

**Psychological Recovery following Coronary Angioplasty:
Illness Cognitions, Coping and Well-being.**

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Section A: Literature Review

Recovery following Coronary Angioplasty: a review of psychological outcomes and predictors of well-being.

1. Introduction

Coronary Heart Disease remains the leading cause of death in England and Wales, with a mortality rate of approximately 110,000 per annum (Department of Health, 2000), and remains a major focus for epidemiological and clinical research. Diagnostic and treatment developments within contemporary cardiology have contributed to significant improvements in morbidity and mortality, with technological advances in the area of coronary revascularisation yielding particularly substantial prognostic gains.

1.1 Coronary revascularisation: advantages of PTCA

Revascularisation is one of the primary treatments for Coronary Heart Disease (CHD) and in essence restores blood flow to coronary arteries narrowed or occluded by atherosclerosis. Several techniques are currently available to effect revascularisation, the most prominent of which are the Coronary Artery Bypass Graft (CABG) and Percutaneous Transluminal Coronary Angioplasty (PTCA). CABG is a surgical technique that achieves revascularisation through the fashioning of new conduits from vessels located elsewhere in the body. Whilst effective, the surgery is invasive, carries risks associated with general anaesthesia and potential for infection, and necessitates a significant period of care and convalescence (Bakhai, Hill, Dundar & Dickson, 2005). PTCA in contrast restores blood flow through the insertion of an angioplasty balloon via a catheter in a peripheral artery. The balloon is then inflated and deflated to widen the narrowed artery, and the procedure usually lasts only around 15 minutes, requires only a small vascular incision with local anaesthetic, and is associated with hospital stays of less than 24 hours. High immediate success rates and low complication rates, together with the lesser invasiveness of this non-surgical procedure, has accelerated the adoption of this revascularisation technique and in

many cardiac settings it is replacing surgical interventions as the treatment of choice for CHD (NCEPD, 2000; ONS, 2004).

1.2 Limitations of PTCA

The progressive nature of atherosclerosis means that the six month post-angioplasty success rate is low, with a high risk of both future restenosis (narrowing at the site of the angioplasty) and cardiac events likely to require additional intervention. Despite the inherent risk however, angioplasty patients are reported to be less likely to initiate cardiac risk-reducing behavioural change and attend rehabilitation, compared to other cardiac populations (Gaw, 1992; Charlson, Allegrante, McKinley, Peterson, Boutin-Foster Ogedegbe & Young, 2002). This apparent contraindicative response may be in part due to the unique characteristics of the procedure, those in fact which are normally perceived to be advantageous. The rapidity of the procedure, brief hospital stay and immediate cardiac symptom diminution may all contribute to positive misperceptions regarding illness severity, return to normal function and future prognosis. Failure to recognise the inherent risks of CHD may therefore help to explain the low uptake rate of behavioural adjustment.

The empirical investigation of recovery from angioplasty to date has focused primarily upon bio-medical and functional outcomes, such as cardiac-specific symptoms and exercise capacity. This research however has failed to account for much of the variance that is seen in angioplasty patients' recovery and subsequent well-being. Despite a growing body of evidence linking psychological factors with prognosis independent of disease severity in other cardiac populations (Hemmingway & Marmot, 1999), predictors and correlates of psychological adjustment and health-related well-being have not been reviewed for the angioplasty population. This is perhaps surprising, given that the extrapolation of results

from other cardiac groups with different illness trajectories has been cautioned against (Astin, Jones & Thompson, 2005). A recent meta-review of revascularisation treatment outcomes has however acknowledged the increasing recognition of psychological variables; revealing that just under half of the reviewed randomised control trial studies included at least one psychological dimension of recovery (Bakhai et al., 2005). Results from these studies suggest improvements across psychology outcome variables following revascularisation, with the PTCA group fairing more favourably immediately after the procedure. However, few differences appeared evident beyond one month follow up and the paucity of data precluded any overall conclusions regarding differences in quality of life between treatments being drawn.

2. Literature Review Method & Results

2.1. Aim

This current review took a critical and systematic approach to the presentation and synthesis of research on the outcomes and predictors of well-being in adult angioplasty patients. It first provides an overview of psychological well-being and related quality of life outcomes following PTCA. It then considers psychological and cardiac-associated physiological factors purported to predict or associate with psychological well-being. Finally, psychological frameworks and models which elaborate and offer improved conceptual understanding of the potential processes underpinning psychological recovery are considered.

2.2 Target journal

The current review was written in accordance with the 2006 submission guidelines of the British Journal of Health Psychology (See Appendix 1).

2.3 Search strategy

The review was founded on searches of several bibliographic databases: Embase (1980-2006), MedLine (1966-2006), PsychInfo (1970-2006) and Web of Science (1970-2006). The National Electronic Library for Health was also interrogated. Title search terms comprised: “percutaneous transluminal coronary angioplasty”, “angioplasty”, “percutaneous coronary intervention”, “cardiac catheterisation”, “coronary stent”; each paired with each of the following: “psychological” (plus truncations), “depression” (plus truncations), “anxiety”, “coping”, “recovery”, “adjustment”, “quality of life”. Follow up of further relevant citations from the products of these searches also supplemented this search strategy.

2.4 Search results and screening criteria.

The literature search resulted in the identification of 206 articles. Once abstracts were reviewed for relevance, and duplicates and non-empirical material (such as opinion articles) removed, 36 English language articles were highlighted for inclusion. All articles reported the results of primary research and included observational quantitative, qualitative or mixed method research designs and key summary data is presented in Appendix 2.

Within the literature, the range of bio-medical, functional, social and psychological factors employed to assess patient Quality of Life (QoL) underlines the numerous different ways in which this term is construed. In an effort to remain focused on the objective of this review,

only those studies which explicitly incorporated at least one psychological measure or subscale were reviewed, and the review therefore gave only cursory attention to non-psychological dimensions of recovery. Studies that comprised exclusively octogenarian or child/adolescent samples were considered to be unrepresentative of the general presenting angioplasty population and thus deemed beyond the scope of this review, and were excluded.

The decision to include methodologically divergent studies was taken because to the author's knowledge, no randomised trials existed which attempted to account for the potential psychological mechanisms underlying recovery. It was also recognised that in studying psychological phenomena the use of randomised, blinded methods is often unfeasible and that observational studies present an important alternative source of data. Along with quantitative research, the searches identified a number of studies employing qualitative designs, which appeared to add to the knowledge base in this area. This qualitative research however, varied considerably with regards to methodological rigour and theoretical underpinning. It was therefore decided that due consideration would be given to the findings of qualitative studies but, as with all research articles reviewed, this work would be subject to stringent critical appraisal. The quality of empirical quantitative work was considered within the criteria of the York Centre for Reviews and Dissemination (2001) and the Cochrane Review for systematic reviews (Higgins & Green, 2005), in mind, whilst qualitative work was considered according to the criteria of Murphy, Dingwall, Greatbatch, Parker and Watson (1998).

Whilst the inclusion of divergent methodological design enabled the synthesis of empirical work from a range of academic and clinical sources, the heterogeneity of design, together

with the breadth of content, precluded the pooling of data and thus the use of observational data meta-analysis.

3. Content of Search Results

3.1 Psychological Outcome Studies

A number of empirical studies to date provided psychologically-relevant quality of life and affective outcomes for patients before and after angioplasty.

3.1.1 Pre-procedure psychological status

Prior to angioplasty, mean state anxiety ratings have been reported to be elevated above population-normed averages, with 16% of men and 24% women scoring above the accepted threshold on the Spielberger State Trait Anxiety Inventory (STAI), comparable to that observed within what the authors termed a neuropsychiatric population (Astin et al, 2005). In line with this, patients' retrospective qualitative accounts of their preparation for the procedure reported similar heightened anxiety states, with nine of eleven patients recalling moderate to high levels of anxious arousal (Higgins, Dunn & Theobald, 2001). Issues which caused particular concern for a sample of 14 angioplasty patients related to the fear of surgery, death and pain (Gaw, 1992). Pre-procedure, patient indices of quality of life on the Short Form 36 (SF36) and 15D were also found to be well below normed-averages (Krumholz, McHorney, Clark, Levesque, Baim & Goldman, 1996; Kattainen, Sintonen, Kettunen & Merlainen, 2005) and although findings from one study reported that patient wellbeing remained within a positive range of functioning, observed gains post-procedure indicated that a degree of relative impairment had been experienced (Kimble, 1998).

3.1.2 Short-term post-procedure psychological status

The current review found empirical evidence to suggest that some aspects of psychological well-being are enhanced subsequent to the conduct of angioplasty. A large RCT, which assigned PTCA patients to receive either an anti-platelet drug or aspirin as a control, suggested that emotional well-being was significantly improved one month post-angioplasty (Cleary, Epstein, Oster & Morrissey, 1991). Other observational research has indicated a significant decrease in anxiety, as measured by the Spielberger State Trait Anxiety Inventory (STAI), at six weeks (Faris & Stotts, 1990; Astin et al, 2005). Carroll (2005) indicated similar statistically significant improvements over the same time frame in the Tension-Anxiety, as well as Fatigue-Inertia and Confusion-Bewilderment subscales of the Profile of Mood State (POMS), yet non-significant trends in the Depression-Dejection and Vigour-Activity subscales. Quality of life studies however, such as those of Papadantonaki, Stotts and Paul (1994) and Bliley and Ferrans (1993) (employing the Quality of Life Index (QLI)) did not suggest that QoL altered at three and six weeks, respectively. The research therefore suggests that in the few weeks following a procedure, patients are most likely to benefit from reduced anxiety levels, but may not be expected to experience improvements in their overall quality of life.

3.1.3 Medium/long term post-procedure psychological status

Improvements in psychological wellbeing and quality of life have been consistently reported in the months and years following angioplasty. Echteld, van Elderen and van der Kamp (2003) found both reduced negative, and increased positive, affect at three months, employing the Positive and Negative Affect Scale (PANAS). Gains on psychologically-

pertinent quality of life measures have also been suggested at six months, ten and twelve months on a range of generic and health-related measures of QoL (Englehart, 1993; Krumholz et al,1996; Mckenna, McEniery, Maas, Aroney, Bett, and Cameron, 1992; Kattainen et al, 2005; Wahrborg, 1999). A methodologically rigorous, prospective investigation has even suggested significant gains in psychological functioning, as measured by the RAND Mental Health Inventory Scale, at six years and beyond (Hlatky, Boothroyd, Melsop, Brooks, Mark, Pitt, et al., 2004).

However, there is also contradictory evidence suggesting that psychological distress may increase and persist in some patients. Whilst gains were reported in the first couple of months, depression on the illness-specific Cardiac Depression Scale (CDS) was observed to significantly increase between two and six months in 140 first time elective patients (Astin et al, 2005). Research has also highlighted that a significant proportion of angioplasty patients suffer from clinically significant affective disorders at one year, with nearly three-quarters of one sample of patients with stable angina (72 %) classified as anxious and just under a third (30%) as depressed (Edell-Gustafsson & Hetta, 2001). Unfortunately, the absence of any baseline measures of affect precludes comparison with earlier functioning.

3.2 Correlates and predictors of psychological adjustment and outcome

A range of factors associated with psychological recovery from angioplasty emerged from the current literature search. These were categorised into either bio-social or psychological indicators for the purpose of this review.

3.2.1 Bio-social factors

Biological and social factors: gender, illness characteristics and social resources, were considered for their contribution.

3.2.2 Gender

Only a limited number of studies to date have considered the impact of gender in adjustment to, and recovery from, angioplasty. Gender differences have been noted in the immediate period prior and following the procedure, with women scoring higher than men on an illness-specific depression measure (CDS) and the mental health scale of the SF36 (Astin et al., 2005; Helgesen, 2003). However these differences did not remain statistically significant over the longer term. Whilst around only a quarter of angioplasty patients reported problems with sleep a year after the procedure, sleep difficulties, associated with the occurrence of intrusive thoughts and feelings of anxiety, have been found to be more prevalent in women and there is some evidence to suggest these may be linked to poorer health-related QoL (Edell-Gustafsson et al, 2001). A relationship may also exist between gender and prior experience of PTCA procedures. Males undergoing angioplasty the first time appeared to report higher anxiety ratings than female comparators, whilst women having a repeat procedure reported higher anxiety levels than men on a visual analogue scale (Lenzen, Gamel, & Immink et al., 2002). Ten years post-angioplasty, research utilising the Heart Patients Psychological Questionnaire also revealed that perceptions of disability were predictive of mortality, but only in males (van Domburg, Pedersen, van der Brand & Nerdman, 2001). Differences may therefore exist in some aspects of the way men and women respond to angioplasty, with women initially presenting with more psychological distress. However research in this area is circumscribed and such responses

may reflect the gender disproportions in affective response found in the general population. Further empirical exploration is required before any conclusions can be drawn.

3.2.3 Coronary illness characteristics and history

Studies have investigated the impact of cardiac-related symptoms, functioning, events or procedures upon psychological well-being, in an attempt to better explain the variance observed in patient recovery. The prevalence of angina symptoms in post-angioplasty patients, with just under half of patients reported to be symptomatic, and the finding that angioplasty patients are significantly more affected by angina than other revascularisation groups has meant that impact of chest-pain has featured prominently in research (Weintraub, Mauldin, Becker, Kosinski, & King, 1995; Straus, Fortin, Hartigan, Folland, & Parisi., 1995). Studies reviewed revealed a plethora of evidence to suggest that the presence of chest pain post-angioplasty is associated with increased emotional distress and decreased health-related QoL (Skaggs & Yates, 1999; Tooth, Mckenna & Maas et al., 1999; Hlatky et al., 2004; Echteld et al., 2003, Edell-Gustafsson et al., 2001, Higgins et al., 2001). Evidence also suggests that patients who experience chronic exertional angina prior to angioplasty experience the greatest post-procedure psychological benefits (Hlatky et al., 2004). This suggests unsurprisingly that the experience of chest pain is highly distressing and that the removal of pain by angioplasty yields significant psychological gains, whilst failure to alleviate symptoms is deleterious to psychological health. The methodological quality of this body of work was found to be satisfactory, although little theoretical foundation was apparent.

Cardiac history has also been linked to psychological well-being in patients with a history of Myocardial Infarction (MI) being found to experience higher levels of dispositional

anxiety in the immediate pre-procedure period (Astin et al., 2005) and prior duration of CHD linked to psychological status (Tooth et al., 1999). The experience of a new cardiac event following angioplasty has also been related to large decreases in treatment- and life-satisfaction (Helgesen, 1999). A randomised comparison of the impact of stenting (the placement and expansion of short stainless steel mesh to provide structural support in the artery) upon patient outcome suggested that overall health-related QoL was better at six months in the stent group, as compared to the non-stented group, whilst no group differences were evident at twelve months (Rinfret, Grines, Cosgrove, Ho, Cox & Brodie, 2001). Further comparison and exploration of specific aspects of QoL was however not possible as a breakdown of the SF36 subscales was not provided.

The evidence for a relationship between exercise capacity and psychological wellbeing to date is inconsistent, with results of randomised control trials presenting disparate findings. One six month study reported that only those PTCA patients who achieved increased exercise performance experienced the most substantial psychological gain (Straus et al., 1995). Whilst, in the similar RITA study which extended follow-up to three years, the PTCA groups' psychological improvement appeared to be far less directly associated with exercise capacity and breathlessness (Pocock et al., 2000). Quality of life and anxiety were also not found to be statistically related to physical functioning within the small sample of Faris et al. (1990). These early findings therefore suggest that anginal pain and cardiac history may interact with psychological aspects of recovery, whilst the relationship of exercise capacity is less clearly understood.

3.2.4 Social resources

Evidence regarding the role of social support in recovery following angioplasty is relatively sparse to date. In one of a few quantitative studies to include a metric for social support, White and Frasure-Smith (1995) looked at social support in forty-seven revascularisation patients (22 PTCA) at one and three months post-procedure. Greater social support, as measured by the perceived social support scale, was found to be associated with reduced negative psychological symptoms at both time points. However, the relative small sample, which comprised non-comorbid, first-time, elective patients only, and the absence of a measure of baseline functioning, limited the conclusions which could be drawn from this empirical data.

In the larger sub-study of the Mediators of Social Support Study (MOSS) (N=129), the support of a partner/confidante was found to closely associate with the use of coping strategies, and to a far greater degree than the personality factors also being investigated (Bosworth, Feaganes, Vitaliano, Mark & Siegler, 2001). Engagement of the support of others may in itself represent a way of coping for patients. There is also conflicting research which has identified individuals who have excellent outcomes irrespective of social support, which suggests that it is the use of individually appropriate coping style which is paramount to well-being (Shaw, Cohen, Fishman-Rosen & Murphy, 1986).

In a fairly substantial qualitative study, employing seven focus groups (N=45), Gulanick, Nliley, Perino and Keough (1998) indicated that a supportive social environment was one of the key factors facilitating patient recovery. This study benefited from the reported achievement of data saturation, through a constant comparative technique, and the completion of consistency checks in the stage of codification.

3.3 Psychological factors

A range of psychological factors which appear to contribute, or are associated with, outcome were highlighted in the literature search. These were divided into dispositional/enduring factors, coping responses and cognitive appraisals.

3.3.1 Dispositional/enduring factors

The past few decades has witnessed sustained debate around the role of personality variables in both the onset and course of CHD, and most particularly the impact of Type-A personality and hostile styles of functioning. Whilst no empirical data presently exists for these dimensions for patients undergoing angioplasty, a circumscribed number of studies have considered the potential effects of depressive style, vital exhaustion, anger, Type-D personality and optimism.

Depressive style

The impact of long term mental health problems upon recovery from angioplasty has received little attention, with most previous studies examining quality of life excluding patients with explicit psychiatric histories. A depressive style of functioning however, in a longitudinal study of 190 participants, has been linked to lower perceived quality of life and higher cardiac symptom severity six-months post-procedure procedure (Burton, Kline, Cooper, Rabinowitz & Dodek, 2003). Whilst participants with significant depressive history did rate lower quality of life and greater severity of symptoms, as compared to patients with no psychiatric history, results also revealed that similar relative positive gains were made at six-month follow-up, irrespective of historical psychological morbidity. The

finding that all participants reported a marked decrease in anginal pain, lethargy and increased energy levels post PTCA is noteworthy given that fatigue and lack of energy are significant premonitory symptoms of myocardial infarction, and that vital exhaustion has been reported to be predictive of morbidity in post-PTCA patients (Appels et al.,1995). This study suggests that angioplasty provides individual benefits which are not mitigated by the experience of psychological ill-health. Methodologically, this research profits from high up-take and low attrition rates in its consecutive sampling, although the impact of its findings are weakened by the exclusion of all non-fluent English speakers, particularly in light of the over-representation of minority ethnic groups presenting with coronary heart disease.

Vital exhaustion & anger

Vital Exhaustion (V.E.), which is characterised by symptoms of unusual fatigue, irritability and demoralisation, has purportedly been alleviated following the angioplasty intervention, with patients experiencing statistically significant reductions in fatigue (Appels, Kop, Bär, De Swart & Mendes de Leon, 1995). However, V.E. appears to remain a clinically significant problem for around one third of the angioplasty population, and the detrimental effects of elevated V.E scores has been highlighted across studies, with increased exhaustion consistently linked to an increased risk of cardiac events post-procedure. In an investigation looking at the effects of V.E and anger as potential risk factors for morbidity in 127 angioplasty patients, Kop, Appels, Mendes de Leon, De Swart & Bar (1994) suggested that presence of these factors increased the likelihood of further cardiac events from 7.5%, for those with no risk factors, to 25% with one risk factor and to 45% when both risk factors were present. These findings suggest that the profile of symptoms comprising V.E may present important predictors of recovery. However, these symptoms

overlap with those experienced in depression and the failure to incorporate measurements of mood within this research has meant that the relationship between these variables could not be truly determined.

The Distressed Personality

The distressed personality, or Type-D personality, is said to be defined by the presence of elevated negative affectivity and the inhibition of emotional expression in social interactions, and is therefore often associated with an increased risk of clinical depression and social alienation. In the only study identified in this area, Pedersen and Middel (2001) examined the relationship between Type D, vital exhaustion and angina in 171 consecutive patients receiving a coronary angiography and scheduled for coronary revascularisation (PTCA or CABG) or pharmacological intervention. Vital exhaustion was found to be significantly reduced in both Type D and non-Type D groups, however as predicted, the Type D group scored significantly higher on V.E. both before and after angioplasty. Univariate analysis revealed Type D to be the only independent predictor of vital exhaustion at baseline and post intervention, which remained predictive when angina was statistically controlled for, suggesting that a Type D profile may be a useful indicator of later styles of distressed functioning, which may confer significant impairments (e.g. depression, social isolation and physical coronary risk factors).

3.3.2 Coping response

Increasing consideration has been given to the way in which angioplasty patients respond to their illness and treatment, with research studies focusing on the process and effect of coping styles and strategies on outcome. Coping has been variously defined as either an enduring style or transitory response, however perhaps the most widely accepted definition

is that of coping as a situationally-related cognitive and behavioural response to manage, reduce or tolerate a stressful event (Lazarus & Folkman, 1984). It has also been delineated as incorporating dichotomous dimensions; with problem-focused coping, involving active steps to alleviate the stressor or how one thinks about it, traditionally favourably contrasted to emotion-focused coping, which entails efforts to regulate the emotional consequences of the stressor. Additionally approach, or proactive, styles of coping have polarized from arguably inferior, avoidant types of coping.

Interviews with angioplasty patients revealed that PTCA is reliably viewed as a significant stressful event that requires some form of coping (Higgins, Dunn & Theobald, 2001). Patient qualitative reports of preparation for scheduled angioplasty were elicited and identified various means of coping, including: acting to acquire knowledge about the procedure; assessing the skill of the medical staff; gaining familial support; and preparing psychologically. Similarly, Cronqvist, Wredling, Nordlander, Langius and Bjorvell, (2000), using a psychometrically validated tool, the Jalowiec Coping Scale, found confrontational and self-reliant approaches to be some of the most commonly reported, with analogous results also found in the matched, healthy reference group.

These findings suggest that angioplasty patients employ a greater preponderance of problem-focused/approach-type, as compared to emotion-focused/avoidant-type, coping responses. However, given that emotion-focused/avoidant strategies are likely to involve processes that are less amenable to conscious consideration and therefore more difficult to elicit and verbalise, there is likely to be an underestimation of these sorts of responses. It has also been suggested that the apparent pattern of active problem solving is representative of responses within the broader population, which may be an artefact of the individualistic

culture which predominates in developed countries where angioplasty is most prevalent (Cronqvist et al., 2000). Efforts may therefore be needed to ensure that research designs are sensitive to ethnic diversity before more reliable and generalisable conclusions can be made regarding coping styles in angioplasty recipients.

Literature reviewed revealed a dearth of analysis regarding the efficacy of coping mechanisms. One study of 122 angioplasty patients indicated a relationship between coping and QoL (Echteld et al., 2001). This study hypothesised that approach styles of coping would exhibit a positive relationship with outcome variables, whilst avoidant coping would be inversely related. However, results contrarily suggested that avoidant coping was positively, and approach coping negatively, associated with QoL (although the latter non-significantly). Whilst this result has not as yet been replicated, it may suggest that emotion-focused styles of coping can be adaptive around the immediate time of the procedure and the use of evasive forms of coping has been reported to decrease in the weeks following angioplasty (Cronqvist et al., 2000). Post-procedure, the initiation of and adherence to risk-reducing behavioural life style change is crucial to continued recovery and a more proactive approach at this stage may therefore be advantageous. Research does generally indicate that modifications, such as dietary change or exercise, are reported by patients following angioplasty (see: Kimble, 1998; Gulanick and Naito, 1994; Gulanick et al., 1998). Although these findings all rely upon self-reported data which may be subject to the possibility of response bias and there is evidence to suggest that change is not initiated in all samples (Gaw, 1992).

The acquisition of information has been identified as a key coping resource and the focus of a number of research studies within angioplasty, perhaps because it presents potential for

intervention. This body of research, however is beyond the scope of this review (see Shaw et al., 1986; Gaw, 1992; Tooth & McKenna, 1995; Tooth, McKenna, Maas & McEniery, 1997; Lenzen et al., 2002 and Lyons, Fanshawe & Lip, 2002).

Whilst a focus upon coping may prove a fruitful endeavour, the literature's failure to employ a shared and adequately detailed definition of the coping construct limits the conclusions that can be drawn from cross-study comparison.

3.3.3 Cognitive Appraisal

There is evidence to suggest that the way in which people understand their illness, the angioplasty procedure and their own ability to meet the demands of this stressful situation influences subsequent adjustment and recovery.

Uncertainty

Awareness of the need of an angioplasty is likely to potentiate numerous uncertainties. In a comparative investigation of 22 elective angioplasty patients and 25 elective CABG patients, White and Frasure-Smith (1995) hypothesised that failure to resolve uncertainty (defined as difficulty giving meaning to an unpredictable situation) would lead to elevated psychological distress post-revascularisation. Findings from this investigation revealed that psychological distress was not related to perceived uncertainty, but that angioplasty patients demonstrated significantly more uncertainty, at one and three months post-procedure, whilst both groups shared similar psychological status.

The increased cognitive uncertainty reported in the angioplasty group post-procedure may stem from recognition of the potential impermanence of the treatment effect. The

progressive course of CHD, with the threat of restenosis, cardiac events and need for further medical intervention, is likely to evoke doubts regarding prognosis and thus cause patients to feel less sure about the future. The finding that psychological distress does not share a direct relationship with uncertainty indicates that feelings of uncertainty are not necessarily detrimental to health, as this investigation had hypothesised. Failure to make sense of the situation or feel certain about the future could on the contrary serve to protect psychological health, through enhancement of motivation to engage in productive coping strategies. However a greater sense of coherence has also been associated with coping, and in particular correlated with less evasive, fatalistic, palliative and self-reliant coping patterns (Echteld et al., 2003).

Failure to find a significant relationship between uncertainty and psychological status could represent an artefact of the small-scale sample employed, which may have constrained the detection of a small to moderate effect size. Limitations were also evident in both the sampling methods, which were unreported, and the sample characteristics, which comprised only male, first-time elective patients and undoubtedly failed to be representative of the presenting angioplasty and CABG populations. Group differences at the outset were also uncontrolled for.

Perceived self efficacy

Given the feelings of uncertainty which are reported to accompany angioplasty, it is unsurprising that patients are reported to experience reduced perceptions of personal control. The impact of perceived control or self efficacy has begun to receive some empirical attention within the angioplasty population. Gulanick et al. (1998) used purposive sampling to examine the reactions of 45 PTCA patients, key themes were found to centre

around issues of individual control (for example, the uncertainty of the disease and future, feelings of powerlessness to stop disease progression and the importance of control of successful change). Perkins and Jenkins (1998) examined efficacy expectations, performance of cardiac recovery behaviours and affective well-being in a sample which comprised emergency, elective, first and repeat angioplasty recipients. Self efficacy scores remained relatively high both pre- and two weeks post-angioplasty in, although post-procedural gains were observed, perhaps as a result of the cessation of immediate patient concerns and anxieties regarding the procedure.

Self efficacy has not been linked to psychological morbidity or recovery within angioplasty, but has been found to predict behavioural outcomes, with patients' self efficacy expectations regarding ability to successfully complete a range of cardiac risk-reducing life style changes related to the actual initiation of these behaviours. An inverse relationship between perceived efficacy and well-being however has also been suggested for those individuals with perceived high self efficacy who experience a recurrent cardiac event. High self efficacy in this angioplasty sub-group has been found to associate with poorer psychological well-being, perhaps because previous efforts to cope and make necessary life style alterations were undermined by the occurrence of the further event (Helgesen, 1999).

Treatment and illness appraisals

In the only rigorous study to explore cognitive appraisals of treatment and illness in angioplasty, Kimble (1998) drew upon Cognitive Appraisal Theory to prospectively examine the role of perceptions of treatment advantages, treatment invasiveness and heart disease threat in psychological well-being and participation in cardiac risk-reduction behaviours. In regression analysis, cognitive appraisals, along with optimism and history of

PTCA, were reported to explain 38% of the variance in wellbeing post-angioplasty but were not predictive of self-reported lifestyle change. The appraisal of illness threat was also found to be independently predictive of psychological wellbeing. This suggests that patient perceptions of illness and treatment are related to psychological recovery and that the threat of CHD, rather than beliefs regarding the angioplasty procedure and its success, are of greatest importance. Additionally, whilst self-report data upon the initiation of risk-factor reduction behaviours suggest that changes are typically made, cognitive appraisals of illness and treatment do not appear to directly relate to initiation of this change. It may therefore be that threat appraisals motivate thoughts of change, and that other variables such as self efficacy explain the actual instigation of change, as in the work of Perkins et al (1998).

Cognitive Adaptation Theory

Taylor (1983) proposed a theory of cognitive adaptation in which successful adjustment to an experience which disrupts basic world assumption, such as angioplasty, is accomplished by a number of positively biased perceptions regarding the self in the areas of optimism, self efficacy and self esteem. In a series of investigations drawing upon this theoretical premise, Helgesen (1999; 2003) followed 298 elective and emergency, first time angioplasty patients over a four year period and compared adjustment in those who experienced further events/interventions and those who did not. Dispositional and situational measures of optimism, self efficacy and self esteem were administered and provided, via principal component analysis, a cognitive adaptation index score. High scores on this index reflected a positive view of the self, the future and a sense of personal control over daily life. Results from these studies revealed that index scores were significantly lower in the group who experienced subsequent events. At six months, the index was predictive of physical and psychological wellbeing, as measured by the Index of Wellbeing

and the SF36. At four years, the cognitive adaptation index continued to predict positive adjustment and better mental health, even when quality of life at six months had been controlled for. The index also predicted the likelihood of sustaining a further cardiac event, a relationship which was not explained by the levels of psychological distress experienced. This suggests that together perceptions relating to optimism, self esteem and self efficacy are predictive of psychological and physical adjustment and recovery and are stronger indicators than psychological distress or the risk of further cardiac events.

Index scores were found to be consistent over time suggesting that cognitions were relatively stable and also that positive cognitions were not weakened by the experience of an additional cardiac events. Cognitive beliefs therefore seemed to have long lasting impact on mental health. These longitudinal investigations benefited from large samples, low attrition rates, and included a more representative sample of emergency as well as elective patients likely to enhance the generalisability of findings. Attempts were also importantly made to control for identified, potential confounding variables, such as illness severity.

Self Regulation and Goal disturbance

Higgins et al. (2001) interviewed patients preparing for angioplasty and, using a constant comparative method of analysis, elicited their process of problem solving. This comprised the stages of problem identification, coping response initiation, followed by the monitoring and appraisal of the response. These findings correspond with the Self Regulation Model (S.R.M.), which suggests that in order to develop a representation, or understanding of illness, a dynamic interaction takes place between the stages of problem interpretation, coping implementation and appraisal (Leventhal, Meyer & Nerenz, 1980).

Whilst such qualitative data has limited generalisability, good methodological rigour was maintained with the use of theoretical sampling, constant comparative techniques and multiple verifications, facilitating the exploration and clarification of emerging themes and the achievement of satisfactory data saturation. The sharing of transcripts, codification and interpretation with participants (respondent validation) may however have further enhanced this design.

Using the S.R.M. as a theoretical starting point, Echteld et al. (2001; 2003) investigated potential psychological correlates and predictors of quality of life with patients enrolled on an angioplasty waiting list and at three months post procedure, using stress appraisal, coping and QOL variables. PTCA was hypothesised to disrupt life goals and be associated with impaired affect and reduced illness-related quality of life. A strong positive relationship was also predicted to exist between approach coping and QoL. Perceived goal disturbance was found to be significantly, negatively related to disease specific QoL, and positively related to negative affect, but the relationship between approach coping and QoL outcomes was not found to be strong and was in fact negatively correlated. Before angioplasty, perception of stress was found to be a greater predictor of QoL than goal disturbance, however at three months the reverse was found to be true. This suggests that the disturbance of goals is associated with reduced illness-related quality of life at the time of angioplasty, but that the relationship is most evident at three months, perhaps because the continued disruption is more distressing and raises greater concerns for longer term QoL and recovery. Active forms of coping (approach) also do not show the relationship with outcome hypothesised by the S.R.M. model and seem unlikely to mediate the relationship between cognition and outcome as is predicted by this model. Investigation into the fit of other aspects of this model, and particularly the role of dimensions of illness beliefs (i.e.

illness identity, controllability, cause, consequence and timeline) are as yet to be explored with the angioplasty population.

4. Discussion

4.1 Discussion of key findings

The current literature review clearly suggests that angioplasty is a significant event which is often experienced as distressing and anxiety-provoking. Before angioplasty, patients report impaired psychological well-being and score below normed-averages on measures of affect and QoL. Significant gains in the aftermath of the procedure (days and weeks) appear to centre on anxious arousal, and the timing of improvements in anxiety probably reflect growing patient awareness of the success of angioplasty. Measurement in the period immediately preceding angioplasty however is likely to capture transient states of anticipatory anxiety and distress, rather than more stable indices of pre-morbid functioning, and the use of retrospective reports of pre-angioplasty psychological functioning, as in Cleary et al. (1991), is also limited by the likelihood of biases in recall. The absence of more meaningful, prospective baselines, immediately prior to angioplasty period (such as one month earlier) make it difficult to draw conclusions regarding the actual impact upon well-being of the pre-angioplasty period and the potential restorative effects of the procedure.

Research findings however do suggest that angioplasty generally produces benefits to mood and quality of life in the longer term, although these gains may be subject to fluctuation over time (Astin et al., 2005). Yet, whilst statistically significant gains may have been experienced, many recipients will still meet the clinical criteria for anxiety and depression (Edell-Gustafsson et al., 2001). Patient awareness of the progressive nature of atherosclerosis, the associated physiological costs and the likely timing of restenosis

(approximately six months), may help to explain this finding. The likelihood of experiencing further cardiac events, symptoms and treatments has also been proposed as a possible explanation for the dilution of previous gains (Pocock et al., 2000; Edell-Gustafsson et al., 2001).

Evidence that variables contribute to rates of morbidity, independently of illness severity, has important implications for clinical practice. The identification of those individuals or subgroups at greatest risk of psychological difficulty enables the targeting of rehabilitation and support resources, which represents a valid, ethical and cost-limiting endeavour. The emergence of several social, biological, and psychological factors predictive of post-procedural psychological functioning and well-being has therefore been welcomed.

Only minimal consideration has been given to the role of gender in determining outcome. Whilst it is suggested that, in line with findings in the broader field of CHD, women may generally present with more anxiety-associated symptoms (Edell-Gustafsson et al, 2001), findings to date do not suggest that women show a different trajectory of psychological recovery to men. Differences are apparent in the responses of men and women according to their prior experience of angioplasty however, which may suggest different foci of concerns (Lenzen et al, 2002).

Recurrent angina has been strongly linked to increased mood disturbance and poorer quality of life post-angioplasty in a number of studies (Skaggs et al., 1999; Tooth et al., 1999; Hlatky et al., 2004; Echteld et al., 2003, Edell-Gustafsson et al., 2001 and Higgins et al., 2001) and as such, represents an important factor for consideration in patient recovery. The elimination or reduction of anginal pain, which is usually associated with successful

angioplasty, is likely to underpin at least some of the positive psychological gain which is generally reported post-procedure. The duration of CHD (Tooth et al., 1999), the experience of prior cardiac events (Astin et al., 2005), new cardiac events (Helgesen, 2003) and, for women, the experience of a prior revascularisation (Lenzen et al., 2002), are further illness characteristics adversely affecting patient wellbeing and thus may usefully predict those patients at greatest risk of difficulty.

Perceived support of others for recipients of the angioplasty procedure was generally found to be a significant factor facilitating well-being and it may represent an important external resource which buffers against negative psychological symptoms during recovery (White et al., 1995). Research however in the angioplasty population is to date sparse.

Factors considered to be indicative of more enduring propensity such as depressive style, Vital Exhaustion and Type D (distressed personality type) appear to be related to poorer psychological outcomes, and in some cases these individuals are at greater risk of recurrent cardiac events (Appels et al., 1995). Such dispositional factors therefore present potentially useful clinical indicators of recovery and adjustment. Although, it is notable that, irrespective of such enduring traits, similar relative gains have been observed in psychological function post-angioplasty (Burton et al., 2003).

The reported impairments to psychological well-being suggest that angioplasty represents a significant and threatening life event which requires some form of coping response. Whilst a range of coping styles and strategies have been described in the angioplasty population, the current body of research however is circumscribed and undoubtedly compromised by a lack of consistency in the ways in which coping is operationalised and measured. Aspects

of the literature suggest that more active, problem-focused/approach responses may be beneficial following angioplasty and are likely to facilitate initiation of risk-reductive behaviours. Avoidant-type coping may provide an adaptive response to situations perceived to be uncertain and not under personal control (such as shortly prior to and following the procedure). Therefore, whilst the encouragement of problem-focused/approach styles may be important in the weeks following angioplasty, the literature suggests that the use of avoidant/emotion-focused strategies is an important and adaptive response around the immediate period of the procedure. In clinical practice, emphasis should not necessarily therefore be placed upon facilitating commitment and plans to behavioural change, which may well be more beneficial if received at a later follow-up; rather, attention should be paid to facilitating more emotionally-focused responses and enhancing the emotional well-being of patients. Conclusions from this element of the current review however should be tempered by the methodological inadequacies present, in particular the absence of multiple follow-up designs which preclude the exploration of possible temporal changes in coping.

The role of cognition in adjustment following angioplasty has begun to receive some attention with perceptions regarding illness, treatment, prognosis and ability to respond to health challenges. The many uncertainties potentiated by a diagnosis of CHD and the need for angioplasty, understandably create perceptions of uncertainty in recipients (White et al., 1995). Whilst anxiety appears to reduce in the aftermath of the intervention, the long-term risks of restenosis and need for re-intervention appear to be reflected in pervasive deficits to affective well-being and quality of life (Edell-Gustafsson et al., 2001). Feelings of self-efficacy and control have also been found to correlate with psychological well-being

(Perkins et al, 1998), whilst perceptions of self-efficacy for behavioural change have also proved useful indicators of actual change.

Compared to other forms of coronary intervention, angioplasty represents a lesser-invasive procedure, however underestimating the impact may cause problems with regards to successful psychological adjustment. A failure to perceive the actual risks associated with CHD and the procedure could help explain why angioplasty patients appear to be less motivated to make necessary behavioural changes.

There is some evidence to suggest that individuals with a negative view of themselves and the future are more likely to be affected by the procedure and thus less likely to show positive well-being post-angioplasty, with cognitive biases in optimism, self-efficacy and self-esteem found to buffer psychological health and facilitate enhanced recovery. Research also suggests that patients adopt a problem solving response and work through a process of problem identification, coping implementation and response appraisal. The procedure's perceived interference with life goals has also been associated with reduced illness-related quality of life, particularly at three months post-procedure, when perhaps expectations for recovery have not been met. Whilst a few recent studies have begun to consider the application of psychological models in angioplasty, findings are limited by the absence of replication and validation.

4.2 Limitations of the literature and review

The articles reviewed covered a breadth of divergent psychological factors and the number of empirical investigations tapping each variable considered was generally low. Research exhibited considerable heterogeneity in the definitions of the psychological constructs

under investigation and this together with the array of mood and quality of life measures employed, tapping, for example, state (HADS; POMS) and/or trait (STAI), and generic (SF36) and/or health-specific (QLI; CDS) dimensions of well-being made the integration and comparisons of findings from different studies more problematic. Poor methodological design and rigour has also limited or tempered the conclusions drawn from some areas of the literature. Research to date is also flawed in that it has not yet provided a sound measure of pre-morbid psychological functioning, uncontaminated by fear of the immediate procedure, against which to evaluate the impact of the intervention. There has been limited prospective work and the period of follow-up tends to short- or medium-term duration, precluding clear conclusions about longer-term psychological wellbeing. Although, the absence of longitudinal assessment is most likely attributable to advances in the uptake and developments of the procedure.

Sampling to date has been skewed, with few studies including emergency patients in their samples, despite this subgroup comprising half the angioplasty population. Yet type of admission pathway to angioplasty is likely to affect opportunity for psychological preparation and adjustment. Elective patients, who undergo non-emergency coronary angioplasty on a scheduled date, are likely to experience a greater opportunity to gather, receive and absorb information. There is currently little research with emergency patients because of the immediacy of the referral, with many studies only reporting data for scheduled patients, and that reported thus far is often retrospective and subject to problems of historical bias. Samples have also tended to be overly homogeneous, excluding individuals with comorbidity, multiple vessel disease, prior cardiac events and psychiatric history. Future investigations employing more realistic, representative samples would be beneficial for this area of research.

The inclusion of a broader range of methodological design enabled the synthesis of empirical findings from a breadth of clinical and academic literature sources, but however precluded the pooling of data to provide quantitative summary statistics. Further, focused meta-analysis looking at quantifiable psychological outcomes and aspects of adaptation in angioplasty would contribute to a more scientific evidence-base, upon which effective decisions regarding clinical practice could be founded.

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Section B: Research Report (Option 1)

Illness Representations, Coping and Psychological Well-being in Angioplasty Patients

1. Abstract

Aim: To investigate the nature of psychological adjustment following angioplasty and to assess the relative contributions of illness cognitions and coping in the context of the Self-Regulation Model (Leventhal, Meyer & Nerenz, 1980).

Design: A longitudinal, prospective within-groups, multi-factorial study.

Method: 120 participants were recruited from an opportunity sample of patients approached during admission to the Manchester Heart Centre for angioplasty. Questionnaires addressing illness beliefs, coping and psychological outcomes were presented at two time points; during admission and three months post-procedure.

Results: Analysis revealed that angioplasty is followed by clinically and statistically significant psychological gains. Perceptions of the illness as serious, and having a cyclical time-course, together with a general difficulty in making sense of the illness, were associated with increased anxiety at the time of treatment, and in most cases also at three months. Higher levels of emotional representation were also strongly associated with anxiety and quality of life outcomes at both time points. Problem-focused and maladaptive coping also showed associations with psychological outcome at treatment and at three months. Illness beliefs were demonstrated to significantly predict psychological well-being, explaining a substantial proportion of variance, with emotional representation the strongest independent predictor. Coping was not found to mediate the relationship between illness beliefs, and psychological distress and quality of life.

Conclusion: This research has demonstrated the utility of illness beliefs, and to an extent the Self Regulation Model in predicting psychological outcome in angioplasty. Cognitive factors may therefore serve as useful clinical indicators to help identify those patients at greatest risk of impaired recovery, which in the future may enable targeting with further support, and evidence permitting, psychological interventions.

2. Introduction

2.1 Coronary Heart Disease

Coronary Heart Disease (CHD) is a chronic, progressive and life threatening illness, which is hugely costly to both the individual and society. The impact of CHD often has repercussions for multiple domains of personal functioning, including physical, familial, social, occupational, financial and psychological. Despite evidence to suggest reduced morbidity and mortality, it also remains the leading cause of death world-wide (Marmot, 2005) and continues to costs over 1.73 billion pounds each year in England alone (Lui, Maniadakis, Gray & Rayner, 2002). CHD primarily affects the coronary arteries and is the result of atherosclerosis, the process whereby fat or cholesterol-laden plaques are deposited on the artery walls. As a result of the build up of plaque, arteries become narrowed or blocked and the blood flow is reduced or interrupted. The loss of oxygen and vital nutrients to the cardiac muscle, can trigger several different manifestations of CHD, the most prevalent being angina pectoris (A.P.) and myocardial infarction (M.I.). In the United Kingdom, over 1.4 million people are reported to suffer from A.P., which is characterised by symptoms of chest pain, shortness of breath and electrocardiographic changes. In the unstable form of A.P., symptomatology is often erratic and thus presents greater challenges for condition management, whilst symptoms associated with stable angina are more predictably linked to physical exertion. Each annum, in the U.K. around 300,000 people in the experience an acute M.I. (Department of Health, 2000) and, whilst associated with similar cardiac symptoms, M.I. more critically is the result of a complete arterial blockage (via a blood clot forming on top of a previous narrowing), which can cause significant cardiac damage and death (Shaffer & Glick, 1980).

2.2 Coronary Angioplasty

In attempts to limit the impact of CHD, there has been extensive research into the development and enhancement of cardiac diagnostic and interventional techniques. One recent technological development has been in the procedure of Percutaneous Transluminal Coronary Angioplasty (PTCA), a non-surgical coronary revascularisation procedure, which restores blood flow to the heart muscle, via the insertion and inflation of an angioplasty balloon. Traditionally, patients considered most appropriate candidates for PTCA were those with stable angina, single vessel disease and proximal, discrete coronary stenosis (narrowing of the artery). However, technological advances, including improvements in catheter design and the introduction of stenting (the placement and expansion of short stainless steel mesh to provide structural support in the artery) mean that this procedure is now routinely carried out on patients with multiple vessel disease, unstable angina, and acute M.I., with over 80% of patients having PTCA procedure performed as an emergency (National Confidential Enquiry into Perioperative Deaths, 2000). PTCA can be highly effective at relieving A.P., improving prognosis in unstable angina and reducing the chances of M.I. The procedure's rapid results, without the inherent risks and period of recovery associated with surgery, have led to its growth as a viable and increasingly, preferred method of coronary revascularisation (Block, Forrester, Litvak, & Grunfest, 1986; National Confidential Enquiry into Perioperative Deaths, 2000; Office for National Statistics, 2004).

Whilst PTCA has many benefits, it is not without its medical complications (Kent, Bentivoglio, Block, Bourassa, Cowley, Dorros, Detre, Gosselin, Gruentzig, Kelsey, et al., 1984). Factors associated with a higher incidence of procedural complications include

female gender, right coronary artery angioplasty site, unstable angina pectoris, and age greater than 60 years (Block et al., 1986). Emergency procedures also carry a higher risk of complication and mortality, as they are often associated with more acute coronary syndromes. The procedure also has a relatively low six month success rate, with a 30-40% risk of restenosis (further narrowing in the artery at the angioplasty site), resulting in a significant proportion of patients requiring further coronary intervention.

2.3 Psychological factors in CHD

Epidemiological research has established a number of factors that are significantly linked to increased susceptibility to CHD, including age, gender, family history, hypertension, hyperlipidaemia (elevated cholesterol level), obesity, inactivity and smoking (for a comprehensive review see: Lawrence, Neil, Fowler & Mant, 1996). Whilst an understanding of these demographic, genetic, biological, and behavioural factors has facilitated many vital preventative and interventional health strategies, there has been a failure to account for the full variance in CHD occurrence. This discrepancy has led to a greater focus upon the psychological and social factors that may influence individual vulnerability.

Various psychosocial factors have been purportedly linked to risk of coronary heart disease, including: social support, stress, enduring dimensions of personality and negative emotion. The role of social support in the pathogenesis of CHD has received some attention, with social isolation reported to be associated with increased propensity for CHD, increased rates of further coronary events and reduced psychological well-being in cardiac patients (Yates, 1995: Case, Moss, Case, McDermott & Eberly 1992). Arguably, the most heavily researched factor has been the concept of Type A Behaviour (TABP), which is

characterised by aggressiveness, competitiveness, hostility, and a sense of time urgency (Friedman & Rosenham, 1974). Whilst, earlier research indicated a significant independent association, (The Review Panel on Coronary-Prone Behaviour and Coronary Heart Disease, 1981), more comprehensive meta-analyses have failed to replicate these findings (Booth-Kewley & Friedman, 1987; Matthews, 1988). However, positive correlations have been maintained between CHD and some of the TAB-associated components, for example hostility (Barefoot, Dahlstrom & Williams, 1983). Thinking has therefore moved on from the notion of coronary-prone personality-type, towards the idea of single or multiple negative emotions as ‘toxic elements in cardiovascular proneness’ (Donker, 2000). This area of the literature is however often still hampered by a failure to clarify and adequately operationalise the constructs under scrutiny, raising issues of construct validity and between-study comparability.

2.4 Psychological factors in coronary angioplasty

The angioplasty population is as yet relatively under-examined but represents a particularly important area for psychological research for several reasons. Firstly, many post-procedure patients experience impaired psychological wellbeing and quality of life in the weeks following, despite high rates of procedural success and symptom diminution (Astin, Jones & Thompson, 2005). Longer term problems with mental health have also been reported, with around 30% of recipients of angioplasty found to meet the clinical criteria for depression at one year (Edell-Gustafsson & Hetta, 2001). To date however, empirical investigation has primarily focused upon physical (e.g. symptom reduction) and functional (e.g. return to work) recovery, with specific aspects and correlates of psychological adjustment receiving far less attention. The limited exploration of psychological adjustment in angioplasty is perhaps surprising given that such factors have been widely

linked to poorer prognosis and increased risk of cardiac events in other cardiac populations (Glassman & Shapiro, 1998; Rozanski, Blumenthal & Kaplan, 1999; Connerney, Shapiro, McLaughlin, Bagiella & Sloan, 2001). The characteristics of the angioplasty procedure however are quite distinct when compared to other cardiac interventions, and to some extent preclude the generalisation of findings from the wider literature (Astin et al, 2005).

Secondly, the clinical advantages particular to PTCA may themselves present problems for patient adjustment and recovery. The successful alleviation of symptoms, such as anginal pain and breathlessness, may foster the belief that the procedure is curative and that the risk of future morbidity is negligible (Gaw, 1992; Gulanick & Naito, 1994; Helgesen 2003). Short hospital stays may also limit the opportunity for information provision and assimilation and compromise the opportunity to develop accurate perceptions and expectations regarding the procedure and CHD. Individuals with such misconceptions and unrealistic expectations are arguably less likely to recognise the progressive nature of CHD and thus the importance of cardiac-protective life style changes for the maintenance of health, which may also help to explain the limited behavioural change and uptake of rehabilitation services observed in the angioplasty population (Jenkins & Kotra-Ottoboni, 1991; Gaw, 1992).

Finally, the frequency of the application of PTCA is growing exponentially (ONS, 2004) and the National Service Framework for Coronary Heart Disease (DOH, 2000), which sets out national standards and service models for the prevention and treatment of CHD, is driving further future growth through the improvement of access to, and capacity for, coronary revascularisation procedures. Specific commitments include raising the number of revascularisation procedures by 3,000 and providing an assessment of the potential

benefits of revascularisation to all patients with acute M.I., unstable angina, and stable angina with continuing ischaemia. An improved understanding of the role of psychological factors in the adjustment to and recovery from angioplasty may help to explain the variation in patient outcomes and provide suggestions for care providers to help facilitate psychological as well as physical recovery.

2.4.1 The role of illness beliefs

There has been a recent plethora of research exploring the ways in which people make sense of and respond to health challenges. Several theoretical models have been proposed to account for the ways in which people construct a cognitive understanding of their illness, the most widely applied being that of the Self Regulation Model (S.R.M.) developed by Leventhal, Meyer & Nerenz (1980). The S.R.M. focuses upon the patient's own implicit beliefs about their illness, and proposes that these are based upon a distinct set of components or areas of illness representation which in turn determine coping (Turk, Rudy & Salovey, 1986; Lau, Bernard & Hartman, 1989). The S.R.M. model conceptualises five dimensions of illness cognition, namely: identity (the label attributed to the illness and the symptoms associated with it), time-line (beliefs about duration and time for recovery), cause (the factors believed to have caused the illnesses onset), consequences (the physical, social, financial and emotional effects of the illness) and cure/controllability (beliefs regarding what the individual themselves or medical practitioners can do to control or bring about recovery from illness). Quantitative support for the various dimensions of the S.R.M. has been well documented (Lau et al, 1989; Bishop & Converse, 1986) and robust meta-analytic research has found that the perception of a strong illness identity, negative consequences, poor perceived control and a long time-line are consistently associated with less favourable physical, psychological and social outcomes across a range of chronic

illness conditions (Hagger & Orbell, 2003). This model has also received some support cross culturally (Weller, 1984; Lau 1995).

The S.R.M. incorporates illness cognitions into a self-regulatory model of illness behaviour. This suggests that cognitive representations, in conjunction with parallel and interacting affective responses, are balanced through the dynamic interaction and adjustment of the stages of interpretation, coping and coping appraisal. A number of studies have investigated the association between illness beliefs and coping behaviours, and beliefs conferring a strong illness identity, chronic timeline and serious consequences have been significantly correlated with the use of avoidance and emotionally expressive coping styles, whilst, perceived controllability has been associated with cognitive reappraisal and problem-focused coping (Hagger et al., 2003). The use of simplistic, correlational, methodological design has however limited conclusions regarding the nature of the relationship between cognitions, coping and psychological outcome and specifically precludes the drawing of causal inference. Failure to utilise prospective research design, with the exception of a few studies (Hampson, Glasgow & Zeiss, 1994; Orbell, Johnston, Rowley, Epsley & Davey, 1998; Rutter & Rutter, 2002), has also limited investigation of the potentially mediating role of coping.

Figure 1. presents an adaptation of the original model, which has the addition of several further pathways of interaction and feedback loops. These modifications sought to address the likely interactions between emotional response and choice of cognitive coping style, and cognitive response and choice of emotional coping style, which have not as yet been articulated in the literature. It also seemed probable that there would be an interaction between stages of coping and coping appraisal across, as well as within, the cognitive and emotional processes. Feedback pathways were added to illustrate that the levels of the

model could have bi-directional relationships. For example, whilst one's perceptions of illness could influence coping style and in turn the evaluation of coping, evaluation of efforts to cope could equally feedback into future choices regarding coping and the way in which the illness was cognitively or emotionally construed. However, further empirical investigation is required to see if these modifications do in fact add value to the model.

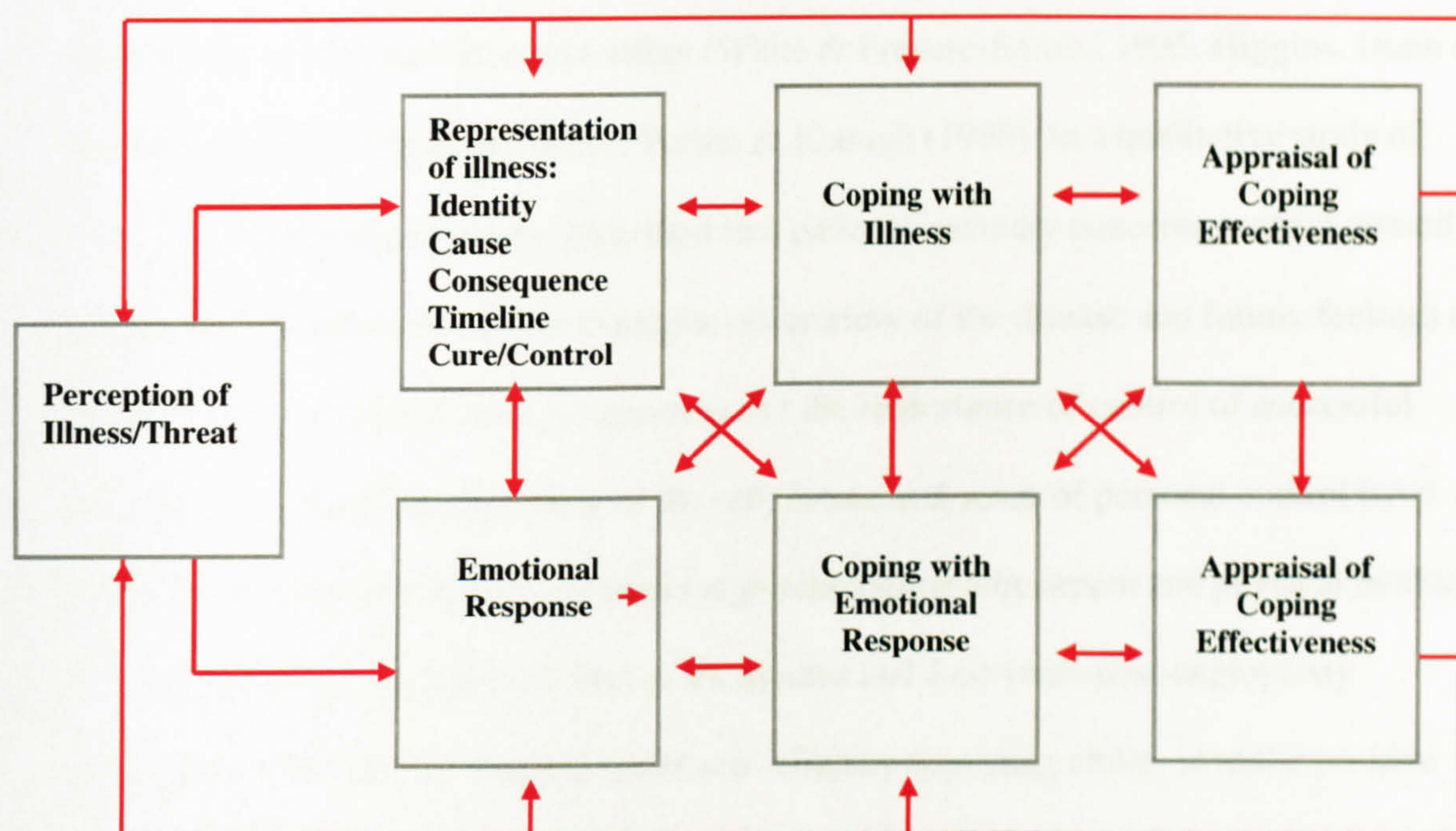


Figure 1. The Self-Regulation Model adapted from Leventhal, Meyer & Nerenz (1980)

2.4.2 Illness beliefs in angioplasty

Research has begun to explore the role of illness cognition in angioplasty and suggests that angioplasty disrupts life goals, which in turn diminishes affective well-being (Echteld, van Elderen & van der Kamp, 2003). Cognitive appraisals, in combination with cardiac history, have been found significantly predictive of psychological well-being in angioplasty, and perceived threat of illness is particularly highlighted as a strong independent predictor (Kimble, 1998). Whilst anxiety appears to reduce in the aftermath of angioplasty (Faris & Stotts, 1990; Astin et al, 2005), the threat of restenosis and need for re-intervention appear

to be reflected in the pervasive deficits reported in well-being (Edell-Gustafsson et al., 2001). Feelings of self-efficacy and control are therefore of understandable importance for angioplasty patients.

An increased sense of uncertainty regarding the future has been found to be both more prevalent in the angioplasty group, as compared to other revascularisation patients, and has been linked to increased negative affect (White & Frasure-Smith., 1995; Higgins, Dunn & Theobald, 2001). Gulanick, Nliley, Perino & Keough (1998), in a qualitative study of forty-five angioplasty patients, identified that patients' primary concerns centred-around issues of individual control (for example, uncertainty of the disease and future, feelings of powerlessness to stop disease progression and the importance of control of successful change). An overall positive view of the self, future and sense of personal control have together been found predictive of positive psychological adjustment and physical morbidity (i.e. occurrence of recurrent events) at six months and four years post-angioplasty (Helgesen, 1999; 2003). Cognitions of self-efficacy regarding ability to make positive lifestyle changes have also been found to correlate with the actual initiation of behavioural change (Perkins & Jenkins, 1998). Situational self-esteem and control have however been shown to have an inverted relationship with well-being for those patients who go on to experience a further cardiac events, suggesting that high levels of perceived control and esteem are disadvantageous when previous efforts to cope and make necessary life style alterations have been undermined (Helgesen, 2003). The work of Helegesen benefits, unlike many of the other studies in this area, from a sound theoretical basis, drawing upon the body of work from Cognitive Adaptation Theory. The majority of the research in this area however is limited by the failure to fully define the constructs under investigation and to address the multiple aspects involved in responding to and coping with chronic illness.

To date there has been a paucity of research applying the S.R.M. to patients undergoing angioplasty. However, in support of the application of the model, Higgins et al., (2001) identified the process of problem solving, in a qualitative study into patients' experiences of preparing for angioplasty, which mirrored the S.R.M. core stages of: problem identification, coping response initiation, and monitoring and appraisal of the response. In the only study to date to employ a self-regulatory approach within the angioplasty population. Hirani, Pugsley & Newman (2006) looked at the structures of illness representations in 214 CHD patients undergoing CABG, PTCA and psychopharmacological treatments, and hypothesised that the different treatment groups could be differentiated upon the basis of several illness representations. CABG patients were predicted to perceive more severe consequences, greater symptom identity, less curability, but a shorter illness timeline, whilst angioplasty patients were hypothesised to have fewer negative representations with the exception of timeline, which they were predicted to perceive as more enduring. However, no statistical differences were evident from this comparative study, and no further exploration of the role of illness cognition in angioplasty was undertaken.

The S.R.M. has also been employed in a number of other cardiac populations, including in the explanation of psychosocial adjustment in patients with atrial fibrillation (Steed, Newman & Hardman, 1999) and in MI patients': speed of presentation to emergency care (Walsh, Lynch, Murphy & Daly, 2004), psychological distress, likelihood of further complication (Cherrington, Moser, Lennie & Kennedy, 2004), return to work and rehabilitation attendance (Petrie, Weinman, Sharpe & Buckley, 1996; Whitmarsh, Koutanji & Sidell, 2001; Cooper, Lloyd, Weinman & Jackson, 1999), where it has been found to be efficacious in prediction of both health-related behaviour and psychological outcomes.

Within studies of cardiac rehabilitation, there has been substantial support for the role of S.R.M. components, with the greatest predictors of non-attendance cited as being that of lesser symptom identity and lesser control and curability. Research suggests that rehabilitation can play an important role in the improvement of cognitions such as perceived control and sense of self-efficacy, and that cognitive changes are often associated with substantial affective gain and functional outcomes. (Michie, O'Connor, Bath, Giles & Earll, 2005; Petrie, Cameron, Ellis, Buick & Weinman, 2002).

In summary, research suggests that the psychological well-being of patients is affected by the process of undergoing angioplasty and that long term difficulties are experienced by some. Cognitive beliefs have been found to associate with quality of life and psychological outcomes in angioplasty, however much of the research in this area is disparate and not underpinned by theory. Despite the frequent absence of the methodological research design necessary for a full causal exploration, the S.R.M. has been usefully employed in many chronic illness populations, including cardiac groups, and as the model not only provides a theoretical framework to aid understanding, but also provides a means of predicting individual responses and outcomes, its application may prove particularly pertinent for the angioplasty population. It is argued that an approach employing a prospective, longitudinal, multivariate design incorporating illness cognitions, coping strategies and dimensions of psychological adjustment and outcome is needed in the field of angioplasty. Such an endeavour may enable a more comprehensive appreciation of the factors and processes involved in post-procedural adjustment and thus facilitate the development of care approaches which maximise psychological as well as physical recovery.

2.5 Research Questions and Hypotheses

The current study prospectively investigated psychological adjustment in patients undergoing the angioplasty procedure and considered the role of illness cognitions and coping strategies in relation to several dimensions of well-being over a three month period. Testable hypotheses were developed on the basis of research findings from the S.R.M. and cardiac literature, and with specific respect to current empirical gaps in the field of angioplasty. The following research questions and specific hypotheses were tested:

1. Do patients show differences in psychological distress and health-related quality of life following the angioplasty procedure?

1.1. Angioplasty patients will experience a significant decrease in anxiety and depression and a significant increase in health-related quality of life three month following PTCA.

2. What associations exist between illness cognitions, coping and psychological adjustment?

2.1. Illness cognitions will associate significantly with psychological distress and health-related quality of life at the time of angioplasty.

2.2. Illness cognitions at the time of angioplasty will associate significantly with psychological distress and health-related quality of life three months post-procedure.

2.3. Coping strategies will significantly relate to psychological distress and health-related quality of life at the time of angioplasty.

2.4. Coping strategies at the time of angioplasty will significantly relate to psychological distress and health-related quality of life three months post-procedure.

3. Do illness cognitions and coping predict psychological wellbeing and adjustment?

3.1. Illness cognitions and coping will explain a significant proportion of the variance in psychological distress and health-related quality of life at the time of angioplasty.

3.2. Illness cognitions and coping will explain a significant proportion of the variance in psychological distress and health-related quality of life three months post-procedure.

4. Does coping mediate the relationship between illness cognitions and psychological adjustment.

4.1. In line with the Self Regulation Model, coping will mediate the relationship between illness cognitions and psychological distress and health-related quality of life three months post-angioplasty.

3. Method

3.1 Research design

The current study employed a quantitative, longitudinal, within-groups design, to investigate the relationships between illness cognitions, coping style and quality of life measures at the time of the angioplasty procedure and after a period of recovery.

3.2 Sample

Patients were invited to take part in this research from a three month sample of around 500 patients admitted for angioplasty on two cardiac wards within the Manchester Heart Centre (October – December 2005). One hundred and twenty angioplasty patients agreed to participate in this research study, the number of patients who declined to participate was unrecorded. A pragmatic, opportunity sampling strategy was employed. Patients were excluded if they were participating in other research projects or if the nursing staff considered them too unwell to participate. No exclusions were made upon the basis of individual illness history, severity and emergency/elective pathway. The decision to exclude patients below the age of eighteen years had been taken, however none of the patients approached met this criteria.

3.3 Measures

Prior to the commencement of the research study, a selection of questionnaire measures were chosen. This decision was made following a review of the measures currently employed within the literature and consideration of several issues:

- Theoretical and empirical underpinning

- Face validity of constructs and questions
- Statistical reliability, standardisation and validation.
- Prior use with cardiac populations
- Appropriateness for the angioplasty sample

3.3.1 Piloting measures

Following selection of the measures, complete renderings of each questionnaire were piloted with five angioplasty patients (convenience sample). This pilot was undertaken to elicit patients' views regarding the accessibility of the content and the brevity of the total battery, and the results helped to inform the choice of final renderings of questionnaires (see Appendices 7 & 8). This pilot sample indicated that they understood the content of the measures and felt that they could complete the battery without undue effort or fatigue. On the basis of this evidence the battery was finalised and included the comprehensive versions of the measures listed below.

3.3.2 Illness representations

The **Revised Illness Perception Questionnaire (IPQ-R)** was developed by Moss-Morris, Weinman, Petrie, Horne, Cameron and Buick (2002) to assess seven areas of illness cognitions. *Illness Identity* elicits the symptoms believed to be associated with illness from a list of twelve core symptoms. *Timeline-Acute/Chronic* looks at the perceived duration of the illness using seven-items, whilst *Timeline-Cyclical* measures less linear aspects of illness progression across four-items. The six-item *consequences* dimension reflects beliefs regarding the seriousness of the condition. *Personal Control*, seven-items, and *treatment control*, five-items, respectively tap sense of self-efficacy or control over the illness in general and the treatment specifically. *Emotional Representations* assesses the patient

emotional responses to illness using six-items and *Illness Coherence* looks at how the illness is understood or made sense of across five-items. High scores on the Identity, Timeline, Consequences, and Cyclical dimensions represent strong beliefs about the number of symptoms attributed to the illness, the chronicity of the condition, the negative consequences of the illness, and the cyclical nature of the condition. High scores on the Personal Control, Treatment Control and Coherence Dimensions, indicate positive beliefs about the controllability of the illness and a personal understanding of the condition. These scales have been shown by the authors to have good internal consistency, with Cronbach's alphas between .79 -.89.

The IPQ-R, and its predecessor the IPQ, provide a theoretically derived measure of illness cognitions, which have been widely used in the study of chronic illness populations. Whilst no studies were identified in which the IPQ-R has been employed with patients receiving angioplasty, it has been used to successfully predict adjustment and outcome in a wide number of chronic illness populations, including cardiac groups (Steed et al., 1999; Cooper, Lloyd, Weinman & Jackson, 1999; Walsh, Lynch, Murphy & Daly, 2004). The initial development and validation of this measure also was in part made on the basis of patients recovering from a first-time Myocardial Infarction (Weinman, Petrie, Moss-Morris & Horne, 1996).

3.3.3 Coping

The **Coping Orientation to Problems Experienced (COPE)** was developed by Carver, Sheier and Weintraub (1989) and provides a multidimensional inventory of coping strategies and can be used to assess typical coping styles or strategies used in response to specific situations. It comprises fifteen, independent, unipolar coping scales, which are

assessed with four-items (1 = don't do this a lot, 4 = do this a lot). Thirteen of these scales have been grouped into three areas: problem-focused, emotion-focused and maladaptive, although the authors indicate that sample specific factor analysis may result in more meaningful groupings. Problem-Focused strategies include: *Active Coping* which involves steps to remove or circumvent the stressor or ameliorate its effects, *Planning* to cope or deal with a stressor, *Suppression of Competing Activities*, *Restraint Coping* which entails awaiting the appropriate opportunity to act and *Instrumental Social Support* incorporating the elicitation and use of practical advice or assistance from others. Emotion-Focused strategies include: the seeking and use of *Emotional Social Support*, *Positive Reinterpretation of the Situation*, *Acceptance* of the stressor, *Denial* of the stressor and *turning to religion*. Maladaptive scales include: the *Focus on and Venting of Emotions*, *Behavioural Disengagement*, and *Mental Disengagement*. Other scales include: *Humour* and *Substance Use*. The higher the score on each scale, the greater the extent to which the coping style is typically employed. Cronbach's alphas computed for each scale have been reported to be high, ranging from .62-.92, with the exception of mental disengagement (.45).

Unlike many other coping measures which have been derived empirically, the construction of the COPE was theoretically grounded and enables the examination of a range of coping strategies independently. The measure has been used in studies of cardiac patients (Steed, Newman & Hardman, 1999).

3.3.4 Psychological distress

The **Hospital Anxiety and Depression Scale (HADS)** was constructed by Zigmond and Snaith (1983) as a measure of emotional distress in clinical populations with symptoms of

physical disease. It incorporates fourteen-items, each with a four-point response, seven of which provide an index of depression and seven an index of anxiety. Clinical cut-off scores enable the screening of pathological mental health difficulties, a cut-off of eight was employed in the current study, as this provided a sensitive threshold with which to assess clinical caseness. This measure is suitable for use in the current study because as it has been shown to have good psychometric properties (Johnston, Pollard & Hennessey, 2000) and has been used extensively, and found to have utility, with cardiac populations (Martin, Lewin & Thompson, 2003).

3.3.5 Health-related Quality of Life

The Medical Outcomes Studies Short Form 36 (SF36) was developed by Ware and Sherbourne (1992) as a measure of health-related quality of life. This measure taps eight health concepts. *Physical Functioning* is a ten-item scale that captures physical ability to complete activities pertaining to daily living, *Role-Physical* is a four-item scale that looks at whether physical functioning limits activity; *Bodily Pain* is a two-item scale that evaluates the perceived amount of pain experienced and the extent to which this interferes with normal work activities and *General Health* is a five-item scale that evaluates perceived general health. *Vitality* is a four-item scale that evaluates feelings of fatigue, *Social Functioning* is a two-item scale that evaluates the extent and amount of time that physical health or emotional problems interfered with family, friends, and other social interactions, *Role-Emotional* is a three-item scale that evaluates the extent to which emotional factors interfere with work or other activities; and *Mental Health* is a five-item scale that evaluates feelings principally of anxiety and depression. Two composite scale scores can be derived, namely: the *Mental Health Component Scale (MCS)* and the *Physical Health Component*

Scales (PCS). Physical and Mental Health Component scores reliability has been reliably found to be satisfactory and often in the region of 0.90 (Ware et al., 1994).

The SF36 has been usefully employed with cardiac patients undergoing angioplasty (Helgesen, 1999; Pocock, Henderson, Clayton, Lyman & Chamberlain, 2000; Rinfret, Grines, Cosgrove, Ho, Cox, Brodie et al., 2001; Burton, Kline, Cooper, Rabinowitz & Dodek, 2003) and has also been validated for use in the broader cardiac population and to effectively differentiate clinical forms of CHD (Failde & Ramos, 2000).

3.3.6 Demographic & biomedical data

Individual demographic and illness data were additionally collected via open ended or forced choice questions. At the first time point information gathered included: age, gender (male or female), employment status (employed, unemployed or retired), marital status (married/cohabiting, single or widowed), prior experience of cardiac events (open response), prior experience of cardiac intervention (open response), comorbid illness (open response) and psychiatric history (yes or no). Further information regarding the short-term success of the procedure, as measured by chest pain at rest and exercise (four point rating scale derived from Cleary et al, 1991), experience of medical complications during angioplasty and the occurrence of cardiac events during three month post procedure, was also collected at the second time point.

3.4 Procedure and statistical analyses

Data was collected via a battery of questionnaires at two time points: Time 1 (T1), whilst hospitalised in the few hours immediately proceeding or following the angioplasty procedure, and Time 2 (T2), 3 months post procedure. Power analysis, using G Power software programme, indicated that a sample of between 48 to 105, corresponding to a 0.05 significance level, and minimum satisfactory power of 80 percent, would be required to detect a medium to large effect. A small effect was estimated to require 500 participants. In line with the medium sized effects reported in the literature, and after discussions with a statistician, the sample size was set at 120. Ethical approval was next sought and obtained from the relevant ethics committee (Appendix 3).

At T1, patients were provided with oral and written explanations of the study aims and requirements for participation by either the primary researcher or an identified member of the nursing team (see Appendix 4). The voluntary nature of participation was emphasised, and patients were given time to consider their participation and the opportunity to ask questions. If in agreement, written consent and permission to inform general practitioners was obtained (see Appendices 5. and 6., respectively). Participants were then asked to complete the first battery of questionnaires, taking approximately 30 minutes (see Appendix 7.). The same set of questionnaires were then sent by post to participants' homes at T2 in a second battery, together with an additional follow-up information sheet and covering letter (see Appendix 8. and 9., respectively).

Data was screened and analysed using the Statistics for the Social Sciences (SPSS) programme, version 11.0. Measures were assessed for internal reliability using Cronbach's alphas. Following the necessary data type, distribution and variation checks, consideration

was given to the demographic and biomedical characteristics of the sample and the presence of potential differences between sub-groups. Parametric and non-parametric statistical analyses were conducted to investigate the significance of identified differences. Pearson's Product Moment Correlation analyses were then performed to examine the relationship between the component elements of the IPQ, COPE, HADS and SF36 scales. Correlation coefficients provided the basis for entry into subsequent regression models. Several multiple regression analyses were conducted, the first looked at whether Illness Cognition (IPQ) and Coping (COPE) were predictive of Psychological Distress (HADS) at T1, the second looked at whether these same predictor variables played a role in determining Mental Health and Physical Functioning (SF36 MCS & PCS). The third regression model used the prospective data to examine the relationship between the predictor variables at T1 and the HADS at T2, and the forth looked at these variables' relationships to the SF36 outcome data. The fifth and sixth models investigated the potentially mediating effect of Coping upon the relationships between Illness Beliefs and Psychological Distress and Illness Beliefs and Mental and Physical Health.

Significance levels were set at the generally accepted $p < 0.05$ level, however for analyses with multiple comparisons that may have increased the likelihood of a Type 1 error occurring, a more stringent significance level of $p < .01$ was set.

4. Results

4.1 Data Screening

To assess whether it was appropriate to utilise parametric, statistical tests, data was first tested for normality of distribution. The Kolmogorov-Smirnov D test was used and indicated significance levels above the .05 threshold (.842-.07), with the exception of the factor Treatment Control which yield a P value of .004. This suggests that the large majority of variables under investigation did resemble a normal pattern of distribution and therefore met this criterion for parametric statistical analysis.

Questionnaire measures are often treated in psychological research as meeting the parametric requirement for interval/ratio data, despite the fact that adjacent units do not truly represent equal amounts (Bryman & Cramer, 1997). Thus, the semblance of interval scaling in the questionnaires administered in this study was assumed to satisfy parametric testing criterion.

4.2 Reliability analyses for predictor and outcome variables

Table 1. presents the internal reliability calculations, using Cronbach's alpha, for all predictor and outcome measures. Reliability analyses generally indicated high levels of internal consistency, with the majority of the measures exceeding the accepted $\alpha \geq .7$ threshold (Kline, 1997). The HADS scales demonstrated internal reliability between $\alpha = .85$ and .91 and the IPQ components ranged between $\alpha = .73$ and .90, with the exception of Treatment Control ($\alpha = .62$). Ten subscales of the COPE were found to be of a satisfactory

level, $\alpha = .71-.93$, however five scales were found to show poor internal consistency: Focus on and Venting of Emotion ($\alpha = .64$), Mental Disengagement ($\alpha = .38$), Denial ($\alpha = .30$), Acceptance ($\alpha = .57$) and Suppression of Competing Activities ($\alpha = .49$). Problem-Focused, Emotion-Focused and Maladaptive supra-dimensions of the COPE however consistently demonstrated an acceptable standard, $\alpha = .76-.87$.

Table 1. Reliability analyses for the predictor IPQ and Cope measures at T1, and HADS and SF36 outcome measures at T2.

Measures	Cronbach's α
HADS - Anxiety	.88
HADS - Depression	.85
HADS - Total	.91
IPQ - Identity	.88
IPQ - Timeline (Chronic/acute)	.90
IPQ - Consequences	.73
IPQ - Personal Control	.74
IPQ - Treatment Control	.62
IPQ - Timeline (Cyclical)	.87
IPQ - Emotional Representations	.87
COPE - Identity	.83
COPE - Positive Reinterpretation	.76
COPE - Mental Disengagement	.38
COPE - Focus on & Venting of Emotions	.64
COPE - Use of Instrumental Social Support	.77
COPE - Active Coping	.74
COPE - Denial	.30
COPE - Humour	.93
COPE - Restraint	.71
COPE - Use of Emotional Social Support	.80
COPE - Substance Use	.89
COPE - Acceptance	.57
COPE - Suppression of Competing Activities	.49
COPE - Planning	.78
COPE - Problem focused Dimension	.87
COPE - Emotion focused Dimension	.78
COPE - Maladaptive Dimension	.76

4.3 Characteristics of the sample at T1

One hundred and twenty participants agreed to participate in this study and responded to the first questionnaire battery at T1.

4.3.1 Demographic data

The sample comprised ninety one males and twenty nine females (24.2%). Eighty participants reported their ethnicity as White/European (74.3%), seven Asian/Other (5.8%). Twenty-four did not detail their ethnicity. Thirty-seven of the sample were employed (30.8%), twelve unemployed (10%) and sixty-eight retired (56.7%). Three participants did not report employment status. Seventy-six participants were married or living with a partner (63.3%), twenty were single (16.7%) and fifteen were widowers (12.5%).

4.3.2 Biomedical data

Fifty participants were admitted to hospital as emergency cases (41.7%) whilst 70 attended hospital for a scheduled procedure (58.3%). Nearly two-thirds of the sample (n=75) had not experienced a prior cardiac medical or surgical procedure (62.5%), whilst nine had received an earlier angioplasty (7.5%), thirteen had been recipients of CABG (10.8%) and three had been implanted with a pace maker (2.5%). Eleven participants had also experienced a prior angiogram (9.2%). With regards to significant comorbid illnesses, seventy described no such problems (58.3%), sixteen highlighted diabetes (13.3%), nine Rheumatoid Arthritis (13.3%), two Asthma and two Hypertension (1.7% for each) and single participants mentioned difficulties with irritable bowel syndrome, chronic obstructive pulmonary disease, chest infection, hernia, degenerative spine, mental health and renal

illnesses (.8% for each). Six of the sample reported having received professional/psychiatric psychological help in the past (5%).

4.4 Characteristics of the sample at T2

Seventy-four (61.7%) of the original sample (n=120) responded to the second questionnaire. Additional biomedical data gathered for those who responded at T2 is outlined below.

4.4.1 Biomedical data

Sixty-nine participants (93.2%) reported at three months that they had not experience any significant complications during the PTCA procedure. Of these, one patient immediately required further angioplasty, one angioplasty was aborted (each, 1.4%) and three suffered other medical complications (4.1%). Over the course of the three months between completion of the first questionnaire and the second, four patients suffered significant anginal pain (5.4%), one required a further PTCA (1.4%), most of the sample reported no further cardiac events (n=67, 90.5%) and two had unspecified difficulties (2.8%). Forty-eight of those responding to the second questionnaire (65.8%) reported experiencing no chest pain, eleven experienced pain but only with substantial activity (14.9%), nine had pain with light physical exertion (12.2%) and five suffered chest pain most of the time (6.6%), irrespective of level of activity or physical exertion.

4.4.2 Demographic and biomedical characteristics of responders and non-responders

Suitable parametric and non-parametric comparisons were employed to look for potential differences in demographic and biomedical information, including in the baseline measurements obtained for psychological functioning and health-related quality of life, between those who did and did not respond to the second questionnaire (T2). Table 2. details the results of these statistical tests. Mann Whitney U, Chi squared tests and analyses of variance tests indicated that there were no statistically significant differences between responders and non-responders with regards to age, ethnicity, marital status, work status, history of mental illness and baseline functioning on the mental health component scale of the SF36, health-related quality of life measure. Differences however did reach statistical significance ($X^2=4.58$, $P=.03$) for gender, which indicated that a greater proportion of those who responded were male. Significant differences were also found for several biomedical characteristics and responders had less experience of prior cardiac events ($X^2=.46$, $P=.03$), previous revascularisation procedures ($X^2=6.46$, $P=.011$) and comorbidity ($X^2=10.90$, $P=.001$). With regards to their baseline functioning, responders showed less psychological distress, scoring significantly lower on the anxiety and depression scales of the HADS ($F=6.91$, $P=.01$; $F=4.8$, $P=.031$, respectively). They also demonstrated enhanced physical well-being, as measured by the SF38 PCS ($F=8.90$, $P=.004$).

Table 2. Demographic, biomedical and baseline characteristics for responders and non-responders.

Variable	T2 Responders	T2 Non-responders	X ²	U	F	Sig.
Mean age (SD)						
Years	60.19 (8.84)	60.35 (13.2)		1.6		.907 (ns)
Gender						
Male	61 (82.43%)	30 (65.22%)	4.58			.03*
Female	13 (17.57%)	16 (34.78%)				
Ethnicity						
White/Euro.	55	34	.973			.32 (ns)
Asian/other	3	4				
Marital status						
Married/cohabit.	52	24	4.83			.09 (ns)
Single	11	9				
Widowed	6	9				
Admission pathway						
Emergency	27	23	2.12			.14 (ns)
Elective	47	23				
Work status						
Employed	24	13	.27			.87 (ns)
Unemployed	7	5				
Retired	41	27				
Previous cardiac event						
Yes	32 (44.44%)	28 (65.12%)	.46			.03*
No	40 (55.56%)	15 (34.88%)				
Previous procedure						
Yes	17 (24.29%)	20 (47.62%)	6.46			.011*
No	53 (75.71%)	22 (52.38%)				
Comorbid illness						
Yes	19 (14.29%)	22 (57.89%)	10.90			.001**
No	54 (85.71%)	16 (42.11%)				
History of mental illness						
Yes	4	2	.03			.858 (ns)
No	70	41				
Baseline Measures						
HADS depression mean (SD)	5.40 (3.97)	7.24 (3.89)			6.91	.01 **
HADS Anxiety mean (SD)	7.19 (4.69)	9.77 (4.55)			4.80	.031*
SF36 MCS mean (SD)	41.51 (8.09)	40.29 (7.81)			.49	.485
SF36 PCS mean (SD)	41.86 (12.09)	34.77 (8.90)			8.90	.004***

4.5 Differences in demographic & biomedical characteristic within the total sample

Parametric and non-parametric tests were employed to compare demographic and biomedical differences within the total group to ensure that homogeneity within the sample was present.

4.5.1 Admission Pathway

The inclusion of patients with different admission pathways in the sample, and thus introduction of potentially divergent illness characteristics, made such analyses salient. The non parametric, Mann-Whitney U and chi squared tests were firstly employed to compare the sample on the basis admission pathway (Table 3). Results suggest differences in some areas, with a greater percentage of elective patients unemployed ($X^2 = 6.92$, $P = .031$) and possessing a history of prior cardiac interventions ($X^2 = 7.06$, $P = .008$). At T2, emergency patients reported that during the angioplasty procedure they had experienced significantly more complications ($X^2 = 4.38$, $P = .036$). No significant differences were highlighted by ANOVA analysis on the basis of study outcome variables.

Table 3. Demographic and biomedical characteristics by admission pathway.

Variable	Emergency	Elective	X ²	U	F	Sig.
Mean age (SD)						
Years	61.46 (12.72)	61.97 (9.47)		1.68		.91 (ns)
Gender						
Male	36	55	.69			.41 (ns)
Female	14	15				
Ethnicity						
White/Euro.	40 (93.0%)	49 (92.46)	.69			.31 (ns)
Asian/other	3 (7.0 %)	4 (7.54)				
Marital status						
Married/cohabit.	34	42	1.432			.49 (ns)
Single	6	14				
Widowed	6	9				
Work status						
Employed	19 (38.78%)	18 (26.47)	6.92			.031*
Unemployed	1 (3.04%)	11 (16.18%)				
Retired	29 (59.18%)	39 (57.33%)				
Previous cardiac event						
Yes	25	35	.05			.83 (ns)
No	24	31				
Previous procedure						
Yes	9 (19.15%)	28 (43.08%)	7.06			.008 **
No	38 (80.75%)	37 (57.02%)				
Comorbid illness						
Yes	20	21	1.44			.23 (ns)
No	26	44				
History of mental illness						
Yes	2	4	.155			.69 (ns)
No	46	65				
Complications						
Yes	4 (14.81%)	1(2.13%)	4.38			.036*
No	23 (85.19%)	46 (97.87%)				
Chest pain						
No	19	29	1.57			.67 (ns)
Yes, with heavy activity	4	7				
Yes, with minimal activity	2	7				
Yes, most of the time	1	4				
Further cardiac events						
Yes	1	6	1.64			.20 (ns)
No	26	41				
Baseline Measures						
HADS depression mean (SD)	3.93 (3.67)	5.37 (4.38)			2.07	.15 (ns)
HADS Anxiety mean (SD)	5.96 (4.84)	6.18 (4.16)			.041	.84 (ns)
SF36 MCS mean (SD)	41.06 (6.85)	41.07 (8.66)			.48	.49 (ns)
SF36 PCS mean (SD)	40.94 (12.17)	38.21 (11.03)			1.44	.24 (ns)

4.5.2 Gender

Whilst on many variables the genders were comparable (see Table 4.), females were on average found to be four years older than male counterparts ($U=976.5$, $P=.05$) and were significantly more likely to be single or widowed ($X^2=9.36$, $P=.009$) or retired ($X^2=8.24$, $P=.016$). The presence of a comorbid illness was found to be greater in females ($X^2=3.9$, $P=.048$). ANOVA indicated no significant differences between males and females for any of the outcome variables.

Table 4. Demographic and biomedical characteristics by gender

Variable	Males	Females	X^2	U	F	Sig.
Mean age (SD)						
Years	60.73 (11.11)	64.90 (9.81)		976.5		.050*
Ethnicity						
White/Euro.	64	25	.626			.43 (ns)
Asian/other	6	1				
Marital status						
Married/cohabit.	63 (75%)	13 (48.15%)	9.36			.009**
Single	14 (16.67%)	6 (22.22%)				
Widowed	7 (8.33%)	8 (29.63%)				
Admission pathway						
Emergency	36	14	.69			.41 (ns)
Elective	55	15				
Work status						
Employed	34 (37.78%)	3 (11.11%)	8.24			.016*
Unemployed	10 (11.11%)	2 (7.4%)				
Retired	46 (51.11%)	22 (81.48%)				
Previous cardiac event						
Yes	46	14	.07			.79 (ns)
No	41	14				
Previous procedure						
Yes	32	5	2.47			.12 (ns)
No	55	20				
Comorbid illness (%)						
Yes	28 (32.19%)	13 (54.16%)	3.9			.048*
No	59 (67.81%)	11 (45.74%)				
History of mental illness (%)						
Yes	5	1	.16			.70 (ns)
No	85	27				
Baseline Measures						
HADS depression mean (SD)	4.48 (4.06)	6.46 (4.43)			.572	.121(ns)
HADS Anxiety mean (SD)	6.0 (4.50)	6.58 (3.99)			.174	.68 (ns)
SF36 MCS mean (SD)	41.17 (8.06)	40.54 (7.75)			3.30	.074 (ns)
SF36 PCS mean (SD)	39.61 (11.74)	37.63 (10.46)			.344	.56 (ns)

4.6 Addressing Research Hypotheses

Results are presented and discussed with reference to the study research Hypotheses.

4.6.1 Hypothesis 1.1

Angioplasty patients will experience a significant decrease in anxiety and depression and a significant increase in health-related quality of life three months following PTCA.

To examine this hypothesis, mean HADS and SF36 scores at T1 and T2 were compared, using four related t-tests. The outcome indicated that significant reductions were experienced in Anxiety ($t=2.81$, $P = .007$), taking the sample mean value below the lower threshold for clinical caseness and thus indicating clinically significant as well as statistically significant change. Gains were also made in physical functioning ($t=-2.33$, $P = .024$). On the HADS Depression scale, a trend of decreased depressive functioning was also observed, although this did not meet the 5% statistical threshold ($t=1.74$, $P = .088$), whilst a non-significant result was found for the MCS of the SF36.

Table 5. Mean scores for outcome variables at T1 and T2.

Measure	N	Mean	Std. Deviation	T	P
HADS T1 anxiety	97	8.12	4.78	2.81	.007*
HADS T2 anxiety	71	6.10	4.40		
HADS T1 depression	97	6.04	4.02	1.74	.088 (ns)
HADS T2 depression	73	4.84	4.17		
SF36 MCS T1	93	41.06	7.97	.40	.69 (ns)
SF36 MCS T2	64	48.12	13.63		
SF36 PCS T1	93	39.27	11.50	-2.33	.024*
SF36 PCS T2	64	40.42	5.68		

Caseness for psychological morbidity, as measured by frequency of participant scoring at or above the threshold on the HADS subscales (score of 8 +) also indicated reduced morbidity, with 51.5% of participants above the threshold for clinical significance for anxiety at the time of angioplasty and 23.8% after, whilst caseness for Depression was observed to fall from 28.9% to 17.8% of the sample between T1 and T2.

These results therefore do not fully support the hypothesis that, at three months post procedure, angioplasty patients will have experienced both significantly reduced anxiety and depression, and significantly improved health-related quality of life, although, specific statistical benefits were found for anxiety and physical health.

4.6.2 Hypothesis 2.1

Illness cognitions will significantly associate with psychological distress and health-related quality of life at the time of angioplasty.

Pearson product moment correlation analyses were undertaken to investigate the relationship between cognitions and outcome (see Appendix 10). $P=.01$ was accepted as the statistical threshold for these multiple comparison to reduce the risk of a Type I error. Results highlighted significant relationships between the IPQ consequences component and baseline scores of both the HADS anxiety scale ($r = .36$, $P = .001$) and the SF36 Mental health Component Scale (MCS) ($r = -.29$, $P = .009$). Treatment Control was observed to have a significant positive relationship with the SF36 Physical Health Component Scale (PCS) ($r = .325$, $P = .003$). Illness Coherence associated negatively with Anxiety ($r = -.284$, $P = .007$) whilst the Timeline-Cyclical component correlated positively ($r = .49$, $P = .0001$).

Emotional Representations positively correlated with both Anxiety and Depression ($r = .74$, $P = .0001$; $r = .55$, $P = .0001$), as well as negatively relating to the MCS.

The hypothesis is thus in part supported, as many of the illness cognitions were found to relate to anxiety, depression and physical and mental quality of life. However, it is of note that not all cognitive variables were found to relate to outcome, and in particular no relationships were evident for Timeline (acute/chronic) and Personal Control, at this level of statistical stringency.

4.6.3 Hypothesis 2.2

Illness cognitions at the time of angioplasty will significantly associate with psychological distress and health-related quality of life three months post-procedure.

At three months, correlation coefficients indicated significant relationships between the IPQ Illness Coherence component and Anxiety ($r = -.46$, $P = .0001$). Timeline-Cyclical was also found to correlate positively with Anxiety ($r = .53$, $P = .0001$) and negatively with the MCS of the SF36 ($r = -.46$, $P = .0001$). The Emotional Representations dimension showed similar associations with Anxiety and the MCS ($r = .54$, $P = .0001$; $r = -.37$, $P = .007$, respectively). No associations were found for the Depression or for the Physical Health Component measures.

An association was therefore again found to exist between illness cognition and outcome, providing general support for this hypothesis, although relationships were not found for all cognition variables indicating that the hypothesis was only supported when specific types of illness beliefs were considered.

4.6.4 Hypothesis 2.3

Coping strategies will significantly relate to psychological distress and health-related quality of life at the time of angioplasty.

The super-ordinate categories of Coping were employed in correlation analyses, rather than individual scales, because of the improved alpha coefficients. The Problem-Focused category of coping demonstrated a significant negative relationship with Anxiety ($r = -.35$, $P = .002$) and Depression ($r = -.34$, $P = .002$), but no relationship to Health-related Quality of Life measures at the time of angioplasty. Emotion-Focused Coping did show some relation to Physical Health, but this association did not achieve statistical significance. Maladaptive Coping however was quite strongly positively related to Anxiety ($r = .47$, $P = .0001$), to a lesser degree with Depression ($r = .33$, $P = .002$), and was also significantly negatively associated with the MCS ($r = -.39$, $P = .0001$).

The hypothesis was therefore supported, with the exception of the emotion-focused coping factor.

4.6.5 Hypothesis 2.4

Coping strategies at the time of angioplasty will significantly relate to psychological distress and health-related quality of life three months post-procedure.

Further bivariate analysis indicated that Problem-Focused coping was inversely related to Depression at three months ($r = -.38$, $P = .007$), trends were observed for Anxiety but did

not reach the statistical significance level. Emotion-Focused coping again did not appear to be related to outcome variables, whilst Maladaptive Coping showed a positive relationship with both Anxiety ($r = .46$, $P = .001$) and Depression ($.38$, $P = .006$). No significant associations were however observed between the Coping variables and the SF36 components.

Coping was therefore found to only relate to psychological distress measures, indicating that this hypothesis was not fully supported by the data.

4.6.6 Hypothesis 3.1

Illness cognitions and coping will explain a significant proportion of the variance in psychological distress and health-related quality of life at the time of angioplasty.

This Hypothesis was examined through the conduction of three hierarchical, multiple regression analyses, using the enter method. Variables were entered in all regression models in accordance with the SRM theoretical premises that illness cognitions impact upon psychological outcome via the selection and implementation of coping strategies. Prior to this, multicollinearity was tested for via bivariate correlations and was found to be below the accepted .8 cut-off (Field, 2000). Only those components of the IPQ and COPE which had demonstrated a significant correlation to the appropriate outcome variable were employed as predictor variables within the following models. The results of ANOVAs (see Appendix 11), which had revealed no statistical difference in outcome according to gender or admission pathway, informed the decision that it was not necessary to statistically control for these variables and thus they were excluded from the regression analyses.

In the first regression model the HADS total at T1 was used as the dependent variable. The IPQ Consequences, Illness Coherence, Timeline-Cyclical and Emotional Representations components, together with the Problem-Focused and Maladaptive Coping classifications of the COPE were entered as predictor variables. In the first step the relevant IPQ components were entered, followed by the COPE categories at step 2. Significant beta values, correlation coefficients, F-values and T-values are presented in Table 6.

Table 6. Multiple regression – predictors of HADS at T1

Predictors	HADS Total T1				
	B	Adj. R ²	F	T	P
Step 1		.59	20.63		.0001
IPQ Timeline (cyclical)					
IPQ illness coherence					
IPQ Emotional representations	.68			6.32	.0001
IPQ Consequence					
Step 2		.61	14.91		.0001
COPE Problem focused coping					
COPE Maladaptive coping					

Results showed that the IPQ components did significantly predict psychological distress, as measured by the HADS, and in fact explained 59% of the variance ($F = 20.63 (4,50)$ $P=.0001$). Inspection of alpha and T-values ($T = >2$ or < -2) indicated that Emotional Representation was the only significantly independent predictor, with a standardized beta of .68, and thus contributing to 46% of the model ($.68^2 = .46$). When the COPE variables were added to the model, a significant increase in the amount of variance explained was observed, with 61% being explained ($F = 14.91 (6,48)$, $P = .0001$). However, the addition of Coping only added a further 2% to the models overall predictive value ($R^2\text{change} = .20$).

The second model again entered correlating IPQ and COPE variables into the first and second steps, respectively, with the SF36 MCS as the outcome variable (see Table 7).

Illness Representation and Coping variables again produced a significant model, with the

IPQ consequences and Emotional Representation component explaining 13% of the Mental Health Component aspect of the SF36 (F=5.25 (2,57), P = .008), and Maladaptive Coping adding a further 10% modeling gain (F = 6.78 (3,56), P = .001). Both the Emotional Representations and the Maladaptive Coping variables significantly independently predicted variation in outcome, the former explaining 7 % ($-.27^2 = .073$) and the latter 14 % ($-.37^2 = .14$).

Table 7. Multiple regression – predictors of SF36 mental health component scale at T1

	SF36 MCS T1				
Predictors	B	Adj. R ²	F	T	P
Step 1		.13	5.24		.008
IPQ Consequence					
IPQ Emotional representations	-.27			-2.0	.05
Step 2		.23	6.78		.001
COPE Maladaptive coping	-.37			-2.91	.005

The only variable to correlate, at the 0.01 alpha level, with the SF36 Physical Health Component was the IPQ Treatment Control variable; this was therefore singularly entered into a standard regression model (see Table 8.). This model accounted for 10% of the variance in the PCS of the SF36 (F=9.48 (1, 80), P = .003).

Table 8. Predictors of the SF36 Physical health components scale at T1

	SF36 PCS T1				
Predictor	B	Adj. R ²	F	T	P
IPQ Treatment control	.325	.10	9.48	3.07	.003

Illness beliefs and coping were therefore found to be predictive of outcome, in support of the experimental hypothesis. Although due to inadequate coefficients (as stated above), this

relationship was limited to some of the few cognitive and coping factors entered into the models.

4.6.7 Hypothesis 3.2

Illness cognitions and coping will explain a significant proportion of the variance in psychological distress and health-related quality of life three months post-procedure.

Hierarchical regression was next completed for the longitudinal study data. IPQ and COPE items correlated very similarly with the HADS score taken at three months as they had with the baseline HADS measurement, with the exception that the consequences component was no longer statistically associated. The IPQ variables were again entered at step 1 and the COPE items at step 2 (see Table 9.). The first step predicted 27% of the variation in psychological distress (HADS) ($F = 5.32$ (3, 33), $P = .004$) and Emotional Representations independently contributed 22% of this, with a standardised beta value of .47 ($.47^2 = .22$). The second step was also found to be of statistically significant gain, with an r^2 change of .017, however the adjusted R^2 , which is the reduced value that attempts to estimate the value of R^2 in the population as opposed to the sample, indicates in fact a loss of predictive value (.27 to .24).

Table 9. Multiple regression – predictors of the HADS T2

	HADS Total T2				
Predictors	B	Adj. R²	F	T	P
Step 1		.27	5.32		.004
IPQ Timeline (cyclical)					
IPQ illness coherence					
IPQ Emotional representations	.47			2.40	.02
Step 2		.24	3.23		.018
COPE Problem focused coping					
COPE Maladaptive coping					

For the SF36 mental health outcome, there were only two IPQ variables which showed appropriate strength associations to permit entry into the regression model, namely the emotional representation and timeline- cyclical items. As Table 10. shows, this model was statistically significant ($F = 6.67 (2, 47)$, $P = .003$) accounting for 19% of the variance, and the timeline item was found to contribute 17% independently ($-.41^2 = .17$).

Table 10. Multiple regression – Predictor of the SF36 MCS T2

	SF36 MCS T2				
Predictors	B	Adj. R²	F	T	P
Step 1		.19	6.67		.003
IPQ Timeline - cyclical	-.41			-2.74	.009
IPQ Emotional representations					

The low bivariate correlation coefficients for the PCS with the IPQ and COPE, did not permit the modelling of predictive influence for this outcome variable.

The hypothesis was therefore supported, with the exception of physical aspects of quality of life.

4.6.8 Hypothesis 4.1

In line with the S.R.M., coping will mediate the relationship between illness cognitions and psychological distress and health-related quality of life three months post-angioplasty

On the basis of the theoretical premise of the S.R.M., that Coping response mediates the relationship between Illness Representations and Psychological Distress and recovery, statistical attempts were made to investigate the potentially mediating role of Coping variables. A four-step hierarchical regression technique described by Baron and Kenny (1986) was employed. Step 1 determined whether the predictor variables had significant effect upon the dependent variable. Step 2 examined the impact of the predictor variables upon the hypothesized mediator variable. Step 3 determined how the hypothesized mediators affect the dependent variable, whilst controlling for the predictor variables and finally Step 4 established whether a mediational relationship exists. In the first of the four-step models, IPQ variables, Timeline–Cyclical, Illness Coherence and Emotional Representations, were used as predictor variables, along with the Problem-Focused item of the COPE, as a potential mediator for the HADS Total at T2. Step 1. had already been shown to be significant in earlier analysis (see Table 9.). The second step also yielded a significant regression model ($F = 7.23$ (3, 61), $P = .0001$), indicating that Illness Representations were significantly predictive of Problem-Focused Coping (see Table 11.). In step 3, however Problem-Focused Coping was not found to significantly predict Psychological Distress, when illness cognition factors were controlled for ($B = -.044$, $P = .775$), and the impact of Illness Cognitions did not alter.

Table 11. Step 2 of four-step regression for HADS T2, IPQ and problem focused coping.

	Problem focused coping			
	B	Adj. R ²	F	P
Step 2		.226	7.23	.0001 ***
IPQ Timeline (cyclical)				
IPQ illness coherence	.46			.0001 ***
IPQ Emotional representations				

Checks were also made as to the potentially mediating role of Maladaptive Coping using the same four-step technique. Step 1. had already been achieved. In the second step the IPQ variables were again entered, this time against Maladaptive Coping as the dependent variable (see Table 12.). This step was found to be statistically significant ($F = 4.66$ (3,55), $P = .005$). Again at the third step the Coping variable was not found to significantly explain any of the variance once Illness Representations were controlled for ($B = .12$, $P = .46$) and its entry also did not affect the contributions of the Illness Representation variables.

As no aspects of Coping were found to correlate with the Health-Related Quality of Life measure, no further exploration of the role of coping was undertaken for the MCS and PCS outcomes.

Table 12. Step 2 of four-step regression for HADS T2, IPQ and Maladaptive coping.

	Maladaptive coping			
	B	Adj. R ²	F	P
Step 2		.14	4.66	.005
IPQ Timeline (cyclical)				
IPQ illness coherence				
IPQ Emotional representations	.277			.032

These findings suggest that whilst aspects of illness cognition do associate with and are predictive of Psychological Distress and Health-Related Quality of Life, coping does not appear to mediate the relationship between these factors and thus the experimental hypothesis that coping mediates the relationship between illness cognitions, and psychological distress and health-related quality of life was therefore rejected.

5. Discussion

5.1 Research Hypotheses

The results of this empirical work are discussed in accordance with the research questions and Hypotheses that were posited at the study outset. Clinical implications of the findings are then outlined, followed by a critical look at methodology and consideration of the theoretical implications.

Hypothesis 1.1

Angioplasty patients will experience a significant decrease in anxiety and depression and a significant increase in health-related quality of life three month following PTCA.

The current study lent further support to the belief that angioplasty improves psychological as well as physical morbidity, with mean average psychological and quality of life outcomes at three months significantly improved on the HADS anxiety scale and the physical subscale of the SF36. A clinically significant difference was also evident for Anxiety as the sample mean average score dropped below the clinical threshold for caseness. Non-significant trends were found for mean Depression scores, although Depression scores remained well below the cut-off both at the two time points. Frequency of clinically significant morbidity also showed a substantial reduction between the time points, with Anxiety caseness falling from 51.5% to 23.8% and Depression caseness from 28.9% to 17.8% of the sample. These findings are not out of line with those obtained in other large non-clinical community populations, for example Crawford, Henry, Crombie & Taylor (2001) who indicated 33% and 11% for anxiety and depression, respectively,

although findings do suggest that angioplasty patients report slightly above average levels of Depressive symptomatology and below average Anxiety. Anxiety may be perceived and reported to be low, in relation to the high levels experienced at the time of angioplasty. Low mood however may be greater at three months post procedure because of an awareness of the threat and timing of restenosis.

Hypothesis 2.1

Illness cognitions will significantly associate with psychological distress and health-related quality of life at the time of angioplasty.

At the accepted and stringent significance level ($P=.01$), several IPQ components correlated with baseline Psychological and QoL functioning. Belief in the negative consequences of illness positively associated with Depression and Anxiety scores and negatively with Psychological QoL, which suggests that those individuals with more negative cognitions regarding the seriousness of their illness are also likely to experience poorer psychological status. The Cyclical-Timeline component did relate negatively to Anxiety but not with Depression or QoL measures, whilst the timeline acute/chronic and identity component showed no associations. These findings suggest that individuals who perceive their illness to have serious consequences tend to score low on adaptive and high on maladaptive outcomes as the Self regulation Model predicts, however perceptions of their illness as having a chronic timeline, and associated with multiple symptoms did not share the same relationship, in contrast to that hypothesised by the model and highlighted in recent meta-analysis (Leventhal et al, 1980; Hagger et al, 2003). This may represent an anomaly of the angioplasty population, where, despite the progressive and chronic nature of CHD, patients underestimate the threat to their health upon the basis of knowledge of the minimal

invasiveness of the PTCA procedure, although, this finding could also reflect the need for a larger sample to determine effect, especially given the cautious significance level employed.

Perceived control over treatment was linked to improved physical well-being but not Psychological Distress, whilst personal control over illness did not associate with any type of outcome measured. Whilst little research has been conducted upon cognitions of control in angioplasty, none has looked at the effect of control/self-efficacy upon psychological well-being, Perkins and Jenkins (1998) indicated that efficacy perceptions are often predictive of engagement in cardiac-protective behaviour and this may help to explain the relationship between treatment control and physical function. Investigations in other chronic illness populations have suggested the import of perceived control for psychological well-being, which was not replicated in this study. The lack of association between control and psychological status suggested that sensations of empowerment regarding the performance of coping behaviours or efficacy of treatment are not important for psychological status at the time of angioplasty. This is perhaps not surprising given it is probably the norm for patients, and especially those admitted as emergency cases, to feel some loss of control in the short-term. Distress may perhaps therefore be alleviated by the normalisation of patient response by nursing staff and through the observation of other patient reactions. Illness Coherence was however negatively associated with Anxiety, suggesting that if the illness is made sense of cognitively, this is related to less negative affect. Emotional responses to illness were also found to relate to improved scores on Anxiety and Depression, as well as psychological QoL measures.

So, whilst it may not be important psychologically to feel in control, findings suggest that a stronger overall meta-cognition regarding illness (illness coherence), emotional understanding, and lesser illness consequences are associated with better psychological status.

Hypothesis 2.2

Illness cognitions at the time of angioplasty will be significantly associated with psychological distress and health-related quality of life three months post-procedure.

The relationships between IPQ components and outcome measures at three months post procedure were found to be similar to those found at the baseline, although the perceived consequences appeared no longer to be related. Illness Coherence was associated negatively to Anxiety. The Timeline-Cyclical and Emotional Representations components showed a negative correlation with Psychological QoL and positive correlation to Anxiety. No components were found to relate to the Depression or Physical Health measures, indicating that a poor understanding of the illness, perceived cyclical nature of the disease and failure to produce an adaptive emotional response during hospital admission were associated with elevated anxiety or impaired psychological quality of life at three months. Perception of the course of illness as cyclical is perhaps quite expected given the threat of restenosis and likelihood of future cardiac intervention. However, this also suggests that this threat is considerable and psychologically debilitating.

Hypothesis 2.3

Coping strategies will significantly relate to psychological distress and health-related quality of life at the time of angioplasty.

Problem-Focused Coping was associated with affective response, relating negatively to Anxiety and Depression. Emotion-Focused Coping showed little association with outcome, whilst Maladaptive styles of response increased significantly in proportion to Anxiety and Depression and decreased in relation to the Psychological QoL. This could suggest that a proactive style when responding to the threat of illness or the procedure may buffer against psychological distress, whilst a maladaptive-type response increases psychological ill health.

Hypothesis 2.4

Coping strategies at the time of angioplasty will significantly relate to psychological distress and health-related quality of life three months post-procedure.

At three month follow-up, Emotion-Focused coping was again unrelated to psychological status, whilst Maladaptive Coping associated significantly with Anxiety and Depression and Problem-Focused coping related to Depression. Only non-significant trends were observed between the Maladaptive Coping and anxiety, and Quality of Life was not found to associate with any of the COPE dimensions. This could therefore also suggest that a Maladaptive style of coping at the time of angioplasty confers likelihood of later psychological difficulties, whilst a proactive response wards against low mood. This relationship will be discussed further below.

Hypothesis 3.1

Illness cognitions and coping will explain a significant proportion of the variance in psychological distress and health-related quality of life at the time of angioplasty.

Multiple regression analyses highlighted that together the correlating IPQ variables, namely: Consequences, Illness Coherence, Timeline-Cyclical and Emotional Representations in the case of the Psychological Distress (HADS Anxiety and Depression combined) and Consequences, Emotional Representations in the case of Psychological QoL (SF36 MCS) provided significantly predictive models, explaining 59% and 13% of variance, respectively. The variable of Emotional Representation was also strongly, independently predictive. These findings suggest that Illness Representations regarding the seriousness, overall sense and temporal nature of the illness, and especially emotional representations, may prove useful indicators of current psychological distress during the admission period for an angioplasty. A small amount of the statistical variance in the third, Physical QoL (SF36 PCS), regression model was explained by IPQ Treatment Control, which may therefore also serve to predict impaired physical status at the time of angioplasty. The addition of Coping variables; Problem-Focused and Maladaptive Coping in the first model and Maladaptive coping in the second, helped to increase the amount of variance explained, which also suggested that these variables may be useful predictors of aspects of psychological well-being. Whilst the regression models were significant, and in the case of Psychological Distress, explained a considerable amount of the variance, a proportion of the variance remained unexplained. It may be that unexamined factors played a contributory role and therefore require some future consideration.

The absence of an adequate social network is likely to have a large impact upon angioplasty patients and thus its inclusion may have added value to the current study. Whilst physical disability following angioplasty is often minimal, most patients will need some degree of physical support from family or friends if they are to continue in their normal functioning in the days following their procedure. Effective emotional support is also likely to be of great importance for patient recovery, because it enables patients to share and explore their personal experience, fears and expectations with others. Externalising cognitions and emotions in this way can facilitate positive adjustment and growth.

Hypothesis 3.2

Illness cognitions and coping will explain a significant proportion of the variance in psychological distress and health-related quality of life three months post-procedure.

Longitudinally, IPQ Timeline-Cyclical, Illness Coherence and Emotional Representations contributed to a significant model for overall Psychological Distress and Timeline-Cyclical and Emotional Representations produced a significant model for QoL (explaining 27% and 19%, respectively). Coping style did not add to the statistical model. This suggests that the same Illness Cognitions which are predictive of current Psychological Distress also are predictive of function at three months post-angioplasty, with the exception of the IPQ Consequences component which was found to no longer correlate with distress. This result is particularly important because it suggests that earlier functioning during hospitalisation could be used to identify those at greatest risk of psychological difficulty during the course of the recovery and adjustment to the angioplasty procedure. This may provide the opportunity for early intervention and thus could limit later psychological ill health, and

perhaps even the associated physical risks. The absence of a predictive role of Coping suggests that, above and beyond the contribution of the IPQ, Coping is not a significant and therefore useful indicator of psychological recovery.

Hypothesis 4.1

In line with the Self Regulation Model, coping will mediate the relationship between illness cognitions and psychological distress and health-related quality of life three months post-angioplasty.

Coping was not found to mediate, or even partially mediate, the relationship between Illness Representations and psychological outcome variables, contrary to the theoretical premises of the S.R.M. In support of this finding, a number of other studies have also presented equivocal results for the role of coping (Hiejmans, 1999; Moss-Morris, Petrie & Weinman, 1996; Scharloo, Kaptein, Weinman, Hazes, Willems, Bergman & Rooijmans, 1998). This body of evidence suggests that illness beliefs may in fact have a direct, rather than indirect, impact upon psychological wellbeing. If such a relationship is in existence, this would need to be accurately represented in models of health behaviour. Whilst, it may be helpful to continue to conceptualise illness cognition as occurring in the broader context of a self-regulatory process of human response and coping, the current study indicates that awareness and understanding of the direct and potentially harmful impact of patients' cognitive interpretations of their illness may need to be increased.

The absence of a mediating relationship, together with the evidence that Coping adds little to the value of Illness Cognition in the prediction of psychological well-being, suggests that coping should perhaps receive less empirical attention than is currently the case.

5.2 Post Hoc Analysis

A comparative post hoc analysis of the mean scores for each illness cognition factor over the two time points was also performed. T-tests indicated that five of the seven variables did not change statistically over time and that the Treatment Control and Timeline (acute/chronic) factors alone showed a significant increase (see Appendix 12.. These results therefore suggest that many illness cognitions do remain stable over the early months following an angioplasty procedure. Increased mean scores for Treatment Control however indicated improvements in patients' perceived sense of efficacy regarding their treatment. This may be due to the substantial symptom reduction that often follows a successful procedure. Whilst, perceptions relating to temporal course suggested that patients had increased perceptions of the likely duration of their illness. Such alterations could reflect the development of a more negative, although perhaps realistic, illness view at three months, perhaps as the result of increased patient awareness, and possibly the experience, of coronary restenosis.

5.3 Clinical Implications

The current study indicates that a substantial proportion of patients presenting for angioplasty experience considerable psychological distress during the period of admission. The implementation of routine psychological screening, either at the point of hospitalisation or, in the case of elective patients, when first presenting could facilitate the improved identification of those with mental health issues, enabling additional intervention to be targeted at these individuals. Incorporating psychological status as a dimension of the existing assessment process is also likely to help improve nursing and medical

practitioners' awareness of the general levels of psychological distress experienced by their client group and facilitate enhanced support of the presenting population as a whole.

The HADS measure may prove a useful screening tool in this endeavour, as it been subject to stringent testing and validation, and has the advantage over many other similar instruments in that it does not rely upon somatic sensations that could be confused with symptoms of illness. Clinical psychologists working in a healthcare setting are unlikely to be engaged in the individual screening, but could play an important role in the implementation and evaluation of this screening process and in the development of appropriate training and support mechanisms for other healthcare professions.

The literature suggests that angioplasty provides statistically and clinically significant psychological gains for many, however distress does persist in a proportion of the population. The recognition that particular sorts of illness cognition are associated with, and are in fact predictive of, psychological outcome represents perhaps the most important finding of the current study. Cognitions relating to the overall sense made of the illness, the perceived temporal nature of the illness (cyclical or non-cyclical) and the emotional response to illness were highlighted to be consistent predictors of well-being at the time of angioplasty and three months following. These factors may therefore provide a useful clinical indication of recovery. Level of symptoms (identity) reported however, were not found to relate to psychological or physical outcomes, and whilst intuitively symptom reporting may be used by healthcare staff, such as nursing practitioners, as a measure of difficulty, other types of cognition are perhaps of greater utility.

The development of measurement tools which tap these cognitions could enable early intervention, which in turn could enhance recovery. Research into the adaptation of illness perceptions is, to date, limited, however the work of Petrie et al. (2002), which applied an intervention to address inaccurate or unhelpful illness representations in M.I. patients, suggested that changes in beliefs regarding the timeline and cure/controllability of illness produced significant improvements in functional outcomes. Whilst the evidence is as yet limited and should be interpreted with caution, this could suggest that cognitive interventions have the potential to enhance recovery in angioplasty. Cognitive interventional work could be conducted by Clinical Psychologists, and perhaps other psychologically trained, and appropriately supervised, health care practitioners, both within the context of the pre-admission clinic and the cardiac ward setting.

Psychological work could perhaps usefully draw upon existing cognitive behavioural frameworks, given that such approaches are already being effectively utilised in many cardiac rehabilitation programmes with other cardiac groups. This approach would present opportunities to work with patient illness beliefs at varying cognitive levels (i.e. the level of: automatic thoughts, assumptions or more deeply held, core beliefs), and the exploration of more long-standing cognitions may prove particularly important within angioplasty given that recipients suffer from a chronic heart condition. Further research is undoubtedly needed in this potential area.

5.4 Critique of the research

5.4.1 Sample

A stratified, and thus representative sampling technique was not employed due to the additional resources this entailed. Efforts were made to achieve a sample, which included both emergency and elective route participants as well as those with comorbid illness and prior cardiac history, however several patients were too unwell or simply chose not to participate. The generalisability of the results may therefore be limited by the voluntary nature of the sample.

Attrition rates were also quite high due to the postal distribution of the second questionnaire (38.3%) and although comparisons highlighted no difference on demographic and QoL variables, responders were highlighted as being more likely to be male and less likely to have experienced prior cardiac events, previous revascularisation and comorbid illnesses. The baseline psychological function of responders, as compared to non-responders, also showed lesser distress and enhanced physical QoL. This suggests that the data collected at Time 2 was not representative of the original sample, and therefore even less likely to be representative of the actual angioplasty population. As this second sample appears to be less chronically unwell, positive recovery outcomes are in particular likely to be over-estimated. Additionally, whilst the numbers required by the power analysis were achieved, participants' full completion of the questionnaire battery was less than consistent. This was perhaps due to the combination of the length of the questionnaire battery, patients feeling physically unwell and the limited time in hospital. The amount of missing data that ensued presented a considerable drawback, limiting the rigour of the study, and may well have reduced the detection of small to moderate effects.

5.4.2 Theoretical premises

The Self Regulation Model has been successfully employed in many different illness populations and has shown promise in cardiac groups. However, research has also suggested the need to re-analyse the model's components when looking at a previously unstudied illness group (Heijmans, 1999; Turk et al, 1986). Contemporary research within the angioplasty population has also stressed the importance of such statistical exploration and validation, with findings from principal component analysis only providing partial corroboration of the SRM factor structures (Hirani et al, 2006). This research in particular highlighted the emergence of a self-image dimension, previously unconsidered and identified the need to consider self-image as a specific consequence of illness. The current study could have perhaps benefited from an exploratory analysis, which would have helped to determine the integrity of the SRM model in angioplasty.

Failure to account for the majority of variance also suggests that additional factors may be implicated in recovery from angioplasty. Leventhal et al.'s model (1980) acknowledged that beliefs are at least in part socially constructed, and thus further consideration of perceived availability and quality of social support might have added value to the study.

5.4.3 Measures

Measurement tools were selected upon the basis of their psychometric properties, face validity and theoretical underpinning. The IPQ-R was in particular chosen because it provided a succinct measure of principle dimensions of the S.R.M, and represented a recently well-validated tool, which had been shown efficacious in the prediction of health-

related behaviour and recovery from chronic disease. The additions of a cyclical timeline dimension, overall illness coherence component and a scale of emotional representation to this measure also appeared to build upon the preceding instrument, the IPQ. However, little research has as yet employed this new tool, which limited comparison with other studies, particularly across the new illness representation dimensions.

The measurement of coping has been heavily critiqued for failing to adequately operationalise the construct of coping and reliance upon post-hoc analysis. Whilst the COPE is derived from theory, the measure relies upon general statements regarding coping with illness and does not distinguish between the different aspects of functioning or illness that are coped with. It may be that participants are responding to quite different stressors, for example pain and impaired social function. As stated previously, it may also be that habitual or emotional coping strategies are less amenable to conscious reflection and thus unlikely to be elicited by a quantitative self-report questionnaire.

Poor levels of internal consistency were also found for many of the subscales of the COPE, suggesting that in this study there was a lack of convergence of the component questions onto the factors theoretically proposed. Use of the supra-ordinate scales (maladaptive, problem-, and emotion-focused) improved the internal reliability of the measure and reduced the numerous variables under scrutiny, however the authors of the COPE have cautioned about the use of such summary scales without the validation via exploratory factor analysis. A principal component factor analysis was completed for the data post hoc, which showed some support for the factor structure, although produced a four factor solution (see Appendix 13.). Many of the components of problem-focused coping loaded onto the first factor, and the second factor appeared to be much in keeping with that of

maladaptive coping. However, emotion-focused coping elements loaded between these two factors. This may help to explain the absence of an association between emotion-focused coping and psychological outcome.

Consideration should also be given to the choice to use generic, as opposed to illness-specific measures of function and well-being. Research has suggested that specific measures have greater differentiation properties, and Schroter & Lamping (2001) indicated in revascularisation patients that one specific measure, the Coronary Revascularisation Outcome Questionnaire, was significantly more responsive than the illness-generic SF36 instrument, three months post-revascularisation. The use of generic measures in the current study may therefore have limited the detection of any smaller effects which were present.

As stated previously, measures of social support were excluded for reasons of brevity. The addition of a measure of social support however could have yielded a study with a greater holistic understanding of patient response and recovery to angioplasty. It is likely that the absence of such measures in the current study, and in previous studies within the literature, constitutes a significant omission, which future research should seek remedy.

The timing of administration of the illness belief measure may also have undermined the rigour of the results, as the context in which illness beliefs are elicited has been reported to be of considerable importance. Hirani et al. (2006) indicated that administration shortly before cardiac intervention may introduce uncertainty into the strength of belief, and thus strength of cognitions would vary across time. Application of the IPQ questionnaire, which spanned shortly before or shortly following the procedure, represented a failure to narrow and standardise the timing of completion and may have introduced an uncontrolled and potentially confounding variable into the study, masking true results.

5.5 Future Work

It would be useful to further explore the role of coping and illness cognition in a larger, more representative angioplasty sample. This replication would help to ensure that any small effects were properly detected and would allow verification of the relationships reported in this study. Multiple follow-up beyond three months would enable the monitoring of outcomes, illness cognition and coping over the course of recovery. Potential changes in the relationships between these variables could be tracked and longer-term maintenance of recovery examined. Attrition rates in future samples could also be improved by face-to-face contact with participants at follow-up, rather than reliance upon postal distribution.

Further theoretical and empirical work is needed to help differentiate and operationalise coping responses. A better understanding of types of coping and the process by which coping strategies are employed would enable further exploration of patient response to the health threat of angioplasty. The construct of coping may also be better investigated using a qualitative approach, which would perhaps facilitate the elicitation of more habitual, emotional (and thus less amenable to conscious inspection) coping strategies.

In the current study, illness perceptions and coping were found to explain a considerable amount of the variance in psychological outcome, however a significant proportion (49%) was not accounted for. This suggests that there are other, as yet unexplored, factors which future research should seek to identify and explore. Whilst the literature regarding the impact of social support in angioplasty is sparse, the available findings do suggest that the perceived social support may be an important factor for recovery. The SRM acknowledges

the importance of social context in the development of illness beliefs and the addition, therefore, of measures which tap perceived availability and quality of social resources could improve the predictive value of future statistical models. Research in this area is much needed.

6. Conclusion

Whilst acknowledging the methodological limitations, the current study was the first to address the relationship of both illness beliefs and coping to outcome in angioplasty patients. It benefited from a far too infrequently encountered prospective, longitudinal and multivariate research design. The research demonstrated the general utility of the Self Regulation Model (S.R.M) in predicting outcome; indicating that illness beliefs were predictive of psychological adaptation in the early months post-angioplasty. In particular, perceptions of the cardiac illness as incoherent and cyclical, together with an elevated degree of emotional illness representation, were found to confer poorer psychological prognosis. As hypothesised, coping also associated with recovery, however coping was not found to mediate the relationship between illness representations and psychological outcome, nor added much predictive value above and beyond that of the illness representations. The current research therefore indicated that illness beliefs may prove to be particularly useful clinical indicators of psychological recovery.

Unlike more enduring personality, demographic and biological variables, illness cognitions and coping are the result of psychological processes which are by their very nature fluid, dynamic and occur within a situational context. These factors, arguably therefore have a greater potential for change and thus may prove an important focus for interventions in the future which seek to enhance psychological recovery in angioplasty.

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Section C: Critical Appraisal

1. Background

The ideas for the current research study were initially borne out of an anecdotal awareness of the high levels of comorbid physical and psychological illness with which clients present in mental health settings. Through my clinical work, I developed a basic appreciation of the complex and bi-directional relationship of these aspects of health, and the impact of their combined effect upon well-being. In particular my interest turned towards the impact of psychological variables in the recovery from chronic illness and the potential role of clinical psychological interventions in this field.

Reading in the area of health psychology enhanced my awareness of the range of psychological models currently employed, and introduced me to the principles of self-regulation in the cognitive appraisal and initiation of coping response to the threat of illness. I became cognisant of the growth of efficacious interventions in cardiac disease, and in particular the national commitment to increasing access to life-changing revascularisation procedures. Despite a recent proliferation of research into the psychological recovery and rehabilitation of various cardiac groups, a literature review revealed a gap in empirical investigation for the angioplasty population, which was surprising given the unique characteristics of this non-surgical procedure.

2. Conducting the Research

Contact in the first instance was undertaken with a nurse specialising in the preadmission clinic for elective angioplasty patients at the Manchester Heart Centre, an institution renowned for its quality of research and care. We discussed many issues relating to

angioplasty, including: what the procedure entailed, typical patient pathways, annual procedure rates, success rates, and the range of patient difficulties characteristically observed. The general responses I received to the planned psychological focus of the study was very positive, which in turn I found enthusing. Discussions were then initiated with one of the Centre's Consultant Cardiologists, the Lead Research and Development Nurse and the Head of Nursing. Once initial agreements for the study had been given, time was spent discussing the academic and clinical requirements and responsibilities for the project.

A detailed research proposal was developed to outline the research aims, hypotheses and methodological design. This document was circulated for comment and iterated according to the feedback of those involved. Once the details had been finalised, a formal ethical submission was made to the appropriate Local Ethics Committee. This process was quite time consuming and at times seemed pedantic and ultimately disheartening. However, encouragingly my presentation of the study rationale at the research ethics meeting appeared to meet with an interested and favourable response from the committee, and following the correction of a few minor amendments ethical approval was granted. An honorary contract was obtained with the host Trust and responsibilities such as indemnity agreed between the host Trust, my employing Trust and the University.

Once approval was granted from the Research and Development department of the research site, data collection was commenced (November 2005). The recruitment of participants was a particularly successful stage of this research project and, whilst quite time intensive, the first round of data was collected over a relatively short period of time (six weeks). This process was probably facilitated by the research culture of the host medical institution, which appeared to possess the inherent expectation that staff and patients would be

supportive of research. Discussing the research design with staff, incorporating staff suggestions, making explicit the current gap in research and highlighting the potential clinical implications also helped to foster staff support and enthusiasm. Listening to the experience and ideas of clinical staff additionally ensured that the project had relevance and was accessible. The project was set up in a manner that sought to place minimal demand on the involved staff members and I ensured I was present at least twice weekly to carry out a significant proportion of the data collection. My presence provided additional opportunities to discuss arising difficulties or concerns with those staff members involved.

Whilst an emphasis on research activity at the site was beneficial to the sample's attainment, the co-ordination of various projects across the same wards presented a few difficulties. To ensure patients were not concomitantly involved in several projects, ongoing communication regarding availability to participate was necessary.

On a pragmatic level, the geographical distance of the research site proved quite tiring and time consuming to get to, and this did encroach into the finite research time I had available to complete the project. I however felt that this was an appropriate cost to bear given the value that the supportive approach of the Institution and staff members conferred. Effective time management was therefore of vital importance throughout the course of this research and every effort was made to thoroughly plan and effectively implement each phase of the research process to ensure it remained as problem-free as possible.

Regular supervision was planned and sought throughout the course of this project, to ensure that the research remained on track, and this enabled the discussion of key research, theoretical and pragmatic issues as they arose over the course of the project. The use of

Gant charts also proved particularly useful as it served as a strong visual reminder of the planned stages and actual progress achieved, and I would look to employ this tool in future projects I am involved in.

I found the actual data collection stage of this research a particularly challenging process because it involved substantial face-to-face contact with patients experiencing a chronic and life threatening physical health condition. Many of the patients I approached to take part were physically unwell and/or emotionally distressed, and whilst very well cared for by the hospital staff, often appeared frightened and confused. As a result, I found this both distressing and draining and also felt limited in my role as an external researcher. I was mindful of not wanting to cause patients any additional distress or concerns during the research and also often spent small amounts of time with patients discussing their experience of hospitalisation and their heart disease. However, I often felt that clients were not receiving as much psychological support as would perhaps have been desirable and in some way wished I could have offered more time and more of myself in the role of Clinical Psychologist.

Whilst much of the research process (beyond data collection) was completed in isolation, which I found necessary for the maintenance of productivity and focus, the support of my peers was invaluable. Sharing my research-related experiences, struggles and exasperations with a subgroup of my cohort helped to normalise the experience and provided a much needed boost to morale at the more difficult times. This also ensured that collective knowledge was shared and that I learnt from the experiences of others.

3. Learning Outcomes

This research project has enabled me to expand my existing research and academic skills, and has enhanced my knowledge in a number of areas. Specifically, I believe that this opportunity has helped me to develop:

- A greater appreciation of the research process and the importance of eliciting the necessary support for success. This study has enabled me to develop an improved understanding of the different phases of research, and in particular the importance of careful planning and an attention to detail. Through this experience I have honed my communication skills and have been able to sensitively and effectively negotiate with key stakeholders. This has ensured that the research project has been well supported and that the research retained its relevance to the clinical setting.
- Improved understanding of the power of a good research design, and particularly the benefits of a longitudinal, prospective, non-correlational methodological design in the investigation of theorised, causal relationships.
- Improved capabilities for multivariate statistics, re-familiarisation with appropriate statistical software and tests, and introduction to the process and function of mediator analyses.
- Further appreciation of both my own strengths and limitations, and the importance of eliciting and effectively using the support of others. Specifically, my experience

highlighted the salience of a good relationship with a supervisor and the advantage of utilising supervision effectively, and in a timely manner.

- Awareness of the literature relating to psychological sequelae in cardiac illness, and angioplasty specifically, and a general appreciation of the potential role of cognition in psychological adaptation to the threat of chronic illness.
- Increased understanding of the multiple demands placed upon clinical staff in a healthcare setting and the time-squeeze experienced, and, in relation to this, the importance of developing research which is both flexible and sensitive to these factors.
- An enhanced appreciation of the psychological impact of chronic illness upon patients, their families and carers. I have come to recognise that, whilst high standards of professionalism and quality are paramount in research, perhaps the most important skill a researcher can foster in a healthcare setting is an empathic approach which is sensitive to the patient and their experience.

Appendix

Appendix 1. British Journal of Health Psychology submission guidelines

British Journal of Health Psychology

Notes for Contributors

The aim of the British Journal of Health Psychology is to provide a forum for high quality research relating to health and illness. The scope of the journal includes all areas of health psychology across the life span, ranging from experimental and clinical research on aetiology and the management of acute and chronic illness, responses to ill-health, screening and medical procedures, to research on health behaviour and psychological aspects of prevention. Research carried out at the individual, group and community levels is welcome, and submissions concerning clinical applications and interventions are particularly encouraged.

The following types of paper are invited:

papers reporting original empirical investigations;

theoretical papers which may be analyses or commentaries on established theories in health psychology, or presentations of theoretical innovations;

review papers, which should aim to provide systematic overviews, evaluations and interpretations of research in a given field of health psychology;

methodological papers dealing with methodological issues of particular relevance to health psychology.

1. Circulation - The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length - Papers should normally be no more than 5,000 words, although the Editor retains discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length.

3. Reviewing - The journal operates a policy of anonymous peer review. Papers will normally be scrutinised and commented on by at least two independent expert referees (in addition to the Editor) although the Editor may process a paper at his or her discretion. The referees will not be aware of the identity of the author. All information about authorship including personal acknowledgements and institutional affiliations should be confined to the title page (and the text should be free of such clues as identifiable self-citations e.g. 'In our earlier work...').


4. Manuscript requirements

Contributions must be typed in double spacing with wide margins. All sheets must be numbered.

Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript with their approximate locations indicated in the text.

Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate page. The resolution of digital images must be at least 300 dpi.

For articles containing original scientific research, a structured abstract of up to 250 words should be included with the headings: Objectives, Design, Methods, Results, Conclusions. Review articles should use these headings: Purpose,

Methods, Results, Conclusions -  [British Journal of Health Psychology - Structured Abstracts Information](#)

For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full.


SI units must be used for all measurements, rounded off to practical values if appropriate, with the Imperial equivalent in parentheses.

In normal circumstances, effect size should be incorporated.

Authors are requested to avoid the use of sexist language.

Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations etc for which they do not own copyright.

For guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association, Washington DC, USA (<http://www.apastyle.org>).

5. Publication ethics Code of Conduct -  [Code of Conduct, Ethical Principles and Guidelines](#)

Principles of Publishing -  [Principle of Publishing](#)

6. Supplementary data - Supplementary data too extensive for publication may be deposited with the British Library Document Supply Centre. Such material includes numerical data, computer programs, fuller details of case studies and experimental techniques. The material should be submitted to the Editor together with the article, for simultaneous refereeing.

7. Post acceptance - PDF page proofs are sent to authors via email for correction of print but not for rewriting or the introduction of new material. Authors will be provided with a PDF file of their article prior to publication for easy and cost-effective dissemination to colleagues.

8. Copyright - To protect authors and journals against unauthorised reproduction of articles, The British Psychological Society requires copyright to be assigned to itself as publisher, on the express condition that authors may use their own material at any time without permission. On acceptance of a paper submitted to a journal, authors will be requested to sign an appropriate assignment of copyright form.

9. Checklist of requirements

Abstract (100-200 words)

Title page (include title, authors' names, affiliations, full contact details)

Full article text (double-spaced with numbered pages and anonymised)

References (APA style). Authors are responsible for bibliographic accuracy and must check every reference in the manuscript and proofread again in the page proof.

Appendix 2. Summary data for reviewed articles

Authors	Journal	Design	Sample	Factors	Timescale
Appels, Kop, Bär, De Swart, & Mendes de Leon (1995)	European Heart Journal	Quantitative, prospective	105 PTCA (0% female) (mean age 54.8) Excluded: comorbidity, over 71y.	Vital Exhaustion (Maastricht questionnaire) Further cardiac event	Pre-PTCA, 2 weeks post 1 ½ years post
Astin, Jones, & Thompson (2005)	Heart & Lung	Quantitative, prospective	140 first time, elective PTCA (25% female) Excluded: comorbidity	Anxiety (STAI) and Depression (Cardiac Depression Scale)	Pre- PTCA, 6-8 weeks post, 6-8 months post
Billey & Ferrans (1993)	Heart & Lung	Quantitative, prospective	40 PTCA	Health-related quality of life (QLI)	Pre-PTCA (night before) 4-6 weeks post
Bosworth, Feaganes, Vitaliano, Mark, & Siegler (2001)	Journal of Behavioural Medicine	Quantitative, retrospective	129 (of 392 invited) PTCA Excluded: below high school education	Personality (NEO Five Factor Inventory) Coping (Ways of Coping Checklist)	31/2 years post
Burton, Kline, Cooper, Rabinowitz & Dodek (2003)	General Hospital Psychiatry	Quantitative, prospective	190 elective PTCA (28 % female)	Depression (DIS -two item subset) Seattle Angina Questionnaire Health-related QoL (SF36)	Pre-PTCA 6 months post
Carroll (2005)	Progress in Cardiovascular Nursing	Quantitative, prospective	40 Percutaneous Coronary Intervention (36 PTCA with stent, 1 non stent, 3 rotoblation) (female 32.5%) (mean age 63 years)	Attention and memory (Wechsler Memory)	During hospitalisation and 6 weeks post.
Cleary, Epstein, Oster & Morrissey (1991)	Medical Care	Qualitative, prospective & retrospective. Randomised to experimental (anti-platelet) or control group (aspirin)	496 (of a larger sample of 1200)	Health-related quality of life Cardiac morbidity and mortality (2 x interview)	48 hours post 1 month post

Cronqvist, Wredling, Nordlander, Langius & Bjorvell (2000)	Coronary Health Care	Quantitative, prospective	56 (79 consecutively sampled). First, PTCA.	Coping (Jaloweic Coping Scale), Sense of Coherence Scale	Pre-PTCA 1 month post
Van Domburg, Pedersen, Brand & Erdman (2001)	Journal of Psychosomatic Research	Quantitative, longitudinal	356 randomly selected, first-time, elective PTCA (23% female)	Heart Patients Psychological Questionnaire	1-2 years post 10 years post
Echteld, van Eideren & van der Kamp (2001)	Quality of Life Research	Quantitative, cross sectional	122 elective, first-time PTCA (20% female) Excluded: 65+ years comorbidity	Health-related QoL (QLI) Chest pain Stress perception, coping (Leiden Coping Questionnaire for Heart Disease), social support	1-3 months pre-procedure.
Echteld, van Eideren & van der Kamp (2003)	Annals of Behavioral Medicine	Quantitative, prospective	234 elective PTCA at T1, 158 at T2,	Positive and Negative Affect Scale, HRQoL (QLI), coping (Leiden Coping Questionnaire) Optimism	Pre -PTCA 3 months post
Edell-Gustafson & Hetta (2001)	Issues and Innovations in Nursing Practice	Quantitative, retrospective	91 PTCA sampled 1 year post (23% female) (mean age 62.7)	Anxiety (STAI), Depression (Zungs Self-rating Scale) and sleep (Uppsala Sleep Inventory)	1 year post
Englehart (1993)	Canadian Journal of Cardiovascular Nursing	Qualitative, prospective	40 PTCA convenience sampled Excluded: history of CABG (17.5% female)	life satisfaction, retrospective and current perceptions of health status and symptoms. Prior expectations and current satisfaction with outcome. Measures of functional capacity and angina.	Pre-PTCA 6 months post
Faris & Stotts (1990)	Progress in Cardiovascular Nursing	Quantitative, prospective	20 elective PTCA (15% female)	QoL (QLI), anxiety (STAI) and physical function	Pre-PTCA Six weeks post

Gulanick & Naito (1994)	American Journal of Critical care	Quantitative, with a few qualitative questions, prospective	54, first time PTCA (31% female)	Self report of Recovery Questionnaire Anxiety/tensions subscales (POMS)	During admission, 1, 6 and 12 weeks post.
Gulanick, Nliley, Perino & Keough (1998)	Heart & Lung	Qualitative focus groups (x7)	45 first time and repeat PTCA, purposively sampled 3-18 months post. (42% female, 42% attended rehab)	Reactions to health risk reduction behaviours, barriers and facilitators to change	Focus group 3-18 months post.
Gaw (1992)	DCCN	Qualitative, prospective	14 elective, PTCA	Motivation to change lifestyle and known cardiac risk factors	Evening pre-PTCA Few hours post 2-3 weeks post
Helgesen (1999;2003)	Health Psychology	Quantitative, prospective	298 elective and emergency at T1, 248 at T2 (1-2 days post) (mean age 57 years) (50% female) Excluded: comorbidity, psychiatric admission	Optimism (Life Orientation Test), self esteem (Rosenberg SE Scale), self efficacy (Mastery Scale). Index of well-being, SF36, life satisfaction and social support (UCLA social support inventory)	Interviews 1-2 days post, 6 months post & 12 months post. Questionnaire 2,3 & 4 years post.
Higgins, Dunn & Theobald (2000;2001)	Australian Coronary Care	Qualitative, retrospective	11 PTCA (30% women)	Semi structured interviews, patient perception of preparing and recovering from angioplasty	Interview 1 month post
Hlatky, Boothroyd, Melsop, Brooks, Mark & Pitt (2004)	Circulation	Quantitative, long term prospective comparison of PTCA and CABG	934 Revasc.	Mental health (RAND) Economic measure	Annual assessment up to 10 years post
Kattainen, Sintonen, Kettunen & Merilainen (2005)	Journal of Technology Assessment in Health Care	Quantitative, prospective	615 elective CABG and PTCA (n=183). (33% female)	HRQoL (15D)	Pre-PTCA 6 Months post 1 year post
Kimble (1998)	Western Journal of Nursing Research	Quantitative, prospective	74 PTCA (21% female) (mean age 62 years)	Optimism (LOT) Treatment appraisal scale developed, Mood (POMS), cardiac-related risk behaviours.	24 hours pre-PTCA, am of discharge, 2 weeks post, monthly.

Kop, Appels, Mendes de Leon, De Swart & Bar (1994)	Psychosomatic Medicine	Quantitative, prospective	127 PTCA	V.E	Not discernable
Lenzen, Gamel & Immink (2002)	European Journal of Cardiovascular Nursing	Quantitative with qualitative components	46 first-time elective PTCA, 40 repeat elective PTCA. (29% female)	Mental health (HADS), Heart patients psychological questionnaire, visual analogue scale for anxiety.	Pre-PTCA after preparatory information. 5 semi structured interviews post
Mckenna, McEniery, Maas, Aroney, Bett, Cameron et al (1992)	Catheterization & Cardiovascular Diagnosis	Quantitative, prospective	102 elective, first-time PTCA Excluded: prior CABG, comorbidity	Life satisfaction, psychological wellness (GHQ), angular status and exercise capacity.	1 day pre 6-8 weeks post For 50 participants 6-12 months post
Papadantonaki, Stotts & Paul (1994)	Heart & Lung	Quantitative, comparative	44 elective CABG, 32 elective PTCA	QoL (GLI) Mental health (POMS)	Pre-PTCA 3 months post
Pederson & Middel (2001)	Journal of Psychosomatic Research	Quantitative, prospective	171 scheduled for CABG, PTCA or conservative pharmacological treatment recruited post angiography Excluded: comorbidity, 75 year +	Angina (New York Heart Association Classification scale)	Pre-procedure 6-14 weeks post
Perkins & Jenkins (1998)	Heart & Lung	Quantitative, prospective	90 PTCA (21% female) (71% first procedure) (78% electives)	Mental health (POMS), Self efficacy (Jenkins Self Efficacy Expectation Scale) Activity checklists	Pre-PTCA 6 months post
Pocock, Henderson, Clayton, Lyman & Chamberlain (2000)	Journal of the American College of Cardiology	Quantitative, prospective. comparative, randomised	1018 revascularisation/ Pharmacological (504 PTCA)	HRQoL (SF36) Exercise test Symptom status	3 months post 1 year post 3 years post
Rinfret, Grines, Cosgrove, Ho, Cox, Brodie et al. (2001)	Journal of the American College of Cardiology	Quantitative, prospective, comparative, randomised	503 post MI, PTCA, randomised to stent or no stent	HRQoL (SF36) Angina (Seattle Angina Questionnaire)	1 month post 6 months post 1 year post
Shaw, Cohen, Fishman-Rosen & Murphy (1986)	Psychosomatic Medicine	Quantitative, prospective	97 (78 at 6 months)	Cardiac information provision, coping, mood state (POMS and STAI)	Pre PTCA 6 months post

Skaggs & Yates (1999)	Heart & Lung	Quantitative & qualitative, prospective, comparative	36 PTCA, 28 CSBG	QoL (QLI) Expected benefits	Whilst hospitalised post PTCA 3 months post
Straus, Fortin, Hartigan, Folland, & Parisi (1995)	Circulation	Quantitative, prospective, comparative, randomised	Pharmacological & PTCA (105), control (88)	Psychological and physical health (McMaster Health Index) Exercise test	Pre-PTCA 1 month post
Tooth, McKenna & Maas (1999)	Heart & Lung	Quantitative, prospective, interventional. Randomly assigned to pre-procedure educational programme or TAU	130 elective PTCA (16% female)	Psychological status (GHQ) Cardiac symptoms and daily living status	2 days pre-PTCA 3-6 months post 9-12 months post
Wahrborg (1999)	European Heart Journal	Quantitative, prospective, comparative, randomised, multinational trial	154 PTCA or CABG Excluded: recent MI	HRQoL (Nottingham Health Profile)	Pre-PTCA 1 year post
Weintraub, Mauldin, Becker, Kosinski, & King (1995)	Circulation	Quantitative, prospective, comparative, randomised,		Measures of cost, mortality and morbidity. QoL (unspecified)	Pre-PTCA Every 6 months up to 3 years post
White & Frasure-Smith (1995)	Heart & Lung	Quantitative, prospective, comparative	22 elective, first-time PTCA, 25 CABG (0% females) Excludes: comorbidity	Mischel Uncertainty in illness, GHQ, social support.	1 month post 3 months post

Appendix 3. Ethical agreement

05/Q1403/131



South Manchester Research Ethics Committee

1st Floor, Room 181
Gateway House
Piccadilly South
Manchester
M60 7LP

Telephone: 0161 237 2268
Facsimile: 0161 237 2383

Mrs Lisa Benn
Trainee Clinical Psychologist
Leicester University
Clinical psychology section, University of Leicester
104 Regent Road, Leicester
LE1 7LT

14 June 2005

Dear Mrs Benn

Full title of study: Illness representations, coping and well-being in
angloplasty patients
REC reference number: 05/Q1403/131

The Research Ethics Committee reviewed the above application at the meeting held on 09 June 2005.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research, subject to the following minor amendments, on the basis described in the application form, protocol and supporting documentation.

In the Patient Information Sheet

- a) Section 6 on page 1 is too long and could benefit from being broken into smaller paragraphs (eg after GP in line 4; after 'assist you' in line 10)
Typos - 2nd line 'participating' should be amended to 'part'
 - 10th line '3-6 months' should be amended to '3-4 months'
 - 11th line 'pots' amended to 'post'
 - 13th line 'chose' to 'choose'
- b) Section 10, page 2 – you should use the standard wording available on the COREC website
[www.corec.org.uk/applicants/help/docs/Guidance on Patient Information Sheets and Consent Forms.doc](http://www.corec.org.uk/applicants/help/docs/Guidance_on_Patient_Information_Sheets_and_Consent_Forms.doc)

Please forward a copy of the amended Patient Information sheet to the Committee as soon as possible.

The favourable opinion applies to the research sites listed on the attached form. Confirmation of approval for other sites listed in the application will be issued as soon as local assessors have confirmed they have no objection.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

An advisory committee to Greater Manchester Strategic Health Authority

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Application	4.1	09 May 2005
Investigator CV Lisa Benn		(None Specified)
Investigator CV Dr L McGowan		(None Specified)
Investigator CV Dr Noelle Robertson		(None Specified)
Protocol	1.1	01 April 2005
Covering Letter		16 May 2005
Letter from Sponsor		17 May 2005
Statistician Comments		(None Specified)
Copy of Questionnaire	1	(None Specified)
GP/Consultant Information Sheets	1.1	01 April 2005
Participant Information Sheet	1.1	01 April 2005
Participant Consent Form	1.1	01 April 2005
R & D Approval		13 May 2005

Management approval

The study should not commence at any NHS site until the local Principal Investigator has obtained final management approval from the R&D Department for the relevant NHS care organisation.

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

Notification of other bodies

The Committee Administrator will notify the research sponsor and the R&D Department for NHS care organisation(s) that the study has a favourable ethical opinion.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

REC Reference: 05/Q1403/131 - Please quote this number on all correspondence

With the Committee's best wishes for the success of this project,

Yours sincerely

C. Carter

PP Dr Phillip Haji-Michael
Chair

Email: cynthia.carter@gmscha.nhs.uk

Enclosures: Attendance at Committee meeting on 09 June 2005
Standard approval conditions
Site approval form (SF1)

An advisory committee to Greater Manchester Strategic Health Authority

Patient Information Sheet

You are invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask us anything that is not clear or if you would like more information. Then take time to decide whether or not you wish to take part. Thank you.

1. Study Title:

Illness Beliefs and Coping Styles in Angioplasty Patients

2. What is the purpose of the study?

This study aims to look at whether the types of beliefs patients hold about their cardiac illness and the particular coping styles they use, shortly following an angioplasty, contribute to different aspects of their wellbeing several months later. The results of this study could help enhance the effectiveness of the education and support given to patients before, during and following their angioplasty procedure.

3. Who is organising the study?

Mrs Lisa Benn, a Clinical Psychologist in training at the University of Leicester is carrying out the study in conjunction with the Manchester Heart Centre.

4. Why have I been chosen?

Many patients who have undergone a successful angioplasty procedure at the Manchester Heart Centre, and are over the age of sixteen, will be asked to participate. Approximately 200 patients will be participating in this study.

5. Do I have to take part?

It is up to you to decide whether or not to take part, as this study is entirely voluntary. If you do decide you would like to participate you are also still free to withdraw at any time without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

6. What will happen if I take part?

If you decide to take part in the study you will be firstly asked to sign a consent form. This is simply to keep a record that shows that you have given your permission to take part in the study. A brief letter stating you are taking part will also be sent with your permission to your GP.

You will then be given a questionnaire to fill out, which will take approximately 30 minutes to complete. The questionnaire will ask for a few details about you and your health, it will also ask about what you think about your health, the ways in which you cope and your level of well-being. Once you have filled in the questionnaire the researcher will collect it from you. Alternatively, if you wish, you can fill in the questionnaire later and return it to a member of the nursing team. If you have any questions or problems you can ask/contact the researcher who will be able to assist you.

3-4 months later a second, similar questionnaire will be sent through the post to your home address for you to complete. Again, you are under no obligation to continue participating and can withdraw from the study if you wish to do so. If you choose to complete this questionnaire, you can return it to the researcher using the stamped addressed envelope provided.

7. What will happen if I do not want to take part?

If you do not wish to participate in this study, or if you wish to withdraw at any time, you may do so without giving a reason for your decision and in no way will your medical care or legal rights be affected.

8. What are the possible disadvantages to taking part?

It is possible that thinking about how you feel about your health and wellbeing could cause you to feel distressed. If so please tell the researcher or a member of staff so we can help.

9. What are the possible benefits of taking part?

This study aims to better inform the support and information angioplasty patients receive before and after their procedure, in order to improve patient recovery and well-being. Filling in the questionnaires may also give you the opportunity to think and express how you feel about your health and the procedure, which some people may find useful.

10. What if something goes wrong?

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, then you may have grounds for a legal action but you may have to pay for it. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms should be available to you.

11. Complaints

If you wish to make a complaint about anything to do with this study please contact:

Dr Noelle Robertson, - Consultant Clinical Psychologist/ Senior Lecturer
University of Leicester,
104 Regent Road, Leicester, LE1 7LT

Telephone: *****

12. Confidentiality

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which leaves the hospital will have your name and other identifiable details removed so that you cannot be recognised from it. Outside of the hospital only your GP will be informed that you are participating.

13. Ethical approval

This study was granted ethical approval by South Manchester Research Ethics Committee on 9th June 2005.

14. What will happen with the results of the study?

The result of this study are likely to be published in a national clinical journal to ensure that the knowledge gained from completing this research study can be shared and used to help develop improved services for patients. However, as stated above, all your personal information is kept strictly confidential and any information presented will be anonymous.

15. Who should I contact for further information or assistance?

Mrs Lisa Benn - Chief Investigator, Clinical Psychologist in training.
University of Leicester, 104 Regent Road
Leicester, LE1 7LT

Telephone: *****

Thank you for your time.

Patient Consent Form

This form should be read in conjunction with the Patient Information Leaflet (version 1.1)

Title of study: Illness beliefs and coping styles in angioplasty patients

Chief Investigator: Mrs Lisa Benn – Trainee Clinical Psychologist

Supervisor: Dr Noelle Robertson – Consultant Clinical Psychologist

1. I confirm that I have read and understood the informati
on sheet dated 01.04.2005
(version 1.1) for the above study and have had the opportunity to ask questions.

Please initial box
☐
2. I understand that my participation is voluntary and that I am free to withdraw at any
time, without giving any reason, without my medical care or legal rights being affected.

☐
3. I understand that sections of my medical notes may be looked by the researchers where
it is relevant to taking part in the above study. I give permission for these individuals to
have access to my records.

☐
4.
understand that my General Practitioner will be informed of my participation in
this study

I ☐
5. I agree to take part in the above study.

☐

To be completed by the Patient

Name (Block Capitals)

Signature..... **Date**.....

Thank you

To be completed by Researcher

Name of Person taking consent

Signature..... **Date**.....

Appendix 6. G.P. letter

Lisa Benn,
Clinical Psychologist in Training
Clinical Psychology Section
University of Leicester
104 Regent Rd
Leicester, LE1 7LT
10/1/2006

Dear Dr

Re:

I am writing to inform you that the above patient has agreed to participate in our research study
'Illness beliefs and coping styles in angioplasty patients'.

This study aims to look at whether the types of beliefs patients hold about their cardiac illness and the particular coping styles they use, shortly following an angioplasty, contribute to different aspects of their wellbeing several months later. The results of this study could help enhance the effectiveness of the education and support given to patients before and following their angioplasty procedure.

Who is organising the study?

Mrs Lisa Benn, a trainee clinical Psychologist at the University of Leicester is carrying out the study in conjunction with the Manchester Heart Centre. She is supervised by Dr Noelle Robertson, consultant Clinical Psychologist & Senior lecturer, University of Leicester.

What does it involve?

Whilst in hospital following the angioplasty procedure, patients will be given an information sheet explaining what the study involves, the voluntary nature of participation, issues of confidentiality, anonymity and how to make a complaint. Following agreement to participate, patients will complete a consent form. They will then be provided with a questionnaire which will take approximately 30 minutes to complete. A researcher will be on hand to assist with any questions or difficulties. The questionnaire will ask for brief information upon the patient's: illness severity and history, beliefs about their illness, coping styles and psychological and health-related wellbeing. 3-4 months later the same questionnaire will be then sent to the patient to complete at home, the researchers contact details will be supplied to help with any queries and a stamped addressed envelope will be provided for the questionnaires return.

If you have concerns regarding this patient's participation in this study or would like to discuss anything further please do not hesitate to contact me.

Yours sincerely

Mrs Lisa Benn – Trainee Clinical Psychologist

~~Questionnaire 1~~

Participant No.
Date

PARTICIPANT QUESTIONNAIRE

Patient Information

1. Name _____ 2. Date of Birth ____/____/____

3. Address _____

4. Gender (tick one) Male ☐ Female ☐

5. Ethnicity _____

6. G.P Name & Address (if known) _____

7. Employment status (tick one) Employed ☐ Unemployed ☐ Retired ☐

8. Marital status (tick one) Single ☐ Married/cohabiting ☐ Widowed ☐

9. Have you experienced previous cardiac events, eg. heart attack? (tick one)
Yes ☐ No ☐

10a. Before this angioplasty, have you ever undergone any other cardiac surgical or
medical procedures, eg. angioplasty, bypass surgery? (tick one) Yes ☐ No ☐

10b. If yes which, how many and when? _____

11a. Do you have any other illnesses that significantly impact upon your life? (tick one)
Yes ☐ No ☐

11b. If yes which? _____

12. Have you ever suffered any mental health/psychological problems for which you have
received professional help? (tick one) Yes ☐ No ☐

Section A: OVERALL HEALTH

The following questions ask for your views about your health and how you feel about life in general. If you are unsure about how to answer any question, try and think about your overall health and give the best answer you can. Do not spend too much time answering, as your immediate response is likely to be the most accurate.

1. In general, would you say your health is:
(Please tick one box)

- Excellent ☐
- Very good ☐
- Good ☐
- Fair ☐
- Poor ☐

2. Compared to one year ago, how would you rate your health in general now?
(Please tick one box)

- Much better than 1 year ago ☐
- Somewhat better than 1 year ago ☐
- About the same as 1 year ☐
- Somewhat worse now than 1 year ago ☐
- Much worse now than 1 year ago ☐

3. The following questions are about activities you might do during a typical day.
Does your ~~heart~~ health now limit you in these activities? ~~If so, how much?~~
(Please tick one box on each line)

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a) Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Moderate activities, such as moving a table, pushing a vacuum, bowling or playing golf	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Lifting or carrying groceries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Climbing several flights of stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Climbing one flight of stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Bending kneeling or stooping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Walking more than a mile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Walking half a mile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Walking 100 yards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Bathing and dressing yourself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. During the past 4 weeks, how much time have you had any of the following problems with your work or other regular daily activities as a result of your physical health? (Please tick one box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the amount of time you spent on work or other activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Accomplished less than you would like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Were limited in the kind of work or other activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Had difficulty performing the work or other activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. During the past 4 weeks, how much time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)? (Please tick one box on each line)

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Cut down on the amount of time you spent on work or other activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Accomplished less than you would like	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Did work or other activities less carefully than usual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. During the past 4 weeks, to what extent have your physical health or emotional problems interfered with your normal social activities with family, neighbours or groups? (Please tick one box)

Not at all	<input type="checkbox"/>
Slightly	<input type="checkbox"/>
Moderately	<input type="checkbox"/>
Quite a bit	<input type="checkbox"/>
Extremely	<input type="checkbox"/>

7. How much bodily pain have you had during the past 2 weeks? (Please tick one box)

None	<input type="checkbox"/>
Very mild	<input type="checkbox"/>
Mild	<input type="checkbox"/>
Moderate	<input type="checkbox"/>
Severe	<input type="checkbox"/>
Very Severe	<input type="checkbox"/>

8. During the past 4 weeks, how much did pain interfere with your normal work (including both outside the home and housework)? (Please tick one box)

- Not at all ☐
- Slightly ☐
- Moderately ☐
- Quite a bit ☐
- Extremely ☐

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question please give one answer that comes closest to the way you have been feeling. (Please tick one box on each line)

	All of, the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a) Did you feel full of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have you been a very nervous person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have you felt so down in the dumps that nothing would cheer you up?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Have you felt calm and peaceful?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Did you have a lot of energy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Have you felt downhearted and low?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Did you feel worn out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Have you been a happy person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Did you feel tired?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives etc.). (Please tick one box)

- All of the time ☐
- Most of the time ☐
- Some of the time ☐
- A little of the time ☐
- None of the time ☐

11. How TRUE or FALSE is each of the statements for you? (Please tick one box on each line)

	Definitely true	Mostly true	Not sure	Mostly false	Definitely false
a) I seem to get ill more easily than other people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) I am as healthy as anybody I know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) I expect my health to get worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) My health is excellent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section B: Managing your illness

This next section asks you to indicate what you generally do and feel, as a result of your illness. Try to answer as honestly as you can. (please tick one box)

	I usually don't do this	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
1. I try to grow as a person as a result of the experience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I turn to work or other substitute activities to take my mind off things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I get upset and let my emotions out.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I try to get advice from someone about what to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I concentrate my efforts on doing something about it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I say to myself "this isn't real."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I put my trust in God.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I laugh about the situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I admit to myself that I can't deal with it, and quit trying.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I restrain myself from doing anything too quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I discuss my feelings with someone.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I use alcohol or drugs to make myself feel better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I get used to the idea that it happened.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I talk to someone to find out more about the situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I keep myself from getting distracted by other thoughts or activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I daydream about things other than this.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I get upset, and am really aware of it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I seek God's help.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I make a plan of action.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I make jokes about it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. I accept that this has happened and that it can't be changed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. I hold off doing anything about it until the situation permits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. I try to get emotional support from friends or relatives.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. I just give up trying to reach my goal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. I take additional action to try to get rid of the problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. I try to lose myself for a while by drinking alcohol or taking drugs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. I refuse to believe that it has happened.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. I let my feelings out.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. I try to see it in a different light, to make it seem more positive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I usually don't do this	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot
-------------------------------	--------------------------------------	--	-------------------------------

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 30. I talk to someone who could do something concrete
about the problem. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. I sleep more than usual. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. I try to come up with a strategy about what to do. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. I focus on dealing with this problem, and if necessary
let other things slide a little. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. I get sympathy and understanding from someone. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. I drink alcohol or take drugs to think about it less. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. I kid around about it. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. I give up the attempt to get what I want. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 38. I look for something good in what is happening. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39. I think about how I might best handle the problem. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. I pretend that it hasn't really happened. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41. I make sure not to make matters worse by acting
too soon. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42. I try hard to prevent other things from interfering with
my efforts at dealing with this. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43. I go to movies or watch TV, to think about it less. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 44. I accept the reality of the fact that it happened. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 45. I ask people who have had similar experiences
what they did. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 46. I feel a lot of emotional distress and I find myself
expressing those feelings a lot | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 47. I take direct action to get around the problem. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 48. I try to find comfort in my religion. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 49. I force myself to wait for the right time to do something. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 50. I make fun of the situation. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 51. I reduce the amount of effort I'm putting into solving
the problem. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 52. I talk to someone about how I feel. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 53. I use alcohol or drugs to help me get through it. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 54. I learn to live with it | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 55. I put aside other activities in order to concentrate on this | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 56. I think hard about what steps to take. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. I act as though it hasn't even happened. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. I do what has to be done, one step at a time. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. I learn something from the experience. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. I pray more than usual. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section C: ~~YOUR~~ BELIEFS ABOUT YOUR ILLNESS

1) Which symptoms have you experienced since your heart condition? ~~and~~ which of these do you think are related to your heart condition? (please tick)

	I have experienced this symptom since my heart condition		This symptom is related to my heart condition	
	Yes	No	Yes	No
a) Pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Sore Throat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Nausea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Breathlessness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Weight Loss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Fatigue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Stiff Joints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Sore eyes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Wheeziness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Headaches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Upset Stomach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l) Sleep Difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m) Dizziness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) Loss of strength	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) Your views about your illness (please tick one)

Please indicate how much you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
2.1) My heart condition will last a short time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2) My heart condition is likely to be permanent rather than temporary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3) My heart condition will last for a long time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4) This heart condition will pass quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5) I expect to have this heart condition for the rest of my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6) My heart condition is a serious condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.7) My heart condition has major consequences on my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8) My heart condition does not have much effect on my life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
2.9) My heart condition strongly affects the way others see me	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
2.10) My heart condition has serious financial Consequences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.11) My heart condition causes difficulties for those who are close to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.12) There is a lot which I can do to control my Symptoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.13) What I do can determine whether my heart condition gets better or worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.14) The course of my heart condition depends on me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.15) Nothing I do will affect my heart condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.16) I have the power to influence my heart condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.17) My actions will have no affect on the outcome of my heart condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.18) My heart condition will improve in time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.19) There is very little that can be done to improve my heart condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.20) My treatment will be effective in curing my heart condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.21) The negative effects of my heart condition can be prevented (avoided) by my treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.22) My treatment can control my heart condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.23) There is nothing which can help my condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.24) The symptoms of my heart condition are puzzling to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.25) My illness is a mystery to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.26) I don't understand my illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.27) My heart condition does not make sense to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.28) I have a clear picture or understanding of my condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.29) The symptoms of my heart condition change a great deal from day to day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.30) My symptoms come and go in cycles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.31) My heart condition is very unpredictable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.32) I go through cycles in which my illness gets better and worse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.33) I get depressed when I think about my illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.34) When I think about my illness I get depressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.35) My illness makes me feel angry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.36) My illness does not worry me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.37) Having this illness makes me feel anxious	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.38) My illness makes me feel afraid	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3) What do you think caused your illness?
Please indicate how much you agree or disagree with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
3.1) Stress or worry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2) Hereditary – it runs in the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3) A germ or virus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4) Diet or eating habits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5) Chance or bad luck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6) Poor medical care in my past	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7) Pollution in the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8) My own behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9) My mental attitude (eg thinking about life negatively)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.10) Family problems or worries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.11) Overwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.12) My emotional state (eg feeling down, lonely, anxious)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.13) Ageing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.14) Alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.15) Smoking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.16) Accident or injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.17) My personality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.18) Altered immunity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) Please list in rank-order the most important factors that you believe caused your illness. You can use any of the items from above, or you may have additional ideas of your own.

1. _____
2. _____
3. _____

Section D: HOW ARE YOU FEELING?
(please tick one box)

1) I feel tense or wound up	Most of the time <input type="checkbox"/>	A lot of the time <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Not at all <input type="checkbox"/>
2) I still enjoy things I used to enjoy	Definitely as much <input type="checkbox"/>	Not quite as much <input type="checkbox"/>	Only a little <input type="checkbox"/>	Hardly at all <input type="checkbox"/>
3) I get a sort of frightened feeling as if something awful is about to happen	Very definitely & quite badly <input type="checkbox"/>	Yes, but not too badly <input type="checkbox"/>	A little, but it doesn't worry me <input type="checkbox"/>	Not at all <input type="checkbox"/>
4) I can laugh and see the funny side of things	As much as I always could <input type="checkbox"/>	Not quite so much now <input type="checkbox"/>	Definitely not so much now <input type="checkbox"/>	Not at all <input type="checkbox"/>
5) Worrying thoughts go through my mind	A great deal of the time <input type="checkbox"/>	A lot of the time <input type="checkbox"/>	From time to time, but not often <input type="checkbox"/>	Only occasionally <input type="checkbox"/>
6) I feel cheerful	Not at all <input type="checkbox"/>	Not often <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Most of the time <input type="checkbox"/>
7) I can sit at ease and feel relaxed	Definitely <input type="checkbox"/>	Usually <input type="checkbox"/>	Not often <input type="checkbox"/>	Not at all <input type="checkbox"/>
8) I feel as if I am slowed down	Nearly all the time <input type="checkbox"/>	Very often <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Not at all <input type="checkbox"/>
9) I get a sort of frightened feeling like butterflies in the stomach	Not at all <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Quite often <input type="checkbox"/>	Very often <input type="checkbox"/>
10) I have lost interest in my appearance	Definitely <input type="checkbox"/>	I don't take as much care as I should <input type="checkbox"/>	I may not take quite as much care <input type="checkbox"/>	I take just as much care as ever <input type="checkbox"/>
11) I feel restless as if I have to be on the move	Very much indeed <input type="checkbox"/>	Quite a lot <input type="checkbox"/>	Not very much <input type="checkbox"/>	Not at all <input type="checkbox"/>
12) I look forwards with enjoyment to things	As much as I ever did <input type="checkbox"/>	Rather less than I used to <input type="checkbox"/>	Definitely less than I used to <input type="checkbox"/>	Hardly at all <input type="checkbox"/>
13) I get sudden feelings of panic	Very often indeed <input type="checkbox"/>	Quite often <input type="checkbox"/>	Not very often <input type="checkbox"/>	Not at all <input type="checkbox"/>
14) I can enjoy a good book, radio/television programme	Often <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Not often <input type="checkbox"/>	Very seldom <input type="checkbox"/>

PARTICIPANT QUESTIONNAIRE: Number Two

1. Name _____

2. Date of birth ____/____/____
3. Address _____

4. Did you experience any significant complications during your angioplasty procedure?

Yes ☐ No ☐

4a. If ~~yes~~ ~~what?~~ _____

4b. ~~Did~~ you require any further medical or surgical procedures? (~~please~~ state)

5. Since your angioplasty have you experienced any cardiac events for which you have sought medical attention (~~eg Heart attack~~)

Yes ☐ No ☐

5a. If ~~yes~~ please state what?

6. Please **tick one** of the following statements which best describes how you have been feeling since your angioplasty:

No chest pain ☐

Chest pain with substantial activity ☐

Chest pain with minimal activity ☐

Chest pain most of the time, not activity-related ☐

Thank you – Please continue with the next few pages of questions

Dear *****

You may remember that whilst you were recently in Hospital for an angioplasty procedure, at the Manchester Heart Centre, you agreed to take part in my research study. This study aims to look at whether people's feelings about their health before an angioplasty affect aspects of their wellbeing several months later.

You have already kindly completed the first part of the study, by filling in a questionnaire whilst you were in hospital. The last part of the study simply involves you completing the same questionnaire now that you are at home. Your participation in this last step is very much appreciated as the results of this study should help to better inform the way we support patients in the future. However, as stated before your participation is entirely voluntary and you have the right to withdraw from this study at any time.

Please find enclosed a copy of the questionnaire for you to complete and a stamped addressed envelope for the questionnaires return. My contact details are written below; please do not hesitate to contact me if you require any assistance or if you would like to discuss the questionnaire or the research study further.

Thank you once again for your cooperation and time, it is greatly valued.

Yours sincerely

Mrs Lisa Benn – Trainee Clinical Psychologist

Contact Details:
Lisa Benn
Clinical Psychology
University of Leicester
104 Regent Road
Leicester
LE1 7LT

Appendix 10. Correlation results

Correlations

	IPQ 1 Identity	IPQ 1 Timeline	IPQ 1 consequences	IPQ 1 personal control	IPQ 1 Treatment control items	IPQ 1 illness coherence	IPQ 1 Timeline cyclical	IPQ 1 emotional representations	Cope 1 problem focused	Cope 1 emotion focused	Cope 1 Maladaptive coping	HADS 2 anxiety	HADS 2 depression	SFMC2	SFPCS2
IPQ 1 Identity	Pearson Correlation Sig. (2-tailed) N	.011 .946 42	.206 .208 39	.163 .328 38	.095 .567 39	-.151 .354 40	.288 .079 38	.263 .101 40	.157 .360 36	.285 .114 32	.529** .001 37	.405* .040 26	.376 .058 26	-.021 .920 25	-.273 .186 25
IPQ 1 Timeline	Pearson Correlation Sig. (2-tailed) N	-.011 .946 38	.333** .002 85	-.100 .367 84	-.176 .107 85	.149 .170 86	-.076 .484 86	.086 .458 77	-.079 .511 72	-.027 .826 69	.052 .649 79	-.218 .103 57	.023 .865 58	-.096 .484 55	.225 .099 55
IPQ 1 consequences	Pearson Correlation Sig. (2-tailed) N	.333** .002 85	1.000 .000 91	.049 .662 82	-.023 .834 84	.010 .928 85	.413** .000 84	.330** .003 77	-.123 .305 72	.033 .791 68	.282* .012 79	.199 .142 56	.148 .269 58	-.172 .213 54	-.145 .294 54
IPQ 1 personal control	Pearson Correlation Sig. (2-tailed) N	.333** .002 85	.049 .662 82	1.000 .000 89	.092 .405 85	.223* .040 85	-.174 .112 85	-.192 .097 76	.170 .157 71	.134 .262 72	.047 .684 79	-.144 .291 56	-.250 .061 57	.200 .144 55	.038 .784 55
IPQ 1 Treatment control items	Pearson Correlation Sig. (2-tailed) N	-.176 .107 85	-.023 .834 84	.092 .405 85	1.000 .000 91	.156 .147 88	-.099 .365 86	-.069 .547 79	.162 .171 73	.229 .055 71	.114 .306 82	-.100 .452 59	-.162 .216 60	.297* .024 58	-.043 .749 58
IPQ 1 illness coherence	Pearson Correlation Sig. (2-tailed) N	.149 .170 86	.333** .002 85	.049 .662 82	.092 .405 85	1.000 .000 91	-.174 .112 85	-.192 .097 76	.170 .157 71	.134 .262 72	.047 .684 79	-.144 .291 56	-.250 .061 57	.200 .144 55	.038 .784 55
IPQ 1 Timeline cyclical	Pearson Correlation Sig. (2-tailed) N	-.076 .107 85	.413** .000 84	-.174 .112 85	-.099 .365 86	-.274* .011 86	1.000 .000 92	.476** .000 80	-.127 .281 74	.101 .405 70	.291** .009 80	.533** .000 58	.317* .014 59	-.460** .000 56	-.009 .947 56
IPQ 1 emotional representations	Pearson Correlation Sig. (2-tailed) N	.086 .458 77	.330** .003 77	-.192 .097 76	-.069 .547 79	-.213 .058 80	-.274* .011 86	1.000 .000 92	-.231 .060 67	.637** .000 64	.122 .317 69	-.293* .041 49	-.376** .007 50	.120 .411 49	.078 .596 49
Cope 1 problem focused	Pearson Correlation Sig. (2-tailed) N	-.027 .826 32	.033 .791 68	.134 .262 72	.229 .055 71	.249* .038 74	.101 .405 70	-.070 .583 64	.637** .000 64	1.000 .000 73	.567** .000 70	-.049 .745 51	-.020 .892 48	.174 .249 46	-.009 .951 46
Cope 1 emotion focused	Pearson Correlation Sig. (2-tailed) N	-.027 .826 32	.033 .791 68	.134 .262 72	.229 .055 71	.249* .038 74	.101 .405 70	-.070 .583 64	.637** .000 64	1.000 .000 73	.567** .000 70	-.049 .745 51	-.020 .892 48	.174 .249 46	-.009 .951 46
Cope 1 Maladaptive coping	Pearson Correlation Sig. (2-tailed) N	.052 .649 37	.282* .012 79	.047 .684 79	.114 .306 82	-.012 .918 81	.291** .009 80	.533** .000 58	-.459** .000 58	.317* .014 59	.416** .001 50	-.365** .007 53	-.116 .406 53	-.009 .947 56	-.009 .947 56
HADS 2 anxiety	Pearson Correlation Sig. (2-tailed) N	-.218 .103 26	.199 .142 56	-.144 .291 56	-.100 .452 59	-.459** .000 58	.533** .000 58	.317* .014 59	-.459** .000 58	.317* .014 59	.416** .001 50	-.365** .007 53	-.116 .406 53	-.009 .947 56	-.009 .947 56
HADS 2 depression	Pearson Correlation Sig. (2-tailed) N	.023 .865 26	.148 .269 58	-.172 .213 54	-.145 .294 54	.038 .784 55	.052 .826 32	.033 .791 68	.122 .317 69	.122 .317 69	.122 .317 69	.122 .317 69	.122 .317 69	.122 .317 69	.122 .317 69
SFMC2	Pearson Correlation Sig. (2-tailed) N	-.021 .920 25	-.172 .213 54	.038 .784 55	-.043 .749 58	.209 .116 58	-.460** .000 58	.365** .007 53	.120 .411 49	.174 .249 46	.174 .249 46	.174 .249 46	.174 .249 46	.174 .249 46	.174 .249 46
SFPCS2	Pearson Correlation Sig. (2-tailed) N	-.273 .186 25	-.145 .294 54	.038 .784 55	-.043 .749 58	.209 .116 58	-.460** .000 58	.365** .007 53	.120 .411 49	.174 .249 46	.174 .249 46	.174 .249 46	.174 .249 46	.174 .249 46	.174 .249 46

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Pearson Product Moment Correlations for IPQ, COPE (Time 1) and SF36 and HADS (Time 2)

Appendix 11. Analysis of variance results

Oneway Anova for Gender

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
SF36 T2 Mental Health Component	Between Groups	590.349	1	590.349	3.294	.074
	Within Groups	11112.442	62	179.233		
	Total	11702.791	63			
SF36 T2 Physical Health Component	Between Groups	11.259	1	11.259	.344	.559
	Within Groups	2027.189	62	32.697		
	Total	2038.448	63			
HADS 2 anxiety	Between Groups	3.393	1	3.393	.174	.678
	Within Groups	1348.917	69	19.550		
	Total	1352.310	70			
HADS 2 depression	Between Groups	41.813	1	41.813	2.457	.121
	Within Groups	1208.214	71	17.017		
	Total	1250.027	72			

Oneway Anova for Pathway into care

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
SF36 T2 Mental Health Component	Between Groups	89.938	1	89.938	.480	.491
	Within Groups	11612.853	62	187.304		
	Total	11702.791	63			
SF36 T2 Physical Health Component	Between Groups	46.159	1	46.159	1.436	.235
	Within Groups	1992.289	62	32.134		
	Total	2038.448	63			
HADS 2 anxiety	Between Groups	.801	1	.801	.041	.840
	Within Groups	1351.508	69	19.587		
	Total	1352.310	70			
HADS 2 depression	Between Groups	35.458	1	35.458	2.073	.154
	Within Groups	1214.569	71	17.107		
	Total	1250.027	72			

Appendix 12. T-tests for illness cognitions over time

T-test Statistics for Illness Beliefs over Time

		Mean	N	Std. Deviation	Std. Error Mean	Sig.
Pair 1	IPQ 1 Timeline	20.2353	51	5.5914	.7829	.000***
	IPQ 2 Timeline	22.7059	51	5.1625	.7229	
Pair 2	IPQ 1 Consequences	19.5536	56	4.5644	.6099	.205
	IPQ 2 Consequences	18.8036	56	4.6648	.6234	
Pair 3	IPQ 1 Personal control	23.4423	52	4.0167	.5570	.183
	IPQ 2 Personal control	22.7308	52	4.0006	.5548	
Pair 4	IPQ 1 Treatment control items	17.6250	56	1.9218	.2568	.016*
	IPQ 2 Treatment control items	18.5357	56	2.9724	.3972	
Pair 5	IPQ 1 Illness coherence	18.6607	56	3.9279	.5249	.147
	IPQ 2 Illness coherence	19.3571	56	4.2187	.5637	
Pair 6	IPQ 1 Timeline cyclical	10.3966	58	3.3662	.4420	.570
	IPQ 2 Timeline cyclical	10.1552	58	3.7920	.4979	
Pair 7	IPQ 1 Emotional representations	17.1765	51	5.0188	.7028	.197
	IPQ 2 Emotional representations	16.3333	51	5.2561	.7360	

Appendix 13. Principle component analysis

Component Matrix: COPE Time 1

	1	2	3	4
Positive reinterpretation and growth	.871			
Mental disengagement		.564		
Focus on and venting of emotions		.847		
Use of instrumental support	.693			
Active coping	.852			
Denial		.576		
Religious coping	.335		.766	
Humour	.609			
Behavioural disengagement		.818		
Restraint	.514			
Use of emotional social support	.455			
Use of substance		.559		
Acceptance	.345			.731
Suppression of competing activities	.764			
Planning	.810			

Component Matrix for COPE Time 2

	1	2	3	4
Positive reinterpretation and growth	.593			
Mental disengagement		.440		.625
Focus on and venting of emotions		.739		
Use of instrumental social support	.494			
Active coping	.531			
Denial		.535		
Religious coping	.529			
Humour	.645			
Behavioural disengagement		.745		
Restraint	.493		.609	
Use of emotional social support	.525			
Use of substances			.388	
Acceptance	.381		.690	
Suppression of competing activities	.716			
Planning	.675			

Extraction Method: Principal Component Analysis.

Loadings greater than 0.4 presented for each variable

■ = highest loading (meeting 0.4 criterion)