

# **THE DEVELOPMENT AND EVALUATION OF A WELLNESS PROGRAMME IN AN INDUSTRIAL WORKSITE**

By

**INGRID DIAN JAMES**

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degree of Masters of Arts in Clinical Psychology at the University of Zululand

**SUPERVISOR:**

**PROFESSOR S D EDWARDS**

**KWA-DLANGEZWA**

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## **Dedication**

*For my mom who sacrifices all for her family.*

*For my dad who wasn't able to share in this achievement.*

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## **Abstract**

This trans-disciplinary study was conducted in the paradigm of health psychology, investigating the causal relationship between physical exercise and psychological wellness. The aim of the study is to increase awareness of the benefits of physical exercise as an adjunct to/or modality of treatment of mental illness. Further, the study aims to highlight the need for promotion of wellness as opposed to treatment of illness.

The study also highlights the need for industries to regard the promotion of mental health as good business practice in order to construct a relevant and sustainable wellness programme. Such programmes must be firmly anchored in collaborative efforts from stakeholders and other health professionals.

The secondary aim of the study is the promotion of trans-disciplinary research as in this case between exercise science and psychology. It is hoped that mental health promotion and prevention would become the task of all individuals rather than only health professionals.

## **Declaration**

I, Ingrid Dian James, do declare that this study is my own work and that I have acknowledged all sources and references in this study.

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**I.D. James**

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## Chapter One

### 1.1 Introduction

This study sought to investigate the causal relationship between physical exercise and psychological wellness. This question gained prominence in a life context of fundamental change to modes of social and economic production; in other words, in a world where we are increasingly less dependent on physical exertions for our survival.

In the past health and wellness were treated as separate entities. Today this is considered a rather simplistic view. Instead both these paradigms are not only integrated but are included in a more holistic conceptualisation incorporating mental, social and spiritual dimensions. Then, health signified the mere absence of disease or illness and wellness meant an optimal functioning and creative adaptation to enhance daily living (McMullen, et al, 1996). In 1946, the World Health Organisation's (WHO) revision extended the meaning of health to include physical, emotional, spiritual, mental, and social components that are balanced, integrated, and co-ordinated (Greenberg and Pargman, 1989). Significantly, current notions of wellness aggressively emphasise prevention as a primary mode of promotion of health.

The new thinking about health and well being emerges from WHO's concern about the increasing incidents of mental and physical disorders in post-industrial societies. WHO estimates that 450 million people suffer from mental disorders, while one in every four persons will be affected by a mental disorder at some stage in her or his life (WHO, 2002). Consequently a community psychological model of mental health envisages primary, secondary and tertiary components of both prevention and promotion (Edwards, 2001 and Cowen, 2000). This investigation can accordingly be located as a secondary component of such a model and collaborates with WHO's projects to enhance mental and physical health on a global scale.

Human beings are rediscovering that our bodies are designed for movement (Fox, 2000) and physical degeneration has a strong connection to mental and physical illness and a dampening of spiritual buoyancy. Consequently, contemporary thinking affirms physical exercise as a way of regenerating the body to attain improved social functioning. But, the promotion of physical activity remains a low social priority. This study aims to increase the profile of physical exercise by examining its deep connections to psychological health and economic production.

The rest of this chapter will discuss the concerns motivating the project, clarify the aims of the study, highlight the hypothesis that structures the study, present

a statement of problem, and provide a clarification of key concepts and a list of abbreviations.

## **1.2 De-limitations and limitations**

The de-limitations that follow set the boundaries in terms of geographical location and participation in the study.

It was important to consider a wellness centre located on an industrial work site, to facilitate worker accessibility. The only available industrial site of this nature in the Richards Bay region was Richards Bay Coal Terminal (RBCT). The subjects were required to be employees of industry. The study required all subjects to attend psychological counselling if necessary and participate in the physical exercise routine for the duration of a ten-week programme.

The researcher intended to secure 20 subjects for this study. However due to the voluntary nature of the study, only 14 subjects were available. Further, all subjects participating in this study were male due to the fact that the industrial setting of RBCT was predominately male dominated. The number and gender of the participants in the study were not representative of the workforce at RBCT. Due to these factors generalisability was limited in this context.

### **1.3 Motivation of the study**

This study arose from problems encountered in a local context while the researcher managed a programme treating mental illness among industrial employees. The experience highlighted the need for alternative methods to manage stress, promote psychological wellness, and educate about the effects of mental illness.

The researcher noted that various constraints arising from cost, available treatment time, shift schedules of workers, and the accessibility of effective treatment programmes of mental illness often militated against effective treatment of industrial workers. Industrial employees often cannot participate in long programmes because of work productivity and various home demands. The relation between psychological wellness, economic production, and social wellbeing is strongly affirmed in critical research in the fields of productivity, wellness and promotion of mental health (Fox, 2000). According to Willis and Campbell (1992), at least one in every four adults will at some point in their lives suffer from moderate depression, anxiety or symptoms of affective disorders. Therefore there is a need to consider a programme that is effective, accessible, short term and could be sustained without the prolonged input of a psychological professional.

In developing countries health practitioners are searching for a cost-effective method of treating mental illness. From new conceptions of health and wellness and the integration of physical well being into the formula of sound health, this project sought to examine physical exercise regimes as a viable alternative form for treatment in mental illness. Physical exercise programmes of health club type may offer a relatively cheap alternative or serve as adjunct treatment to drug therapy, which is the more popular treatment plan in a substantial number of sufferers (Fox, 2000).

#### **1.4 Hypothesis**

A ten-week psychological wellness programme that increases physical exercise with counselling support if needed will enhance psychological wellness.

#### **1.5 Statement of the problem**

- To investigate the causal relationship in which physical exercise can alter psychological states to enhance optimal economic and psychological wellness.



## **1.6 Definitions**

### **1.6.1 Anthropometric measurements**

Refers to demographic data of the subjects, that is stature, body mass, body girth and body diameter measurements (Kent, 1996).

### **1.6.1 Fit index**

Refers to a person's fitness index which comprises of:

- lean body mass
- hamstring range of motion
- abdominal strength (sit-ups)
- upper body strength (push-ups)
- VO<sub>2</sub>max

### **1.6.2 Flexibility**

Refers to the capacity of a joint to move easily through its full range of motion (Donatelle, Snow and Wilcox, 1999; Kent, 1996). Range of motion (ROM) will be used interchangeably with flexibility for the purposes of this study.

### **1.6.3 Psychological wellness**

Psychological wellness is defined as a process of optimal functioning and creative adapting that involves the total person (physical, mental, emotional, social and spiritual dimensions) and strives for an ever-increasing quality of life (McMullen, et al, 1996).

### **1.6.4 Physical exercise**

Physical exercise is defined as a particular subset of planned activities and purposeful attempts to improve health and well-being. Regular physical exercise is defined as a minimum of three times per week at an intensity of at least 70% of the individual's potential (Edwards, 2002; Fox, 2000). For the purposes of this study physical exercise will be used interchangeably with physical fitness.

### **1.6.5 Wellness centre**

A wellness centre will refer to the recreational facility, involved in the promotion of mental and physical health, available on site to industrial employees.

### **1.6.6 Wellness programme**

For the purposes of this study, a wellness programme refers to the assessment of physical fitness of each individual, followed by an individualised programme to optimise the benefits of physical exercise. Further a wellness programme

includes a psycho-educational component focusing on the benefits and effects of exercise and effective stress management. Such a programme also offers ongoing motivational support to each person in the study.

### **1.6.7 Maximal oxygen consumption (VO<sub>2</sub> max)**

VO<sub>2</sub> refers to a person's maximal amount of oxygen that the body uses to generate energy while performing heavy exercise (Kent, 1996; Donatelle, Snow and Wilcox, 1999).

## **1.7 Abbreviations**

<b>1.7.1 BP</b>	blood pressure
<b>1.7.2 BPM</b>	beats per min
<b>1.7.3 Fit Index</b>	fitness index
<b>1.7.4 FM</b>	fat mass
<b>1.7.5 GRA</b>	graduate research assistant
<b>1.7.6 HMS</b>	human movement studies
<b>1.7.7 HR</b>	heart rate
<b>1.7.8 HROM</b>	Hamstring range of motion
<b>1.7.9 LBM</b>	lean body mass

<b>1.7.10 RBCT</b>	Richards Bay Coal Terminal
<b>1.7.11 RPM</b>	revolutions per minute
<b>1.7.12 TBM</b>	total body mass
<b>1.7.13 Unizul</b>	University of Zululand

**Table 1.1 Abbreviations used in this study**

## **1.8 Aims of the study**

The aims of this study are listed below:

- To incorporate physical exercise into an effective treatment programme for mental illness in industry.
- To create an awareness about the importance of psychological wellness and physical exercise in the treatment and prevention of mental illness.
- To use physical exercise as an adjunct to traditional treatment methods in industry.
- To initiate an acceptable wellness programme for industrial workers with special consideration to time and familial constraints and employment pressure.

## **1.9 Summary**

Chapter One introduces the study which sought to develop and evaluate a wellness programme on an industrial site. The limitations and de-limitations were explained. This chapter provides the motivation and aim of the study and expounds on the terminology and abbreviations found henceforth. The chapter also presents the hypothesis that the study sought to test and provides a brief summary of the chapters to follow.

Chapter two presents the historical development of the health psychology paradigm. It is also a review of literature pertaining to the benefits of physical exercise, and previous studies done on psychological wellness and physical exercise. It provides a brief outline for the current and emerging trends of promotion of psychological wellness and prevention of mental illness.

Chapter Three explains the research methodology used in this study. The sampling method, instruments used in data collection, procedures adhered to and scoring is discussed in detail.

Chapter Four presents the data collected, providing statistical analysis and explains the significance of results.

Chapter Five provides recommendations and a summary of the study conducted.

The following chapter seeks to provide a composite review of literature available in the relevant area of interest pertaining to physical exercise and psychological wellness.

## **Chapter Two**

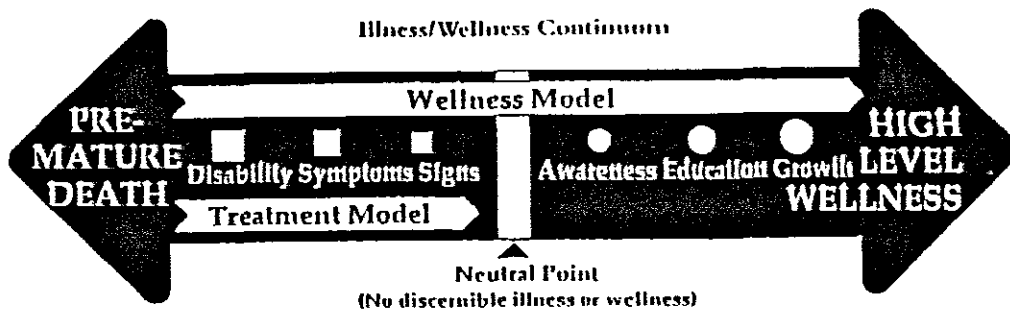
### **Literature review**

#### **2.1 Introduction**

The following chapter seeks to place this study in context within the contemporary paradigm of health psychology. The definitions of health and wellness used previously as well as the emergence of a holistic conceptualisation of wellness are discussed here. The chapter also highlights the benefits of regular physical exercise in relation to psychological wellness. Previous studies conducted illustrate the contemporary conceptualisation of wellness.

#### **2.2 Definitions of health and wellness**

Health and wellness were thought of as being separate entities prior to the 1940s. Wellness was defined as optimal creative and adaptation functioning to enhance daily living, while health referred to the mere absence of disease and infirmity (McMullen, et al., 1996). This type of conceptualisation gave rise to the wellness and health continuum (Robbins et al. 1991).



**Figure 2.1 Robbins illness/wellness continuum**

The above figure illustrates the illness/wellness continuum. The neutral point refers to the traditional idea of good health that is, the absence of illness or symptoms of illness. The treatment model refers to the presence of illness or disease requiring medical intervention. As the signs and symptoms of illness increase the individual moves towards death.

The opposite end of the continuum represents wellness, the first stage of which is awareness of caring for oneself. This gives rise to acquiring knowledge about wellness and requirements for good health. Inevitably the knowledge acquired influences an individual's lifestyle choices in a positive way, enabling higher levels of wellness.

In 1946, WHO revised its definition to include physical, emotional, mental, social and spiritual dimensions. Halbert Dunn (1961) maintained that health was a

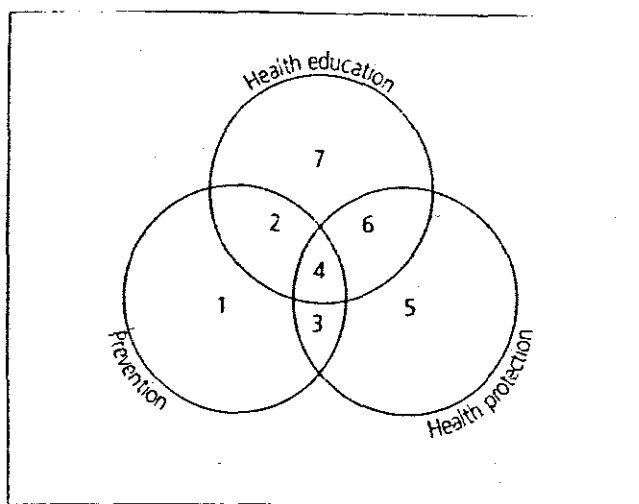


state of balance while wellness was dynamic, i.e. one incessantly moved towards optimal functioning. He highlighted three criteria for an individual's level of wellness: direction and progress; the 'total individual' and the individual's functioning. Direction and progress was an individual's dynamic movement towards optimal functioning and the inability to stop at a particular level of wellness. In order for wellness to remain an active process, individual initiative is required. The 'total individual' refers to the holistic interaction of necessary aspects of a person's life, viz. the physical, mental, emotional, social and spiritual dimensions. The third criterion of individual functioning refers to skills or activities that mediate the abovementioned dimensions.

An essential element of wellness that was added to this conceptualisation is adaptation (McMullen, et al. 1996). Individuals are constantly required to adapt to different challenges presented in daily living. The ability to adapt to various challenges or changes directly influences the wellness state of a person.

The aforementioned continuum is one of many similar explications about health and wellness based on the disease/illness model. Trent and Herron (1999) describe this model as being responsible for mental health becoming a euphemism for mental illness and/or bipolar opposite mental health. They advocate a shift to understanding mental health as a separate concept to mental illness.

Tannahill (2000) views positive health and ill-health as axes at right angles to each other. The basic tenet of this view is that the absence of disease or illness does not guarantee positive health as proposed by the wellness continuum (Edwards, 2002). Tannahill adopts a salutogenic approach, i.e. he conceptualises the prevention of illness as being a subset of health promotion. His health promotion model is indicated by three overlapping spheres, i.e. areas of health education, prevention and health protection (policies and regulations aimed at promoting positive health (refer to Fig 2.2). The aims of this model are two-fold: to focus on positive health objectives e.g. encouraging physical activity to enhance wellness and physical fitness and to foster positive health attributes specifically in reference to sense of coherence, fortitude, empowerment and assertiveness.



**Figure 2.2 Tannahill's model of health promotion**

Conway and Madoed (2002) argue that although the aim of clinical psychology is the reduction of psychological distress and enhancement and promotion of

well-being, well-being is clearly neglected by most psychologists. In South Africa, this is especially true due to limited resources. The imposition of limited resources and time constraints has lead to psychologists focusing their efforts on reducing psychological distress and difficulties that clients present with, that is those individuals already been identified as having mental illness or seeking assistance within mental health services. Conway and Macloed (2002) stress the argument that the enhancement and promotion of psychological wellness is as important to health practitioners as treating the mentally ill.

## **2.3 Psychological wellness**

### **2.3.1 Definition**

In this study, psychological wellness is defined as a process of optimal functioning and creative adapting that involves the total person (physical, mental, emotional, social and spiritual dimensions) and strives for the ever-increasing quality of life (McMullen, 1996). This definition provides a holistic and composite explanation of psychological wellness.

A person strives to attain psychological wellness by achieving balance in all of these areas. None of these dimensions are weighted as more important than the other, although the physical dimension is highlighted in this study. It is this conception of the physical dimension that informs the hypothesis of this study i.e. increased physical exercise will enhance psychological wellness.

### **2.3.2 Dimensions of psychological wellness**

As listed above, the five dimensions of psychological wellness will be discussed further.

#### **2.3.2.1 The physical dimension**

Physical health refers to the process of making choices that create a strong, flexible and energetic body able to perform daily tasks without excessive fatigue. The state of physical health is directly influenced by choices made in areas of exercise, nutrition, rest, stress management, substance abuse, disease and injury prevention and appropriate treatment methods of illness.

Physical fitness can be defined as the ability to be physically active on a regular basis. In other words, to engage in a particular subset of purposefully planned activities in an attempt to improve health and well being (Edwards, 2002; Fox, 2000). Physical fitness can be divided into two components viz. skill-related and health related (Donatelle et al. 1999). The skill related components pertain to athlete performance such as speed, balance, agility, co-ordination and power. The health related components are body composition, flexibility, muscle strength and endurance and aerobic fitness and will be discussed further.

#### **2.3.2.1.1 Total body mass or body composition**

These terms refer to the proportion of fat (adipose) and lean tissue (made up of muscle, water, bone and organs) in the body (Donatelle et al. 1999; Greenberg and Pargman, 1989). Individuals are at greater risk of developing physical ailments such as heart disease, diabetes, hypertension, certain forms of cancer etc. should they not be able to maintain optimal body mass (Donatelle et al. 1999). For physically active individuals, maintaining optimal body mass is an essential part of a healthy lifestyle that is beneficial and enjoyable (McMullen et al. 1996).

In this study, total body mass was determined using a metered scale. A detailed description of the calculation of lean body mass is given in chapter three.

#### **2.3.2.1.2 Flexibility**

Flexibility is the ease of movement and the range of motion of a joint (Donatelle et al. 1999; Kent, 1996; Greenberg and Pargman, 1989). The structure of the bones, the connective tissue, overlying muscles and skin determines the ease and extent of motion for each joint. Therefore increased flexibility reduces the incidence of injuries to tendons and joints. In this study, flexibility is determined by the hamstring range of motion, discussed further in chapter three.

#### **2.3.2.1.3 Muscle strength and endurance**

Muscular strength is the ability to generate force with the muscles while endurance refers to the ability to perform repeated contractions of a particular muscular group (Donatelle et al. 1999; McMullen et al. 1996). Resistance training is the medium used to enhance muscular strength and endurance, the benefit of which is increased ability to maintain muscle mass and bone strength which often decreases with age. Muscular strength and endurance was calculated by the number of sit-ups (abdominal strength) and push-ups (upper body strength) completed by each subject in this study.

#### **2.3.2.1.4 Aerobic fitness**

Aerobic fitness is the ability to engage in exercise that uses large muscles groups in rhythmic contraction and relaxation for an extended period of time usually between 15 to 60 minutes (Donatelle et al. 1999). The human body consumes oxygen to release energy stored in carbohydrates and fats. Cardio respiratory or cardiovascular fitness are other terms used to describe aerobic fitness. Aerobic fitness was evaluated by determining each subject's VO<sub>2</sub>max in this study.

#### **2.3.2.2 The mental dimension**

This dimension expounds on the process of the individual using her or his mind to create a greater understanding and appreciation of the self, others and the environment for the purposes of learning and thinking rationally.

#### **2.3.2.3 The emotional dimension**

This dimension is indicative of the individual's psychological strength. It facilitates the process of an individual accepting her or his worth and the worth of others. The individual strives to create, recognise and express her or his feelings in an acceptable way. The practice of positive self talk and optimistic outlook of life is essential for psychological strength.

#### **2.3.2.4 The spiritual dimension**

The spiritual dimension refers to the process of creating and discovering the meaning and purpose of life, individual sense of belongingness and demonstrating values through behaviours.

#### **2.3.2.5 The social dimension**

The social dimension pertains to creation and maintenance of healthy relationships through individual choices, healthy interaction with people and satisfying interpersonal relationships.

### **2.4 Health and wellness behaviour**

Understanding human behaviour regarding health and wellness is important for effective promotion of health and prevention of disease and illness. Health psychology has highlighted the following factors i.e. predisposing factors, enabling factors and reinforcing factors and lifestyle influences in an effort to explain individual behaviour regarding wellness.

#### **2.4.1 Predisposing factors**

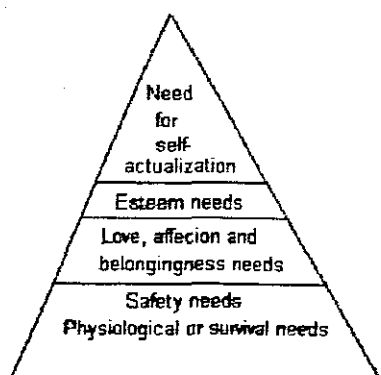
Genetic constitution can be held responsible for the increased risk of developing conditions such as depression, alcoholism, psychosis, heart disease, diabetes and numerous other conditions. Although the individual is not able to alter her or his family genetic structure, lifestyle changes and adaptations may reduce the predisposed risk.

Individuals acquire numerous health beliefs, attitudes, values and knowledge regarding health throughout their lives. The interaction between personal preferences and motivations towards health and wellness shape behaviour.



Knowledge is acquired through various media, social interactions and personal experience. This knowledge, although not always scientifically proven, becomes intertwined with more reliable beliefs and values (McMullen *et al.* 1996). An informed wellness lifestyle requires accurate and reliable knowledge combined with other motivating factors for movement towards higher levels of wellness.

The fulfilment of needs is another strong motivator of health and wellness. Maslow's (1968) hierarchy of human needs depicts the progression of an individual towards self actualisation.



**Fig 2.3 Maslow's (1968) hierarchy of human needs**

The physiological or survival needs e.g. water, air, nourishment, etc. are essential for the body to stay alive. Once those needs have been met, Maslow (1968) proposes that individuals move to the higher levels such as safety, love, self esteem and ultimately self actualisation. The tenet of this theory is that human beings must satisfy lower-level needs before attempting higher levels. A healthy person will be motivated by a need to reach self actualisation. Self

esteem, love and a sense of belonging are strong motivators. Lifestyle choices are informed by how individuals perceive themselves and others' perception of them.

Pleasure and pain are also strong motivators of human behaviour. Individuals seek to increase the incidence of pleasure while avoiding painful stimuli. Health and wellness is usually attained at the expense of pain e.g. treating physical ailments with appropriate interventions may minimise the duration of the illness, reduce the signs and symptoms thereby decreasing painful stimuli. Although individuals may not enjoy the experience of physical exercise to the same degree, the benefits and contribution to enhancing health and wellness can still be regarded as motivation.

#### **2.4.2 Enabling and reinforcing factors**

Personal initiative discussed above, is the first stage of the process of a wellness lifestyle. The basis of the second stage is implementation and maintenance. Skills and resources are required to implement a wellness strategy. The acquisitions of skills empower the individual by making her or him proficient at a particular task. For example, although the wellness programme was initiated by the researcher and GRA at RBCT, it can be sustained by the participants with minimal intervention of a health professional.

The availability and accessibility of wellness resources is an important consideration. Individuals from favourable socio-economic and environmental conditions and superior education are able to purchase healthier foods e.g. foods limited in preservatives, food colouring and other chemicals. Such individuals also have greater accessibility to health care facilities and health professionals and increased exposure to health and wellness information. By contrast, individuals from lower socio-economic groups and disadvantaged communities have greater difficulty adopting a wellness lifestyle due to limited accessibility and availability of resources.

A critical reinforcing factor of a wellness lifestyle is social feedback. Human behaviour is governed to a large extent by negative and positive reinforcement depending on the source and type of reinforcement. Healthy lifestyle choices receiving positive reinforcement are more likely to be sustained by individuals (McMullen et al. 1996).

### **2.4.3 Lifestyle influences**

Although external factors have a significant role in determining whether an individual is predisposed, reinforced and or enabled to make positive behavioural changes; the individual's action or lack of action represents an enormous influence on overall wellness (Donatelle et al. 1999). Certain risk factors are associated to susceptibility to premature illness and death; it is these

factors that hinder high levels of wellness. Examples of risky behaviour include the following:

Risky behaviour
<ul style="list-style-type: none"><li>➤ Smoking</li><li>➤ Consuming more than two alcoholic beverages per day or more than seven drinks per week</li><li>➤ Failure to exercise aerobically at least three times per week for a minimum of 20-30 minutes per session.</li><li>➤ Eating and exercising such that body fat is above or below optimal levels</li><li>➤ Driving while intoxicated or riding with someone who is intoxicated</li><li>➤ Engaging in unsafe sexual practices</li><li>➤ Lack of a strong social support network</li><li>➤ Poor stress management</li></ul>

Table 2.1 Examples of risky behaviour

Attempts to effect behavioural changes to attain higher wellness should be informed by strategies pertaining to individual needs, situation and characteristics.

2.5. Stress management

The human body is naturally in a state of homeostasis, a term used to describe the internal physiological and psychological balance within the body. A stressor is anything that disrupts this natural state of homeostasis. Stress can be defined

as the phenomenon of assorted stressors provoking a physiological and psychological response beyond homeostasis (Donatelle et al. 1999). Eustress refers to stressors while distress refers to stressors that prompt a stress response.

### 2.5.1 General adaptation syndrome

Hans Selye (1956) developed the general adaptation syndrome. This theory sought to explain the physiological changes that the body experiences when exposed to a stressor. The body undergoes the following changes (Donatelle et al. 1999; McMullen et al. 1996; Greenberg and Pargman, 1989):

Physiological changes in the body in response to stressful stimuli
<ul style="list-style-type: none"> <li>➤ Increased heart rate, blood pressure and respiration</li> <li>➤ Increased blood volume, caused by the decrease in urine production and an increase in sodium retention</li> <li>➤ Increased metabolic activity and oxygen consumption, and the release of endorphins which dull pain receptors</li> <li>➤ Increased muscle contractions, dilations of coronary arteries, dilation of pupils, constriction of the abdominal arteries and movement of the blood from nonessential to essential areas of the body</li> </ul>

**Table 2.2 Physiological changes in the body**

Activation of the flight or fight response is the body's emergency system to protect or remove itself from harm's way. Energy is mobilised and redirected

from storage and non-crucial functions to those functions needed to remove or reduce impending or perceived danger. This is the alarm phase.

Common responses to stressful situations are as illustrated by the table below.

Common signs and symptoms of stress	
<b>Emotional</b> Forgetfulness Nervousness Excessive worrying Difficulty sleeping	<b>Cardio respiratory</b> Heart pounding Cold, sweaty palms Throbbing headaches Shortness of breath Palpitations Shallow breathing
<b>Muscular</b> Shaky hands Back pain Tension headaches Twitches	<b>Gastrointestinal</b> Upset stomach Constipation Diarrhoea

**Table 2.3 -common signs and symptoms of stress**

Resistance is the second phase characterised by the rebound effect aimed at resisting the stressor (McMullen et al. 1996). The body's primary aim is to adapt to the stressor and return to homeostasis. Successful adaptation leads to a disappearance of the alarm phase.

The third phase, exhaustion occurs as a result of continued exposure to the stressor to which the body has already adapted. Prolonged exposure can cause

organs to become fatigued leading to greater susceptibility to disease and illness (McMullen et al. 1996).

Managing stress is an ongoing process. Understanding the stress response assists the development of appropriate management strategies.

**2.6 Benefits of physical exercise**

Physical exercise provides both physiological and psychological benefits as listed below.

**2.6.1 Physiological benefits**

Benefits of physical exercise
<ul style="list-style-type: none"><li>➤ Maintenance of normal blood pressure and reduction in blood pressure in hypertensive individuals.</li><li>➤ Maintenance of optimal body weight.</li><li>➤ Increased muscle tone, strength, flexibility and endurance.</li><li>➤ Reduced risk for injuries.</li><li>➤ Decreased mortality (premature death) and morbidity (illness) from infections and chronic disease.</li><li>➤ Prevention and alleviation of chronic back conditions</li><li>➤ Improved sleep patterns.</li><li>➤ Increased energy for work and recreation.</li><li>➤ Improved posture-crucial for increased physical appearance and combating fatigue.</li></ul>

**Table 2.4 Benefits of physical exercise**

The above table lists the benefits of physical exercise (Donatelle et al. 1999; McMullen et al. 1996; Edlin and Golanty, 1988).

**2.6.2 Psychological benefits**

The psychological benefits can be listed as follows (Fox, 2000; Donatelle et al. 1999; McMullen et al. 1996; Edlin and Golanty, 1988):

Psychological benefits of exercise
<ul style="list-style-type: none"><li>➤ Regular exercise reduces anxiety, depression, tension and fatigue and enhances vigour and the ability to deal with negative aspects of stress. All of these changes are linked to what habitual exercisers refer to as a "feeling better sensation" or the "feel good" state (Edwards, 2002; Fox, 2000).</li><li>➤ An improved sense of self control, self esteem and self efficacy is reported (Callen, 1983)</li><li>➤ Regular exercise reduces physical and psychological tensions, regulates breathing and initiates self awareness.</li><li>➤ Improved interpersonal relationships.</li><li>➤ Exercise may provide a valuable treatment mode for some mental illness, and or used as an adjunct to traditional therapeutic approaches e.g. treatment of clinical depression (Fox, 2000).</li><li>➤ Exercise may be effective in the prevention of mental illness and disorders</li><li>➤ Is relatively inexpensive and can be sustained without minimal supervision and input from health professionals</li><li>➤ Optimistic outlook on life</li></ul>

**Table 2.5 Psychological benefits of physical exercise**



## **2.7 Negative effects of exercise on wellness**

Fox (2000) cites existence of exercise addiction or dependence as a psychopathological disorder as resulting from participation in physical exercise although it is rare. Problematic dependence is usually confused with high level of commitment and dedication. In activities that require slim bodies, eating disorders are more prevalent (Edwards, 2002; Fox, 2000). Exercise is used as a form of control of the body composition. The ingestion of banned anabolic steroids is higher in athletes requiring performance and/ or body-building attributes.

## **2.8 Summary**

Chapter two provides a brief introduction to the paradigm of health psychology defining the key concepts of wellness and health. Psychological wellness and its components are explained within the parameters of this study. Behaviour pertaining to health and wellness is expounded on with regards to predisposing, reinforcing and enabling and lifestyle factors. This chapter also provides a brief discussion of stress and effective management. The benefits and negative aspects of physical exercise are explored with regards to an individual's psychology and physiology.

The following chapter is a discussion of the research methods used in the study.

## **Chapter Three**

### **Research methodology**

#### **3.1 Introduction**

This chapter explains the method of participant selection, data collection, assessment procedures, and data scoring. The administration of the test battery (psychological wellness evaluation and physical assessment), wellness programme, as well test protocols and various statistical tools used to analyse the data will also be discussed in this chapter.

#### **3.2 Sampling**

A sample of 14 subjects of Richards Bay Coal Terminal (RBCT) participated in a 10-week wellness programme. The researcher secured the sample by approaching the safety and health manager of RBCT for the opportunity to conduct a wellness programme on site (refer to appendix A-correspondence to Mr V.H. Hlela). Subjects were given a description of the study and ensured confidentiality should they agree to participate (refer to appendix B-correspondence to subjects).

### **3.3 Data collection**

The data collection process involved pre-test and post-test phases for both psychological and physical assessment.

A psychological wellness questionnaire was administered to each subject to evaluate current wellness status. The questionnaire was administered to the group of fourteen subjects in one sitting by the researcher. (psychological wellness pre-test). The researchers used this data to structure and subsequently conduct counselling and motivational sessions with subjects when needed. At the end of the duration of the 10-week programme, the researcher administered the psychological wellness questionnaire to subjects (psychological wellness post-test).

The researcher elicited the assistance of the University of Zululand (Unizul)-department of Human Movement Studies (HMS) to evaluate subjects' current fitness status (physical fitness pre-test). The graduate research assistant (GRA) from Unizul-dept of HMS, used this data to construct a physical activity routine to suit the conditions of each subject. Subjects' physical fitness was assessed at the end of the duration of the 10-week wellness programme (physical fitness post-test).

### 3.4 Administration of test battery

The test battery comprised of psychological and physical fitness components for psychological and physical assessments was administered by the researcher and the GRA.

### Components of the test battery

The following tables provide the components and objectives of the psychological wellness assessment and physical fitness assessment respectively.

#### Psychological wellness assessment

Components	Sub-components	Objectives
Mood assessment	Negative mood states: depression, anxiety, anger, confusion, fatigue, stress  Positive mood states: Energetic, happy, confident, healthy, being in control and strong	To assess subjects' mood state
Life style	Healthy habits: exercise, eating, eating breakfast, sleeping, smoking, drinking, being under or over weight.	To ascertain the subject's cognitive state of general contentment with her or his life.
Satisfaction with life	Self efficacy: attainment of goals and aspirations and general contentment with life	To determine satisfaction levels pertaining to life and goals.
Sense of coherence	Comprehensibility, life interest, self efficacy, interpersonal trust and	To determine the subject's sense of coherence

	predictability	
<b>Fortitude</b>	Self-appraisal, appraisal and appraisal	family-support-appraisal
<b>Stress management</b>	Commonly stressful events	occurring
<b>Coping skills</b>	Coping skills	
		To appraise coping skills

**Table 3.1 Components and aims of psychological scales used**

**Physical fitness assessment**

Components	Sub-components	Objectives
<b>Anthropometric measures</b>	TBM	To measure subject's TBM
	LBM	To calculate subject's LBM
<b>Flexibility</b>	Flexibility	To measure hamstring flexibility
<b>Muscle strength and endurance</b>	Abdominal strength (sit-ups)	To measure abdominal strength and endurance
	Upper body strength (push-ups)	To measure upper body strength and endurance
<b>Aerobic capacity</b>	Cycle ergo meter test (VO <sub>2</sub> max)	To determine subject's VO <sub>2</sub> max

**Table 3.2 Components and aims of physical assessment**

### **3.4.1 Psychological assessment of wellness**

The psychological assessment test battery was done by means of a questionnaire compiled by Edwards (2001). There were 5 components that constituted the assessment. They were mood, lifestyle, sense of coherence, fortitude, and stress management. The researcher completed each questionnaire with subjects on an individual basis (refer to appendix C for the psychological wellness questionnaire and appendix D for the scoring key respectively). Three counselling sessions per week were set up to provide ongoing support, motivation, and psycho-education in this study.

#### **3.4.1.1 Mood assessment**

Each subject was required to describe how they were feeling at the time by choosing the most appropriate option. This was done by means of a Likert scale. The mood assessment sought to quantify each subject's mood in terms of negative mood states of anxiety, depression, fatigue, anger and stress. The positive states of being in control, increased energy levels, happiness, confidence and strength were also assessed (Edwards, 2001).

Scoring: The questionnaire offered each subject 5 options, viz. not at all (0); A little (1); moderately (2); quite a bit (3); and extremely (4). Scores were obtained by reverse scoring all items for negative mood states, with the exception of

moderately where the score of 2 remained the same. The scores for the positive mood states remained the same.

#### **3.4.1.2 Lifestyle assessment**

This assessment was twofold, i.e. health habits and satisfaction with life. Subjects were required to indicate their health habits by responding with either yes or no. These questions pertained to smoking habits, eating habits, sleeping habits, exercise habits and alcoholic drinking habits and body weight.

Scoring: The scoring for the health habits were obtained by rating the answers with a score of 1 or 0, where healthy habits were given the positive score of 1, and unhealthy habits were scored as 0. This was then added to the score obtained for lifestyle choices.

#### **3.4.1.3 Satisfaction with life**

This assessment determined the subject's level of fulfilment of goals and aspirations, regrets and general contentment with her or his life.

Scoring: The 7 point Likert scale was as follows 1=strongly disagree and 7=strongly agree. 4= neither agree nor disagree and remained the same in the scoring.

#### **3.4.1.3 Sense of coherence**

There are five factors that are assessed by this 13 item scale: comprehensibility, life interest, self efficacy, interpersonal trust and predictability (Edwards, 2001).

Scoring: A Likert scale that ascended in intensity was used. The following items were reversed scored: 5,7,9,10,11 while the score of 4 remained the same.

#### **3.4.1.4 Fortitude**

This scale sought to appraise the subject's dependability on self, social relationships and familial relationships (Edwards, 2001).

Scoring: A Likert scale was used where 1=does not apply and 4=applies very strongly. Item 20 was reversed scored.

#### **3.4.1.5 Stress management**

The Holmes and Rahe (1967) social readjustment scale was included in the psychological assessment. The subject's commonly occurring events are rated according to how stressful each event is. The second phase of the questionnaire applied to the coping skills of the subject, where the subject was required to response with yes if the question applied to her or his situation.



Scoring: The stress scores have a ceiling of 100. All scores of events that are indicated are added and reversed scored. If the subject obtained of score exceeding 100, the reverse score was automatically made 0.

**3.4.1.6 Coping skills**

A list of fifteen coping mechanisms employed by individuals in stressful situations was given. This appraisal is an indication of whether or not an individual is coping effective with her or his stressors.

Scoring: Items on the coping skills that are marked yes are scored as 1; the total is subtracted from 15. The remainder is the coping with stress score.

The final assessment of psychological wellness was reflected as a percentage applying the following scoring formula:

$$\frac{\text{(The sum of the five components of the wellness assessment)}}{376} \times 100$$

Counselling and motivational sessions when needed were conducted with subjects. The dominant themes of discussion were as follows:

- Meaning of wellness
- Benefits of exercise
- Benefits of effective stress management
- Benefits of healthy lifestyles
- Meaning of health
- The effects of psychological well-being on physical health

#### **3.4.2 Administration of physical fitness assessment**

The physical assessment comprised of the following components:

- total body mass
- lean body mass
- hamstring range of motion
- abdominal strength (sit-ups)
- upper body strength (push-ups)
- VO<sub>2</sub>max

The percentage rankings of the above components were then used to calculate the individual's fitness index (Appendix E).

**3.5 Physical fitness test protocols**

The explanation that follows pertains to the various tests and procedures performed to determine the physical fitness of each subject.

**3.5.1 Total body mass (TBM)**

This test was used to determine the subject's total body mass. The unit of measurement is kilogram.

Equipment	measuring scale
Procedure	Subjects were required to be clothed in their shorts only and proceed to stand on a measuring scale. The GRA recorded all readings.

**Table 3.3 Procedure and measurement of TBM**

**3.5.2 Lean body mass (Coetzee, 2001)**

LBM is a component of total body mass. Each subject's LBM was calculated as follows:

$$TBM = LBM + \text{Fat Mass (FM)}$$
 (where FM was determined using a 3 site skinfold scale).

Therefore

$$LBM = TBM - FM$$

### 3.5.3 Hamstring range of motion (HROM) (Coetzee, 2001)

This test was used to determine hamstring flexibility.

Equipment	Plinth, goniometer
Procedure	The subject was required to lie supine on the plinth. The affected leg's trochanter aligned with the vertex of the goniometer. The subject was then required to relax the quadriceps muscle. The GRA placed one hand on the suprapatella (anteriorly) and the other hand at the calcaneus (posteriorly). The GRA then raised the affected leg to the point where the patella-femoral joint flexed. Subsequently the GRA recorded the range of motion of affected leg's hamstring flexibility.
Scoring	The GRA recorded each leg hamstring flexibility twice where the better trial of two was recorded. The average of the independent legs flexibility was calculated. This value represents each subject's hamstring flexibility where the unit of measurement is degrees.

**Table 3.4 Procedure and scoring of HROM**

### 3.5.4 Abdominal strength -one minute speed sit-ups (Ellapen, 1997)

This test measured each subject's abdominal muscular strength and endurance.

Equipment	one gym mat; stopwatch
Procedure	The start position is where the subject assumes a supine position on the mat with fingers interlocked behind the head, knees bent and feet held flat on the mat by the GRA. The subject was required to sit up and touch his elbows to his knees. Thereafter he returns to start position. The GRA ensured the correct performance of the test by straddling the subject's feet and placing both hands on the subject's calves just below the back of knee. This was done to ensure that the subject did not slide and was able to maintain the starting position throughout the trial.
Scoring	The movement of sitting up and touching the elbows to the knees is regarded as one execution. The total is the number of completed executions performed in sixty seconds.

**Table 3.5 Procedure and scoring of abdominal strength and endurance**

### 3.5.5 Upper body strength-one minute speed push-ups (Ellapen, 1997)

This test was used to determine the subjects' muscular strength and endurance of the upper body.

Equipment	one gym mat, stopwatch
Procedure	In the start position for males the subject was required to lie in a prone position with legs together. Hands were pointed forward and positioned under the subjects' shoulders. Subjects then pushed up from the floor by straightening their elbows while keeping their bodies straight.
Scoring	After one complete cycle the subject was credited with one push-up. Bending of the back, sagging of the abdomen, and elbows not being fully extended were credited with half a push-up.

**Table 3.6 Procedure and scoring of upper body strength and endurance**

### 3.5.6 VO<sub>2</sub>max (Coetzee, 2001)

The aim of this test was to measure the subject's maximal oxygen consumption.

Equipment	cycle ergo meter, sphygmomanometer, polar heart rate monitor
Procedure	This is a progressive maximal test. The subjects' resting heart rate (HR) was measured. The test comprised of several two minute intervals, where resistance was fixed. The subject started the test at a particular RPM depending on his level of fitness. 60 RPM was used for sedentary people while 70 RPM was used for the physically fit individuals. At the end of every two minute interval, the subject's BP was recorded by the GRA. Subjects terminated the test at the end of that two minute interval once they reached the HR of 160 BPM. Thereafter each subject went into a recovery period comprising of one minute. BP was recorded in the first thirty seconds of each one minute interval and at the end of the recovery period the HR was recorded. The recovery period was terminated once the HR reached 120 BPM and when the subjects' BP reached 120/80.

**Table 3.7 Procedure of determining VO<sub>2</sub>max**

The following precautions were observed throughout these trials:

- The GRA determined whether subjects were using beta blockers, chronic medication, or medication for hypertension.
- If the subjects' HR was greater than 120 BPM, the GRA waited until the HR diminished below the aforementioned rate.
- Resting BP was recorded and if BP was greater than 180/100 the subject was rested until BP returned to 120/80.
- The test was immediately terminated if the subject wished to do so due to physical discomfort and exertion or if the subject's BP reached 220/110.

### 3.5.7 Description of the physical activity programme

The following table represents the physical activity programme that the subjects participated in at least three times per week under the supervision of the GRA.

Phases	Activity	Fitness Components
Warm-up (20 minutes)	Cycling or Stepping *Intensity: easy to moderate	Aerobic
Stretching (10 minutes)	Scalene muscles (neck) Deltoids (shoulder) Pectoral muscles (chest) Biceps Triceps Back Quadriceps Hamstrings Abductors Adductors Calves	Flexibility
Strengthening (30 minutes)	1. Lats pull-downs (3 sets of 10-15 reps) 2. Leg extension 3. Chest press 4. Hamstring curls 5. Shoulder press 6. Calve raises 7. Bicep curls 8. Abductor contraction 9. Triceps extensions 10. Abductor contractions 11. Crunches 12. Transverse crunches	Muscle strength and endurance

	13. Lateral hip raises 14. Pelvic lifts	
Cool down (20 minutes)	Cycling or Stepping Intensity: easy	Aerobic
Stretching (10 minutes)	Scalene muscles (neck) Deltoids (shoulder) Pectoral muscles (chest) Biceps Triceps Back Quadriceps Hamstrings Abductors Adductors Calves	Flexibility

**Table 3.8 Physical activity programme**

**Note:**

1. All stretching exercises were of a slow, static nature and maintained for 30 seconds.
2. The GRA ensured that all subjects maintained the correct technique when executing the exercises.
3. All strengthening exercises were as follows: 2 sets X 10 – 15 reps
4. Subjects trained at 70 % of their maximum for all strengthening exercises.



### **3.6 Data analysis**

Once the post test battery was completed, subjects' scores on both (pre-test and post-test) were statistically analysed. The data was processed and displayed quantitatively by means of tables and graphs. Other statistical instruments used to determine the significance of the data gathered were standard deviation, mean, pair t-test and percentage differences in pre and post-test scores. The analysis of data will be discussed more comprehensively in Chapter 4.

### **3.7 Summary**

Chapter three presents an in-depth explanation of participant selection, data collection, assessment procedures and data scoring methods. Chapter four presents an analytical discussion of the results obtained.

## **Chapter Four**

### **Data results and analysis**

#### **4.1 Introduction**

The following chapter is a presentation and evaluation of the data collected in this study. The data for the psychological assessment and physical assessment *is summarised in tabular form followed by the discussion of the significant results.* The statistical tools used to analyse the data in this chapter are mean, standard deviation, t-test and percentage differences.

#### **4.2 Results of psychological assessment**

The psychological wellness assessment was determined by administering a wellness questionnaire (Edwards, 2002). The compilation of the scales by Edwards (2002) was based on the research of McNair et al. (1971), Dean et al. (1990), Noakes and Granger (1995), Diener et al. (1985), Frenz et al. (1993), Antonovsky (1987,1993), Pretorius (1998), Turner (1990 and Holmes and Rahe (1967). The components were mood, lifestyle, satisfaction with life, sense of coherence, fortitude, stress management and coping skills.

The sum of the components yielded a wellness percentage (W.P). The aim of the study was to increase competency in all components in order to effect a change in overall wellness.

**Table 4.1 PRE AND POST TEST SCORES FOR PSYCHOLOGICAL ASSESSMENT**

Subject	Age	Mood 1	Mood 2	L/Style 1	L/Style 2	Sat. Life 1	Sat. Life 2	Coherence 1	Coherence 2	Fortitude 1	Fortitude 2	Stress Man.1	Stress Man.2	Coping 1	Coping 2	W.P.1	W.P.2
1	37	25	27	2	5	25	28	63	68	53	58	32	59	12	15	56.4	69.1
2	20	29	31	3	5	25	27	55	60	52	57	0	50	12	13	48.8	64.6
3	35	36	35	5	5	24	25	62	63	64	65	5	31	13	14	55.6	63.3
4	53	23	26	5	5	24	24	45	49	56	57	0	25	8	12	42.8	52.6
5	25	29	29	4	4	23	24	56	60	45	52	41	41	13	14	56.1	29.6
6	29	24	26	1	4	20	21	47	51	49	53	0	40	8	10	39.6	54.5
7	19	27	26	4	4	28	28	70	71	52	53	75	75	15	15	72.1	72.3
8	42	21	24	6	6	17	20	45	50	46	51	100	100	15	15	66.5	70.7
9	41	26	28	5	5	19	20	53	60	51	62	62	76	10	11	60.9	69.7
10	21	20	21	2	4	28	27	50	54	38	51	0	37	12	12	39.9	54.8
11	32	23	24	4	4	30	30	63	64	62	61	0	27	13	13	51.8	59.3
12	23	29	28	2	4	24	25	54	57	50	52	100	100	12	13	72.1	74.2
13	25	21	23	2	4	28	28	61	63	56	58	25	63	15	15	55.3	67.6
14	24	22	24	4	4	19	23	57	62	59	64	0	62	13	13	46.3	67
sum	426	358	372	49	63	334	350	781	832	733	794	440	786	171	185	762.2	869.3
mean	30.4	25.6	26.6	3.5	4.5	23.9	25	55.8	59.4	52.4	56.7	31.4	56.1	12.2	13.2	54.4	62.1
std dev.	99.33	83.21	86.42	11.46	0.65	77.62	3.19	181.44	6.60	170.28	4.87	108.16	24.86	39.75	1.58	177.23	11.63
t-test			0.52		0.03		0.4		0.18		0.06		0.05		0.18		0.08
%diff			3.8		22.2		4.4		6.1		7.6		44.03		7.58		12.4

**KEY**

Mood 1	Pretest score	Mood 2	Mood post test score
L/style 1	Lifestyle pretest score	L/Style 2	Lifestyle post-test score
Sat.Life 1	Satisfaction with life pretest score	Sat.Life 2	Satisfaction with life post-test score
Coherence 1	Sense of coherence pretest score	Coherence 2	Sense of coherence post-test score
Fortitude 1	Fortitude pretest score	Fortitude 2	Fortitude post-test score
Stress Man 1	Stress management pretest score	Stress Man 2	Stress management post-test score
Coping1	Coping skills pretest score	Coping 2	Coping skills post-test score
W.P 1	Wellness percentage pretest score	W.P 2	Wellness percentage post-test score

The discussion of results obtained that follows, is with reference to Table 4.1 Pre and post-test scores for psychological assessment.

#### **4.2.1 Mood assessment**

The subjects' mood was assessed for positive and negative states. The pre-test mean score of 25.6 increased to 26.6 in the post-test. The percentage increase was 3.8%. The t-test score was 0.52 which was not significant at the 5% level.

#### **4.2.2 Lifestyle assessment**

The subjects' lifestyle was assessed with reference to healthy habits pertaining to exercise, eating, sleeping, smoking, drinking and maintaining optimal body weight. The pre-test mean score of 3.5 increased to 4.5 in the post-test. The percentage increase was 22.2%. A t-test score of 0.03 was yielded which was not significant at the 5% level.

#### **4.2.3 Satisfaction with life**

Satisfaction with life assessed levels of self-efficacy and general contentment with life. The pre-test mean score of 23.9 increased in the post-test to 25 yielding a percentage difference of 4.4%. The t-test value of 0.4 was not significant at the 5% level.

#### **4.2.4 Sense of coherence**

This scale sought to assess the individual's comprehensibility, life interests, interpersonal trust and predictability. The pre-test mean score of 55.8 increased to 59.4 in the post-test, yielding a percentage increase of 6.1%. The t-test value of 0.18 was not significant at the 5% level.

#### **4.2.5 Fortitude**

The fortitude scale was an appraisal of support structures of self, family and social networks. The pre-test mean score increased from 52.4 to 56.7 in the post-test. The percentage difference obtained was 7.6%. The t-test value of 0.06 was not significant at the 5% level.

#### **4.2.6 Stress management**

The Holmes and Rahe (1967) social adjustment scale identified the commonly occurring current stressful events. The pre-test mean score of 31.4 increased to 56.1 in the post-test, yielding a percentage increase of 44.03%. The t-test score of 0.05 was not significant at the 5% level.

#### **4.2.7 Coping skills**

This scale sought to appraisal current coping mechanisms of subjects. The pre-test mean score of 12.2 increased to 13.2 in the post-test with a percentage increase of 7.58. The t-test score of 0.18 was not significant at the 5% level.

#### **4.2.8 Wellness percentage**

The wellness percentage was obtained by dividing the sum of the above components by three hundred and seventy six (total score of the questionnaire), then multiplying the result by one hundred to obtain score reflected as a percentage. The pre-test mean score of 54.4 increased to 62.1 in the post-test yielding a percentage increase of 12.4%. The t-test value of 0.08 was not significant at the 5% level.

#### **4.3 Results of physical assessment**

The physical assessments, in both the pre and post-tests, were conducted using the same test battery measuring the following components of each subject: lean body mass, flexibility, muscle strength and endurance and VO<sub>2</sub>max.

These components when combined, provides the fitness index of each subject. One of the aims of the study was to increase ability in all components to effect a

positive change in the fitness index of the subjects. The discussion that follows is with reference to Table 4.2 Pre and post test fitness scores.

**Table 4.2 PRE AND POST TEST FITNESS SCORES**

Subject	BM1	BM2	LBM1	LBM2	HR0M1	HR0M2	Sit-ups1	Sit-ups2	Push-ups1	Push-ups2	VO2max1	VO2max2	Fit Index1	Fit Index2
1	63	63	87.3	85	60	60	75	75	80	85	34.9	52	65.5	70
2	75	75	89.5	89	50	60	94	95	99	100	76.9	78	86.3	82.8
3	78.2	76	81.5	82	65	65	70	75	50	60	57.5	60	59.3	75
4	78.5	78	82.7	80	45	60	91	92	100	100	48	52	79.8	77
5	86	80	73.1	72	45	60	87	90	98	100	37.2	60	64.6	77
6	81	81	72	72	50	60	0	70	0	70	0	55	24.4	68
7	82.2	82	82.4	80	70	70	83	85	100	100	49.8	52	76.1	78.2
8	85.3	83	81	75	60	60	80	85	99	100	52.8	55	82	76.3
9	84	84	73.3	70	60	60	60	65	60	65	35.7	45	61.5	64.8
10	84	84	73	73	55	60	49	80	64	65	23	50	48.4	68.7
11	85	85	73.9	74	40	60	0	75	98	98	24	28	56.8	70
12	85	85	71.2	70	60	60	70	70	74	75	23	50	55.2	68.8
13	83.4	86	76	75	45	60	40	50	45	55	43.2	60	58.2	64.3
14	91.8	90	73	73	45	60	60	65	74	75	34.9	50	66.8	68.8
sum	1142.4	1132	1089.9	1070	750	855	859	1072	1041	1148	540.9	747	884.7	1009.7
mean	81.60	80.85	77.85	76.43	53.57	61.07	61.36	76.57	74.36	82.00	38.64	53.36	63.19	72.12
SD	6.72	6.54	6.08	5.84	9.08	2.89	30.25	12.34	29.06	17.36	18.58	10.73	15.75	5.54
t-test		0.78		0.01		0.01		0.00		0.14		0.00		0.02
% diff		0.01		0.02		12.3		19.1		9.3		28.3		12.4

**KEY**

BM1 Body mass pretest score  
LBM1 lean body mass pretest score  
HR0M1 hamstring range of motion pretest score  
Sit-ups 1 sit-ups pretest score  
Push-ups 1 push-ups pretest score  
VO2max 1 VO2max pretest score  
Fit Index 1 Physical fitness index pretest

BM2 Body mass pretest score  
LBM2 lean body mass post-test score  
HR0M2 hamstring range of motion post-test score  
Sit-ups 2 sit-ups post-test score  
Push-ups 2 push-ups post-test score  
VO2max 2 VO2max post-test score  
Fit Index 2 Physical fitness index post-test



#### **4.3.1 Total body mass**

Maintaining optimal body mass is an integral part of a wellness programme to ensure the reduction of incidence of illness and disease (Donatelle et al. 1999; McMullen et al. 1996; Edlin and Golanty, 1988). One of the benefits of physical exercise is that it is combined with other programmes to effect weight loss.

The mean of the pre-test score for TBM was 81.60 and this decreased to 80.85 in the post-test. There is a percentage difference of 0.01% decrease in TBM. Since TBM is composed of LBM and FM, it follows that the reason for the decrease in TBM is as a result of an decrease in FM, i.e. a percentage difference of 0.01. The t-test score of 0.78 was not significant at the 5% level.

Maintaining optimal body mass, an individual should strive to increase the lean body mass (LBM) and reduce fat mass (FM) to increase overall physical health. Therefore this is a positive adaptation in this study.

#### **4.3.2 Flexibility**

Flexibility is the range of motion and movement of a joint. By increasing flexibility, injuries to tendons and joints decrease (Donatelle et al. 1999; McMullen et al. 1996, Greenberg and Pargman, 1989). The pre-test mean score for hamstring range of motion (HROM) was 53.57 and increased in the post-test

to 61.07 with a percentage difference of 12.3. The t-test score of 0.01 was not significant at the 5% level.

#### **4.3.4. Muscle strength and endurance**

Muscle strength and endurance are important component of maintaining muscle mass and bone strength which usually decreases with age. Strength and endurance tests were carried out on two areas of the body i.e. abdominal and upper body. The abdominal strength was determined by the number of sit-ups completed by subjects while upper body strength was determined by the number of push-ups.

##### **4.3.4.1 Abdominal strength**

The pre-test mean scores of 61.36 increased to 76.57 in the post-test. The t-test score yielded a result of 0.00 which was not significant at the 5% level. There was a percentage difference increase of 19.1%.

##### **4.3.4.2 Upper body strength**

The pre-test mean score for push-ups was 74.36 and increased to 82 in the post-test. This yielded a percentage increase of 9.3%. The t-test score of 0.14 was not significant at the 5% level.

#### **4.3.5 VO<sub>2</sub>max**

VO<sub>2</sub>max is the ability of the body to use the maximal amount of oxygen to generate energy. This energy is generally stored in fats and carbohydrates in the body. It was the aim of the study to increase the VO<sub>2</sub>max of each subject to enhance cardio-vascular fitness and inhibit heart disease, circulatory disorders and assist with control of blood pressure. The pre-test mean score of VO<sub>2</sub>max was 38.64 and increased to 53.36, i.e. there was a percentage increase of 28.3%. The t-test score of 0.00 was not significant at the 5% level.

#### **4.3.6 Fitness index**

The fitness index was obtained by the sum of the components discussed above. It was the aim of the study to effect a positive change in the fitness index of each subject in the duration of the ten-week wellness programme. The pre-test mean score of fitness index was 63.19 and increased in the post-test to 72.12 with a percentage increase of 12.4%. The t-test score of 0.02 was not significant at the 5% level.

#### **4.4 Significance of study**

The following psychological aims were accomplished, i.e. positive increases in:

- mood assessment
- lifestyle

- satisfaction with life
- sense of coherence
- fortitude
- stress management
- coping mechanisms

These positive increases contributed to the increase in the overall wellness percentage of the subjects.

The following fitness objectives to effect positive change were achieved:

- to increase LBM and decrease % FM
- to increase flexibility
- to increase muscle strength and endurance
- to increase VO<sub>2</sub>max

These positive changes contributed to the overall increase in the fitness index of subjects.

However the t-test scores for both psychological and physical components of the assessment were not significant at the 5% level. This may be attributed to the following:

- Poor sample size (N was 14)

- Irregularity with participation in exercise programme (Edwards, 2002) that may be attributable to the following reasons: work commitments, annual shutdown of the industrial site, programme was run in the late second half of the year (year-end commitments and time constraints hindered the programme)
- Short duration of the programme (ten weeks for psychological and physical fitness programmes)

Although the t-test scores were not significant at the 5% level, positive increase was obtained in all components with the exception of abdominal strength which remained constant. These results indicate the effectiveness of such a programme although results were marginal. The major reason for the increase in overall psychological wellness can be attributed to regular exercise with the duration of at least ten weeks. This is supported by the similar findings of Edwards (2002).

#### **4.5 Summary**

This chapter presented the results of the data collected in tabular form, discussed the statistical significance and the importance of the findings with regards to the study.

The following chapter presents the conclusions and recommendations of the study.

## **Chapter Five**

### **Findings and recommendations**

#### **5.1 Introduction**

Health and wellness interventions have thus far involved three interventions viz. disease and illness treatment, illness prevention and health and wellness promotion (Edwards, 2002). According to Corbin and Lindsey (1997) health clubs have of late become increasingly concerned with promotion of health and wellness. This is supportive of the WHO's (2002) view that the combination of prevention and promotion programmes in mental health with overall public health decreases stigma and increases cost-effectiveness with multiple positive outcomes.

#### **5.2 Findings**

- Regular exercise enhances psychological wellness (Edwards, 2002).
- Physical exercise provides an inexpensive adjunct and/or treatment of mental illness (Fox, 2000).
- The expertise of a mental health professional is required to initiate a wellness programme, which can then be sustained by participants with minimal intervention by professionals.
- The construction and sustainability of mental health promotion programmes in the workplace is made possible if the organisation accepts

that mental health promotion is good business practice (Morrow, 2001).

RBCT is dedicated to adopting a transdisciplinary approach to promote wellness by setting up a wellness centre with the following services from health professionals viz. medical services provided by doctors and nurses, biokinetics provided by a biokinetic intern, psychological services provided by a psychology intern, emergency rescue services provided by rescue personnel and occupational health nurses to frequent the wellness centre. This trans-disciplinary approach adopted by RBCT is supported by Hauf and Bond (2002) who advocate that successful, accessible and sustainable programmes are anchored firmly in community collaboration. When stakeholders participate in joint training and other professional developmental activities collaboration is enhanced.

### **5.3 Recommendations**

Increased psychological wellness produces healthier employees who are able to perform optimally thereby increasing work productivity (Fox, 2000). It is therefore in the best interests of industry to initiate and actively sustain wellness programmes for all employees. This can be achieved by:

- I. Industries making provisions for access to wellness centres on site.

Edwards (2002) identifies this phenomenon becoming more prevalent in future.

- II. Industries actively promoting regular physical exercise.



- III. Industries promoting regular physical and psychological assessments for employees for the prevention of illness and promotion of mental health.
- IV. Industries adopting a trans-disciplinary approach to promotion of wellness and prevention of illness.

It is hoped that this trans-disciplinary study can be used as a pilot study for further investigation of the causal relationship between physical exercise and psychological wellness. Fox (2000) maintains that existing literature is conducted within exercise and sport sciences, a field which is relatively new and inexperienced in research. This illustrates the need for trans-disciplinary studies, a view supported by Almeida-Filho (2002) who advocates this viewpoint for meaningful contribution to popular knowledge about health, healing and culture-sensitive mental health policies.

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**Appendix A**  
**Correspondence to Mr V.H. Hlela**

University of Zululand  
KwaDlangezwa  
01 October 2002

Mr V.H. Hlela  
The Manager  
RBCT Wellness centre  
Richards Bay

Sir-

Re: Implementation of a wellness programme on site

I am currently completing my masters in clinical psychology at the University of Zululand. My area of interest lies in the development and evaluation of a wellness programme on an industrial work-site. I am particularly interested in the effect of physical exercise on psychological wellness. I would like to pursue my studies at your wellness centre as it is the only available facility for employees in the Richards Bay area.

My programme will run for the duration of ten weeks and entails both a psychological and physical fitness assessment. I intend to secure a sample of volunteers of approximately 20 to 30 people. I will also be working in conjunction with the bio kinetics intern from the University of Zululand with minimal disruption to production time.

Your assistance in this matter would be greatly appreciated.

Thank you  
Regards  
Ingrid James (intern clinical psychologist)  
082 651 8440.

## **Appendix B**

### **Correspondence to subjects**

University of Zululand  
KwaDlangezwa  
01 October 2002

**To employees of RBCT**  
**Wellness centre**  
**Richards bay**

I am currently completing my masters in clinical psychology at the University of Zululand. My area of interest pertains to the impact of physical fitness on psychological wellness. My study is a development and evaluation of a wellness programme on an industrial work-site such as RBCT. It is my intention to recruit volunteers for my programme. The following criteria apply:

- Participants must be employees of RBCT who have access to the wellness centre.
- Participants are requested to participate in a ten-week programme consisting of a psychological wellness assessment as well as a physical fitness assessment.
- Participants must be able to participate in the physical exercise programme designed for them at least three times per week for a minimum of 20-30 minutes.
- Motivational counselling is available should participants need further assistance.

All participants of this study will be guaranteed confidentiality of results obtained. Interested employees may contact me at the wellness centre or on my cellphone (082 651 8440).

Your assistance in this study would be greatly appreciated.

Thank you

Regards  
Ingrid James (intern clinical psychologist)

## Appendix C-Psychological wellness questionnaire

### Wellness Profile

Name:

Age:

Gender:

Home language:

Contact number:

Address:

### Mood Assessment

Circle the number that best describes how you are feeling right now

	Not at all	A little	Moderately	Quite a bit	Extremely
How anxious do you feel?	0	1	2	3	4
How depressed do you feel?	0	1	2	3	4
How confused do you feel?	0	1	2	3	4
How angry do you feel?	0	1	2	3	4
How energetic do you feel?	0	1	2	3	4
How fatigued do you feel?	0	1	2	3	4
How confident do you feel?	0	1	2	3	4
How happy do you feel?	0	1	2	3	4
How healthy do you feel?	0	1	2	3	4
How much do you feel in control?	0	1	2	3	4
How strong do you feel?	0	1	2	3	4
How stressed do you feel?	0	1	2	3	4

### Lifestyle Assessment

Health habit questions	Yes	No
1. Do you smoke?		
2. Do you eat breakfast?		
3. Do you eat regularly? (average at least three meals a day)		
4. Are you neither underweight nor overweight?		
5. Do you average less than seven hours sleep a day?		
6. Do you drink moderately (average one or less alcohol drinks per day) or not at all?		
7. Exercise regularly? (average thirty minutes per day at least three days per week)		

### Satisfaction with life assessment

Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement or disagreement with each item by circling the appropriate number before each item. Please be open and honest in your responding. The 7-point scale is: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither agree nor disagree, 5 = slightly agree, 6 = agree, 7 = strongly agree.

- |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | In most ways my life is close to ideal.                     |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | The conditions of my life are excellent.                    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | I am satisfied with my life.                                |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | So far I have got the important things I want in life.      |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | If I could live my life over, I would change almost nothing |



## Sense of Coherence

Please circle the number that applies to you.

1. Until now your life has had ...

1 2 3 4 5 6 7

No clear goals or  
purpose at all

very clear goals  
and purpose

2. Do you have very mixed-up feelings and ideas?

1 2 3 4 5 6 7

very often

very seldom  
or never

3. Does it happen that you have feelings inside you would rather not feel?

1 2 3 4 5 6 7

very often

very seldom  
or never

4. Think of the people with whom you come into contact daily, aside from the ones to whom you feel closest. How well do you know most of them?

1 2 3 4 5 6 7

you feel that  
they're strangers

you know them  
very well

5. Most of the things you will do in the future will probably be ...

1 2 3 4 5 6 7

completely  
fascinating

deadly  
boring

6. You anticipate that your personal life in the future will be ...

1 2 3 4 5 6 7

totally without  
meaning or purpose

full of meaning  
and purpose

7. What best describes how you see life:

1 2 3 4 5 6 7

one can always  
find a solution to  
painful things in life

there is no  
solution to painful  
things in life

8. When something unpleasant happened in the past your tendency was ...

1 2 3 4 5 6 7

"to eat yourself  
up about it"

to say "ok, that's that,  
have to live with it,"  
and go on.

9. When you think of difficulties you are likely to face in important aspects of your life, do you have the feeling that:

1 2 3 4 5 6 7

you will always  
succeed in overcoming  
the difficulties

you won't succeed  
in overcoming  
the difficulties

10. Has it happened in the past that you were surprised by the behaviour of people whom you thought you knew well?

1 2 3 4 5 6 7

never  
happened

always  
happened

11. Has it happened that people whom you counted on disappointed you?

1 2 3 4 5 6 7

never  
happened

always  
happened

12. In the past 10 years your life has been ....

1 2 3 4 5 6 7

full of changes  
without you knowing  
what will happen next

completely  
consistent  
and clear

13. Your life in the future will probably be ...

1 2 3 4 5 6 7

full of changes  
without your knowing  
what will happen next

completely  
consistent  
and clear

### The Fortitude Questionnaire (FORQ)

Please indicate the extent to which the following statements applies to you and/or your situation.

Use the following scale

1	=	does not apply
2	=	applies slightly
3	=	applies a lot
4	=	applies very strongly

Mark your responses to the left of the statement

EXAMPLE 1 I like apricots: The 1 indicates that the statement does not apply to you.

- \_\_\_ 1. I always feel pretty sure of myself.
- \_\_\_ 2. I take a positive attitude towards myself.
- \_\_\_ 3. I have no trouble making up my mind.
- \_\_\_ 4. I trust my ability to solve new and difficult problems.
- \_\_\_ 5. On the whole I am satisfied with myself.
- \_\_\_ 6. In general, there are more than 5 people that I could really count on to be dependable when I need help.
- \_\_\_ 7. I am very satisfied with the comfort and support that I get from others.
- \_\_\_ 8. Learning about new and different things is very important in our family.
- \_\_\_ 9. When making a decision, I weigh the consequences of each alternative and compare them against each other.
- \_\_\_ 10. I am very satisfied with the help and support that I get from those that I count on.
- \_\_\_ 11. I know that someone will always be around if I need assistance.
- \_\_\_ 12. There is plenty of time and attention for everyone in our family.
- \_\_\_ 13. My friends give me the moral support I need.
- \_\_\_ 14. I rely on my family for emotional support.
- \_\_\_ 15. I have a deep sharing relationship with a number of members of my family.
- \_\_\_ 16. Members of my family are good at helping me solve problems.
- \_\_\_ 17. In my family we tell each other about our personal problems.
- \_\_\_ 18. Activities in our family are pretty carefully planned.
- \_\_\_ 19. Friends often have good advice to give.
- \_\_\_ 20. At times I think I am no good at all.

# Stress Management Questionnaire

## What is your stress score?

How many of the following life crises have you experienced in the last month? Add up your score on this events table, worked out by Dr. Richard Rahe of Washington Medical School, to find out how much stress management you need.

	Score		Score
1. Death of a spouse	100	23. Son or daughter leaving home	29
2. Divorce	73	24. Trouble with in-laws	29
3. Marital separation	65	25. Outstanding personal achievement	28
4. Jail sentence	63	26. Spouse beginning or stopping work	26
5. Death of a close family member	63	27. Beginning or ending school or university	26
6. Personal injury or illness	53	28. Change in living conditions	25
7. Marriage	50	29. Change in personal habits	24
8. Losing a job	47	30. Trouble with the boss	23
9. Marital reconciliation	45	31. Change in working hours or conditions	20
10. Retirement	45	32. Change in residence	20
11. Change in health of a family member	44	33. Change in school or university	20
12. Pregnancy	40	34. Change in recreation	19
13. Sex difficulties	39	35. Change in church activities	19
14. Gain of a new family member	39	36. Change in social activities	18
15. Business readjustment	39	37. Moderate mortgage or loan	17
16. Change in financial status	38	38. Change in sleeping habits	16
17. Death of a close friend	37	39. More or fewer family get-togethers	15
18. Change to a different line of work	36	40. Change in eating habits	15
19. More or fewer arguments with a spouse	35	41. Holiday	13
20. High mortgage or loan	31	42. Christmas	12
21. Foreclosure of a mortgage or loan	30	43. Minor violation of the law	11
22. Change in responsibilities at work	29		

**Total Score**

### Results

<b>100 and over</b>	Your stress level has reached worrying proportions. You must change an aspect of your life to try to reduce that score.
<b>80 - 100</b>	You are over-stressed and your score is reaching the critical area.
<b>60 - 80</b>	You are under the average amount of stress.
<b>59 or below</b>	You are enjoying a particularly stress-free time. Make the most of it.

## How well are you coping with stress?

1. Do you often want to burst into tears?
2. Do you have any nervous habits?
3. Do you find it hard to concentrate?
4. Do you feel you cannot talk to anyone?
5. Do you often feel irritable?
6. Do you eat when you are not hungry?
7. Do you feel you cannot cope?
8. Do you sometimes feel you will explode?
9. Do you often drink to calm your nerves?
10. Do you sleep badly?
11. Do you rarely laugh?
12. Do you drive very fast?
13. Do you feel constantly tired?
14. Have you lost interest in sex?
15. Do you often feel miserable?

Yes


### Results

If you have answered "yes" to more than five of these questions, you need stress management. Identify the problems that you think may be leading to stress and do something about it.

## Appendix D

### Scoring key for psychological wellness questionnaire

The Wellness percentage can be obtained by dividing the sum of all scores by 376. The total score is obtained as follows:

- All items are scored as indicated with the exception of the following:
- **Mood scale:** mood items for anxious, depressed, confused, angry, fatigued and stressed are reversed scored i.e. 0 for 4, 1 for 3, 3 for 1 and 4 for 0. Items scored 2 stay the same.
- **Lifestyle scale:** these items are either score 1 or 0. Items scoring 1 are as follows: 1=no; 2=yes; 3=yes; 4=yes; 5=no; 6=yes and 7=yes.
- **Sense of coherence:** only the following items are reversed scored: 5; 7; 9; 10; 11
- **Fortitude scale:** item 20 is reversed scored i.e. 1 for 4; 2 for 3; 3 for 2 and 4 for 1.
- **Stress management:** these scores are added and have a ceiling value of 100. They are then reversed scored. For e.g. death of a spouse 100 scores 0. Items marked holiday and Christmas which total 25 will be scored 75.
- **Coping skills:** items are marked as yes or no. Those marked yes score 1, are totalled and subtracted from 15. The remainder is the coping stress score.

## Appendix E- Physical Fitness Record Sheet

HEALTH AND FITNESS ASSESSMENT					
Name:			Age:		Gender:
Mass:	Height:	Date:		Smoke:	
Diseases:					
Exercise history:					Comments:
<b>Body composition</b>	Triceps:	Subscap:	Supra-il:		
	Biceps:	Abd:	Calf:		
	Thigh:	Chest:	In thigh:		
	% Fat:	LBM:	Fat mass:		
	Recommend	15%:	25%:		
<b>Range of motion</b>	Calfs	R:	L:		
	Hamstrings	R:	L:		
	Hip flexors	R:	L:		
	Shoulder	R:	L:		
<b>Posture</b> <u>Back view</u>  <u>Side view</u>	Lateral deviation				
	Bending				
	Shoulders				
	Scapula				
	Hip height				
	Leg length				
	Ankles				
	Neck				
	Chest				
	Shoulders				
	Kyphosis				
	Lordosis				
	Abdomen				
	<b>Mechanics of motion</b>				

<b>Muscle endurance</b>		<b>Sit ups (1 minute)</b>			
<b>Strength</b>		<b>Push ups (30 seconds)</b>			
<b>Physical working capacity and cardio-respiratory function</b>					
<b>Time</b>	<b>Workload</b>	<b>Heartrate</b>	<b>Blood pressure</b>	<b>PWC<sup>170</sup></b>	
				<b>Predicted VO<sub>2</sub>max</b>	
				<u>Comments:</u>	
<b>Other tests</b>		<b>Cholesterol:</b> <b>mmol/l</b>			
<u>Recommendations:</u>					
<b>Tester:</b>					