

**Title: The effectiveness of a 12 month physical activity promotion
intervention in members of An Garda Siochana in selected Garda
Stations.**

By

Sandra Gillick-Nevin

**A Thesis submitted in Fulfilment of the requirements for the Masters
of Arts Degree in Recreation and Leisure.**

Waterford Institute of Technology

Research Supervisor: Dr. Maria Murphy-Griffin BA. MSc. Ph.D.

Submitted to WIT

June 2007

Declaration

I declare this thesis to represent my own work.

Sandra Gillick-Nevin

June 2007.

Acknowledgements

It would be impossible to thank all those who have assisted me at so many levels in the preparation of this work. Many people gave freely of their time, answering questions, giving support and keeping me focused.

Particular thanks is due to all the Gardai that took part in my study, and those that help facilitate the study. Special thanks to Ms. June Bolger in the HSE, who when approached was very interested in this initiative. So much so, the initiative had an input from the HSE. The guest speakers added greatly to the intervention. Thank-you to Mr. Barry Lambe, Ms. ElMary Purlil, Mr. Stewart Higgins and Mr. John Bannon for their time and interesting presentations.

A special thanks to the following for their time, patience and endless support:

My research supervisor, Dr. Maria Murphy-Griffen. As a keen marathon runner, I felt at times that I could only get myself to 16 miles, where she picked me up and brought me to the finish line.

My statistical advisor, Willie Ryan, who helped make things look a bit easier.

My husband Johnny who keeps me sane, and my children Jack and Molly who remind me what life is all about.

Behind every woman is a kind, caring, and supportive mother. To you mam, I owe a lot, and I hope you know how great you are.

My family and friends who think I am a little bit mad, thank-you for your patience and constant advice.

Title: The effectiveness of a 12 month physical activity promotion intervention in members of An Garda Síochána in selected Garda stations.

Name: Sandra Gillick- Nevin

Abstract

The study examined the effects of promoting physical activity in the workplace, in An Garda Síochána. 100 questionnaires were sent out to each of the participating Garda stations. All participants filled out a physical activity questionnaire followed by a fitness screening at pre and post intervention, 12 months apart. Specific objectives of the study were to examine the effects of physical activity promotion on: a) stage of readiness to participate in physical activity (Stage of Change) b) amount/frequency of physical activity undertaken, pre and post intervention and c) fitness levels pre and post intervention.

There were three levels of intervention. The control group received no intervention (NI); an information only group (IO) received literature on a regular basis displayed on a dedicated bulletin board; and a targeted and tailored intervention (TT) received the same as the IO intervention and in addition had specific stage of change literature, guest speakers, targeted newsletters, medical checks and motivational interviewing/ goal setting.

Results:

The significance of association in non parametric tests (chi square tests on stage of change and physical activity frequencies) between pre and post intervention shows there is a significant association according to the type of intervention applied. There was a progression in participant's stage of change. At post test there was an increase of n=10 (8%) of those in the active stages (action/maintenance). 48% of the group were regularly physically active at post test and the amount of people increasing their frequency of physical activity from once to three times weekly rose from n=12 (26%) to n=20 (93.5%) at post test. In the parametric tests significant T tests on fitness scores are highlighted, which shows an association between pre and post intervention in a number of tests. This was seen in body weight, body composition, strength and flexibility scores. The reliability of the significant parametric test is supported by the significant association in the non parametric test. Therefore in conclusion for the

sample subjects of the study it could be suggested that physical activity frequency benefits from greater intervention (TT). The benefits for fitness outcomes are more complex. They may be affected by gender and there is not strong evidence to show that they depended on the type of intervention applied.

Keywords: *Physical Activity Promotion, Stage of Change, Physical Activity in An Garda Siochana, Physical Fitness.*

Table of Contents

	Page No.
Abstract	
Table of contents	(i)
List of Tables.....	(v)
List of Figures.....	(vi)
List of Appendices.....	
Chapter 1- Introduction	
1.1 Background Information	2
1.2 Training Phases of Student Probationer Gardai	2
1.3 Developments in Occupational Health in An Garda Siochana	3
1.4 Objectives of the study	4
Chapter 2- Review of Literature	
2.1 Health Benefits of Physical Activity	8
2.2 Physical Activity Recommendations for Health	10
2.3 Physical Activity Participation in An Garda Siochana	12
2.4 The cost effectiveness of promoting physical activity to employees to reduce absenteeism.	14
2.5 Other variables affecting the participation of Gardai in physical activity	18
2.5.1 Stress	19
2.5.2 Diet	19
2.5.3 Alcohol	19
2.5.4 Behaviour Change Theories	20
2.6 The Transtheoretical Model (TTM)	22
2.7 Stages of Change	23
2.8 Application of the Stage of Change Model	25
2.9 Stage Appropriate Materials	29
2.10 Limitations of the TTM	30
2.11 What is an Intervention?	32
2.12 Community Approaches to Interventions	32

2.13	Worksite Physical Activity/Health Promotion	35
2.13.1	The Benefits of the workplace as a site for promotion	36
2.14	Randomised lifestyle interventions using the TTM for physical activity promotion.	38
2.15	Physical Activity Promotion in Ireland	42
2.16	Seven-Day Recall of Physical Activity	44
2.17	Factors effecting Physical Activity Exercise Programmes using the TTM.	46
2.17.1	Adherence Levels	46
2.17.2	Barriers to Exercise	47
2.17.3	Relapse Prevention	47
2.17.4	Motivational Interviewing	48
2.18	Conclusion	48
2.19	Rationale for Study	49
2.20	Research Questions	50

Chapter 3- Methodology

3.1	Introduction	53
3.2	Recruitment process	53
3.3	Sample Chosen	54
3.4	Research Design	55
3.4.1	Intervention Types	55
3.4.2	Initiation of Physical Activity Promotion Initiative within An Garda Siochana.	57
3.4.3	Time-Table and Content of Physical Activity Promotion Intervention	58
3.5	Instrumentation	62
3.5.1	Stage of Change questionnaire	63
3.5.2	7D-Par	63
3.6	Statistical methods used	64

Chapter 4-Analysis of Results

4.1 .Sample	66
4.2 Stage of change	66
4.3 Physical activity participation	70
4.4 Fitness screening	74
4.5 Attitudes towards physical activity	76
4.6 Minutes of physical activity	77
4.7 Individual case studies	79

Chapter 5- Discussion of Results

Introduction	86
5.1 Limitations to this study	87
5.1.1 The worried well	87
5.1.2 Volunteering for the study	88
5.1.3 Intervention environment	88
5.1.4 Measuring tools	88
5.1.5 Work rosters	89
5.2 The impact of the intervention types.	89
5.3 Stage of change	92
5.4 Physical activity participation	95
5.5 Pre and post fitness screening results	97
5.6 Attitudes to physical activity participation	98
5.6.1 Provision of initiatives	98
5.6.2 Health concerns	99
5.6.3 Motives and barriers influencing exercise participation	99
5.6.4 Programme effectiveness	100
5.6.5 Coping strategies	101
5.6.6 Measuring tools for investigation	101

Chapter 6- Conclusions and Recommendations

Introduction	104
6.1 Response to intervention	104
6.2 Implementing the research	105
6.3 Main findings of study	106
6.3.1 Stage of Change	106
6.3.2 Frequency of physical activity and fitness test results.	107
6.4 Management support	108
6.5 Motives and barriers influencing participation in physical activity	108
6.6 Recommendations	109
6.6.1 How physical activity could be promoted to members of An Garda Siochana	110
6.6.2 How Management can support the promotion of physical activity promotion	110
6.6.3 Recommendations of further study on the physical activity behaviour of members of An Garda Siochana.	112

Bibliography

Appendices

List of Tables

	Page No.
Table 1: Training Phases of a Student Probationer Garda	3
Table 2: Community approaches to interventions (King 1991)	33
Table 3: Garda Stations in the Physical Activity Promotion Intervention	56
Table 4: Content and Characteristics of Intervention Type and Materials Used.	58
Table 5: Time-Table of Physical Activity Promotion Intervention	60
Table 6: The Sample	66
Table 7: Stage of Change Pre to Stage of Change Post	67
Table 8: Stage of Change Pre to Post in the three intervention groups (TT, IO, NI)	67
Table 9: The Stage of change progression of participants at pre and post test.	68
Table 10: Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups combined.	70
Table 11: Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups.	71
Table 12.: Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups combined.	72
Table 13: Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups.	73

Table 14: Participant's fitness test scores association with the three intervention groups combined.	74
Table 15: Mean Fitness test scores for males and females at pre and post test	75
Table 16: Mean Fitness test scores according to groups	75
Table 17: Motives for and barriers preventing physical activity participation	76
Table 18: Minutes of physical activity participation at pre and post test.	77
Table 19: Case Study-Participant A.	79
Table 20: Case Study-Participant B	80
Table 21: Case Study- Participant C	81
Table 22: Case Study- Participant D	82

List of Figures

	Page No
Figure 1: Stage of change at pre and post test	66
Figure 2: % of participants physically active at pre and post intervention	70
Figure 3: Participant's fitness screening results at pre test and post test.	74

List of Appendices

Appendix 1: Physical Activity Questionnaire/ 7 Day Recall of Physical Activity.

Appendix 2: Physical Activity Readiness Questionnaire (Par Q).

Appendix 3: Fitness Screening Sheets.

Appendix 4: Jumpstart 2004- Time Management

Get a Life: Get Active

Focus on Fitness

Get a Life: Get Active Handbook.

A Handy Guide to Physical Activity for a Healthier Heart

Appendix 5 Jump-Start to Health: Stage-Matched Manuals;

Book 1. “Do I need this?.

Book 2. “Try it you’ll like it”

Book 3. “I’m on my way”.

Book 4. “Keep it going”.

Book 5. “I wont stop now”

Appendix 6. Goal setting/ Fit check

Appendix 7. Jumpstart Newsletters No 1 2 &3.

Physical Training Programme

10Km Training Programme

Fitech Training Information Sheets

Weight Management Information Sheet

Flexibility Information Sheet.

Nutrition for Sport

Age & Opportunity- Physical Activity

Appendix 8.

- “What’s your Portion- Size Matters”
- Diet and Nutrition Presentation by Dietician Ms. ElMary Purtill
- Back care and Healthy Posture Presentation by Physiotherapist Mr. Stewart Higgins
- Physical Activity presentation- by Barry Lambe, Physical Activity Co-Ordinator with the Health Promotion Services.
- Blood Pressure- Information Sheet.
- Presentation on physical activity and stress management by counsellor. Mr. John Bannon.

Appendix 9. Walk/Jog/Cycle around Ireland in 9 weeks.

8 Weeks to Christmas Weight Loss Challenge.

Draw for participants who completed challenge for T-shirts, gear bags.

Appendix 10. Newspaper Clippings for Bulletin Board

Eat your way to fitness (Thompson 2003)

Exercising the right to health in the workplace (Healy 2004)

Getting in Shape for the future (Thompson 2003).

Join walking Challenge and feel miles better (O’Sullivan 2004)

Taking the path to better health (The Irish Times 2005)

Working out why you are overweight is first exercise.(Mee 2004)

Walk your way towards a healthier, fitter and slimmer you

(Shaughnessy 2004)

Fit and free by cycling (Thompson 2005)

Health & Well-Being- Ireland 2010 (Larkin 2006)

An active interest in your work (Larkin 2006)

The changing face of the GP’s surgery (O’Morain 2004)

The Walking bus-travel in Style (Newman 2004)

My Kind of exercise (Weston 2004,2005 & 2006)

Staying Young (Mee 2004)

Food for thought- A special investigation (O’Sullivan 2005)

Smiling your way to fitness (Healy 2005).

Chapter 1

Introduction

1.1 Background Information

The Garda Code (1995) sets out the mission of An Garda Siochana, to achieve the highest attainable level of: Personal Protection, Community Commitment and State Security. The mission framework comprises of the following:

Purpose: to help deliver a continuously improving and new service, which is respected by staff and the community they serve;

Values: aiming towards a service that is caring, interpersonal, responsive, and protects all human rights;

Strategy: aimed towards policing excellence where the Gardai are better skilled, motivated, and equipped to deliver new policing services and value for money;

Corporate behaviour standards: develop a climate of openness, co-operation and improvement. The guiding principles of the mission of An Garda Siochana ensure that the Gardai should carry out their functions with integrity, fairness, efficiently and effectively, and in a way that reflects local need and obtains the best value for money.

The researcher has been a P.E Teacher in the Physical Education department in the Garda Training College, Templemore, Co. Tipperary for the past seven years. At the Garda College Student training takes place over a period of two years, comprising of phases in the College and phases outside in Garda Stations (Phase 1, II, III, and IV).

1.2 Training Phases of a Student Probationer Garda

Each candidate must pass a pre-entry Physical Competency Test (PCT) before successful entry to the training programme. This takes place after a medical screening. The PCT is a job related test that includes three circuits of job related skills i.e. jumping over a gate, dragging a manikin, lifting a tyre, weaving in through cones, and a short sprint. This is followed by the Push/Pull machine, which is an isokinetic machine that measures the peak force and average force a candidate can exert over a

20 second period. Thereafter physical testing takes place at the end of phases one and three. These tests are reflective of the physical programme the students undergo at student training. These tests include Police Self Defence, First Aid, Swimming, and Life-Saving, where students must achieve levels of competency.

Table 1: Training Phases of a Student Probationer Garda

Phase	Location	Duration
1	Garda College	22 weeks
11	Training Station	24 weeks
111	Garda College	12 weeks
1V	Permanent Station	36 weeks
V	Garda College	4 weeks

At phase 1 and 111, each student must pass the physical fitness test in order to proceed to the next phase of training. After two years training each member who is successful in all disciplines of training and performance is a graduated member of An Garda Siochana, with a Primary BA Degree in Policing. The career of a member will span thirty years, without any form of physical assessment. It is largely left therefore to each individual to maintain his or her own level of fitness.

1.3 Developments in Occupational Health in An Garda Siochana

Currently there is a working group set up at Human Resource Management (HRM) in An Garda Siochana to examine Occupational Health structures/services in the organisation. Their initial recommendations propose a new health structure for An Garda Siochana, where Human Resource Management will operate a National Welfare Committee and National Safety Committee comprising of Occupational Health Service, Employee Assistance Service and Risk Management Unit. The experience and recommendations proposed by the physical education health and safety department in the Garda Training College Templemore would act as a support to the Chief Medical Officer. This would entail the development of a Health and Fitness programme/ policy tailored to meet the needs of a modern policing service.

Preliminary recommendations of the steering committee identify the need for awareness programmes to support Gardai to take responsibility for their own health and well-being. A restructuring of the Health/Fitness screening programme is required to address in particular if a member is suitable to seek overseas duty/promotion or other job related opportunities. Currently there is no defined policy of health and fitness for members of An Garda Síochána following their two years training period. This working group aims to follow the example set by the Royal Canadian Mounted Police (R.C.M.P), New York Police Dept (N.Y.P.D), New South Wales Police Australia (N.S.W.P), and the Irish Defence Forces (PDF).

Many members can find themselves losing any fitness gained during training. This loss of physical fitness can be on a temporary basis depending on work demands, or can be a complete loss in physical fitness and physical activity participation. Gardai often become unable to participate in, or disinterested in physical activity. It is this dilemma that inspired the author to undertake some research into the area of physical activity promotion, in particular the effectiveness of promoting physical activity in the workplace. Currently there is no research available in Ireland in relation to this topic in An Garda Síochána.

1.4 Objectives of the study

Aim To Examine whether a stages of change-based, targeted and tailored intervention was more effective at increasing frequency of exercise, stage of change for exercise and fitness levels than an information only intervention, or no intervention, over a 12 month period.

Objectives:

- (A) To examine if a physical activity promotion intervention would result in a change in participant's motivational readiness to become more physically active. Specifically this would be observed by progressing one or more stages in the TTM/stage of change model from pre to post intervention.

- (B) To examine if a physical activity promotion intervention would result in a significant increase in the weekly amount/frequency of physical activity from pre to post intervention at statistical significance level $p \leq 0.05$.
- (C) To examine if a physical activity promotion intervention would result in a significant increase in physical fitness levels, using the following tests: Cardiovascular fitness using the 6-minute bike test, sit and reach test to measure flexibility, grip strength to measure muscular strength, from pre to post intervention at a statistical significance level $p \leq 0.05$.

Chapter 2

Review of Literature

“We enjoy one of the most luxurious lifestyles on earth
Our food is plentiful. Our work is automated. Our
leisure is effortless. And it’s killing us”.
(Newman 2004)

Introduction

It appears from most of the literature and anecdotal observations of society at large that a lot of people do not take enough physical activity to derive health benefits. The problem is multi-faceted and has become a major health issue, particularly in the western world. Intervention is necessary to address this major epidemiological problem.

2.1 Health Benefits of Physical Activity.

The health benefits of exercise are well documented and researched, and at this stage it is accepted that people of all ages can enhance their health by incorporating a moderate level of physical activity into their daily lives. Lee et al., (1997) carried out a review of all the major epidemiological studies that have taken place over the last 50 years, and found that there is overwhelming evidence in support of the promotion of physical activity in order to prevent premature mortality. Regular exercise is significantly associated with positive changes in risk factors for heart disease and may also provide protective benefits for non-insulin dependant diabetes mellitus, obesity, colon cancer in men, breast cancer and certain reproductive cancers in women, and osteoporosis among post-menopausal women.

Exercise also offers psychological benefits including improvements in anxiety, depression and self-esteem among non-clinical and clinical samples and in community-based interventions (US Department of Health and Human Services, (1996), Ainsworth et al., (1994), Bouchard (1994), Blair et al., (2001). It was also suggested by Pate et al., (1995) that there is a correlation between sedentary lifestyles and an increase in mortality rates.

A report from the American College of Sports Medicine (ACSM 1995) identifies the most common health risks affecting people: excess stress, high blood pressure, cigarette smoking, back injuries, being overweight, alcohol abuse, high blood cholesterol, drug abuse, depression and mental health problems. Physical activity was not listed. However physical activity can positively impact on all of these conditions.

If increased physical activity can help to decrease the onset of some diseases then physical activity programmes are imperative in the attempt to combat growing trends. McGinnis et al., (2002) identifies the five domains of health as: genetics, social circumstance, environmental conditions, medical care and behavioural choices. Of the five domains, behavioural choices represent the strongest influence on health in the United States, accounting for approximately 40-50% of preventable deaths. Behavioural choices include for example: choices relating to food consumption and physical activity levels, and how people cope with stress. (McGinnis 2002) McGinnis (2002) identifies further shifts in the health profile of populations, which are burdening the health care systems. These trends need to be considered for the future. Some of these trends include the following:

- Dramatic increase in the rate of people who are overweight and obese.
- Increase in insufficient physical activity for health benefit
- Emergence of type 2 diabetes (adult-onset) among children and adolescents
- Projected global epidemic of diabetes reaching 300 million diagnosed cases by 2025
- Stress and mental health emerge as some of the strongest cost drivers in health care

In Ireland the Centre for Health Promotion Studies and the Health Promotion Unit produced the SLÁN Report in 1999 and revised this report in 2003. These reports found that 40% of males and 25% of females were in the overweight category, with 11% of males and 9% of females obese. In 2003 these figures had risen, with 42 % of males and 27% of females overweight and obesity levels rising to 14% for males and 12% of females, showing signs of “creeping obesity” in Irish society. More and more people therefore are at increased risk for the onset of type 2 diabetes. Friel et

al., 2003 highlight the challenge that lies ahead where this in turn will impact on the number of people being diagnosed with hypertension, obesity, heart disease, cancer and others.

2.2 Physical Activity Recommendations for Health

In 1990 the American College of Sports Medicine (ACSM), set guidelines to achieve fitness benefits. It was necessary to exercise for 20 minutes or more at 60-80% of maximum heart rate for 3 or more days per week. Since then many studies have been carried out to identify the target physical activity level for the promotion of health. These studies were carried out by the ACSM (1995), Health Education Board of Scotland (1997), and Healthy People 2010 (U.S. DHHS, 2000). There has been a shift in thinking in relation to this recommendation. The Irish Heart Foundation (2001) accepts now that every adult should take 30 minutes or more of moderate physical activity on most days of the week to derive health benefits. One 3.2km walk daily is a specific way to meet the new standard. Three periods of vigorous activity, lasting at least 20 minutes are still recommended for fitness gains. As suggested by Pate et al., (1995), the fact that this activity can be undertaken in one single exercise session or accumulated in multiple bouts of 10 minutes is flexible and encouraging. This leaves scope for accumulating bouts of planned or unplanned activity that are part of active living. Ebisu (1985) supported the view that splitting exercise sessions could improve fitness, and greater improvements in HDL cholesterol than one or two longer sessions.

DeBusk (1990), revealed also that intermittent exercise in a day produced similar improvements in health-related outcomes to one longer bout. Jakicic (1995) examined how both intermittent (bouts of 10 minutes) and continuous physical activity can improve fitness, with increased weight loss and adherence in the intermittent group. Jakicic & Wing (1997) substantiates that intermittent exercise can improve exercise adherence. These findings have resulted in health organisations like ACSM (1995) and The Irish Heart Foundation (2001) recommending the accumulation of at least 30 minutes of at least moderate-intensity physical activity on most, preferably all, days of the week to derive health benefits.

Examples of moderate-intensity physical activity include, taking one 30-minute walk each day for five days of the week, taking one 30 minute walk on each weekend day and three 10 minute walks on three weekdays, doing three 10-minute bouts of activity on at least five days of the week, comprising of digging the garden, playing with children, walking to pay a bill or shopping. Murphy and Hardman's study in (1998), added further for intermittent approaches, when promoting physical activity. Their walking group increased VO₂Max and reduced Body Mass Index (BMI), which is a height by weight calculation of the body mass, and waist circumference. King (1995), carried out a long- term trial demonstrating that exercise does not have to take place in a fitness facility, and thus encouraged home based activity to be physically active.

Physical inactivity has been upgraded to the status of a major risk factor for coronary heart disease. Franke and Anderson (1994) studied the relationship between physical activity and risk factors for cardiovascular disease (CVD) among law enforcement officers. The purpose of this study was to characterise the CVD risk of law enforcement officers (LEO), and to determine whether the level of either physical exercise or fitness plays a role in mediating this risk. The study suggests that CVD risk increases with LEOs age. In the population at the greatest risk for CVD, i.e. over 48 years old, being physically active is associated with an attenuation of CVD risk. Thus physical activity need not always be initiated early in life to have a positive influence on CVD risk.

In the Irish context, SLÀN (1998) found that 42% of adults (16-75yrs) took some form of regular physical activity, with 21% participating in no physical activity at all in a typical week. The SLÀN Survey (1998) also showed that less than 30% of full-time employees exercise regularly, and more women (45%) than men take no exercise at all. In 2003 these figures had risen, with 28% of adult respondents reported doing no physical exercise at all (30% men and 25% women). This figure represents an increase of 7% from the previous survey in 1998. This clearly illustrates the challenge for all physical activity promoters in Irish society.

2.3 Physical Activity Participation in An Garda Siochana

“It is important that all members of the service should be physically fit and proficient in the physical skills necessary both to perform their duties and to defend themselves against attack. The object of the physical fitness course is to educate/train students not only to become fit but also to retain the physical fitness and skills in the years ahead” (An Garda Siochana Code Chapter 9.15).

This is the single reference to the importance of physical activity and the maintenance of fitness in the Garda Code, which highlights the lack of policy on physical fitness in the organisation. There is no reference to physical activity and recommended levels for members after they graduate from the two year training programme in the Garda Training College in Templemore. It is difficult to quantify law enforcement tasks due to the erratic nature of emergency situations. Police duties vary from routine paperwork and sitting in a patrol car, to pursuing suspects, physical arrests, manual handling of criminals, lifting/dragging objects/bodies, climbing walls/fences/ stairs and defence from physical assault. All of these skills are occupational skills required by members of An Garda Siochana and are required erratically with little warning of the skill being required. Elements of fitness required are aerobic and anaerobic endurance coupled with power and strength. Gardai may be required to suddenly perform at maximal physical capacity in life threatening situations.

Gettman (1998) recommends that law enforcement officers should have what could be described as a unique fitness and exercise requirement in comparison to other occupational groups. Gardai need to be ready both physically and mentally to perform in any emergency situation. Because of the high risk attached to these duties, it would be reasonable to assume that Gardai should have above average physical capacities in order for them to carry out their duties safely and effectively. Gettman (1998) also observed that in fact most of a Garda's working time is spent doing sedentary tasks.

He further states that police officers develop an unhealthy, inactive, sedentary lifestyle, which minimised physical readiness and maximised health risks.

Connaughton (2000), purposes that if law enforcement officers are physically fit, their abilities to perform are enhanced, they are less likely to experience injury, disability or even death, and they project a positive image that instils confidence in the people they serve. Connaughton (2000) highlights a case in New York, U.S.A. where an attending police officer, by his unfitness to perform on duty was seen to be negligent in the performance of his duty (e.g. unable to perform foot pursuit-physical build, which contributed to his inability to discharge his weapon properly.)

Sharky (1997) suggested that physical adaptation of the worker to the specific job was necessary to achieve optimal performance.

Currently at Student Garda training level in the college, the police self defence course is using the new retractable baton. The retractable baton training system is physically demanding. The Armament Systems and Procedures (ASP) training system endorses the importance of aerobic fitness for officers and recommends that officers need to run one mile every day to enable them to be fit enough to engage in a three minute struggle with an assailant on duty.

Any research carried out in the Irish policing context on participation of members in physical activity, has on the most part been left to student Gardai undertaking their dissertation in their final phase of training. Recent studies were undertaken in various divisions from Tipperary, Dublin Metropolitan Region, (DMR south), Westmeath, Irishtown, Donnybrook, DMR West, and H Districts (Santry, Ballymun and Whitehall Garda Stations). The majority of these studies respondents agreed on the health benefits of regular exercise, and thought it was important that Gardai participate in physical activity. This was concurrent with the studies carried out by Coone (1999), Tully (1999), Heaney (2000), Kirby (2000) & White (2003). In all of these studies the vast majority of respondents only exercised between one and three times weekly, with only between 6-15% participating in regular physical activity i.e. 30 minutes of physical activity on most days of the week

The most comprehensive study was that of Garda Browne (2001). The report on participation rates in sport was published, arising from a request by Deputy Commissioner Strategic and Resource Management to investigate the extent of fall-off in Gardai's participation in sport and the reasons for this fall-off. The survey consisted of 502 Gardai who had graduated five years previous. The main reasons found for not participating in sport, were lack of motivation to sustain effort and also time. Browne reported that 32% were not exercising regularly. Only over a third of respondents agreed that work supervisors facilitated participation in physical activity.

2.4 The cost effectiveness of promoting physical activity to employees to reduce absenteeism.

A dearth of research exists on the importance of maintaining physical fitness in law enforcement officers, especially in Ireland. The physical skills required by members of An Garda Síochána are varied and diverse. An Garda Síochána have no policy of fitness levels desired of its members. Further research is needed in order to match certain tasks and training programmes, e.g. training programmes devised to improve officer's ability to chase criminals, lift bodies and handle violent criminals. Overall the main reason for the increase in absences was an ageing workforce. An older workforce brings with it age-related illness such as heart disease and cancer. There is now clear evidence, highlighted by the International Union for Health Promotion and Education (2000) that comprehensive approaches to health promotion in the workplace, including activities that focus on the individual, and those addressing the work environment are important to the overall well being of employees.

A recent survey by IBEC (2004), the business and employers organisation, has shown that absence in Irish workplaces is estimated to cost businesses about 5 billion euros a year. According to the report, 14 million workdays are lost due to absence, i.e. 7.8 days per person employed. The main cause of short-term absence for both males and females is minor illness. However, over 25% of the 557 organisations surveyed estimated that many male absences were not due to genuine ill health. Chenoweth (1999) estimates that 95% of the American health care budget goes toward medical

care, whereas only 5% goes on preventative measures. He estimates that half of unscheduled absences are predominately due to minor ailments. Therefore there is merit in promoting health and well-being, and particularly initiatives brought to the workplace.

Shephard (1990), Blair et al. (1986b) and Gettman (1998) found in their worksite studies that there was an indirect positive relationship between fitness levels and absenteeism. These studies also implied that increased fitness levels could help reduce health care costs. Shephard (1992) highlighted other potential benefits related to the improved wellness and fitness of employees which included reduced disability and life insurance rates, reduced workers compensation claims, and lower turnover of employees. Steinhardt et al. (1991) also found that increased exercise and participation in lifestyle programmes were related to lower medical care claims.

Steinhardt et al. (1991) also noted that people who become more aware of their health initially may incur health care claims as a preventative measure. These people could be categorised as the “worried well”. Their study also concluded that absenteeism levels of physically active law enforcement officers appear to be lower than absenteeism levels of sedentary law enforcement officers.

Studies demonstrate that comprehensive worksite health and physical activity promotion programs can lower healthcare costs, decrease absenteeism, and improve performance and productivity. Such studies reported by Wellness Councils of America (1995), included a study undertaken by The Bank of America, who conducted a health promotion programme, and found insurance claims reduced an average of \$164 per year for the group while the control group increased \$15. Blair (1996) reported how Pacific Bell’s “Fitworks” participants claimed \$300 less in medical and insurance claims per participant, which were savings of \$700,000 per annum.

Woolfenden (1996) identified organisational and personal factors that are associated with sickness absence among police officers in Manchester, U.K. He suggested that absenteeism could be controlled by the introduction of physical fitness programmes and programmes to increase the awareness of healthy lifestyles during and after

police training. He demonstrated that some absences are avoidable and that there are benefits to be gained from investigating this further in each organisation. In a study carried out by Harrell et al (1993) law enforcement officers in North Carolina, USA, took part in a 12-week aerobic exercise and weight training programme in order to increase fitness levels. The study aimed to reduce the risk of cardiovascular disease, which indirectly impacts on levels of absenteeism. There were significant improvements found in cardiovascular fitness, strength, muscular endurance, flexibility and body composition as a result of participating in the programme. Harrell and his colleagues concluded that this programme had advantages for law enforcement officers. Most importantly the cardiovascular fitness programme identified the high-risk people easily and early. Steinhardt et al (1991a) supported this belief also advocating a health promotion programme to promote an active lifestyle.

Lost productivity, increased health care costs, and a diminished quality of life were associated with health problems. Crucially the prevalence of cardiovascular disease is higher among police officers than among the general population as highlighted by Sparrow (1983) and Williams et al. (1987). Superko et al.,(1998) investigated the effects of a mandatory health screening and physical maintenance programme for law enforcement officers. Their results suggested that a validated, job-related physical performance test, in conjunction with a health assessment and training programme, was capable of producing significant improvements in certain health domains. These included blood pressure, resting heart rate, fitness scores and coronary heart disease. This information suggests that there may be potential economic benefits to be gained from a health and physical fitness programme.

In another study designed to assess the benefits of a physical activity programme, Williams et al., (1987) assessed the risk factors associated with the development of Atherosclerotic Heart Disease (AHD) and evaluated the relationship of fitness to the risk. The severity of the AHD risk in male police officers was investigated. They also tried to determine whether exercise capacity and frequency of physical activity were associated with decreased severity of AHD. Results showed that police officers had a high prevalence of risk factors for AHD. They also revealed that increased

fitness was associated with reduced risk. These significant findings re-enforced the finding that the prevalence of AHD in police officers is somewhat higher than in the general population.

With reference to the predicted return on investment, Aldana (2001), reported on the systematic reviews of studies that reported benefit-to-cost ratios. Their results estimate an average health care cost saving of \$3.48 for every dollar invested. An average saving due to absenteeism reduction of \$5.48 for every dollar invested was also estimated. In the same report, Coca Cola reported a reduction in health care claims with an exercise program alone, saving \$500 per employee per year for the employees, of which 60% of the workforce joined their Health-Works fitness programme. A study carried out by Thompson (1990), cited in Blair (1996) for Prudential Insurance Company reported that the company's major medical costs dropped from \$547 to \$312 for each participant in its wellness program. Thompson (1990), cited in Blair (1996), also found that absenteeism is impacted by employer health promotion programs. Pacific Bell's Fitworks program decreased absent days by 0.8% to save \$200 million in one year. Bertera (1990) carried out a study in DuPont Corporation examining the side effects of its health promotion on absences among workers. It reported a 14% decline in disability days. There was a total of 11,726 fewer net disability days taken. It emerged through these studies that programs reported improvement in job attitude, work performance, energy level and morale among participants.

Research carried out by Oldenhove (1998) cited in Aldana (2001) in Australia and New Zealand, suggested that a 10% increase in physical activity could save up to \$600 million in health care costs per year. This increase in physical activity could then save up to 300 lives per year, and with everyone sufficiently active there is a potential to save five times this number of lives. Aldana (2001) found it interesting to note that more people are physically inactive than the numbers who smoke or who are obese, but more money is put into the latter.

2.5 Other Variables affecting Gardai's participation in physical activity.

In general, there are numerous reasons for non-participation in regular physical activity. Gardai have numerous variables that effect their willingness or ability to be physically active. They are beyond the scope of this study but need to be noted.

Longer working days, increased commuting time and increased stress in jobs see people adapting to sedentary leisure time activities such as watching TV/playing play-station. There is a certain expectation with regards to work capacity in An Garda Siochana, where members could have to work erratic hours during stressful and difficult periods e.g. investigating a murder, hostage or public order situation. Being fit for duty comes into play here.

Sharkey (1997) set out a definition of work capacity

“as the ability to accomplish production goals without undue fatigue and without becoming a hazard to yourself and to you co-workers. It is the product of a number of factors, including natural endowment, skill, nutrition, aerobic and muscular fitness, intelligence, experience, acclimatisation and lean body weight. Even skill and experience do not ensure work output. There are numerous factors which affect our job without adding ourselves as another hazard to the endless list”.

The life of a member of An Garda Siochana revolves around shift work. New recruits to the force may find this change in lifestyle difficult. This adjustment along with the sense of power after receiving your badge and getting used to being referred to as a Garda can be very daunting. Anecdotally you can observe a solidarity within An Garda Siochana, which is uncanny, and Gardai tend to socialise together as a result of similar working hour and experiences. There is a culture in existence which acts as a safety net or support system for each other. However certain elements could act as hazards towards the health and fitness of Gardai. The following factors affect the health and fitness of individuals.

2.5.1 Stress

Stress can have many effects on a person. Gardai may turn to food or alcohol therefore leading to weight gain or the opposite may occur a person may lose their appetite and therefore lose weight. Both factors may have detrimental effects on an individual's health. Certain critical incidents within the job may also cause stress for certain people. Critical Incident Stress Management is a form of "first aid". This can help reduce incidence of sick leave, faster return of work, smaller medical compensation claims and reduced legal costs (Everly 2000).

2.5.2 Diet

Due to the nature of the job members mealtimes vary and a routine may be difficult to follow. The work roster has quick changeovers where members finish at 10pm and start again for 6am the following morning. Shift work puts people's bodies in conflict with their natural circadian cycle. Therefore eating habits are altered by the shift work and workers can often experience higher rates of gastrointestinal problems such as constipation, diarrhoea, indigestion or stomach ulcers, altered appetite, and a gain or loss in body weight. These issues occur for a number of reasons: eating in a rush, eating poorly during the day and then over-eating on the night shift, a time when the digestive processes are slower, consuming too much caffeine to stay alert, and a tendency to consume more high-fat foods (Schnurr 2004).

2.5.3 Alcohol

Alcohol and its consumption levels are not only a huge part of the culture within An Garda Síochána but also within Irish society. Gardai tend to socialise together and going for a few drinks forms a huge part of this activity. A Report in Queensland (1997) by the New South Wales Workplace Health and Safety Authority, identified how alcohol has a large influence on police officers within the job, and excessive consumption could lead to poor health, lack of job interest, poor job productivity and low self esteem and confidence.

2.5.4 Behaviour Change Theories

Many techniques have been developed for intervening with physical activity behaviours, some of which are based on theoretical models. While some of these models show more promise than others, no model seems to exist that is sufficient to thoroughly explain exercise behaviours or how best to intervene. Among the most prominent theories that have received some empirical support in physical activity literature are the theory of reasoned action, health belief model and the decisional theories. Yet studies have generally only found to explain a relatively small percentage of variance in physical activity levels.

(A) Theory of reasoned action, where if a person believes that embarking on a physical activity programme improves health, energy and mood they will consider physical activity.

(B) The Health Belief Model which proposes that people take part in physical activity based on the belief that developing health problems could be due to inactivity. This theory was supported in studies carried out by Magnus (1979), Morris (1990), Paffenbarger (1993) and Blair (1995).

(C). Behaviour Modification and Learning Theories. Skinner (1953) advocated the learning theories, which have been widely used and applied to physical activity behaviour change. This theory suggests that a person is more likely to be physically active when the right environment is in place, and where the experience is pleasurable and positive.

(D) Theory of Protection Motivation. This model also involves health decision – making, and is similar to the health belief model except that it adds the concept of self-efficacy. Self-efficacy is a cognitive confidence a person has in their ability to successfully perform a particular behaviour. (Sallis et al., 1999). Bandura (1977) maintains that individuals with high confidence in their ability for a given task will be more likely to engage in that situation-specific task. It is the self-belief in our capacity to control ourselves and our environment, which will influence our actions and the success of these actions.

(E)The Decisional Balance Theory /Behavioural Choice Theory. Measuring up the pros and cons, the benefits and barriers of exercise participation, can help people make the decision to exercise or not. Janis & Mann (1977) attempted to explain how

people decide whether to engage in a particular behaviour or not. Individuals with a positive decisional balance, i.e. who see more benefits to physical activity, or who see more value in the benefits of physical activity are more likely to participate in physical activity. Epstein (1998) indicated that choice of an alternative depends on the behavioural cost. The choice of being sedentary is very responsive to cost, and reducing the accessibility of sedentary behaviours or increasing the cost of being sedentary are both methods for reducing sedentary behaviours.

Lechner & de Vries (1995) studied the determinants of adherence level in an employee fitness program. The determinants measured were attitude, self-efficacy expectation, and social support. The test was carried out on police who intended to start participating in a program. The study found that the indirectly measured self-efficacy was the best predictor for average exercise frequency, followed by attitude. Therefore the author suggests that promotion to improve adherence should focus on how to overcome barriers.

Ory (2002), describes the Behaviour Change Consortium (BCC), approach as intervening at several levels, including community, home, work and the clinic. This is appropriate and relevant to An Garda Síochána, where you have a multi-tiered community. The whole organisation is broken into smaller communities working in Garda stations and districts dispersed around the country. There is a need to offer a multi-behaviour approach to behaviour change by including nutritional advice as an variable with physical activity in interventions. Interventions that include a social-environmental approach are believed to be more sustainable over the long-term.

2.6 The Transtheoretical Model (TTM)

Prochaska & Di Clemente's model (1983) of the stages and process of self-change of smoking has been adopted by those intending to become active. The TTM has been applied to an array of health-related behaviour change interventions. These include exercise, Marcus et al., (1992a), diet and nutrition, Det Vet and De Nooijer (2006), alcohol and substance abuse DiClemente et al., (1991), just to mention a few. It was in the 1990's that the TTM was tested for its applicability for physical activity and exercise. The transtheoretical or stages of change model examines a person's current behaviour with their intention to maintain or change their pattern of behaviour.

Prochaska & Di Clemente et al (1992) conducted a study initially on smokers, and tested the TTM that posits a series of stages through which smokers move as they successfully change their smoking habit. Individuals move through a series of stages as they try to adopt and maintain a new behaviour. They observed that subjects in the earlier process of change may need less intense and more extensive types of programmes to be able to follow them through and move them to action.

Furthermore for early stage smokers, repeated contacts seem essential with feedback that focuses on stage-specific goals.

The four constructs of the TTM are the following: (a) stages of change (SOC), (b) processes of change (POC), (c) self-efficacy (SE), and (d) decisional balance (DB). Two of these constructs, the 5 stages of change and processes of change, are unique to the transtheoretical model. The stage of change explains when people change, whereas the processes of change describe how people change. Their study also found that interventions in health promotion campaigns were ineffective because of their action orientation and not appropriate for 80% of the population. The underlying learning outcome of their intensive study is that interventions will only achieve maximum effectiveness when they are matched to the level of readiness and the unique sociological and psychological characteristics of an individual. Prochaska (1992) generated a rule of thumb for at-risk populations, with estimations that 40% are in pre-contemplation, 40% in contemplation and 20% in preparation. Although there are four constructs to the model, the stages of change is the most identifiable component of the model.

The other components such as the processes used during each stage, self-efficacy, and decision balance have been added to the original model to form a more comprehensive picture of the self-change process. This study will examine the stage of change in isolation to the other constructs. The stage of change models list six discrete stages that individuals might go through in pursuit of change. Change implies progress occurring over time. Of the six stages of change identified in Prochaska's model (1997), five of these stages have been studied within the physical activity domain. Cardinal (1997), Gorley and Gordon (1995), Nigg and Courneya (1998), Marcus (1994). The Transtheoretical Model demonstrates how exercise maintenance is the culmination of movement through stages of change. The theory aims to examine how individuals move through stages of readiness to change their behaviour and interventions should coincide with those stages of readiness.

2.7 Stages of change

Stage 1 (Pre-Contemplation)

Precontemplation is a stage where individuals do no physical activity and do not intend to start in the next 6 months. Many people at this stage are unaware of their problems. DiClemente (1992) identified that it isn't that they can't see the solution, it is that they can't see the problem. Usually others will see it before they will, so generally they will present themselves because of pressure from others. However it is mindful to note that in some cases individuals may have tried a number of times before and have become apathetic about their inability to change. At this stage Gallagher (2002), recommends an increase in awareness and education is needed and can be given through events such as health fairs/fitness screenings.

Stage 2 (Contemplation)

In the contemplation stage individuals do not participate in physical activity, but intend to start in the next 6 months. Individuals indicate that they are thinking about change but not immediately. People can remain in this stage for a long time, as if knowing where they want to go but are not quite ready to make the changes required.

Contemplators are aware of the pros of physical activity and their benefits, and are also aware of the cons. For programme facilitators it is important to help people to become motivated to make a change in their behaviour with education and advice. This will then empower people to think more about the solution than the problem, and to think more about the future than the past.

Stage 3 (Preparation)

The preparation stage is where individuals participate in some physical activity, but not at levels meeting the ACSM (1995) guidelines. This is the stage where individuals intend to take steps to change, usually within the next thirty days. This is a decision-making stage where individuals combine intention and behaviour. Velicer et al. (1998) suggested that this is the cohort that should be recruited for action-orientated programmes. This is where support is necessary, and clients need help to initiate their programme. Informational support (specific information on topics and behaviour), practical support (resources to satisfy needs) and emotional support, (empathy, monitoring) is imperative.

Stage 4 (Action)

In the action stage individuals participate in regular physical activity but have done so for less than 6 months (e.g. longer than a sports season). Individuals modify their behaviour, experiences and environment in order to overcome their problems and barriers to exercise. These individuals have adopted a new behaviour. This also means that they have made adjustments to their lives to facilitate this change especially to cope with barriers and difficulties that pose themselves when trying to adopt a new routine. At this stage it is important to prevent relapses and clients need help to maintain their exercise program, through offering incentives or buddy programmes. Following a period of six months where there is sustained action the person will progress into the maintenance stage.

Stage 5 (Maintenance)

In maintenance individuals have participated in regular physical activity for 6 months or longer. This is the stage in which people work to prevent relapse and stabilise behaviour changes made. There is a need to continue to make exercise part of a regular lifestyle, and reward systems may be needed to maintain interest. It is not yet known whether a person needs to remain in stage five for a certain amount of time in order to be permanent in this stage and reduce the risk of slipping back. A person in this stage still needs to be motivated and vigilant about their physical activity programme and know what to do if a relapse has occurred.

2.8 Application of the Stage of Change Model

The TTM also incorporates the process of behaviour change, adopted by Marcus in 1992, which are the techniques that people use to try to modify their exercise behaviour.

The 10 processes applied to physical activity include;

5 cognitive processes: consciousness raising, dramatic relief, environmental re-evaluation, self-evaluation, and social liberation.

5 behavioural processes: counter-conditioning, helping relationships, reinforcement management, self-liberation and stimulus control.

Interventions based on this model aim to match the treatment with the individual's stage of readiness for change. A stage-matched exercise promotion intervention for individuals in the early stages of change (pre-contemplation and contemplation) would focus on increasing use of cognitive processes and addresses raising awareness of the benefits of exercise. Materials designed for individuals in the latter stages would focus on the behavioural processes, encouraging individuals to begin exercising and suggesting strategies for maintaining an active lifestyle. The most promising outcomes to date have been found with computer-based programmes and interactive interventions. Marcus (1992), used a stage-matched intervention at the workplace, and found that more employees in the stage-matched group progressed one or more stages over a 3 month intervention.

Marcus (1996a) carried out a study on employee's stages and process of behaviour change. 65% of the surveyed employees participated in little or no exercise. At the 6 month follow-up 32% remained sedentary, despite a change from winter to summer, while 26% moved from pre-contemplation through to action. This study also found that of those that slipped back a stage from time to time, they are more likely to slip back to contemplation as opposed to returning to pre-contemplation. Individuals who may successfully leap over stages such as from contemplation to maintenance are at high risk for relapse. A movement from contemplation to maintenance is recommended over a twelve month period as opposed to over a six month period. This is to encourage more sustainable progress. Dramatic relief was the only cognitive process that changed significantly indicating a strong belief in the health benefits of physical activity. It recommends that interventions tailored specifically to subject's stage of readiness to be active and using specific processes to help in the change process are warranted.

Following a seven- month intervention, Cardinal (1997), suggested from his results that movement from contemplation to preparation might occur more naturally than movement from preparation to action, concluding that deciding to exercise occurs more naturally than beginning to exercise. Bull, Kreuter & Scharff (1999), found that after three interventions which were applied to a group, that of tailored, personalised and general health messages, in promoting Leisure Time Physical Activity (LTA), and physical activities of daily living (PADLs), patients in the tailored group were more likely to increase PADL than the others at follow up, however there was no differences in LTA's. Bull (1999) recommends that to help maximise effectiveness of tailored interventions on physical activity, studies need to identify the social, psychological and environmental variables that are most likely to influence the content of tailored programmes.

Herrick et al., (1996) examined the decisional balance and self-efficacy scores across the five stages of change from a worksite group. Employees at each stage of change possess differences in terms of their pros, cons, and self-efficacy. Wellness programmes therefore need to focus on stage-specific interventions.

Prochaska et al., (1997) maintain that pros and cons are an excellent indicator of an individual's progress from pre-contemplation to contemplation and preparation. At the pre-contemplation stage cons outweigh the pros, and the pros outweigh the cons at the maintenance stage.

Marcus, & Emmons et al., (1998) concluded that stage-specific intervention strategies appear promising for moving participants more quickly from adoption to maintenance of exercise. Mettler (2000) found encouraging results during their physical activity promotion programme, where participant's stages of exercise behaviour underwent overall positive transitions. Mettler also recommends that if a stage of change model is used in adherence intervention programs, the minimum length of physical activity intervention should be at least 6 months. This enables stability in movement through the stages of change. By definition, movement from contemplation to maintenance cannot occur in less than 6 months. Follow-up should then occur at 3 and 6 month intervals, and post-intervention, to determine whether individuals have maintained, advanced or regressed from their final intervention exercise level.

Armstrong & Sallis (1993) supported the use of the TTM in the study of exercise and found that contemplators were more likely to adopt exercise than pre-contemplators, and that self-efficacy at baseline was an important predictor of later exercise behaviour. The existence of sub-stages in the contemplation stage as found by Gorely & Bruce in 2000, represents implications for closely tailoring interventions to the needs of the individual. Gorely & Bruce (2000), emphasise the importance of increasing self-efficacy and the pros of physical activity, and lowering the cons of physical activity as being important in facilitating movement within the contemplation stage, and from contemplation to action/maintenance.

Jordan & Nigg (2000) studied college undergraduates and consistent with the findings of Prochaska et al., (1997), the cons of exercise adoption were higher than the pros in the pre-contemplation stage but reversed positions between the contemplation and preparation stages.

The limitations found in intervention strategies aimed at promoting physical activity are that many of these efforts have been directed at increasing exercise participation in those individuals who are already somewhat active, or are in the process of becoming more active. Programmes are typically developed that attract people who are reasonably motivated or have a history of participation in formal exercise rather than the more sedentary members of the community (King, 1994).

Marcus (1996) also concurs with Dishman (1998), and Janis and Sallis (1993) that although the numerous studies that demonstrated short-term results is positive, little success has been achieved in improving long-term maintenance of exercise behaviour. Population-based interventions such as media-based campaigns, aimed at increasing public's interest in initiating physical activity have been ineffective in reaching large numbers of people, as observed by Marcus et al (1994). Ashworth (1997) poses the alternative hypothesis that stage movements are short-lived and did not lead to behaviour change. Wanzel (1994) reported that generally work-site programmes recruit only about 20% of employees, and this figure drops to 10% after taking into account the dropout rates for physical activity programme3s, i.e. 50%.

Furthermore the employees that were attracted to the programme tend to be people that are already active to some degree. Wanzel (1994) identified this as a drawback to any intervention, because sometimes the people that would benefit from these interventions do not respond, or it is not matched to their current stage of readiness to take part in physical activity. However the fact that there is an interest given to physical activity in the work place can transcend a positive attitude towards physical activity and maybe bring unmotivated employees closer to even contemplating a more active lifestyle.

2.9 Stage Appropriate Materials

Marcus and Forsyth (2003) illustrate relevant topics to be considered for Creating Stage-Appropriate Materials.

Stage 1: Pre-contemplation (Not thinking about change)

Promote benefits of physical activity, information displays, i.e. newsletters and posters. Examine the individual's pro's and con's of physical activity participation and fitness screening.

Stage 2: Contemplation (Thinking about change)

Fitness screening, setting short and long term goals, programme advice to increase activity levels .e.g. the establishment of a lunchtime walking group. This is where the group organise their activity using this guide to getting it started.

Stage 3: Preparation (Doing some physical activity)

This is very much an action –orientated approach. Goal setting, on-going monitoring, develop a walking programme group/programme, advice on how to fit more activity into a busy schedule. Workshop on related topics of interest, e.g. stress management, diet and nutrition, back-care.

Stage 4: Action (Doing enough physical activity)

The person is in a routine and needs support to prevent boredom, and incorporates new initiatives e.g. novel initiatives/activities, charity walks in the area, screening/monitoring, additional activities e.g. cholesterol testing, blood pressure testing, diet and nutrition advice, back-care advice, stress management.

Stage 5: Maintenance (Making physical activity a habit)

Programmes for participants in this stage would include avoiding injury, advice on programme management, planning activities/events e.g. marathon, or trying new activities e.g. yoga, curves gym, step aerobics.

Dishman and Sallis (1994) found that adding incentives for participants in a programme helped the programme to be even more effective. Incentives can be financial, such as additional payment for participation or the employer might organise a group rate with a local sports facility e.g. gym membership or supply passes to classes e.g. curves gym. Prizes such as t-shirts, bags, or scratch cards for all those who participate can be effective and popular.

2.10 Limitations of the TTM

It is important to recognise the shortcomings of adopting this model for exercise participation. Adams and White (2004) identify some potential problems with applying the stages of change in activity promotion. They concluded that using the model raises many issues, but despite these problems, stage-based interventions have shown at least some promising results. Their main arguments are that stage-targeted interventions are not superior to non-staged interventions in inducing longer term behaviour change. The following are the main limitations as observed by their appraisal.

No Long-term effects

Even though the model has reported success in the short term, the progress is not as encouraging long term (over 12 months). The factors as to why this is the case need to be examined. This is closely related to the barriers that are ever present in the lives of individuals. If an intervention is a targeted intervention only, the disadvantage is that targeted information may not always be appropriate for every individual of the identified group at the same time. The message may not address unique needs, interest and concerns of the individual. Therefore it is imperative that the tailored approach is incorporated into the intervention. However you cannot expect long-term effects from short-term interventions. However long term behaviour change does depend on initial short term changes in behaviour, thus evidence in favour of stage targeting.

The Complexity of Behaviour

Physical activity is not a single behaviour, but a complex category of different specific actions. If barriers to physical activity participation are still present this will interfere with the success of the TTM in the intervention. Individuals will weigh up their own pros and cons of physical activity and if the cons outweigh the pros these negative aspects of being physically active may interfere with the individual eventually starting a physical activity programme. People will have different self-efficacy beliefs for different situations. Environmental constraints will influence individual's ability to embark on the physical activity that is being promoted to them. Overcoming barriers is central to individuals behaviour change especially in the preparation stage.

The Validity of Staging Algorithms

At present there appears to be no gold standard algorithm with which to compare the change in individuals exercise behaviour. If the staging tool is unstable, this can leave misinterpretations by the researcher and participants. This can lead to mismatching of participants in stage-based interventions. Most of these algorithm are based on reliable self-assessed behaviour and motivation. Respondents are asked whether they feel they are attaining certain behaviours, and this can lead to misconceptions of personal levels of activity.

Stage progression is not the same as behaviour change

It is very important to highlight the fact that even though individuals may show stage progression this does not necessarily mean that they actually increase their physical activity. It merely shows that they have increased their motivational readiness to change their behaviour. Programmes need to also focus on the actual physical activity undertaken by the individual. This is where the analysis of 7-day recall is important in order to look at actual physical activity levels. When recruiting candidates for physical activity promotion programmes, it is possible that you will not recruit the pre-contemplators and contemplators that would benefit most, and most of your efforts would end up with the "worried well" group of people who are in action and maintenance starting off.

In conclusion for effective longer-term physical activity promotion results longer-lasting interventions may need to go beyond health education, and incorporate environmental change strategies to improve opportunities for physical activity. This is particularly relevant to the Gardai, as there are many environmental factors that interfere with members participating in physical activity. So even if the stage matched intervention has increased their motivational readiness to become more active, influencing factors will impede their intentions, for example access to showers in work, shift-work arrangements and time management

2.11 What is an Intervention?

“An intervention is a targeted idea set to try to influence or modify certain behaviour” (King 1992).

In this context it is a set of targeted activities designed to foster increased physical activity in a population. An intervention will vary according to a number of variables influencing it e.g. environmental setting of the target group. An intervention can be carried out as a stand alone project, or in conjunction with other interventions. Normally interventions take place at four different levels; personal, interpersonal, environmental and societal (King 1995). The majority of interventions have occurred on the personal and interpersonal level (King et al., 1992). Bandura’s theory of behaviour (1977) influences how interventions can attempt to examine behaviour. Interventions which have been tailored and client-centred, appear more successful using this model.

2.12. Community Approaches to Interventions

King (1991) identifies strategies on how to best intervene to promote physical activity, and the need for them to be co-ordinated, sustained and applied to:

- The individual (interpersonal encouragement)
- Group (education)
- Community (social/environmental change).

King (1991) highlights the components of a community approach to intervention, targeting the person, organisation, the environment and public policy. A community is a group of people living/working together in one place sharing the same values and beliefs. Therefore members of An Garda Siochana working together in a station would be considered a community, bound by structures, sanctions and similarities.

Table 2: Community approaches to interventions (King 1991)

Level of Intervention	Channel	Target	Strategy
Personal	Face to face, telephone, mail, self-help	Patients, clients, employees	Information, counsellor support, person monitoring
Interpersonal	Classes	Patients, individuals	Information, group affiliation, family
Organisation	Worksites, schools, neighbourhoods	Employees	Incentives, education, organisation support
Institutional/legislation	Policies	Broad spectrum of population	Standardisation of exercise, incentives, flexible work time, monetary incentives for the development of facilities.

The modern society provides many alternatives to a physically active one. Dishman et al., (1994) cite that the lack of progress toward physical activity goals is a result of

poor understanding of interventions. Consistent with research carried out by Dishman (1990) and Marcus et al., (1992), it is likely that of those that take up an exercise programme, 50% of men and women are likely to drop out within 3-6 months. This figure was based on participating in vigorous exercise. Marcus (1992) recommended a need for a greater understanding of programme focus for people at different stages of participation. People have different needs at different times, especially to maintain their participation and interest in their exercise regime.

It is argued also by Dishman (1994) that the action-oriented approach focuses on immediate behaviour change and does not take into account how people change. It therefore cannot be assumed that an individual is already motivated to adopt regular physical activity and ready to take action. Here lies the challenge ahead for facilitators of physical activity programmes. The benefits of physical activity are well-advertised. The question is how we deliver the physical activity promotion programmes to attract all people. Dishman & Buckworth (1996) reviewed six randomised controlled trials and reported that exercise programmes that were effective in attracting and maintaining high levels of participation had the following features in common;

- A focus on moderate intensity exercise.
- Informal exercise rather than professionally supervised structured programmes.
- Frequent professional contact for advice, support and encouragement, either by phone or a visit.

Blair (1992) recommended how important a community exercise and nutrition programme is, as a new strategy to get sedentary adults in society more active. Dietz (1996) expands on Blair's research incorporating the need to increase activity by promoting its role in people's lifestyle versus the role of inactivity in people's lifestyle.

The Health Promotion Department's Dublin Healthy Cities Plan 1998-2000, is an example of a joint initiative to enhance the health of workplace employees.

The eight key areas are: Nutrition, Alcohol, Smoking, Accident prevention, Drugs, Environment, Active- Living. Workplace policies were drawn up for the following areas. Drugs/Alcohol, Smoking, Physical Activity Participation and Nutrition.

2.13 Worksite Physical Activity/Health Promotion

Weston (1995) defines promotion as “the act of furthering the growth or development of something”. O’Donnell (1994) defined health promotion as the science and art of helping people change their lifestyle to move toward a state of optimal health.

Harris (2000) defined this optimal health as “a balance of physical, emotional, social, spiritual and intellectual health”. Worksite health promotion is a multi-faceted subject area, and is best understood as the combination of educational, organisational, and environmental activities and programs designed to motivate and support healthy lifestyles among a company’s employees and their families. Promoting physical activity is therefore just one of the determinants of such a programme (Chenoweth 1999).

The three chief goals of a Worksite Health Promotion Programme defined by Chenoweth (1999) are (1) to assess health risks, (2) to reduce those health risk factors that can be reduced, and (3) to promote socially and environmentally healthy lifestyles. The worksite can be the most effective setting to capture the attention of many individuals and their behaviour. With worksite promotion everyone wins, both employer and employee. A Comprehensive Model of Worksite Health Promotion was adopted by Randolfi (1997). This model includes the following components:

- health education program,
- employee health services and benefits,
- physical fitness and nutritional programs,
- health promotion policies and procedures,
- counselling and employee assistance programs,
- safe and healthy work environment,
- integration of company and community resources.

A model workplace health promotion program was adopted by The University of California Irvine Health Promotion Centre (UNIHPC1995) cited in the Wellness Council of America (1995). Their focus is on four main components:

- (1) The individual employee, e.g. lifestyle behaviour programs, health and safety training, preventive services i.e. screenings.
- (2) The physical workplace, e.g. workplace safety, managing hazards, facilities.
- (3) The organization, e.g. overall policy, mission statement, complying with regulations and
- (4) The community, e.g. co-operating with other agencies. Possible outcomes to be achieved include improved employee productivity, morale, reduced absenteeism, healthier working environment and improved reputation in the community.

2.13.1 The Benefits of the workplace as a site for promotion

The workplace is an ideal setting for workplace physical activity promotion principally due to its accessibility to educate and motivate people. It offers an opportunity to reach out to the workforce in a number of ways. The employer could use this opportunity to support our ageing workforce, as a means to interact in an informal setting and to make contacts. Most importantly the workplace helps promote the relationship between employer and employees, and could help to increase productivity, and indirectly keep health costs reduced. (Chenoweth 1999).

The three most common reasons cited by O'Donnell (1994) for employer's interest in health promotion are; the desire to control spiralling health care costs, to encourage a healthy productive work-force, and as a means of boosting the morale of employees and the image of the organisation. A healthy productive employee is one who is given the opportunity to develop physically, emotionally, socially, intellectually and spiritually.

Crump (1996), conducted a study on 10 federal agencies in Canada, and results showed that employees participated more when their co-workers and managers endorsed the programmes. Greater participation was found where employers were able to reduce the barriers to participation such as time and location.

Holzbach (1993) found similar results in Johnson & Johnson, showing that employee attitude changes were greater at health promotion intervention sites. Dejoy & Southern (1993), recommended that health promotion efforts should be integrated into the overall corporate strategy of an organisation. Management support is essential. De Joy and Southern (1993) highlighted the need for management support at the onset of implementation of worksite promotion programmes as certain organisation and structural modifications may need to be made prior to implementation of the programme.

In the Irish setting companies such as Intel and Microsoft have led the way with their provision of on-site gyms, and a range of in-house therapies for staff. Intel's Environmental Manager recently said in an interview with the Irish Times (2004), that the company benefits by having healthier, less stressed staff at work. Citigroup at Dublin's North Wall Quay offers staff an on-site gym as well as a range of therapies and health initiatives. "Staff are happier and more productive when they are healthier", emphasises Maureen Mulvihill of the Irish Heart Foundation in the same article in the Irish Times (2004). Dr. Catherine Woods, Lecturer in Exercise and Health Psychology at DCU, reported in the Irish Independent (2004), that participating in sport or exercise around the workplace isn't just about getting to know people, it also has benefits for individuals such as becoming fitter and in turn more likelihood of adopting a healthy lifestyle. She further adds that research suggests that reduced absenteeism may be attributed to exercise in the workplace. Woods in a recent report (2004) found that in a survey, two-thirds of Irish teenagers do not partake in any exercise. These teenagers are the adults of tomorrow and are likely to become inactive adults and parents, unless intervention programmes are put into action at all levels of society.

In Ireland the Healthy Bodies- Health Work Report (Department of Health and Children, 1998) found that lack of management commitment was a major obstacle to health promotion in the workplace and this was also found in the evaluation of the Irish Heart Foundation (IHF) Happy Heart at Work programme (Kelliher et al., 2002). In the United States the Centre of Disease Control (CDC) Director challenged the directors of 14 CDC agencies to encourage all their employees to participate in

the Physical Activity challenge. The results of this study found that most managers felt that it was important to serve as role models, positively influencing participation in the intervention (Hammond et al., 2000). One interviewee summed it up as follows:

”... it's a matter of what do the top prioritise? If the top puts priority towards health promotion it'll be important in the building...” (Male, Age 50-59yrs).

2.14 Randomised lifestyle interventions using the TTM model for physical activity promotion.

Brownell (1980), Knadler and Rogers (1987), Blamey et al., (1995) and, Andersen et al., (1998), all demonstrated the effects that the increased use of the stairs had when it was promoted in the workplace. Thus giving promise to the notion that when something is promoted to people they may incorporate it into their lifestyle.

Epstein and Leonard (1998) used the behaviour modification theory to increase physical activity. Participants reported increase in leisure activity minutes above baseline at 6 months, 12 months and four years. A study was also carried out in the UK by Naylor et al (1999) on a group of people attending primary care for routine checks. At 2 and 6 months they found no difference in progression with use of the TTM versus traditional activity information. Cardinal and Sachs (1995) used the technique of delivering physical activity information by mail to employees, at 1 and 7 months. However, no long-term effects on physical activity participation were found. Dunn & Marcus et al., (1999) distributed self-help manuals to employees, delivered at baseline, one month and 3 months. Participants showed short-term increases in physical activity at three months.

Marcus (1999) used the TTM including individualized motivation and tailored materials. This had significant increases in people's activity levels. Chen (1998), Marcus (1999), and Cardinal & Sachs (1995) used telephone, written and delivered materials in their studies and reported equal success with increases in physical activity. Brawley & Rejeski (1996) Dunn (1999) and Andersen et al., (1999) found increases in physical activity with both intermittent physical activity, and with the

traditional approaches in comparison to the use of TTM. Thus, highlighting different methods can have similar results in relation to increasing physical activity levels.

Leaf and Reuben (1996), Brawley and Rejeski, (1996) & Chen (1998) all used the recommended ACSM (1990 & 1995) guidelines of physical activity, and adapting the TTM to physical activity promotion in the workplace. They found that the lifestyle intervention groups increased physical activity. This was attributed also to the effect of the self-help materials and the targeted and tailored approach of the interventions. This gives promise to group motivated lifestyle change that reported significant increases in frequency of exercise. “Fresh Start” was the name of the initiative used by Graham-Clarke (1994) in the UK, where they used primary care patients with cardiovascular risk. The intervention used TTM videoed counselling and written information, at 4, 6, 12 & 18 months. This study revealed increases in energy expenditure, but no long term effects (i.e. longer than 6 months) were observed.

Loughlan and Mutrie (1997) in the UK, conducted a study comprised of a fitness assessment and consultation using the TTM at 1, 3 & 6 months. All subjects increased number of hours per week exercising from 3.5 hours at baseline 3.5 to 5 hours at 6 months. Hassler (2000) and Kirk (2001) carried out similar studies in the UK, where they offered sedentary adults in contemplation/preparation stage an exercise consultation, one-to-one motivational interviewing of 30 minutes plus written information, versus written information and non-staged specific advice. After 3/5 weeks both groups found that their leisure- time physical activity had increased from 398 to 598 minutes per week, with 82% of the group showing stage progression. Research carried out by Peterson and Aldana (1999) found that during a short term 6 week intervention, 33% of the staged matched group showed improvements, and increased their physical activity by 13%, compared with only 1% with those receiving generic information only on physical activity.

Harland (1999) (Newcastle Exercise project) used the TTM based activity counselling, with four groups, (a) interview only, (b) interview & passes for a physical activity, (c) 6 interviews, (d) 6 interviews & financial incentives.

At 3 months 55% of the most intensive group showed increases in physical activity, 38% of the group with combined interventions showed increases in physical activity, compared with 16% of the control group, who received only routine care with no intervention. At 12 months there were no inter-group differences. "PROJECT PACE" (Physician based Assessment and Counselling for Exercise, U.S), designed by Calfras, Sallis & Oldenburg (1997), showed promising short-term effects on physical activity levels. No long term effects on physical activity were studied

On a positive note the "Change of Heart", project carried out by Hilton and Doherty (1999), found that those receiving staged- matched information increased their physical activity levels, and that there was a considerable increase in amount of time spent in physical activity at 4 months, and at 12 months compared with the control group with no intervention. At 12 months 31% had progressed into the action stage. Stage specific counselling was given to participants in primary care with a follow up phone call 6 weeks later. 52% of subjects were more active at 6 weeks follow up, compared with 12 % of the control group. A second study carried out in 2000 used stage- based counselling, with follow up phone calls at 1, 2, and 3 months, and with postcard reminders at 2, 3, 4 and 5 months. More contemplators made stage progression than in the control group. Overall 33% of participants showed stage progression.

An intervention named "Physically Active for Life", was carried out by Pinto (2001), This intervention used the TTM model, where participants in the intervention to promote physical activity received group counselling, stage specific written information, a follow up meeting after four weeks, and monthly mailings on the benefits of physical activity and local activities. The control group received no intervention but received routine care. At 8 months 79% of participants were in the preparation stage, and 28% met ACSM guidelines.

"Project Active" was an initiative carried out by Dunn (1999), using the TTM in group counselling, with weekly meetings up to week 16, fortnightly meetings up to week 24, monthly meetings to week 52 and bimonthly to week 104. Stage matched pamphlets and reminder letters/phone-calls were used at different times throughout

the programme when participants required the follow-up. The control group received free gym membership, 3 weeks supervised instruction, and received all pamphlets and information. This group were encouraged to use the gym 3 times weekly, and received a phone-call reminder if they lapsed. At 6 months both groups increased physical activity levels. The control group increased fitness levels, with the intervention group increasing moderate intensity physical activity. However there were no significant activity levels differences.

With some studies that showed a progression in stage, like Cardinal & Sachs (1995), it is important to remember that it is activity rather than stage that affects health. Stage progression does not necessarily mean physical activity progression, and the ultimate aim of activity promotion interventions must be to increase activity levels. It is important therefore to focus on activity more than stage of change as an outcome measure.

Despite the fairly intensive intervention delivered by the Newcastle project (Harland 1999), no long-term effects on activity levels were reported. In the second PACE study (Dunn et al., 1999), it was identified that the intervention was most effective in people originally in the contemplation stage of activity change. There may be a need to trial each stage- matched intervention separately to ensure optimum design before combining interventions into fuller programmes. Dunn et al., (1999) recommended that further studies should be mindful to include activity levels as well as stage of change as outcome measures.

Studies show that physical activity can be increased by intervention. The optimal way for selecting intervention components, settings, time frame do warrant attention. However in the short term (less than 6months), 73% of programmes reported some significant benefit of TTM based interventions over control conditions. Longer term (greater than 6months), 29% reported some benefit.

2.15 Physical Activity Promotion in Ireland:

In 2001 Mr. Micheal Martin, TD, Minister for Health and Children launched campaigns in Ireland to promote physical activity. The first was “Get a life, Get Active”, which ran over eighteen months with publications and distributions to households, schools, health boards. Some publications were advertised for a short period of time. “Let it Go, Just for 30 minutes” was launched in July 2003, in continued response to inactivity at its relationship to obesity and health. “Let it Go, Through Dance”, was launched to capture the over fifties. These initiatives were in response to the latest figures by the SLÁN report (1998) and (2003), that 60% of the population do not take any physical activity, even for health gain.

In response to the prevalence of inactivity in Ireland, identified in the Department of Health and Children’s Health Promotion Strategy 2000-2005, the HSE have launched a pilot GP exercise referral scheme. Given the key position GPs are in as a powerful source of health advice, physical activity could be promoted at primary care level. A steering group for the HSE was formed in 2003 to oversee all aspects of this exercise referral scheme and how it can be integrated with the leisure industry, general public and exercise education sector. Under the Government’s Primary Care Strategy, groups of GPs will work together and co-operate with each other and their practices will include services such as paramedics, practice nurses, physiotherapists, occupational therapists and counsellors. This type of multi-disciplinary service will hopefully address the need to promote a physically active lifestyle as a form of treatment and therapy especially at primary care level. The future intention of the HSE is that health promotion will not be a stand alone service. It is envisaged that it will be integrated into all the other disciplines of work offered by the HSE and health promotion will be seen as a way of working by all staff (Pilot programme carried out by HSE in South/West region 2000).

In 1995 UCG carried out a “Health at Work Project” needs analysis of 250 companies in the West of Ireland, to develop a set of targeted lifestyle interventions, and to examine the processes and outcomes. This project focused on organisational structures and interventions which supported the lifestyle programmes (Hope and

Kelliher 1995). The findings from this project indicated that the health risk behaviours (physical inactivity being one) targeted by the interventions generally improved, but that the programmes within these companies were seen as being peripheral to company operations. In a workplace it is often difficult to convince management of the worthiness of initiatives that are not profitable and tangible. Many of the lifestyle issues of promoting exercise, nutrition awareness and self-checks are seen as disposable extras, even though participants showed a reduction in perceived barriers to healthy eating and exercise participation. There is a need to integrate health promotion activities with those of health and safety.

In response to the Fitzpatrick Review (2005) carried out by the Department of Arts, Sport and Tourism, The Local Sports Partnership initiative (LSP) emerged. Each LSP offers something to all the community, where the local sports office in the county council co-ordinate activities in each county and are aimed at promoting physical activity to people of all ages. In 1996 the European Network for Workplace Health Promotion (ENWHP) was established, as a network of national health promotion agencies to collect and disperse information on WHP at national and EU levels. It was set up by the European Commission. These initiatives included interventions for the ageing population and physical activity programmes for small and medium sized enterprises. The recommendations from the ENWHP continually influence policy making in Ireland. The Health Promotion Unit (HPU) and Dept of Health and Children, (Ireland) launched the Health Promotion Strategy 2000-2005, in response to policy development. This involved a wide range of strategic aims and objectives geared to contribute to the overall improvement of the health of the Irish population. The overall aim was to increase participation in regular, moderate physical activity, in different population groups, settings (schools/colleges, workplace), and topics.

The HPU aim to focus on specific areas: (a) Policy making to influence national policy in relation to active living; (b) To promote and create awareness of physical activity at moderate levels; (c) Increase opportunities and provision for health-enhancing physical activity. i.e. sport for all, education and behaviour change activities, and resources; (d) To foster and encourage partnership and support with

inter-board collaboration; (e) Monitoring the progress towards the achievement of 30 minutes of moderate intensity physical activity per day.

As a response to the Department of Health and Children's National Health Promotion Strategy 2005, the Health Service Executive (HSE) in Ireland have developed the Health at Work (HAWK) programme, which is designed to promote physical activity at the workplace. Its aim is to train the trainers. This concept is seen by the HSE as being more effective and sustaining than a professional coming in for a specific time span and leaving. The sustained approach is maintained by a system where you empower employees to deliver the programme themselves and thereby not breaking the continuity. This progressive initiative by the HSE is being piloted within An Garda Siochana in 2007. The selected Garda Divisions are Louth, Cavan/Monaghan, and Meath/Westmeath.

2.16 Seven –Day Recall of Physical Activity

Physical activity level can be measured using the 7D PAR questionnaire. The Seven-Day Physical Activity Recall (PAR) interview was originally developed for use in the Stanford Five-City Project, which was a community based public health education trial (Sallis et al., 1985). Because it is a general-purpose measure of physical activity that has been evaluated many times over the years, it is widely used in epidemiologic, clinical, and behaviour change studies. The original development of The Stanford 7D-PAR instrument was administered by interview and later revised for use as a self-administered questionnaire. The methodology has evolved over the years, because of accumulated experience. Most studies use the basic PAR, published by Blair (1985), as the protocol and make changes to suit their particular study.

Sallis., (1985) made modifications in their study where only activities of 10 minutes or more in a single activity were recorded. Work and leisure activities were recorded separately. Baranowski (1999) carried out a study to assess the ideal amount of days of recall to achieve the desired level of reliability. They found that to achieve a reliability of 0.8 using a 7-d activity record, it requires 2 weeks of assessment. These analyses revealed that there were differences between weekend and weekday physical

activity levels. Trost (2000) found also that to achieve a reliability of .7 required between 3 and 5 day of monitoring, whereas a reliability of .8 was achieved with between 5 and 9 days of monitoring. This emphasises the importance of monitoring continuously over an entire day and including both weekdays and weekend days in the monitoring period.

Blair et al., (1985), assessed habitual physical activity by a seven-day recall, in a worksite setting, and found that the physical activity recall provided useful estimates of physical activity, and can meet the need of monitoring exercise in populations. Dishman & Steinhardt (1989) also support the seven- day recall as a reliable and valid tool, and their results on college students were consistent with previous studies by Taylor (1984) on community –based adult populations. The re-call assessment of physical activity is a pragmatic approach for large populations where direct observation or objective monitoring cannot be implemented. Young, Jee & Appel (2001) also support the use of the seven-day recall of physical activity, reporting its use for adults across the age span, including older adults. They found however that change in physical activity was not associated with change in VO₂Max. However it is important to note that an increase in VO₂ Max is closely associated to intensity of training rather than participation.

Another questionnaire that measures physical activity is the Modifiable Activity Questionnaire (MAQ). MAQ is a physical activity questionnaire of past-year activity. Vuillemin (2000) compared self-administration of this questionnaire with interviewer –administration. It was found that a significant effect on mode of administration was found for leisure physical activity with lower score in self-administered form than interview. However the mode of self-administered conditions to report physical activity, is still favoured with large populations and seen as the most practical method to adopt. It has been suggested that though the 7D-PAR questionnaire may be an unstable estimate of habitual physical activity, it may be sensitive enough to changes in physical activity patterns and therefore, suitable for lifestyle interventions studies.

Jacobs et al., (1993) stated that the 7D-PAR questionnaire gives an approximation of the coverage of recent and maybe usual physical activity. The relationship between the 7 D-PAR and Stage of Change was validated by Marcus and Owen (1992a).

2.17 Factors effecting Physical Activity Exercise Programmes using the TTM

The TTM examines people's current behaviour with their intention to maintain or change their pattern of behaviour. In this context it is physical activity participation that you are trying to change. There are many factors that can have an influence on the intended change.

2.17.1 Adherence levels

Adams and White (2003) critically reviewed the effectiveness of 16 activity interventions using the TTM as their base. The majority of these studies (12) were interventions over three to six months, with the remaining four taking place over a twelve to eighteen month period. Using written materials and information on display, coupled with counselling, it was found that 73% of the programmes reported some significant benefit of the TTM based intervention in comparison to control group. The main progress was found in stage progression and activity levels. The marked findings from this review indicate that the TTM based activity promotion programmes found some short-term benefit in terms of activity levels or activity change. Long-term effects seem harder to sustain, and leave scope to examine the future of these programmes. Additionally, Adams and White (2003) suggest that if a stage matched intervention is claimed to be effective then it must be effective in people in all stages of activity change. Although tailoring is not one of the core components to the TTM, it is the method through which the model is operated. Tailoring aims to match the programme to the participant, e.g. preferences, gender, age, stage of change.

2.17.2 Barriers to Exercise

Buckley (1999) identified barriers as being real or perceived. These barriers are comprised of different types and can have an effect on a person's ability to sustain a physical activity programme. They come in various forms. Physical barriers can be physical appearance, health/injury status, and age. Emotional barriers can be related to participant's personality or their perceived ability to take part. Motivational barriers are clearly evident in people's energy levels, needs, interests and enjoyment. Time barriers are often the most popular barrier for people where work and family influences pose as reasons not to be physically active. Availability barriers appear where participants report not having the appropriate equipment, clothes, facilities, or company to take part in a certain activity. It is not possible to be able to monitor every barrier that could affect a person's participation in physical activity, but it is important to be aware of their existence and influence over a person. It is imperative to point out that in today's society some people may be asked to alter their behaviour, while the environment in which they live and work is not conducive to the recommended changes in physical activity participation, e.g. shower facilities are not always available, time is not available to be active, and facilities are not conducive to active living.

2.17.3 Relapse Prevention

Maintenance of behaviours represents a great challenge for promoters of physical activity because relapse rates are high, estimated by Dishman (1990) at 50%. Coping skills are required to prevent escalation of a lapse e.g. missing an exercise session, into a relapse i.e. a week without exercising. It is important to identify situations that place a person at risk for not being physically active and put a contingency plan in place to deal with it. People need to be constantly aware of the need to plan activities to cope with personal, environmental and professional commitments.

2.17.4 Motivational Interviewing

In order to prevent relapse and deal with barriers that each person comes across, Miller (1991) introduced a systematic approach to increasing motivation and assisting the individual's behaviour change. Strong emphasis is placed on personal responsibility for change. Barriers are identified and the individual is assisted in problem solving to remove barriers. This model shows promise in counselling overweight people to increase their activity levels.

2.18 Conclusion

The literature review supports the concept of promoting physical activity to people to enhance individuals overall well being. The ACSM has set out the desired guidelines on the type and amount of physical activity necessary to derive both optimum health and fitness benefits. The promotion of physical activity participation in the workplace has grown in popularity and many studies give credence to its application. Initiatives based in the workplace can help focus on preventative measures in tackling some of the shifts in health profiles of our population and trends elsewhere e.g. obesity levels and the increase in those with type 11 diabetes. The workplace is identified as an ideal setting where you have a homogenous group with similar needs and influences.

In the models researched, physical activity promotion is often a central component of worksite health promotion, which a lot of companies are implementing. Policy makers are beginning to influence workplaces to adopt health promotion. This is seen in the Irish context with the Health Promotion Unit publishing their strategy in 2005. An Garda Siochana is a large organisation (12000 members) and members physical activity behaviour is an under-reported area. There is still a challenge to fully quantify Gardai's tasks in order to describe fitness levels required in comparison to other occupations. However from Browne's study (2001) carried out on members' physical activity behaviour, 32% are not regularly physically active, which is similar to the general population. Within such a large organisation it is difficult to endorse change. It appears evident from the policy makers that physical fitness and health are

treated simultaneously. It appears therefore that if physical activity promotion could contribute to health improvements of members it would be supported.

It is imperative to highlight the growing support for how cost effective it is to promote physical activity to employees to reduce health care costs, absenteeism. This could help gain management support which is identified as essential to any promotion initiative.

The intended study was influenced by previous physical activity promotion initiatives carried out in the workplace. The ACSM guidelines are used as a marker for participants to aim towards, in order to become regularly physically active.

The initiatives that appeared to make progress were those that were targeted and tailored. In order to compare the effects of a physical activity promotion initiative in the workplace, previous studies used three or four intervention groups, comprising of a control group, a targeted and tailored group and two groups in the middle where the initiatives are less intensive and interpersonal. In the intended study the targeted group are members of An Garda Síochána, and the initiative is tailored to each members needs, where individual monitoring, assessment, goal setting can be provided. The stage of change/TTM model that previous studies have used support how it helps to make sure that a programme is set at an individual's stage of readiness to change their behaviour. In this case their actual readiness to become more physically active. Physical activity interventions based on this model have been shown to increase physical activity participation among adults. The time frame recommended is no shorter than 6 months in order to give an individual a chance to move through the stages. In the short term (less than 6months), 73% of programmes reported some significant benefit of TTM based interventions over control conditions. Longer term (greater than 6months), 29% reported some benefit.

Even though long term effects are not evident from the studies, 12 months is a workable time frame for an initiative.

2.19 Rationale for study

The author gained a great insight into physical activity participation from the studies documented in the literature review. An Garda Síochána is a large organisation that rarely gives individual attention to its members. A physical activity promotion

initiative will be an opportunity for members to receive personal attention and assessment of their fitness in order for them to make positive changes. Based on what previous studies observed, and in order to examine what the content of initiatives should be to promote change, three different initiatives will be delivered. It was important to try to deliver the initiative at different interpersonal levels to find out what level would be practical for An Garda Síochána as an organisation and in particular to try to influence policy making on this issue. The targeted and tailored initiative will be the most intensive and indeed the most labour intensive for the promoter. The information only initiative was chosen as it was less labour intensive and may well be the only practical way to promote physical activity to such a large organisation. The control group are the third group that will receive no intervention in the workplace.

The author intends to monitor the progress of individuals in the workplace interventions. This will give the author an opportunity to observe how the interventions affected individuals. These case studies may show shortcomings in the intervention design or may illustrate the importance they could be for members of An Garda Síochána.

2.20 Research Questions

1. (a) Will there be a progression in the dependent variable participants stage of change from pre to post intervention in the three groups combined ?.

1. (b) Will there be a progression in the dependent variable participants stage of change from pre to post intervention using the three groups as the independent variable?.

2. (a) Will there be an increase in the dependent variable frequency of weekly physical activity participation from pre to post intervention in the three groups combined ?.

2. (b) Will there be an increase in the dependent variable frequency of weekly physical activity participation from pre to post intervention using groups as the independent variable ?.

3. (a) Will there be an improvement in the dependent variables, cardiovascular fitness, flexibility, strength, and body composition from pre to post test intervention in the three groups combined ?.

3. (b) Will there be an improvement in the dependent variables, cardiovascular fitness, flexibility, strength, and body composition from pre to post test intervention using gender and the groups as the independent variable?.

Chapter 3

Methodology

3.1 Introduction

The main objective of the study was to examine the effects of promoting physical activity to members of An Garda Siochana in their workplace. This was an experiment with two intervention groups and one control group. The main aim was to examine the effectiveness of promoting physical activity in the workplace on participants; stage of change, frequency of physical activity and fitness levels pre and post test. This was proposed using the ACSM physical activity guidelines as a target, towards becoming regularly physically active. Being regularly physically active is the daily accumulation of at least 30 minutes of self-selected activity which includes all leisure, occupational or household activities that are at least moderate to vigorous in intensity and could be planned or unplanned activities that are part of everyday life.

The study would examine the effects of the intervention on the exercise behaviour of participants, in particular;

- Stage of motivational readiness to participate in physical activity, pre and post intervention. (Stage of Change)
- Amount/frequency of physical activity undertaken, pre and post intervention
- Fitness levels pre and post intervention.

3.2 Recruitment Process

The author is a Physical Education Instructor tasked with educating students in Physical Fitness. Part of her ongoing responsibility is to promote physical activity throughout An Garda Siochana. Various methods were examined to establish an effective approach for this dissertation. Literature suggests that research is needed into the effects of physical activity promotion through ongoing support over a period such as a year. This period is chosen, even though the literature suggests that commitment may be high in the short term of up to three months. However this would not be practicable in the Garda setting, primarily due to time constraints, work rosters and accessibility to members. The intended intervention will examine a

subject's success in increasing physical activity and could be in direct proportion to the intervention type.

3.3 Sample Chosen

Figures from Garda Human Resource Management in May (2006), show the numbers of An Garda Siochana at 12,625. These Gardai are spread throughout Garda Stations in the 26 counties. It would be frivolous to think that it would be possible to conduct a random sample study of workplace physical activity promotion within the entire organisation. This is due to the obvious constraints of cost, time and accessibility for a lone researcher.

The sampling technique used by the researcher is non-probability convenience sampling. It consists of taking the sample from people who are available at the time the study is carried out and fit the criteria you are looking for and it is practical in terms of time and money. The sample Garda stations chosen represented a fair geographical spread throughout the midlands, which was reflective of station size and type i.e. Division, District and sub-district/ station, accessibility and willingness of the selected Garda stations to take part in the programme. Based on these criteria, Garda stations were identified as being suitable, available and accessible for the study. In order to gain access to the Garda stations involved, permission to undertake the study was essential. Close liaison with the Superintendent's office in each division was vital in this respect. The researcher made the commitment to maintain the highest level of confidentiality and safety to each participant, and to discuss the delivery of the programme to enable each participant to take part during their shift. All members of each Garda station chosen were given the opportunity to take part in the initiative, and each intervention group was then representative of those that replied to the initial questionnaire and were interested in taking part in the intervention starting with the fitness testing.

3.4 Research Design

This was an experiment with two intervention groups and one control group. The physical activity promotion in the workplace took place over a twelve-month period in order to examine long-term effects on physical activity participation. All participants were informed about the content of the programme which was attached to the pre-intervention questionnaire. All participants undertook baseline physical activity questionnaires and fitness screening and again at post intervention. (See Appendix 1).

3.4.1 Intervention Types

The intervention programmes took place at three different levels of interpersonal contact.

(1) No intervention/Control Group (NI)

This group received no contact whatsoever from the researcher between the pre and post fitness screening. This was a period of eleven months where Gardai monitored and took responsibility for their own physical activity participation. The researcher contacted each participant after eleven months to schedule the post test physical activity questionnaire/fitness screening.

(2) Information Only Intervention (IO)

The information-only physical activity promotion intervention had a dedicated physical activity promotion bulletin board posted in each station. Monthly physical activity promotion leaflets, Jumpstart Newsletters designed by the researcher, and information resources promoting physical activity were posted on the dedicated physical activity board in each Garda Station. There was no interpersonal interaction with members outside the collection of the physical activity questionnaire and the fitness screening. This intervention type largely made the information available to Gardai, and it was up to the individual to avail of the material.

(3) Targeted Tailored Intervention (TT)

The Targeted Tailored physical activity promotion programme consisted of targeting participants in each stage of change and tailoring the intervention to individuals. This consisted of the IO promotion data, as well as personal interaction between the participant and the facilitator, in the form of goal-setting, monitoring and individual advice. This intervention used the stage- matched manuals, monthly workshops and presentations on related topics. There was ongoing motivation in the form of bi-monthly phone calls, blood pressure and cholesterol testing, and specific physical activity initiatives e.g. training programmes, physical activity challenges and posted prompts. This intervention was the most labour intensive for the researcher, with the ongoing delivery of information and the organisation of guest speakers.

The TT intervention was delivered in conjunction with the Health Service Executive (HSE). As part of their commitment to promoting physical activity the author had the privilege of specialised personnel to deliver the workshops to the members of this intervention. Workshops lasting two hours were presented on; physical activity promotion, physiotherapy and back care, stress management and diet and nutrition. A nurse was available to take blood pressure and cholesterol levels

Table 3: Garda Stations in the Physical Activity Promotion Intervention

The stations were divided equally into three groups and 100 Gardai were randomly selected within each group. There were 129 valid respondents out of 300 questionnaires circulated.

Intervention Type	Garda Stations
Targeted Tailored Intervention (TT) (n = 59)	Portlaoise Division, Co.Laois
Information Only Intervention (IO) (n=36)	Celbridge & Maynooth , Co. Kildare Bray, Shankill & Greystones (N District)
No Intervention (NI) (n=34)	Templemore & Thurles, Co. Tipperary

3.4.2 Initiation of Physical Activity Promotion Initiative within An Garda Siochana.

The following were the steps taken by the researcher to introduce the programme to the participating Garda stations;

- A letter to each Chief Superintendent introducing the programme
- Sanction given by the Chief to allow the programme to commence
- Interview with each Garda station's Inspector/ Sergeant in charge.
- A timetable drawn up to show the intention of the programme.
- Circular from the sergeant in charge to members urging members to participate.
- Circulation of the physical activity questionnaires.
- Return of questionnaires in reply box
- Timetable of physical fitness screening to each Garda station
- Commencement of the physical activity promotion initiative.

3.4.3

Table 4: Content and Characteristics of Intervention Type and Materials Used.

	(A) Targeted and Tailored Interpersonal Intervention (TT)	(B) Information Only Intervention (IO)	(C) NO intervention (NI)
Physical Activity Questionnaire (Appendix 1)	Yes	Yes	Yes
Fitness Screening (Appendix 2,3)	Yes	Yes	Yes
Educational materials- (Appendix 4)	Yes	Yes	No
Stage-Matched Manuals “Jumpstart Manuals” (Appendix 5)	Yes	No	No
Goal Setting/ Motivational Interviewing (Appendix 6)	Yes	No	No
Newsletters/Information bulletin board (Appendix 7)	Yes	Yes	No
Checks at 6 months (Appendix 6)	Yes	No	No

Bi-Monthly workshops/ Lectures on related topics; i.e. Stress management, Diet and Nutrition, Back-care, Physical activity Levels Blood pressure testing Cholesterol testing Given by HSE personnel (Appendix 8)	Yes	No	No
Incentives/Competitions e.g. Programme took place during shift. ➤ 8 week weight loss challenge ➤ Walk Around Ireland Challenge Scratch cards for all participants. Monthly draw for t- shirt, bag, towel etc. (Appendix 9)	Yes	No	No
Newspaper Articles Posted on Bulletin Board (Appendix 10)	Yes	Yes	No

Marcus & Emmons. 1998 compiled a collection of stage-matched manuals relative to a participants stage of change These are titled “Jump Start to Health” (Appendix 5)

Stage 1 Pre-contemplation (“Do I need this?”)

Stage 2 Contemplation (“Try it, You’ll Like it”)

Stage 3 Preparation (“I’m on my way”)

Stage 4 Action (“Keep it Going”)

Stage 5 Maintenance (“I won’t stop now”)

Table 5. Time-Table of Physical Activity Promotion Intervention

Intervention	TT	IO	NI
Dec 04	Questionnaires	Questionnaires	Questionnaires
Jan 05	Fitness Screening	Fitness Screening	Fitness Screening
Feb 05	Jumpstart Newsletter	Jumpstart Newsletter	
Mar 05	Physical Activity Stage-Matched Posted materials	Posted Materials	
April 05	Walk around Ireland Challenge Newsletters Phone call.	Newsletter	
May 05	Stress Management and physical activity workshop Posted stage-matched materials	Posted Materials	
June 05	8 Week Weight Loss Challenge. Newsletters	Newsletter	

	Body fat\Testing		
July 05	Back-care and Physical Activity Workshops Posted stage-matched materials.	Posted Materials	
Aug 05	Newsletter	Newsletter	
Sept 05	Diet and Nutrition Workshop Weight In Posted stage-matched materials.	Posted materials	
Oct 05	Newsletter	Newsletter	
Nov 05	Cholesterol Testing and Blood pressure Posted stage matched materials.	Posted Materials	
Dec 05	Questionnaires	Questionnaires	Questionnaires
Jan 06	Post Intervention Fitness Screening	Post Intervention Fitness Screening	Post Intervention Fitness Screening

3.5 Instrumentation

A questionnaire was designed expanding on the item used by Garda Colm Browne, Garda Research Unit in research carried out in 2000. (Appendix1).

This questionnaire comprised of;

- Participants Background (Gender, Age, Marital Status, Type of Job etc)
- Participation in Sport/Physical Activity. (Each participant was asked at pre and post test if they were regularly physically active. If not participants were asked to report how many days per week they were physically active).
- Attitudes to Sport/Physical Activity in the workplace. (Motives for/barriers preventing participation in physical activity. Attitudes to physical activity within An Garda Siochana)
- Stage of Change. (Pre and Post test)
- 7 Day Recall of Physical Activity
- Indication of interest in Physical Fitness Screening.

Following the questionnaire process, the fitness screening took place over a scheduled week in each station. Each participant signed up for a 40 minute appointment.

During this time the schedule was as follows:

- Medical Screening/ Information about the programme (PAR-Q).(Appendix 2). This included taking blood pressure and resting heart rate.
- Height, Weight and Body Fat. The body fat was measured with the use of the Harpenden Calipers. The female sites used were tricep, iliac crest and thigh and the male site were chest, abdominal and thigh.
- Flexibility- Sit and reach test.
- Cardiovascular Test- 6 minute bike test. A portable Monark Bike was used to implement the test, and the Fitech computerised heart monitor was used.
- Grip Strength was measured using the grip dynamometer to measure strength on their dominant side.
- Results Summary/Feedback

A scratch card was given to each participant who kept their fitness screening appointment and attended all the workshop/presentations in the intervention. There was a reply box in each station with a clear reply date. All replies were entered into a draw for a sports voucher.

3.5.1 Stage of Change Questionnaire (Marcus et al, 1992)

This simple questionnaire is designed to assess the exercise behaviour and stage of change of a participant (Appendix 1). Subjects are placed into a stage based on their responses. The scoring algorithm for this instrument is in accordance with Marcus et al. (1992). There were five statements describing different levels of physical activity. Each participant was to tick the statement that described his or her current level of physical activity. The first level was for subjects who did not exercise and had no intention to exercise in the future. The next level included subjects who did not exercise, but intended to start exercising. The third level included subjects who exercised but not regularly. Subjects in the fourth stage currently exercised regularly but had done so for less than six months. The final stage included subjects who exercised regularly, and had done so for six months or longer. (See Literature Review 2.9).

3.5.2 7D-PAR (Sallis et al., 1985)

The 7D-PAR questionnaire was initially developed for use in the Stanford Five-City Project, a community based public health initiative. (Sallis et al.,1985). The version of the 7D-PAR instrument evaluated in the Stanford study is interviewer-administrated, which assessed both work and leisure-time activities for the previous seven days. It attempts to document all the physical activity undertaken by a person for one week. (Appendix 1)

In this study the self-administered 7D-PAR instrument, which can be seen in appendix 1 was used in a spreadsheet form where each participant ticks the relevant activity undertaken on each day. The only aspect the participant needed to think

about was the amount of time taken at this activity. Participants were told that any activity that lasted at least ten minutes and to the nearest five minutes was to be recorded. Vuillemin (1999) agreed that even though this self-report measure leaves scope for participants to under or over report their activity levels, it may be sensitive enough to measure changes in physical activity patterns and therefore, suitable for lifestyle intervention studies.

3.6 Statistical Methods Used

Data were analysed using various statistical measures. Change in stage of change and frequency of physical activity were compared between pre and post test. Fitness test pre and post scores were also compared. Each test was examined to observe any changes in the group combined and also the group according to intervention type. Non parametric chi-square test was used to examine difference in stage of change and physical activity frequency from pre to post test. Stage of change and physical activity frequency were classed as dependent variables. A contingency table in a matrix format was used to show the frequency distribution of participants in the five stages of change. This was compiled using a cross tabulation. The purpose of the test is to show the stage of change from pre to post intervention.

A parametric T test was used to compare fitness scores (dependent variables) at pre and post test in the three groups combined and separate as independent variables.

Chapter 4

Analysis of Results

4.1 Sample

Table 6: The Sample

Sample N= 129	
Males	74%
Females	26%
Age	Mean 38yrs
Years of Service	Mean 16.7yrs
Marriage Status	70% married
Job Description	
Uniform Shift	70%
Uniform Clerical	11%
Plain Clothes Shift Workers	11%
Plain Clothes Non-Shift	8%

4.2 Stage of Change.

Figure 1: Stage of Change at Pre and Post Test

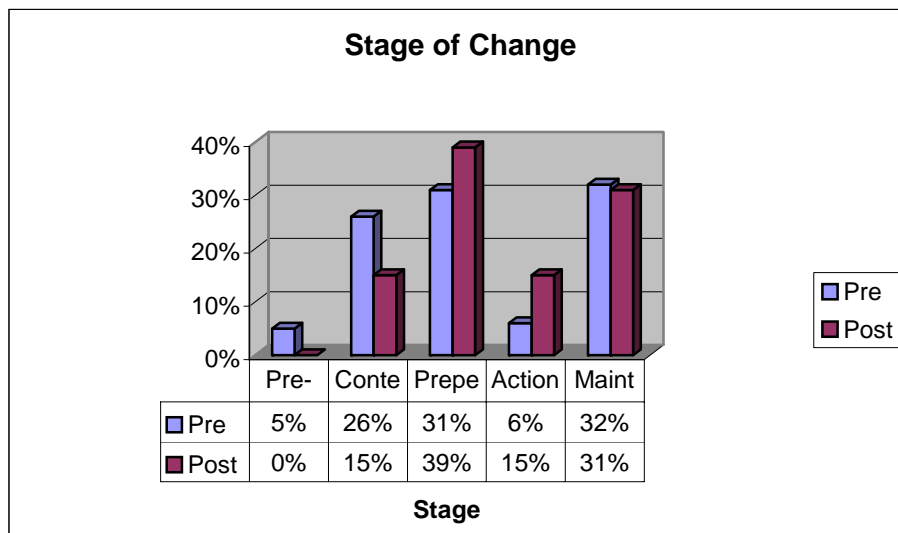


Figure 1 shows the percentage of participants in each of the five stages of change at pre and post test. There was movement through the various stages.

To better statistically analyse movement through the stages it was necessary to collapse the five stages of change to two categories (not active and active).

Table 7: Stage of Change Pre to Stage of Change Post

		Stage of Change Post		Pre Total
		Not Active N (%)	Active (%)	
Stage of Change Pre	Not Active *	64 (49.6)	16 (12.4)	80 (62)
	Active **	6 (4.7)	43 (33.3)	49 (38)
Post Total		70 (54.3)	59 (45.7%)	129(100)

Red Pre Green Post Orange Total

* Combination of Pre-contemplation, Contemplation and Preparation stages

** Combination of those in the Action and Maintenance stages.

Table 7 shows a significant change in the stage of change from pre to post test. ($\chi^2=56.21$, $df=1$, $p<.05$). It shows an increase in the number of people that are active: 49 (38%) at pre test to 59 (46%) at post test.

Table 8. Stage of Change Pre to Post in the three intervention groups (TT, IO, NI)

Stage of Change Pre		Stage of Change Post		Total Pre
		Not Active N(%)	Active N (%)	
1. TT*	Not active	28 (47.5)	9 (15.3)	37 (62.7)
	Active	0 (0)	22 (37.3)	22 (37.3)
	Total Post	28 (47.5)	31 (52.5)	59 (100)
2. IO*	Not active	16 (44.4)	4 (11.1)	20 (55.6)
	Active	2 (5.6)	14 (40)	16 (44.4)
	Total	18 (50)	18 (50)	36 (100)
3. NI*	Not active	20 (58.8)	3 (8.8)	23 (67.6)
	Active	4 (11.8)	7 (20.6)	11 (32.4)
	Total Post	24 (70.6)	10 (29.4)	34 (100)

*TT (Targeted/Tailored), IO(Information Only), and NI (No Intervention) intervention groups.

Red Pre Green Post Orange Total

Table 8 shows participants' stage of change prior to and following a physical activity promotion programme. In the TT intervention the numbers that were active significantly increased from 22 (37%) to 31 (51%) from pre to post ($\chi^2=31.686$, $df=1$,

$p < .05$). The IO had a marginal significant change from 16 (44%) to 18 (50%) ($\chi^2 = 16.2$, $df = 1$, $p < .05$). Conversely the numbers that were active in the NI intervention is significantly decreased from 11 (32%) at pre intervention to 10 (29%) ($\chi^2 = 9.174$, $df = 1$, $p < .05$) at post intervention. The numbers that were inactive group at post test are still high (71% in the NI, 50% in the IO and 48% in the TT).

Table 9: Stage of change progression of participants at pre and post test

Pre Test			Post											
			Pre-cont		Contemp		Prep		Action		Maint		Total	
Stage	n.	%	n.	%	n.	%	n.	%	n.	%	n.	%	n.	%
Precont	6	4.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Cont	34	26.4	6	100	13	38.2	2	5.0	0	0.0	0	0.0	21	16.3
Prep	40	31.0	0	0.0	16	47.1	26	65.0	4	50.0	3	7.3	49	38.0
Action	8	6.2	0	0.0	3	8.8	9	22.5	3	37.5	4	9.8	19	14.7
Maint	41	31.8	0	0.0	2	5.9	3	7.5	1	12.5	34	82.9	40	31.0
Total	129	100	6	100	34	100	40	100	8	100	41	100	129	100

Table 9 illustrates the movement of participants through each of the individual stages of change in physical activity behaviour from pre to post test. Each stage of change is colour coded to show where each participant moved to at post test. e.g all the pre-contemplators (red) moved one stage to contemplation, with two participants moving to preparation. It is quite noticeable that the number of participants in the preparation/ action stage (green and blue) increased from 48 to 68 at post intervention.

Contemplators are colour coded as orange. At pre test there was 34 participants in contemplation (26%). At post test the orange shows were these participants stage of change was twelve months later. 13 participants remained in contemplation (38% of original group). 16 participants moved one stage to preparation, 3 moved two stages to action and two participants moved three stages to maintenance at post test.

59% (N=34) of the entire group remained in the same stage of change at post test. 10% (N=6) regressed a stage: two from maintenance to action, two from action to preparation and two from preparation to contemplation. 32% (N=19) progressed a stage of change. Most of this movement was from contemplation to preparation and preparation to action. These results indicate that the majority of participants remained in the same stage of change at the post test. 32% of participants moved on a stage in the TT intervention in comparison to 28 and 29% in the IO & NI interventions respectively.

The numbers of participants that moved back a stage at post -intervention is small with 10%, 8% and 15% in the TT, IO and NI interventions respectively. Participants in the IO intervention who were in the action and maintenance stage remained the same at the post test, with all the pre-contemplators and half of the contemplators moving towards the preparation stage at the post- test. 64% (N=36) of the IO intervention group remained in the same stage, with 8% regressing a stage (N=3). The 28% (N=10) that progressed were from contemplation to preparation and preparation to action stage. 10.8 % of participants regressed back a stage but 30.2% progressed along their stage of change. Although the NI intervention received only the questionnaires and fitness screening 56% of this group remained at the same stage, with 29% moving in a positive direction and 15% regressing back a stage.

4.3 Physical Activity Participation

Regular physical activity was defined as 30 minutes of moderate physical activity on most days of the week. The percentage of participants that fitted this definition pre and post intervention is shown below.

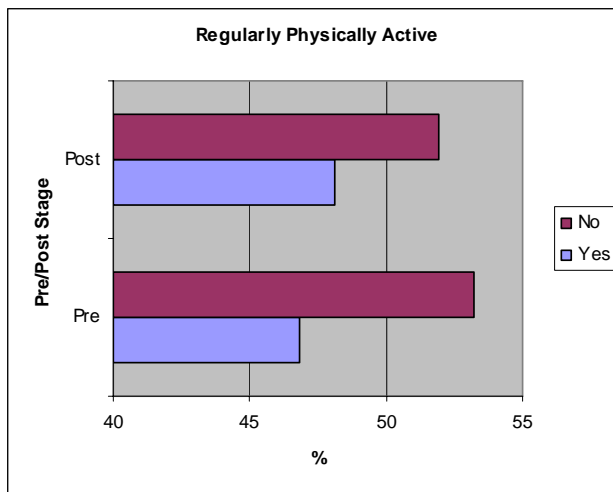


Figure 2: % of participants physically active at pre and post intervention

At post intervention 48% were regularly physically active but 52% were still not regularly physically active.

Table 10. Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups combined.

		Post Intervention Physical Activity		Total
		Yes N (%)	No N (%)	1.00 Yes
Pre Intervention Physical Activity	Yes	52 (41.9)	6 (4.8)	58 (46.8)
	No	8 (6.5)	58 (46.8)	66 (53.2)
Total		60 (48.4)	64 (51.6)	124 (100)

Red Pre Green Post Orange Total

Figure 2 and Table 10 show that those who were regularly physically active, increased from 58 (47%) at pre intervention to 60 (48%) ($\chi^2= 74.31$, $df=1$, $p< .05$).

While chi squared test showed that there was a significant difference between pre and

post results, this must be interpreted with caution due to the small increase in number of yes answers.

It must be noted that the 6 (4.8%) who said yes at pre intervention said no at post intervention, while conversely a different 8 (6.5%) who said no at pre intervention said yes at post intervention, giving a total gain of 2 to the yes count.

Table 11: Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups.

Groups	Pre Intervention		Post Intervention		Total
			Yes N (%)	No N (%)	Total N (%)
TT*	Regularly Physically Active	Yes	24 (42.1)	2 (3.5)	26 (45.6)
		No	4 (7)	27 (47.4)	31(54.4)
	Total		28 (49.1)	29 (50.9)	57 (100)
IO*	Regularly Physically Active	Yes	17 (47.2)	1 (2.8)	18 (50)
		No	1 (2.8)	17 (47.2)	18 (50)
	Total		18 (50)	18 (50)	36 (100)
NI*	Regularly Physically Active	Yes	11 (35.5)	3 (9.7)	14 (45.2)
		No	3 (9.7)	14 (45.2)	17 (54.8)
	Total		14 (45.2)	17 (54.8)	31 (100)

* TT Targeted /Tailored), IO (Information Only), NI (No Intervention) physical activity interventions
RED (Pre test) Green (Post test) Orange (Total Groups)

Table 11 shows the numbers that were regularly physically active at pre and at post intervention in the three groups. There was an increase in the numbers who were regularly physically active at post test in the TT intervention from (26(46%) at pre test to 28 (49%) at post test) ($\chi^2= 35.673$, $df=1$, $p<.000$). The IO and NI intervention groups were unchanged at post test.

Table 12. Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups combined

		Active less than 4 days (Post)			Total Pre N (%)
		Once a week N (%)	Twice a week N (%)	Three times a week N (%)	
Active less than 4 days (Pre)	Once a week	4 (8.7)	7 (15.2)	4 (8.7)	15 (32.6)
	Twice a week	3 (6.5)	9 (19.6)	7 (15.2)	19 (41.3)
	Three times a week	0 (0)	3 (6.5)	9 (19.6)	12 (26.1)
Total Post		7 (15.2)	19 (41.3)	20 (43.5)	46 (100)

RED (Pre test) Green (Post test) Orange (Total Groups)

Table 12 shows that 15.2% report exercising once a week, 41.3% twice a week, and 43.5% three times weekly at post intervention. The numbers physically active three times a week have increased from 26.1% (n 12) at pre intervention to 43.5% (n 20) at post intervention but this was not significant ($\chi^2=8.078$, $df=4$, $p<.089$).

Table 13. Changes in the frequency of weekly physical activity participation from pre to post intervention in the three groups.

Groups	Active less than 4 days (Pre Intervention)		Active less than 4 days (Post Intervention)			Total Pre N (%)
			Once a week N (%)	Twice a week N (%)	three times a week N (%)	
TT*	Active less than 4 days	Once a week	2 (10)	4 (20)	1 (5)	7 (35)
		Twice a week	0 (0)	4 (20)	3 (15)	7 (35)
		Three times a week	0 (0)	1 (5)	5 (25)	6 (30)
	Total Post		2 (10)	9(45)	9 (45)	20 (100)
IO*	Active less than 4 days	Once a week	1 (11.1)	1 (11.1)	2 (22.2)	4 (44.4)
		Twice a week	0 (0)	2 (22.2)	0 (0)	2 (22.2)
		Three times a week	0 (0)	1 (11.1)	2 (22.2)	3 (33.3)
	Total Post		1 (11.1)	4 (44.4)	4 (44.4)	9 (100)
NI*	Active less than 4 days	Once a week	1 (5.9)	2 (11.8)	1 (5.9)	4 (23.5)
		Twice a week	3 (17.6)	3 (17.6)	4 (23.5)	10 (58.8)
		Three times a week	0 (0)	1 (5.9)	2 (11.8)	3 (17.6)
	Total Post		4 (23.5)	6 (35.3)	7 (41.2)	17 (100)

RED (Pre test) Green (Post test) Orange (Total Groups)

* TT(Targeted /Tailored), IO (Information Only), NI (No Intervention) physical activity intervention groups.

Table 13 shows an increase in the numbers in the TT intervention that were exercising three times a week.($\chi^2=8.677$, $df=4$, $P>.05$). This is not significant. The IO intervention had only a marginal change in post scores that were not significant ($\chi^2= 4.313$, $df=4$, $p<.365$) and similar results were found for the NI ($\chi^2=1.946$, $df=4$, $p<.746$).

4.4 Fitness Screening

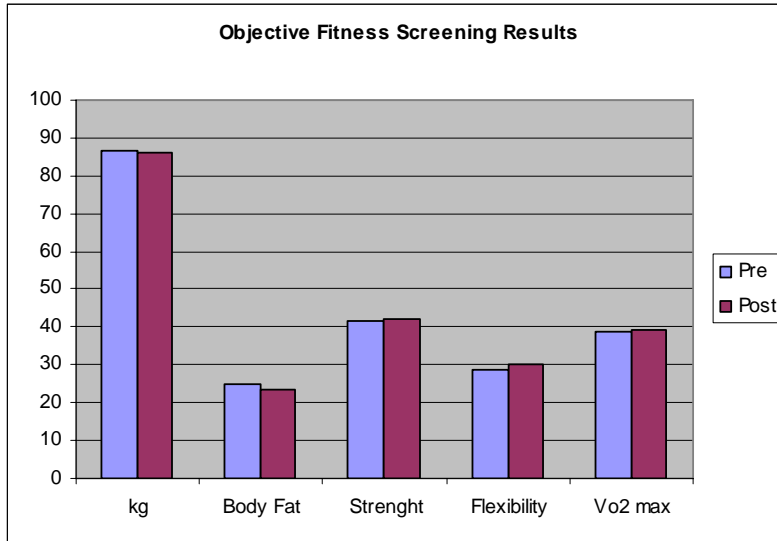


Figure 3: Participant’s fitness screening results at pre test and post test.

Figure 3 show the pre and post fitness test scores.

Table 14: Participant’s fitness test scores association with the three intervention groups combined.

Paired Samples Statistics

	Mean	N	Std. Deviation
Weight Pre	86.4839	93	13.02223
Weight Post (-)	86.0108	93	12.67615
Body-comp Pre	23.8280	93	5.74385
Body-comp Post (-)	23.3441	93	8.19663
Strength Pre	41.6774	93	10.57803
Strength Pre (+)	41.9785	93	10.81663
Flexibility Pre	28.7957	93	7.98580
Flexibility Post (+)	30.1290	93	8.10559
Cardiovascular Fitness pre	38.6129	93	10.41428
Cardiovascular Fitness Post(+)	38.9892	93	10.58249

Figure 3 and Table 14 show that there was a change in two of the fitness test scores from pre to post test.

There was a change in the mean weight. ($t=2.196, df=92, p<.031$). There was also a change in the mean flexibility levels from pre to post ($t=-4.466, df=92, p<.000$).

Table 15: Mean fitness test scores at pre and post test.

Mean Scores	Males		Females		Result
	Pre	Post	Pre	Post	
Flexibility (cm)	28	31	34	36	Below Average –Males Below Average-Females
Strength (kg) Dynamometer	41	42	26	26	Average –Males Average-Females
Aerobic Capacity (ml/kg/min)	38	39	31	31	Average-Males Average-Females
Blood Pressure	Normal		Normal		Normal
Body Fat %	24	23	30	30	Over-fat both male and female

Table 15 shows the mean fitness scores for males and females at pre and post test. For males flexibility ($t=3.628, df=65, p<.001$) and Body composition ($t= 3.182, df=26, p<.001$) changed from pre to post test. For females flexibility scores ($-t=-2.711, df=32, p<.01$) increased with a decrease in body fat levels (1%) at post test.

Table 16: Mean fitness test scores according to Groups

Group TT*	Weight Pre	Weight Post (-)
n.	35	35
Mean	87.1	86.6
	Flexibility Pre	Flexibility Post
Mean	27.3	29.6
Group IO*	Body-comp Pre	Body-comp Post
n.	30	30
Mean	22.8	22
Group NI*	Flexibility Pre	Flexibility Post (+)
n.	28	28
Mean	31.7	32.7

TT(Targeted /Tailored), IO (Information Only), NI (No Intervention) physical activity intervention groups.

Table 16 shows the fitness test scores that changed from pre to post test in the three intervention groups. In TT group there is an increase in flexibility ($t=3.454$, $df=57$, $p<.001$) from pre to post intervention. In the IO group there is a slight decrease in body fat of almost 1% ($t=2.342$, $df=29$, $p<.026$). In the NI group there is a slight increase in flexibility ($t=2.639$, $df=33$, $p<.042$). However both body fat and flexibility changes were not significant.

4.5 Attitudes towards physical activity

Respondents' attitudes remained unchanged at post intervention to those expressed at pre intervention. 60% of participant's feel that they do not participate in enough physical activity to derive health benefits. There is strong evidence that Gardai feel that management do not support the organisation's members to be physically active (98%). 100% of respondents replied that they would welcome a physical activity initiative in their workplace.

When Gardai were asked as to what they need to motivate them to become more physically active the most common responses ranked in order were;

A goal/target (51%)

Adequate time to be physically active (39%)

Facilities (10%)

Table 17: Motives for and barriers preventing physical activity participation

Motives	Barriers
To Keep fit and healthy (78%)	Lack of time (63%)
The desire to lose weight (55%)	Demands of shift-work (51%)
To relieve stress (36%)	Family commitments (40%)
To get outdoors (37%)	Lack of energy (45%)

Table 17 shows the most common motives for participating in physical activity and the main barriers preventing them from participating in physical activity. The motives for participation in physical activity were varied. These were ranked in

order. At post intervention these motives and barriers remained the same, and in the same order.

4.6 Minutes of physical activity participation

Participants were given the opportunity to record their last seven days physical activity and classify its type and frequency. The three most common activities undertaken were walking, cycling, and “other physical activity.

Table 18: Minutes of physical activity participation at pre and post test.

Activity	Pre test n. %	Post test n %.	Mean Weekly Minutes Pre	Mean Weekly minutes Post	Average increase/decrease
Walking Outside work	99 77%	100 78%	198	213	Increase of 15 minutes
Cycling	54 42%	54 42%	213	188	Decrease of 25 minutes
Sport	20 16%	17 13%	337	332	Decrease of 5 minutes
Active Housework	45 35%	65 50%	103	144	Increase of 41 minutes
“Other Physical Activity	87 67%	90 70%	900	933	Increase of 33 minutes

Table 18 shows the time spent at a range of physical activities per week. At post intervention on average participants (78%) were walking for 213 minutes weekly. This represents 30 minutes of moderate intensity exercise on most days of the week. This is 15 minutes more per week than in the pre test (189 minutes). The frequency of walking reported at post test classifies as regular physical activity. 42% of participants cycle as a form of physical activity. At post test the time spent at this activity decreased by 25 minutes. This also represents regular physical activity by these participants at this activity. Active housework as a means of physical activity

was reported by 50 % of the participants, with an increase of 41 minutes at post test. This equates to 21 minutes of daily activity at post test. Participants could report physical activity expenditure in “other physical activity” if it did not fit into identified activities in the 7-D recall of physical activity. These activities are not specified by participants. However 70% of participants reported taking part in “other physical activity” at post test. The average amount of minutes of reported activity at post test was 133 minutes daily activity. This could represent severe over-reporting on behalf of participants. There is a need to examine the types of “other physical activity” that Gardai take part in that does not come under the list of activities in the questionnaire. (Appendix 1).

4.7 Individual Case Studies

Anecdotally the author did observe some very significant changes in certain individual's behaviour in each intervention. These case studies are very inspirational to the author and produced some positive results to take from the experience. These four examples illustrate how the intervention had some positive influences on some individuals.

Table 19. Case study-Participant A.

Participant A	Male Physical Fitness Improvements
Intervention Type	Information only
Age (yrs)	51
Weight (kg)	Pre 96kg Post 93kg
Body Fat (%)	Pre 28% Post 24%
Flexibility (cm)	Pre 24cm Post 35cm
Grip Strength Dynamometer (kg)	Pre 45kg Post 45kg
Aerobic Capacity (ml/kg/min)	Pre 40 (VO₂Max) Post 48 (VO₂Max) VO₂Max(ml/kg/min)
Stage of Change	Pre Contemplation Post Action
Physical Activity Participation	Pre Twice weekly Post Five times weekly

Participant A was a male member who once was very active and fit, and due to time constraints and the nature of the job had let time pass, where he had become quite inactive, and was not a regular exerciser. The intervention for him acted as the prompt for him to reassess his lifestyle and make positive goals to resume physical activity as a regular part of his lifestyle. He was a member of the IO intervention. The presence of the questionnaire, stage of change information, fitness screening, regular information on the bulletin board, and post intervention fitness screening acted as enough motivation for him to make adjustments to his lifestyle. Even though

his weight did not change, he made great strides elsewhere. He increased his participation in physical activity levels from twice weekly to five times at post test, which would be now classed as regularly physically active. His estimated VO₂Max (Aerobic fitness) improved, as did his flexibility and strength scores. At post intervention he was determined to maintain this exercise programme, but added that without ongoing monitoring he hoped he would not become less focused. He also moved his motivational readiness for physical activity from contemplation at pre test to action at post test. The IO intervention he received showed that a minimum intervention was enough to motivate him to make changes to his behaviour.

Table 20. Case Study-Participant B

Participant B	Male
	Weight Loss
Intervention Type	Targeted Tailored Intervention (TT)
Age (yrs)	40
Weight (kg)	Pre 92kg Post 87kg
Body Fat (%)	Pre 22% Post 18%
Flexibility (cm)	Pre 33cm Post 38cm
Grip Strength Dynamometer (kg)	Pre 50kg Post 53kg
Aerobic Capacity(ml/kg/min)	Pre 45(VO₂Max) Post 56(VO₂Max) VO₂Max (ml/kg/min)
Stage of Change	Pre Action Post Maintenance
Physical Activity Participation	Pre Three times weekly Post Five times weekly

Participant B was a male member who took part in the TT intervention. From the onset of the programme weight loss was his overall aim of participating. Over the course of the intervention he lost 5kg, which moved his status from being over weight/ at risk (22% fat), to an ideal range (18%fat). His aerobic fitness, estimated (VO₂) Max increased from 45 to 56ml/kg/min at post test. His stage of motivational readiness moved from action to maintenance stage at post-test. At post intervention

he was regularly physically active. He attended all the workshops and guest speakers on the programme, and felt that he benefited from all the information, support and motivation that the intervention brought to the station. The TT intervention had a positive effect on his physical fitness and activity levels and he felt the benefits of it. He embraced the programme and reaped the benefits. He was fearful that once the physical activity programme was finished, he may regress to his old behaviours. At post test he made a contingency plan of activities he was going to participate in to keep his interest up. This also highlights the fact that when the programme was present he responded to it, but when left to his own devices was fearful of his ability to continue progressing. The ongoing support and monitoring is emphasised by this participant who clearly said that he would need it.

Table 22 Case Study- Participant C

Participant C	Male Increased Overall physical activity participation
Intervention Type	Information Only
Age (yrs)	49
Weight (kg)	Pre 97kg Post 95kg
Body Fat (%)	Pre 26% Post 24%
Flexibility (cm)	Pre 30cm Post 33cm
Grip Strength (kg)	Pre 38 Post 38
Aerobic Capacity(ml/kg/min)	Pre 41(VO₂Max) Post 52.2(VO₂Max) VO₂Max (ml/kg/min)
Stage of Change	Pre Contemplation Post Action
Physical Activity Participation	Pre Twice times weekly Post Five times weekly

Participant C is a male who also took part in the TT intervention. At the start of the intervention he did not take much exercise, and did not really know what interested him. He was uninterested in his weight and fitness levels, and really wanted to

become more physically active in order to alleviate stress, and desired to get outdoors. He decided to start walking, and at post test was an active member in a local walking club, embracing active walking with his dog and participating in organised walks. At post test he had a great regular programme going, which he felt was a major part of his life and now a priority which he loved. His stage of motivational readiness had moved from contemplation right through to the action stage. He felt that he reaped the benefits at work, and in his personal life. His fitness levels increased from an estimated VO₂ Max score of 41ml/kg/min at pre test to 52.2 ml/kg/min at post intervention. Even though his weight did not fluctuate much he was content with his body fat and weight. He had reached his target of being a regularly physically active man, and most importantly was enjoying it.

Table 22. Case Study- Participant D

Participant D	Male Medical Condition –benefited from health screening
Intervention Type	Targeted Intervention
Age	40
Weight	Pre 96kg Post 95kg
Body Fat	Pre 24% Post 22%
Flexibility	Pre 35cm Post 35cm
Grip Strength	Pre 38 Post 37
Aerobic Capacity(ml/kg/min)	Pre 40(VO₂Max) Post 42(VO₂Max) VO₂Max (ml/kg/mins)
Stage of Change	Pre Preparation Post Preparation
Physical Activity Participation	Pre twice weekly Post four times weekly
Cholesterol Test	>6

Participant D was a male member that took part in the TT intervention in the station. Initially he did not appear over enthusiastic about the programme. His pre and post scores do not reveal that he embraced the programme seriously, even though he was quite fit anyway. He availed of the intervention's medical checks i.e blood pressure and cholesterol screening days, and was quite concerned with his results. As the researcher is not a medical practitioner, he was advised to attend his doctor to investigate further. About two months after the intervention ceased he contacted the researcher to inform her of recent events. During the visit to his doctor he also found the results of both tests high, and upon further investigation, and tests, it was revealed that he was quite ill, and required emergency surgery on a tumour. Without revealing the extent of his medical problem, he made contact with the researcher to thank her for highlighting these results and that only for early intervention to detect his situation, it could have been grave. He conveyed the importance of regular screening, especially in males, and increasing awareness of health issues. He admitted that only for he attended these medical screenings as part of the overall programme, he would never have known his health status until maybe it was too late.

The specific objectives of the physical activity promotion programme in the workplace endeavoured to examine the effects on participants ; stage of motivational readiness to participate in physical activity, frequency of physical activity undertaken and fitness levels pre and post intervention. Even though there was no statistical significance to support the programme, there was subtle changes in participants physical activity behaviour. It is still difficult to pinpoint or recommend the ideal level of interpersonal contact needed to induce change, as the results were similar, irrespective of intervention type. However the TT intervention was most effective in increasing the frequency of physical activity participation towards regular activity. This gives credence to the fact that Gardai still responded to personal attention and that they thrive on goals, initiatives and ongoing monitoring and advice to enhance their participation.

The programme content was aimed at increasing physical activity participation rather than increasing specific fitness levels. This could explain the lack of fitness gains at post test. The participants did show movement in the stage of change of exercise

behaviour. No participant moved from pre contemplation right through to maintenance at post test, even though this is attainable in the length of the .intervention. The subtle changes must be applauded, even if it is only one or two stages. One aspect to highlight is that participants motives for and barriers preventing participation in physical activity are clear and programmes must take these into account in design and approach.

Chapter 5

Discussion of Results

Introduction

The author carried out research on the effects of a long term physical activity promotion programme for members of An Garda Siochana. This was always going to be a challenge, as the literature demonstrates improvements in physical activity levels with short-term interventions, i.e. 3-6 months, but no improvements with long term interventions. The long-term effects of physical activity promotion were investigated in the present study. Most encouraging was the fact that at post-test there was a tendency for participants to increase their frequency of physical activity from once to three times weekly. The goal was to increase physical activity participation to at least 30 minutes of moderate exercise on most days of the week, in order to be classed as a regular exerciser. But any improvements in exercise behaviour must be commended. 70% of this cohort came from the TT intervention, which suggests that this intervention and its activities increased participation in physical activity. An example of an activity from the TT intervention was the ‘around the country in 8 weeks challenge’, “**W**_{hen} **W**_{here} **W**_{ho}.” This was a lunchtime walking group set up in the Garda station, and the motivational cues were displayed in the Garda station (Appendix 8, 9, 10).

An Garda Siochana is such a huge organisation (over 12000 members), in order to induce change in the exercise behaviour of its members, it would require a change of attitude at many levels, including policy making and operational levels. The author is unsure if her findings are enough to influence the policy makers. Of particular interest to the author was the “worried well” a “category of regular exercisers who are willing to take part in any physical activity initiative, because they already possess a high level of motivation. Methods to attract members that would benefit most from programmes like this need to be carefully considered. These Gardai are most likely the pre-contemplators and contemplators and need special attention in recruitment and retention in exercise programmes.

5.1 Limitations to this study

The intervention was carried out on a non-random convenience sample and therefore results cannot be generalised to the population at large. The significances found can only relate to the sample chosen. The sample was not a normal distribution to start off with and this led to difficulties in analyzing the intervention's effect. This raises the issues on the ideal sample to choose from and its accessibility and availability. There were numerous other limitations affecting the delivery and evaluation of this study. The two main limitations were surrounding the fact that some of the participants were already reasonably healthy and physically active, and the self-report tools used in the study with this cohort proved unreliable. Due to the unpredictability of Garda work and shift-work rosters, at times even the most carefully planned timetable could be disrupted at short notice.

5.1.1. The Worried Well

It could be suggested that the majority of the people who participated in this worksite physical activity promotion initiative were healthy and active. These people are often referred to as the “worried well” i.e. people who are healthy but always concerned about the status of their well-being and will always make an effort to participate in activities to enhance their health. Therefore the people who would benefit most from a programme like this appear not to volunteer, and shy away from initiatives in the workplace. This could be due to their feelings of inadequacy and fear of not being suitable candidates.

Dishman et al (1998) acknowledged that many people who join worksite physical activity initiatives may have been active prior to the intervention and thus it will be difficult to improve their physical activity levels. This programme depended on volunteers to participate and these appeared to be from an active cohort. e.g. how many have minimum average fitness scores from the 6 minute bike test (89%). This is a general limitation with this type of research design, where there is a self- selection bias.

5.1.2. Volunteering for a study

If this was an obligatory programme for all members with consequences at the follow up (e.g. promotion opportunities, pay rise, incentives) participation rates may have been higher and the programme and its results for each person may have been taken more seriously. This however takes the choice of the participant to exercise away, and leaves it with the employer as a work appraisal tool. An Garda Siochana as an organisation, and individual members, are adversely affected by the low rates of participation in physical activity, which has implications for health fitness, productivity and absenteeism levels. Browne (1999) reported that this was relevant to Gardai, stating that “most programmes tend to be geared to those who are ready to take action to become more physically active in spite of the fact that most people are not in this stage of readiness for action”. Browne suggested that this mismatch may explain why so many programmes fail in their endeavour to keep people physically active”.

5.1.3. Intervention Environment

Sallis and Owen (1999) point out that there is minimum amount of reference put on the micro-environment (i.e. physical and social factors) when planning programmes. . Social support is important to people, but little is known about when, how and what type of support is necessary to promote physical activity. Although focusing on these variables are beyond the scope of this study none the less they need to be identified as potential limitations also. Interventions to promote physical activity should be aware of the synergy required at micro, meso and macro environment levels. These personal, psychological, environmental and programme factors need to be considered or a mismatch will occur.

5.1.4. Measuring Tools

The ability of participants to accurately recall recent Physical Activity is questionable. There was no reliability study carried out on this group before the study which may have helped the researcher. A review of literature (Baranowski,1998) surrounding the reliability and validity of self report measures found that using these types of

questionnaires assume that people have an understanding of specific terms such as moderate intensity exercise and that their report of physical activity expenditure is similar to what the researcher expects. These factors can explain some suspect self-report questionnaires. The author was aware that a new physical activity measuring tool specific for the Irish population was been developed by Dr. Catherine Woods and staff in Dublin City University (DCU), but was not validated at time of the initiation of this study.

5.1.5. Work Rosters

It was promised that all participants could take part in the programme during their shift. However accessibility to all participants was difficult due to the nature of the workloads on a particular day and calls that came into the station. Workshops, fitness screenings and presentation times often had to be changed or rescheduled due to work commitments which were difficult for the facilitators and time consuming for the researcher.

Members of An Garda Siochana work in units. The station party is divided up into four units (A, B, C, D.). One unit is on duty at any one time to ensure a 24hr service.

Accessing all relevant and interested participants during their working shift was often difficult. Due to the three relief work roster at any one time/day there would always be a unit off, a unit not working until 10pm(nights), a unit working 6am-2pm(early) and the last unit working 2pm-10pm (late).

The data analysed in the previous chapter revealed some varied findings. In order to discuss these findings each variable will be examined and dealt with separately.

5.2 The impact of the intervention types

Wanzel in 1994 reported that work-site programmes in general recruit 20% of employees and this figure will drop to 10% within 6 months. However in the present study it has been found that the response rates were higher (43%). This could be due to the persistence and time put in by the author in setting up the initiative e.g. letters of permission and support, liaising with management and the sergeant in charge of each Garda station, drawing up workable timetables and putting up bulletin boards/leaflet

holders. The intervention was new, and with the permission of management in each station for the set up of the initiative, members responded by taking part.

The TT intervention was welcomed in the stations involved and the visibility of the programme was evident with the monthly workshops, medical tests e.g. cholesterol and blood pressure, the physical activity challenges or information leaflets and newsletters displayed on their dedicated bulletin board. The initial response was 78 out of 100 questionnaires circulated. With the exclusion of spoilt and invalid questionnaires the remaining group was 59 out of 100, which was a 59% response rate.

The IO intervention was less visible and there was less interaction within between the researcher and volunteers. Initially 50 out of 100 participants responded to the questionnaire. This was reduced to 36%. The NI had a response rate of 34%. The adherence rate remained highest in the TT intervention. The intervention that involved the least interpersonal contact had lower participation (NI).

A considerable amount of people midway through the TT programme expressed their regret to the author for not taking part from the start. Anecdotally the author felt that members were sceptical at the launch of this programme, not trusting that their results would be kept private and that somehow their inadequacies would be exposed. It is also possible that due to the manner in which this programme was marketed it attracted the “worried well” who were already fit and active. The pre-contemplators and contemplators may have felt less confident about taking part and deselected themselves at this point. This is unfortunate as these are the people that this type of study would like to attract and are the people who would benefit most from what the intervention and its initiatives would offer. Most gains in terms of reduced health risk come from moving people from being sedentary to doing some physical activity. This raises questions surrounding the selection process involved for recruiting participants to take part in physical activity initiatives.

The workshops and guest speaker's input helped create a good atmosphere in the station, and there was a good facilitator/ participant relationship. There was a good response from all ranks with the chief superintendent, superintendent, 2 inspectors and 2 sergeants taking part in the TT intervention. This reinforced the positive attitude towards the programme. However this level of management participation was only evident in the TT intervention, partly because management were themselves interested in the intervention. Management participation and interest was not as evident in the IO and NI intervention apart from a few members that were interested in sport themselves, again "the worried well". Participants that reported an increase in their physical activity levels from once to three times weekly were from the TT intervention group. This highlights that the TT approach did manage to motivate those that were less active to become more active, even though they did not reach regular physical activity levels (i.e. 30 minutes of moderate intensity physical activity on most days of the week).

The IO intervention was an intervention with no personal contact at all. Once the initial questionnaire and fitness screening stage was finished the only presence of a worksite physical activity initiative was the literature posted on the bulletin board at the station, or newsletters delivered to the station. In these Garda stations the researcher depended on a Guard who acted as a volunteer to receive the programme information and place it on the bulletin board or designated shelf. There was not a sense of belonging to the programme in these stations, due to the lack of interpersonal contact. 15% of the participants that increased their physical activity to three times a week came from the IO intervention group.

In the NI group once the questionnaire and fitness screening was finished Gardai were left to their own devices, until eleven months later when each participant received notification of the post fitness screening. Some participants had forgotten about the project, but when contacted they looked forward to the re-test to compare results. It was interesting to note that 15% of the Gardai who increased their physical activity participation to three times weekly came from the NI group. This suggests that even a subtle prompt about physical activity participation in the form of the fitness screening

may have been enough to induce some change. It is interesting that the IO intervention who received the posted information had similar increases in exercise participation as the NI intervention. The researcher has no evidence that Gardai in the IO intervention actually read the posted literature. Both participant A and C in the case studies revealed that they increased their weekly physical activity participation from twice to five times weekly at post test, also moving from pre-contemplation to action at post test. There were no improvements in fitness at post test, but they did report a reduction in weight at post. This progress is quite substantial coming from an IO intervention. From this result there may be no benefit to be gained by providing information for Gardai to observe regarding physical activity, (IO) and providing none at all (NI).

5.3 Stage of Change

The methodology used in the Hilton & Doherty (1999) and The Newcastle Exercise Project (1999) was similar to the design of the present study. Results of both studies demonstrated no inter-group differences in stage of change at post test. Non parametric Chi-square test used as a measure of association for categorical dependent variable to the group independent variables combined. It was necessary to collapse the five stages of change categories to two categories; not active (pre-contemplation, contemplation and preparation) and active (action and maintenance). There was an increase in 10 participants (8%) in the action group at post test, 8 of which were in the TT intervention. This is testament to the efforts of the intervention. However a significant outcome of the intervention, irrespective of intervention type, was that on average 59% of participants remained in the same stage of change at post test. On a positive note 30% of participants progressed a stage. This means that one in three participants in the programme moved on a stage at post test.

Bull, Kreuter and Schorff (1999) reported that twelve months was an ideal time span to move right through from pre-contemplation to maintenance. The author in this study did not find evidence of this transition. The majority of participants remained in the same stage at post test or progressed/regressed one stage. Even though the TT intervention did

possess the recommended tailored, personalised and general advice, seen to be most effective, it did not yield great dividends in this study, in relation to stage of change.

Movement of participants through each of the stages of change (Table 8, pg 76). Even though the stage of change was analysed in two groups in order to report significance, the author thought it was important to appreciate the subtle movements

- Pre-contemplation (6 at pre test, 0 at post test)

At post test there were no pre-contemplators. This was very encouraging. It must be emphasised that the biggest challenge facing physical activity promoters is getting the sedentary people active or even at the stage where they are thinking about becoming more physically active. The increased gains are to be made by getting those who are most sedentary to do some form of activity.

- Contemplation (34 at pre test, 13 at post test)

38% of Gardai stayed at this stage at post test. This illustrates the challenge in trying to get people who have acknowledged what they need to do, to develop the confidence and obtain the support they require to prepare to make changes. In this study the fitness screening served as an awareness of Gardai's fitness levels, but maybe this was not enough to help prepare to make changes. Each participant got a stage-matched booklet to read. This raised awareness for some volunteers and 47% of contemplators moved to preparation, with the remaining 15% moving to action at post-test. The TT intervention had 63% of the participants that had progressed to the action stage at post-test.

- Preparation (40 at pre test, 26 at post test)

65% of the Gardai in the preparation stage remained in that stage at post test. Only 7.5% moved right through to maintenance, with 22.5% (1 in 5) moving one stage to action. This is where the combination of intention and behaviour change occurs. 39% of the total group were in this stage at post test, an increase of 8%. The preparation stage is difficult to move on from. Possibly a dedicated action-orientated programme may have been more suitable to these participants consisting of organised classes and activities. Ongoing programme planning would benefit these people also. These aspects were not part of the intervention programmes which were more directed at physical activity

participation awareness. But the intervention newsletters did provide information on time management, coping strategies and activity types.

- Action (8 at pre test, 20 at post test)

50% of the action group at pre test regressed back to preparation. Only 12% of the group moved on to maintenance. The remaining 38% remained in the action stage at post test. It is conceivable that Gardai could progress from the pre-contemplation, contemplation or preparation stages through to the maintenance stage within twelve months. However, this progression did not occur in this study.

- Maintenance (41 at pre test, 34 at post test)

This stage had a large portion of the group, and in the authors view a group that were comprised of participants who possibly overestimated their activity levels. However the group remained the same at post stage, with only 7 Gardai regressing, but no more than two stages. This group were already fit and active and motivated toward their goals. The programme itself did not really make a worthwhile impact on their activity levels but they still enjoyed the opportunity to get a yearly fitness assessment and the medical checks available i.e. cholesterol and blood pressure testing. They did out weight the remainder of the group and the author felt that such a large presence of “the worried well”, possibly led to others feeling inadequate. In hindsight the Gardai that may have benefited most from an intervention of this kind are those in the pre-contemplation, contemplation and preparation stages. These Gardai may have shied away from the intervention thinking they are not the profile of participant required, or they are ‘not fit enough’ or they might just not be interested. Herein lies the challenge. Programme promoters need to consider carefully the best type of intervention to attract those who would benefit most from it. 11% of total participants, one in ten regressed a stage at post test. This was concurrent with Marcus’s study (1996), where they found that even if people regressed a stage they were only likely to go back to contemplation and not pre-contemplation.

The TT and IO interventions used materials aimed at participants in each stage of motivational readiness for change. Upon reflection it is possible that there may not have been enough focused at those in the preparation stage, this is where an action orientated programme could work best. 83% of participants in the maintenance stage remained

there at post stage. This was positive, with only 10% regressing to action and 7% to preparation. However participant A and C in the IO intervention did move from pre-contemplation to action during the intervention. Similarly Participant B in the TT reported a significant reduction in body weight/body fat and increase in cardiovascular fitness which he dedicated to the presence of the intervention in the workplace, and feared that he may regress to inactivity without its motivation. The explanation for this could be that either these participants are self-motivated or “the worried well”, who enjoy any interventions that involve physical activity. It was encouraging however that at post test their stage of change was still at maintenance.

The results of the present study do not mirror those found in Hilton and Doherty (1999). Their staged matched intervention at twelve months resulted in 31% of the group progressing to the action stage at post test compared to 16% in the current study. However the movements found in this study are similar to those found in the “Project Pace” by Calfras et al. (2000). 33% of participants showed a stage progression of some sort. This compares to 30% in this study showing stage progression.

5.4 Physical Activity Participation

In order to become “regularly physically active”, a person must aim to participate in some form of moderate physical activity for 30 minutes minimum on most days of the week. It is as effective to do one 30 minute bout of exercise, or three intermittent bouts of 10 minutes. These activity levels are enough to derive health benefits (Irish Heart Foundation 2001). This study found that at post test 48% of participants were reaching this target, which was an increase of 1% from 47%. However interesting changes occurred in the remaining 52%, who were not regularly physically active at pre-test. The cohort of participating Gardai that exercised three times weekly increased from 12 to 20 participants from pre to post test, and those that were physically active once weekly fell from 20% at pre test to 7% at post test. It is encouraging to see that even though participants were still not regularly physically active, they are much more active at post test. These participants who increased their physical activity came from the TT

intervention, suggesting that the intervention helped to increase the frequency of physical activity undertaken. The two participants case studied in the TT intervention both reported significant improvements in physical activity participation and their fitness scores were improved dramatically for them. This is contrary to the overall result of no change in the fitness scores at post test. Both of these individuals had improved their fitness where they were categorised as good at post test compared at average at pre test.

48% of the group were regularly physically active at post-test. This is above the national average found by the SLÁN report in 1998, which reported that 30% of adults were regularly physically active. There is an expectation that members of An Garda Síochána would be fit due to the nature of the job. Therefore some individuals may consider this figure (i.e. 48%) to be low. It is the authors view that messages relating to the health benefits of being physically active in society at large are either not effective or are not being targeting to those who may benefit most by increasing their level of physical activity. An Garda Síochána as an organisation should take responsibility for their members and dedicate more time and resources into promoting health and physical activity and thereby empower members to take responsibility for their own health and well-being.

Participants agreed that the health benefits of physical activity act as a motivator to exercise. This was also found in Brown's study on Gardai in 2001. Although thinking and doing are closely related, thinking does not always result in doing. Therefore although the interventions were welcomed in the Garda stations, and participants showed great enthusiasm and intention to make changes in their physical activity behaviour, the majority did not do what they had intended to do. Programmes offered to people need to be evaluated regularly to see if they are having the desired effect. If the author evaluated midway through the programme it may have shown more improvements in physical activity. and attitudes towards physical activity. as has been reported in other short term studies on physical activity. promotion.

The twelve-week aerobic programme offered by Harell (1993) showed significant improvements in cardiovascular fitness levels and body composition. This shows that a shorter intensive active programme may bring about changes in fitness. However the question could be asked as to whether this improvement could be sustained in the long term. Programmes need to keep their content positive and motivational to promote adherence to the programme. This is labour intensive for programme operators, and could be viewed as hand holding and not empowering individuals to take responsibility for their own behaviour. However in the pre-contemplative, contemplative and preparation stages participants are at risk of regressing at all times and require support to reach a stage where they are ready to reach their exercise goals themselves.

5.5 Pre and Post Fitness Screening Results

The results show that there was a relationship between pre and post significant T tests according to intervention types that are significant. In TT group there is a decrease in weight and increase in flexibility from pre to post intervention. In the IO group there is a slight decrease in body fat of almost 1%. In the NI group there is an increase in flexibility. The improvement in two areas of fitness could suggest the TT had better results. Fitness screening was an element of all the physical activity interventions in the workplace (TT, IO, NI). It was the element that was the most labour/time intensive. Gardai were very responsive to this part of the intervention, partly due to the immediate feedback they received. In particular the TT participants had an opportunity to set their goals and received stage matched participation intentions based on these results. At pre test there was not a large concern for improving fitness levels from participating Gardai, but there was a huge interest in weight management, and this remained unchanged at post test. Although participants changed their physical activity levels this did not translate into fitness gains. Higher intensity training programmes are required to increase physical fitness and increasing physical activity frequency does not guarantee fitness gains. The overall aim of the current research intervention was to promote regular physical activity participation rather than increasing fitness levels. Exercise programmes need to be tailored to meet the desired results, e.g. improved health, fitness or weight

loss. The twelve week aerobic programme offered by Harell (1993) showed significant improvements in cardiovascular fitness levels and body composition. This shows that a shorter intensive active programme may bring about changes in fitness. However the question could be asked as to whether this improvement could be sustained in the long term.

The workplace has been identified as an important setting to encourage behaviour change as illustrated by Chenoweth (1995), O'Donnell (1994) and Randolifi (1997). Physical activity programmes undertaken in the work environment need to aim for behaviour change at a range of levels, to meet specific and desired outcomes e.g. fitness, weight loss, health benefits. Lifestyle change can be facilitated through the combination of efforts to enhance awareness of physical activity and coping with barriers to participation e.g. shift-work, family commitments and lack of time. Behaviour change is successful where the environment is created that supports good health practice. This needs to be at the centre of any programme delivered by An Garda Síochána in order to satisfy people's needs and be realistic in its delivery.

5.6 Attitudes to Physical Activity Participation

5.6.1 Provision of Initiatives

The Gardai filling out the questionnaires appeared to be very honest when asked for their own opinions. 100% of Gardai replied that they would welcome a physical activity initiative in the workplace. With such an overwhelming response one would expect great participation rate and success. However it may be Garda culture/environment, or even society at large, where people express the importance of initiatives provided by their employer, and that they are being neglected by not having these opportunities available to them. However when the desired initiatives were provided for, many members they did not avail of them.

98% of respondents feel that management do not offer any support to the organisation's members to become physically active. It would need further investigation to assess what level of support would be needed by management to satisfy member's needs. Employers in the interim need to realise that facilitating employee's physical activity participation should not always be seen as a costly, expensive, and unworthy investment. A minimum investment that is client centred could prove popular with staff, leading to an intangible increase in employee's morale.

5.6.2 Health Concerns

60% of Gardai felt that they do not exercise enough to derive health benefits. This correlated to the actual finding where 52% of participants were not regularly physically active at post test. Weight management was high on member's agenda, so possibly a weight watchers support group would have been beneficial. The WWW. Lunchtime Walking Group in the TT intervention proved successful. People met at lunch time and walked a series of marked routes near the workplace. The new Sli na Slainte route around Portlaoise proved popular for this purpose. However guards reported to the researcher that they would prefer not to walk around the town at lunchtime, so they had their own routes mapped out. However people are being asked to alter their behaviour while the environment in which they live and work remains the same. Organisational change and management support is required to facilitate behaviour change.(King 1991)

5.6.3 Motives and barriers to exercise participation

Gardai were asked for motives for and barriers preventing member's participation in physical activity. The main motives for participating in physical exercise were to keep fit and healthy, the desire to lose weight and to relieve stress. These motives will always influence the types of programmes offered to people. From the authors observation an action orientated programme may have proved more fruitful for some of the members involved. This would have encouraged them to experience activities of different intensities and types in order to find their preference.

When Gardai were asked what they need to motivate them to become more physically active the most common responses in order were, a goal/time and adequate time to be physically active and facilities. In the present study there was no gym facilities on site at Thurles, Templemore, Portlaoise, Maynooth, Celbridge and Shankhill Garda Stations. In three stations the gym was now used to store equipment, and in two stations the gym looked dilapidated and anecdotal evidence gave the impression that it is not used a lot. In some places even though facilities were provided Gardai were still not physically active e.g. Bray. Some Garda stations, e.g. Store Street in Dublin City, have a very successful gym operating with staff to run the gym and offer support and instruction. However the Gardai who are using the gym are the people who are active and the people who would benefit most become the non users. It is not enough to spend money on gym equipment and facilities without providing also the interpersonal attention.

It is a multi-faceted problem, where people need facilities to exercise, especially Guards working shift work. Providing facilities in isolation may not be the solution to the lack of participation in physical activity. Facilities were only third on the priority list for members to help them become more physically active. People need to have a goal and time in which to realise their goals. This is reflective of the society we live in today where we appear to be cash rich and time poor. For Gardai coping strategies to help time management and work rosters need to be at the centre of physical activity programmes in order to maintain participation levels.

5.6.4 Programme Effectiveness

The bulletin boards in each Garda Station displayed information about joining clubs and activities and how to be more active in their local area. It is hard to measure if people availed of this information or not, or if it influenced them to become physically active at all. An interpersonal action orientated programme may be also effective in getting people active in conjunction with an awareness programme.

Programmes need to be planned based on individual's needs and their particular stage of readiness for changing their behaviour. We are definitely living in a cash- rich, time- poor society, where we are continually slaves to the clock, and never seem to have time to do anything. It is becoming increasingly evident that if people are not active on their lunch hour during work, they will not get a chance once they get home. The reasons are complex and varied, and include long commuting times, and family commitments. Therefore being physically active moves quickly down the list of priorities.

5.6.5 Coping Strategies

The ability to timetable physical activity at lunchtime or anytime now days requires planning in advance. Gardai need to organise their activity, training gear, access to showers, food and relaxation time, which can often put them under stress when it is supposed to offer the opposite. The more sedentary alternative is often the easier option. The feel good factor felt from exercise is only felt after the activity, and this delayed gratification can be forgotten when Gardai make their choices how to spend their precious free time. Active lunchtime was a feature promoted by the TT places of work e.g. fitting in a simple walk, jog or run was suggested. This involved the organisation of their lunch, which could be pre made at home, having training clothes in work, having access to a shower, and managing their time that they would change, exercise, shower, eat, relax and be back at work on time. This leads on to the other variables affecting the physical activity behaviour of participants e.g. shower facilities at work, management flexibility, provision of adequate lockers, environmental factors, e.g. secure bicycle storage for those that wish to cycle to work. These are beyond the scope of this dissertation but have important influences on participation rates in physical activity.

5.6.6 Measuring tools for investigation

It was difficult to get a true picture of the amount of physical activity undertaken by the Gardai in this study. Some participants reported doing up 36 hours of weekly physical activity at pre-intervention and 73.5 hours of physical activity at post-intervention.

This suggests that people had problems filling in this questionnaire. Due to the fact that the pre test questionnaires were posted to each participant, the researcher was not present during the completion of the pre-intervention questionnaire and was therefore unable to answer questions that the member may have had. This could have impeded the researcher's ability to pick up mistakes which might have been rectified immediately.

A review of literature surrounding the reliability and validity of self report measures found that using these types of questionnaire assumes that people have an understanding of specific terms such as moderate intensity exercise and that their understanding of what constitutes moderate intensity is the same as the researchers (Baranowski, 1988). Research has also questioned a lay person's ability to recall accurately the duration spent at various intensities (Lowther et al., 1999). With this group extra time would be required to fill out both pre and post test questionnaires in the presence of the researcher to attain a more accurate account of physical activity participation. Loughlin (1995) suggested in his final recommendations that the 7D-PAR questionnaire be used initially within an interview framework to minimise potential overestimation or underestimation of physical activity levels. The present research may have achieved more accurate results relating to physical activity participation if participants were required to fill out both pre and post test questionnaires in the presence of the researcher.

Chapter 6

Conclusions and Recommendations

Introduction

The sample chosen is a convenient sample and cannot be said to represent the sample population. The researcher endeavoured to use random sampling i.e members within stations chosen in some aspects, however the sample is convenient. The tests therefore apply to the sample picked rather than the sample population. Further research is needed using more random sampling as it would be more representative. Significant tests have shown association between pre and post intervention. The significance of association in non parametric tests between pre and post intervention shows there is a significant association according to the type of intervention. In these cases caution has been highlighted which show that where cell count has been low leading to association not being sufficiently robust. In the parametric tests significant t tests are highlighted which shows an association between pre and post intervention in a number of tests. Here caution must also be highlighted as significance can happen by chance in a proportion cases if a range of tests are taken. Nonetheless the reliability of the significant parametric test is supported by the significant association in the non parametric test.

Therefore in conclusion for the sample subjects of the study it could be suggested that physical activity frequency benefits from greater intervention. The benefits for fitness outcomes are more complex. They may be affected by gender and there is not strong evidence to show that they depended on the type of intervention applied. Most of all the research has highlighted problems in carrying out research in this area and shows the need for greater research.

6.1 Response to the Physical Activity Intervention

There was a high response rate to the intervention in the workplace, ranging from 34% in the NI, to 70% in the TT, reflecting the level of interest the initiatives brought into the workplace. The overall response rate was 48%. The TT intervention illustrates that a more visible client centred intervention will at least create an interest in the programme.

Unexpectedly there was a large interest from members approaching retirement. The career of a Garda spans up to thirty years. Therefore programmes would have to be age, gender and environmentally targeted to different groups and sub groups.

Weight management is still a central feature of exercise programmes and will still influence participation by members both male and female. This is a global trend and possibly Department of Health policy makers/facilitators need to focus more on the importance of increasing physical activity levels, rather than overemphasising obesity awareness in isolation. Members were asked to categorise their weight and physical activity levels. The data collected in this study would indicate that their perception of themselves was accurate. 60% felt that they do not participate in physical activity to derive health benefits and this was accurate. They predicted their weight category accurately also. 35% were ideal weight, 57% were overweight and 15% were obese at post test. Participants were aware of their body compositions. Programmes targeting body composition effectively may be responsive to change. The Health Belief Model shows that people do respond to health warnings. Therefore awareness of their body composition should be a motivation to try to increase physical activity participation.

74% of the participants were male and 26% female, which is reflective of the gender breakdown in An Garda Síochána. Programmes that are delivered to promote physical activity will therefore need to be aimed at the needs and motives of both males and females, which can be quite varied in nature.

6.2 Implementing the Research

The author found current tools for measuring physical activity hard to administer and the responses obtained may not have been accurate. This is partly due to the nature of this particular workplace, where time was precious, and members may have rushed through the questionnaires. Participants did not see the questionnaires as being of real value to them. In hindsight the author should have allowed more time and supervision in the completion of the seven day recall of physical activity, and the stage of change

questionnaire. Filling in the questionnaires too quickly may have led to people over or under stating their physical activity levels, and thus leading to inaccurate reporting.

The intervention may have been more successful if limited to participants in the pre-contemplation, contemplation and preparation stages. This would have made the intervention more specific. 32% of the participants in this intervention reported being already in the maintenance stage, whereas 62% of the participants were in the first three stages (pre-contemplation, contemplation and preparation).

6.3 Main Findings of Study

6.3.1 Stage of change

The significance of association in non parametric tests (chi square tests on stage of change and physical activity frequencies) between pre and post intervention shows there is a significant association according to the type of intervention applied. There was a progression in participant's stage of change. At post test there was an increase of n=10 (8%) of those in the active stages (action/maintenance). 30% of participants progressed a stage of motivational readiness for change at post test, irrespective of intervention type. This indicates that the intervention had some effect. It is unclear what level of interpersonal contact is needed to induce further change. On the other hand 59% of participants remained at the same stage at post test.

There were no participants that progressed all the way to maintenance from the pre-contemplation or contemplation stage, which is attainable over a twelve month period. This is still a major challenge that presents itself for further physical activity promotion programmes. The fact that all the pre-contemplators moved to contemplation is encouraging and positive. It is at these early stages that the most gains are to be achieved, and of most benefit to people's health and fitness.

6.3.2 Frequency of physical activity and fitness test results

48% of the group were regularly physically active at post test and the amount of people increasing their frequency of physical activity from once to three times weekly rose from n=12 (26%) to n=20 (43.5%) at post test.). The amount of participants that only exercised once weekly reduced from 20% to 6.9% at post test. This shows a clear trend in the movement towards regular physical activity participation. Even though they are still not regular in their participation at post test, their frequency is moving in the right direction.

The results of the fitness screening provided much feedback. In the parametric tests significant T tests on fitness scores are highlighted, which shows an association between pre and post intervention in a number of tests. This was seen in body weight, body composition, strength and flexibility scores. The reliability of the significant parametric test is supported by the significant association in the non parametric test. Therefore in conclusion for the sample subjects of the study it could be suggested that physical activity frequency benefits from greater intervention (TT). The benefits for fitness outcomes are more complex. They may be affected by gender and there is not strong evidence to show that they depended on the type of intervention applied. The mean overall fitness results at post test remained the same: 24% were excellent, 20% good, 45% average, 9% below average and 2% poor physical fitness. However the main focus of the programme was of participation in regular activity rather than improvement of fitness levels. There is a possibility that participants were content to be of average/good fitness and did not feel the need to improve towards excellent. This is a side effect of a volunteer based programme. If this programme was mandatory the profile of results would be different. This also provides support for the recommendation that future interventions should focus on those who are not regularly physically active and those who are not fit at pre-test.

6.4 Management Support

98% of members felt that management offered no support towards physical activity participation or keeping fit. Management support is essential. In An Garda Síochána there are many levels of seniority, from the commissioner to the operational Garda. In order for change to occur it requires a senior officer to have a personal interest in the particular area to induce change. It is a very slow process to try to change policy and convince the policy makers of a viable project. This is unfortunate but the reality is that there are so many lobby groups trying to improve their own department in order to improve the overall working conditions of Gardai. Therefore it is often a hit and miss when it comes to health and well-being of the members of An Garda Síochána.

100% of respondents said they would welcome an initiative in the workplace. However this does not necessarily mean that if an initiative was provided that 100% would get involved and made progress. This supports the view that thinking and actually doing are closely related, but intention does not always result in action. This is where the challenge lies in providing physical activity promotion programmes that will move pre-contemplators and contemplators into action.

6.5 Motives for and barriers preventing participation in physical activity.

Time to participate in physical activity was the greatest reported barrier for members. In the case of the Gardai in this study the biggest barrier is time. This is a factor that could be addressed with proper time management and empowering people to practice time management. Work schedules are a real barrier with the effects of shift-work providing an extra barrier to physical activity participation. These two factors are closely related, and with management support could be tackled. In fairness to An Garda Síochána, there are ongoing new pilot work rosters in operation around the country, but a solution to current shift-work side effects is slow in the making.

The reasons that members were physically active were also similar to society in general. The main motives were to improve fitness, lose weight and relieve stress. These motives are interlinked. Often the member has lost interest in fitness and therefore puts on weight. The side effects of a stressful job are elevated levels of personal stress. If programmes were designed to make members more active they would see improvements in their weight and feel the benefits of physical activity on stress levels.

Members were asked what they needed to become more physically active. Facilities were a priority. However providing a gym and sports facilities is not always the answer to this problem. Where a gym was provided, after a short period only those that were already fit and active were using the facilities. The people who need to become more active do not always respond to the provision of equipment. The other requirement was having a goal/target. People need the interpersonal client-centred approach where their goals are monitored and programmes are evaluated regularly. Time management and interpersonal attention is what people need to maintain adherence.

6.6 Recommendations

To promote physical activity in an organisation comprising of 12,625 members would be a difficult task. At senior management level where ever they turn some section has their hand out looking for sanction of either personnel or finance to enhance the service they provide. Physical activity promotion could be left as the poor relation when resources are divided out. However if the importance of promoting physical activity and its health benefits could be highlighted at senior management level some progress could be made. Physical activity promotion will always be synonymous with health promotion, and is not likely to ever be a stand alone project.

6.6.1 To promote physical activity participation to members of An Garda Siochana

The author's recommendations are as follows:

- The overall approach to physical activity in An Garda Siochana needs to be reviewed. Based on the size of the organisation, it is impossible to focus on physical activity in isolation, without examining the other factors that influence physical activity: intrapersonal factors i.e. relapse prevention, use of trans-theoretical model (TTM), meso-environmental factors e.g. environmental stress, behavioural settings, and macro-environmental factors e.g. the prevalence of recreational settings and facilities to exercise.
- Physical activity promotion initiatives need to focus on physical activity as a source of enjoyment and a way of life, rather than the over-reliance on competition. Lifestyle physical activity is the daily accumulation of at least 30 minutes of self-selected activities, which can be all leisure, occupational and household activities that are at least moderate to vigorous in their intensity and could be planned or unplanned activities and integrated into daily life.

6.6.2 Management support for the promotion of physical activity to its members

- At present there is no workplace health promotion legislation to guide employers in the workplace. Therefore employers are not under any obligation to provide such programmes. However organisations need to invest in preventative programmes in order to cut down on health care costs, decreased work productivity and absenteeism.
- There is a need for management support of a nationwide physical activity promotion programme. This dedicated physical activity promotion and fitness screening initiative could be a mobile unit set up to promote initiatives in the workplace. The environmental, organisational and social factors affecting such an initiative would need to be examined before the implementation of an initiative.

- Incentives offered by the organisation to its members, e.g. reduced rates in local facilities, tax incentive for those who remain fit. The physical pre entry job competence test exists to successfully get into An Garda Siochana. Similarly there should be acceptable age related fitness levels to be retained in the job. Members should be rewarded for maintaining these levels.
- The introduction of age related yearly fitness screening tests. Each member will have their age related fitness level profile, and incentives are also given to those that maintain age related fitness e.g. promotion, over seas duty, transfer opportunities.
- Initiatives in conjunction with Garda medical section should be piloted. Garda medical aid and G.P referral schemes within the organisation could be monitored in order to have a co-ordinated approach to health and fitness promotion. In particular providing members with individualised feedback about their health and fitness status and progress, increases their chances of successfully becoming more active and striving towards taking the recommended levels of physical activity. This is consistent with research that found that most programmes have included multi-component interventions, targeting a number of health-related behaviours including physical activity, smoking, stress and nutrition.
- Time allowed during work hours to participate in physical activity. Some Garda stations allow a longer lunch hour to accommodate members that are training. Support in time management to members in order to make the best of their time. This could be incorporated into an initiative in the workplace.

- To help members become successful at participating in a sustained physical activity programme a systematic plan needs to be in existence using the following steps:
 1. identify the participants motivation
 2. establish realistic goals
 3. identify barriers to exercise
 4. monitor progress
 5. provide feedback
 6. offer support
 7. use of problem-solving strategies when necessary.

6.6.3 Recommendations of further study on the physical activity behaviour of members of An Garda Siochana;

- To examine the effects of an action- orientated physical activity promotion programme in the workplace. Ideally this programme would take place over 12 weeks, but participants tested again after 12 months to examine the long term effects on participant's physical activity levels gained during the short term intervention.
- Even though long term change is the overall goal the author would recommend a shorter intervention study to examine short term effects of promoting physically activity in Garda stations. (3-6months).
- Due to the wide age span/ years of service in An Garda Siochana, it would be relevant to choose one sub-group to examine their physical activity participation. This could be selected based on gender, age/years of service, rank, of physical activity level (Stage of Change).
- Devise what type of programme would be most effective in recruiting members who might benefit most from a physical activity promotion initiative in the workplace.

- Devise a research methodology which aims to recruit a random sample that forms an intervention group in order to have the ability to make recommendations to the whole population sample. The current study will serve as a pilot study in which to base a more comprehensive random research project.

Bibliography

Adams, J. and White, M. (2003). Are activity promotion interventions based on the transtheoretical model effective? A Critical Review. British Journal of Sports Medicine, Vol.37, pp. 106-114.

Ainsworth, B.E., Montoye, H.J., and Leon, A.S.(1994). Methods of assessing physical activity during leisure and work: In: physical activity, fitness and health:International proceedings and consensus statement. C. Bouchard., T. Stephens., and R.J. Shephard (eds). Champaign, IL: Human Kinetics, pp. 146-159.

Ajzen, I.(1991) The Theory of Planned Behaviour. Organisation Behavioural Human Decision Processes 50:179-211.

Aldana, S.G. (2001). Financial impact of health promotion programs; A comprehensive review of the literature. American Journal of Health Promotion.15:296-320.

American College of Sports Medicine (1990). The Recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness in healthy adults. Med.Sci.Sports Exercise. 22:265-274.

American College of Sports Medicine (1995).Guidelines for exercise testing and prescription (5th ed). Baltimore: Williams & Wilkins.

Anderson, R.E., Franckowiak, S.C., Snyder, J., Bartlett, S.J., & Fontaine, K.R.(1998) Physical activity promotion by the encouraged use of stairs. Journal of American Medical Association Vol 129:363-9.

Anderson, R.E. Effects of a lifestyle activity V structured aerobic exercise in obese women (1999). Journal of American Medical Association. 218;335-340.

An Garda Siochana: Ireland's Police Service, Government publication 2004.

An Garda Siochana Code (1995). Recruiting, Training, Probation & In-Service Training. Chapter 9.9.15.

Armament Systems and Procedures (ASP) (2006).Tactical baton and Handcuff Instructor Certification Course Syllabus. Appleton, WI, USA.

Armstrong, C.A. & Sallis., J.F (1993). Stages of change, self-efficacy, and the adoption of vigorous exercise: A prospective

analysis. Journal of Sport & Exercise Psychology. 15, 390-402

Ashworth, P. (1997) Breakthrough or Bandwagon? Are Interventions tailored to stage of change more effective than non-staged interventions? Health Education Journal. Vol 56 pp 166-174.

Bandura, A. (1977). Toward a unifying theory of behavioural change. Psychological Review, Vol. 84, pp. 191-215.

Bannon, A. (2005). Food for thought- A special investigation. The Irish Examiner. 17/05/05.p4.

Barnowski, T.(1999) Intra-individual variability and reliability in a 7-day exercise record .Medicine and Science in Sports Exercise Vol 31 pp 1619-1622.

Barnowski, T. (1998). Validity and reliability of self-report measures of physical activity: An information-processing perspective. Research Quarterly for exercise and sport, Vol. 59. No.4 pp.314-327.

Bertera, R. (1990) “The effects of a workplace health promotion on absenteeism and employee costs in a large industrial population?”. American Journal of Public Health, September 1990:1101-1105.

Bertera, R.(1993) “Behavioral risk factors and illness day changes with workplace health promotion, “. American Journal of Health Promotion. 24: 365-373.

Blair, S. N.(1984). How to Assess Exercise Habits and Physical Fitness. In:. Maturazzo, J.D., Herd, J.A., Miller, N.E., & Weiss, S.M. Behavioural Health:A Handbook of Health Enhancement and Disease prevention (Eds). New York:Wiley pp 424-447.

Blair, S.N and Haskell,W.(1985) Assessment of habitual physical activity by a seven-day recall in a community survey and controlled experiments. American Journal of Epidemiology. Vol 122 PT5 PP 794-804.

Blair, S.N.(1986) A public health intervention model for worksite health Promotion. Journal of the American Medical Association 255:921-6.

Blair, S.N., LKohl III, H.W., & Gordon, N.F. (1992). Physical activity and health: A lifestyle approach. Med.Exerc.Nutr.Health 1:54-57.

- Blair, S.N. (1995). Changes in physical fitness and all-cause mortality: A prospective study of healthy and unhealthy men. Journal of American Medical Association; 273:1093-8.
- Blair, Susan,(1996) “TheFitworks Savings Story,”Pacific Bell
- Blair, S.N., Dunn, A.L., Marcus, B.H., Carpenter, R.A., & Jaret, P.(2001) Active Living Every Day. Champaign, IL: Human Kinetics.
- Blamey, A., Mutrie, N., Aitchison,T.(1985). Health promotion by encouraged use of stairs. British .Medical Journal. 311:289-290
- Bouchard, C., Shephard, & Stephens (Eds.) (1994). Physical Activity, Fitness and Health. Human Kinetics, Champaign, IL.
- Boutelle, K. N., Kirschenbaum, D.S., Baker, R.C., and Michell, M.E.(1999). How can obese weight controllers minimize weight gain during the high risk holiday season?.By self-monitoring very consistently. Journal of Health Psychology. 34: 276-284.
- Brawley, L.R., & Rejeski, W.J. (1996) Physical activity and health-related quality of life. Exercise sport science review. 24;71-108.
- Breckon, J.D. (2002) Motivational Interviewing in exercise prescription. In Lavallee, D., & Cockerill, I. (Eds) Counselling in sport and exercise contexts. London: Blackwell.
- Browne, C. (2001) Sport in An Garda Siochana-Participation rates. Garda Research Unit, Garda College, Templemore.
- Brownell., K., A., Stunkard, J.,& Albaum, J.(1980) Evaluation and modification of exercise patterns in the natural environment. American .Journal of .Psychiatry 137:1540-1545.
- Buckley, F. (1999) cited in Miller, W.R., & Rollnick, S. (2002) Motivational Interviewing: preparing for change. Guilford Press.
- Buckworth, J., & Dishman, R. (2002) Exercise Psychology. Human Kinetics.
- Bull,F.C., Kreuter,W.M.,& Scharf, P.D.(1999) Effects of tailored, personalised and general health messages on physical activity. Journal of Patient education and counselling.Vol 36. pp 181-192.
- Calfras, K., Sallis, J., Oldenburg, B.(1997) Mediators of change in physical activity following an intervention in primary care:PACE. Journal of Preventative medicine.26:297-304.

Cardinal, B.J., & Sachs, M.L (1995). Prospective analysis of stage-of-exercise movement following mail-delivered, self-instructional exercise packets. American Journal of Health Promotion. 9:430-432.

Cardinal, B.J. (1997) Predicting Exercise Behavior: Using Components of the Transtheoretical Model of Behavior Change. Journal of sport behaviour. Vol 20 PT 3 pp 272-283.

Centre for Health Promotion Studies,(1999).The National Health and Lifestyle Surveys, (Slan and HBSC), National University of Galway.

Chen, S.M. (1998) Wellness in the Workplace: Beyond the point of no return. Health Values, Vol .12, pp.16-22.

Chenoweth, D. (1999). Worksite Health Promotion. Human kinetics. Champaign,IL.

Connaughton, D.P., Hausenblas, H.A., Dannecker, E.A., Lovins, T.R.(2000). An examination of 7 years of biannual university police department fitness assessment data. Journal of Research Quarterly for Exercise and Sport, 71:31-37.

Coone. P.(1999). Sport and Fitness in An Garda Siochana. Its more than just a game Dissertation submitted in part-fulfillment of the requirements for B.A. in policing studies. Unpublished Thesis.

Crump, C.E. (1996). Effect of organization-level variables on different employee participation in 10 federal worksite health promotion programs. Journal of Health Education 23(2):204-223.

DeBusk, R.F., Stenstrand, U., Sheehan, M., & Haskell, W.L.(1990). Training effects of long versus short bouts of exercise in healthy subjects. American Journal of Cardiology. 65:1010-1013.

Dejoy, D.M., & Southern, D.J. (1993). An integrative perspective on work-site health promotion. Journal of Medicine 35(12):1221-1230.

Department of Health and Children.(1999). Building Healthier Hearts :A Report of the Cardiovascular Health Strategy Group.Dublin, Dept of Health and Children.

Department of Arts, Sport & Tourism (2005) Fitzpatrick Review- Review of Local Sports Partnership Programme. Fitzpatrick Associates Economic Consultants. Dublin.

Department of Justice, Equality and Law Reform (2000). An Garda Annual Report, Garda headquarters, Pheonix Park, Dublin.

Department of Health and Children.(1998).Healthy-Bodies- Health Work Report. Department of Health and Children, Dublin.

Department of Health and Children. (2001). Health Promotion in the workplace. National Consultative Committee on Health Promotion. Report of Sub-Committee on Health promotion in the workplace. Department of Health and Children. Dublin.

Department of Health and Children.(2005).The National Health Promotion Strategy 2000-2005. Department of Health and Children, Dublin.

Det Vet, E., & De Nooijer, J. (2006). The Transteoretical Model for fruit, vegetables and fish consumption: associations between intakes, stages of change and stage transition determinants. International Journal of Behavioral Nutrition and Physical activity. 3:13.

DiClemente, C.C., & Prochaska, J.O.(1991) The process of smoking cessation :An Analysis of Precontemplation, Contemplation, and Preperation Stages of Change. Journal of Consultation and Clinical Psychology. Vol 59. 295-304.

DiClemente, C.C., Prochaska, J.O. (1992). Standardized, individualized interactive and personalized self-help intervention for stages of smoking cessation. International Journal of Addictive behaviours,10,pp. 395-406.

Dietz, W.H.(1996) The role of lifestyle in health: The epidemiology and consequences on inactivity. Proceedings of the nutrition society, Vol 55, No. 3.pp 829-840.

Dishman, R.K., .& Steinhardt, H.(1989) Reliability and concurrent validity for a 7-d recall of physical activity in college students. Medicine and Science in Sports ExerciseVol 20 PT 1 Pp 14-25.

Dishman, R.K.(1990) Determinants of participation in physical activity. In: Bouchard, C., Shephard, R.J., Stephens, T., Sutton, J.R.,& McPherson, B.D., Exercise, fitness and Health. Champaign: Human Kinetics Books.p.p 75-101.

Dishman, R.K., and Sallis, J.F.(1994) Determinants and interventions for physical activity and exercise. In: Bouchard, C, Shephard, R.J., Stephens, T, eds. Physical activity, fitness and health: international proceedings and consensus statement. Champaign,IL: human Kinitics Publishers.214-38.

Dishman, R.K., & Buckworth, J. (1996). Increasing Physical activity: A quantative synthesis. Medicine and science in sports and exercise. Vol 28 PT 6 PP 706-719.

Dunn, A., Garcia, M., & Marcus, B.(1999). Six –month physical activity and fitness changes in Project Active, a randomised trial. Journal of Medicine and Science in Sports and exercise. Vol 30 pp 1076-1083.

Dunn, A.(1998) Lifestyle physical activity interventions history, short and long-term effects and recommendations. American Journal of Preventive Medicine, Vol 15. Issue 4. pp 398-412.

Ebisu,T.(1985) Splitting the distance of endurance running: on cardiovascular endurance and blood lipids. International Journal of.Physical.Education.30:37-43.

ENWHP-Net-News. European Network Workplace Health Promotion.(1996)
Cost-Benefit Analysis of Health Promotion Measures. Federal Institute for Occupational Safety and Health. Dortmund.

Epstein, T. & Leonard, H. (1998) Integrating Theoretical approaches to promote physical activity, American Journal of Preventive Medicine.Vol 15;257-265.

European Foundation for the improvement of Living and Working Conditions (1999). New Approaches to improve the Health of a Changing Workforce.European Foundation for the improvement of Living and Working Conditions.Luxembourg.

Everly, G. (2000). Crisis Intervention: A review. International Journal of Emergency Mental Health.2 (2), 119-125.

Franke, W.D., & Anderson, D.F.(1994). Relationship between physical activity and risk factors for cardiovascular disease among law enforcement officers. Journal of Occupational and Educational Medicine.Vol 36. No.10.

Friel, S., Nic Gabhainn, C., & Kelleher. C. (1999) The National Health & Lifestyle Surveys: Results from Slan & HBSC. Centre for Health Promotion Studies, NUIG.

Galan, P., Kriska, A.M., & Hercberg, S. (2000) Self-Administered questionnaire compared with interview to assess past-year physical activity. Journal of Medicine and Science in Sports and Exercise. Vol 32 PT 6 PP 1119-1124.

Gallagher, A., Boreham, C., Twisk, J., Neville, C.(2002). Associations between physical fitness and activity patterns during adolescence and cardiovascular risk factors in young adulthood: The Northern Ireland Young Hearts Project. International Journal of Sports Medicine, 23 (Suppl 1), s22-26.

Gettman, L.R. (1998). Occupational related fitness and exercise adherence. In Dishman, R.K, Exercise Adherence its impact on Public Health, p.352. Human Kinetics, Champaign, III.

Gilsenan, Y.(2001) The effects of weight training, plyometric training and complex training on upper and lower body power in Law enforcement personnel. Waterford Institute of Technology: Unpublished Masters Dissertation.

Gorely, T. & Bruce, D.(2000) A 6-month investigation of exercise adoption from the contemplation stage of the transtheoretical model.International Journal of Psychology of Sport and Exercise. Vol 29, pp.89-101.

Gorley, T. and Gordan, S.(1995). An examination of the Transtheoretical Model and exercise behaviour in older adults. Journal of sport and exercise psychology, vol. 17, No.3.pp. 312-324.

Graham-Clarke, P., & Oldenburg, B. (1994) The effectiveness of a general practice based physical activity intervention on patient activity status.American Journal of Behaviour change 11:132-44.

Hammond, S.L. & Leonard, B.(2000) Physical activity challenge: An evaluation of a worksite health promotion intervention. American Journal Health Promotion. 15 (1); 17-20.

Harland, J., White, M., & Drinkwater, C. (1999). The Newcastle exercise project:A randomised controlled trial of methods to promote physical activity in primary care. British medical Journal.21:40-7.

Harrell, J.S., Griggs, R.T., Rockin, E.W., Meibohm, A.E., & Williams. O.D.(1993). Impact of a 12-week aerobic exercise and weight programme for law enforcement trainees. American Journal of Health Promotion, 7, 410-420.

Harris, M.F.(2000) Promoting physical activity in general practice: A controlled trial of written advice and information materials. British Journal of Sports Medicine. 34; 262-267.

Hassler, T. Fisher., B. MacIntyre, P. (2000) Exercise consultation and physical activity in patients with type 1 diabetes. Practical Diabetes International 2000;17:44-8.

Health Education Board of Scotland (1997). The Promotion of physical activity in Scotland: A Strategic Statement. HEBS. Edinburgh.

Health Promotion Unit (2003).Dietary habits of the Irish Population: results from Slan. Summary Report. University of College Dublin, National Nutrition Surveillance Centre.

Health Promotion Department (1999). Dublin healthy Cities Plan- Workplace policies-A Guide to Staff Health Promotion. Health Promotion Department, Eastern Health Board.

Healthy People 2010. Office of Disease Prevention and Health promotion. U.S. Department of health and Human services. 200 Independence Ave, SW, Room 738G, Washington, DC 20201.

Healy, A.(2004). Exercising the right to health in the workplace. Health Supplement Irish Times, 27/1/2004. p 7

Healy, A. (2005). Smiling your way to fitness. The Irish Times-Health Supplement. 15/2/05. p 4

Heaney, J. (2000) Playing into the hearts of the people. Dissertation submitted in part fulfilment of the requirements for B.A. in Policing studies. Garda training College. Unpublished B.A Thesis.

Heart Health Task Force (2003).Ireland's Changing Heart. Second Report on Implementation of the Cardiovascular Health Strategy.Heart Health Task Force, Dublin.

Herrick, A.B. & Stone, W.J. (1996) Stages of Change, Decisional Balance, and Self-Efficacy Across Four Health Behaviors in a Worksite Environment. American Journal Of Health Promotion. Vol 12 pt 1 pp 49-56.

Hilton, S., Doherty, S., & Kendrick, T.(1999) Promotion of healthy behaviour among adults at increased risk of coronary heart disease in general practice:methodology and baseline data from the Change of Heart study. Health Education Journal. 58:3-16.

Holzbach, R. (1993) The effects of a comprehensive Health Promotion program on employee attitude. Journal of Occupational Medicine.22:24-29.

Hope, A. & Kelleher, C. (1995) Health at Work. Lifestyle and Cancer-A Health Promotion in the Workplace. Centre for Health Promotion Studies, National University of Ireland Galway..

IBEC (2004) -ESRI Monthly Industrial Survey. March.

International Union for Health Promotion and Education (2000).A Report for the European Commission.Luxembourg..

Irish Heart Foundation (2001) National Heart Alliance Position Paper on Physical Activity for Children and Young People.National Heart Alliance.

Jacobs, D. R., Ainsworth, J.E., Hartman, T.J., and Leon, A. S. (1993) A simultaneous evaluation of 10 commonly used physical activity questionnaires. British Journal of Medicine and Science in Sport Exercise. 25:81-91.

Jakicic, J.M., Wing, R.R., Butler, B.A., and Robertson, R.J. (1995). Prescribing exercise in multiple short bouts versus one continuous bout:effects on adherence, cardiorespiratory fitness, and weight loss in overweight women. International Journal on Obesity 19:893-901.

Jakicic, J.M., Wing, R.R. (1997) The relationship between presence of exercise equipment in the home and physical activity level. American Journal of Health Promotion, 11, 363-365.

Jakicic, J.M., Snyder, K.A. (1997) The effects of long-term, moderate intensity, intermittent exercise on aerobic capacity, body composition, blood lipids, insulin and glucose in overweight females. International Journal on obesity.21:1180-9.

Janis, I.L., Mann, M.A.(1997) Decision Making : A Psychological Analysis of Conflict, Choice and Commitment. New York: The Free Press.

Jordan, P.J. & Nigg, G.J. (2000) Does the Transtheoretical model need an attitude adjustment? Integrating attitude with decisional balance as predictors of stage of change for exercise.Psychology of Sport and exercise. pt 3 pp 65-83.

Kelliher, C., (1996) Review of workplace health Promotion in Ireland. Centre for Health Promotion Studies, NUIG.

Kirby, A. (2000) Physical Fitness in An Garda Siochana. Dissertation submitted in part-fulfillment of the requirements for B.A. in policing studies. Unpublished Thesis. Garda College Templemore.

Kirk, A., Higgins, I., Hughes, A.(2001) A randomized, controlled trial to study the effect of exercise consultation on the promotion of physical activity in people with type 2 diabetes: a pilot study. Diabetes UK18:877-82.

King, A.C.(1991) Community intervention for promoting of physical activity and fitness. Exercise, Sport and Science Review. 19:211-259.

King, A.C., Blair, S.N. et al.(1992) Determinants of Physical Activity and interventions in adults. Medicine and science in sports and exercise. Vol 24. PT 6 pp 221-236.

King, A.C. (1994) Clinical and community interventions to promote and support physical activity participation. In :Dishman, R., ed. Advances in exercise adherence. Champaign, IL:Human Kinetics. 183-212.

King, A.C., Haskell, W. L.,Young, D.R., Oka, R.K., and Stefanick, M.L.(1995) Long-term effects of varying intensities and formats of physical activity on participations rates, fitness, and lipoproteins in men and women aged 50-65 years. Circulation 91;2596-2604.

Knadler, GF., Rodgers, T.(1987) Mountain climb month program: a low-cost exercise intervention program at a high-rise worksite. Fitness in business, Baltimore (MD): Williams &Wilkins. Oct:64-7.

Larkin, E.(2006). Ireland 2010- Health & Well-Being. Exercise is good for you and your crew. The Irish Independent. P.10.

Larkin, E. (2006). Occupational Health- Sport in the Workplace. An active interest in your work. The Irish Independent- Jobs and Careers. P.2.

Leaf, D.A., Reuben, D.B.(1996) Lifestyle interventions for promoting physical activity: A kilocalorie expenditure-based home feasibility study. American Journal of Medical Science.312:68-75.

Lechner, L., De Vries, H.(1995). Effects of an employee fitness program on reduced absenteeism. Journal of Occupational Medicine. 39;827-831.

Lee, I-M, Paffenbarger, R.S, (1997). Associations of light, moderate, and vigorous intensity physical activity with longevity. The Harvard Alumni Health Study. American Journal of Epidemiology. Vol 151,No 3: 293-299.

Loughlan, C, & Mutrie, N. (1997) An evaluation of the effectiveness of three interventions in promoting physical activity in a sedentary population. Health Education.56:154-65.

Magnus, K., Matroos, A., Strackee, J. (1979) Walking, cycling, or gardening, with or without seasonal interruption, in relation to acute coronary events. American Journal of Epidemiology.110:724-33.

Marcus, Bess.H. & Rossi, J.S. (1992) The stages and processes of exercise adoption and maintenance in a worksite sample . Health Psychology.Vol 11 Pt 6 pp 386-395.

Marcus, B.H., Owen, N. (1992a) Motivational readiness, self-efficacy and decision-making for exercise. Journal Applied Social Psychology.22: 3-16.

Marcus, B. H. (1992b) Self-Efficacy and the Stages of Exercise behaviour Change Research Quarterly for Exercise and Sport.Vol 63,No1, pp 60-66.

Marcus, B.H., & Simkin, L.R.(1994) The Transtheoretical model:applications to exercise behaviour. Medicine and Science in Sports and exercise. Vol 26 pt 11 pp 1400-1404.

Marcus, B.H., & Eaton, A.C. (1994a) Self-Efficacy, Decision Making, and Stages of Change:An Integrative Model of Physical Exercise. Journal of Applied Social Psychology.24,6,pp, 489-508.

Marcus, B.H & King, T.K. (1996) Theories and Techniques for Promoting Physical Behaviours. Sports Medicine.Vol 22 PT 5 PP 321-331.

Marcus, B. Simkin, L.R., Rossi, J.S., & Pinto, M.(1996a) Longitudinal shifts in Employees stages and processes of exercise behaviour change. American Journal of Health Promotion.Vol 10 pt 3 pp 195-200.

Marcus, B., Emmons, K., & Simkin-Silverman, L.(1998) Evaluation of motivationally tailored Vs standard self-help physical activity interventions at the workplace. American Journal Health Promotion.12;246-53.

Marcus, B., and Forsyth, L.A. (2003) Motivating people to be physically active. Champaign, IL, Human Kinetics.

McGinnis, J.M., Williams-Russo, P., & Knickman, J.R. (2002) The case for more active policy attention to health promotion. Health Affairs. 21:78-93.

Mee, P. (2004). Staying Young. The Irish Times- Health Supplement. 30/3/04. p 3.

Mee, P. (2004). Working out why you are overweight is first exercise. The Irish Times-Health Supplement. 14/12/04. p. 6.

Mettler, M.M. (2000) Evaluation of a community-based physical activity campaign via the Transtheoretical model. Health Promotion Practice. Vol 1 pt 4 pp 351-359.

Miller, W.R., Rollnick, S. (1991) What motivate's people to Change?. Guilford New York. pp 14-29.

Morris, J.N., Clayton, D.G., Everitt, M.G., Semmence, A.M., Burgess, E.H. (1990). Exercise in leisure time :Coronary attack and death rates. British Heart Journal. 63:325-34.

Murphy, M.H., Hardman, A.E.(1998) Training effects of short and long bouts of brisk walking in sedentary women. Medical Science & Sports Exercise. 30:152-7.

Naylor, P.J., Simmonds, G. (1999) Comparison of staged-matched and unmatched interventions to promote exercise behaviours in the primary care setting. Health Education Research, Vol. 14, No5, 653-666.

Newman, C. (2004) Why are we so fat?.Offical Journal of the National Geographic Society. Vol 206, No.2. pp 118-124.

Nigg, C.R. & Courneya, K.S. (1998). Transtheoretical Model: Examining Adolescent Exercise Behaviour. Journal of Adolescent Health. Vol. 22, pp. 214-224.

O'Donnell, M.P. (1994) Health Promotion in the workplace. (2nd ed), pp 390-424. Albany, New York:Delmar.

Oka, R. K., King, A.C., and Young, D.R.(1995) Sources of social support as predictors of exercise adherence in women and men ages 50-65. Women Health: Gender Behaviour Policy.1:161-75.

Oldenhove (1998) cited in Aldana, S.G.(2001). Financial impact of health promotion programs;A comprehensive review of the literature. American Journal of Health Promotion. 15:296-320.

O'Morain, P. The changing face of the GP's surgery. The Irish Times- Health Supplement. 1/6/04. pp4.

Ory, M.G., Jordan, P.J., and Bazzarre, T.(2002) The Behaviour Change Consortium:setting the stage for a new century of health behaviour-change research. Health Education research-Theory and Practice. Vol. 17 No.5,pp 500-511.

O'Sullivan, K.(2004). Join Walking Challenge and feel miles better. The Irish Times-Health Supplement. 25/1/04.p 8.

O'Sullivan, C. (2005). Food for thought- A special investigation. The Irish Examiner. 17/05/05. pp16.

Paffenbarger, R.J., Hyde, R., Wing, A., Lee, I-M.,Jung, D., & Kampert, J..(1993) The association of changes in physical activity level and other lifestyle characteristics with mortality among men. N.Engl. J.Med. 328:538-45.

Pate, R. R., M. Pratt, S. N. Blair. (1995) Physical activity and public health: a recommendation from the Centres for disease control and prevention and the American College of Sports Medicine. JAMA 273: 402-407.

Peterson, T.R., & Aldana, S.G.(1999) Improving exercise behaviour: An application of the stages of change model in a worksite setting. American Journal of Health Promotion13.pp 229-232.

Pinto, B., Lynn, H., Marcus, B. (2001) Physician based activity counselling: Intervention effects on mediators of motivational readiness for physical activity. Annals of behaviour medicine.23:2-10.

Prochaska, J.O., DiClemente, C.C. (1984). The Transtheoretical approach;crossing traditional boundaries of change. Homewood, IL:Dorsey Press.

Prochaska, J.O., & DiClemente, C.C. (1983) Stages and processes of self-change in smoking: Toward an integrative model of change. Journal of Consulting and Clinical Psychology,5, 390-395.

Prochaska, J.O., & DiClemente, C.C. (1992) In Search of How People Change- Applications to Addictive Behaviors. American Psychologist. Vol. 47. N0.9 1102-1114.

Prochaska, JO.; Vellicer, W.F. (1997) The Transthoretical model of health behaviour change. American Journal of Health Promotion Vol 12 Issue 1 pp 38-48.

Randolfi, E.A. (1997). A comprehensive model of worksite health promotion. Cited in U.S. Department of Health Services. Healthy people 2000: National Health Promotion and Disease Prevention Objectives. (DHHS publication No. (PHS) 91-50213. Washington, DC:U.S. Government Printing Office.

Sallis, J.F., Haskell, W. L & Wood, P.D. (1985). Physical activity assessment methodology in the Five-City Project. American Journal of Epidemiology. 121:91-106.

Sallis, J.F. Owen, N.(1999) Physical activity and behaviour medicine. Thousand Oaks, CA sage publication.

Schnurr, H.(2004) Are there special nutritional considerations for shift workers?. Canadian Health Network.

Sharky J. (1997) Fitness and Health. Human Kinetics, Champaign, IL

Shaughnessy, H. (2004). Walk your way towards a healthier, fitter and slimmer you. The Irish Times-Health Supplement. 14/12/04. p. 3.

Shephard, R.J.(1990).Costs and benefits of an exercising versus a non-exercising society. In Bouchard, C, Shephard, J, (Eds.) Exercise, Fitness and Health, pp. 49-60. Human Kinetics, Champaign, III.

Shephard, R.J. (1992) Twelve years experience of a fitness program for the salaried employees of a Tronoto Life Assurance Company. American Journal of Health Promotion. 6:292-310.

Shephard, R.J.(1998) Exercise adherence in corporate settings:personal traits and program barriers. In:Dishman, R.K, Exercise adherence :Its Impact on Public Health.Champaign, IL: Human Kinetics, pp 305-320.

Skinner, B.F. (1953) Science and Human Behaviour. New York: Free Press.

Sparrow, D.(1983). Coronary heart disease in police officers participating in the normative aging study. American Journal of Epidemiology, 118, 508-513.

SPSS. (1996)The Stastical Package for Social Sciences (SPSS/PC+). 6.0 ed Chicago:SPSS.

Steinhardt, M., & Dishman, R.K.(1989) Reliability and validity of expected outcomes and barriers for habitual physical activity. Journal of Occupational Medicine. 31:536-546.

Steinhardt, M.Greenhow, L., & Stewart, J.(1991) The relationship of physical activity and cardiovascular fitness to absenteeism and medical care claims among law enforcement officers. Journal of the South Carolina Medical Association, 5, 455-460.

Superko, R.H., Bernauer, E.(1998). Effects of a mandatory health screening and physical maintenance programme for law enforcement officers. The Physician and Sports Medicine, 16, 9, 99-109.

Taylor, C. B., Coffey, T., Berra, K., Iaffaldano, R., Casey, K., & Haskell, W.L. (1984) Seven-day activity and self-report compared to a direct measure of physical activity. American Journal of Epidemiology. 120:818-824.

The Irish Times (2005). Taking the path to better health. The Irish Times- Health Supplement. 3/5/05.p. 4.

The Office for Health Gain (2000). Promoting increased physical activity:-A Review of the National Strategy for Health Boards in Ireland. 1997-2000. The office for health gain. Dublin

Thompson (1990) cited in Blair, Susan, (1996) “TheFitworks Savings Story,”Pacific Bell.

Thompson, C.E. &Wankel, L. M. (1980) The effects of perceived activity choice upon frequency of exercise behaviour. Journal of Applied .Social .Psychology. 10:436-443.

Thompson, S. (2003). Eat your way to fitness. The Irish Times. 6/10/03.pp13.

Thompson, S. (2005). Fit and free by cycling. The Irish Times. 5/4/05.pp2.

Thompson, S. (2003). Getting in Shape for the Future. The Irish Times. 7/10/03. pp13.

Trost, S.G., Pate, R.R.(2000) Using objective physical activity measures with youth: How many days of monitoring are needed? Journal of Medicine and Science in Sports and Exercise.vol 32 426-431.

Tully, D.(1999) Sport and Fitness in An Garda Siochana. Dissertation submitted in part fulfilment of the requirements for B.A. in policing studies. Garda College, Unpublished dissertation

Velicer, C.C., Prochaska, J.O., & DiClemnete, C.C (1998) Standardized, individualised, interactive and personalised self-help programs for smoking cessation. Health Psychology. 11:111-118.

Vuillemin, A., & Oppert, J.M.(2000). Self-administered questionnaire compared with interview to assess past –year physical activity. Medicine and science in sports and exercise. Vol32 PT 6 pp 1119-1124.

Wanzel, R.S. (1994) Decades of worksite fitness programmes:Progress or rhetoric?. International Journal of Sports Medicine, 17, 324-337.

Wellness Councils of America, (1995) “Self care works: Are Worksite health promotion programs cost-effective?. Worksite Wellness Works.(on line). Available:<http://www.wellworkplace@welcoa.org>.

Wellness Councils of America (1995) “Self Care Works:Medical Claims-based Study shows \$4.75 Savings for every \$1.” Worksite Wellness Works. .(on line). Available:<http://www.wellworkplace@welcoa.org>.

Weston, R.(1995) What is health promotion?. How does it relate to the workplace/. European Journal of Cancer Prevention, 4,115-122.

Weston, P. (2004). My Kind of exercise. The Irish Times-Health Supplement. 30/3/04.p.8

Weston, P. (2005). My Kind of exercise. The Irish Times-Health Supplement. 24/2/05.p.8.

Weston, P. (2006). My Kind of exercise. The Irish Times-Health Supplement. 11/7/06. p.8.

White, C. (2003) Health and Fitness in An Garda Siochana: Is the training received by members adequate?. Dissertation submitted in part fulfilment of the requirements for B.A. in policing studies. Garda Training College, Unpublished B.A. Thesis

Williams, M, Petratis, M., & Baechle, T. (1987). Frequency of physical activity, exercise capacity and atherosclerotic heart disease risk factors in male police officers. Journal of Occupational Medicine, 29,596-600.

Workplace Health and Safety (1997). Managing Shiftwork, Queensland

World Health Organisation (1996). Ottawa Charter for Health Promotion: An international conference WHO Regional Office, Copenhagen

Woolfenden, S.I. (1996). An exploration of sick absence in the police service. Manchester, 46-3788.

Woods Catherine (2004) An active interest in your work.Cited in : The Irish Independent-Occupational Health. September 24th 2004.

Young, D.R., Haskell, W.L., Taylor, C.B., & Fortmann, S.P.(1998) Effect of community health education on physical activity knowledge, attitudes and behaviour: the Stanford five-city project. American Journal of Epidemiology. 40:6-12.

Young, D.R., Jee, S.H.& Appel., L.J. (2001)A comparision of the Yale Physical Activity Survey with other physical activity measures. Journal of Medicine and Science in Sports and Exercise. Vol 33 Pt 6 pp 955-961.