conkrite, R.C. & Moos, R.H. (1983). Social-environmental factors in unipolar depression: Comparisons of depressed patients and nondepressed controls. *Journal of Abnormal Psychology*, 93: 119-133.

Billings, A.G. & Moos, R.H. (1985). Life stressors and social resources affect posttreatment outcomes among depressed patients. *Journal of Abnormal Psychology*, 94: 140-153.

Booth, B.M., Kirchner, J.E., Hamilton, G., Harrell, R. & Smith, G.R. (1998). Diagnosing depression in the medically ill: validity of a lay administered structured diagnostic interview. *Journal of Psychiatric Research*, 32: 353-360.

Bowling, A. (2001). Measuring disease: a review of disease-specific quality of life measurement scales. Second Edition. Buckingham, UK: Open University press.

Bowman, G.S., Thompson D.R. & Lewin, R.J.P. (1998). Why are patients with heart failure not routinely offered cardiac rehabilitation? *Coronary Health Care*, 2: 187-192.

Boyle, R. (2000). National Service Framework for Coronary Heart Disease. *Chief Medical Officer's Update*, 26: 2-3.

Brink, T.L., Yesavage, J.A., Lum, O., Heersema, P., Adey, M. & Rose, T.L. (1982). Screening tests for geriatric depression. *Clinical Gerontologist*, 1: 37-43.

British Heart Foundation. (1997). Coronary Heart Disease Statistics. London: British Heart Foundation.

British Medical Association (1999). British National Formulary 38. London, UK: BMA and the Royal Pharmaceutical Society of Great Britain.

Carney, R.M., Rich, M.W., Freedland, K.E., teVelde, A., Saini, J., Simeone, C. & Clark, K. (1988). Major depressive disorder predicts cardiac events in patients with coronary artery disease. *Psychosomatic Medicine*, 50: 627-633.

Carroll, D. (1992). Health Psychology: Stress, Behaviour and Disease. London: The Falmer Press.

Channer, K.S., O'Connor, S., Britton, S., Walbridge, D. & Rees, J.R. (1988). Psychological factors influence success of coronary artery surgery. *Journal of the Royal Society of Medicine*, 11: 629-632.

Chin, M.H. & Goldman, L. (1997). Correlates of Early Hospital Readmission or death in patients with congestive heart failure. *American Journal of Cardiology*, 79: 1640-1644.

Cleland, J.G.F. (1999a). Understanding heart failure. Banbury, UK: Family Doctor Publications.

Cleland, J.G.F. (1999b). (Ed.) Lectures in Heart Failure. London UK: Science Press Ltd.

Cleland, J.G.F. & Wang, M. (1999). Depression and heart failure – not yet a target for therapy? *European Heart Journal*, 20: 1529-1531.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 10: 37-46.

Cohen, J. (1977). Statistical Power Analysis for the Behavioral Sciences. Revised Edition. New York: Academic Press Inc.

Cohen, S. (1988). Psychosocial models of the role of social support in the etiology of physical disease. *Health Psychology, 7*: 269-297.

Cowie, M.R., Mostered, A., Wood, D.A., Deckers, J.W. & Poole-Wilson, P.A. (1997). The epidemiology of heart failure. *European Heart Journal, 18*: 208-225.

Coyne, J.C., Kahn, J. & Gotlib, I.H. (1987). Depression. In T. Jacob (Ed.) Family interaction and psychopathology: Theories, methods, and findings. Applied clinical psychology. pp. 509-533. New York: Plenum.

Curtis, A.J. (2000). Health Psychology. UK: Routledge.

Denollet, J. (1993). Emotional distress and fatigue in coronary heart disease: The Global Mood Scale (GMS). *Psychological Medicine, 23*: 111-121.

Denollet, J. & Brutsaert, D.L. (1998). Personality, disease severity, and the risk of long-term cardiac events in patients with a decreased ejection fraction after myocardial infarction. *Circulation, 91*: 167-173.

Department of Health (2000). National Service Framework for Coronary Heart Disease. London: Department of Health.

Ell, K., Nishimoto, R., Morvay, T., Mantell, J. & Hamovitch, M. (1989). A longitudinal analysis of psychological adaptation among survivors of cancer. *Cancer, 63*: 406-413.

Engel, G.L. (1977). The need for a new medical model: A challenge for biomedicine.

Science, 196: 129-135.

Engel, G.L. (1980). The clinical application of the biopsychosocial model. *American*

Journal of Psychiatry, 137: 535-544.

Erhardt, L.R. & Cline, C.M.J. (1998). Organisation of the care of patients with heart

failure. *Lancet*, 352 (Supplement I): 15-18.

Eriksson, H. (1996). How common and how much of a problem is heart failure. In J.J.V.

McMurray & J.G.F. Cleland (Eds), Heart Failure in Clinical Practice, pp.29-38. London:

Martin Dunitz Ltd.

Everson, S.A., Goldberg, D.E., Kaplan, G.A., Cohen, R.D., Pukkala, E., Tuomiletho, J. &

Salonen, J.T. (1996). Hopelessness and risk of mortality and incidence of myocardial

infarction and cancer. *Psychosomatic Medicine*, 58: 113-121.

First, M.B., Spitzer, R.L., Gibbon, M. & Williams, J.B. (1997). Structured Clinical

Interview for DSM-IV Axis I Disorders (SCID-I). Washington, DC: American

Psychiatric Press Inc.

Fitzpatrick, R., Newman, S., Archer, R. & Shipley, M. (1991). Social support, disability

and depression: a longitudinal study of rheumatoid arthritis. *Social Science and Medicine*,

33: 605-611.

Folstein, M.F., Folstein, S.E. & McHugh, P.R. (1975). "Mini-mental state": a practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*, 12: 189-198.

Foreman, M.D. (1987). Reliability and validity of mental status questionnaires in elderly hospitalized patients. *Nursing Research*, 36: 216-220.

Frasure-Smith, N., Lesperance, F. & Talajic, M. (1993). Depression following myocardial infarction. *Journal of the American Medical Association*, 270: 1819-1825.

Frasure-Smith, N., Lesperance, F. & Talajic M. (1995). Depression and 18-month prognosis after myocardial infarction. *Circulation*, 91: 999-1005.

Fratricelli, A., Gesuita, R., Vespa, A. & Paciaroni, E. (1996). Congestive heart failure in the elderly requiring hospital admission. *Archives of Gerontology and Geriatrics*, 23: 225-238.

Freedland, K.E., Carney, R.M., Rich, M.W., Caracciolo, A., Krotenberg, J.A., Smith, L.J. & Sperry, J. (1991). Depression in elderly patients with congestive heart failure. *Journal of Geriatric Psychiatry*, 24: 59-71.

Friedman, R., Sobel, D., Myers, P., Caudill, M. & Benson, H. (1995). Behavioral Medicine, Clinical Health Psychology, and Cost Offset. *Health Psychology*, 14: 509-518.

Goldberg, D. & Williams, D. (1988). A User's Guide to the General Health Questionnaire. Windsor, UK: NFER-Nelson Publishing Company.

Griez, E.J.L., Mammari, N., Loirat, J.C., Djega, N., Trochut, J.N. & Bouhour, J.B. (2000). Panic disorder and idiopathic cardiomyopathy. *Journal of Psychosomatic Research*, 48: 585-587.

Hamilton, M. (1967). Development of a rating scale for primary depressive illness. *British Journal of Social and Clinical Psychology*, 6: 278-296.

Hammen, C. (1997). Depression. Hove, UK: Psychology Press Ltd.

Harvey, P. (1988). Health Psychology. Harlow, UK: Longman Group UK Limited.

Havranek, E.P., Ware, M.G. & Lowes, B.D. (1999). Prevalence of depression in Congestive Heart Failure. *The American Journal of Cardiology*, 84: 348-350.

Hawthorne, M.H. & Hixon, M.E. (1994). Functional Status, mood disturbance and Quality of Life in patients with Heart Failure. *Progress in Cardiovascular Nursing*, 9: 22-32.

Ho, K.K.L., Anderson, K.M., Kannel, W.B., Grossman, W. & Levy, D. (1993). Survival after the onset of congestive heart failure in the Framingham Heart Study subjects. *Circulation*, 88: 107-115.

Hodges, E.P., Mast, B., Lichtenberg, P.A. & Curyton, K. (1998). Disease and depression in older medical patients. *Psychological Reports*, 83: 1081-1082.

Idler, E.L. & Kasl, S. (1991). Health perceptions and survival: Do global evaluations of health status really predict mortality? *Journal of Gerontology: Social Sciences*, 46: S55-65.

Janoff-Bulman, R. (1985). The aftermath of victimization: Rebuilding shattered assumptions. In C.R. Figley (Ed.) Trauma and its wake: The Study and treatment of post-traumatic stress disorder. Volume 1. pp 15-35. New York: Brunner/Mazel.

Janoff-Bulman, R. (1989). Assumptive worlds and the stress of traumatic events: Applications of the schema construct. *Social Cognition*, 7: 113-136.

Janoff-Bulman, R. (1992). Shattered assumptions: Towards a new psychology of trauma. New York: The Free Press.

Jiang, W., Alexander, J., Christopher, E., Kuchibhatla, M., Gauden, L.H., Cuffe, M.S., Blazing, M.A., Davenport, C., Califf, R.M., Krishnan, R.R. & O'Connor, C.M. (2001). Relationship of depression to increased risk of mortality and rehospitalization in patients with Congestive Heart Failure. *Archives of Internal Medicine*, 161: 1849-1856.

Kay, D.W.K., Henderson, A.S., Scott, R., Wilson, J., Rickwood, D. & Grayson, D.A. (1985). Dementia and depression among the elderly living in Hobart community: the

effect of the diagnostic criteria on the prevalence rates. *Psychological Medicine*, 15: 771-788.

Koenig, H.G. (1998). Depression in hospitalised older patients with congestive heart failure. *General Hospital Psychiatry*, 20: 29-43.

Konstam, V., Salem, D., Pouler, H., Kostis, J., Gorkin, L., Shumaker, S., Mottard, I., Woods, P., Knstam, M.A. & Yusuf, S. (1996). Baseline quality of life as a predictor of mortality and hospitalization in 5,025 patients with heart failure. *American Journal of Cardiology*, 78: 890-895.

Kranzler, H.R., Ronald, M.N., Burlison, J.A., Babor, T.F., Apter, A. & Rounsaville, B.J. (1995). Validity of psychiatric diagnoses in patients with substance use disorders: is the interview more important than the interviewer? *Comprehensive Psychiatry*, 36: 278-288.

Krishnan, K.R.R., George, L.K., Pieper, C.F., Jiang, W., Arias, R., Look, A. & O'Connor, C. (1998). Depression and social support in elderly patients with cardiac disease. *American Heart Journal*, 136: 491-495.

Krumholz, H.M., Butler, J., Miller, J., Vaccarino, V., Williams, C.S., Mendes de Leon, C.F., Seeman, T.E., Kasl, S.V. & Berkman, L.F. (1998). Prognostic importance of emotional support for elderly patients hospitalized with heart failure. *Circulation*, 97: 958-964.

Ladwig, K.H., Roll, G., Breithardt, G., Budde, T. & Borggrefe, M. (1994). Post-infarction depression and incomplete recovery 6 months after acute myocardial infarction. *Lancet*, 343: 20-23.

Lane, D., Carroll, D., Ring, C., Beevers, D.G. & Lip, G.Y.H. (2002). The prevalence and persistence of depression and anxiety following myocardial infarction. *British Journal of Health Psychology*, 7: 11-21.

Langosch, W. (1989). Cardiac Rehabilitation. In S. Pearce & J. Wardle (Eds), The Practice of Behavioural Medicine, pp. 27-49. Oxford: The British Psychological Society in association with Oxford University Press.

Langosh, W. (1994). Cardiac rehabilitation: Need for psychological input? *The Irish Journal of Psychology*, 15: 84-95.

Lecrubier, Y., Sheehan, D.V., Weiller, E., Amorim, P., Bonora, I., Sheehan, K.H., Janavs, J. & Dunbar, G.C. (1997). The Mini International Neuropsychiatric Interview (MINI): a short diagnostic structured interview: reliability and validity according to the CIDI. *European Psychiatry*, 12: 224-231.

Leventhal, H., Meyer, D. & Nerenz D. (1980). The common sense representations of illness danger. In S. Rachman (Ed.) Medical Psychology, Volume 2, pp. 7-30. New York: Pergamon.

Leventhal, H. & Nerenz, D. (1985). The assessment of illness cognition. In P. Karoly (Ed.), Measurement Strategies in Health Psychology, pp. 517-554. New York: John Wiley.

Lewin, B. (1989). Cardiac Disorders. In A. Broome & S. Llewelyn. (Eds), Health Psychology – Processes and Applications, Second Edition. pp.141-166. London: Chapman & Hall.

Lewin, B. (1997). The psychological component. In D.R. Thompson, G.S. Bowman, D.P. de Bono & A. Hopkins. Cardiac Rehabilitation. Guidelines and Audit Standards, pp. 21-45. London: Royal College of Physicians of London.

Lewin B. (1998). Unpublished chapter. Cardiac Rehabilitation, a cognitive behavioural model, the Heart Manual and other topics. (paper available from website, www.cardiacrehabilitation.org.uk)

Lewis, M.A., Rook, K.S. & Schwarzer, R. (1994). Social support, social control, and health among the elderly. In G.N. Penny, P. Bennett & M. Herbert. (Eds). Health Psychology. A Lifespan Perspective. pp. 191-211. Switzerland: Harwood Academic Publishers.

Lip, G.Y.A. & Lane, D.A. (2002). Psychological interventions for depression in heart failure. *The Cochrane Library*, 3: 1-12.

Lloyd, G.G. & Cawley, R.H. (1983). Distress or illness? A study of psychological symptoms after myocardial infarction. *British Journal of Psychiatry*, 142: 120-125.

McDowell, I. & Newell, C. (1996). Measuring Health: A Guide to Rating Scales and Questionnaires. Oxford, UK: Oxford University Press.

MacMahon, K.M.A. & Lip, G.Y.H. (2002). Psychological Factors in Heart Failure. *Archives of Internal Medicine*, 162: 509-516.

Mair, F.S., Crowley, T.S. & Bundred, P.E. (1996). Prevalence, aetiology and management of heart failure in general practice. *British Journal of General Practice*, 46: 77-79.

Majani, G., Pierobon, A., Giardini, A., Callegari, S., Opasich, C., Cobelli, F. & Tavazzi, L. (1999). Relationship between psychological profile and cardiological variables in chronic heart failure. The role of patient subjectivity. *European Heart Journal*, 20: 1579-1586.

Marteau, T.M. (1995). Health beliefs and attributions. In A. Broome & S. Llewlyn (Eds). Health Psychology: processes and applications. Second Edition. pp. 3-21. London, UK: Chapman & Hall.

Massie, B.M. & Shah, N.B. (1997). Evolving trends in the epidemiologic factors of heart failure: rationale for preventative strategies and comprehensive disease management. *American Heart Journal*, 133: 703-712.

Microsoft (1997). Encarta 97 encyclopedia. CDROM. USA: Microsoft Corporation.

Moorey, S., Greer, S., Watson, M., Gorman, C., Rowden, L., Tunmore, R., Robertson, B. & Bliss, J. (1991). The factor structure and factor stability of the Hospital Anxiety and Depression Scale in patients with cancer. *British Journal of Psychiatry*, 158: 255-259.

Moos, R.H. & Schaefer, J.A. (1984) The crisis of physical illness: An overview and conceptual approach. In R.H. Moos (Ed.) Coping with Physical Illness: New Perspectives, Volume 2, pp. 3-25. New York: Plenum Press.

Moser, D.K. & Worster, P.L. (2000). Effect of psychosocial factors on physiologic outcomes in patients with heart failure. *The Journal of Cardiovascular Nursing*, 14: 106-115.

Murberg, T.A. & Bru, E. (2001a). Social relationships and mortality in patients with congestive heart failure. *Journal of Psychosomatic Research*, 51: 521-527.

Murberg, T.A. & Bru, E. (2001b). Coping and mortality among patients with congestive heart failure. *International Journal of Behavioural Medicine*, 8: 66-79.

Murberg, T.A., Bru, E. & Aarsland, T. (2001). Personality as predictor of mortality among patients with congestive heart failure: a two-year follow-up study. *Personality and Individual Differences*, 30: 749-757.

Murberg, T.A., Bru, E., Aarsland, T.R.N. & Svebak, S. (1998a). Functional status and depression among men and women with congestive heart failure. *International Journal of Psychiatry in Medicine*, 28: 273-291.

Murberg, T.A., Bru, E., Aarsland, T.R.N. & Svebak, S. (1998b). Social support, social disability and their role as predictors of depression among patients with congestive heart failure. *Scandinavian Journal of Social Medicine*, 26: 87-95.

Murberg, T.A., Bru, E., Tveteras, R., & Aarsland, T.R.N. (1999). Depressed mood and subjective health symptoms as predictors of mortality in patients with congestive heart failure: a two-years follow-up study. *International Journal of Psychiatry in Medicine*, 29: 311-326.

Musselman, D.L., Evans, D.L. & Nemeroff, C.B. (1998). The relationship of depression to cardiovascular disease: epidemiology, biology, and treatment. *Archives of General Psychiatry*, 55: 580-592.

Nelson, E.A. & Jordan, D.M.II (2001). Preliminary results of a pilot program on depression in patients with congestive heart failure. *Psychological Reports*, 88: 42-44.

NHS Centre for Reviews and Dissemination. (1998). Cardiac rehabilitation. *Effective Health Care*, 4(4).

O'Connor, D.W., Pollitt, P.A., Hyde, J.B., Fellows, J.L., Miller, N.D., Brook, C.P. & Reiss, B.B. (1989). The reliability and validity of the Mini-Mental State in a British community survey. *Journal of Psychiatric Research*, 23: 87-96.

Ogden, J. (1996). Health Psychology: a textbook. Buckingham, UK: Open University Press.

Olin, J.T., Schneider, L.S., Eaton, E.M., Zemansky, M.F. & Pollock, V.E. (1992). The Geriatric Depression Scale and the Beck Depression Inventory as screening instruments in an older adult outpatient population. *Psychological Assessment*, 4: 190-192.

Penninx, B.W.J.H., van Tilburg T., Boeke, J.P., Deeg, D.J.H., Kriegsman, D.M.W. & van Eijk, J.T.M. (1998). Effects of social support and personal coping resources on depressive symptoms: different for various chronic diseases? *Health Psychology*, 17: 551-558.

Petrie, K.J., & Weinman, J.A. (1997). Illness Representations and Recovery from Myocardial Infarction. In K.J. Petrie & J.A. Weinman (Eds), Perceptions of Health and Illness. Current Research and Applications, pp.441-461. The Netherlands: Harwood Academic Publishers.

Pitts, M. (1998). An introduction to health psychology. In M. Pitts & K. Philips (Eds) The Psychology of Health: An Introduction. Second Edition. London UK: Routledge.

Profant, J. & Dimsdale, J.E. (2000). Psychosocial factors and congestive heart failure. *International Journal of Behavioural Medicine*, 7: 236-255.

Rachman, S. (1997). *Anxiety*. Hove, UK: Psychology Press.

Radloff, L.S. (1977). The CES-D scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1: 385-401.

Reschke, A.H. (2001). Depression and functional impairment in out-patients with congestive heart failure. *Dissertation Abstracts International: Section B: - The Sciences and Engineering*, 61 (9-B): 5002.

Robins, L., Helzer, J., Croughan, J., Williams, J. & Spitzer, R. (1981). National Institute of Mental Health Diagnostic Interview Schedule: history, characteristics, validity. *Archives of General Psychiatry*, 38: 381-389.

Rozzini, R., Sabatini, T., Frisoni, G.B. & Trabbucchi, M. (2002). Depression and major outcomes in older adults with heart failure. *Archives of Internal Medicine*, 162: 362-363.

Ruberman, W., Weinblatt, E., Goldberg, J.D. & Chadhary, B.S. (1984). Psychosocial influences on mortality after myocardial infarction. *New England Journal of Medicine*, 311: 552-559.

Rule, B.G., Harvey, H.Z. & Dobbs, A.R. (1989). Reliability of the Geriatric Depression Scale for younger adults. *Clinical Gerontology*, 9: 37-43.

Saner, H. (1998). Foreword. *European Heart Journal*, 19 (Supplement O): O1-O2.

Scogin, F.R. (1994). Assessment of depression in older adults: a guide for practitioners. In M. Storandt & G.R. Vandenbos (Eds) Neuropsychological assessment of dementia and depression in older adults: a clinician's guide, pp. 61-80 Washington DC: American Psychological Association.

Segal, D.L., Hersen, M. & Van Hasselt, V.B. (1994). Reliability of the Structured Clinical Interview for DSM-III-R: an evaluative review. *Comprehensive Psychiatry* 35: 316-327.

Segal, D.L., Hersen, M., Van Hasselt, V.B., Kabacoff, R.I. & Roth, L. (1993). Reliability of diagnosis in older psychiatric patients using the structured clinical interview for DSM-III-R. *Journal of Psychopathology and Behavioural Assessment*, 15: 347-356.

Segal, D.L., Kabacoff, R.I., Hersen, M., Van Hasselt, V.B. & Ryan, C.F. (1995). Update on the reliability of diagnosis in older psychiatric outpatients using the structured clinical interview for DSM-III-R. *Journal of Clinical Geropsychology*, 1: 313-321.

Shabetai, R. (2002). Depression and heart failure. *Psychosomatic Medicine*, 64: 13-14.

Sheikh, J.I. & Yesavage, J.A. (1986). Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. *Clinical Gerontology*, 5: 165-172.

Sherbourne, C.D. & Stewart, A.L. (1991). The MOS Social Support Survey. *Social Science and Medicine*, 32: 705-714.

Skotzko, C.E., Krichten, C., Zietowski, G., Alves, L., Freudenberger, R., Robinson, S., Fisher, M. & Gottlieb, S.S. (2000). Depression is common and precludes accurate assessment of functional status in elderly patients with congestive heart failure. *Journal Cardiac Failure*, 6: 300-305.

Snow, R. & Crapo, L. (1982). Emotional bondedness, subjective well-being, and health in elderly medical patients. *Journal of Gerontology*, 37: 609-615.

Spielberger, C.D., Gorsuch, R.L. & Lushene, R.E. (1970). The State-Trait Anxiety Inventory (STAI) Test Manual for Form X. Palo Alto: Consulting Psychologist Press.

Spitzer, R.L., Williams, J.B.W., Kroenke, K., Linzer, M., Verloin deGruy, F., Hahn, S.R., Brody, D. & Johnson, J.G. (1994). Utility of a new procedure for diagnosing mental disorders in primary care: the PRIME-MD 1000 study. *Journal of the American Medical Association*, 272: 1749-1756.

Strakowski, S.M., Keck, P.E., McElroy, S.L., Lonczak, H.S. & West, S.A. (1995). Chronology of comorbid and principle syndromes in first-episode psychosis. *Comprehensive Psychiatry*, 36: 106-112.

Strakowski, S.M., Tohen, M., Stoll, A.L., Faedda, G.L., Mayer, P.V., Kolbrener, M.L. & Goodwin, D.C. (1993). Co-morbidity in psychosis at first hospitalisation. *American Journal of Psychiatry*, 150: 752-757.

Streiner, D.L. & Norman, G.R. (1995). Health Measurement Scales. A Practical Guide to Their Development and Use. Second Edition. Oxford UK: Oxford University Press.

Stukenberg, K.W., Dura, J.R. & Kiecolt-Glaser, J.K. (1990). Depression screening scale validation in an elderly, community-dwelling population. *Psychological Assessment*, 2: 134-138.

Struthers, A.D., Anderson, G., Donnan, P.T. & MacDonald, T. (2000). Social deprivation increases cardiac hospitalisations in chronic heart failure independent of disease severity and diuretic non-adherence. *Heart*, 83: 12-16.

Tabachnick, B.G. & Fidell, L.S. (1996). Using Multivariate Statistics. Third Edition. New York, USA: HarperCollins College Publishers.

Townsend, P., Philmore, P. & Beattie, A. (1988). Health, deprivation. Inequalities and the North. London: Croom Helm.

Turk, D.C., Rudy, T.E. & Salovey, P. (1986). Implicit models of illness. *Journal of Behavioural Medicine*, 9: 453-474.

Vaccarino, V., Kasl, S.V., Abramson, J. & Krumholz, H.M. (2001). Depressive symptoms and risk of functional decline and death in patients with heart failure. *Journal of the American College of Cardiology*, 38: 199-205.

Weissman, M.M. & Merikangas, K.R. (1986). The epidemiology of anxiety and panic disorders. *Journal of Clinical Psychiatry*, 46 (Supplement): 11-17.

Winett, R.A. (1985). Ecobehavioral assessment in lifestyles: concepts and methods. In P. Karoly (Ed.) Measurement Strategies in Health Psychology, pp. 147-181. New York: John Wiley and sons.

Wright, R.E. (1995). Logistic regression. In L.G. Grimm & P.R. Yarnold (Eds) Reading and understanding multivariate statistics. pp. 217-244. Washington DC, USA: American Psychological Association.

Yesavage, J.A., Brink, T.L., Rose, T.L., Lum O., Huang, V., Adey, M. & Leirer, V.O. (1983). Development and validation of a geriatric depression screening scale: a preliminary report. *Journal of Psychiatric Research*, 17: 37-49

Zigmond, A.S. & Snaith, R.P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67: 361-370.

Zuccala, G., Cocchi, A. & Carbonin, P. (1995). The impact of depression on self-perceived health status. *Journal of the American Geriatric Society*, 43: 198-199.

Zuccala, G., Cattell, C., Gravina-Manes, E., Di-Niro, M.G., Cocchi, A. & Bernabei, R. (1997). Left ventricular dysfunction: A clue to cognitive impairment in older patients with heart failure. *Journal of Neurology, Neurosurgery and Psychiatry*, 63: 509-512.

Zung, W.W.K. (1965). A self-rating depression scale. *Archives of General Psychiatry*, 12: 63-70.

APPENDIX I – CONSENT FORMS.

CONSENT FORM.

PLEASE CIRCLE YOUR RESPONSE TO EACH STATEMENT:

I have read the information sheet provided and asked any questions I might have about this study:

YES

NO

I understand that I can withdraw from the research at any point should I wish to for any reason:

YES

NO

I agree to take part in the **FIRST STAGE** of this study by returning these questionnaires:

YES

NO

I agree to take part in the **SECOND STAGE** of this study and understand that I may be contacted by Jane Haworth either by telephone or letter to arrange a convenient time for an interview to take place:

YES

NO

IF YES, My telephone number is _____

NB- you may not have to take part in the second stage even if you do agree to take part in the second stage of the study.

I give consent for my medical notes to be accessed:

YES

NO

Signed.....

Print name.....

Date.....

Occupation / Previous Occupation.....

CONSENT FORM FOR ACCESS TO MEDICAL NOTES.

PLEASE CIRCLE YOUR RESPONSE TO EACH STATEMENT:

I consent for Jane Haworth to have access to my medical notes kept within the hospital:

YES

NO

I consent for Jane Haworth to have access to my medical notes kept by my GP:

YES

NO

Signed.....

Print name.....

Date.....

Study Number.....

APPENDIX II – POSTAL PACK.

Castle Hill Hospital
Castle Road
Cottingham
East Yorkshire
HU16 5JQ

Academic Cardiology
Direct Line: 01482 624073

Dear _____,

The Academic Department of Cardiology is interested in how their patients manage with a heart condition. Jane Haworth has kindly agreed to run a study that asks patients how they are feeling and coping, as part of her doctoral training research programme.

I would be very grateful if you would take the time to read the enclosed sheets. If you felt that you wanted to participate in the study then complete the questionnaires and return them in the pre-paid envelope. Please return the questionnaire by *date 3 weeks from posting*.

If you have any further questions regarding the study, please do not hesitate to contact Jane Haworth on 01482 624073.

Thank you for taking the time to read this.

Very best wishes,

Dr Andrew L. Clark, MA, MD, MRCP.
Senior Lecturer in Cardiology.

HELPSHEET.

What to do if you want to participate:

- 1) Read the information sheet and ring Jane Haworth if you have any questions.**
- 2) Fill in the Consent form.**
- 3) Complete the 2 questionnaires :**
 - 'HAD' Scale.**
 - 'Social Support' questionnaire.**
- 4) Put these sheets in the pre-paid envelope and post it.**

If you want to participate but don't want to fill out the questionnaires – ring Jane Haworth – 01482 624073

You can ask a friend/ relative/ member of care staff to help you fill out the forms, if you wish.

NEED MORE HELP? RING JANE HAWORTH ON 01482 624073

PATIENT INFORMATION SHEET.

Castle Hill Hospital
Castle Road
Cottingham
East Yorkshire
HU16 5JQ

This study that you are being invited to join is concerned with how people with a heart condition feel and cope.

The study involves two parts. The first part involves patients who have had contact with the Academic Cardiology Unit based at Castle Hill Hospital being sent some questionnaires. You will find the questionnaires in this pack. These questionnaires are concerned with how you are feeling and how you feel that you have been coping. If you agree to take part, please fill in the questionnaires and return them in the envelope provided.

Only some of the patients who take part in the first part of the study will be invited to take part in the second part. You will find a form in this pack asking you whether or not you mind being contacted again for the second part of this study. Please fill this in and return it with your questionnaires. Only those patients who agree and return their consent form will be considered for the second part of the study. You may not have to do anything extra even if you do agree to take part in the second part of the study.

The second part of the study involves taking part in an interview and completing some more questionnaires. I will be asking questions about how you are feeling and coping with life. If you are in agreement then this interview will take place in your home but if you would prefer to have it on hospital premises then this can also be arranged.

Taking part in this study is completely voluntary – your decision to take part or not take part in the study will not affect your health service treatment at all.

Having agreed to take part you can withdraw at any time you wish. If after you send in your questionnaires you change your mind about being involved then you can ring the number below and your questionnaires will be destroyed.

The questionnaires used in this study will have all personal identifying information removed so that you as an individual cannot be identified from your responses. If issues are identified during this study which are important for your treatment and well-being then these will be communicated to your doctors with your permission.

I am very grateful to you for considering this study. If you would like any further information to help you decide whether or not to take part in this study then please do not hesitate to contact me on 01482 624073 (this is the number of the Department of Academic Cardiology at Castle Hill Hospital.)

Jane Haworth
Trainee Clinical Psychologist

CONSENT FORM.

PLEASE CIRCLE YOUR RESPONSE TO EACH STATEMENT:

I have read the information sheet provided and asked any questions I might have about this study:

YES

NO

I understand that I can withdraw from the research at any point should I wish to for any reason:

YES

NO

I agree to take part in the **FIRST STAGE** of this study by returning these questionnaires:

YES

NO

I agree to take part in the **SECOND STAGE** of this study and understand that I may be contacted by Jane Haworth either by telephone or letter to arrange a convenient time for an interview to take place:

YES

NO

IF YES, My telephone number is _____

NB- you may not have to take part in the second stage even if you do agree to take part in the second stage of the study.

I give consent for my medical notes to be accessed:

YES

NO

Signed.....

Print name.....

Date.....

Occupation / Previous Occupation.....

This questionnaire is to help us know how you are feeling.

HAD SCALE

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

Read each item and TICK ONE BOX ONLY for the reply which comes closest to how you have been FEELING DURING THE PAST WEEK.

NAME:.....DATE.....

1) I feel tense or 'wound up':

Most of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A lot of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From time to time, occasionally.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) I feel as if I am slowed down:

Nearly all the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sometimes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) I still enjoy the things I used to enjoy:

Definitely as much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not quite so much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Only a little.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hardly at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9) I get a sort of frightened feeling like 'butterflies' in the stomach:

Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occasionally.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quite often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) I get a sort of frightened feeling as if something awful is about to happen:

Very definitely and quite badly.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, but not too badly.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A little, but it doesn't worry me.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10) I have lost interest in my appearance:

Definitely.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't take as much care as I should.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I may not take quite as much care.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I take just as much care as ever.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) I can laugh and see the funny side of things:

As much as I always could.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not quite so much now.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Definitely not so much now.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11) I feel restless as if I have to be on the move:

Very much indeed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quite a lot.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not very much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) Worrying thoughts go through my mind:

A great deal of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A lot of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From time to time but not too often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Only occasionally.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12) I look forward with enjoyment to things:

As much as I ever did.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rather less than I used to.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Definitely less than I used to.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hardly at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6) I feel cheerful:

Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sometimes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13) I get sudden feelings of panic:

Very often indeed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quite often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not very often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7) I can sit at ease and feel relaxed:

Definitely.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Usually.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14) I can enjoy a good book or radio or TV programme:

Often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sometimes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very seldom.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUPPORT SURVEY.

NAME:

About how many close friends and close relatives do you have (people that you feel at ease with and can talk to about what is on your mind)? Enter in the boxes below the number of:

Close friends? Close relatives?

People sometimes look to others for companionship, assistance, or other types of support.

How often is each of the following kinds of support available to you if you need it?

Circle the number according to the extent of support.

	NONE of the time	A LITTLE of the time	SOME of the time	MOST of the time	ALL of the time
1) Someone to help you if you were confined to bed	1	2	3	4	5
2) Someone you can count on to listen to you when you need to talk	1	2	3	4	5
3) Someone to give you good advice about a crisis	1	2	3	4	5
4) Someone to take you to the doctor if you needed it	1	2	3	4	5
5) Someone who shows you love and affection	1	2	3	4	5
6) Someone to have a good time with	1	2	3	4	5
7) Someone to give you information to help you understand the situation	1	2	3	4	5
8) Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
9) Someone who hugs you	1	2	3	4	5
10) Someone to get together with for relaxation	1	2	3	4	5
11) Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
12) Someone whose advice you really want	1	2	3	4	5
13) Someone to do things with to help get your mind off things	1	2	3	4	5
14) Someone to help with daily chores if you were sick	1	2	3	4	5
15) Someone to share your most private worries and fears with	1	2	3	4	5
16) Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
17) Someone to do something enjoyable with	1	2	3	4	5
18) Someone who understands your problems	1	2	3	4	5
19) Someone to love and make you feel wanted	1	2	3	4	5

APPENDIX III – STRUCTURED INTERVIEW PACK.

BASIC INFORMATION SHEET.

Name.....
Date of birth.....
Study Number.....
Date of Interview.....

1. DEMOGRAPHIC DATA.

1) Are you married? Married or living with someone as if married
 If NO were you ever? Widowed
 Divorced or similar
 Separated
 Never married

2) Any children?
 If YES how many?

3) Where do you live?

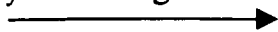
4) Who do you live with?

5) Did you finish school?
 Age left?
 Any exams?

Further education – degree?
 Post-graduate degree?

2. OCCUPATIONAL HISTORY.

Are you working now?



YES 1) How long have you worked there?

IF LESS THAN 6 MONTHS – Why did you leave you last job?

2) Have you always done that kind of work?



NO 1) Why is that?

2) What kind of work have you done before?

3) How are you supporting yourself now?

5. CURRENT SITUATION.

1) Have you had any problems in the past month? (Inc. social/ environmental/ health/ family).

.....
.....
.....

6) What has your mood been like? (When were you last feeling OK / your usual self?) (IF SIG. USE SCID P.9)

.....
.....
.....

7) How has your physical health been? (Have you had any medical problems?)

.....
.....
.....

8) Do you take any medications or vitamins?

MEDICATION – how much?

How often?

Any changes in the amount that you have been taking?

.....
.....
.....

9) How much have you been drinking (alcohol) in the past month?

.....
.....
.....

10) Have you been taking any drugs in the past month? (Street drugs – marijuana, cocaine, etc)

.....
.....

11) How have you been spending your free time?

.....
.....
.....

12) Who do you spend your free time with?

.....

THE MINI-MENTAL STATE EXAMINATION (DIS VERSION)

NAME: DATE:/...../.....

- ORIENTATION: (10 points) (score 1 if correct). Ask the client:-** **SCORE**
1. *What is the year? ___/1
 2. *What is today's date? ___/1
 3. *What is the day of the week? ___/1
 4. *What is the month? ___/1
 5. *Can you tell me where we are? (residence or street name required) ___/1
 6. *What city/town are we in? ___/1
 7. What county are we in? ___/1
 8. What country are we in? ___/1
 9. What is the season? ___/1
 10. What floor of the building are we on?
(when asked in the Community this question is not asked: simply score as correct) ___/1

REGISTRATION: (3 points) (score 1 for each correct one)

11. Name three objects, eg apple, table, penny. Ask the client to repeat them and to remember what they are because you will be asking them to name them again in a few minutes. ___/3

ATTENTION AND CALCULATION: (5 points)

12. a) Ask the client to subtract 7 from 100, and then to subtract 7 from the answer they get and to keep subtracting 7 until you tell them to stop.
 - b) Ask the client to spell the word WORLD forwards and then backwards.
- Score: use higher score from a) or b) ___/5

RECALL: (3 points)

13. Ask the client: "What were the three objects I asked you to remember?" ___/3

LANGUAGE: (9 points)

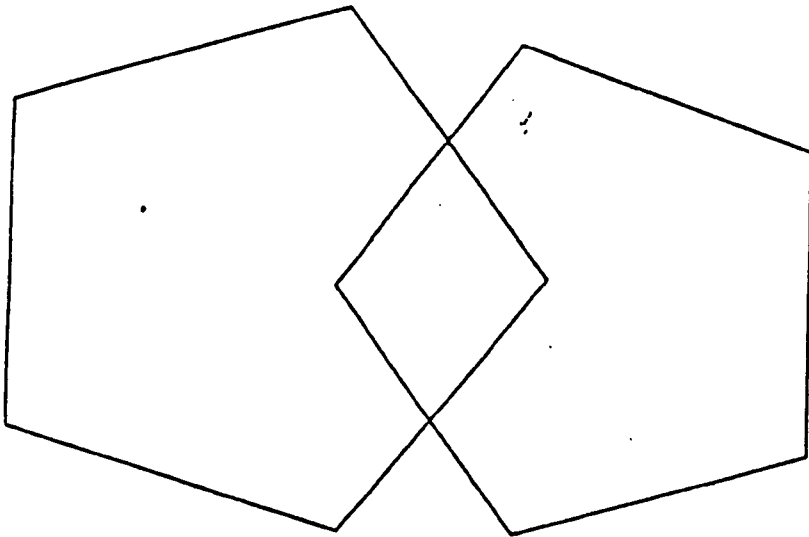
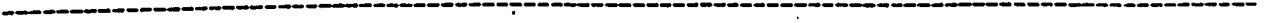
- 14(a). Point to watch. Ask client what it is called. ___/1
- 14(b). Point to pen. Ask client what it is called. ___/1
15. Ask client to repeat: "no ifs, and no buts". ___/1
16. Ask client to read the words overleaf and do what it says.
(the person must close their eyes to score) ___/1
17. Instruct client: "pick up this piece of paper in your right hand, fold it in half, and put it down using your left hand". (Score 1 point for each correct section of the 3-part instruction). ___/3
18. Ask the client to write a sentence on the paper. (The sentence must have a subject, a verb, and make sense). ___/1
19. Ask the client to copy the design overleaf. ___/1

Total MMSE score (maximum=30) ___/30

CUT-OFF SCORES

- 24-30 :no cognitive impairment
- 18-23 :mild cognitive impairment
- <17 :severe cognitive impairment

CLOSE YOUR EYES



A. MOOD EPISODES

MAJOR DEPRESSIVE EPISODE CRITERIA

onset of episode: _____
 check if: current _____
 past _____
 if past, offset: _____

A. Five (or more) . . . during the same 2 weeks . . . at least one of the symptoms is either (1) depressed mood, or (2) loss of interest or pleasure.

A1	(1) depressed mood <i>Notes:</i>	? - +	A1
A2	(2) markedly diminished interest or pleasure <i>Notes:</i>	? - + <div style="border: 1px solid black; padding: 2px; margin: 5px auto; width: 60px; text-align: center;">A16 p. 15</div>	A2
A3	(3) weight loss/gain; decreased/increased appetite <i>Notes:</i>	? - +	A3
A4	(4) insomnia or hypersomnia <i>Notes:</i>	? - +	A4
A5	(5) psychomotor agitation or retardation <i>Notes:</i>	? - +	A5

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

A6	(6) fatigue or loss of energy <i>Notes:</i>	? - +	A6
A7	(7) feelings of worthlessness or excessive or inappropriate guilt <i>Notes:</i>	? - +	A7
A8	(8) diminished ability to think or indecisiveness <i>Notes:</i>	? - +	A8
A9	(9) thoughts of death, suicidal ideation, attempt, or plan <i>Notes:</i>	? - +	A9
A10	AT LEAST FIVE OF A(1)-A(9) ARE "+" AND AT LEAST ONE OF THESE IS A(1) OR A(2)	? - + A16 p. 15	A10
A11	C. Clinically significant impairment or distress <i>Notes:</i>	? - + A16 p. 15	A11
A12	D. Not due to a substance or a general medical condition (check p. 24) WARNING: A "YES" answer to the interview question equals a "-" rating <i>Notes:</i>	? - + A16 p. 15	A12

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

<p>A13</p>	<p>E. Not better accounted for by Bereavement <i>WARNING: A "YES" answer to the interview question equals a "-" rating</i></p>	<p>? - + A16 p. 15</p>	<p>A13</p>
<p>A14</p>	<p>CRITERIA A, C, D, AND E ARE "+" Check here ___ if criteria have been met in the past month.</p>	<p>+ ↓ Major Depressive Episode</p>	<p>A14</p>
<p>A15</p>	<p>Total number of Major Depressive Episodes</p>	<p>---</p>	<p>A15</p>

MANIC EPISODE CRITERIA

onset of episode: ___
 check if: current ___
 past ___
 if past, offset: ___

<p>A16</p>	<p>A. Abnormally and persistently elevated, expansive, or irritable mood . . . <i>Notes:</i></p>	<p>? - + A45 p. 21</p>	<p>A16</p>
<p>A17</p>	<p>... lasting at least 1 week (or any duration if hospitalization is necessary) <i>Notes:</i></p>	<p>? - + A30 p. 18</p>	<p>A17</p>
<p>A18</p>	<p>B. During the period of mood disturbance, three (or more) of the following symptoms have persisted (four if the mood is only irritable) and have been present to a significant degree: ----- (1) inflated self-esteem or grandiosity <i>Notes:</i></p>	<p>? - +</p>	<p>A18</p>

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

DYSTHYMIC DISORDER CRITERIA

A45	<p>A. Depressed mood for most of the day, for more days than not for at least 2 years <i>Notes:</i></p>	<p>? - + B1 p. 26</p>	A45
<p>B. Presence of two (or more) of the following:</p>			
A46	<p>(1) poor appetite or overeating <i>Notes:</i></p>	<p>? - +</p>	A46
A47	<p>(2) insomnia or hypersomnia <i>Notes:</i></p>	<p>? - +</p>	A47
A48	<p>(3) low energy or fatigue <i>Notes:</i></p>	<p>? - +</p>	A48
A49	<p>(4) low self-esteem <i>Notes:</i></p>	<p>? - +</p>	A49
A50	<p>(5) poor concentration or difficulty making decisions <i>Notes:</i></p>	<p>? - +</p>	A50

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

A51	(6) feelings of hopelessness <i>Notes:</i>	? - +	A51
A52	AT LEAST TWO "B" SYMPTOMS ARE "+"	? - + B1 p. 26	A52
A53	C. Never without the symptoms in A and B for more than 2 months at a time	? - + B1 p. 26	A53
A54	Age at onset of current Dysthymic Disorder	---	A54
A55	D. No Major Depressive Episode during the first 2 years of the disturbance	? - + B1 p. 26	A55
A56	E. Has never had a Manic, Mixed, or Hypomanic Episode	? - + B1 p. 26	A56
A57	F. Does not occur exclusively during the course of a chronic psychotic disorder	? - + B1 p. 26	A57
A58	G. Not due to a substance or a general medical condition (check p. 24) <i>WARNING: A "YES" answer to the interview question equals a "-" rating</i> <i>Notes:</i>	? - + B1 p. 26	A58
A59	H. Clinically significant distress or impairment <i>Notes:</i>	? - + B1 p. 26	A59

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

F. ANXIETY AND OTHER DISORDERS

PANIC DISORDER CRITERIA

F1	A. (1) recurrent unexpected panic attacks <i>Notes:</i>	? - + F25 p. 50	F1
F2	A. (2) at least one of the following: (b) worry about the implications of the attack; (a) concern about having additional attacks; (c) a significant change in behavior <i>Notes:</i>	? - + F25 p. 50	F2
F3	Four (or more) of the following panic attack symptoms developed abruptly and reached a peak within 10 minutes <i>Notes:</i>	? - + F25 p. 50	F3
F4	(1) palpitations	? - +	F4
F5	(2) sweating	? - +	F5
F6	(3) trembling or shaking	? - +	F6
F7	(4) shortness of breath	? - +	F7
F8	(5) choking	? - +	F8
F9	(6) chest pain	? - +	F9
F10	(7) nausea or abdominal distress	? - +	F10
F11	(8) feeling dizzy	? - +	F11
F12	(9) derealization or depersonalization	? - +	F12
F13	(10) fear of losing control or going crazy	? - +	F13
F14	(11) fear of dying	? - +	F14
F15	(12) paresthesias	? - +	F15
F16	(13) chills or hot flashes	? - +	F16

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

F17	AT LEAST FOUR OF (1)-(13) ARE "+"	? - + F25 p. 50	F17
F18	C. Not due to a substance or a general medical condition (check p. 60) WARNING: A "YES" answer to the interview question equals a "-" rating Notes:	? - + F25 p. 50	F18
F19	D. Not better accounted for by another mental disorder Notes:	? - + F25 p. 50	F19

↓
Panic Disorder

F20	B. (1) the presence of Agoraphobia Notes:	? - + F24 p. 49	F20
F21	B. (2) agoraphobic situations are avoided, endured with marked distress or with anxiety, or require a companion Notes:	? - + F24 p. 49	F21
F22	B. (3) the anxiety or phobic avoidance is not better accounted for by another mental disorder Notes:	? - + F24 p. 49	F22

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

OBSESSIVE-COMPULSIVE DISORDER CRITERIA

F25	<p><i>Obsessions:</i> (1) recurrent and persistent thoughts, impulses, or images <i>Notes:</i></p>	? - + F30 below	F25
F26	<p>(2) not simply excessive worries about real-life problems <i>Notes:</i></p>	? - + F30 below	F26
F27	<p>(3) the person attempts to ignore or suppress or neutralize such thoughts <i>Notes:</i></p>	? - + F30 below	F27
F28	<p>(4) the person recognizes that they are a product of his or her own mind <i>Notes:</i></p>	? - + F30 below	F28
F29	OBSSESSIONS (1), (2), (3), AND (4) ARE “+”	? - +	F29
F30	<p><i>Compulsions:</i> (1) repetitive behaviors or mental acts <i>Notes:</i></p>	? - + F33 p. 51	F30

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

A. The person has been exposed to a traumatic event in which both of the following were present:

F40

(1) the person experienced, witnessed, or was confronted with an event that involved death, serious injury, or a threat to the physical integrity of self or others

Notes:

? - +
|
F65
p. 56

F40

F41

(2) response involved intense fear, helplessness, or horror

Notes:

? - +
|
F65
p. 56

F41

B. The traumatic event is persistently reexperienced in one (or more) of the the following ways:

F42

(1) distressing recollections of the event

Notes:

? - +

F42

F43

(2) dreams of the event

Notes:

? - +

F43

F44

(3) acting or feeling as if the traumatic event were recurring

Notes:

? - +

F44

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

F62	E. Duration of the disturbance is more than 1 month	? - + F65 below	F62
F63	F. Clinically significant distress or impairment	? - + F65 below	F63
F64	POSTTRAUMATIC STRESS DISORDER CRITERIA A, B, C, D, E, AND F ARE “+” Check here ___ if criteria have been met in the past month.	+ ↓	F64
		309.81 Post- traumatic Stress Disorder	

OTHER ANXIETY DISORDERS

F65	300.22 Agoraphobia Without History of Panic Disorder Check here ___ if present in the past month.	? - +	F65
F66	300.23 Social Phobia Check here ___ if present in the past month.	? - +	F66
F67	300.29 Specific Phobia Check here ___ if present in the past month.	? - +	F67
F68	300.02 Generalized Anxiety Disorder Check here ___ if present in the past month.	? - +	F68

Ratings: ? = Inadequate Information; - = Absent (or subthreshold); + = Present

ADJUSTMENT DISORDERS CRITERIA

F77	<p>A. The development of emotional or behavioral symptoms in response to an identifiable stressor(s) <i>Notes:</i></p>	<p>? - + END SCID</p>	F77
F78	<p>B. These symptoms or behaviors are clinically significant <i>Notes:</i></p>	<p>? - + END SCID</p>	F78
F79	<p>C. Does not meet criteria for another specific Axis I disorder and is not an exacerbation of a preexisting Axis I or Axis II disorder <i>Notes:</i></p>	<p>? - + END SCID</p>	F79
F80	<p>D. The symptoms do not represent Bereavement. <i>WARNING: A "YES" answer to the interview question equals a "-" rating</i> <i>Notes:</i></p>	<p>? - + END SCID</p>	F80
F81	<p>E. Once the stressor has terminated, the symptoms do not persist for more than an additional 6 months. <i>Notes:</i></p>	<p>? - + D 17, p. 39 F 69, p. 57</p>	F81
F82	<p>Make diagnosis of Adjustment Disorder based on predominant symptoms: Check one: <input type="checkbox"/> 309.0 Adjustment Disorder With Depressed Mood <input type="checkbox"/> 309.24 Adjustment Disorder With Anxiety <input type="checkbox"/> 309.28 Adjustment Disorder With Mixed Anxiety and Depressed Mood <input type="checkbox"/> 309.3 Adjustment Disorder With Disturbance of Conduct <input type="checkbox"/> 309.4 Adjustment Disorder With Mixed Disturbance of Emotions and Conduct <input type="checkbox"/> 309.9 Unspecified Adjustment Disorder</p>	<p>↓ Adjustment Disorder END SCID</p>	F82

Ratings: ? = Inadequate information; - = Absent (or subthreshold); + = Present

This questionnaire is to help us know how you are feeling.

HAD SCALE

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

Read each item and TICK ONE BOX ONLY for the reply which comes closest to how you have been FEELING DURING THE PAST WEEK.

NAME:.....DATE.....

1) I feel tense or 'wound up':

Most of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A lot of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From time to time, occasionally.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) I still enjoy the things I used to enjoy:

Definitely as much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not quite so much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Only a little.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hardly at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) I get a sort of frightened feeling as if something awful is about to happen:

Very definitely and quite badly.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes, but not too badly.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A little, but it doesn't worry me.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) I can laugh and see the funny side of things:

As much as I always could.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not quite so much now.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Definitely not so much now.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) Worrying thoughts go through my mind:

A great deal of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A lot of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
From time to time but not too often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Only occasionally.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6) I feel cheerful:

Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sometimes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Most of the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7) I can sit at ease and feel relaxed:

Definitely.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Usually.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8) I feel as if I am slowed down:

Nearly all the time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sometimes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9) I get a sort of frightened feeling like 'butterflies' in the stomach:

Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occasionally.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quite often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10) I have lost interest in my appearance:

Definitely.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't take as much care as I should.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I may not take quite as much care.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I take just as much care as ever.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11) I feel restless as if I have to be on the move:

Very much indeed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quite a lot.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not very much.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12) I look forward with enjoyment to things:

As much as I ever did.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rather less than I used to.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Definitely less than I used to.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hardly at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13) I get sudden feelings of panic:

Very often indeed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quite often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not very often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not at all.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14) I can enjoy a good book or radio or TV programme:

Often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sometimes.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not often.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Very seldom.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GERIATRIC DEPRESSION SCALE

Name:
Date:
Study No:

Please circle YES or NO in response to the questions below.

It's important to choose the best answer for how you felt OVER THE PAST WEEK.

- 1) Are you basically satisfied with your life? YES NO
- 2) Have you dropped many of your activities and interests? YES NO
- 3) Do you feel that your life is empty? YES NO
- 4) Do you often get bored? YES NO
- 5) Are you in good spirits most of the time? YES NO

- 6) Are you afraid that something bad is going to happen to you? YES NO
- 7) Do you feel happy most of the time? YES NO
- 8) Do you often feel helpless? YES NO
- 9) Do you prefer to stay at home, rather than go out and do new things?
YES NO
- 10) Do you feel that you have more problems with memory than most?
YES NO

- 11) Do you think that it is wonderful to be alive now? YES NO
- 12) Do you feel pretty worthless the way that you are now? YES NO
- 13) Do you feel full of energy? YES NO
- 14) Do you feel that your situation is hopeless? YES NO
- 15) Do you think that most people are better off than you? YES NO

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.

CONSENT FORM FOR ACCESS TO MEDICAL NOTES.

PLEASE CIRCLE YOUR RESPONSE TO EACH STATEMENT:

I consent for Jane Haworth to have access to my medical notes kept within the hospital:

YES

NO

I consent for Jane Haworth to have access to my medical notes kept by my GP:

YES

NO

Signed.....

Print name.....

Date.....

Study Number.....

APPENDIX IV – FURTHER DESCRIPTIVE RESULTS.

Table IV.1: Table to show the types of co-morbid problems present in the Interviewed group (n=98).

Type of co-morbid problems present

Type of co-morbid problem.	Frequency	Percent
Bowel disorders	6	6.1
Skin disorders	3	3.1
Endocrine disorders	3	3.1
Sensory organ disorders	4	4.1
Nervous system disorders	9	9.2
Kidney/liver disorders	5	5.1
Stomach disorders / reflux	4	4.1
Cancer	3	3.1
Side effects - Gout / Cough	10	10.2
Blood disorders	1	1.0
Mobility problems / limb problems	2	2.0

Table IV.2: Table to show the frequency of participants on each type of prescription medication (N = 100).

Type of medication	Frequency	Percent
Anti-depressants	13	13.0
Anti-platelet drugs	37	37.0
Anti-coagulants	47	47.0
Diuretics	76	76.0
ACE-inhibitors	74	74.0
Beta adrenoreceptor blockers	75	75.0
Cardiac glycosides	22	22.0
Lipid regulators	41	41.0
Pain med. or anti-inflammatories	29	29.0
Potassium channel activators	5	5.0
Calcium channel blockers	5	5.0
Proton-pump inhibitors	13	13.0
Medication for arrhythmias	6	6.0
Hypnotic medications	8	8.0
Anxiolytic medications	2	2.0
Angiotensin-II receptor agonists	6	6.0
Nitrates	30	30.0

Table IV.3: Table to show the social support sub-scales and the ratings for number of close friends and close relatives for all participants who returned the postal survey (n = 121).

	Number of close relatives.	Number of close friends.	Tangible support (%).	Affectionate support (%).	Positive support (%).	Emotional and informational support (%).
Mean	3.91	4.31	77.46	75.67	72.21	72.22
SD	4.74	3.72	29.18	29.96	29.18	30.13
Minimum	0	0	0	0	0	0
Maximum	30	25	100	100	100	100
Missing data (%)	19.0	13.2	7.4	7.4	7.4	9.1

The table above shows that the range of number of close friends and relatives was large (30 and 25 respectively). The large amount of missing data for these sub-questions indicate that this section of the questionnaire was not clear or easy to understand or fill-in. There was only one participant who replied that they had no close friends or relatives. The sub-scales of social support are very similar in their means and standard deviations. The standard deviation scores illustrate the large amount of variation. There were no significant differences between the participants who only participated in the postal stage of the survey and those who participated in the interview stage in terms of close friends ($t = -0.866$, $p(2\text{-tailed}) = 0.389$), close relatives ($t = -1.268$, $p(2\text{-tailed}) = 0.208$), tangible support ($t = -1.549$, $p(2\text{-tailed}) = 0.124$), affectionate support ($t = -0.247$, $p(2\text{-tailed}) = 0.805$), positive support ($t = -1.586$, $p(2\text{-tailed}) = 0.115$) and emotional and informational support ($t = -0.726$, $p(2\text{-tailed}) = 0.469$).

APPENDIX V – FURTHER RESULTS FROM THE PREVALENCE STUDY.

Table V. 1 – Results of the independent sample t-tests to look for differences between male and female participants on the HADS at the two time points.

	MALE Mean (SD)	FEMALE Mean (SD)	t score	df	2-tailed p
HADS Anx. (Postal)	6.76 (4.96)	9.26 (5.26)	-2.138	114	0.035
HADS Dep. (Postal)	5.53 (4.42)	7.26 (4.27)	-1.696	114	0.093
HADS Anx. (Interv.)	4.78 (3.87)	4.24 (3.51)	0.533	96	0.595
HADS Dep. (Interv.)	3.80 (4.74)	4.29 (3.62)	-0.495	96	0.621

Table V.2 - Results of the independent sample t-tests to look for differences between participants in the two collapsed social deprivation groups (Group 1 = SD 1 and 2, Group 2 = SD 3 to 5) on the HADS at the two time points.

	GROUP 1 Mean (SD)	GROUP 2 Mean (SD)	t score	df	2-tailed p
HADS Anx. (Postal)	7.84 (5.21)	5.83 (4.74)	1.952	95	0.054
HADS Dep. (Postal)	6.07 (4.88)	4.81 (3.92)	1.373	95	0.173
HADS Anx. (Interv.)	4.91 (3.60)	3.76 (3.43)	1.427	76	0.158
HADS Dep. (Interv.)	3.96 (4.10)	3.24 (3.08)	0.840	76	0.404

Table V.3 - Results of the independent sample t-tests to look for differences between participants in the two collapsed age groups (Group 1 =< 65 years and Group 2 = >65 years) on the HADS at the two time points.

	GROUP 1 Mean (SD)	GROUP 2 Mean (SD)	t score	df	2-tailed p
HADS Anx. (Postal)	8.70 (5.04)	6.50 (4.98)	2.250	114	0.026
HADS Dep. (Postal)	6.35 (4.81)	5.62 (4.22)	0.845	114	0.400
HADS Anx. (Interv.)	6.16 (4.31)	3.97 (3.33)	2.760	96	0.007
HADS Dep. (Interv.)	4.03 (4.51)	3.82 (3.28)	0.266	96	0.791

APPENDIX VI – FURTHER RESULTS FROM THE VALIDATION STUDY.

Table VI.1 - Table to compare the classification of participants with depression or no depression when using the SCID and the HADS with the traditional cut-off of 11 (n = 98).

		SCID-I Diagnosis	
		No Depression	Depression
HADS categorisation	No depression	70	22
	Depression	0	6

Table VI.2 - Table to compare the classification of participants with depression or no depression when using the SCID and the HADS with the traditional cut-off of 8 (n = 98).

		SCID-I Diagnosis	
		No Depression	Depression
HADS categorisation	No depression	63	15
	Depression	2	13

Table VI.3 - Table to compare the classification of participants with anxiety or no anxiety when using the SCID and the HADS with the traditional cut-off of 11 (n = 98).

		SCID-I Diagnosis	
		No Anxiety	Anxiety
HADS categorisation	No anxiety	80	12
	Anxiety	0	6

Table VI.4 - Table to compare the classification of participants with anxiety or no anxiety when using the SCID and the HADS with the traditional cut-off of 8 (n = 98).

		SCID-I Diagnosis	
		No Anxiety	Anxiety
HADS categorisation	No anxiety	73	4
	Anxiety	7	14

APPENDIX VII – FURTHER RESULTS FROM THE PREDICTORS STUDY.

For each of the regression analyses the same procedure was used. As a large number of independent variables were considered for this predictive analysis they were grouped in to the following blocks:

BLOCK 1: Age, sex, social deprivation.

BLOCK 2: Number of close friends, number of close variables, tangible support, affectionate support, positive support, emotional and informational support and sum of social support scores.

BLOCK 3: Time since diagnosis, type of heart failure, class of heart failure, severity of impairment as rated by a cardiologist, percentage of ejection fraction, number of days in hospital in the 6 months prior to send-out.

BLOCK 4: Number of previous MIs, Number of strokes.

BLOCK 5: Diabetes, hypertension, arthritis, respiratory disease, angina, arrhythmias, co-morbid problems present or not.

BLOCK 6: Undergone surgery, number of pacemakers, other surgery, other interventions.

BLOCK 7: MMSE score.

BLOCK 8: Current medications: anti-depressants, anti-platelet drugs, anti-coagulants, diuretics, ACE-inhibitors, Beta-adrenoreceptor blockers, cardiac glycosides, lipid-regulators, pain medication or anti-inflammatories, potassium channel activators, calcium channel blockers, proton-pump inhibitors, medication for arrhythmias, hypnotics, anxiolytics, angiotensin-II receptor agonists, nitrates.

BLOCK 9: History of anxiety, history of depression, mental health history 1 (MMH1 -any history recoded into binary), mental health history 2 (MMH 2 - received prior treatment recoded into binary).

Certain variables could not be included in the multiple regression for different reasons. For example, 'time since last MI' and 'time since surgery' were not included because these variables were not applicable to a large number of participants (e.g. if they had not experienced an MI). The variable 'Type of heart failure' had to be excluded from the regression analysis because it would not make sense to recode this into a meaningful binary variable. The variables in Block 9 could not all be included in the regression because they represent the same information, coded in a different way, therefore it is not logical to include them all in the regression because of the extent of the collinearity (high relationship) between the variables.

Table VII.1 - Results of the Kolmogorov-Smirnov test for continuous variables.

Variable	Most	Extreme	Differences	K-S Z	2-tailed p
	Absolute	Positive	Negative		
HADS Anx. (Postal)	0.103	0.103	-0.067	0.990	0.280
HADS Dep. (Postal)	0.156	0.156	-0.096	1.508	0.021
HADS Anx. (Interv.)	0.161	0.161	-0.109	1.593	0.013
HADS Dep. (Interv.)	0.217	0.217	-0.147	2.149	0.000
Log of HADS Anx (P)	0.154	0.079	-0.154	1.481	0.025
Log of HADS Dep (P)	0.143	0.118	-0.143	1.381	0.044

Table VII.2 – To show the inter-correlations between the various social support subscales for the Interviewed group.

Correlations

		SS - tangible score recoded	SS - affective score recoded	SS - Positive score recoded	SS - Emotional and information recoded	Social Support sum of raw scores
SS - tangible score recoded	Pearson Correlation	1.000	.855**	.817**	.711**	.890**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	95	95	94	93	92
SS - affective score recoded	Pearson Correlation	.855**	1.000	.805**	.674**	.888**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	95	96	95	94	92
SS - Positive score recoded	Pearson Correlation	.817**	.805**	1.000	.839**	.943**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	94	95	96	93	92
SS - Emotional and information recoded	Pearson Correlation	.711**	.674**	.839**	1.000	.936**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	93	94	93	94	92
Social Support sum of raw scores	Pearson Correlation	.890**	.888**	.943**	.936**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	92	92	92	92	92

** Correlation is significant at the 0.01 level (2-tailed).

Table VII.3 – Table to show the results of the independent samples t-test comparing those who received a diagnosis of depression (with the SCID-I) with those who did not.

		Mean	Standard Deviation	t score	Sig. (2-tailed)
No depression	Tangible SS	84.56	26.02	2.822	0.006
Depression		66.44	33.26		
No depression	Affectionate SS	80.68	27.66	2.502	0.014
Depression		63.27	37.36		
No depression	Em. And Inf. SS	77.25	27.98	2.138	0.035
Depression		62.50	34.61		
No depression	Sum of SS	79.34	18.60	2.397	0.019
Depression		67.76	25.37		
No depression	Class of HF	2.14	0.65	-2.586	0.011
Depression		2.59	1.01		

Table VII.4 – Table to show the two-by-two table constructed to compare the frequency of prior mental health problems to a diagnosis of SCID-I anxiety (N=98).

		SCID-I Diagnosis	
		No Anxiety	Anxiety
Prior mental Health history	No history	56	3
	History	24	15

Table VII.5 – Table to show the two-by-two table constructed to compare the frequency of prior mental health problems to the presence of a SCID-I diagnosis (N=98).

		SCID-I Diagnosis	
		No Diagnosis	Diagnosis
Prior mental Health history	No history	47	12
	History	19	20