HEALTH BELIEF MODEL INTERPRETATIONS OF SOCIOPSYCHOLOGICAL FACTORS ASSOCIATED WITH COMPLIANCE FOR WEIGHT LOSS AND CARDIAC REHABILITATION PROGRAMMES

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ABSTRACT

Four aims were formulated for the present study. The first was to construct a questionnaire, using the Health Belief Model (HBM) as an organizing rubric, and to test its psychometric properties in a pilot study. The second was to utilize the questionnaire to understand why individuals did or did not comply on the University of Cape Town Weight Loss and Heart Foundation Cardiac Rehabilitation programmes during the period 1987 to 1989. A third aim was to establish possible commonalities and/or differences between and within groups of weight loss and cardiac compliers and noncompliers on these programmes. This would address the gap in most studies which have only looked at one particular health behaviour at a time. The fourth aim was to accumulate information about the current health activities (or long-term compliance) and beliefs of individuals and to compare how these had changed over a period of time.

The questionnaire was piloted on 35 participants (10 cardiac compliers and 3 noncompliers (M age = 55.7 years), 16 weight loss compliers and 6 noncompliers (M age = 37.4 years) from the above programmes for the period 1983 to 1986. The questionnaire was subsequently utilized to assess 37 weight loss compliers (7 males and 30 females M age = 45 years), 11 cardiac compliers (9 males, 2 females, M age = 57 years), 19 weight loss noncompliers (1 male, 18 females, M age = 40

years) and 19 cardiac noncompliers (19 females, M age = 54 years) from the programmes for the period 1987 to 1989. Historical data was provided in the form of starting Profile of Mood States (mood disturbance) and Health Behaviour Assessment Scale (life-style) scores for all participants. Further scores were gathered on follow-up so as to evaluate whether any changes had occurred.

The importance of (a) defining short- and long-term compliance and/or noncompliance, and (b) the need to examine behaviours after compliance or noncompliance to determine whether changes in behaviour have occurred was evident. In the current research, not all short-term compliers remained compliant and not all noncompliers continued to be noncompliant.

The Health Belief Model questionnaire designed and utilized in this study revealed a number of findings. The three HBM components of "benefits", "barriers" and "enabling factors" were associated with compliance in this study. The findings for the "benefits" component indicated a difference in the perception of the efficacy of the programme. The responses for this component need to be considered in light of the retrospective nature of the study. The component of "motivation" did not contribute significantly in the understanding of compliance as a separate variable. This confirmed similar findings in the literature.

The factors associated with short-term noncompliance for weight loss and cardiac subjects in this study were inconvenience, having to rush to work and time problems. Although no significant differences in responses were found for the HBM subcomponent of inconvenience, it was associated with noncompliance. Cardiac noncompliers also indicated that they had left the programme because they could maintain the life-style on their own. This finding indicates that these subjects believed in their self-efficacy to continue with the life-style independently.

Weight loss noncompliers did not cope well physically and emotionally with the programme. It seems that having to change their diet and level of exercise proved to be too complex and constituted barriers to implementing the required regimen. The numerous factors established in the literature to be associated with attempted weight loss, such as feelings of failure, low self-esteem, and psychological dependence on food as a coping mechanism, need to be considered as issues which may complicate weight loss and which may, in turn, constitute barriers in themselves before the individual has attempted to diet or exercise. A multi-disciplinary approach which deals not only with the gradual implementation of diet and exercise requirements, but which also defuses negative attitudes towards dieting, which teaches alternative coping skills, educates weight loss

individuals about the risk factors of obesity, and which helps individuals to set realistic goals is emphasized.

On the surface, the noncompliance by cardiac subjects seemed to be associated with the fact that they were already physically active and diet conscious on joining the cardiac programme. They could therefore implement the regimen on their own and in fact noted this as a reason for noncompliance. However, despite indicating that they had coped well physically and emotionally with the programme, the mood disturbance of these subjects had worsened on follow-up. Being physically active and diet conscious was not therefore sufficient for total recovery of these individuals. The importance of monitoring all aspects of CHD rehabilitation, such as taking medication, smoking habits and stress management is highlighted.

These cardiac noncompliers started the HFCR programme with low mood disturbance scores. However, they also indicated that the onset of their CHD was sudden and that factors beyond their control were the cause of their illness. It is possible that denial was associated with noncompliance for these subjects, although this could not be established with certainty. These findings accentuate the importance of dealing with these issues at the inception of a rehabilitation programme, or even while they are still in the coronary care unit.

The life-threatening nature of cardiac illness and the lack of it in the weight loss phenomenon pointed to a potential association between the lack of symptoms and noncompliance for weight loss individuals but could not be established with certainty.

Weight loss individuals displayed more mood disturbance than cardiac subjects. The mood disturbance of all noncompliers had worsened on follow-up while the mood disturbance for compliers had improved. Weight loss noncompliers were required to make the most life-style changes and the behaviours of all subjects had improved over time

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CHAPTER ONE: INTRODUCTION

This chapter provides a context for the present study in that it outlines the current situation pertaining to the phenomenon of compliance and relates it specifically to a South African setting. The basis for the study and its aims are also presented.

1.1 GENERAL COMMENT ON COMPLIANCE

The poor extent to which individuals comply with, or carry out health care advice is evident in most treatment programmes and studies of this phenomenon (Bennett & Jones, 1986; Haynes, Taylor, & Sackett, 1979; Stunkard, 1981). An understanding of this issue is therefore of extreme importance for health care professionals, as recommended actions carried out in the present affect the future health of an individual (Croog & Levine, 1977; Ice, 1985).

The low compliance rates reported for obesity (0% to 28%) (Stunkard, cited in Becker, Maiman, Kirscht, Haefner, & Drachman, 1977b) and for cardiac disease (13% to 60%) (Bruce, Frederick, Bruce, & Fisher, 1976; Carmody, Senner, Malinow, & Matarazzo, 1980; Oldridge, 1982) indicate an ongoing need for treatment as noncompliers are likely to return at a later stage. Furthermore, these health problems present certain risks if left untreated. Cardiac disease is a life-threatening illness (Ice, 1985) and obesity has been cited as an independent risk factor for inter alia

cardiovascular disease (Hubert, cited in Foreyt, 1987; Kannel & Gordon, cited in Stunkard, Stinnett, & Smoller, 1986).

1.2 GENERAL COMMENT ON BEHAVIOUR, BELIEFS AND THE HEALTH BELIEF MODEL

A widely used organizing rubric for examining factors associated with compliance is a socio-behavioural measuring tool called the Health Belief Model (HBM). In this study, the HBM provides a framework for the investigation of compliance on the University of Cape Town (UCT) Weight Loss programme and the Heart Foundation Cardiac Rehabilitation programme.

Extensive research has shown that peoples' beliefs and perceptions of consequences of an action affect ensuing behaviour (Haefner & Kirscht, 1970; Holm, Fink, Christman, Reitz, & Ashley, 1985; Kaplan, Atkins, & Reinsch, 1984). Various researchers have stressed the importance of understanding why a specific behaviour occurs before one sets out to change it, even if the behaviour can theoretically be changed without understanding causal patterns (Rosenstock, 1966; Kinnaird, Hoham, & Kieval, 1982).

Beliefs are often modifiable (Becker et al., 1979; Haefner & Kirscht, 1970), and can become congruent with the behaviour change (Becker et al., 1979; Croog & Richards, 1977; Cummings, Becker, Kirscht, & Levin, 1982; Haefner & Kirscht,

1970; Taylor, cited in Janz & Becker, 1984). However, modification alone may not always be sufficient to maintain the change (Haefner & Kirscht, 1970). Long-standing habits such as dietary patterns are not markedly influenced by changes in beliefs as these behaviours satisfy a variety of needs simultaneously (Burbach & Schomer, 1987; Haefner & Kirscht, 1970). Studies have also shown that people do not always carry out what they believe (Filingeri, 1985).

The link between behaviour and beliefs is therefore an intricate one, where numerous variables are interactive. The HBM offers a framework from which to understand and explain how beliefs and resultant behaviours are affected (Becker et al., 1977b; Chen & Land, 1986). This is carried out within the context of various contributing factors (Rosenstock, 1966; Kelly, Mamon, & Scott, 1987).

1.3 GENERAL COMMENT ON BEHAVIOUR CHANGE

Habits such as inactivity, excessive eating, smoking and Type-A coping, common to coronary heart patients, are long-standing (Haefner & Kirscht, 1970), well-learned, automatic behaviour patterns (Sensenig & Cialdini, 1984). These habits may become part of the individual's natural self-regulating process (Suls, 1984) and consequently satisfy a variety of motives (Haefner & Kirscht, 1970). None of these behaviours can be seen to exist in a vacuum (Suls, 1984). Changes should therefore be carried out within the context of other behaviours in order to complement the individual's life-style

(Berkanovic, 1976; Marlatt & Gordon, 1980; Merritt, 1982; Rosenstock, 1988; Suls, 1984; Wadden & Stunkard, 1986).

The benefits of a positive life-style change (Finnegan & Suler, 1985) and exercise in particular have been cited extensively in the literature (Carmody et al., 1980; Giese, 1983; Giese & Schomer, 1986; Leon, 1984; Schomer, 1984; Schomer & Dunne, 1986; Willerson & Bruce, 1983). Exercise is seen as a natural protective process which aids longevity and improves the physical and psychological quality of life (Leon, 1984; Oldridge, 1982; Oldridge & Jones, 1986). An improvement in morale (Prosser et al., 1981), self-image (Rigotti, Thomas, & Leaf, 1983; Schomer, 1984) general well-being, depression, anxiety and tension (Kavanagh, Shephard, Tuck, & Querishi, 1977; Kavanagh & Noakes, 1979; Schomer, 1984) have also been recorded.

1.4 GENERAL INFORMATION ABOUT THE PROGRAMMES EXAMINED IN THIS STUDY

The programmes examined are held at the UCT Sports Centre at 7.30 a.m. for the UCT Weight Loss (UCTWL) programme and from 6.30 a.m. onwards for the Heart Foundation Cardiac Rehabilitation (HFCR) programme. The UCTWL programme encourages participation in exercise classes three times a week, which are supervised by exercise physiologists. Courses generally run for approximately 12 weeks. The UCTWL programme also offers dietary advice from a registered dietician and provides psychological feedback on changes in mood states and

health behaviours as measured by the Profile of Mood States (POMS) and Health Behaviour Assessment Scale (HBAS) respectively.

The HFCR programme similarly recommends exercise participation supervised by exercise physiologists three times a week. The recommended period of stay is 6 weeks. A registered dietician is employed and psychological feedback on the POMS and HBAS is provided. The HFCR programme also runs relaxation sessions. Regarding facilities and service, the HFCR programme has more equipment than the UCTWL programme in terms of bicycles, weights and trampolines. Medical doctors and nurses also form part of the team.

The psychological feedback for both programmes is carried out by interns on the Health Psychology Masters programme at UCT. Both programmes examined in this study therefore exhibit a multi-factorial approach.

1.5 LINK TO AN ONGOING PROJECT

The current research was linked to an ongoing project run at the two programmes via (a) two of the three measuring scales, and (b) the subjects.

The POMS and HBAS used in the ongoing project provided important baseline data and historical evidence for those HBM questions which examined historical events and complemented HBM components which examined current situations.

Furthermore, follow-up data also indicated any alterations in the subjects' mood states (as measured by the POMS) and health behaviours (as assessed by the HBAS).

It follows that sample selection was guided by the inclusion of these two scales, as all subjects were required to have minimum baseline data. This is discussed in detail under the main study section (see chapter 4).

1.6 EXISTING LITERATURE

To date, research which has used the HBM has examined groups of subjects presenting the same health problem (e.g., hemodialysis or cardiac or weight loss or cancer etc., patients) and has not included groups of subjects with different health problems as controls.

Literature to date emanates mainly from the United States of America, the United Kingdom and Europe. The contribution from South Africa is still somewhat meagre. Although various local studies have looked at compliance, they have examined the results of their research and not the phenomenon of compliance itself (Burbach & Schomer, 1987; Giese & Schomer, 1986). The need for research within the South African context which replicated overseas studies but which also included subject groups presenting different health care problems was therefore established.

1.7 AIMS OF THIS STUDY

The aims of the present study were:

1. To construct a questionnaire, using the HBM as an organizing rubric, and to test its psychometric properties in a pilot study.

2. To then utilize the questionnaire to understand why individuals did or did not comply on the UCTWL and HFCR programmes during the period 1987 to 1989.

3. To establish possible commonalities and/or differences between and within groups of weight loss and cardiac compliers and noncompliers on these programmes. This would address the gap in most studies which have only looked at one particular health behaviour at a time.

4. To accumulate information about the current health activities (or long-term compliance) and beliefs of individuals and to compare how these had changed over a period of time.

1.8 GENERAL COMMENT

This study covered a vast area of literature in terms of compliance, the HBM, obesity and cardiac disease. The literature review is therefore extensive but has been presented in as succinctly a manner as possible.

The design of the HBM questionnaire constitutes a major part of the methodology and is outlined at length in chapter 4.

The literature review, hpotheses, method, results and discussion will now be presented.

CHAPTER TWO: LITERATURE REVIEW

This chapter outlines the literature pertinent to this study, namely that on compliance, the Health Belief Model, obesity and cardiac disease. These are discussed in turn.

2.1 COMPLIANCE

This section of the literature review defines and outlines the complexity of compliance, as well as important factors which affect it. These factors include the tenuous link between the outcome of treatment and compliance, the assessment and/or measurement of compliance, as well as patient and regimen variables associated with compliance.

2.1.1 Compliance and Noncompliance Defined

A general definition of the term compliance refers to the extent to which an individual carries out medical or health care advice (Haynes, 1979). Depending on the goals of treatment, these may include keeping appointments, seeking medical advice and adhering to prescribed health behavioural advice for exercise, dietary control, smoking cessation and taking prescribed medicine. Thus a complier is one who carries out a prescribed regimen, while a noncomplier does not.

In the literature, the terms "adherence" and "alliance" have been used interchangeably with "compliance" even though the term "compliance" has been criticized for conjuring up the image of patients as passive recipients of health care advice (Klinger, 1984; Stunkard, 1981). Since the term "compliance" is evident in the latest literature, its usage has been continued in this study.

Compliance can be subdivided into short- and long-term compliance.

2.1.2 Short-Term Compliance

This refers to the completion of a particular regimen (Belisle, Roskies, & Levesque, 1987; Epstein & Cluss, 1982). For example, weight loss individuals who remained on the UCTWL programme for its entire duration would be classified as short-term compliers. Short-term noncompliance refers to those individuals who do not complete a programme or regimen (Belisle et al., 1987; Epstein & Cluss, 1982). Thus, individuals who dropped out of the UCTWL programme would be short-term noncompliers.

2.1.3 Long-Term Compliance

Long-term compliance refers to the continuation of health or medical care advice after completion of a programme (Belisle et al., 1987; Epstein & Cluss, 1982). Individuals who completed the HFCR programme and who continued the regimen

would be called long-term compliers. Long-term noncompliance indicates that the regimen was discontinued (Belisle et al., 1987; Epstein & Cluss, 1982). For example, individuals who completed the UCTWL and HFCR programmes but who did not continue with the recommended regimen would be classified as long-term noncompliers.

The conceptualization of the above terms as they pertain to this study are discussed in detail in the methodology (see chapter 4).

Some regimens require only short-term compliance. For example, medication intake for bronchitis requires only short-term compliance, whereas other illnesses, such as myocardial infarction, require both short- and long-term compliance. The varying ranges of compliance required for different programmes necessitate the more detailed definitions of compliance as outlined above.

In addition, clear definitions of compliance and/or noncompliance are important in order to distinguish between compliers and noncompliers (Morrow, Del Gaudio, & Carpenter, 1977). Conceptualization of a definition of compliance depends not only on treatment goals, but also on the area of research and interests of the researcher (Sackett, 1979). For example, exercise compliance may be one aspect of a cardiac patient's recovery, but stress coping, an improved

diet, smoking cessasion, as well as medication may also form part of the regimen.

The degree to which the individual effects all these behaviours constitutes compliance for the above example. Compliance can then be measured by looking at the outcome of these behaviours. Thus, the individual's fitness and stress levels, his/her weight loss, decrease in the number of cigarettes smoked and improved symptoms due to medication intake can be assessed so as to estimate how well the individual complied or did not comply. These constitute the outcome, or results of treatment.

2.1.4 The Relationship Between Compliance and Treatment Outcome

The relationship between outcome and compliance is not straightforward (Epstein, 1984; Epstein & Cluss, 1982; Gordis, 1979; Sackett & Snow, 1979) and is often confounded by the interference of a third variable (Epstein, 1984). For example, some compliant individuals do not achieve the treatment goal while some noncompliers do (Epstein & Cluss, 1982). Compliant individuals who do reach the treatment goal may achieve this outcome due to factors other than compliance (to be elaborated on) (Gordis, 1979). Thus, a direct link between compliance or noncompliance and treatment outcome cannot always be established (Epstein & Cluss, 1982; Eraker, Kirscht, & Becker, 1984).

Table 1 summarizes four possible relationships between compliance and treatment outcome. These are clarified below.

Cell A represents those patients who complied and who reached the treatment goals. These patients do not cause concern.

Cell B denotes those patients who complied but who did not reach the goals of treatment. Therefore, faithful adherence has not produced the desired outcome (Eraker et al., 1984). Gordis (1979) distinguishes between compliance and treatment errors. "Compliance" is expressed as the intent to comply and "treatment errors" as the lack of efficacy of the regimen or the incorrect diagnosis of the illness.

This concept advocates that if the treatment goal is not reached, then the inadequacy of the regimen more than the individual's degree of compliance is at fault. An example is an overweight individual who rigidly sticks to his/her diet and exercise regimen but who does not lose weight. Various factors such as an incorrect diagnosis (e.g., thyroid problems or a low metabolic rate) may have influenced the outcome (Eraker et al., 1984). This emphasizes the importance of measuring compliance directly

Table 1

Compliance and Treatment Outcome

	Treatment goal	
Compliance level	Reached	Not reached
High	A	B
Low or zero	C	D

(From Sackett, 1979)

and independently from the treatment outcome (Epstein, 1984).

Cell C designates those patients who were not compliant but who nonetheless achieved the treatment goal. According to Sackett (1979), this may be a question of regimen efficacy (e.g., overprescription) more than one of compliance. An additional variable, such as the patient did not eat less but started jogging, may also have contributed to this.

Cell D indicates those patients who were not compliant and who did not reach the treatment goals. It is these patients who are a major concern for they often return for treatment (Baekeland & Lundwall, 1975; Eraker et al., 1984).

2.1.5 Assessment and/or Measurement of Compliance

Past research has emphasized the assessment or measurement of the outcome of compliance. Compliance figures vary from 15% to 93% (Taylor, Lichtman, & Wood, 1984; Baekeland & Lundwall, 1975; Davis, 1968a, b). This range is due to the different health problems that were examined. In addition, the variation in required levels of adherence and complexity of a particular regimen, as well as diverse subject populations and methods used in the research contributed to this range of compliance figures (Epstein & Cluss, 1982).

Regimens of short duration yield an average of 62% compliance (Epstein & Cluss, 1982). Those which require longer treatment, such as taking medication and medical (Taylor et al., 1984) and health care advice for chronic diseases, yield average compliance figures of 50% (Sackett & Haynes, cited in Rosenstock, 1966). Even lower compliance rates have been attained for the addictive and indulgent behaviours. Smoking cessation yields a success rate of 30%, and weight loss maintenance a compliance rate of only 10% (Hunt, Barnett, & Branch, cited in Rosenstock, 1988).

There are various problems inherent in assessing compliance. Gordis (1979) found that patients tended to underrate noncompliance and overrate compliance. He also established that assessment of the degree of compliance, either on various aspects, or on the whole of a regimen is not sufficient to depict the phenomenon of compliance (Gordis, 1979). Dichotomization of participants into compliers and noncompliers merely oversimplifies the issue.

Furthermore, the point at which an individual is considered either compliant or noncompliant may differ from programme to programme (Epstein & Cluss, 1982; Morrow et al., 1977; Sackett & Snow, 1979). For example, weight loss requires a higher degree of compliance than does attending a check-up appointment. The definition and amount of compliance required for these problems would therefore vary.

The above comments highlight the importance of the assessment of short- and long-term compliance, so as not to oversimplify the compliance phenomenon.

2.1.6 Variables Related to Compliance

Many behavioural techniques have been successful in changing behaviour in the short-term but the problem of long-term maintenance is extensive (Marlatt & Gordon, 1980; Matthews & Hingson, 1977; Rosenstock, 1988). This is particularly prevalent for weight loss individuals where low compliance figures, as reported above, indicate poor long-term compliance.

Furthermore, research has shown that compliance to various regimens decreases over time (Matthews & Hingson, 1977; Sackett & Snow, 1979). This is the case for cardiac individuals, where, despite the life-threatening nature of the disease, compliance to health care advice diminishes (Blumenthal, Williams, Wallace, Williams, & Needles, 1982). Therefore, adherence to a programme itself is often insufficient to prevent a resumption of old habits (Epstein & Cluss, 1984; Hentinen, 1986; Oldridge et al., 1983). The compliant individual should be investigated some years later to ensure that compliance has been maintained. Accordingly, the importance of the follow-up data gathered in this study is accentuated.

In order to understand the complex phenomenon of compliance, researchers have unsuccessfully searched for observable characteristics to distinguish the complier from the noncomplier (Haynes, 1979). In fact, Porter (cited in Blackwell, 1973, p. 249) concluded that "every patient is a potential defaulter; compliance can never be assumed". Sackett and Snow (1979) remark that "noncompliance is a protean feature of all regimens that involve self-administration" (p. 11). The abundance of psychological theories on human behaviour reflect the difficulties in trying to resolve this phenomenon. Since there is no single way to explain behaviour, there is no single way to predict or understand compliance or noncompliance (Kinnaird et al., 1982). Compliance is further complicated by the tenuous link between the outcome of treatment and adherence, as outlined above (Eraker et al., 1984). Nonetheless, numerous factors associated with compliance have been found (Blackwell, 1973).

Although many of the variables invite intricate discussion, they will be presented in brief. For ease of reference, these have been listed under the headings "regimen related variables" and "patient related variables". The variables to be described are summarized in Table 2.

Table 2

Summary of Regimen and Patient Related Variables Found to Affect Compliance

Regimen Variables	Patient Variables
Disease/health problem	Experience with illness
Suitability of regimen	History of compliance
Efficacy of regimen	Health as a value
Side-effects	Age
Goal setting	Cost-effect
Complexity of treatment	Expectations
Duration of treatment	Locus of control
Patient-physician interaction	Self-efficacy
Traits of health practitioner	Motivational factors
Practical issues	Mood disturbance
Incentives, reinforcers	Social support
	Cognitive dissonance
	Social validation
	Demographic variables such as sex, marital status, socioeconomic status, education

2.1.7 Regimen-Related Variables

a. The extent of the disease/health problem itself: The stage of the illness and its treatment are important for compliance (Sackett, 1979) as a patient who is seriously afflicted will have to comply more in order to become well (Davis, 1968a; Epstein, 1984). Davis (1968a) and Haynes (1979) found patients who were more disabled by their symptoms to be less compliant than those who were not. Furthermore, the less well a patient is, the more complex the regimen is likely to be (Davis, 1968a). The complexity of a regimen is discussed below (see f.). For example, overweight individuals with diabetes mellitus need to measure their insulin levels accurately as these may be affected by eating the wrong kind of food. Overweight individuals who are not diabetic need to attend to their diet but not monitor their insulin levels. They consequently follow a simpler regimen than do overweight, diabetic individuals.

b. Suitability of the programme/regimen: The patient's needs must be adequately accommodated (Haynes et al., 1979). In order to accomplish this a suitable programme/regimen, based on a correct diagnosis (Sackett, 1979), must be prescribed for the patient (Dunbar, Marshall, & Hovell, 1979; Epstein & Cluss, 1982). This necessitates

that each individual be seen as unique, rather than part of a uniform group (Dunbar et al., 1979).

c. Efficacy of the programme: The programme itself must be seen as safe (Becker & Maiman, 1975; Becker et al., 1977b; Cummings et al., 1982; Eraker et al., 1984) and effective by both the physician and the patient (Taylor et al., 1984). Compliance was found to decrease if the significance of a regimen was not conveyed to the patient (Sensenig & Cialdini, 1984).

d. Side-effects: Haynes (1979) found that disability resulting from the symptoms more than the symptoms themselves resulted in lower compliance. In addition, individuals who denied the severity of the illness were less compliant than those who did not (Cassem & Hackett, 1977; Davis, 1968a; Imboden, 1972; Kavanagh et al., 1977; Kinnaird et al., 1982; Matthews & Hingson, 1977).

Extreme discomfort as a result of exercise has been associated with noncompliance (Lees & Dygdon, 1988). It would therefore be important to distinguish between side-effects sustained from the illness and those experienced from exercise.

e. Goal setting: Goals set by the health care advisor must be clear, desirable and realistically attainable by the

patient (Epstein & Cluss, 1982; Haynes, 1979; Rabkin, 1982-83; Sensening & Cialdini, 1984; Stern, Pascale, & Ackerman, 1977; Wenger, 1986). This is important with weight loss subjects where a distorted body-image may result in unrealistic goal setting (Rabkin, 1982-83).

Individuals must be allowed some choice as far as treatment goals are concerned (Eraker et al., 1984; Kinnaird et al., 1982; Sensenig & Cialdini, 1984). This results in a feeling of independence which may consequently improve self-esteem (Kinnaird et al., 1982). For example, overweight individuals need to have some say in their eating plan and/or the required weight loss.

Davis (cited in Cummings et al., 1982) and Eraker et al. (1984) found that some understanding of the reasons for treatment instructions was important for compliance. However, knowledge of the purpose of treatment has been positively correlated with compliance medication but not for following dietary instructions (Cummings, Becker, & Maile, 1980). Furthermore, knowledge alone is insufficient to make an individual compliant (Matthews & Hingson, 1977).

f. Complexity of treatment: A programme that is too complex will negatively affect compliance (Baekeland & Lundwall, 1975; Becker & Maiman, 1975; Belisle et al., 1987; Cummings et al., 1980; Cummings et al., 1982;

Eraker et al., 1984; Hulka, 1979; Matthews & Hingson, 1977; Sackett, 1979; Streja, Boyko, & Rabkin, 1982). An example of a complex programme is one that requires weight loss, smoking cessation and exercise compliance. A regimen that is tailored to fit an individual's daily routine can help alleviate some of the complexity (Dunbar et al,, 1979). For example, instructing patients to take their pills when they carry out a routine task, such as brushing their teeth, could assist in lessening the complexity of taking medication.

Davis and Eichhorn (cited in Cummings et al., 1982) noted that cardiac patients made those changes which required the least amount of adjustments to their life-style. Compliance with regimens that required changes in personal habits such as smoking, drinking and diet caused the most difficulty (Davis, 1967). Baekeland and Lundwall (1975) found that non-adherence with one aspect of a regimen, for example, diet, could result in noncompliance with another, for example, exercise.

Dunbar et al. (1979) and Eraker et al. (1984) advocate that gradual changes be implemented. Thus, a new step is introduced only if the previous one has been mastered. This recommendation would appear to be most logical when working with personal habits such as diet, exercise and smoking as these may be overlearned ways of reacting to certain crucial

cues in the environment (Sensenig & Cialdini, 1984). It is therefore important to assist the individual in learning new ways of coping before trying to eliminate old coping mechanisms.

g. Duration of the treatment: Research has shown that adherence on programmes that are run for an optimal period of 12 weeks have a higher rate of compliance than those that are conducted for a shorter or longer period of time (e.g., 6 or 18 weeks) (Haynes, 1979).

h. Patient-physician interaction: Various studies (Becker & Maiman, 1975; Cummings et al., 1982; Davis, 1968b; Eraker et al., 1984) have indicated the significance of this interaction itself as well as its various aspects for compliance. These include the rapport between doctor and patient and type of interaction (Davis, 1968b). For example, a formal interaction is less conducive to compliance than a friendly interaction (Davis, 1967). Whether instructions for the regimen were clear (Blackwell, 1973; Eraker et al., 1984; Hulka, 1979) and how well the physician had communicated that the health problem was severe, are also important. The recommended programme or regimen needs to be seen as life-saving by both doctor and patient (Davis, 1967; Taylor et al., 1984).

i. Traits of the health practitioners themselves: An overweight practitioner who smokes, for example, would not be a good role-model for a healthy life-style (Sensenig & Cialdini, 1984).

j. Practical issues: The time, place, cost, number of hours required to participate in the regimen, and the length of time the person was kept waiting before the appointment, were found to negatively affect compliance (Andrew et al., 1980; Archer, Rinzler, & Christakis, 1967; Bruce, et al., 1976; Haynes, 1979; Oldridge et al., 1983; Taylor et al., 1984). Belisle et al. (1984) found high dropout rates in early morning sessions.

k. Incentives, reinforcers: The use of contracts which are drawn up between the client and the practitioner, telephone calls, reminders and good listening have been found to enhance compliance (Belisle et al., 1987; Zifferblatt, 1975).

2.1.8 Patient-Related Variables

a. Experience with the illness: Cummings et al. (1982) and Eraker et al. (1984) found patients who had experienced their illness for longer to be poor compliers compared to those who had experienced their symptoms for a shorter time. They indicated a causal factor to be little or no change in their condition, despite compliance. Davis and Eichhorn

(cited in Davis 1967), however, found cardiac patients who had been impaired for a longer period of time to be more compliant. This has also been the experience of the researcher in her work with cardiac patients. It would seem that those patients who had experienced discomfort and who were pain-free after their bypass operations were relieved by the absence of symptoms and were more likely to comply than those patients who had no or little symptoms leading up to either their bypass operations or coronaries.

b. Previous history of compliance: Patients who had previously dropped out of programmes are more likely to be noncompliant than those who had not (Baekeland & Lundwall, 1975; Sackett, 1979).

A previous history of noncompliance is particularly prevalent for weight loss individuals. Research confirms a poorer prognosis for individuals who have dieted many times than for those who have not (Jeffery et al., 1985). Schachter (cited in Brownell, Marlatt, Lichtenstein, & Wilson, 1986) views a relapse, or deviation from the eating plan, as positive providing that it is used as a learning experience. New ways of coping can be learned as a result of the experience thereby preventing further relapses (Schacter, cited in Brownell et al., 1986). This emphasizes the importance of identifying noncompliers at the inception

of a programme and using noncompliance in a positive way for the individual to learn new coping methods.

c. Health as a value: An association between poor compliance and an adverse attitude towards health has been noted (Epstein & Cluss, 1982; Lau, Hartman, & Ware, 1986; Mechanic & Cleary, 1980; Shephard, Corey, & Kavanagh, 1981). Research has also shown that middle-aged people value their health more highly (Taylor et al., 1984). If a patient has a fairly high regard for health then complying to a particularly regimen may not be as difficult as it would be for the person who does not have a high regard for his/her health.

Patients with better health behaviours and/or higher health values were generally found to be more compliant (Epstein, 1984). Individuals who smoke have been found to be more noncompliant than non-smokers (Oldridge, 1984; Streja et al., 1982).

d. Age: The literature on this variable is diverse. Taylor et al. (1984) found middle-aged patients to be more compliant. This may however be due to the fact that these particular subjects valued their health more highly (as mentioned above) and that "health value" more than "age" was the operant variable. Cummings et al. (1982) and Schilling (1985) found older patients to be more

compliant. Becker et al., (1977b) found either very young or very old patients to be more compliant.

e. Cost-effect: A regimen that is very disruptive to an individual's life-style and family life may require that the patient forego a lot in order to comply (Becker et al., 1977b; Cummings et al., 1982; Hollis, Connor, & Matarazzo, 1982; Suls, 1984). Therefore, changes need to complement the present life-style and not interfere with it.

f. Expectations: These must be realistic and met if possible (Bennett, 1986; Epstein & Cluss, 1982; Hulka, 1979; Kinnaird et al., 1982). Expectations that are not met may result from unrealistic goals (as discussed in b. above under "regimen related variables").

g. Locus of control: This is defined as an individual's perception of personal (internal locus of control) or situational (external loscus of control) factors which cause or influence specific events (Watson, Greer, Pruyn, & Van Den Borne, 1990). Locus of control has been positively correlated with compliance (Brownell, 1984a; Colvin & Olson, 1984; Epstein & Cluss, 1982; MacDonald, 1985; Mechanic & Cleary, 1980; Streja et al., 1982). Herman, Olmstead, and Polivy (1983) found obese individuals to be more susceptible than non-obese individuals to external influences such as food cues. Individuals with a

fatalistic view of their health problems (i.e., external locus of control) have been found to be less compliant (Chen & Land, 1986). An example is the attitude that an illness is due to bad luck. Research has shown that a feeling of control over one health behaviour area may result in positive changes in others (Epstein, 1984). This links to the comment in b. above that compliance on one variable leads to compliance on another.

h. Self-efficacy: This is the extent to which an individual feels capable of carrying out the required behaviour change (Hartigan, Baker-Strauch, & Morris, 1982; Mitchell & Stuart, 1984; Rosenstock, Strecher, & Becker, 1988).

Bandura (1977) distinguishes between locus of control, discussed above, and self-efficacy. He believes locus of control to be a more generalized concept of the self which is related to outcome expectations. Self-efficacy is a belief in one's personal abilities in a specific setting (Bandura, 1977). Locus of control and self-efficacy are linked by virtue of the fact that outcome expectancy is affected by the perceived ability to carry out a particular action. For example, a cardiac patient who is informed that stress management is an important factor for the prevention of further heart problems needs to believe that he/she can cope with stress in order to carry out the required action.

i. Motivational factors: A sense of commitment and a motivation to change are necessary for compliance (Sensenig & Cialdini, 1984). The trigger factor which resulted in the desire to change is also significant (Colvin & Olson, 1984). For example, the individual who is coerced or pressurized into joining a weight loss programme is less likely to comply than the individual who voluntarily signed up.

j. Mood disturbance: Lower compliance in depressed (Haynes, 1979; Giese & Schomer, 1986) and anxious persons (Holm et al., 1985) has been found.

k. Social support: The importance of support by family, friends and colleagues for compliance has been cited extensively (Berkanovic, 1976; Brownell et al., 1986; Cummings et al., 1982; Eraker et al., 1984; Kinnaird et al., 1982; Rosenstock, 1988). A lack of social support has been linked to noncompliance (Berkanovic, 1976; Brownell et al., 1986; Cummings et al., 1982; Eraker et al., 1984; Kinnaird et al., 1982; Rosenstock, 1988). Berkanovic (1976) found the social networks formed by friends, family and work to shape beliefs and behaviour.

l. Cognitive dissonance: Dissonance between the patient's attitude and values and the doctor's advice was found to affect compliance negatively (Davis, 1967, 1968b; Vincent,

1971). For example, if a doctor advises a patient to stop work, consideration of the patient's attitude towards work is important if it is highly valued by the individual. Hence, if the patient does comply, dissonance would result between the enjoyment received from going to work and the fear of not adhering to the doctor's advice. If the patient does not comply, dissonance may arise because of the newly learned knowledge that nonadherence will endanger his/her health. Davis (1968b) points out the importance of taking social, psychological and cultural facets of a patient into consideration when addressing this issue.

m. Social validation: Sensenig and Cialdini (1984) describe this as the degree to which the individual identifies with the way others are behaving in the same situation. An example of this is an overweight individual who sees other overweight participants on a weight loss programme as working towards a common goal of weight loss. An extremely overweight individual would probably feel very uncomfortable in an aerobic class attended by women with perfect figures.

n. Demographic variables: Race, socio-economic status, and sex have not been found to affect compliance (Mushlin & Appel, 1977).

2.1.9 Summary

This section of the literature review highlighted the importance of a clear definition of compliance and the distinction between short- and long-term compliance. It also points out that while outcome of treatment may be the most common form of measurement of compliance in the literature, the assessment of outcome alone oversimplifies the issue as this may be influenced by a number of factors. Therefore, compliance for all recommended behaviours and health care advice which form part of a particular regimen needs to be examined.

Although various methods have been utilized to understand and investigate compliance, the HBM is commonly employed. The numerous regimen and patient related variables that have been associated with compliance will be incorporated into the HBM framework in the following section on the literature reviewed for the HBM.

2.2 THE HEALTH BELIEF MODEL (HBM)

This section of the literature review outlines general information about the HBM and presents its research and theoretical origins and development. The HBM variables are discussed in detail, followed by support for and criticisms of the model. The reformulated version of the HBM utilized in this study is then discussed.

2.2.1 General Information About the HBM

The model emphasizes the effect on beliefs of a decision-making process carried out within the realms of interaction with other individuals and events (Becker et al., 1979). Beliefs therefore provide a setting for responses in the various stages of the decision-making process and determine subsequent behavioural choices (Rosenstock, 1966). In this perspective, the individual is viewed as an active recipient of instructions and the variables used in the model relate to the subjective world of the individual and how these personal states in turn link to the individual's current health behaviour (King, 1984; Rosenstock, 1966).

Although the model has been used successfully to predict and explain health behaviour in a vast array of studies, it does not claim to explain all health related behaviours (Becker & Maiman, 1975). It does, however, offer a framework from which to understand health actions (Kelly et al., 1987; Rosenstock, 1966). The model's success has been attributed to its emphasis on the cognitive evaluative responses of the individual, rather than trying to determine characteristics of the noncomplier (King, 1983).

In 1977, the Carnegie Grant Subcommittee on Modification of Patient Behaviour for Health Maintenance and Disease Control, used the Health Belief Model as an organizing rubric in their review of various formulations to explain

health-related behaviour (Becker et al., 1977a). Their rationale for using the HBM was that (a) it provided potentially modifiable links between demographic, background and resource variables of other models and could be applied to a variety of dependent variables; (b) was derived from a core of well-established theory; and (c) its theoretical basis and variables were similar to those of other models of decision-making under uncertainty.

A diversity of populations, settings, health conditions health-related actions, approaches and tools have been researched (Becker et al., 1977a; Janz & Becker, 1984). The model's flexibility and adaptability in explaining various health behaviours is apparent in the vast number of studies (to be discussed in 2.2.6) which have successfully utilized its framework.

2.2.2 Research Origins

The HBM originated from several independent research studies undertaken between 1950 and 1960 by a group of Public Health Service investigators in the U.S.A. (Rosenstock, 1974). During this period, prevention, and not the treatment of disease was a major concern for Public Health Care workers.

The original HBM was subsequently developed in order to explain voluntary preventive, or disease avoidance, health

behaviour. This was behaviour undertaken by individuals who considered themselves healthy and who wished to prevent or detect illness (Kasl & Cobb, cited in Rosenstock, 1966; Rosenstock, 1974). Annual check-ups, screening tests and immunizations for the early detection of diseases that develop without early overt symptoms (i.e., asymptomatic diseases) were examined (Rosenstock, 1974). The diseases examined include cervical cancer, dental disease, rheumatic fever and immunization for polio and influenza.

The focus on disease-avoidance in the original version of the model excluded positive health behaviours, sick-role and illness behaviours. Kasl and Cobb (cited in Rosenstock, 1974) define these behaviours as follows.

Positive health behaviours are defined as actions undertaken by an individual to improve an already good state of health, for example, taking vitamins to supplement the daily diet. Sick-role behaviour consists of the actions undertaken by an individual who is symptomatic, or who has overt signs of illness (e.g., rheumatic fever). Illness behaviour, is the action carried out by those who feel they are in a state of ill health and who need clarification of this. An example of this is an overweight individual who feels extremely tired and who would like to assess whether or not this is related to his/her weight problem.

The omission of these health problems in the original works was due to pressing research requirements and the disparity has since been bridged.

2.2.3 Theoretical Origins

The model's theoretical foundations emanate from a core of well-established psychological and behavioural theory (Becker et al., 1977b) and the field theory of social psychologist, Kurt Lewin, played a particularly significant role in the development of the HBM (Rosenstock, 1966). Of importance to this study is the contribution of the theory as utilized for the development of the HBM. Therefore, the depth of the theory as an explanation of personality, as well as controversies lodged against it, will not be discussed. Since the HBM has been used successfully to explain a range of health behaviour, the inherent value of the theory as utilized in the model, may be assumed.

Kurt Lewin's field theory utilizes mathematical concepts to describe interactions between the individual and the environment. His theory has been criticized for the misuse of physical and mathematical concepts. However, for ease of interpretation, the terminology will be presented as adopted in the theory (Hall & Lindzey, 1978).

Lewin's theory separates the individual and the world of which he/she is a part. The individual and his/her psychological environment make up the "life space" which is described as the "whole of psychological reality" (Hall & Lindzey, 1978, p. 389). The life space is separated from the physical environment by permeable and variable boundaries through which two-way communication takes place. Hence psychological factors may impact on the environment and vice versa.

Behaviour is a function of how an object or event is perceived within the context of its total field. Lewin uses the dynamic concepts of energy, tension, need, valence and force or vector to describe concrete behaviour in actual situations. These concepts will be discussed in brief.

Lewin sees the individual as a complex energy system which is constantly striving for equilibrium. A state of equilibrium means that energy (or tension) is equally distributed in the system. Disequilibrium indicates that increased tension exists to a greater extent in one part of the system than in another (Hall & Lindzey, 1978).

Changes to the state of tension result from either internal or external cues. These changes may result from needs such as hunger, wishes, drives and urges or from the individual's perceived valence of psychological and/or physical factors.

The individual is seen to live in a life space made up of regions which are valued in varying degrees (Rosenstock, 1974).

Positively valued forces (positive valence) exert forces which pull the individual towards the region, resulting in a decrease in tension. For example, the desire for a state of physical and mental wellness motivates an individual to carry out positive health behaviours, thus relieving the tension of feeling unhealthy. That is, the individual actively does something about his/her state of health. Negatively valued forces (negative valence) repel or push the individual away from a region and result in an increase in tension. Disease, for example, is an undesirable state of health which results in an increase in tension. Relatively neutral forces are seen to have no effect. The individual's daily decisions are seen to be affected by a process of being pulled by positive forces and pushed by negative forces (Rosenstock, 1974).

Behaviour in this perspective is based on (a) the subjective value of an outcome, and (b) the expectation that the proposed action will result in the desired consequence (Rosenstock, 1988). Behaviour is then predicted from the value that an individual places on an outcome, as well as from the expectations that the individual has about the behaviour achieving the desired outcome (Becker & Maiman,

1975; Becker et al., 1977b; Lewin, cited in Becker & Maiman, 1975). This "value-expectancy" concept describes an individual's act of decision-making under conditions of uncertainty or where a choice is required.

2.2.4 Development and Use of the HBM

The above "value-expectancy" concept was used to develop the HBM. As in the Lewinian tradition, the HBM focussed on current rather than historical events experienced by individuals (Rosenstock, 1974). Thus, current issues were conceived to determine behaviour, while historical issues were of importance only if represented in the current dynamics. The relationship between behaviour and beliefs was formally called the Health Belief Model. Transcribed into health-related terms the "value-expectancy" concept would be (a) the desire to avoid illness (or get well if ill) (value aspect), and (b) the expectation that the action would prevent (or ameliorate) an illness (expectancy aspect) (Rosenstock, 1966).

The earliest preventive health care model postulated that inherent beliefs energized and directed behaviour (Kirscht, cited in Chen & Land, 1986). Thus, in order for health behaviour to occur, certain health beliefs had to exist. A causal influence of beliefs on behaviour was thus inferred.

It was hypothesized that an individual would not pursue preventive medical care or advice unless he/she had (a) at least minimal levels of the relevant health knowledge (i.e., health beliefs), (b) sufficient motivation ("sufficient" not defined in the literature), (c) saw him/herself as threatened by or vulnerable to the particular health risk in question, and (d) was in a necessary state of psychological readiness to act before a decision to carry out any health action could be made (Rosenstock, 1966; Rosenstock, 1974; Becker & Maiman, 1975; Becker et al., 1977b).

In the original disease-avoidance model (see Figure 1), the extent of the individual's readiness to undertake preventive health action was determined by five interrelated constructs, or variables (Rosenstock, 1966), namely:

1. The individual's (and not the professional's) perception of the degree of his/her susceptibility to an illness.

2. The extent to which the individual felt that contracting the illness could have serious physical, psychological and or social consequences (severity).

3. Whether the intended action would reduce susceptibility and/or severity (benefits).

4. No serious barriers were seen to impede the action.

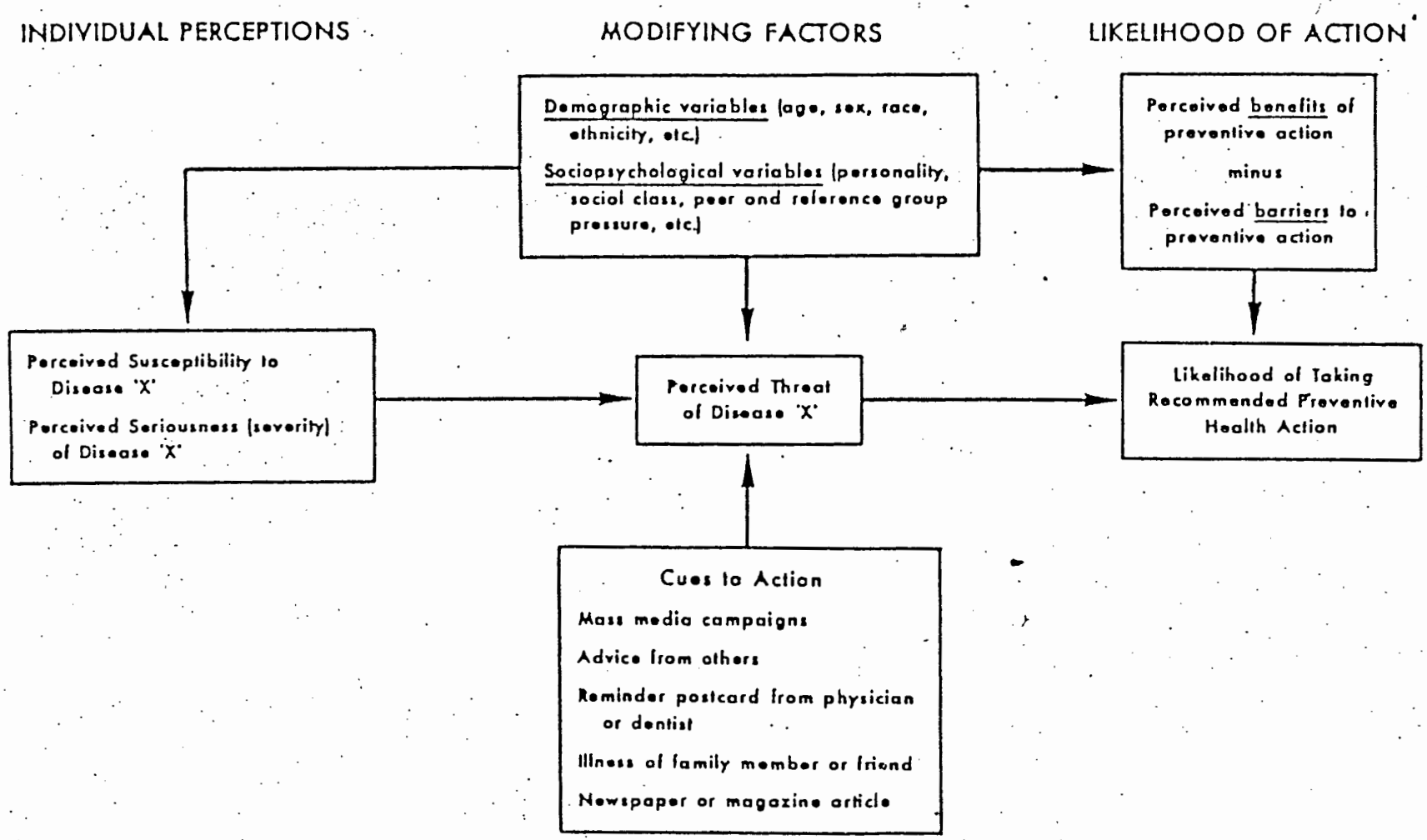


Figure 1. Original Formulation of the Health Belief Model (Becker and Maiman, 1975)

5. A cue or stimulus triggered the action.

Susceptibility and severity constituted the person's perceived state of readiness to carry out the health action. Benefits, minus the barriers determined the likelihood of the health behaviour being carried out. A cue or stimulus was necessary to trigger the action. Modifying variables such as demographic, socio-psychological and structural factors were seen to have a conditioning and not a causal effect on ensuing behaviour (Becker, Drachman, & Kirscht, 1972a, b).

Based on research by Becker et al. (1972a, b) the variable of "motivation" was formally incorporated into the model. Hence, in subsequent formulations of the model, six variables were seen to interact to determine readiness to act. These were motivation, perceived susceptibility, severity, benefits, barriers and cues to action (see Figure 2).

Becker and Maiman (1975) found individuals with a combination of beliefs to be more compliant than those who did not exhibit a combination of beliefs. For example, the individual who believed only in susceptibility would be less likely to comply than the individual who believed in both his/her susceptibility to, and the severity of, a disease. In addition to this, the individual who believed in the

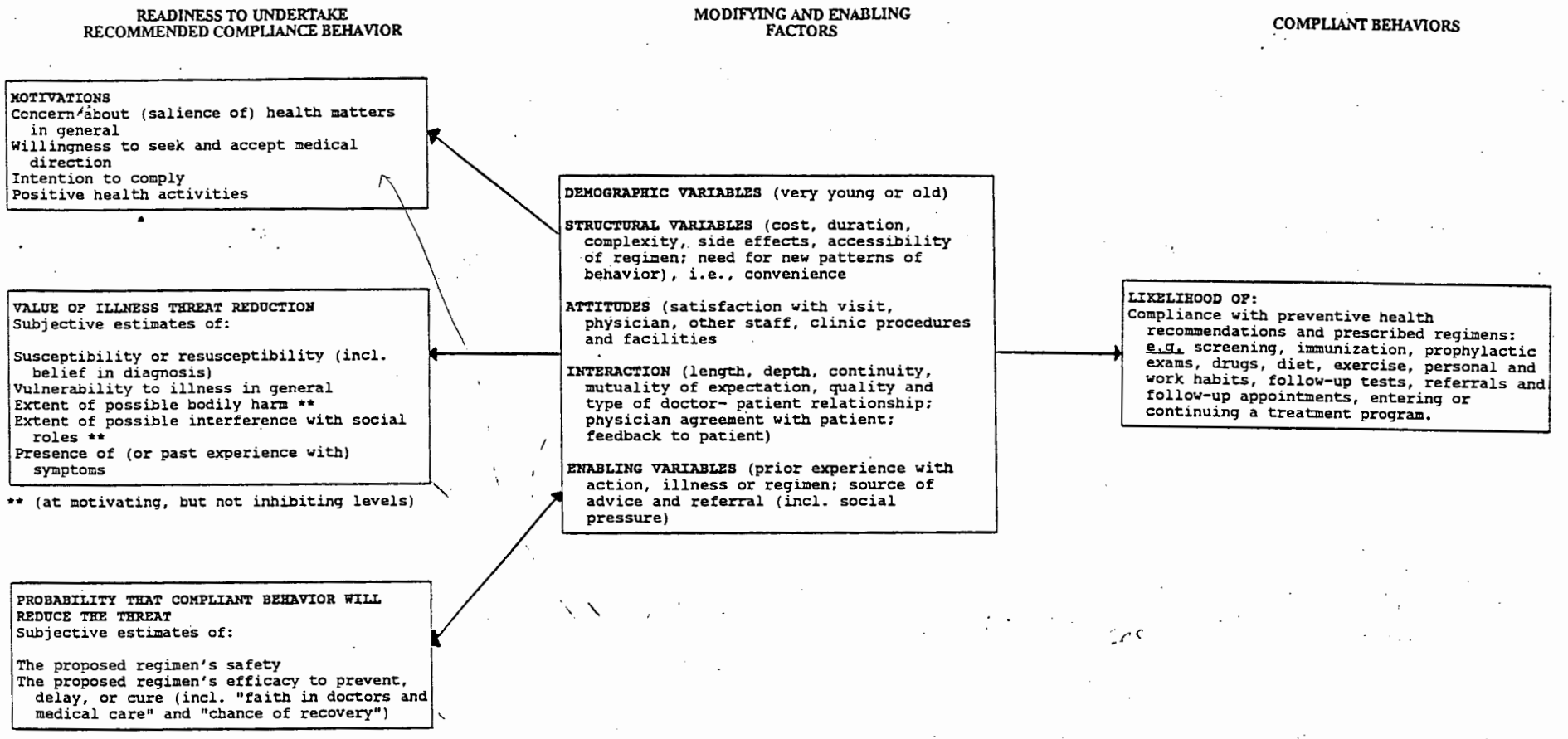


Figure 2. Revised formulation of the Health Belief Model (after Becker and Maiman, 1965)

benefits and efficacy of the proposed action would be more likely to comply than an individual who did not see the benefits. Furthermore, compliance was lower if more barriers (or "costs") than benefits were perceived by an individual. The above variables constitute the measurable indicators of the model. These measurable indicators represent the theoretical constructs or latent variables of the model, specifically the individual's health beliefs (Chen & Land, 1986).

The variables will now be discussed in more detail. For ease of reference each variable as it was included in the original disease-avoidance model for preventive behaviour (see Figure 1) will first be introduced and explained. Changes which have occurred since the inception of the model will then be outlined so as to present an up-to-date depiction of each variable used in the HBM (see Figure 2). Regimen and patient variables related to compliance (as discussed in the previous section on compliance) will be included into the relevant HBM components so as to clearly show the link between the literature on compliance and HBM.

2.2.5 HBM Variables

The individual's readiness to act is determined by the variables of motivation, perceived susceptibility to an illness and perceived severity of contracting the illness; as well as a cost-benefit analysis of the benefits of

carrying out the behaviour minus the barriers which might impede the action.

2.2.5.1 General Health Motivations

General health motivation was not included in the original model (see Figure 1) as readiness to act for preventive health behaviour was seen to be sufficiently encapsulated in the variables of perceived susceptibility, severity, benefits and barriers.

Based on a study by Becker et al. (1972a) and a vast literature survey by Becker and Maiman (1975) the traditional model was expanded and reformulated to include a general health motivation variable (see Figure 2). This concept investigated the various stimuli which induced reactions to health cues. Possible influences on positive health motivation included general health concerns, beliefs and practices. Inclusion of this dimension allowed for representation of individual differences concerning health matters.

Becker et al. (1977b) included the concepts of "intention to comply" and "general positive health activities" within the variable of health motivation. This was based on their findings that mothers who undertook general health precautions for their children, such as giving supplements to the diet and owning a fever thermometer were more

compliant than those mothers who did not. This aspect of the HBM therefore assesses the patient related variables of "health as a value" and "motivation" factors for change.

2.2.5.2 Perceived Susceptibility

This variable constitutes the likelihood of the individual taking health behaviour action as a result of the level of perceived fear of being vulnerable to a particular illness or disease, or the possibility of the illness occurring (Becker & Maiman, 1975). Hence, higher levels of compliance were anticipated for individuals who perceived themselves as being highly susceptible to an illness.

As a subjective estimate of the risk involved, the level of perceived susceptibility may vary widely from individual to individual (Rosenstock, 1974). For example, an obese individual may experience various degrees of perception of susceptibility to myocardial infarction. One extreme may be absolute denial of all possibility of ever having a heart attack. The other extreme may reflect an intense fear of having a heart attack and a more moderate position would be acceptance of the potential risk for a heart attack.

In more up-to-date versions of the model (see Figure 2), this variable has been reformulated to include the question of resusceptibility to a particular illness for those individuals who are symptomatic or who have been diagnosed

as having the illness in question (Becker & Maiman, 1975). Compliance was more prevalent in those cases where individuals believed noncompliance with the required behaviour might result in resusceptibility to the same illness, or susceptibility to other illnesses (Becker et al., 1972a, b).

"Susceptibility to illness in general", as well as "belief in the diagnosis" were added to the dimension of susceptibility (Becker & Maiman, cited in Janz & Becker, 1984). These additional dimensions enabled the examination of broader health indices and behaviours (e.g., illness and sick-role behaviours).

Although an individual may recognize his/her susceptibility to an illness, no action will be undertaken unless he/she believes that becoming ill (be it an initial occurrence of for the first time or a reoccurrence of the illness) would have serious organic and/or social consequences (Becker & Maiman, 1975). This is the perceived severity of an illness.

2.2.5.3 Perceived Severity

This variable designates the likelihood of an individual taking action as determined by his/her perception of the complications, problems and threat posed by contracting the

illness (or leaving it untreated if a diagnosis has already been made). In the case of a confirmed diagnosis, the concept of vulnerability, perceived resusceptibility and severity are related to the severity of the disease at the onset and at the point when medication is given (Becker et al., 1977a). The regimen related variable of "the extent of the disease or health problem itself" is therefore covered by the severity component of the HBM.

Perceptions of severity regarding the seriousness of an illness and its consequences may vary from individual to individual. The degree of seriousness can be influenced by the emotional reactions created by the thought of the disease, as well as by possible medical and or clinical complications (Rosenstock, 1966; Rosenstock, 1974).

For example the individual with angina may be concerned that the illness will reduce his/her physical functioning or perhaps lead to another heart attack and even death. If the illness itself does not impose severe physical complications, the individual may be concerned about its effect on his/her job and personal life (Rosenstock, 1966). An example of this is the individual who feels physically fit after a heart attack but who is concerned about possible interference of his/her illness with family life. This may take the form of fear of sexual activities or general over-exertion.

In the absence of symptoms, the consequences of contracting the illness may be sufficient to motivate an individual to carry out health-related behaviour. The presence of symptoms as in illness and/or sick-role behaviours, however, exerts an elevating effect on perceived severity and motivates the individual to carry out the health related behaviour (Rosenstock, 1966).

The degree of severity of the symptoms may also affect the desire to adopt health-related behaviour (Becker & Maiman, 1975; Becker et al., 1977a). Extremely severe or moderate symptoms may have a negative effect on the inclination to undertake the regimen. Minor symptoms may not be sufficient to motivate action (e.g., the smoker who develops a sore throat), while severe symptoms may inhibit action as a result of a fatalistic attitude. An example of the latter is an individual who has a terminal disease such as cancer and who feels that the symptoms are so bad that nothing can be done to improve his/her health.

Although the above variables of motivations, perceived susceptibility and severity, were viewed as providing a force to action, they were not hypothesized as defining the course of action itself (Rosenstock, 1974). The actual direction of the particular health-related action would be

affected by beliefs concerning the benefits or effectiveness of available alternatives to reduce the susceptibility and severity of an illness weighed against the barriers inherent in the health action. Thus, the next step in the decision-making process involves an evaluation of the perceived benefits in undertaking the health action.

2.2.5.4 Perceived Benefits

This is the individual's evaluation of the feasibility and efficacy of the health-related behaviour or treatment programme in reducing or preventing susceptibility and/or severity. This component therefore incorporates the regimen related variables of "suitability of the regimen" and "efficacy of the regimen".

Effective methods to prevent or control the susceptibility and/or severity must be available and the individual must have faith in the physician (Rosenstock, 1966; Becker & Maiman, 1975). For example an individual who believes he/she is susceptible to cancer, but who also knows there is no effective method to control or prevent the illness, would experience a conflict in his/her decision-making process as there seems to be little positive valence in carrying out the health-related behaviour. This could result in a delay in seeking help or carrying out the action.

Under the dimension of benefits, Becker et al. (1977b) included the variable "feeling of control over problem" in a study on prediction of dietary compliance. In subsequent studies using the HBM, this variable has sometimes been included separately, as in Sweeney and Gulino (1987) to explain breast-feeding behaviour and Champion (1987) to assess breast self-examination. At other times, as in Chen and Land (1986), this concept is included within the dimension of "general health perception/motivation".

In the next step of the cost-benefit analysis, the benefits of carrying out the health action are weighed against the barriers or (Janz & Becker, 1984). The intended action would be seen as beneficial if it can reduce the susceptibility or severity of the illness and if the barriers do not exceed the benefits. The individual therefore weighs the effectiveness of the intended course of action for reducing susceptibility and/or severity against the barriers inherent in the proposed action. The HBM components of benefits minus the barriers inherent in the compliance behaviour measure the patient related variables of "cost-effect" of carrying out the behaviour and "cognitive dissonance" experienced by the individual.

2.2.5.5 Perceived Barriers

These are the individual's perception of physical (painful, unpleasant), psychological (upsetting), financial (costly),

social and/or other barriers (inconvenience) which may be inherent in the proposed action (Rosenstock, 1966).

Based on substantiating data from other studies, further structural, attitudinal, interaction and enabling factors were added to the existing model (Becker et al., 1977b). These were the complexity of a regimen (a structural variable); attitudes towards the visit, the physician, the facility and the procedures; and interaction variables which consisted of the patient-practitioner relationship and physician continuity. Enabling factors included prior experience with the action, illness or regimen; social influence (e.g., from friends and/or family) and source of advice or referral.

Demographic (e.g., age, sex, ethnic group) and socio-psychological factors (i.e., personality, social class, peer and reference group pressure) were seen to have a conditioning effect on the individual's motivations to carry out health-related behaviour. Therefore, a cause-effect relationship was not established for these factors (Becker & Maiman, 1975; Becker et al., 1977b; Haynes, 1979).

The regimen related variables of "side-effects from" and "complexity of" the programme and "practical issues" fall under the HBM component of "structural variables". "Goal setting", "duration of treatment", "patient-physician

interaction", "traits of the health practitioner" "incentives, reinforcers" and "expectations" (the latter a patient variable) are examined by the HBM subcomponents of "attitudes" and "interaction".

Barriers result in conflicting motives for which various resolutions are possible (Rosenstock, 1966) and may negatively affect compliance (Becker & Maiman, 1975).

If the level of readiness to act is high, and the barriers weak, that is, the benefits outweigh the barriers, then the action will be adopted. An example of this is an individual who wants to regain a certain level of fitness and who joins a health club in the same building where he/she works. This individual knows the consequences of being unfit (susceptibility and severity) and knows he/she can reach his/her previous level of fitness at the health club (efficacy and benefits). By joining a health club in the same building where he/she works, the number of barriers such as inconvenience, etc., that may have incurred are diminished.

If the readiness to act is weak and the barriers strong, that is, the barriers outweigh the benefits, then action will not be undertaken. For example, the individual who has

to travel extreme distances to get to the exercise venue may see this as too cumbersome to carry out the health action.

If both the level of readiness and barriers are high, then the individual may experience difficulty in resolving this conflict. The individual may demonstrate two possible reactions (Rosenstock, 1966).

Firstly, the individual may remove him/herself from the conflict by engaging in activities which do not really reduce the threat, but which reduce the level of anxiety. For example, a grossly overweight individual who is aware of the risks involved and who really wants to lose weight may have a high level of readiness. However, if food plays an important coping function (Burbach & Schomer, 1987), then the barriers to carrying out the health behaviour of dieting may also be considerable. Such an individual may appease the conflict by promising to diet and thus momentarily relieve the conflict between the barriers and the benefits. That is, he/she alternates between the choice of overeating and being overweight without carrying out the decision to diet. The individual therefore vacillates between the two conflicts without deciding to deal with the situation.

The second possibility of resolving the conflict which may occur if both the readiness to act and barriers are high, is a marked increase in the level of fear or anxiety

(Rosenstock, 1966). It is important to note that a substantial increase in anxiety may prevent an individual from even thinking or acting rationally. This may result in the inability to consider alternative means of dealing with the situation (Burbach & Schomer, 1987; Rosenstock, 1974).

Certain dimensions which make up the model, such as motivation, perceived susceptibility, severity, benefits and modifying factors (to be discussed) such as cost, duration, complexity, etc., could also constitute a barrier (Becker & Maiman, 1975; Becker et al., 1977a, b; Rosenstock, 1966, 1974). For example, symptoms that are too severe may have an inhibiting effect on motivation. Equally so, an individual who does not believe in the intended health action's efficacy may also experience this as a barrier.

Although motivations, perceived susceptibility and severity were seen as forces to action, while perceived benefits, minus the perceived barriers, provided a path of action, some trigger or cue was required to set the action in motion (Rosenstock, 1974). This was considered important as the above factors could result in high levels of intensity without any overt action.

2.2.5.6 Cues to Action

A "cue to action", either internal or external, made the individual aware of the potential health threat and hence triggered the appropriate health behaviour (Becker & Maiman, 1975; Becker et al., 1977a; Becker et al., 1979). An internal cue could be symptoms or bodily states, such as extreme tiredness in an overweight individual, or chest pains in an angina patient. A belief that smoking may cause cancer is also an internal cue. External cues could be social pressure, health advice or reminders from health care practitioners in the form of pamphlets, media input, or interaction with someone who had a similar experience.

The required intensity of the cue was related to the degree of readiness to act in terms of the levels of susceptibility and severity (Becker & Maiman, 1975). Hence, low levels of susceptibility and severity required an intense cue or stimulus. For example, an individual who does not believe that he/she is susceptible to a heart attack may only go for a check-up if extreme symptoms are experienced (e.g., severe chest pains). Very intense levels of susceptibility and severity require only a slight cue. For example, an individual who believes him/herself to be highly susceptible because of a familial history of cardiac disease may visit a physician as a result of seeing a relevant poster.

Initially, this dimension of the model was not as clearly researched as the others because of the difficulty in operationalizing the concept of "cues" in retrospective studies (Rosenstock, 1966). In studies of this nature the beliefs and behaviours are measured simultaneously and cues (such as a fleeting glance at a poster) can easily be forgotten. Hence the difficulty in trying to assess the cause some time after the event has occurred is evident.

Significant correlations for this variable have subsequently been found in understanding mothers' compliance with paediatric medical regimens (Becker et al., 1972a, b); compliance with influenza inoculation (Larson et al., cited in Janz & Becker, 1984); anti-hypertensive regimens (Nelson et al., cited in Janz & Becker, 1984); dieting and exercise behaviour (O'Connell, Price, Roberts, Jurs, & McKinley, 1985), breast-feeding practices (Sweeney & Gulino, 1987); and medication compliance among psychiatric outpatients (Kelly et al., 1987).

2.2.6 Evidence in Support of Components of the HBM

The findings of three major reviews of 46 studies which used the HBM up to and including 1984 are relevant (Becker & Maiman, 1975; Becker et al., 1977a; Janz & Becker, 1984). Predictive and explanatory values for compliance to preventive, sick-role and illness behaviours were found for

the components of susceptibility, severity, benefits and barriers.

Since the reviews, the model has also been used successfully to measure cardiac (Holm et al., 1985) and obesity subjects' beliefs (Filingeri, 1985); the relationship between breast self-examination and HBM variables (Champion, 1987); medication compliance among psychiatric outpatients (Kelly et al., 1987); and breast-feeding practices in Hispanic populations (Sweeney & Gulino, 1987).

None of the above-mentioned reviews cited significant findings on "motivation" as a separate variable. However only prospective studies which included "motivation" in the HBM framework (i.e., the individual's beliefs were identified at one point in time and the particular behaviour measured at a later stage), report positive findings for this variable (Becker et al., 1972a, b; Becker & Maiman, 1975; Becker et al., 1977b; Chen & Land, 1986; Janz & Becker, 1984). In addition, "motivation" has not been found to contribute significantly to the understanding of compliance as a separate variable. That is, it is only significant in conjunction with the other HBM variables.

Of the 46 studies reviewed, 18 were prospective and 28 were retrospective (i.e., the individual's beliefs and behaviour were tapped concurrently but with the assumption that

beliefs existed prior to the particular behaviour). For example the present study looks at beliefs held by obese and cardiac patients on joining the programmes and how these affected short- and long-term compliance. Historical beliefs are therefore measured along with current behaviours. Retrospective studies have been criticized because they do not allow causal patterns to be tested (Chen & Land, 1986). That is, if cause precedes effect, then beliefs should be measured before behaviours.

Janz and Becker (1984) used a "significance ratio" to indicate the contribution of the HBM dimensions in three major types of research. These were preventive health, illness and sick-role behaviour (defined above) and clinic utilization studies of paediatric services, physician visits, preventive, acute and accident visits, clinic appointment keeping, illness-related and general services in a health maintenance organization. The ratio was calculated by dividing "positive and significant statistical findings for HBM dimensions by the total number of studies which reported significant levels for that dimension" (Janz & Becker, 1984, p. 1).

A combination of all the findings from the various studies which looked at the HBM and health-related behaviour found the dimensions of the model to contribute significantly to understanding health behaviour in the following descending

order: barriers (89%), susceptibility (81%), benefits (78%) and severity (65%). The breakdown for the findings for preventive, illness and sick-role and clinic utilization studies is outlined in Table 3.

Janz and Becker (1984) ascribed the low contribution of susceptibility in the sick-role behaviour studies to the difficulty in operationalizing this dimension of the model when an illness has already been established, or where symptoms are evident.

Becker and Maiman (1975) and Janz and Becker (1984) accord the low contribution of severity in the clinic and preventive health studies to (a) the lack of symptoms as a motivating factor, and (b) the absence of a diagnosis for these illnesses. The significant contribution of severity to the sick-role behaviour studies is because these individuals are symptomatic or have already been diagnosed as ill.

Of importance in the reviews was that the order of significant ratios for both prospective and retrospective studies was the same regardless of study design. This finding evidently undermines the criticism that since retrospective studies do not enable the establishment of causal links, the findings may not be as relevant as those yielded by prospective studies (Becker & Maiman, 1975;

Table 3

Contributions of HBM Components to Understanding Compliance

Type of Study	HBM components			
	Susceptibility	Severity	Benefits	Barriers
Preventive	86%	50%	74%	93%
Illness/sick-role	77%	88%	80%	92%
Clinic	67%	33%	100%	50%
Total all studies	89%	65%	78%	89%

Becker et al., 1979; Haefner & Kirscht, 1970; Rosenstock, 1966, 1974).

As outlined above, the evidence in support of the HBM is substantial. The criticisms of the HBM that have been voiced are discussed below.

2.2.7 Criticisms of the HBM

Criticisms by one of the authors of the original model were made in one of the earliest papers on the HBM (Rosenstock, 1966).

> He commented that (a) little is known about the stability of the beliefs although they may vary from time to time as a function of situational changes, and (b) that nothing is known about the genesis of the beliefs, nor of the conditions under which they are acquired. Seemingly, the potential value of the model would be greatly enhanced if the origins and development of the health beliefs were specified and if the beliefs were placed within a broader theoretical framework that would account for responses to a wide variety of stimuli. That is, experimental studies must be undertaken to determine the causal role of the relevant health beliefs. (p. 109)

It is indeed surprising that researchers who have used the model since its inception have not sought to include these very important elements into the model, or that those who have criticized the model do not acknowledge Rosenstock's observations as outlined above.

Hence, the criticism by King (1983, 1984) that the model lacks a theory of attribution of health beliefs is indeed valid, but not new. Equally so, the objection that the model assumes that health beliefs are inherent and present before the health behaviour occurs is also valid, but not new (Becker et al., 1979; Chen & Land, 1986).

Rosenstock et al. (1988) recommended that "locus of control", a more generalized concept about the self, be distinguished from "self-efficacy", a more situation-specific concept which focuses on beliefs about an individual's abilities in a given setting. To date, no studies have done so.

Lau et al. (1986) commented that "health as a value" should be incorporated into the model. This criticism was based on their findings that those individuals who valued their health more highly, were more inclined to be compliant than those who did not value their health. The model does however provide a category for this criticism in "salience

of health matters in general" under the component "motivation".

2.2.8 Revised Formulation of the HBM Utilized in this Study

The above criticisms and the findings from the literature were taken into account by the researcher and the following variables added to the conventional model (see Figure 3 for the revised version of the HBM).

Those variables added to the HBM as a result of the above criticisms will first be discussed and then further modifications to the HBM framework so as to suit the purposes of this study will be outlined.

a. "Feeling of control over the problem" was maintained in the model as by Becker et al. (1977a) and Becker et al. (1977b) who included it in the "benefit" component of the model. In this study, however, "feeling of control" was included as an enabling factor for compliance. It was presupposed that a feeling of control over either obesity or cardiac disease would be associated with compliance. In this study, benefits were operationalized as those linked to the programmes themselves. The inclusion of a feeling of control under the "benefits" component would therefore have been illogical.

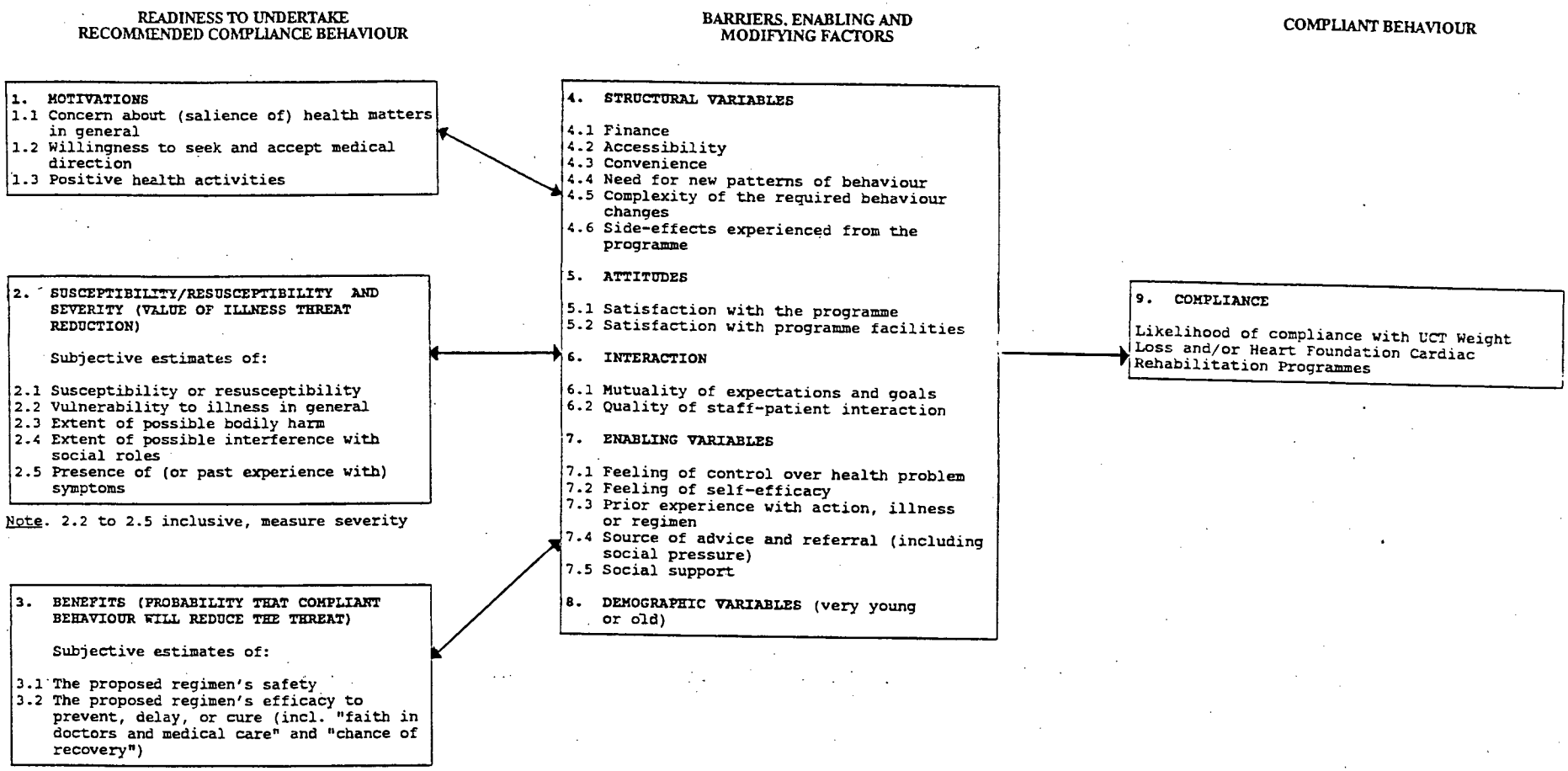


Figure 3. Formulation of the Health Belief Model used in this study

"Cause of condition" as per the above criticism by King (1983, 1984) and Rosenstock (1966) was included as part of the subcomponent of "feeling of control over the problem" in the main study questionnaire. The rationale for doing so was that cause of condition and locus of control have been linked in the literature where individuals with a fatalistic view of their health problem (Chen & Land, 1986) and a lack of feeling of control over their life-style have been found to be less compliant (Brownell, 1984a; Colvin & Olson, 1984; Epstein & Cluss, 1982; MacDonald, 1985; Mechanic & Cleary, 1980; Streja et al., 1982). Details of how this concept was examined are outlined in the methodology (see chapter 4).

b. As per the above criticism by Rosenstock et al. (1988) "self-efficacy" was included as a further enabling factor for compliance. The logic for doing so was the same as for that used for "locus of control" above.

c. Becker et al. (1977b) included a subcomponent of "extent of family problems" as an enabling variable (see Figure 2). This study used the concept of "social support" to incorporate the larger network of family, friends and occupation. The importance of this network for compliance has been outlined in section 2.1.8.

Definitions of "feeling of control", "self-efficacy" and "social support" as operationalized in this study are delineated in the section on the development of the questionnaire (see chapter 4).

Additional changes to the HBM formulation were made.

d. "Intention to comply" as employed by Becker et al. (1977b) was excluded from the study. In a retrospective study such as this one, this aspect would have been difficult to examine accurately.

e. The "extent of possible bodily harm" and "extent of possible interference with social roles" were not limited to their effect on a motivating level (see Figure 2). As outlined in the HBM component "severity" (see chapter 2, section 2.2.5.3), it is possible that symptoms can have either a motivating or demotivating effect on an individual's decision to adopt the health advice. Since the individuals in this study actually attempted to assume some form of health regimen, it may be possible that symptoms had a motivating effect on their decision. However, this cannot be presupposed. This study did not wish to limit the association of symptoms and compliance to only the "motivating effect".

2.2.9 Summary

This section of the literature review described the usefulness of the HBM as a framework for assessing compliance. The HBM incorporates not only those regimen and patient related variables found to be associated with compliance, but also provides a point of reference for the additional factor of susceptibility or resusceptibility to an illness. Its potential as a tool for measuring compliance on the UCTWL and HFCR programmes was therefore evident.

The literature reviewed for obesity and coronary heart disease will be presented in the following section.

2.3 OBESITY AND CORONARY HEART DISEASE (CHD)

This section summarizes the literature reviewed for obesity and cardiac disease. The etiology, the consequences, mood disturbance, treatment recommendations, compliance rates and differences between compliers and noncompliers for the two health problems are presented. Common and/or different compliance-related issues found for both these health problems are summarized at the end of this section of the literature review.

2.3.1 OBESITY

2.3.1.1 General

Obesity is a very common western world phenomenon (MacFarlane, 1986; McCarthy, 1990; Mustajoki, 1987; Rothblum, 1990) and is an addictive disorder (Brownell et al., 1986) which is more prevalent in women than in men (McCarthy, 1990; Merritt, 1982). It is frequently defined as the presence of more than 20% to 30% body weight as fat (Griffiths, 1981; MacFarlane, 1986; Stunkard et al., 1986).

2.3.1.2 Etiology

Obesity is a condition with a multi-factorial etiology (Brownell & Jeffery, 1987; MacFarlane, 1986; Straw & Terre, 1983) and its initiation and maintenance is governed by different processes which vary from individual to individual (Brownell et al., 1986).

Physiological and psychological factors play an important role in the etiology of obesity (Mendelson, cited in Burbach & Schomer, 1987). However, an imbalance between food intake and energy expenditure is particularly evident amongst obese individuals (McMinn & Katahn, 1986). This imbalance is more often ascribed to a lack of physical activity (Brownell, 1984a; Cradock 1978) than to physiological problems (Burbach & Schomer, 1987).

An inability to distinguish between hunger and satiety (Bruch, 1963) and eating in response to various psychological internal needs and/or external cues is common (Herman et al., 1983; Leon & Chamberlain, 1973; Leon & Roth, 1977). Despite an awareness by individuals that their relationship to food was abnormal and self-destructive (Leon & Chamberlain, 1973), eating and emotional arousal have been linked extensively in the literature (Daniels, 1986; Leon & Chamberlain, 1973; Lowe & Fisher, 1983). Food is often used as a way of avoiding uncomfortable situations and feelings (Burbach & Schomer, 1987; Hooker & Convisser, 1983) such as anxiety (Jönsson, Björvell, Levander, & Rössner, 1986) and depression (Polivey & Herman, cited in McCarthy, 1990).

2.3.1.3 Consequences of Obesity

Despite social (Brownell, 1982; Foreyt, 1987; Wadden & Stunkard, 1985), peer (O'Connell et al., 1985), spouse (Sobal, 1984), media (Wadden & Stunkard, 1985; Willmuth, 1986) and slimming industry pressure (Björvell & Rössner, 1987), obesity is more than a cosmetic issue (MacFarlane, 1986). It has been highlighted as an independent risk factor for cardiovascular disease and has been associated with various other illnesses (Brownell, 1982; Foreyt, 1987; Griffiths, 1981; Merritt, 1982). These include an increased risk for high blood pressure, osteoarthritis, diabetes mellitus, renal disease, cirrhosis of the liver, gallbladder

and endocrine disease, hypertension, gout, suboptimal pulmonary function and impaired life expectancy. An increased risk for morbidity and mortality is prevalent (Wadden & Stunkard, 1986).

2.3.1.4 Mood Disturbance

No single personality characteristic (Klesges, 1984; Charles, 1983; Wadden & Stunkard, 1985) or psychiatric abnormality specific for obesity has been established (McReynolds, 1982; Mustajoki, 1987). The presence of mood disturbances is seen as a result, rather than a cause, of obesity (Wadden & Stunkard, 1985). Feelings of anxiety and depression are frequently present (Foreyt, 1987; Hartigan et al., 1982; Jacobs & Wagner, 1984; Wing, Epstein, Marcus, & Kupfer, 1984).

Various mood states are concurrent with changes in weight (Weighill & Buglass, 1984). Improved self-esteem, self-image and confidence have been associated with weight loss (Burbach & Schomer, 1987; Colvin & Olson, 1984; Wadden & Stunkard, 1985), while depression and anxiety are apparent with weight gain (Wing et al., 1984). However, negative mood changes have been associated with weight loss (Burbach & Schomer, 1987). This finding is ascribed to the adverse effect of the loss of food if it has been used as a coping mechanism. In some studies, mood changes have been correlated with juvenile rather than adult onset obesity

(Grinker, Hirsch, & Levin, 1973; Merritt, 1982; Trice, Wesolowski, Ferrell, & Eufemia, 1987). In others, however, this was not found to be the case (Burbach, 1984; Burbach & Schomer, 1987; Genender et al., 1982; Wing, Marcus, Epstein, & Kupfer, 1983).

2.3.1.5 Treatment for Obesity

A long-term (Brownell & Jeffery, 1987), multi-factorial approach is recommended (Gordon & Tobias, 1984; McMinn & Katahn, 1986; Russ, Ciavarella, & Atkinson, 1984; Straw & Terre, 1983). Besides exercise (Barnstuble, Klesges, & Terbizan, 1986; Dickson & Zeichner, 1985; Hayes & Ross, 1986) and dietary interventions (Merritt, 1982; McMinn & Katahn, 1986), these approaches should provide psychological and social support (Brownell & Jeffery, 1987; Burbach & Schomer, 1987; Foreyt 1987; Jeffery et al., 1984; Straw & Terre, 1983). Programmes which do not examine the psychological aspect have been criticized as contributing to failure and client frustration (Pekarik, Blodgett, Evans, & Wierzbicki, 1984).

The gradual implementation of changes (Straw & Terre, 1983), commencing with the simplest (Black, & Trelfall, 1986) is recommended. This type of approach enables a diversion from food as a coping mechanism (Burbach & Schomer, 1987). Cognitive factors, reinforcement, binge eating, body-image, relapse (breaking the diet) and monetary deposits have been

designated as further important issues for intervention (Brownell & Jeffery, 1987; Jeffery et al., 1984).

2.3.1.6 Comparison of Obese and Non-Obese Individuals

No differences in terms of age, sex, marital status, employment, educational level, depression and neuroticism have been found between obese and non-obese subjects (Stuart, cited in Ellsworth, Strain, Strain, & Vaillant, 1986). These differences are also absent between obese compliers and noncompliers (Trice et al., 1987). Non-obese individuals show a more restrained pattern of eating when compared to obese individuals (Ruderman, 1986). In addition, increased levels of exercise distinguish non-obese individuals and successful weight losers from unsuccessful losers (Colvin & Olson, 1983; Trice et al., 1987). Obese individuals were generally found to be more sedentary, did not respond well to exercise (Barnstuble et al., 1986) and experienced breathlessness and fatigue (Griffiths, 1981). However, obese individuals were aware of making healthier food choices on exercise days (Dickson & Zeichner, 1985).

2.3.1.7 Compliance

Despite these risk factors, compliance rates are extremely low and vary from 0% to 28% (Trice et al., 1987). High relapse rates after initial weight loss are common (Brownell et al., 1986) where less than 5% of dieters lose 40 pounds

or more and still fewer maintain the weight loss (Jordan, Canavan, & Steer, 1985, 1986; McFadden & Kaplan, 1987; Ryden & Sörbis, 1986; Straw & Terre, 1983; Stunkard et al., 1986).

2.3.1.8 Factors Associated with Noncompliance and/or Compliance

a) Noncompliance

Noncompliers had greater expectations of the outcome of their weight loss (Bennett, 1986) and had made frequent attempts at losing weight (Bennett & Jones, 1986; Jeffery, Snell, & Forster, 1985; Rabkin, 1982-1983). These repeated weight loss endeavours resulted in feelings of failure and low self-esteem (Mitchell & Stuart, 1984; Marlatt & Gordon, 1980).

Noncompliers did not view their weight loss as successful, despite minimal differences between their rate of weight loss and that of compliers (Mitchell & Stuart, 1984). They found their diets monotonous and unattractive (Bender & Bender, 1976). They also experienced more practical difficulties with programmes (Bennett & Jones, 1986).

A lack of self-confidence, a feeling of isolation and a disturbed body-image is commonly present amongst noncompliers (Foreyt, 1987; Hartigan et al., 1982; Jacobs & Wagner, 1984; Wing et al., 1984). A lack of identity

(Bruch, 1963), dependence on others and ineffective use of self-reinforcement has also been found (Jacobs & Wagner, 1984).

A history of psychological and psychiatric problems was found amongst noncompliers (Bennett & Jones, 1986; Rabkin, 1982-83). This was prevalent amongst noncompliers who suffered from juvenile onset obesity (Merritt, 1982; Trice et al., 1987).

b) Compliance

Compliers had higher degrees of social support (Brownell, 1982, 1984a, b; Rabkin, 1982-83; Straw & Terre, 1983; Streja et al., 1982). In addition, they experienced higher levels of self-control (Brownell, 1984a, b), internal locus of control (Bolocofsky, Coulthard-Morris, & Spinler, 1984; Hartigan et al., 1982) and self-efficacy (Blair, Booth, Lewis, & Wainwright, 1989; Bernier & Avard, 1986; Bolocofsky et al., 1984; Mitchell & Stuart, 1984; Rabkin, 1982-83). Compliers accepted responsibility for their weight loss (Colvin & Olson, 1984; Hartigan et al., 1982; Mechanic & Cleary, 1980) and displayed more self-discipline (Bolocofsky et al., 1984). In addition, compliers exhibited more mature defences (Bolocofsky et al., 1984; Ellsworth et al., 1986; Ryden & Sörbis, 1986).

2.3.2 CORONARY HEART DISEASE (CHD)

2.3.2.1 General

In developed countries, CHD accounts for 40% of deaths and is a major cause of morbidity (Denolin, 1986). In South Africa, its prevalence has reached epidemic proportions (Giese & Schomer, 1986).

2.3.2.2 Etiology

CHD has a multi-factorial etiology (Halhuber & Halhuber, 1978; Kannel & Gordon, cited in Leon, 1984). The most common risk factors are smoking, diabetes, hyperlipidemia and hypertension (Gotsman & Weiss, 1986; Halhuber & Halhuber, 1978; König, 1986). These classical risk factors generally interact with environmental and social factors to result in the illness. Contributing life-style factors are incorrect diet, often with a high fat content which results in serum cholesterol and obesity, smoking, lack of exercise and excessive alcohol intake (Finnegan & Suler, 1985). Middle-aged and/or elderly men are predisposed to CHD (Johnston, 1985).

The Type-A personality has been linked with CHD and is characterized by an excessive competitive drive, time urgency, impatience, aggression and hostility (Evans, 1990; Hawkins, 1982; Jenkins, 1979; Kavanagh & Noakes, 1979; Wood, 1986). Most of these characteristics are instigated by challenge (Evans, 1990). However, the controversy on the

Type-A personality is ongoing. Some studies negate its existence (Evans, 1990), whilst others indicate that it is modifiable (Friedman et al., 1984; Roskies, Spevack, & Surkis, 1978).

2.3.2.3 Consequences of CHD

CHD is a life-threatening disease (Ice, 1985). Within the first 3 to 6 months subsequent to the inception of the disease, the concerns of the patient commonly relate to the ability to return to pre-morbid functioning as confirmation of successful recovery (Coombs, Roberts, Crist, & Miller, 1989). Sexual functioning and the ability to return to work are frequently affected (Byrne, Whyte, & Butler, 1981; Cay, Vetter, Phillip, & Dugard, 1973; DeVelasco, 1986; Kavanagh et al., 1977).

2.3.2.4 Mood Disturbance

Successful recovery is often impeded by mood disturbances such as depression and anxiety (Blumenthal et al., 1982; Gulledge, 1979; Imboden, 1972; Kavanagh, 1984; Mayou, Williamson, & Foster, 1978).

Anxiety concerning a lack of confidence and a fear of reinfarction or death has been cited as a cause for the depression (Kavanagh et al., 1977). Coping is often achieved through denial (e.g., the individual exercises excessively, withdraws from treatment, or ceases to take

his/her medication) (Baile & Engel, 1978; Cassem & Hackett, 1977; Imboden, 1972; Kavanagh et al., 1977; Kinnaird et al., 1982). Denial is considered adaptive in the acute stage (Levine et al., 1987). However it subsequently complicates rehabilitation (Imboden, 1972; Kavanagh, 1984), as once the individual has recovered, blocking and distortion of cognitive and affective factors prevent realistic appraisal of the situation (Levine et al., 1987).

2.3.2.5 Treatment for CHD

In order to prevent reinfarction or further progression of the disease, rehabilitation programmes seek to return individuals to an optimal level of physical, social, psychological and vocational functioning (Denolin, 1986; Giese & Schomer, 1986; Oldridge & Jones, 1986).

Many physical and psychological life-style adjustments need to be undertaken by the CHD patient (Blumenthal et al., 1982; Finnegan & Suler, 1985; Miller, Wikoff, McMahon, Garrett, & Ringel, 1985). These may include the need for exercise, medication, dietary control, smoking cessation and stress response modification.

A multi-disciplinary approach is therefore recommended (King, Martin, Morrell, Arena, & Boland, 1986; Perkins, Oldenburg, & Andrews, 1986; Roviaro, Holmes, & Holmsten,

1984). If possible, this should be tailored to suit the individual (Kavanagh & Noakes, 1979; Miller et al., 1985).

2.3.2.6 Compliance

Compliance is essential for rehabilitation. Ornish et al. (1990) reported regression of coronary arteriosclerosis after only one year of adherence to comprehensive life-style modification. Improvements in functional capacity, lessening of angina pectoris (i.e., chest pains caused by blocked arteries) (Rigotti et al., 1983), reduction in cardiovascular death or reinfarction (Oldridge & Jones, 1986) and improvement in fatigue and breathlessness (McCormick, 1987) have been noted by others.

Despite the importance of compliance to health care advice as a determinant of prognosis (Kavanagh et al., 1977; Shephard et al., 1981), high dropout rates occur within the first three months of rehabilitation (Carmody et al., 1980). Adherence behaviours declined after the initial attack (Carmody et al., 1980; Ice, 1985; Kinnaird et al., 1982; McMahon, Miller, Wikoff, Garrett, & Ringel, 1986) and most studies obtained low rates of long-term compliance (Ice, 1985). Within one year, 13% to 60% of individuals (Blumenthal et al., 1982) resumed old habits (e.g., smoking) (Hentinen, 1986; Oldridge et al., 1983). Bruce et al. (1976) and Kavanagh and Noakes (1979) found that a high percentage of dropouts continued their exercise routines

after initial noncompliance. However, as mentioned above, exercise may be only one aspect of a patient's regimen and individuals should be assessed on all requirements for recovery.

2.3.2.7 Factors Associated with Noncompliance and/or Compliance

a) Noncompliance

Life-style issues associated with noncompliance include continued smoking (Archer et al., 1967; Finnegan & Suler, 1985; Holm et al., 1985; Oldridge, 1984) and inactivity during leisure time (Blumenthal et al., 1982; Oldridge et al., 1983; Oldridge, 1984). An adverse attitude towards exercise (Andrew et al., 1980) and health (e.g., they smoked) (Naismith, Robinson, Shaw, & McIntyre, 1979; Shephard et al., 1981) was evident.

Noncompliers lacked a sense of self-efficacy (Hollis, Carmody, Connor, Fey, & Matarazzo, 1986; Kaplan et al., 1984) and control over their problem (Ell & Hayworth, 1985). A lack of social support was typically experienced (Andrew et al., 1980; Ell & Haywood, 1985; Hilbert, 1985; Holm et al., 1985; Klinger, 1984; McMahon et al., 1986; Oldridge et al., 1983). Blue collar jobs, work conflicts and changes in place of residence and/or employment were found (Holm et al., 1985; Oldridge et al., 1983; Oldridge, 1984). Noncompliers experienced more demands made on their time

(Buck, 1985) and were less financially secure (Oldridge et al., 1983; Oldridge, 1984).

Noncompliers expressed dissatisfaction with programme issues such as disinterested staff (Oldridge et al., 1983) and inconvenience of the programme (Andrew et al., 1980; Archer et al., 1967; Holm et al., 1985; Klinger, 1984; Oldridge et al., 1983).

Noncompliers experienced additional side effects from the illness (Klinger, 1984; Oldridge et al., 1983). These included the presence of angina (Oldridge et al., 1983), coughing and sputum production (Oldridge & Jones, 1986; Shephard et al., 1981). Mood disturbance on entry to a programme was prevalent for noncompliers (Giese & Schomer, 1986).

b) Compliance

Motivations and realistic expectations have been more important for compliance than the milieu (Holm et al., 1985; Johnson, 1984). Individuals who experienced their symptoms for longer were more compliant than those who had not (Davis & Eichhorn, cited in Davis, 1967). Compliers displayed a sense of self-efficacy (Hollis et al., 1986; Kaplan et al., 1984) and control over their problem (Ell & Hayworth, 1985). Social support was typically experienced (Andrew et al., 1980; Ell & Haywood, 1985; Hilbert, 1985; Holm et al.,

1985; Klinger, 1984; McMahon et al., 1986; Oldridge et al., 1983).

2.3.2.8 Contradictory Findings

Contradictory findings for age and compliance have been found. Some studies report no differences between compliers and noncompliers (Blumenthal et al., 1982), while others report higher compliance rates in older patients (Schilling, 1985). Prior experience with the regimen (Klinger, 1984), symptoms (Haynes, 1979) and severity of the disease (Shephard et al., 1981) have been found to be predictive of compliance in some studies, but not in others (Blumenthal et al., 1982; Ice, 1985).

Long-term studies of cardiac patients have found that noncompliers initially experience higher levels of depression (Bruhn, Wolf, & Phillips, 1971). However, after the crucial three-year period following a heart operation or infarct, levels of depression had in fact decreased resulting in no differences between compliers and noncompliers (Bruhn et al., 1971).

2.3.3 THE COMPLIANCE-RELATED LINK BETWEEN OBESITY AND CHD

Although the two health problems examined in this study have different symptoms and levels of severity, there are common compliance-related factors. In addition to commonalities on

compliance issues, differences on some factors are of importance for understanding compliance. Presented below is an overview of the issues either common to or different for both groups. The literataure on these two health problems is vast, hence only those issues pertinent to the current research are presented below. This summary is based entirely on the above literature review.

Short- and long-term compliance rates are generally low for obesity and CHD. Both these health problems have a mutli-factorial etiology which requires a diverse treatment approach. Obesity is an addictive disorder which is more common amongst women of various ages. CHD is more evident amongst middle-aged and/or elderly men.

Individuals from both health problems display contrary attitudes towards health care regimens. Inactivity, was prevalent for obese and CHD noncompliers. In addition, cardiac noncompliers adopted a negative outlook towards exercise and health and continued to smoke. Obese noncompliers found their diets monotonous and unattractive. Noncompliers from both health problems were dissatisfied with the particular programme in which they had participated and experienced practical difficulties.

A lack of realistic expectations was detected in both health problems. Obese noncompliers felt less successful with

their weight loss despite, sometimes, minimal differences between their rate of weight loss and that of compliers. Cardiac compliers were motivated and more realistic in their expectations. Cardiac noncompliers either overexercised or discontinued treatment and often dealt with their illness by denial.

A lack of social support and feelings of inadequate control and self-efficacy negatively affected compliance for both obesity and CHD. Obese noncompliers lacked self-confidence, felt isolated and displayed a distorted body-image. Cardiac noncompliers were generally blue collar workers, had more demands made on their time, and experienced work and financial problems.

Depression and anxiety were present in both health problems. As mentioned, cardiac noncompliers often employed denial as a means of coping with their illness and mood states. For obese individuals, the mood states varied in relation to weight loss and/or weight gain. The removal of food as a less mature form of coping, usually resulted in fluctuating mood states. A history of psychological and/or psychiatric problems was frequently found in individuals with juvenile onset obesity. No such history was established for cardiac noncompliers.

Previous experience with the health problem had varying consequences on compliance for obese and CHD individuals. Frequent attempts at dieting and weight loss resulted in feelings of failure and low self-esteem for obese individuals, whereas experience with CHD positively affected cardiac compliance.

Regarding the severity of presenting symptoms; cardiac noncompliers suffered added side-effects from their illness. These were angina, coughing and sputum production. An additional difference in these health problems is that the life-threatening nature of cardiac disease is overt, while the risks for obesity are not. Although obesity is a risk factor for various illnesses, including CHD, low compliance rates indicate that this factor alone is insufficient to deter excessive eating.

2.4 SUMMARY OF THE LITERATURE REVIEW

This chapter has presented the literature accumulated for compliance and has shown this phenomenon to be a complex issue which, despite extensive research, remains an enigma for health care professionals. The HBM, as a well-used organizing rubric for understanding the compliance phenomenon, was introduced and finally the literature on obesity and CHD was outlined. The importance of an examination of compliance for these two health problems was highlighted.

The following chapter outlines the hypotheses which were devised to accomplish the aims of this study.

CHAPTER THREE: HYPOTHESES

This chapter outlines the hypotheses formulated to test the aims of the current study as presented in chapter 1. The hypotheses are devised in terms of the HBM components and subcomponents and for ease of reference, are numbered as per Figure 3 (see chapter 2). These numbers are underlined in the text so as to distinguish between those numbers which identify HBM variables and those which designate section headings. This numbering system will be used throughout the remainder of this thesis.

The large number of hypotheses outlined below are all based on the literature reviewed for compliance, the HBM, obesity and CHD. It is acknowledged that these are extensive, yet they relate to the specifically formulated questions in the HBM questionnaire. Although the literature established the connection between the HBM variables and compliance, the link as it pertains to the current research is defined. The hypotheses as they relate to the underlying assumptions of the HBM are first outlined. The hypotheses for each HBM component, and where relevant, the subcomponents, are then presented. Where applicable, the hypotheses as they pertain to weight loss or CHD specifically, are defined. Unless stated, the hypotheses relate to both CHD and weight loss.

Hypotheses concerning participants' mood states are discussed at the end of the section as these were not assessed by the HBM questionnaire but by an additional measuring tool.

3.1 THE HBM PREMISE AS IT PERTAINS TO THIS STUDY

Hypotheses were formulated around the HBM premise that cardiac and weight loss individuals' readiness to act was associated with (a) their motivation to adopt the required health action, (b) their perceived susceptibility or resusceptibility to the particular health problem, and (c) their perceptions of the severity of the health problem. An association was hypothesized between compliance and a cost-benefit analysis of the benefits weighed against the inherent barriers of undertaking the life-style requirements. A relationship between modifying factors and individuals decisions to carry out the required action was also hypothesized.

The specific hypotheses that were formulated for each of the HBM components and subcomponents will now be outlined.

3.2 HBM HYPOTHESES FORMULATED IN THIS STUDY

1. Motivation:

An association between compliance and motivation was hypothesized. Specifically, in terms of the HBM subcomponents, a positive association between compliance and subjects' 1.1 general concern about health matters, 1.2 their willingness to seek and accept medical direction, and

1.3 their participation in positive health activities was anticipated..

2. Susceptibility/resusceptibility and severity (value of the illness threat reduction):

2.1 Susceptibility/resusceptibility: A positive relationship between compliance and belief in susceptibility to risk factors such as diabetes, hypertension and CHD was hypothesized for weight loss individuals. A positive association between compliance and perception of resusceptibility to further CHD complications (such as another heart attack) was anticipated for cardiac subjects.

2.2 Vulnerability to illness in general: An association between vulnerability to illness in general and compliance was expected.

2.3 Extent of possible bodily harm: A relationship between this HBM component and compliance was hypothesized.

2.4 Extent of possible interference with social roles: A negative association between compliance and interference of the health problem with social roles and compliance was foreseen.

2.5 Presence of (or past experience with) symptoms: It was anticipated that longer impairment for CHD subjects would be positively associated with compliance. Longer experience of

a weight problem for weight loss individuals would be negatively associated with compliance. A comparative assessment more than exact cut-off points was important and the variation in length of time was not therefore considered.

3. Benefits (probability that compliant behaviour will reduce the threat): Concerning the benefits of carrying out the required behaviour changes, a positive association between compliance and belief in the safety (3.1) and the efficacy (3.2) of the programme was hypothesized.

Barriers, Enabling and Modifying Factors

A number of barriers associated with noncompliance were hypothesized. These included structural, attitudinal, interaction and enabling factors.

4. Structural variables:

A negative association between compliance and 4.1 financial difficulties, 4.2 accessibility of the programme, and 4.3 inconvenience was hypothesized.

4.4 Need for new patterns of behaviour: An association between compliance and the need for new patterns of behaviour was hypothesized. Required changes to personal habits such as smoking, alcohol intake and diet would be associated with noncompliance.

4.5 Complexity of the required behaviour changes: Life-style changes that were complex would be negatively associated with compliance. Furthermore, a negative association between compliance and complexity was expected if the regimen interfered with the individual's daily routine.

4.6 Side-effects experienced from the programme: Side-effects from the exercise programmes would be associated with noncompliance.

5. Attitudinal variables: A negative relationship between compliance and dissatisfaction with 5.1 the programme, and 5.2 the facilities was foreseen.

6. Interaction variables: A positive relationship between compliance and 6.1 the mutuality of expectations and realistic goals and 6.2 satisfaction with the attitudes of staff and the quality of interaction between subjects and staff at the programmes in question was hypothesized.

7. Enabling variables:

7.1 Feeling of control over the problem: A positive association between internal locus of control and compliance was hypothesized. A negative relationship between external locus of control and compliance was foreseen.

7.2 Feeling of self-efficacy: A lack of self-efficacy would be negatively associated with compliance.

7.3 Prior experience with the action, illness or regimen: A negative association between compliance and prior experience with obesity in the form of numerous attempts at dieting and nonadherence on previous programmes was anticipated. A positive association between compliance and experience of CHD in the form of previous heart attacks, angina pectoris, or heart surgery was expected.

7.4 Source of advice and referral (including social pressure): An association between this subcomponent and compliance was hypothesized. Specifically, a negative association between social pressure and compliance was anticipated.

7.5 Social support: A positive association between social support and compliance was hypothesized.

8. Demographic variables: It was hypothesized that demographic factors such as age, sex, education and socio-economic status would not be associated with compliance.

The above hypotheses relate to specific HBM components and subcomponents. However, as proposed by Becker and Maiman

(1975), it was further hypothesized that a combination of the above beliefs would be associated with compliance.

3.3 MOOD DISTURBANCE

As far as mood disturbance is concerned, it was hypothesized that depression and anxiety (as measured by the POMS) would be negatively associated with compliance.

3.4 SUMMARY

In the endeavour to meet the aims of this study and to resolve the compliance phenomenon for the two programmes examined, the above hypotheses were formulated so as to utilize the HBM and available literature to the fullest potential.

The hypotheses highlight the number of variables associated with compliance in general and indicate the need for an investigation of these issues using the comprehensive approach offered by the HBM.

The following chapter outlines the methodology utilized to test the above hypotheses and to accomplish the aims of the current study.

CHAPTER FOUR: METHODOLOGY

The previous chapter presented the hypotheses formulated to examine the aims of the present study. This chapter outlines the methodology employed to test these hypotheses.

The methodology consists of two principal sections. The first is comprised of (a) the design of the HBM questionnaire, (b) the pilot study conducted to test the psychometric properties of the questionnaire, (c) the findings from the pilot study, and (d) the changes subsequently made to the questionnaire as a result of these findings.

The second section of the methodology consists of the main study which utilized the revised HBM questionnaire to (a) test the hypotheses outlined in chapter 3, and (b) to further accomplish the aims of the current research as set out in chapter 1.

4.1 THE HEALTH BELIEF MODEL QUESTIONNAIRE (HBMQ)

The revised HBM formulation employed in this study (see Figure 3, chapter 2) was discussed in the literature review. Although the HBM has been used extensively in various areas of research, no standardized questionnaire exists. All studies have designed their own HBM questionnaire (Janz & Becker, 1984). A questionnaire relating to weight loss and

CHD within the South African context was therefore devised by the researcher.

4.1.1 Design of the HBMQ

Table 4 summarizes the HBM variables and corresponding questions designed to elicit information about obese and/or CHD subjects' health beliefs and compliance behaviour. Components of the model examined by the POMS and the HBAS (to be discussed in 4.4.2.1 and 4.4.2.2) are also indicated in the table.

In order to be consistent, the HBM variables in Table 4 and the discussion of the design of the questions are numbered according to the revised formulation of the model used in this study (see Figure 3). In the table, questions are numbered as they first appeared in the pilot study and then in the main study questionnaires (hence referred to as Q1 and Q2 respectively). The renumbering of questions in Q2 resulted from modifications produced by the pilot study findings (to be discussed in 4.3). Additional changes to Q1 arose from further readings and are included in the discussion of the design of the questionnaire. Consequently, only those changes resulting from the pilot study are discussed in section 4.3.

The underlying premises of the HBM have been summarized in the previous chapter and will not be repeated. However,

Table 4

Summary of Questions Examining Components of the HBM

READINESS TO UNDERTAKE RECOMMENDED COMPLIANCE BEHAVIOUR	QUESTIONS EXAMININING CORRESPONDING COMPONENTS OF THE HBM (Q1)	(Q2)	OTHER
1. MOTIVATIONS			
1.1 Concern about (salience of) health matters in general	1, 2, [3] (8), (10)	6, 7, (17), (19)	HBAS
1.2 Willingness to seek and accept medical direction	4	1	
1.3 Positive health activities	1, 2, [3] (8), (10)	6, 7, (17), (19)	HBAS
2. SUSCEPTIBILITY/RESUSCEPTIBILITY AND SEVERITY (VALUE OF ILLNESS THREAT REDUCTION)			
Subjective estimates of:			
2.1 Susceptibility or resusceptibility	13	4+5	
2.2 Vulnerability to illness in general	14	Omitted	
2.3 Extent of possible bodily harm	15, 16	8, 9	
2.4 Extent of possible interference with social roles	21	24	
2.5 Presence of (or past experience with) symptoms	18	10	
Note. 2.2 to 2.5 inclusive, measure severity			
3. BENEFITS (PROBABILITY THAT COMPLIANT BEHAVIOUR WILL REDUCE THE THREAT			
Subjective estimates of:			
3.1 The proposed regimen's safety	19	15	
3.2 The proposed regimen's efficacy to prevent, delay, or cure (incl. "faith in doctors medical care" and "chance of recovery")	17, 24 (4), 5, 6	12+13, 26, 21* (1), 2, 3	

(table continues)

BARRIERS, ENABLING AND MODIFYING FACTORS	QUESTIONS EXAMININING CORRESPONDING COMPONENTS OF THE HBM (Q1)	(Q2)	OTHER
4. STRUCTURAL VARIABLES			
4.1 Finance	26c, 27c, 30d	29c, 30c, 33d	
4.2 Accessibility	28, 29, 30b, c	31, 32, 33b, c	
4.3 Convenience	26b, 27b, 30a, e, 31	29b, 30b, 33a, e, 34	
4.4 Need for new patterns of behaviour	10	19	HBAS
4.5 Complexity of the required behaviour changes	11	22	
4.6 Side-effects experienced from the programme	20	14	
5. ATTITUDES			
5.1 Satisfaction with the programme	26a, 27a	29a, 30a	
5.2 Satisfaction with the facilities	30c	33c	
6. INTERACTION			
6.1 Mutuality of expectations and goals	26g, 26h, 27g, 27h	29g, 29h, 30g, 30h	
6.2 Quality of staff-patient interaction	26f, 27f	29f, 30f	
7. ENABLING VARIABLES			
7.1 Feeling of control over health problem	7, 26d, 27d	(16), 29d, 30d,11*	
7.2 Feeling of self-efficacy	9, 12, 25	18, 20, 27, 29i*, 30j*	
7.3 Prior experience with action, illness or regimen	8 (15, 16, 18)	17, (8, 9, 10)	
7.4 Source of advice and referral (incl. social pressure)	7	16	
7.5 Social support	22, 26e, 27e (7), (21)	25, 29e, 30e (16), (24)	
8. DEMOGRAPHIC VARIABLES (very young or old)	Section A	Section A	
9. COMPLIANT BEHAVIOUR			
Maintenance of the life-style	23	28** 23*	

* Added to Q2
** Feeder question
( ) Indirectly assesses relevant HBM subcomponent
[ ] Combined with another question

Figure 4 recapitulates the assumptions of the HBM so as to provide a visual reference for this section of the study.

A particular reference will only be cited in this section if it is absolutely essential for the operationalization of a term in the HBMQ. At all other times, the researcher will refer to the relevant section in the literature review (see chapter 2).

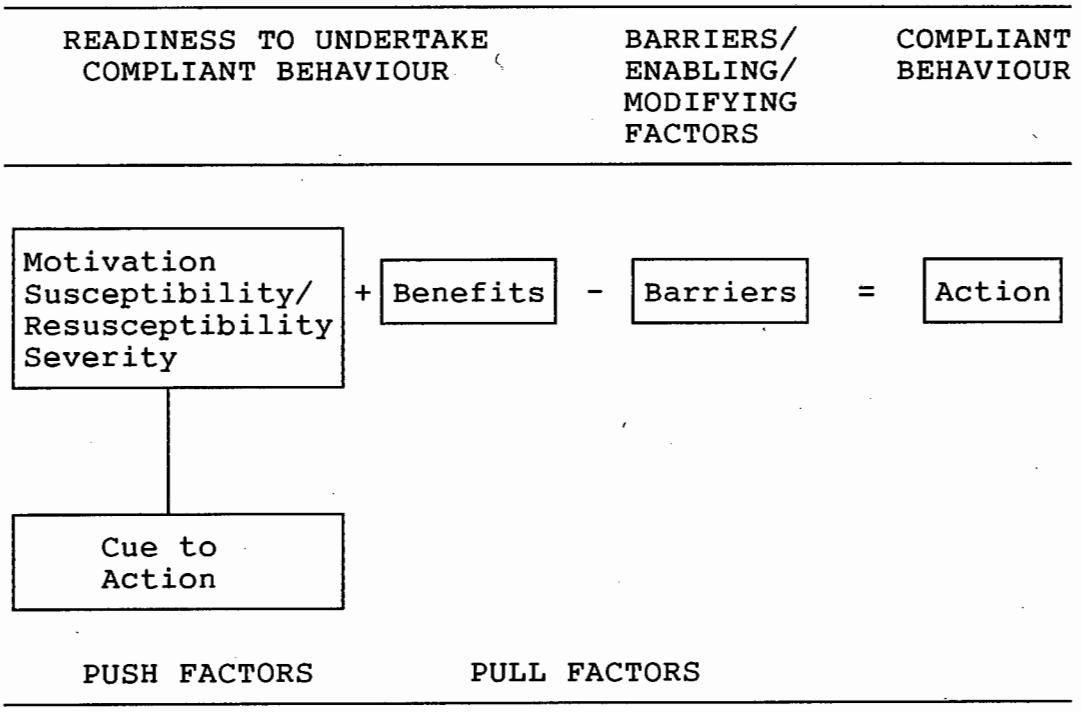
The rationale for the design of the questions in the HBMQ will now be presented.

1. Motivations

This component of the HBM was measured by an individual's concern for general health matters, his/her willingness to seek and accept medical direction and his/her positive health activities. For ease of discussion, subcomponents are grouped if examined by the same questions.

1.1 General health concerns and 1.3 Positive health activities: These HBM subcomponents were examined by the HBMQ and the HBAS. Further information on these subcomponents was obtained by HBM subcomponents 4.4 "need for new patterns of behaviour" and 7.3 "prior experience with the action, illness or regimen". These are discussed below.

Figure 4 Underlying assumptions of the HBM



The link between positive health activities, health as a value and general concern for health was established in the literature review (see section 2.1.8).

In this study, a general concern for health (which implies valued health) was therefore assessed through health activities undertaken by the individual. In addition, factors found to result in obesity and/or cardiac disease were explored. These included insufficient exercise, poor dietary habits, lack of stress control and smoking habits (see sections 2.3.1.2 and 2.3.2.2). Questions elicited information on past and current levels of physical activity. Specific information about smoking, eating and exercise behaviours, drug and alcohol use, stress coping and safety knowledge was examined in the HBAS.

1.2 Willingness to seek and accept medical direction: Becker et al. (1972b) analyzed this subcomponent of the HBM by examining the degree to which individuals followed their doctors' orders. The HBMQ adopted a similar procedure but examined adherence to specific medical advice for medication, diet, alcohol and exercise so as to cover a multi-disciplinary approach as recommended in the literature (see sections 2.3.1.5 and 2.3.2.5).

2. Susceptibility/resusceptibility and severity (value of the illness threat reduction)

This component of the HBMQ examined an individual's perceived susceptibility or resusceptibility to risk factors for obesity and/or CHD. Severity related specifically to these health problems and was examined by vulnerability to illness in general, the extent of possible bodily harm, the health problem's interference with social roles and the presence of (or past experience with) symptoms.

2.1 Susceptibility/resusceptibility: In Q1, the major obesity and CHD risk factors of diabetes, hypertension and heart problems were explored (see sections 2.3.1.3 and 2.3.2.3). In Q2, the investigation of this HBM subcomponent was expanded to include an association between familial history of the above risk factors (as the trigger for fear of susceptibility) and perception of susceptibility itself. This enabled the appraisal of an individual's knowledge of his/her heightened susceptibility to obesity and/or CHD in the light of a familial history of the major risk factors.

2.2 Vulnerability to illness in general: Illnesses such as colds, influenza, bronchitis, asthma and colon problems were assessed in Q1. The inclusion of these illnesses was based partly on a similar approach used by Janz and Becker (1984), but mainly on this researchers random choice of commonly known illnesses. This incorrect logic was rectified as a

result of findings from the pilot study and is discussed in 4.3 below and in the criticisms of the study (see chapter 6).

2.3 Extent of possible bodily harm: The questions devised to examine this HBM subcomponent related to either the risk factors for, or the health problems linked to obesity and/or CHD. Thus, the individual's amount of excess weight, level of hypertension, feelings of fatigue and breathlessness were investigated (see sections 2.3.1.1, 2.3.1.3, 2.3.2.2, and 2.3.2.5). This subcomponent indirectly assessed 7.5 below.

2.4 Extent of possible interference with social roles: In this study, factors which interfered with the social network and subsequently with compliance were examined. The choice of these factors was based on various findings in the literature review and encompassed rejection by others (including by a spouse or significant other), employment problems and physical discomfort (see sections 2.1.7 and 2.1.8). These factors could, therefore, interfere with an individual's social roles in general, as well as with his/her role as a spouse, significant other, or as an employee.

2.5. Presence of (or past experience with) symptoms: This subcomponent was examined by assessing the time of onset of symptoms. The basis for this question were the findings that more noncompliant than compliant weight loss individuals dieted frequently and suffered from juvenile onset obesity (see section 2.3.1.8). Thus weight loss noncompliers had

encountered a weight problem since they were teenagers and had more experience with dieting, as well as with the phenomenon of obesity itself.

The opposite was established for cardiac patients who were found to be more compliant if they had been symptomatic for longer (see section 2.3.2.7).

The association between time of onset and compliance for weight loss and cardiac individuals could therefore be investigated.

3. Benefits (probability that compliant behaviour will reduce the threat)

Perceived benefits derived from participation on the programmes were examined through the individual's estimate of the programme's safety and efficacy.

3.1 The proposed regimen's safety: Becker et al. (1977b) successfully assessed this HBM subcomponent by asking respondents whether they anticipated any further health problems as a result of their diet. This study therefore designed a similar question but specifically examined the perceived safety of the weight loss and/or cardiac programmes investigated in this study.

3.2 The proposed regimen's efficacy to prevent, delay, or cure (including "faith in doctors and medical care" and "chance of recovery"): The individual's perceived efficacy of the programme was explored in the manner of a question on the changes in severity of his/her health problem as a result of participation on the programme in questions. Kelly et al. (1987) successfully made use of a similar approach for assessing medication efficacy amongst psychiatric patients.

The efficacy of the programme was further examined by directly assessing the individual's perceived benefit derived from the programme. In Q2 an additional question examined how well the programme had assisted participants in assimilating the new life-styles. These question were based on the findings that perceived benefit, programme efficacy and compliance are related (see sections 2.1.7 and 2.2.5.4).

Becker et al. (1972b) effectively explored an individual's faith in the medical profession by examining his/her beliefs about the efficacy of modern medicine. The HBMQ expanded on this approach and asked about beliefs in the efficacy of modern medicine compared to that of commonly known alternative medicines (such as homeopathy, naturopathy and herbal treatment [acupuncture added to Q2]).

The individual's general faith in "chance of recovery" was examined by assessing his/her belief that a state of general

ill health could be improved. This question was based on a similar approach used by Becker et al. (1977b).

This subcomponent was indirectly assessed by 1.2 above ("willingness to seek and accept medical direction"). The link between adherence to medical advice and efficacy of modern medicine was based on the findings by Becker et al. (1972b) that mothers who believed in the effectiveness of modern medicine were more compliant for administering medication to their children than those mothers who did not.

Barriers, Enabling and Modifying Factors

Various structural, attitudinal, interaction, barriers and enabling and modifying factors were examined.

4. Structural variables: A negative association between compliance and variables such as financial cost, accessibility, convenience, the need for new patterns of behaviour, the complexity of the changes and side-effects was established in the literature review (see section 2.1.7).

4.1 Financial cost was examined by asking whether or not it had posed a problem for subjects.

4.2 Accessibility to the programmes was assessed by examining problems related to the distance required to travel to the venue, transport availability, location of the venue and its parking facilities. Problems associated with the

parking facilities were surveyed as these had been a source of discontent for many participants. Information about the existence of this issue was taken from ongoing discussions by programme staff at the time of the study.

4.3 Convenience regarding time was examined. The cardiac and weight loss programmes examined in this study commenced at 6.30 a.m. and 7.30 a.m. respectively. Participants were therefore asked to state whether the starting time of the programme on which they had participated had been problematic and then to indicate preferred alternative times.

4.4 The need for new patterns of behahaviour: This was examined by asking whether the individual was required to alter his/her exercise, diet, smoking and other habits. Information from the HBAS complemented this aspect of the HBM and indicated additional life-style changes to stress coping, safety knowledge and drug and alcohol abuse. This subcomponent was indirectly assessed by 1.1 and 1.3 above.

4.5 Complexity: The individual's perception of the complexity of the programmes was examined by exploring whether he/she experienced difficulties with the required changes to exercise, diet, smoking and other behaviours. The rationale for the inclusion of these behaviours has been discussed in HBM subcomponents 1.1 and 1.3 above.

4.6 Side-effects from exercise such as chest pains, lack of breath, nausea and fainting were examined. These particular problems were included so as to understand the possible association between compliance and those side-effects suffered from exercise in general and also between compliance and those side-effects experienced from the presenting health problem itself.

Extreme discomfort from exercise has been associated with noncompliance (see section 2.1.7). Lees and Dygdon (1988) indicated that participation in exercise, especially new exercise, frequently resulted in muscle pain and fatigue. The presence of muscular pain usually occurred a day or two after exercise. Fainting and nausea have also been reported as a result of overexertion during exercise (American College of Sports Medicine, 1980).

Chest pains are symptomatic of angina pectoris (see section 2.3.2.6) and symptoms of fatigue and breathlessness have also been associated with heart disease and obesity (see sections 2.3.1.7 and 2.3.2.6).

It was therefore important to assess whether possible side-effects from exercise were perceived as such, or whether they were perceived as indications of deterioration of the presenting health problem.

5. Attitudes and 6. Interaction: Attitudes towards a programme and interaction with its staff was successfully examined by Becker et al. (1972b) by inquiring whether individuals were satisfied with these issues. A similar approach was utilized in this study. Thus, the level of like or dislike for the exercise programme, satisfaction with staff interaction and mutuality of expectations was investigated.

7. Enabling variables

This component of the HBM examined feelings of control and self-efficacy, prior experience with the action, illness or regimen, the source of advice and referral (including social pressure) and social support.

7.1 Feeling of control: An individual's perceived level of internal and/or external locus of control over his/her health problem was investigated. Internal locus of control was defined as the extent to which an individual believed he/she was a controlling factor in his/her life-style. External locus of control was defined as the extent to which factors beyond the individual's control impacted on his/her life-style (Bandura, 1977).

As a result of further reading (King, 1983, 1984), an additional question in Q2 assessed both internal and external locus of control by asking individuals to indicate the perceived cause of their health problem.

7.2 Self-efficacy: As per Rosenstock et al. (1988), this was defined as the individual's feeling of capability for carrying out the requested life-style changes, as well as their ability to maintain the life-style. Questions assessing subjects' feelings of positiveness and confidence which were included were based on the findings in the literature review that noncompliance and a lack of these feelings was associated (see section 2.1.8). The extent to which subjects coped physically with the relevant programme was assessed since exercise was a major component of the programmes. As denial has been associated with noncompliance for cardiac individuals (see section 2.3.2.7) and mood changes with noncompliance for weight loss individuals (see section 2.3.1.4), the relationship between emotional coping and compliance was examined.

7.3 Prior experience with action, illness or regimen: Prior experience with the illness was examined in HBM subcomponents 2.3 and 2.5 above where the extent of the health problem and presence of, or past experience with symptomology was investigated. Prior experience with the required health action or regimen was assessed by exploring individuals' participation in previous diets, health or fitness and/or cardiac rehabilitation programmes. In addition to investigating the said HBM subcomponent, this question indirectly explored the individual's positive health activities discussed in 1.3 above.

The inclusion of the above activities was based on various findings in the literature. Lower compliance rates were established for individuals who dieted more frequently than for those who did not (see section 2.3.1.8). The lack of physical activity amongst obese and cardiac noncompliers has been discussed in 1.3 above.

7.4 Source of advice and referral (including social pressure): Self-motivation, referral by a doctor, pressure from a spouse or significant other and the media were delineated as the main sources of advice and/or referral. The rationale for their inclusion is diverse.

The UCTWL programme advertises its courses in a local tabloid and the HFCR programme is marketed to the medical profession by the Heart Foundation. The majority of weight loss individuals joined as a result of the advertisement and most cardiac individuals joined due to referral from their doctor. The potential association between compliance and source of referral was therefore investigated.

Use of the term "media" is criticized in the discussion (see chapter 6).

A category for "other" was included as additional ways of joining the programme were possible. The UCTWL and HFCR programmes have been conducted for several years and

individuals who heard of the programme by word of mouth may have contacted the organizers directly for information. Furthermore, cardiac individuals who came into contact with Heart Foundation advertisements and pamphlets which are available to the public could then have approached their physicians for a referral to join, rather than wait for their doctor to recommend the programme.

Sobal (1984) outlined the negative effects of obesity on a marriage and the ensuing pressure on the overweight spouse to lose weight. A potential association between compliance and pressure from a spouse or significant other was therefore examined.

The question which examined this subcomponent analyzed not only the source of advice or referral but also the feeling of internal locus of control over the decision to join the programme. This has been discussed in 7.1 above. In addition, this subcomponent indirectly examined 7.5 below.

7.5 Social support: The importance of social support for obesity and cardiac disease has been outlined in the literature review (see section 2.1.8).

Sensenig and Cialdini (1984) found that compliance was influenced by the degree to which individuals identified with the way in which others act in a similar situation. O'Connell et al. (1985) established social approval of

exercise to be an important predictor of exercise compliance for obese individuals. Since exercise participation was one of the major concerns of the two programmes, physical activity by family, friends and colleagues as a form of social support, was assessed.

Other forms of social support were indirectly examined in HBM subcomponents 2.4 ("extent of possible interference with social roles") and 7.4 ("source of advice or referral, including social pressure") above.

8. Demographic variables: Sociodemographic variables such as age, sex, marital status, income, occupation were considered. The standard approach used by the Human Sciences Resource Centre (HSRC) for collecting this type of data was sent to the researcher upon request and adopted in the current research.

9. Compliance: A question on whether individuals complied or not, was included as a feeder question. However, their long-term compliance was assessed by asking whether they had maintained the life-style changes.

Cue to Action:

This component of the HBM was not directly examined in this study. Cues to action are difficult to assess in a retrospective study and attempts to understand trigger factors some two to three years after the event will be

obscured by extraneous variables such as history and maturation. Certain issues such as feelings of discomfort, symptomology, referral from a doctor, pressure from a loved one or an advertisement may be associated with a decision to join but may not in fact be the true trigger factor. Thus in this study, the cue to action which initiated the decision by obese and/or cardiac individuals to participate in the programmes could not be measured.

4.1.2 Validity of the HBMQ

The validity of the HBMQ was established in various ways. The researcher approached a number of colleagues and staff members in the UCT Psychology Department, the HSRC and Professor Rosenstock, an author of the HBM, to evaluate and criticize the wording and clarity of the questionnaire. The psychometric properties of the questionnaire were then tested in a pilot study. This will now be discussed in detail. The pilot study questionnaire (Q1) is in Appendix C.

4.2 PILOT STUDY

4.2.1 Subjects

Cardiac subjects from Giese's (1983) study and weight loss individuals from Burbach's (1984) research formed the target population for the pilot study. These studies were linked to the ongoing project and the subjects were therefore considered to be the most appropriate group to test the HBMQ. The content of the questionnaire related to cardiac and/or weight loss issues in general. In particular, the questions

examined events and information relating to the UCTWL and HFCR programmes in which these individuals had participated.

The researcher considered the uneven number of compliers and noncompliers in the pilot study sample to be unimportant for the evaluation of the questionnaire's psychometric properties.

The sample groups for the Giese (1983) and Burbach (1984) studies consisted of 41 cardiac males (M = 55.7 years, SD = unreported) and 42 weight loss females (M = 37.4 years, SD = unreported). Table 5 summarizes the breakdown of compliers and noncompliers from these studies and from the pilot study. The percentage success rate of the sample selection is also indicated.

4.2.2 Procedure

Individuals were approached either telephonically or personally and asked to complete a copy of the questionnaire. They were also requested to comment on its wording and clarity.

4.2.3 Test-Retest Reliability of the HBMQ

Eleven compliers of the pilot study group agreed to complete the questionnaire a second time 6 to 8 weeks later. The absence of noncompliers was not considered problematic for the testing of consistency of responses.

Table 5

Pilot Study Target Population and Sample Group

	Target population		Pilot study sample group		Percentage success rate	
	C	NC	C	NC	C	NC
Cardiac	22	19	10	3	45.5	15.8
Weight loss	38	4	18	4	47.3	100.0
Total	60	23	28	7	46.7	30.4

Note. Cut-off were points established by Giese (1983) and Burbach (1984).

C = Compliers: Cardiac subjects who remained on the Giese (1983) study for five months. Overweight individuals who completed a three-month weight loss course in the Burbach (1984) study.

NC = Noncompliers: Individuals who dropped out of these programmes.

4.2.4 Results of the Pilot Study

The pilot study raw data was processed and two-way frequency tables drawn up. These indicated the degree of shift in responses between the first and second administration of the pilot study questionnaire. The computations are summarized in Table 6.

The coefficients generally indicate a satisfactory level of association between the test and retest responses. However, some questions were problematic. These will be elaborated on.

Low values were computed for questions 4C, 4D, 10C, 15D, 21C 21D, 27A, F, G, H and 30B. Negative values were obtained for questions 7D, 27B, C and I. The low coefficient values obtained for questions 4 and 21 were found to be as a result of inadequate response options. In addition, the phraseology of question 21 was inadequate. As other parts of the above questions obtained high, or perfect coefficients, interference by factors such as maturation, history and current issues (such as a change in the fee structure at the HFCR programme) may have been influential. Although questions 2, 11, 16 and 18 obtained high coefficients, respondents indicated that their phraseology was unclear. Although no statistical value was computed for question 17, a manual examination of responses indicated that the phraseology of this question was problematic. Other questions for which no statistical value could be calculated

Table 6

Pilot Study Phi Coefficients by Question

QUES	PHI	QUES	PHI	QUES	PHI	QUES	PHI
AGE	.9	8B	1.0	16F	9.2***	27C	-.3
HGT	.9	8C	1.0	17	*	27D	1.0
SEX	1.0	8D	.7	18	.7**	27E	.8
MS	1.4	8E	.8	19	*	27F	.2
ED	*	9	*	20A	*	27G	.3
OCC	*	10A	7.5**	20B	*	27H	.3
INC	9.2	10B	.6	20C	1.0	27I	-.2
CHD	1.0	10C	.5	20D	1.2	28	.9 **
PRG	1.0	10D	.7	20E	25.8***	29A	7.4
1	*	11	1.0	21A	8.6***	29B	1.0
2	.7	12	*	21B	8.6***	29C	8.6***
3	--	13A	*	21C	.4	29D	8.6***
4A	.7	13B	*	21D	.4	29E	8.6***
4B	.8	13C	*	21E	-	30A	*
4C	.4	13D	-	22A	1.0	30B	4.8***
4D	.5	14	1.0	22B	*	30C	1.0
5A	.6	15A	.9**	22C	1.0	30D	1.0
5B	.6	15B	.9**	22D	*	30E	-
5C	.6	15C	.9**	22E	1.1	31A	1.0
6	*	15D	.3**	23	.9**	31B	8.6
7A	1.0	15E	1.0	24	5.9***	31C	1.0
7B	1.0	16A	1.0	25A	*	31D	24.5***
7C	.7	16B	1.0	25B	1.4	31E	24.5***
7D	-.1	16C	.7	26	-		
7E	4.5**	16D	1.0	27A	.2		
8A	1.0	16E	1.0	27B	-.3		

* Less observations than cells; association measures not computed
** Pearson's correlation
*** Chi-square
-- Qualitative response
- Zero observations

were also examined manually and were not found to be problematic.

As a result of the above findings, the necessary changes to the questionnaire were made. These were the inclusion of additional responses options and the rewording of unclear phraseology. The layout of the questionnaire was reworked by the researcher in order to improve the general flow and presentation. Question 14 was deleted as it yielded qualitatively redundant data. As the psychometric properties of the questionnaire are evident from the coefficients in Table 6, the changes to the questionnaire will be briefly discussed. The HBMQ utilized in the main study (Q2) is in Appendix D.

4.3 CHANGES TO THE HBMQ AS A RESULT OF THE PILOT STUDY

4.3.1 Response Options

To facilitate responses and improve the general appearance of the questionnaire, additional response options were inserted. All response options were then boxed. Examples of how subjects were to indicate their responses were added to the introductory section.

Table 7

Changes to Response Options by Question

Pilot study questions (Q1)		Main study questions (Q2)	
Qs	Type of response	Qs	Type of response
Occ	open-ended	*Occ	options given
1	closed question	6	open-ended
5	yes/no/don't know	2	yes/sometimes/no don't know
6	yes/no 7-pt scale	3	yes/sometimes/no
11	yes/no 7-pt scale	20	yes/no
13	likely/not likely 7-pt scale	5	yes/no
17	yes/no 7-pt scale	13	yes/no
19	never/always 7-pt scale	15	yes/sometimes/no
21	yes/no	24	yes/sometimes/no/n/a
22	yes/sometimes/no	25	yes/sometimes/no/n/a
29	never/always 7-pt scale	14	yes/no
30	never/always 7-pt scale	33	boxed options

*Occupation

Likert scales were altered so that all positive and negative responses ran down the same side of the page. Metric units were requested for information on height and weight. Further alterations to response options such as changes from open- to close-ended questions and vice versa and from ordinal to categorical scales are summarized in Table 7.

4.3.2 Phraseology

Respondents indicated that some questions were either ambiguous or lacked clarity. Terms such as "physical activity" (question 2) and "symptoms" (questions 16 and 18) were therefore operationalized (see Q2, Appendix D). The word "feel" (questions 19 and 25) was omitted to avoid a potentially implied emotional aspect. Questions 11 and 17 were reworded to reflect the direction of change (i.e., positive or negative), experienced by individuals when they carried out the required health behaviours. In addition, two separate questions which asked whether problems had improved or deteriorated were formulated for question 17. Questions 21 and 28 and the introduction to questions 26 and 27 were recomposed to improve their clarity.

4.3.3 Layout in General

The overall flow of ideas was improved by altering the order of the sections. The introductory section of the questionnaire was expanded to include additional information on the aims of the study. The section for the name and address was incorporated into the introductory section.

These pages could then be removed at the time of data capture to ensure confidentiality.

4.4 MAIN STUDY

4.4.1 Subjects

Some 425 individuals who participated on the UCTWL and HFCR programmes during the period 1987 to 1989 formed the target population for the main study (see Table 8).

The sampling framework consisted of the names of participants from the two programmes for the period 1987 to 1989. Cardiac subjects were listed by year of entry into the HFCR programme. Weight loss subjects were listed for the six consecutive weight loss courses carried out during this period.

A discrepancy in the duration of the programmes existed. The UCTWL programme ran for a specified number of weeks ($\underline{M}$ = 12 weeks, range = 10 to 14 weeks). The HFCR programme recommended participation for a minimum of 6 weeks. Participants could however choose to remain after this period. Individuals who discontinued the HFCR programme after completion of the minimum period as opposed to those who withdrew for other reasons could however be identified in the questionnaire.

The process of subject selection was guided by two factors. These were the level of compliance, and POMS and HBAS scores

Table 8

Breakdown of the Main Study Target Population

	Compliers	Noncompliers	Total
Weight loss	113	140	253
Cardiac	63	109	112
Total	176	249	425

(to be discussed in 4.4.2.1 and 4.4.2.2) obtained from the ongoing project.

1. Level of compliance:

Short-term compliers were individuals who remained on the respective programmes. Weight loss compliers consisted of individuals who (a) remained on the UCTWL programme until completion of a particular course, and (b) who completed POMS and HBAS forms both at the inception and at the end of the programme. Cardiac compliers consisted of individuals who (a) remained on the HFCR programme for at least 12 weeks, and (b) who completed POMS and HBAS forms upon joining the programme and after 12 weeks.

Short-term noncompliers were participants who dropped out of the respective programmes. Drop outs were determined by the existence of POMS and HBAS scores which were obtained at regular intervals, predetermined by the ongoing project.

Noncompliers for the cardiac group were individuals who had starting POMS and HBAS scores but who left before a second assessment at 12 weeks. Noncompliers for the weight loss group consisted of individuals with starting POMS and HBAS data who left prior to completion of the particular weight loss course attended. No exact cut-off point was established, however, the researcher included a subgroup of noncompliers who withdrew from the UCTWL programme just before its completion so as to establish possible differences

between these individuals and those who dropped out right at the start of the programme. The latter group is referred to as the "dropouts" (D/O).

Long-term compliance: The period of long-term follow-up varied from 2 years for those individuals who had participated on the programmes during 1987, to 3 months for those subjects who participated during the last quarter of 1989. Subjects were assessed for their compliance on exercise and dietary patterns, as well as on other behaviours, such as smoking cessation and/or improved stress management. These additional behaviours were identifiable in the HBMQ.

2. Baseline data: This was composed of two sets of scores. The first was the POMS and HBAS scores gathered when individuals joined the respective programmes. The second was POMS and HBAS scores obtained from individuals who remained on the HFCR programme for 12 weeks and by individuals who completed the UCTWL programmes. These assessment intervals are outlined in Table 9.

Participants with incomplete data were omitted from the sample. These were individuals who dropped out without completing any POMS and HBAS forms or who remained on the respective programmes but who did not complete the POMS and HBAS forms.

Table 9

Assessment Intervals of Subjects in the Main Study

		Assessment intervals		
		1	2	3*
Compliers				
	Cardiac	start	12 wks	follow-up
	Weight loss	start	12 wks	follow-up
Noncompliers				
	Cardiac	start	**	follow-up
	Weight loss	start	**	follow-up

* The third assessment was carried out in the realms of this study.

** Noncompliers were assessed once as they dropped out before a second assessment could be carried out.

A further consideration in subject selection was that programmes had been altered from year to year in various ways such as in the length of time over which they were conducted, changes in staffing, fee structure, etc. It was therefore deemed important that a sample from each year for the cardiac programme and each course for the weight loss programme be chosen in order to determine whether any of these change were associated with compliance.

A breakdown of the sample group is shown in Table 10.

4.4.2 Apparatus in Addition to the HBMQ

The POMS and HBAS questionnaires have been used on the UCTWL and HFCR programmes since 1983. As part of a service offered on the programmes, Health Psychology interns give feedback to individuals on any changes in their mood states and health behaviours during the course of their participation on the respective programmes.

4.4.2.1 Profile of Mood States (POMS) Questionnaire

The POMS is a standardized scale developed to provide subjective data on transient affective states such as feeling, affect and mood (McNair, Lorr & Droppelman, 1971). It is a self-administered tool which measures six mood states: tension-anxiety (T), depression-dejection (D), anger-hostility (A), vigour-activity (V), fatigue-intertia (F), confusion-bewilderment (C) (McNair et al., 1971).

Table 10

Main Study Sample Group

	Compliers			Noncompliers			
	W/L	C	Total	W/L	C	D/O	Total
Males	7	9	16	1	19	0	20
Females	30	2	32	18	0	3	21
Total	37	11	48	19	19	3	41

Key

W/L = weight loss

C = cardiac

D/O = dropouts

These mood states are measured on 65, 5-point adjective rating scales. The intensity modifiers range from a minimum of zero to a maximum of five and a standard scoring template results in a total mood disturbance (TMD) score. The TMD reflects a global estimate of the affective state and is obtained by subtracting the vigour score from a total of the tension, depression, anger, fatigue and confusion scores.

McNair et al. (1971) consider a one-week rating period sufficient time to measure typical and persistent mood reactions to current life situations and short enough to assess any acute effects of treatment. Other time spans such as "today", "right now" and "the past three minutes", have also been used successfully (McNair et al., 1971). Longer periods of a month, a year or a lifetime are criticized for providing too general an assessment and for not depicting specific changes in subjective states (McNair et al., 1971). As a one-week rating period was utilized in the ongoing project the present study similarly used the same rating period.

The psychometric properties of the POMS have been reviewed and found to be satisfactory. It is a scale with face, predictive and construct validity (McNair et al., 1971). The POMS proved to be a reliable tool for measuring the mood states of psychiatric outpatients' and their responses to various therapeutic approaches (McNair et al., 1971). It was also successful in the assessment of the outcome of various

experimental studies on normal and nonpsychiatric populations (McNair et al., 1971). Reliability indices for the extent to which individual items measure the same factor are near .90 or above (McNair et al., 1971). Test-retest reliabilities are lower than .80 and .90 and McNair et al. (1971) attribute this to the inherent fluctuating nature of mood states.

The POMS was included as an additional measuring tool as it provided data which was complimentary to the HBMQ. Since the present study examined both retrospective and current data, the initial POMS scores furnished important supportive information against which follow-up data could be compared. This enabled the verification of changes in mood states over time. (See Appendix A for a copy of the POMS).

4.4.2.2 The Health Behaviour Assessment Scale (HBAS)

The HBAS (1981) is a nonstandardized scale which assesses six behaviours: smoking, eating, exercise, drug and alcohol use, stress management and safety knowledge. Each behaviour is scored out of 10. Scores lower than 10 denote that the particular behaviour can be improved. For ease of comparison in this study, an average score of the above behaviours was calculated.

The HBAS psychometric properties are not reported in the literature. It was included in the study as the HBAS scores

gathered by the ongoing project provided important baseline information. In addition, follow-up data would indicate levels of change in the individual's behaviour over a period of time. The HBAS also assesses relevant HBM components (as outlined above) and was included as a complementary measuring tool to the HBMQ. (See Appendix B for a copy of the HBAS).

4.4.3 Procedure

The subjects were contacted telephonically or in person and asked to complete the HBMQ, the POMS and the HBAS. The researcher indicated that feedback would be given on the completed questionnaires.

Each questionnaire was coded to reflect the programme participated in and whether the individual had complied. A number was allocated to each subject and recorded on the HBMQ, the POMS and the HBAS before posting. This assisted in the sorting of questionnaires when returned and enabled confidential identification of subjects when the top pages containing the individual's name and address were removed before sending the questionnaires in for data capture.

Any discrepancies or unanswered questions were clarified with the individual during the feedback call.

4.5 SUMMARY

This chapter has outlined the design of the HBMQ, the pilot study which established its psychometric properties and the

main study which utilized the revised HBMQ to gather the data. The statistical methods used to analyze the data and the results obtained are discussed in the following chapter.

CHAPTER FIVE: RESULTS

The previous chapter outlined the apparatus and procedure used to gather the data for this study. This chapter presents the results that were obtained. It commences with a description of the statistical procedures utilized to analyze the data and then gives a summary of the findings.

This study examined a large number of hypotheses. Thus the possibility of making a Type I error (i.e., rejecting the null hypothesis when it is true) (Howell, 1989) became greatly infalted. For this reason, only those results found to be significant at the 1% level are reported.

5.1 PROCEDURE OF THE STATISTICAL ANALYSES

This section outlines the procedure of the data analysis which progressed from the general to the specific (see Figure 5). Thus, responses by all compliers and noncompliers were first examined. Differences between and within groups were then investigated by comparing the replies from weight loss and cardiac compliers and the responses from weight loss and cardiac noncompliers. Finally, differences within the health problems themselves were examined by comparing the responses of cardiac compliers with those of cardiac noncompliers and those of weight loss compliers with those of weight loss noncompliers. Unless indicated, BMDP software was utilized to analyze the data (Dixon, 1981).

Figure 5 Order of analysis between and within the sample groups

Order of analysis	Analysis between and within groups
1.	COMPLIERS VS NONCOMPLIERS
2.	W/L VS CARDIAC W/L VS CARDIAC
3.	

The responses per question, by programme, (i.e., weight loss and cardiac) and compliance, (i.e., compliers by noncompliers) were first analyzed and two-way frequency tables of the categorical data by weight loss and cardiac compliers and noncompliers then computed. Column percentages of the observed frequencies, as well as the (Pearson) chi-square test statistics for independence between rows and columns were obtained for each question.

A second step in the analysis was to perform additional computations for those tables where a distinction between and within the weight loss and/or cardiac groups was evident. For example, responses from cardiac and weight loss subjects were compared; or responses from all weight loss subjects were compared. The Epistat programme rather than BMDP was chosen for this set of computations as it was simpler to use. Fisher's Exact Test computes the exact probability under the null hypothesis of apparent associations as strong or stronger than that of the data. This test was used when the data could be categorized into a two-by-two contingency table and when cell frequencies fell below five. Cut-off points were not arbitrarily chosen but assigned as per the breakdown in the relevant questions.

In order to examine the relationship between responses on various questions, multi-way tables were constructed. Some three-dimensional tables were computed but due to the small

sample size, cell frequencies of less than five prevented further development of these comparisons.

One-way and two-way analyses of variance were carried out for questions involving continuous data and for the comparison of continuous data with responses to various questions. Once again the small sample size and cell frequencies of less than five prevented further analysis of these comparisons.

Analyses of variance for repeated measures were calculated for the POMS and HBAS data to examine any changes over time.

The above analyses revealed that the responses from all compliers and noncompliers did not differ significantly on any of the HBM components and subcomponents. However, significant differences were found when responses within the subdivisions (see Figure 5) were examined.

The responses from the D/O group (see chapter 4, section 4.4.1) did not differ from those of the weight loss compliers and they indicated that they had dropped out of the programmes for practical reasons. The small number of subjects that made up this group did not allow for further comparisons of the responses. This group will not be discussed further.

The results obtained from the above procedures will now be discussed.

5.2 RESULTS

The findings from this study are presented using the HBM as an organizing rubric. However, so as to avoid repetition, only the number for each HBM subcomponent, as assigned throughout this thesis, will be reffered to (see Figure 3, chapter 2).

To simplify the data presentation, separate tables for the respective HBM components were drawn up. These are identified at the beginning of the relevant HBM component. The enabling factors were summarized separately from the barrier variables for presentation purposes only. Continuous data for height and weight, length of time that symptoms were experienced and distance travelled to the programmes are summarized in separate tables and are referred to when applicable.

The tables have been composed to reflect the HBM subcomponents, the questions which obtained the relevant information and the corresponding findings ensuing from the questions. Responses to all HBMQ questions are listed and test statistics (e.g., chi-square values) are annotated in the tables.

Chi-square values were calculated on the original data but for ease of presentation, only yes responses are indicated. Where necessary, categorical responses of yes and sometimes

as well as Likert scale responses of quite and very were collapsed and are annotated accordingly in the tables. The percentage of individuals who responded no to the various questions can be inferred from the percentage who indicated yes. This manner of reporting the data was considered simpler and more appropriate than presenting all possible response options. Although some intricate data may have been lost, presentation of the data in this manner does not detract from the overall picture; it merely simplifies it.

The reasons for noncompliance and compliance are summarized separately from the other results of the questionnaire so as to prevent misrepresentation of these results. This may have occurred due to the nature of the questions where individuals were asked to allocate the reasons for compliance or noncompliance amongst a list of possible factors. If, for example, compliers did not indicate "sufficient finance" as a reason for compliance it need not mean that they did not have sufficient finance but simply that they did not report it as a factor.

Those analyses which contributed to sample distinguishing findings (e.g., that weight loss individuals were overweight and that cardiac individuals suffered from heart problems [see Table 12 and 13]) are asterisked in the relevant tables but are not elaborated on below.

5.2.1 Findings from the HBMQ

All subjects responded in a similar manner to the HBM component "1. Motivation" (see Table 11).

2. Susceptibility/Resusceptiblity and Severity (i.e., the value of the illness threat reduction) (see Table 12)

Continuous data are summarized separately in Tables 13 (height and weight information) and 14 (the length of time that symptoms were experienced).

No significant differences between the responses from compliers and noncompliers were evident for any subcomponents measuring this aspect of the HBM. The obvious findings that were significant are annotated in the tables.

3. Benefits (probability that compliant behaviour will reduce the threat) (see Table 15)

No differences between the responses from compliers and noncompliers were established for any part of this component. However, significant differences in the responses between and within the groups were found for HBM subcomponent 3.2.

All weight loss compliers believed they had benefitted by participating in the programme and that the programme had assisted them in learning the new life-style. Significantly less weight loss noncompliers indicated that they had not either benefitted or received assistance from the

Table 11

Summary of Findings for HBM Component "1. Motivations"

HBM component and relevant questions	Percentage responding yes or who agree[a]					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
1.1 Concern about (salience of) health matters in general						
and						
1.3 Positive health activies:						
(See also 4.4 Table 16 and 7.3 Table 18)						
++ Sporting activities at school (Q6):						
None	13.5	0.0	10.4	5.3	10.4	7.9
One/Two	35.1	45.4	37.4	26.3	21.1	23.7
Three/Four	37.9	27.3	35.4	52.6	63.2	57.9
Five/More	13.5	27.3	16.8	15.8	5.3	10.5
Physical activity in the past five years (Q7):						
(tennis, walking, cycling,bowls, jogging, golf, swimming, cardiac rehabilitation)	64.9	63.6	64.6	52.6	73.7	63.2
1.2 Willingness to seek and accept medical direction:						
+ Likelihood of adherence to medical advice for:						
Prescribed medication (Q1A)	94.6	90.9	93.8	100.0	100.0	100.0
Recommended diet (Q1B)	91.9	100.0	93.8	89.5	100.0	94.7
Alcohol consumption (Q1C)	91.9	90.9	91.7	89.5	100.0	94.7
Exercise requirements (Q1D)	94.6	90.9	93.8	100.0	94.8	97.4

\+ Yes and sometimes responses collapsed

++ Open-ended question

[a]For example, 13.5% of weight loss compliers indicated that they had participated in no sporting activities at school (1.3, Q6)

Table 12

Summary of Findings for HBM Component "2. Susceptibility/Resusceptibility and Severity"

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
2.1 Susceptibility/resusceptibility:						
Familial history of:						
Diabetes (Q4A)	24.3	9.1	20.8	21.1	31.6	26.3
Hypertension (4B)	40.5	45.5	41.7	42.1	52.6	47.4
Heart Attack (Q4C)	48.6	72.7	54.2	52.6	73.7	63.2
Other (blood pressure, arthritis, cancer, stroke, asthma, depression) (Q4D)	51.4	54.5	52.1	47.4	42.1	44.7
Own susceptibility to:						
Diabetes (Q5A)	0.0	0.0	0.0	15.8	0.0	7.9
Hypertension (Q5B)	18.9	9.1	16.7	42.1	26.3	34.2
Heart Attack (Q5C)	2.7	18.2	6.3	10.5	26.3	18.4
Other (Q5D)	21.6	0.0	16.7	15.8	26.3	21.1
2.2 Vulnerability to illness in general:						
Not examined in Q2						
2.3 Extent of possible bodily harm:						
(See Table 13 for height and weight details) *						
Presently at ideal weight (Q8F)	0.0	36.4	8.3	0.0	42.1	21.1
+ Health problems before joining programmes:						
High/low blood pressure (Q9A)	29.7	45.5	33.3	36.9	21.1	28.9
Breathlessness (Q9B)	67.5	54.6	64.6	57.9	68.4	63.1
Fatigue (Q9C)	75.6	72.8	75.0	78.9	42.1	60.6

(table continues)

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
[ab]Overweight (Q9D) *	100.0	45.5	87.5	100.0	47.4	73.7
[c]Heart problems (Q9E) *	2.7	81.8	20.8	5.3	73.7	39.5
Other (back trouble, depression, bypass, angina) (Q9F)	19.4	45.5	25.5	50.0	21.1	35.1
2.4 Extent of possible interference with social roles:						
+ Rejection by others, spouse/significant other (Q24A)	18.9	9.1	16.7	26.4	0.0	13.1
Employment problems (Q24B)	5.4	9.1	6.3	5.3	5.3	5.3
Physical discomfort (Q24C)	56.7	63.7	58.3	63.2	42.2	52.7
Other (lack of self-esteem, depression, tiredness and listlissness) (Q24D)	8.1	0.0	6.3	10.5	5.3	7.9
2.5 Presence of (or past experience with) symptoms:						
Length of time that symptoms were experienced for (Q10, see Table 14) *						

\+ Yes and sometimes responses collapsed

* Significant difference between weight loss and cardiac compliers and noncompliers at the 1% level

[a]$\chi^2(2, N = 48) = 28.81$, $p<.01$, weight loss vs cardiac compliers

[b]$\chi^2(2, N = 38) = 17.0$, $p<.01$, weight loss vs cardiac noncompliers

[c]Fisher's Exact Test, $p<.01$.

Table 13

Height (in Centimetres) and Weight (in Kilograms)

	Height (Q8A)[a]	Current weight (Q8B)[b]	Weight one year ago (Q8C)[c]	Most ever weighed (Q8D)[d]	Weight at age 21 (Q8E)
			Compliers		
Weight loss (n = 37)					
M	163.8	85.8	88.6	96.9	67.3
SD	9.2	14.0	18.5	17.1	18.6
[e]Range	184/133	130/65	135/63	139/66	125/0
Cardiac (n = 11)					
M	173.6	76.1	75.8	82.2	64.8
SD	5.6	11.5	14.8	13.3	8.0
Range	180/160	88/55	99/54	101/65	76/53
			Noncompliers		
Weight loss (n = 19)					
M	163.7	90.6	88.8	98.3	62.2
SD	7.5	14.4	15.3	15.6	18.6
Range	180/153	112/70	115/63	125/74	90/0
Cardiac (n = 19)					
M	175.3	79.8	78.8	84.2	70.4
SD	5.8	11.3	10.5	12.7	9.4
Range	183/158	101/58	98/57	106/58	89/50

Note. A significant diference between all weight loss and cardiac subjects at the 1% level was found for all the above questions except Q8E.

[a]$F(1, 82) = 33.93$, $p<.01$. [b]$F(1, 82) = 10.71$, $p<.01$. [c]$F(1, 82) = 9.04$, $p<.01$. [d]$F(1, 82) = 15.53$, $p<.01$. [e]Range: First the maximum and then the minimum figure is given.

Table 14

Length of Time (in Months) that Symptoms were Experienced (Question 10)

	Compliers		Noncompliers	
	Weight loss (n = 37)	Cardiac (n = 11)	Weight loss (n = 19)	Cardiac (n = 19)
M	225.6	88.4	201.3	25.8
SD	183.9	146.7	220.0	54.3
Range	696/12	504/3	480/48	240/0

Note. A significant difference between weight loss and cardiac subjects at the 1% level was found $F(1, 82) = 20.58$, $p<.01$

Table 15

Summary of Findings for HBM Component "3. Benefits"

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
3.1 Perception of regimen's safety:						
+ Concern that programme would cause further health problems (Q15)	8.1	9.1	8.4	5.3	10.5	8.1
3.2 Perception of regimen's efficacy to prevent, delay, or cure (including "faith in doctors, and medical care and "chance of recovery": (See also 1.2 Table 4)						
Improvement in health problems (Q12)	94.6	81.8	91.7	68.4	78.9	73.7
Deterioration in health problems (Q13)	10.8	9.1	10.4	10.5	10.5	10.5
[a]Benefit from the programme (Q26) ****	100.0	100.0	100.0	68.4	100.0	84.2
+++ [bc]Assistance from programme in learning new life-style (Q21) ** & ****	100.0	72.7	93.7	79.0	89.4	84.2
+ Belief in alternative medicines:						
Homeopathy (Q2A)	35.1	36.4	35.4	73.7	26.3	50.0
Naturopathy (Q2B)	32.4	18.2	29.1	47.4	31.6	39.5
Herbal treatment (Q2C)	32.4	45.5	35.5	63.2	47.4	55.3
Acupuncture (Q2D)	18.9	27.3	20.9	47.4	21.1	34.2
Belief that a state of ill health can be improved (Q3)	100.0	100.0	100.0	100.0	100.0	100.0

\+ Yes and sometimes responses collapsed

+++ Likert scale responses collapsed

** Significant difference between weight loss and cardiac compliers at the 1% level

**** Significant difference between weight loss compliers and noncompliers at the 1% level

[a] $\chi^2(1, N = 56) = 9.993$, $p<.01$. [b] $\chi^2(2, N = 48) = 10.963$, $p<.01$. [c] $\chi^2(2, N = 56) = 10.210$, $p<.01$.

programme. Significantly more weight loss than cardiac compliers indicated that the programmes had helped them in learning the new life-style.

Barriers, Enabling and Modifying Variables

Table 16 outlines the barrier variables, Table 17 the distance travelled to the programme and Table 18 the enabling and modifying variables, as well as the outcome of compliance.

No significant differences between compliers and noncompliers were found on any of these HBM components. However, when analyzed by programme, significantly more weight loss than cardiac noncompliers responded that they had to change their exercise and dietary patterns (see 4.4, Table 16), experienced these changes as complex (see 4.5, Table 16) and did not cope as well physically or emotionally with the weight loss programme (see 7.2, Table 18).

Significantly more weight loss than cardiac noncompliers indicated that they were self-motivated at the start of the relevant programme (see 7.4, Table 18).

9. Compliance (see Table 18)

No significant difference was established in the long-term compliance of compliers and noncompliers, with high percentages of both groups managing to maintain the life-styles.

Table 16

Summary of Findings for HBM components "4. Structural, 5. Attitudinal and 6. Interaction Variables"

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
4. Structural variables:						
4.1 Finance:						
Fees problematic (Q33D)	16.2	18.2	16.7	26.3	0.0	13.2
Sufficient finance (Q29C, 30C, see Tables 20 & 21)						
4.2 Accessibility:						
Distance to travel (Q31, see Table 17)						
Own transport(Q32A)	83.8	100.0	87.5	89.5	100.0	94.7
Other transport (Q32B, C, D)	16.2	0.0	12.5	10.5	0.0	5.3
Location of venue problematic (33B)	18.9	9.1	16.7	15.8	5.3	10.5
Parking problematic (Q33C)	16.2	18.2	16.7	0.0	0.0	0.0
4.3 Inconvenience:						
General (Q29b, 30b, see Tables 20 & 21)						
Time of day (Q33A)	43.2	45.5	43.8	78.9	68.4	73.7
Other (had to get up too early) (Q33E)	56.0	0.0	4.3	5.3	21.1	13.2
Preferred alternative times:						
Early morning (Q34A)	70.3	81.8	72.9	47.4	47.4	47.4
Midday (lunch time) (Q34B)	2.7	9.1	4.2	5.3	5.3	5.3
Late afternoon (Q34C)	10.8	0.0	8.3	31.6	26.3	28.9
Evening (Q34D)	24.3	9.1	20.8	47.4	26.3	36.8
Other (mid-morning) (Q34E)	10.8	0.0	8.3	10.5	15.8	13.2
4.4 Need for new patterns of behaviour:						
[a]Exercise (Q19A) ***	91.9	81.8	89.6	94.7	57.9	76.3
[b]Diet (Q19B) ***	97.3	81.8	93.8	100.0	68.4	84.2
Smoking (Q19C)	10.8	0.0	8.3	21.1	21.1	21.1
Other (getting up early, stress coping) (Q19D)	2.7	18.2	6.3	0.0	5.3	2.6

(table continues)

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
4.5 Complexity:						
+ [c]Changes were experciened as difficult (Q22) *** (e.g., simultaneous changes to diet and exercise or simultaneous changes to diet and smoking habits)	59.5	36.4	54.2	68.4	21.1	44.7
4.6 Side-effects:						
+ [d]Chest pains (Q14A) **	8.1	45.5	16.7	10.5	15.8	13.2
+ Lack of breath (Q14B)	45.9	36.4	43.8	47.4	31.6	39.5
+ Nausea (Q14C)	8.1	18.2	10.5	10.6	0.0	5.2
+ Fainting (Q14D)	2.7	18.2	6.3	5.3	5.3	5.2
+ Other (knee injury, fatigue, difficulty with exercises) (Q14E)	10.8	27.3	14.6	10.5	5.3	7.9
5. Attitudes:						
Liked/disliked the exercise programme (Q29A, 30B, see Tables 20 & 21)						
Satisfaction with facilities (Q33C, see Tables 20 & 21)						
6. Interaction:						
Unrealistic staff expectations (Q29G, 30G, see Tables 20 & 21)						
Own expectations not met (Q29H, 30H, see Tables 20 & 21)						
Lack of staff/patient interaction (Q29F, 30F, see Tables 20 & 21)						

\+ Yes and sometimes responses collapsed

** Significant difference between weight loss and cardiac compliers at the 1% level

*** Significant difference between weight loss and cardiac noncompliers at the 1% level

[abc]Fisher's Exact Test, $p<.01$. [d]$\chi^2(2, N = 48) = 10.82653$, $p<.01$.

Table 17

Distance (in Kilometres) Required to Travel to the Exercise Venue (Question 31)

	Compliers		Noncompliers	
	Weight loss (n = 37)	Cardiac (n = 11)	Weight loss (n = 19)	Cardiac (n = 19)
M	10.0	11.2	9.8	14.0
SD	8.2	9.0	5.8	9.1
Range	35/1	35/2	20/1	35/4

Note. No significant differences were established for this question.

Table 18

Summary of Findings for HBM Component "7. Enabling Variables" and "9. Compliance"

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
7.1 Feeling of control						
++ Cause of health problem (Q11):						
Poor life-style	43.2	54.5	45.8	31.6	57.8	44.7
Combination of medical and life-style	24.3	0.0	18.8	10.5	5.3	7.9
Medical and hereditary	2.7	18.2	6.3	15.8	31.6	23.7
Life-style and psychological	8.1	9.1	8.3	10.5	0.0	5.3
Psychological	2.7	0.0	2.0	0.0	5.3	2.6
Job, social role	2.7	9.1	4.2	0.0	0.0	0.0
Lack of motivation	2.7	0.0	2.1	0.0	0.0	0.0
Don't know	5.4	9.1	6.3	5.3	0.0	2.6
Other (stopped smoking, pregnancy)	8.2	0.0	6.3	26.3	0.0	13.2
Self-motivation (Q29D, 30D, see Tables 20 & 21 and 7.4 below)						
7.2 Feeling of self-efficacy:						
+++ Positiveness (Q18)	94.6	100.0	95.8	94.7	94.7	94.7
+++ Confidence (Q20)	94.6	80.9	93.7	89.4	89.5	89.5
+++ [a]Coped physically with the programme (Q27A) ***	97.3	100.0	97.9	89.5	100.0	94.7
+++ [b]Coped emotionally with the programme (Q27B) ***	94.6	90.9	93.7	84.2	100.0	92.1
Could maintain the life-style on their own (Q29I, 30J, see Tables 20 & 21) ***						

(table continues)

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
7.3 Prior experience with action, illness or regimen:						
Prior participation on:						
[c]Various diets (Q17A) *	73.0	27.3	62.5	94.7	0.0	47.4
[d]Health/fitness programmes (Q17B) ***	32.4	9.1	27.1	63.2	5.3	34.2
[e]Cardiac Rehabilitation programme (Q17C) *	0.0	27.3	6.3	0.0	15.8	7.9
None (Q17D)	24.3	45.5	29.2	0.0	78.9	39.5
Other (weight loss injections, walking, hiking, swimming) (Q17E)	10.8	9.1	10.4	15.8	5.3	10.5
7.4 Source of advice and referral (including social pressure):						
[f]Self-motivation (Q16A) ***	81.1	45.5	72.9	94.7	42.1	68.4
[g]Referral by a doctor (Q16B) *	5.4	72.7	20.8	5.3	73.7	39.5
Pressure from a spouse/significant other (Q16C)	21.6	9.1	18.8	15.8	31.6	23.7
Media influence (Q16D)	32.4	27.3	31.3	36.8	0.0	18.4
Other (nighbour, friend) (Q16E)	13.9	9.1	12.8	10.5	0.0	5.3
7.5 Social support:						
+ Participation in sport by:						
Parents (Q25A)	27.0	18.2	25.0	21.0	15.8	18.5
Spouse/significant other (Q25B)	59.4	36.4	54.2	47.3	42.1	44.7
Brothers or sisters (Q25C)	43.2	54.6	45.8	47.4	36.9	42.1

(table continues)

HBM component and relevant questions	Percentage responding yes or who agree					
	Compliers			Noncompliers		
	W/loss (n = 37)	Cardiac (n = 11)	All (n = 48)	W/loss (n = 19)	Cardiac (n = 19)	All (n = 38)
Children (Q25D)	62.2	90.9	68.7	68.4	68.5	68.4
Business colleagues (Q25E)	48.6	45.5	47.9	36.9	68.5	52.6
Friends (Q25F)	78.4	81.8	79.1	57.9	63.1	60.5
Family support (Q29E, 30E, see Tables 20 & 21 and 2.4 Table 12)						
9. Compliance:						
+ [hi]Maintained the life-style changes (Q23) *** & ****	67.6	81.9	70.8	21.1	84.2	52.7

\+ Yes and sometimes responses collapsed

++ Open ended question

+++ Likert scale responses collapsed

* Significant difference between weight loss and cardiac compliers and noncompliers at the 1% level

*** Significant difference between weight loss and cardiac noncompliers at the 1% level

**** Significant difference between weight loss compliers and noncompliers at the 1% level

[a]$\chi^2(2, N = 38) = 15.556$, $p<.01$. [b]$\chi^2(2, N = 38) = 9.513$, $p<.01$. [cdefg]Fisher's Exact Test, $p<.01$. [h]$\chi^2(2, N = 56) = 10.879$, $p<.01$. [i]$\chi^2(2, N = 38) = 15.5$, $p<.01$.

Analysis of the data by programme indicated that more cardiac than weight loss noncompliers exhibited better long-term compliance. Amongst the weight loss group, significantly more compliers than noncompliers maintained the life-style.

8. Demographic variables (see Table 19)

Subjects did not differ on the demographic factors of marital status, education level, occupation, income and number of children still supported. The difference in age between cardiac and weight loss subjects will be addressed in the discussion (see chapter 6).

Reasons for Noncompliance or Compliance (see Tables 20 and 21)

Significantly more cardiac than weight loss noncompliers discontinued the programme because they were able to maintain the life-style independently. Compliers did not differ in their reasons for remaining on the programmes.

5.2.2 Findings from the Additional Measuring Tools

The following results for the additional measuring tools utilized in this study were found.

5.2.2.1 Profile of Mood States (POMS)

Table 22 summarizes the scores for the POMS data. Significantly more weight loss than cardiac individuals displayed mood disturbance. Cardiac noncompliers started out on the cardiac programme with the lowest mood disturbance

Table 19

Demographic Characteristics of the Sample in Percentages

Characterstics	Compliers			Noncompliers		
	Weight loss (n = 37)	Cardiac (n = 11)	All (n = 48)	Weight loss (n = 19)	Cardiac (n = 19)	All (n = 38)
[a]Age in years:						
M	45	57	48	40	54	47
SD	12	10	13	9	8	11
Range	71/22	72/39	72/22	63/20	69/41	69/20
Sex:						
Male	19.0	81.8	33.3	5.3	100.0	52.6
Female	81.0	18.2	66.7	94.7	0.0	47.4
Education:						
Std 9/<	16.2	18.2	16.7	36.8	15.8	26.3
Std 10	16.2	18.2	16.7	10.5	15.8	13.2
Std 10 plus 1 or 2 years	32.4	18.2	29.1	42.2	26.3	34.2
University degree	24.4	27.2	25.0	10.5	31.6	21.1
Other (nursing, secretarial, trade)	10.8	18.2	12.5	0.0	10.5	5.3
Marital status:						
Single	18.9	9.1	16.7	15.8	0.0	7.9
Married	67.6	81.8	70.8	52.6	94.8	73.7
Divorced, separated, widowed	13.5	9.1	12.5	31.6	5.2	18.4
Occupation:						
Employer	13.6	18.2	14.6	10.5	15.8	13.2
Self-employed	8.1	0.0	6.3	15.8	10.5	13.2
Employee	48.6	54.5	50.0	42.1	57.9	50.0
Temporarily unemployed	0.0	0.0	0.0	0.0	0.0	0.0

(table continues)

Characterstics	Compliers			Noncompliers		
	Weight loss (n = 37)	Cardiac (n = 11)	All (n = 48)	Weight loss (n = 19)	Cardiac (n = 19)	All (n = 38)
Student	0.0	0.0	0.0	0.0	0.0	0.0
Housewife	24.3	0.0	18.8	26.3	0.0	13.2
Pensioner	5.4	27.3	10.4	5.3	15.8	10.5
Medically unfit for work	0.0	0.0	0.0	0.0	0.0	0.0
Income:						
R 0,00 - R 999,00	24.3	0.0	19.1	42.1	0.0	21.1
R1 000,00 - R1 999,00	24.3	18.2	23.4	10.5	10.5	10.5
R2 000,00 - R2 999,00	16.2	18.2	17.0	10.5	31.6	21.1
R3 000,00 - R3 999,00	8.1	18.2	10.6	10.5	15.8	13.2
R4 000,00 - R4 999,00	2.7	9.0	4.3	5.3	10.5	7.9
R5 000,00 +	13.5	18.2	14.9	0.0	26.3	13.2
Did not wish to say	8.1	18.2	10.6	21.1	5.3	13.2
Number of children still supported:						
0	45.9	63.6	50.0	26.3	31.6	28.9
1	2.7	0.0	2.1	15.8	15.8	15.8
2	24.3	27.3	25.0	31.6	31.6	31.6
3	27.0	9.1	22.9	10.5	21.1	15.8
4	0.0	0.0	0.0	15.8	0.0	7.9

Note. Cardiac subjects were signficantly older than the weight loss subjects. [a]$F(1, 82) = 25.12$, $p < .01$.

Table 20

Reasons for Noncompliance (Question 29)

	Reasons	Percentage who said yes or who agree		
		Weight Loss (n = 19)	Cardiac (n = 19)	Total
4.	Structural variables:			
4.1	Lack of finance (Q29C)	15.8	0.0	7.9
4.3	Inconvenience (Q29B)	36.8	63.2	50.0
5.	Attitudes			
5.1	Disliked the programme (Q29A)	15.8	0.0	7.9
6.	Interaction:			
6.1	Unrealistic expectations of staff (Q29G)	0.0	5.3	2.6
	Own expectations not met (Q29H)	26.3	10.5	18.4
6.2	Lack of staff/patient interaction (Q29F)	10.5	10.5	10.5
7.	Enabling variables:			
7.2	[a]Could maintain the life-style alone (Q29I)	0.0	36.8	18.4
	Lack of self-motivation (Q29D)	31.6	5.3	18.4
7.5	Lack of family support (Q29E)	26.3	0.0	13.2
	Other (work and time problems) (Q29J)	57.9	52.6	55.3

[a]A significant difference at the 1% level between responses from cardiac and weight loss compliers was found. Fisher's Exact Test, $p<.01$.

Table 21

Reasons for Compliance (Question 30)

	Reasons	Percentage who said "yes"		
		Weight Loss (n = 19)	Cardiac (n = 19)	Total (n = 38)
4.	Structural variables:			
4.1	Finance sufficient (Q30C)	51.4	36.4	47.9
4.3	Convenience (Q30B)	29.7	36.4	31.3
5.	Attitudes:			
5.1	Liked the programme (Q30A)	86.5	63.6	81.3
6.	Interaction:			
6.1	Realistic expectations of the staff (Q30G)	51.4	36.4	47.9
	Own expectations met (Q30H)	43.2	27.3	39.6
6.2	Staff/patient interaction (Q30F)	43.2	54.5	47.9
7.	Enabling variables:			
7.1	Needed to stay on to maintain the life-style (Q30J)	51.4	81.8	58.3
	High self-motivation (Q30D)	70.3	81.8	72.9
7.5	Family support (Q30E)	48.6	45.5	47.9
	Companionship (Q30I)	51.4	18.2	43.8
	Other (wanted to learn; had paid for the programme; support for friend; allowed time off) (Q30K)	13.5	9.1	12.5

Table 22

Total Mood Disturbance Scores from the Profile of Mood States (POMS)

	Compliers			Noncompliers		
	Weight loss (n = 37)	Cardiac (n= 11)	All (n = 48)	Weight loss (n = 19)	Cardiac (n = 19)	All (n = 38)
POMS1						
M	190.8	183.3	189.1	190.3	155.4	172.9
SD	45.3	60.8	48.6	50.2	37.2	47.0
Range	288/104	312/117	312/104	311/118	261/114	311/114
POMS2						
M	165.4	162.2				
SD	41.0	46.0				
Range	280/107	295/96				
POMS3						
M	177.6	156.7	173.0	213.8	172.6	193.2
SD	50.7	46.0	50.0	54.5	53.2	57.1
Range	318/110	267/110	318/110	339/149	219/124	339/124

(table continues)

Annova Summary Table for POMS1 and POMS3

Source	ss	df	ms	f	probability
Between subjects					
Programme	24 582.7	1	24 582.7	7.43	0.007
Comply	1 232.4	1	1 232.4	0.37	0.543
Programme x comply	5 022.5	1	5 022.5	1.52	0.2213
Error	271 193.2	82	3 307.2	-	-
Within subjects					
Time	3.3	1	3.3	0.00	0.963
Time x programme	886.2	1	886.2	0.57	0.453
Time x comply	14 390.3	1	14 390.3	9.22	0.003
Time x programme x comply	121.5	1	121.5	0.08	0.781
Error	128 012.7	82	1 561.1	-	-

(table continues)

Annova Summary Table for POMS1, POMS2 and POMS3

Source	ss	df	ms	f	[a]probability
Between subjects					
Programme	3 536.4	1	3 536.4	0.83	0.368
Error	201 375.7	47	4 284.6	-	-
Within subjects					
Time	12 145.6	2	6 072.8	4.75	0.012
Time x programme	1 270.1	2	635.0	0.50	0.597
Error	120 177.4	94	1 278.5	-	-

[a]Probabilities are for Greenhouse-Geisser adjusted degrees of freedom (Dixon, 1981).

score. On long-term follow-up the mood profiles of compliers had improved for both cardiac and weight loss individuals while those for both weight loss and cardiac noncompliers had deteriorated.

5.2.2.2 Health Behaviour Assessment Scale (HBAS)

Table 23 summarizes the findings for the HBAS. Weight loss noncompliers had to carry out the most life-style changes. The behaviours of all individuals had improved over time.

5.3 SUMMARY OF THE FINDINGS (SEE TABLE 24)

No significant differences at the 1% level were found between compliers and noncompliers when considered as a whole on any of the HBM components or subcomponents. However, significant differences were obtained when the issue of compliance was looked at between and within the two health problems i.e., when the responses of weight loss subjects were compared to those from the cardiac group and when responses by weight loss compliers and noncompliers were compared. No significant differences between cardiac compliers and noncompliers were found.

The results from this study revealed that more weight loss compliers than noncompliers believed they had benefitted from the programme and that it had assisted them in assimilating the new life-style. More weight loss than cardiac compliers expressed that they had received assistance from the

Table 23

Mean Health Behaviour Assessment Scale (HBAS) Scores

	Compliers			Noncompliers		
	Weight loss	Cardiac	All	Weight loss	Cardiac	All
	(n = 37)	(n = 11)	(n = 48)	(n = 19)	(n = 19)	(n =48)
HBAS1						
M	6.1	6.9	6.3	5.5	7.3	6.4
SD	1.1	1.9	1.4	1.4	1.3	1.6
Range	8/4	9/2	9/2	7/2	9/3	9/2
HBAS2						
M	7.5	7.9				
SD	1.1	0.9				
Range	9/5	9/6				
HBAS3						
M	7.3	7.6	7.4	6.3	7.2	6.7
SD	1.1	1.1	1.1	1.5	1.5	1.6
Range	9/5	9/5	9/5	9/3	9/4	9/3

(table continues)

Annova Summary Table for HBAS1 and HBAS3

Source	ss	df	ms	f	probability
Between subjects					
Programme	32.3	1	32.3	11.11	0.001
Comply	6.6	1	6.6	2.26	0.1366
Programme x comply	4.8	1	4.8	1.65	0.202
Error	238.6	82	2.9	-	-
Within subjects					
Time	14.2	1	14.2	23.19	0.000
Time x programme	3.7	1	3.7	5.95	0.017
Time x comply	3.5	1	3.5	5.77	0.019
Time x programme x comply	0.4	1	0.4	0.61	0.439
Error	50.3	82	0.6	-	-

(table continues)

Annova Summary Table for HBAS1, HBAS2 and HBAS3

Source	ss	df	ms	f	[a]probability
Between subjects					
Programme	7.6	1	7.6	2.50	0.12
Error	149.5	49	3.1	-	-
Within subjects					
Time	27.1	2	13.53	27.67	0.000
Time x programme	0.9	2	0.47	0.95	0.3904
Error	47.9	98	0.49	-	-

[a]Probabilities are for Greenhouse-Geisser adjusted degrees of freedom (Dixon, 1981).

Table 24

HBM Components for which Significant Differences at the 1% Level were Found

HBM variable	Differences amongst compliers	Differences amongst noncompliers	Differences within weight loss group	Differences between cardiac & weight loss	Compliers versus noncompliers
3.2 The proposed regimen's efficacy to prevent, delay or cure:					
Benefit from programme (Q26)	-	-	more compliers	-	-
Assistance from programme (Q21)	more weight loss	-	more compliers	-	-
4.4 Need for new behaviours:					
Exercise (Q19A)	-	more weight loss	-	-	-
Diet (Q19B)	-	more weight loss	-	-	-
4.5 Complexity: (Q22)	-	more weight loss	-	-	-
7.2 Feeling of self-efficacy:					
Coped physically (Q27A)	-	more cardiacs	-	-	-
Coped emotionally (Q27B)	-	more cardiacs	-	-	-
Could maintain the life-style alone (Q29I)	-	more cardiacs	-	-	-
7.4 Source of advice/referral:					
Self-motivation (Q16A)	-	more weight loss	-	-	-
9. Compliance:					
Maintained the life-style changes (Q23)	-	more cardiacs	more compliers	-	-
Other:					
Mood disturbance (POMS)					
Overall	-	-	-	more weight loss	-
On follow- up				-	more noncompliers
Life-style changes (HBAS)	-	more weight loss	-	-	-

programme. These form the benefit factors (HBM subcomponent 3.2) which were associated with compliance in this study.

More weight loss than cardiac noncompliers were required to change both their exercise and dietary behaviours (4.4) and found the execution of these changes to be complex (4.5). More cardiac than weight loss noncompliers indicated that they coped well physically and emotionally with the programme and that they could maintain the life-style on their own (7.2). More weight loss than cardiac noncompliers indicated that they were self-motivated at the start of the programme (7.4). These constitute the "barriers" and "enabling" factors associated with compliance in the current research.

Long-term follow-up established that more cardiac than weight loss noncompliers managed to maintain the life-style. More weight loss compliers than noncompliers were compliant in the long-term.

The POMS revealed that weight loss subjects displayed more mood disturbance than cardiac subjects. On follow-up the mood disturbance for compliers had improved but worsened for noncompliers. Weight loss noncompliers had to carry out the most life-style changes as measured by the HBAS and the behaviours of all subjects had improved over time.

In this study, an association between compliance and subcomponents of the HBM variables perceived benefits,

barriers and enabling factors was found. A number of hypotheses were not met in this study.

No association was established between compliance and the HBM components of motivation (1.) and susceptibility, resusceptibility or severity (2.). No relationship between compliance and the HBM subcomponents of the perceived safety of the programme (3.1); financial difficulties (4.1); accessibility (4.2) and convenience (4.3) of the programmes; side-effects (4.6); attitudes (5); interaction (6); feeling of control over the problem (7.1); prior experience with the action, illness or regimen (7.3) and social support (7.5) was found.

The hypotheses that a number of benefits minus the barriers or that a combination of beliefs would be associated with compliance could not be tested because of the small sample size which prevented a comparison of responses for the various HBM components.

The implications of the above findings will now be discussed in the following chapter.

CHAPTER SIX: DISCUSSION

The implications of those findings presented in the previous chapter, together with a critique of the study and recommendations for future research will now be discussed.

Three important issues will be addressed in the course of the discussion. These include (a) the findings of the study, (b) the contribution of the HBM variables in understanding the compliance phenomenon for the two programmes in question, and (c) a critique (where necessary) of the HBMQ.

The discussion of the findings will proceed with the lack of significant findings when responses from all compliers and noncompliers were compared. Short- and long-term compliance or noncompliance will be broached and then possible explanations for this phenomenon outlined. Following this, the implications of those significant findings between and within the health problems examined will be discussed. Where relevant, findings will be linked to the outcome of compliance for this study.

6.1 COMPLIERS VERSUS NONCOMPLIERS

No significant differences in the responses from these two groups were found when all compliers and noncompliers were

compared. This may be ascribed to the fact that the compliance phenomenon is inherently linked not only to the specific health problem being studied but also to the aims and complexity of the particular regimen in question (Epstein & Cluss, 1982; Sackett, 1979).

Thus, although some common compliance-related issues for obesity and CHD were established (see chapter 2, section 2.3.3), these health problems obviously differ in terms of overt symptomology and severity. The life-threatening nature of CHD is evident (Ice, 1985), while the threat to health for obesity is less overt and more future-oriented than immediate (Becker et al., 1977b; Rabkin, 1982-83). The complexity of the health regimens for these two health problems would therefore differ with that for CHD being the more complex.

For some questions (e.g., see 4.4, Q19A, Table 16) no differences between the responses of compliers and noncompliers were found when the groups were compared as a whole. However, when responses by weight loss and cardiac subjects within the noncomplier group were investigated, it was evident that the responses from weight loss subjects had skewed the mean. The compliance phenomenon in this study would therefore have been greatly oversimplified if only the responses from all compliers and noncompliers had been examined.

6.2 SHORT-AND LONG-TERM COMPLIANCE OR NONCOMPLICANCE

The data from the present study supports the literature that short-term compliance on a programme does not presuppose long-term compliance (Epstein & Cluss, 1982; Gordis, 1979; Holm et al., 1985). This was evident where some compliers did not maintain the recommended life-style regimen (see Table 18, chapter 5).

The same can be said for short-term noncompliance, where nonadherence on the programmes was not associated with long-term noncompliance. That is, a high percentage of those cardiac subjects who did not comply with the cardiac programme (i.e., they were short-term noncompliers) did in fact maintain the prescribed life-style.

These findings emphasize the importance of defining short- and long-term compliance (Epstein, 1984). They also highlight the need to examine behaviour after noncompliance has occurred so as to ascertain whether individuals continued to be noncompliant (Trice et al., 1987).

The findings and reasons for compliance or noncompliance will now be discussed in more depth.

6.2.1 Short-term compliance

Weight loss and cardiac compliers indicated that they continued with the programmes because they liked the exercise programme and were self-motivated. A high percentage of individuals needed to stay on in order to maintain the life-style. In addition, compliers experienced family support, realistic expectations of the staff and companionship. Their own expectations were met and they found the programme convenient.

The positive association of family support with compliance for weight loss and cardiac individuals has been well documented (Andrew et al., 1980; Brownell, 1982; 1984a, b; Ell & Haywood, 1985; Hilbert, 1985; Holm et al., 1985; Klinger, 1984; McMahon et al., 1986; Oldridge et al., 1983; Rabkin, 1982-83; Straw & Terre, 1983; Streja et al., 1982).

Furthermore, the importance for compliance of quality staff-patient interaction (Becker & Maiman, 1975; Cummings et al., 1982; Davis, 1968b, Eraker et al., 1984) and the necessity that expectations be met (Bennett, 1986; Epstein & Cluss, 1982; Hulka, 1979; Kinnaird et al., 1982) has been well established in the literature.

The significance of companionship for compliance is supported in the literature where dieting has been

experienced as a very lonely process which results in feelings of isolation (Foreyt, 1987; Hartigan et al., 1982; Jacobs & Wagner, 1984; Wing et al., 1984).

6.2.2 Short-term noncompliance

The main reasons for noncompliance for both weight loss and cardiac individuals were the inconvenience caused by the programme and other factors such as having to rush to get to work after the programme, and the early starting time of the programmes. The negative effect of these factors on compliance is supported in the literature (Andrew et al., 1980; Archer et al., 1967; Bruce et al., 1976; Haynes, 1979; Oldridge et al., 1983; Taylor et al., 1984). The 6-week recommended participation period on the cardiac programme was not associated with noncompliance in this study.

Significantly more cardiac than weight loss noncompliers indicated that they had dropped out of the programme because they could maintain the life-style independently. These cardiac noncompliers therefore believed in their ability (or self-efficacy) to carry out the recommended life-style changes. This finding is not supported in the literature where cardiac noncompliers were generally found to lack a feeling of self-efficacy (Hollis et al., 1986; Kaplan et al., 1984). However, in this study, most cardiac noncompliers did not need to alter their exercise and diet

behaviours when they joined the programme so they would be able to continue with these behaviours without attending the programme.

6.2.3 Long-term compliance and/or noncompliance

A large percentage of cardiac individuals (including noncompliers) continued to maintain the life-style changes. However, this study did not assess whether stress management by CHD subjects had improved. Since stress management is an important aspect of cardiac rehabilitation, its evaluation should be considered as part of long-term compliance. If this aspect had been examined, it is likely that long-term compliance for CHD individuals would not have been as high as it was in this study.

Long-term compliance was generally low amongst the weight loss group although significantly more short-term weight loss compliers than noncompliers managed to maintain the life-style.

6.3 IMPLICATIONS OF THE FINDINGS FOR THE HBM COMPONENTS

1. Motivation

The findings for this study denote that all subjects exhibited comparable levels of general health motivation as measured in this study and that these motivations were similarly associated with compliance and/or noncompliance.

There may be three possible explanations for the lack of significant findings for this HBM component. Firstly, since the study is retrospective in nature, it is difficult to establish the health motivations that occurred historically. This is supported by reviews of the HBM which verified that only prospective studies have established positive findings for "motivation" (Becker et al., 1972a, b; Becker & Maiman, 1975; Becker et al., 1977b; Champion, 1987; Chen & Land, 1986; Haefner & Kirscht, 1970).

This brings us to the second explanation for the lack of significant differences between compliers and noncompliers on this component. The relatively small sample prevented further development of the comparisons of responses to various questions. The links between the HBM components as measured by the HBMQ in this study, could not therefore be established. The reviews by Becker and Maiman (1975), Becker et al. (1977a) and Janz and Becker (1984) found that this component contributed significantly to understanding the compliance phenomenon only in conjunction with other HBM variables and not as a separate variable. The findings in this study therefore confirm that the HBM component "motivations" is not successful as a separate variable for understanding compliance.

A final possible explanation may be that the information examined in this study related to general health motivations

more than specific information such as what actually motivated the individuals to join the respective programmes. The initial trigger factors or cues to action as potentially motivating issues were not assessed in this study for reasons outlined in the methodology (see chapter 4, p. 112).

By way of refinement of the questionnaire, "willingness to seek and accept medical advice" (HBM subcomponent 1.2) should not be conceptualized as a single idea as some individuals may seek advice but may not accept or follow it. It is also suggested that general and specific health motivations which relate to the health problem in question be examined.

2. Susceptibility/Resusceptibility and Severity

2.1 Susceptibility/resusceptibility: The lack of significant findings for this subcomponent may be due to a lack of knowledge about the risk factors involved with the health problems examined, but it is more likely attributable to a fear of admitting to possible susceptibility.

Although the debilitating effect of fear on action has been reported in the literature (Becker & Maiman, 1975; Rosenstock, 1966) the above findings indicate that admission to being at risk is frightening, but not how this factor is associated with compliance in this study. In a retrospective study such as this one, it is difficult to

assess how individuals felt about their susceptibility or resusceptibility prior to joining the programmes. At that point in time individuals might have been more prepared to indicate their susceptibility or resusceptibility to these illnesses than they were able to at follow-up as they were about to carry out action which could be seen to decrease the risk. This issue remains open to further investigation.

Severity

The implications of the findings for each subcomponent will first be discussed and then the overall contribution of this component summarized.

2.2 Vulnerability to illness in general: This subcomponent was not examined in Q2 for reasons explained in the methodology (see chapter 4, p. 101). The omission of this subcomponent was not considered to be problematic in light of the aims of the current research which were, amongst others, to establish the reasons for noncompliance on the programmes. If general illness had been associated with this phenomena it would have been identified in the questionnaire (see question 29 in Q2, Appendix D).

2.3 Extent of possible bodily harm: Low percentages of compliers and noncompliers responded that they were at their ideal weight. Since most weight loss individuals had previously attempted to diet (see 7.3), the fact that they

were still overweight has implications for their feelings of self-efficacy concerning weight loss, as well as feelings of failure and low self-esteem which have been found to result from frequent attempts to diet (Mitchell & Stuart, 1984; Marlatt & Gordon, 1980).

Although more cardiac than weight loss individuals maintained the recommended life-style, they still expressed dissatisfaction with their weight. In hindsight, the term "ideal" may have been too limiting. More practical data could have been obtained if individuals had been asked to indicate whether they believed themselves to be presently overweight or not, or at which weight they felt most comfortable.

The responses by subjects concerning the health problems examined in this study (e.g., excess weight, breathlessness and fatigue) confirm that in this particular sample, other health problems which may have complicated compliance were absent.

2.4 Extent of possible interference with social roles: Physical discomfort more than rejection or employment problems interfered with an individual's social roles. This finding indicates that being overweight or having heart disease was not associated with rejection and employment problems for the subjects in this study. These results do

not however negate the fact that the problems examined are generally experienced by weight loss and/or cardiac individuals as outlined in the literature review.

In retrospect, the concept of "physical discomfort" should not have been included in the section of the questionnaire which examined this HBM subcomponent. "Physical discomfort" is not a social role and may in fact arise from the health problem itself. The concept of "social roles" should have been operationalized further to be more specific about the various roles which subjects may have encountered.

2.5 Presence of (or past experience with) symptoms: Weight loss individuals experienced their health problems for longer than did cardiac subjects. This finding is not surprising since the life-threatening nature of CHD prevents the illness from being experienced over an extended time. The implications of frequent dieting for feelings of failure and lack of self-esteem have been discussed in 2.3. These attitudes should be defused prior to further attempts at dieting or weight loss.

Cardiac noncompliers experienced their heart problem for a shorter period than did compliers. Since a smaller turnover in cardiac patients with a longer period of impairment has been noted (Davis & Eichhorn cited, in Davis, 1967), it

would be important to deal with the issue of a sudden onset of CHD with newcomers at the inception of a programme.

Becker and Maiman (1975) purport that unless an individual believes that becoming ill will have serious organic and/or social consequences, no action will be undertaken. The results from the subcomponents 2.3 and 2.5 support this. The presence of overt life-threatening symptoms, as evident in cardiac illness seemed to be associated with compliance, while the absence of these in the weight loss phenomenon seemed to be associated with noncompliance.

Most cardiac noncompliers maintained the life-style which indicates that the overt life-threatening nature of cardiac illness may have pressurized them into long-term compliance. On the other hand, the overt symptoms of obesity, that is, being overweight, may not be regarded by some subjects as sufficiently life-threatening to require compliance. This is confirmed in the literature where the presence of physical symptoms has been found to have an elevating effect on perceived severity (Becker & Maiman, 1975). Furthermore, Becker et al. (1977b) found mothers to view obesity as somewhat unrelated to illness and remedies. Therefore, weight loss individuals may have felt less pressurized to comply in the absence of physical symptoms. The findings from this study emphasize the importance of educating overweight individuals about the risk factors of obesity.

The life-threatening nature of cardiac illness, physician authority and media have also been found to result in high levels of compliance for CHD patients (Croog & Levine, 1977). The threat to health for overweight individuals is perceived as future-oriented more than immediate (Becker et al., 1977b; Rabkin, 1982-83) and the reasons for weight loss related more to body-image and social acceptance than to health (Rabkin, 1982-83). The association with compliance of lack of symptoms other than excess weight for weight loss individuals is open to further investigation.

3. Benefits (probability that compliant behaviour will reduce the threat)

3.1 The proposed regimen's safety: Individuals were generally not concerned about the safety of the programmes. The lack of findings on this subcomponent may reflect common knowledge amongst individuals about the efficacy of exercise.

Becker et al. (1977b) found this subcomponent to be predictive of weight loss but tailored their question to evaluate the diet in question. In the HBMQ, an assessment was done on a general level. More productive information may have been obtained if a specific evaluation of safety attitudes towards exercise and diet had been conducted.

3.2 The proposed regimen's efficacy to prevent, delay or cure: Most individuals indicated that their health problems had improved and not deteriorated. This suggests that the programmes were effective in the short-term in ameliorating the presenting health problems.

Significantly more weight loss than cardiac compliers believed that the programme had assisted them in learning the new life-style. However, Gordis (1979) found that compliers tended to overrate compliance. This may be possible with the responses in this study since weight loss individuals were not in fact at their ideal weight, although they currently weighed less than one year previously or their maximum weight attained (see Table 13, chapter 5).

More cardiac compliers than noncompliers needed to change their diet and exercise behaviours as noncompliers were already carrying out these activities (see 4.4). The programme will consequently have been more beneficial for compliers than for noncompliers who possibly required more assistance in implementing these changes.

The significant difference in the responses from weight loss compliers and noncompliers may have been associated with other issues found to be pertinent in the literature.

Noncompliers have been found to view their weight loss as unsuccessful despite minimal differences between their rate of weight loss and that of compliers (Mitchell & Stuart, 1984). Higher expectations of the outcome of their weight loss have also been established for noncompliers (Bennett, 1986). It is therefore possible that noncompliers felt they had not benefitted from the programme or that it had helped them in learning the new life-style since they had started out with unrealistic expectations. Furthermore, weight loss noncompliers may have felt less positive towards the programme on follow-up because they were still overweight. The importance of ascertaining an individual's expectations at the inception of a programme is emphasized.

For the weight loss -group, a further issue needs consideration. If, as established in the literature, weight loss individuals use food as a coping mechanism (Burbach & Schomer, 1987), then removing food without teaching alternative coping skills is problematic. A multi-disciplinary approach which deals not only with exercise and diet, but also with the psychological aspects of overeating, is important for initial weight loss and the maintenance thereof.

The low figures for belief in alternative medicines may not reflect a lack of belief in these medicines but inadequate knowledge. The question which examined this issue was not

sufficiently clear to detect individuals' knowledge about alternative medicines. Therefore, a recommended change to the HBMQ would be to ask subjects to first give some indication of how they thought alternative medicines worked or were used, and then to evaluate their efficacy.

The questions evaluating subjects' belief that a state of ill health can be improved could have dealt more specifically with their belief in the possibility of improvement to their particular health problem.

This HBMQ component provided some clarification of how individuals perceived the respective programmes and how these views were associated with compliance. Once again, the retrospective nature of the study must be considered as participants may have felt differently at the time of joining the programmes.

Barriers, Enabling and Modifying Factors

4. Structural variables: The findings and implications of factors such as finance, accessibility and convenience for compliance have been discussed above in 6.2.

4.4 Need for new patterns of behaviour: The need to change exercise and diet behaviours was apparent for weight loss compliers and noncompliers and cardiac compliers. High

percentages of cardiac noncompliers were already physically active and diet conscious. No cardiac compliers were required to change their smoking behaviour, as opposed to cardiac noncompliers and all weight loss subjects.

The negative association between smoking and compliance has been well established in the literature (Archer et al., 1967; Finnegan & Suler, 1985; Holm et al., 1985; Oldridge, 1984; Streja et al., 1982). The association between smoking and compliance could not however be established with certainty in this study.

By way of criticism of the HBMQ, the need to take medication as part of a regimen for CHD should also have been examined in this subcomponent as this may have added to the complexity of changes (see 4.5) for cardiac subjects.

4.5 Complexity: All subjects experienced some difficultly implementing the required life-style regimen although significantly more weight loss than cardiac noncompliers encountered this to a greater extent. For some subjects in this study, simultaneous changes to their exercise and eating patterns were difficult and may have been associated with noncompliance.

These findings denote the difficulties experienced by individuals trying to lose weight and support the literature

that a programme that is too complex is associated with noncompliance (Baekeland & Lundwall, 1975; Becker & Maiman, 1975: Belisle et al., 1987; Cummings et al., 1980; Cummings et al., 1982; Eraker et al., 1984; Hulka, 1979; Matthews & Hingson, 1977; Sackett, 1979; Streja et al., 1982).

The complexity of losing weight has been outlined in the literature review and the data presented in this study are indicative of the benefits of a multi-disciplinary approach rather than exercise and diet alone, in dealing with a weight problem. Gradual behaviour changes carried out within the context of other behaviours are more beneficial than changes which are implemented in isolation (Black & Trelfall, 1986; Suls, 1984).

In order to enhance compliance it would be of extreme importance to defuse the participant's attitude towards previous experiences in their weight loss at the inception of a programme. Making weight loss individuals aware of the fact that 100% compliance is not always possible and that past failures must be viewed as positive learning experiences to help facilitate compliance is highlighted (Brownell and Jeffery, 1987; Jeffery et al., 1984).

4.6 Side-effects: Becker and Maiman (1975) found the presence of physical symptoms to have an elevating effect on

compliance. It may be expected that, because they were exercising, cardiac compliers experienced chest pains. However, the presence of chest pains for cardiac compliers may have reminded them of the life-threatening nature of their illness and been positively associated with compliance. These findings are however insufficient to draw definite conclusions about the association between side-effects and compliance. This issue is therefore open to further investigation.

5. Attitudes and 6. Interaction: These aspects have been discussed in 6.2.1 and 6.2.2.

7. Enabling factors:

7.1 Feeling of control: Most subjects indicated that a poor life-style contributed to their health problems. Those cardiac noncompliers who noted that medical and hereditary factors played an important role attributed factors beyond their control to the cause of their heart problem. Ell and Hayworth (1985) also found cardiac noncompliers to lack a feeling of control over their problem. This response by cardiac noncompliers may have lessened their feeling of being able to prevent or control a reoccurrence of their heart problem.

The importance of working through these issues with newcomers to a rehabilitation programme, or even whilst they

are still in the intensive care unit, is of utmost importance for compliance and complete recovery.

7.2 Feeling of self-efficacy: All subjects generally felt positive and confident about changing their behaviours. Significantly more weight loss than cardiac noncompliers did not cope well physically or emotionally with the programme. Those cardiac noncompliers who were already physically active and who did not need to change their diet when they joined the programme, may have been able to cope better physically with the exercise programme.

The poor emotional coping by weight loss noncompliers may be associated with the effect of losing food as a coping mechanism. This may have affected them more than it did the compliers who coped well emotionally with the programme. This may be due to the weight loss compliers exhibiting more mature defence mechanisms as established in past research (Bolocofsky et al., 1984; Ellsworth et al., 1986; Ryden & Sörbis, 1986). This conclusion seems likely considering the improved POMS scores obtained for weight loss compliers, and the deterioration in scores for weight loss noncompliers. This will be discussed in more detail below (see 6.4).

The use of denial by cardiac noncompliers as a way of dealing with their health problem has been established in the literature (Baile & Engel, 1978; Cassem & Hackett,

1977; Imboden, 1972; Kavanagh et al., 1977; Kinnaird et al., 1982). During telephonic feedback most of the cardiac noncompliers reported feeling very well and expressed disbelief that they had in fact experienced a heart attack. Although long-term behavioural compliance on exercise or diet for the cardiac noncompliers was good, the emotional coping of these individuals had worsened as indicated by their follow-up POMS scores (see Table 22, chapter 5).

Compliance with the behavioural components of the programme was therefore not associated with an improvement in mood states for these subjects. This may indicate that these individuals were not coping as well as they had believed they were when they first joined the programmes. Alternatively, the starting POMS scores of the noncompliers may not be a true reflection of how individuals felt at the start of the programme and may have been distorted by denial. The issue of how denial by CHD individuals is associated with initial mood disturbance (as measured by the POMS) and long-term compliance is open to further investigation.

7.3 Prior experience with action, illness or regimen: Significantly more weight loss than cardiac individuals had attempted to diet. Although this is an obvious discovery, it confirms that participation on the UCTWL programme was not their first attempt to lose weight. Since a poor

prognosis for individuals who diet frequently has been found (Jeffery et al., 1985) the importance of defusing potentially negative attitudes towards weight loss is once again emphasized.

7.4 Source of advice and referral (including spouse pressure): In this study, weight loss individuals voluntarily joined the programme and indicated that they were self-motivated. Cardiac individuals were all referred by their doctors and were not as motivated as were the weight loss individuals. Caution in analyzing these responses is however necessary as they may not reflect that cardiac individuals lacked self-motivation but that referral by their doctor encouraged them to be on the programme. The issue of how referral by a doctor affects levels of motivation for cardiac individuals is open to further investigation.

A very high percentage of weight loss noncompliers indicated that self-motivation contributed to their joining the programme. As one of the reasons for noncompliance was lack of self-motivation, a drop in the level of motivation from starting point to dropping out seemed to have occurred (see Table 20, chapter 5). Some weight loss noncompliers also indicated that their expectations had not been met and that this was a contributing factor towards short-term noncompliance. This may have contributed towards a decrease

in self-motivation. However, because of the small sample size which prevented comparisons between questions, these findings cannot be claimed with certainty.

The term "media" as used in the HBMQ was too broad and was confounded by the fact that the UCTWL programme advertises its course in a local paper. This should have been operationalized more clearly.

7.5 Social Support

The degree to which family, friends and colleagues participated in sport did not vary for compliers and noncompliers. In this study, social support in the form of social validation or approval of exercise (Sensenig & Cialdini, 1984) was not associated with compliance. Other forms of social support were discussed in 6.2. This study does not claim to have covered all aspects of the concept of "social support".

8. Demographic Variables: As confirmed in the literature, sex, marital status, educational level, employment and income did not appear to affect compliance (Hilbert, 1985; Matthews and Hingson, 1977; McMahon, 1986; Mushlin and Appel, 1977; Rosenstock, 1988; Streja et al., 1982). The fact that cardiac subjects were older than weight loss subjects is not surprising as CHD is prevalent amongst middle-aged and elderly men (Johnston, 1985).

6.4 PROFILE OF MOOD STATES (POMS)

6.4.1 Compliers

The POMS score at completion of the programmes for the cardiac and weight loss compliers was substantially lower than their initial score, indicating that their mood disturbance had decreased. The follow-up POMS scores for weight loss compliers had worsened since completion of the programme, but were still substantially lower than their scores at the beginning of the programme. The scores of cardiac compliers on the other hand continued to improve over the follow-up period

6.4.2 Noncompliers

The starting POMS scores for weight loss noncompliers was the same as that of the compliers. However, on follow-up, their mood level had worsened considerably.

The cardiac noncompliers started out with a very low mood disturbance. The possible influence of denial (see 7.2 above) and the fact that these noncompliers were already exercising at the inception of the programme, may explain the contradiction in the findings to those of Giese and Schomer (1986) where, at the start of the programme, the nonexercising group were found to have a greater mood disturbance than the exercising group. Bruhn et al. (1971) found that cardiac noncompliers experienced higher levels of

depression initially. However, the findings from this study cannot be said to contradict Bruhn et al.'s findings as the mood disturbance score obtained from the POMS measures a number of mood states besides depression.

Upon follow-up the mood disturbance of the cardiac noncompliers had deteriorated. Bruhn et al. (1971) found no differences between levels of depression of cardiac compliers and noncompliers on 3-year follow-up. Once again the disparity in the findings from this study and those of Bruhn et al. may be due to the type of measuring tool used in the current research, as mentioned above.

Since the mean starting mood disturbance for cardiac compliers was higher than that for the cardiac noncompliers, these compliers may have been able to admit their anxiety concerning their illness and thus deal with these fears, rather than deny them as the noncompliers may have done. This is supported in the literature where the noncompliant patient was found to be unable to accept the limitations of their illness and fear, resulting in denial as a coping mechanism (Kinnaird et al., 1982).

The worsening of mood disturbance for noncompliers and the improvement of mood disturbance for compliers is significant. It cannot, however, be assumed that the

changes in mood disturbance are due to either compliance or noncompliance.

Since compliers were assessed at the completion of the programmes it is recommended that noncompliers be traced and their mood disturbance tested simultaneously. This would enable an assessment of any changes in scores as being due to extraneous variables such as history and maturation, or due to compliance for the compliers and noncompliance for the noncompliers.

6.4.3 Weight loss versus cardiac subjects

Significantly more mood disturbance was established for weight loss than for cardiac individuals. Cardiac individuals started the programme with lower mood disturbance scores than weight loss individuals. The results from this study do not entirely refute those of Stuart (cited in Ellsworth et al., 1986) that no differences between obese and non-obese individuals on depression and/or neuroticism exist. Of importance is the various measuring tools that may have been utilized. The results from this study do, however, indicate a difference in the mood disturbance of weight loss and cardiac subjects as measured by the POMS.

6.5 HEALTH BEHAVIOUR ASSESSMENT SCALE (HBAS)

Weight loss noncompliers needed to make the most life-style changes. These findings are confirmed by 4.4 above. Since the scores for the HBAS were averaged for the purposes of this study, the data was meaningful only in the light of substantive data from the HBMQ. Examining the behaviours which needed to be changed, more than analyzing a mean score may be a more useful way of identifying subtle but important differences between the individuals' health behaviours. Future use of the HBAS should consider the qualitative, more than the quantitative aspects of this questionnaire.

6.6 CRITICISMS OF THE DESIGN OF THE STUDY

The criticisms levelled at the HBMQ have been discussed for the relevant HBM components and questions which examined them. Some general comments about the study are outlined below.

6.6.1 Retrospective nature of the study

As parts of this study are retrospective in nature, associations between beliefs and behaviour cannot be concluded with absolute certainty. Noncompliers in this study may still hold the same beliefs as when they joined the programmes. These may differ to those held by compliers at the inception of the programme. This cannot however be ascertained as the beliefs of compliers may have changed and become congruent with the compliant behaviour. That beliefs

and behaviour can become congruent has been found in the literature (Becker et al., 1979).

6.6.2 Extraneous variables

Some factors may have changed since participants were first on the programme. For example, the number of children at home may have increased or decreased, income could have fluctuated, occupation may have changed, etc. In addition, the responses by weight loss participants may have been negatively affected by the fact that they were not at their ideal weight when completing the questionnaire. This may have inadvertently obscured their memory of their experience on the programme.

6.6.3 Follow-up period

The follow-up period varied for some subjects in the study. Future studies should ensure that the sample groups are similar in respect of the follow-up period.

6.6.4 Subject selection

As far as subject selection is concerned, most studies use people who are willing to comply and these volunteers may differ in terms of motivation or other characteristics which prompt them to volunteer (Epstein & Cluss, 1982). Weight loss individuals volunteered, while cardiac patients were referred. Further research would need to ensure that samples of volunteers and referred subjects be represented

for all health problems studied in order to minimize the effects of motivation and/or referral as a confounding variable.

Sample groups in the study were of unequal size. Females were predominant in the weight loss group and males in the cardiac group. The number of compliers was greater than the number of noncompliers with more weight loss individuals making up the compliance group. Subjects also differed with respect to their ages, with cardiac individuals being older. Additional research would need to ensure sample groups equal in size and demographic variables such as sex and age so as to minimize the effects of these variables.

6.6.5 Inception cohort

As far as the inception cohort for this study is concerned, those weight loss individuals who initially signed up for the programme but who did not attend should also be classified as dropouts. Cardiac individuals who came to the programme once and who did not return should also be included. Baekeland and Lundwall (1975) and Sackett and Snow (1979) outline the importance of including these individuals in order to truly distinguish between those individuals who withdraw after receiving only some treatment and those who leave towards the end of a particular regimen.

6.6.6 Physical impairment

The degree of physical affliction has been found to affect compliance with greater left ventricular function impairment found in cardiac dropouts (Blumenthal et al., 1982; Ice, 1985). This fact was not accounted for in this study as the data on record did not hold this information. It is recommended that future research take these factors into consideration.

6.7 COMMENT ON THE HBMQ

The psychometric properties of the HBMQ were tested in the pilot study and were found to be good. The primary use of the HBMQ was to understand compliance for the programmes examined in this study. As such the questionnaire has been a a useful measuring tool for identifying differences between these groups on the variables benefits, barriers and enabling factors. The researcher sees questionnaire design as an ongoing process and recommends that the criticisms rendered above be considered in further use of the questionnaire.

6.8 SUMMARY AND CONCLUSION

The findings from this study highlight the importance of (a) defining short- and long-term compliance and/or noncompliance, and (b) the need to examine behaviours after compliance or noncompliance to determine whether changes in behaviour have occurred. In the current research, not all

short-term compliers remained compliant and not all noncompliers continued to be noncompliant.

The factors associated with short-term noncompliance for weight loss and cardiac subjects in this study were inconvenience, having to rush to work and time problems. Although no significant differences in responses were found for the HBM subcomponent of incovenience, it was associated with noncompliance. Cardiac noncompliers also indicated that they had left the programme because they could maintain the life-style on their own. This finding indicates that these subjects believed in their self-efficacy to continue with the life-style independently.

The three HBM components of "benefits", "barriers" and "enabling factors" were associated with compliance in this study. The findings for the "benefits" component indicated a difference in the perception of the efficacy of the programme. The responses for this component need to be considered in light of the retrospective nature of the study. The component of "motivation" did not contribute significantly in the understanding of compliance as a separate variable. This confirmed similar findings in the literature.

Weight loss noncompliers did not cope well physically and emotionally with the programme. Their mood disturbance had

also worsened on follow-up. It seems that having to change their diet and level of exercise proved to be too complex and constituted barriers to implementing the required regimen. The numerous factors associated with attempted weight loss, such as feelings of failure, low self-esteem, and psychological dependence on food as a coping mechanism, need to be considered as issues which may complicate weight loss and which may, in turn, constitute barriers in themselves before the individual has attempted to diet or exercise. A multi-disciplinary approach which deals not only with the gradual implementation of diet and exercise requirements, but also with the defusion of negative attitudes towards dieting, which teaches alternative coping skills, which educates weight loss individuals about the risk factors of obesity and which helps individuals to set realistic goals is emphasized.

On the surface, the noncompliance by cardiac subjects seemed to be associated with the fact that they were already physically active and diet conscious on joining the HFCR programme. They could therefore implement the regimen on their own and in fact noted this as a reason for noncompliance. However, despite indicating that they had coped well physically and emotionally with the programme, the mood disturbance of these subjects had worsened on follow-up. Being physically active and diet conscious was not therefore sufficient for total recovery of these

individuals. The importance of monitoring all aspects of CHD rehabilitation, such as taking medication, smoking habits and stress management is highlighted.

These cardiac noncompliers started the HFCR programme with low mood disturbance scores. However, they also indicated that the onset of their CHD was sudden and that factors beyond their control were the cause of their illness. It is possible that denial was associated with noncompliance for these subjects, although this could not be established with certainty. These findings accentuate the importance of dealing with these issues at the inception of a rehabilitation programme, or even while they are still in the coronary care unit.

The life-threatening nature of cardiac illness and the lack of it in the weight loss phenomenon pointed to a potential association between the lack of symptoms and noncompliance for weight loss individuals but could not be established with certainty.

On follow-up, the mood disturbance of compliers had improved, while the mood disturbance for noncompliers had worsened.

A number of issues are recommended for future research.

1. An assessment of how referral by a doctor affects the motivation levels of CHD subjects.

2. The association of compliance and lack of symptoms for both CHD and weight loss subjects.

3. The association of compliance and the sudden onset of CHD.

4. The effect of denial by CHD subjects on initial POMS scores.

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NAME_____ DATE_____

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE space under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY.

IDENTIFICATION

The numbers refer to these phrases.
0 = Not at all
1 = A little
2 = Moderately
3 = Quite a bit
4 = Extremely

	0 NOT AT ALL	1 A LITTLE	2 MODERATELY	3 QUITE A BIT	4 EXTREMELY
1. Friendly					
2. Tense					
3. Angry					
4. Worn out					
5. Unhappy					
6. Clear-headed					
7. Lively					
8. Confused					
9. Sorry for things done					
10. Shaky					
11. Listless					
12. Peeved					
13. Considerate					
14. Sad					
15. Active					
16. On edge					
17. Grouchy					
18. Blue					
19. Energetic					
20. Panicky					
21. Hopeless					
22. Relaxed					
23. Unworthy					
24. Spiteful					
25. Sympathetic					
26. Uneasy					
27. Restless					
28. Unable to concentrate					
29. Fatigued					
30. Helpful					
31. Annoyed					
32. Discouraged					
33. Resentful					
34. Nervous					
35. Lonely					
36. Miserable					
37. Muddled					
38. Cheerful					
39. Bitter					
40. Exhausted					
41. Anxious					
42. Ready to fight					
43. Good natured					
44. Gloomy					
45. Desperate					
46. Sluggish					
47. Rebellious					
48. Helpless					
49. Weary					
50. Bewildered					
51. Alert					
52. Deceived					
53. Furious					
54. Efficient					
55. Trusting					
56. Full of pep					
57. Bad-tempered					
58. Worthless					
59. Forgetful					
60. Carefree					
61. Terrified					
62. Guilty					
63. Vigorous					
64. Uncertain about things					
65. Bushed					

MAKE SURE YOU HAVE ANSWERED EVERY ITEM.

NCS Data-Reflex W 1268-543

HEALTH BEHAVIOUR ASSESSMENT SCALE

ALL INFORMATION CONTAINED IN THIS QUESTIONNAIRE IS TREATED CONFIDENTIALLY

PLEASE ENTER YOUR FULL NAME, CONTACT ADDRESS, TELEPHONE NUMBER, AGE AND DATE IN THE SPACE PROVIDED BELOW:

NAME: .....

ADDRESS: .....

TELEPHONE NUMBER: .....

AGE: .....

DATE: .....

PLEASE COMPLETE THE QUESTIONNAIRE BY CIRCLING THE ANSWER (ALMOST ALWAYS/SOMETIMES OR ALMOST NEVER) THAT BEST DESCRIBES YOUR BEHAVIOUR. YOU MUST ANSWER THE QUESTIONS HONESTLY TO GET ANY REAL VALUE FROM THE QUESTIONNAIRE. THANK YOU.

1.	I eat a variety of foods each day, such as fruits and vegetables, whole grain breads and cereals, lean meats dairy products, dry peas and beans, and nuts and seeds.	Almost Always	Sometimes	Almost Never
2.	I wear a seat belt while riding in a car.	Almost Always	Sometimes	Almost Never
3.	I avoid drinking alcoholic beverages or I drink no more than 1 or 2 drinks a day.	Almost Always	Sometimes	Almost Never
4.	I have a job or do other work that I enjoy.	Almost Always	Sometimes	Almost Never
5.	I maintain a desired weight, avoiding overweight and underweight.	Almost Always	Sometimes	Almost Never
6.	I avoid using alcohol or other drugs (especially illegal drugs) as a way of handling stressful situations or the problems in my life.	Almost Always	Sometimes	Almost Never

IF YOU ARE A NON-SMOKER SKIP ITEMS 7,8 and 9. I NEVER SMOKE

7.	I avoid smoking cigarettes.	Almost Always	Sometimes	Almost Never
8.	I smoke only low tar and nicotine cigarettes or I smoke a pipe or cigars.	Almost Always	Sometimes	Almost Never
9.	I avoid smoking in bed.	Almost Always	Sometimes	Almost Never
10.	I limit the amount of fat, saturated fat, and cholesterol I eat (including fat on meats, eggs, butter, cream, shortenings, and organ meats such as liver).	Almost Always	Sometimes	Almost Never

11.	I participate in group activities (such as church and community organizations) or hobbies that I enjoy.	Almost Always	Sometimes	Almost Never
12.	I read and follow the label directions when using prescribed and over-the-counter drugs.	Almost Always	Sometimes	Almost Never
13.	I am careful not to drink alcohol when taking certain medicines (for sleeping, pain, colds, and allergies), or when pregnant.	Almost Always	Sometimes	Almost Never
14.	I obey traffic rules and the speed limit when driving.	Almost Always	Sometimes	Almost Never
15.	I do exercises that enhance my muscle tone for 15-30 minutes at least 3 times a week (examples include yoga and calisthenics).	Almost Always	Sometimes	Almost Never
16.	I am careful when using potentially harmful products or substances (such as household cleaners, poisons, and electrical devices).	Almost Always	Sometimes	Almost Never
17.	I avoid eating too much sugar (especially frequent snacks of sticky candy or soft drinks).	Almost Always	Sometimes	Almost Never
18.	I find it easy to relax and express my feelings freely.	Almost Always	Sometimes	Almost Never
19.	I do vigorous exercises for 15-30 minutes at least 3 times a week (examples include running, swimming, brisk walking).	Almost Always	Sometimes	Almost Never
20.	I avoid driving while under the influence of alcohol and other drugs.	Almost Always	Sometimes	Almost Never
21.	I have close friends, relatives, or others whom I can talk to about personal matters and call on for help when needed.	Almost Always	Sometimes	Almost Never
22.	I limit the amount of salt I eat by cooking with only small amounts, not adding salt at the table, and avoiding salty snacks.	Almost Always	Sometimes	Almost Never
23.	I use part of my leisure time participating in individual, family, or team activities that increase my level of fitness (such as gardening, bowling, golf, and baseball).	Almost Always	Sometimes	Almost Never

24. I recognize early, and prepare for, events or situations likely to be stressful for me,	Almost Always	Sometimes	Almost Never	

FINALLY, PLEASE RATE ON THE POINT-SCALE BELOW HOW HEALTHY YOU THINK YOU ARE:

EXTREMELY HEALTHY ——— 10 9 8 7 6 5 4 3 2 1 ——— EXTREMELY UNHEALTHY

REASONABLY HEALTHY

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE. YOUR KIND PARTICIPATION IN THIS RESEARCH IS MUCH APPRECIATED.

THANK YOU.

HEALTH BELIEF MODEL QUESTIONNAIRE

This research looks at factors which could affect why people remain on or leave the Cardiac Rehabilitation and Weight Loss Programmes run at the University of Cape Town. This study is being conducted by a Psychology Masters student from the university and your contribution would be greatly appreciated. All information will be kept confidential.

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A: BIOGRAPHICAL DETAILS

NAME: _____ [1][2][3]

DATE OF BIRTH: _____ AGE: _____ [4][5]

HEIGHT: _____ [6][7][8]

SEX: (Please circle) MALE FEMALE [9]

MARITAL STATUS: (Please circle)

SINGLE MARRIED DIVORCED SEPARATED WIDOWED [10]

EDUCATIONAL LEVEL ATTAINED: (Please circle relevant option) [11]

1. STD 9 OR LOWER
2. MATRICULATION CERTIFICATE
3. DIPLOMA (Please Specify) _____
4. UNIVERSITY DEGREE
5. OTHER (Please Specify) _____

_____

OCCUPATION: _____ [12]

WHAT IS YOUR NET INCOME PER MONTH? [13]

1. R 0,00 - R1999,00
2. R2000,00 - R2999,00
3. R3000,00 - R3999,00
4. R4000,00 - R4999,00
5. R5000,00 +

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HOW MANY CHILDREN DO YOU STILL SUPPORT FINANCIALLY (Please circle)

NONE 1 2 3 4/MORE [14]

B: PROGRAMME DETAILS

PROGRAMME ATTENDED: (Please circle)

WEIGHT LOSS CARDIAC [15]

YEAR(S) ATTENDED: (Please circle)

PRIOR TO 1983 1983 1984 1985 1986 1987 1988 1989 [16][17][18][19][20][21][22][23]

FOR ALL QUESTIONS PLEASE CIRCLE WHERE APPLICABLE

C: HEALTH ACTIVITIES

1. In which of the following high school sports did you participate? (Please circle more than one option if applicable). [24][25]

a) None
b) Athletics
c) Hockey
d) Soccer
e) Rugby
f) Netball
g) Cricket
h) Tennis
i) Squash
j) Swimming
k) Springboard Diving
l) Competitive Gymnastics
m) Water Polo
n) Badmington
o) Horse Riding
p) Other (Please Specify) _____

_____

2. Have you been physically active (i.e. for at least half an hour, three times per week) in the past five years?

YES NO [26]

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3. If you answered yes to question 2, please indicate the sporting or exercise activities in which you have participated during the past five years.

_____

_____

D: OPINION ABOUT MEDICAL ADVICE

4. Are you likely to adhere to your doctor's advice on the following?

Prescribed medication	YES	SOMETIMES	NO	27
Recommended diet	YES	SOMETIMES	NO	28
Alcohol consumption	YES	SOMETIMES	NO	29
Exercise requirements	YES	SOMETIMES	NO	30

5. Do you believe that the following alternative medical therapies are more effective than modern medicine?

Homeopathy	YES	NO	DON'T KNOW	31
Naturopathy	YES	NO	DON'T KNOW	32
Herbal treatment	YES	NO	DON'T KNOW	33

6. Do you believe that a poor state of health can be improved?

YES 7 6 5 4 3 2 1 NO 34

E: MOTIVATIONAL FACTORS

7. Which of the following contributed to your joining the programme? (Please circle more than one option if applicable).

a) Self-motivation 35
b) Referral by doctor 36
c) Pressure from spouse or significant other 37
d) Media 38
e) Other (Please Specify) _____ 39

_____

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8. Please indicate if you participated in any of the following prior to joining the UCT programme? (Please circle more than one option if applicable). [40]

a) Weight loss diets (e.g. Weigh Less, Cambridge, crash diets)
b) Health/fitness programmes e.g aerobics classes
c) Cardiac rehabilitation e.g. Groote Schuur programme
d) Other (Please Specify) _____

_____

9. When you joined the programme how positively did you feel about changing your health behaviour?

Not very positive 1 2 3 4 5 6 7 Very positive [41]

10. Which of the following habits/behaviours were you requested to change? (Please circle more than one option if applicable).

a) Exercise [42]
b) Diet [43]
c) Smoking [44]
d) Other (Please Specify) _____ [45]

_____

11. Did these changes affect your daily routine?

YES 7 6 5 4 3 2 1 NO [46]

Please elaborate if you wish: _____

_____

_____

12. How confident did you feel about your ability to carry out the requested lifestyle changes?

Confident 7 6 5 4 3 2 1 Not confident [47]

Please mention the change(s) which caused the most difficulty:

_____

_____

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F: SUSCEPTIBILITY TO ILLNESS

13. Which of the following illnesses do you think you would be likely to contract?

Diabetes	Likely	7	6	5	4	3	2	1	Not likely	48
Hypertension	Likely	7	6	5	4	3	2	1	Not likely	49
Heart Attack	Likely	7	6	5	4	3	2	1	Not likely	50

Other (Please Specify) _____ 51

_____

14. Please indicate if you suffer from the following illnesses: 52

Colds	YES	SOMETIMES	NO
Influenza	YES	SOMETIMES	NO
Bronchitis	YES	SOMETIMES	NO
Asthma	YES	SOMETIMES	NO
Colon Problems	YES	SOMETIMES	NO

Other (Please Specify) _____

_____

G: SYMPTOMS

15. Please complete each of the following:

Current weight _____ 53 54 55

Weight one year ago _____ 56 57 58

What is the most you have ever weighed? _____ 59 60 61

What was your approximate weight at age 21? _____ 62 63 64

Is your present weight your ideal weight YES NO 65

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16. Did you experience any of the following symptoms when you **joined** the UCT programme?

High blood pressure	YES	SOMETIMES	NO	66
Low blood pressure	YES	SOMETIMES	NO	67
Breathlessness	YES	SOMETIMES	NO	68
Fatigue	YES	SOMETIMES	NO	69
Overweight	YES	SOMETIMES	NO	70

Other (Please Specify) _____ 71

_____

17. Did the severity of any of the abovementioned symptoms change **during** the programme?

YES 7 6 5 4 3 2 1 NO 72

Please indicate which symptoms changed and how they changed.

_____

_____

_____

18. Please indicate the length of time between the **onset** of your symptoms and **joining** the UCT programme?

Number of days _____ 73 74 75 76
(or)
Number of weeks _____
(or)
Number of months _____
(or)
Number of years _____

19. Did you ever feel concerned that the exercise programme would cause further health problems?

Never 1 2 3 4 5 6 7 Always 77

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20. Did you experience any of the following during the programme?

Chest Pains	Never	1	2	3	4	5	6	7	Always	78
Lack of breath	Never	1	2	3	4	5	6	7	Always	79
Nausea	Never	1	2	3	4	5	6	7	Always	80
Fainting	Never	1	2	3	4	5	6	7	Always	81

Other (Please Specify) _____ 82

_____

H. EXTENT OF SOCIAL SUPPORT

21. Did your state of health interfere with your lifestyle in any of the following ways during the treatment programme?

Rejection by others	YES NO	83
Rejection by significant other e.g. spouse	YES NO	84
Employment problems	YES NO	85
Physical Discomfort	YES NO	86

Other (Please specify) _____ 87

_____

_____

22. Do any of the following people participate in regular exercise or sport?

Spouse or significant other	YES	SOMETIMES	NO	88
Brothers or sisters	YES	SOMETIMES	NO	89
Children	YES	SOMETIMES	NO	90
Business colleagues	YES	SOMETIMES	NO	91
Friends	YES	SOMETIMES	NO	92

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I: ATTITUDE TOWARDS THE PROGRAMME

23. How long did you stay on the programme?

Number of days _____ 93 94 95 96
(or)
Number of weeks _____
(or)
Number of months _____
(or)
Number of years _____

24. Do you think you benefited by participating in the programme?

YES NO 97

25. How well did you feel that you coped with the programme?

Physically Very well 7 6 5 4 3 2 1 Not very well 98

Emotionally Very well 7 6 5 4 3 2 1 Not very well 99

THE FOLLOWING QUESTION SHOULD ONLY BE ANSWERED IF YOU NO LONGER PARTICIPATE IN THE UCT PROGRAMME.

26. What do you think contributed to your leaving the programme? (Please circle more than one option if applicable)

a) Dislike for the exercise programme itself
b) Inconvenience
c) Lack of finance
d) Lack of self-motivation
e) Lack of family support
f) Lack of staff/patient interaction
g) Unrealistic expectations of staff
h) Your own expectations not being met
i) Other (Please Specify) _____

_____

_____

100 101 102 103 104 105 106 107 108

FOR OFFICE USE ONLY

THE FOLLOWING QUESTION SHOULD ONLY BE ANSWERED IF YOU STILL PARTICIPATE IN THE UCT PROGRAMME.

27. What do you think contributed to your staying on the programme? (Please circle more than one option if applicable).

a) Liked the exercise programme
b) Convenience
c) Sufficient finance
d) High self-motivation
e) Family support
f) Staff/patient interaction
g) Realistic expectations of staff
h) Your own expectations being met
i) Other (Please Specify) _____

_____

J: PRACTICAL ISSUES CONCERNING THE PROGRAMME

28. Approximately how far (in kilometers) is the rehabilitation centre from your home?

_____

29. How did you get to the programme most mornings?

a) Own vehicle
b) Lift with someone on the programme
c) Spouse
d) Friend
e) Other (Please Specify) _____

_____

30. Did any of the following negatively affect your participation in the programme?

Time of Day	Never	1	2	3	4	5	6	7	Always
Location	Never	1	2	3	4	5	6	7	Always
Parking	Never	1	2	3	4	5	6	7	Always
Fees	Never	1	2	3	4	5	6	7	Always

Other (Please Specify) _____

_____

_____

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31. When would you most prefer to exercise? (Please circle the relevant option).

[132]

a) Early morning (before work)
b) Midday (during lunch hour)
c) Late afternoon
d) Evening
e) Other (Please specify) _____

_____

MANY THANKS FOR YOUR TIME AND EFFORT. YOUR CONTRIBUTION IS MOST APPRECIATED.

Kindly return your completed form in the envelope provided to:

Sharon Frewen
Psychology Department
University of Cape Town
Private Bag
Rondebosch
7700

HEALTH BELIEF MODEL QUESTIONNAIRE

Thank you very much for agreeing to complete this questionnaire! You will need approximately half an hour in which to do so.

This research, which is being conducted by a Psychology Master's student from the University of Cape Town, looks at possible reasons for why people remain on or leave the Cardiac Rehabilitation and Weight Loss Programmes held at the University of Cape Town.

Your input will assist us in gaining some understanding of this very complex issue. This in turn will be most beneficial for all individuals attending, not only, prospective UCT Cardiac Rehabilitation and Weight Loss programmes, but programmes of this nature in general. Any new knowledge could help organizers to deal with potential problems at the inception of a programme and thus assist people in not only completing the programme, but also in maintaining the newly learnt lifestyle.

Your contribution is greatly appreciated. All information will remain confidential.

NAME: _____

ADDRESS: _____

_____

WOULD YOU BE AVAILABLE FOR A SHORT FOLLOW-UP INTERVIEW?

YES	NO

- 2 -

For all questions you will be asked to place a cross in the box provided. The following are **examples** of how to indicate your response to the questions contained in this questionnaire:

What colour shirt are you wearing today?

Red	1
Blue	2
Yellow	X

Do you live in South Africa?

YES	NO

Do you think the following cities receive a lot of rain?

CITY	YES	SOMETIMES	NO	DON'T KNOW
Cape Town	X			
Cairo			X	
Beirut				X
Johannesburg		X		

For all the questions that follow, please place a cross in the box provided. Please do not use the column marked 'For official use only' at the far right of the questionnaire.

FOR OFFICE USE ONLY

1 [ ][ ][ ]
4 [ ][ ][ ]
7 [ ][ ]

- 3 -

A: BIOGRAPHICAL AND PERSONAL DETAILS

DATE OF BIRTH: _____ **AGE:** _____

SEX:

Male	1
Female	2

9 [ ]

MARITAL STATUS:

Single	1
Married	2
Divorced	3
Separated	4
Widowed	5

10 [ ]

HIGHEST EDUCATIONAL LEVEL ATTAINED:

Std 9 or lower	1
Std 10	2
Std 10 plus 1 or 2 years further training	3
University Degree	4
Other (Please Specify)	5

11 [ ]

WHAT IS YOUR POSITION IN THE LABOUR MARKET?

Employer (other people work for you)	1
Self-employed (you work for yourself)	2
Employee (you work for other people)	3
Temporarily unemployed (looking for a job)	4
Student	5
Housewife	6
Pensioner	7
Medically unfit for work	8

12 [ ]

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- 4 -

WHAT IS YOUR NET INCOME PER MONTH?

R 0,00 - R 999,00	1
R1 000,00 - R1 999,00	2
R2 000,00 - R2 999,00	3
R3 000,00 - R3 999,00	4
R4 000,00 - R4 999,00	5
R5 000,00 +	6
Do not wish to say	7

13 [ ]

HOW MANY CHILDREN DO YOU STILL SUPPORT FINANCIALLY?

NONE	1	2	3	4/MORE

14 [ ]

B: OPINION ABOUT MEDICAL ADVICE

15 [ ]

1. Are you likely to adhere to your doctor's advice on the following?

DOCTOR'S ADVICE	YES	SOMETIMES	NO
Prescribed medication			
Recommended diet			
Alconol consumption			
Exercise requirements			

19 [ ]

2. Do you believe that the following alternative medical therapies are more effective than modern medicine?

ALTERNATIVE MEDICINE	YES	SOMETIMES	NO	DON'T KNOW
Homeopathy				
Naturopathy				
Herbal treatment				
Acupuncture				

3. Do you believe that a person's state of general ill-health can be improved?

YES	SOMETIMES	NO

23 [ ]

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C: KNOWLEDGE OF SUSCEPTIBILITY TO ILLNESSES

4. Have any close family members (i.e. parents, brothers, sisters) ever suffered from any of the following illnesses?

24 [ ]

ILLNESS	YES	NO
Diabetes		
Hypertension		
Heart Attack		

Other Illnesses? (Please Specify) _____

_____

_____

5. Do you think **you** would be likely to suffer from any of the following illnesses in the future?

28 [ ]

ILLNESS	YES	MAYBE	NO	DON'T KNOW
Diabetes				
Hypertension				
Heart Attack				

Other (Please Specify) _____

_____

_____

D: HEALTH ACTIVITIES

6. Please list the sporting activities in which you participated at high school:

32 [ ]

_____ _____

_____

_____

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7. Have you exercised or been physically active (i.e. for at least half an hour, three times per week) in the past five years?

YES	NO

34 ☐

If you answered yes, please list the sporting or exercise activities in which you have participated

_____

_____

_____

E: STATE OF PHYSICAL HEALTH

8. Please complete each of the following. (Please indicate the units used, i.e. pounds or kilograms, centimetres or inches).

35

What is your height? _____

What is your current weight? _____

What was your weight one year ago? _____

What is the most you have ever weighed? _____

What was your approximate weight at age 21? _____

Is your present weight your ideal weight? | YES | NO |

50 ☐

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- 7 -

9. Did you experience any of the following health problems **before** you joined the UCT programme?

HEALTH PROBLEM	YES	SOMETIMES	NO
High or low blood pressure			
Breathlessness			
Fatigue			
Overweight			
Heart problems			

51 [ ]

Other (Please Specify) _____

_____

_____

10. For how long did you experience your health problem(s) **before** joining the programme?

YEARS	MONTHS

57 [ ]

11. What do you think may have caused your health problem(s)?

60 [ ]

_____

_____

_____

12. Did any of the health problems mentioned in 9 above **improve during** the programme?

YES	NO

61 [ ]

Please list those that improved:

_____

_____

_____

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13. Did any of the health problems mentioned in 9 above **deteriorate during** the programme?

YES	NO

62 ☐

Please list those that deteriorated:

_____

_____

_____

14. Did you experience any of the following **during** the programme?

63 ☐

	YES	SOMETIMES	NO
Chest pains			
Lack of breath			
Nausea			
Fainting			

Other (Please Specify) _____

_____

_____

15. Were you ever concerned that the exercise programme would cause possible further health problems?

YES	SOMETIMES	NO

68 ☐

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F: MOTIVATIONAL FACTORS

16. Which of the following contributed to your joining the programme? (Please place a cross in more than one option if applicable).

69

Self-motivation	1
Referral by doctor	2
Pressure from spouse or significant other	3
Media	4

Other (Please Specify) _____

_____

_____

17. Please indicate if you participated in any of the following **before** joining the UCT programme?

74

ACTIVITY	YES	NO
Different weight loss diets e.g Cambridge/Weigh Less/crash diets		
Health/fitness programmes e.g. aerobic classes		
Cardiac rehabilitation e.g. Groote Schuur programme		
None		

Other (Please Specify) _____

_____

_____

18. When you joined the programme how positive did you feel about changing your health behaviour?

79

Very Positive		Somewhat Positive			Not Positive	
7	6	5	4	3	2	1

END OF 1ST ROW

FOR OFFICE USE

1 [ ][ ][ ]

4 [ ]

- 10 -

19. Which of the following habits/behaviours were you **requested** to change when you joined the programme? (Please place a cross in more than one option if applicable).

Exercise	1
Diet	2
Smoking	3

5 [ ]
[ ]
[ ]
[ ]

Other (Please Specify) _____

_____

_____

20. How confident did you feel about your ability to carry out the requested lifestyle changes?

Confident	Somewhat Confident	Not Confident
7 6	5 4 3	2 1

9 [ ]

21. How well did the programme assist you in learning to carry out the requested lifestyle changes?

Very well	Quite well	Not well
7 6	5 4 3	2 1

10 [ ]

22. Were these changes difficult for you to implement?

YES	NO

11 [ ]

Please list the ones which caused you the most difficulty:

_____

_____

_____

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23. Have you managed to maintain the requested lifestyle changes?

YES	SOMETIMES	NO

12 ☐

Please elaborate if you wish: _____

_____

_____

G. EXTENT OF SOCIAL SUPPORT

24. Did your ever experience any of the following as a result of your health problem(s)?

	YES	SOMETIMES	NO	N/A
Rejection by others e.g friends spouse				
Employment problems				
Physical Discomfort				

13 ☐ ☐ ☐ ☐

Other (Please Specify) _____

_____

_____

25. Do any of the following people participate in regular exercise or sport?

	YES	SOMETIMES	NO	N/A
Parents				
Spouse/significant other				
Brothers or sisters				
Children				
Business colleagues				
Friends				

17 ☐ ☐ ☐ ☐ ☐ ☐

22

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H: ATTITUDE TOWARDS THE PROGRAMME

26. Do you think you benefitted by participating in the programme?

YES	NO

23 ☐

27. How well do you think you cope(d) with the programme?

	Very Well		Moderately Well			Not well	
Physically	7	6	5	4	3	2	1
Emotionally	7	6	5	4	3	2	1

24 ☐☐

28. Did you complete the programme?

Weight Loss: you stayed on to the programme to the end of the course.

Cardiac: you stayed on the programme for 3 months or longer.

YES	NO

26 ☐

→ **Please answer question 29**

→ **Please answer question 30**

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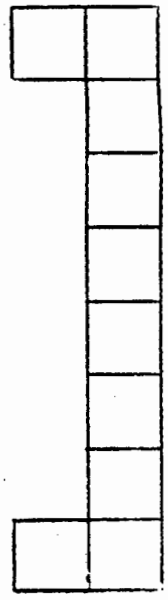
- 13 -

29. What do you think contributed to your leaving the programme? (Please place a cross in more than one option if applicable)

Dislike for the exercise programme itself	1
Inconvenience	2
Lack of finance	3
Lack of self-motivation	4
Lack of family support	5
Lack of staff/patient interaction	6
Unrealistic expectations of staff	7
Your own expectations not being met	8
You could maintain the new lifestyle on your own	9

27 

Other (Please Specify) _____

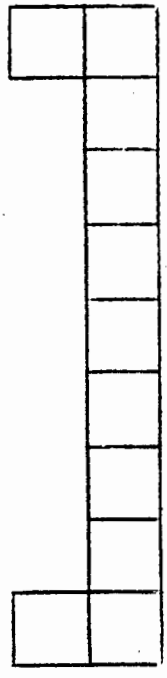
_____ 35

_____

If you answered question 29 please skip question 30 and go to question 31.

30. What do you think contributed to your staying on the programme? (Please place a cross in more than one option if applicable).

Liked the exercise programme	1
Convenience	2
Sufficient finance	3
High self-motivation	4
Family support	5
Staff/patient interaction	6
Realistic expectations of staff	7
Your own expectations being met	8
Companionship	9
Needed to stay on to maintain the new lifestyle	10

37 

Other (Please Specify) _____

_____

_____ 46

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I: PRACTICAL ISSUES CONCERNING THE PROGRAMME

48

31. Approximately how far (in kilometers) is (was) the UCT venue from your home?

_____

51

32. How did you get to the programme most days?

Own vehicle	1
Lift with someone on the programme	2
Spouse	3
Friend	4

Other (Please Specify) _____

_____

_____

56

33. Please indicate if any of the following ever inconvenienced your participation in the programme? (Please place a cross in more than one option if applicable).

Time of day	1
Location	2
Parking	3
Fees	4

Other (Please Specify) _____

60

_____

_____

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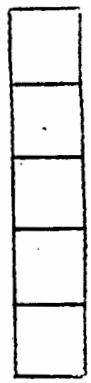
34. When would you most prefer to exercise?

Early morning (before work)	1
Midday (during lunch hour)	2
Late afternoon	3
Evening	4

61  65

Other (Please Specify) _____

_____

_____

MANY THANKS FOR YOUR TIME AND EFFORT. YOUR CONTRIBUTION IS MOST APPRECIATED.

Kindly return your completed form in the envelope provided to:

Sharon Frewen
Psychology Department
University of Cape Town
Private Bag
Rondebosch
7700