# Motivation and Behaviour Change in *Parkrun* Participants in Western Cape, South Africa

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# DECLARATION

I, Edgar Chivunze (CHVEDG002), hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| BMI | Body Mass Index |
| IQR | Interquartile Range |
| NCD | Non-communicable Disease |
| WHO | World Health Organisation |
| UK | United Kingdom |

# ABSTRACT


**Background**

Participation in physical activity is a cost effective way to reduce the risks of over 25 chronic diseases. Despite the many dangers of physical inactivity, more than a quarter of the South African population remains inactive. One initiative aimed at increasing engagement in physical activity is *parkrun,* a free weekly 5 km running/walking based activity. There has been an increase in the number of *parkrun* participants in South Africa since its inception. An understanding of the motivation for participation and health related behaviour change is important for organisers and public health professionals to increase participation in this weekly mass participation event.

**Aim**

The aim of this study was to describe the motivations for participation in *parkrun* and physical activity related behaviour changes among *parkrun* participants registered in the Western Cape Province of South Africa.

**Specific objectives**

The specific objectives of this study were: to identify demographic characteristics of *parkrun* participants in the Western Cape Province of South Africa; to describe the motivations for participating in *parkrun* runs in the Western Cape Province of South Africa; and to investigate physical activity related behaviour changes as a result of participating in *parkruns* in South Africa's Western Cape Province based on pre and post participation physical activity levels

**Methods**

A cross sectional study was performed on 1787 *parkrun* participants registered at 40 *parkrun* sites in the Western Cape Province of South Africa. Participants from 37 of these sites were invited to participate via the *parkrun* South Africa mailing list in an online survey. Participants from the remaining three *parkrun* sites responded on paper-based questionnaires at the *parkrun* sites. The questionnaire included sections on demographic characteristics including employment status, gym membership and educational level; physical activity programmes before joining *parkrun* and changes in physical activity after joining *parkrun*.

**Results**

The median age of participants was 50 (IQR:38-59). Female participants formed 53.3% of the sample. Approximately 80% of participants were educated to diploma or degree level (Technikons/College/University); and participants reported high employment rates (71%). Fifty-one percent of the sample were gym members. A total of 64.8% reported having very good to excellent health.

A total of 86.1% reported health/fitness as the biggest motivation for participation in *parkrun*. Another 71.8% of the sample were motivated by enjoyment. Safe environment (58.7%), earning Discovery Health Vitality Points (46.4%), stress relief (40.8%), cost (40.4%) and socialisation (39.4%) were other common motivations among the sample.

After joining *parkrun*, 24% of participants took up new physical activity programmes, with a further 24% of participant increasing their weekly volume of physical activity. More female participants (50.9%) than male participants (44.7%) increased their physical activity levels or took up new physical activity programmes ($\chi^2$ =7.331, p=0.007). Running was the widely adopted physical activity attracting 18.2% of the sample as new runners.

**Conclusion**

In conclusion, we found that *parkrun* in the Western Cape is mostly taken up by participants in their sixth decade of life with half of them being overweight. Most participants are physically active before joining *parkrun* with more than half exceeding recommended global physical activity levels. These results were described in previous studies in Australia and the UK. We also found health/fitness to be the biggest motivation for *parkrun* participation followed by enjoyment and the safe environment provided at *parkrun* sites. Running and walking are the common activities that are taken up by participants after joining *parkrun*. Further prospective studies are recommended to determine cause and effect models and describe health related physical activity behaviour changes in detail.

# CHAPTER 1: INTRODUCTION AND SCOPE OF THE THESIS

## 1.1. Introduction

Physical inactivity has been labelled a 'pandemic' and a major cause of mortality and morbidity [1]. In 2010, physical inactivity was identified as the fourth leading cause of death globally and a major contributor of health expenditure worldwide [1, 2]. Its association as a risk factor for chronic non-communicable diseases (NCDs) including heart diseases, type 2 diabetes mellitus, chronic kidney diseases, some cancers and depression has been described in the literature [3]. These diseases were collectively the second leading cause of mortality accounting for 30% of recorded deaths in Africa in 2011 [4].

In South Africa, NCDs caused 39% of deaths in 1996 and 2010, figures that were similar to the numbers of deaths from HIV/AIDS and Tuberculosis combined [5, 6]. The health system has been overburdened in dealing with the increasing incidence of NCDs [4, 7]. As the economic and social effects of these diseases together with physical inactivity increases, there is need for cost effective preventative measures to curb this trend [7]

Physical activity is an affordable way to reduce the risks, and manage non-communicable diseases [3]. The global trend in physical activity has not changed much, despite the focus of many public health initiatives aimed at improving participation in health related physical activities [8]. Many people are still not meeting the minimum thresholds of physical activity required for improving health outcomes. The World Health Organisation (WHO) published these guidelines more than a decade ago where a minimum of 150 minutes of moderate physical activity is required to reduce markers of non-communicable diseases attributable to physical inactivity [9].

Some studies have shown that engaging in a minimum amount of physical activity yields benefits to being completely sedentary [10]. Others report that at least 15 minutes of exercise a day or 90 minutes a week have beneficial effects on cardiovascular disease markers [11]. There is a dose response to physical activity, in that the more physical activity that an individual performs, the greater the risk reduction for non-communicable diseases [12, 13].

Efforts to increase participation in physical activity take many forms. Mass participation physical activity events have been used for a long time to increase health behaviour among participants or for other reasons [14]. A disadvantage of these events is that they are not held regularly. One such event that introduced changes to traditional way of conducting mass participation events is *parkrun. Parkrun* is a weekly free mass participation event held in parks and other free open areas close to where people stay [15]. *Parkrun* has been found to be associated with weight loss and improvements in mental health and wellbeing [16-18].

Research on *parkrun* has mainly been on the health benefits of *parkrun* and related health behaviour change [17, 19]. Despite the presence of *parkrun* in South Africa for more than nine years, which has seen its membership grow to more than 750 000 members, to our knowledge no study has been conducted on this population. The heterogeneous population, the wide variations in socioeconomic status, the diverse cultural practices and high rates of crime in South Africa have been described as affecting physical activity participation [20]. These are the factors that *parkrun* seek to address as a mass participation event to encourage physical activity [21].

To improve understanding of the motivation for participation in *parkrun* and identify health related behaviour change, there is need for research into *parkrun* participants.

## 1.2. Aim and Objectives

### 1.2.1. Aim of this Study

The aim of the study was to describe the motivations for participating in *parkrun* runs and physical activity related behaviour changes among *parkrun* participants registered in the Western Cape Province of South Africa

### 1.2.2. Specific Objectives

The specific objectives were:

- To identify demographic characteristics of *parkrun* participants in the Western Cape Province of South Africa

- To describe the motivations for participating in *parkrun* runs in the Western Cape Province of South Africa

- To investigate physical activity related behaviour changes as a result of participating in *parkruns* in South Africa's Western Cape Province based on pre and post participation physical activity levels

## 1.3. Significance of this Study

*Parkrun* is a growing initiative that encourages free participation in 5 km runs / walks for all participants regardless of their physical activity history and capacity. While this intervention attracts many participants in South Africa, the motivation for participation in *parkruns* and the health related behaviour change have not been described. Physical inactivity levels remain high in South Africa and the scourge of NCDs is ever burdening healthcare facilities [(4)]. Cultural, socioeconomic factors and the presence of the built environment have been cited as barriers to physical activity participation [(20)].

*Parkrun* plays a role in the fight against physical inactivity, NCDs and addressing the associated barriers to exercise participation as an affordable and safe way to improve health [(22)]. Knowledge of factors associated with greater participation will further help organisers to encourage more participation and reduce attrition from already registered participants. Describing the health related behaviour changes due to *parkrun* participation helps in encouraging more participation in *parkrun* and reduce the burden of physical inactivity.

## 1.4. Plan of Development

This dissertation will present a comprehensive review of the literature on physical activity, mass participation events and *parkrun* (Chapter 2). The study methodology will be discussed in detail (Chapter 3). The results and discussion will be presented next, describing the demographic characteristics, the motivation for participation in *parkrun* and the associated health related behaviour change together with the limitations of this study (Chapter 4 and 5). The summary and conclusions are presented last (Chapter 6)

# CHAPTER 2: LITERATURE REVIEW

## 2.1. Introduction to Physical Activity

### 2.1.1 Introduction

Physical activity is defined as any 'bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure' [23]. When physical activity consists of planned and structured 'bodily movements done to address components of physical fitness' this is called exercise [24].

The types of exercises referred to in the literature include endurance training and resistance training [25]. Endurance training involves performing exercises aimed at improving the 'functional capacity of the pulmonary, cardiovascular and skeletal muscle systems' [25]. When an exercise is done in a way that causes a muscle to contract against resistance either using weights or the body, this is called resistance training [25]. Resistance training can either be isometric, concentric or eccentric [26]. In isometric resistance training, the muscle contracts without changes in its length, concentric exercise involves shortening contraction against resistance while in eccentric contraction the muscle lengthens under a load [25].

When an individual does not engage in recommended levels of physical activity, this is called physical inactivity [27]. Physical inactivity has been associated with increased mortality and morbidity and a major risk factor for non-communicable diseases [1, 28, 29].

Engaging in regular physical activity has been found to have many benefits to health and well-being globally [10, 30-32]. The use of physical activity for health benefits is an old phenomenon, dating back to ancient times [33]. Modern public health efforts are aimed at encouraging communities to participate in physical activity to gain the benefits as described in the sections below. In this review, we first describe the dangers of physical inactivity followed by a concise review of the benefits of physical activity and strategies commonly employed to encourage greater participation in physical activity. We also review literature on mass community participation physical activity events and finally look at *parkrun* as a physical activity enhancer [15].

A literature search was carried out using the University of Cape Town library databases. Science Direct, Google Scholar, PubMed, Wiley and Ovid, CINAHL, Medline and Web of Science databases were used in the search. Articles published from January 2000 up to May 2019 were considered. The following keywords were used in different combinations: *'physical activity', 'exercises', 'history of physical activity', benefits of physical activity', 'barriers to physical activity', 'physical activity South Africa', 'physical inactivity', 'mass participation events', 'parkrun',* and *'motivation for participation'*

## 2.1.2. Physical Inactivity

### 2.1.2.1 Physiological adaptations to physical inactivity

The body adapts to physical inactivity by going through a myriad of changes. There is a decrease in cardiac function due to reduced stroke volume and subsequent cardiac function [(34)]. Heart rate at rest increases due to the reduced left ventricular function as does the sympathetic tone leading to increased risks of hypertension and other cardiovascular diseases [(31, 32)].

The body's response to insulin is reduced and this increases the risk of type 2 diabetes mellitus [(35-37)]. Other non-metabolic adaptations include reduced bone mass, and reduction in motor control to skeletal tissues thereby increasing loss of muscle mass and weakness in skeletal muscles [(38)]

### 2.1.2.2. Dangers of Physical Inactivity

Not participating in adequate physical activity has reached epidemic levels in most populations [(2, 39)]. Engaging in at least 150 minutes of moderate intensity exercises in a week is regarded as meeting recommended dosages of physical activity [(12, 40)]. Failure to reach this target is called physical inactivity [(29, 41, 42)]. Hospital based case control studies found an association between physical inactivity and head, neck and cervical cancer [(43, 44)]. These results were obtained from a single health facility in the United States. Data on physical inactivity was obtained through the use of a questionnaire and this may present challenges in recall bias in these case control analyses [(44)].

Increased adiposity is associated with physical inactivity [(45, 46)]. Myers, Gibbons, Finlayson & Blundell (2017) looked at physical inactivity as measured using questionnaires and the relationships to body mass index (BMI) and body fat percentage. They found low physical

activity was associated with increased adiposity [45]. In kids aged 10 to 14 years, physical inactivity was found to be associated with overweightness [46]. It cannot be inferred from these studies that physical inactivity causes overweightness due to the cross-sectional nature of the designs.

A longitudinal study of 235 professionals in China found an association between sedentary behaviour and the development of cardio-metabolic disease markers [47]. Measurements of weight, plasma glucose, triglycerides and cholesterol were used as markers of cardio-metabolic syndrome [47]. The participants were given accelerometers to monitor their activity levels for over a year [47]. The longitudinal nature of this study and the use of validated outcome measures from the accelerometer improves interpretation of the results. The authors also considered and controlled for other variables including smoking, diet and income [47]. A systematic review found that sedentary participants had higher BP than their more active counterparts [48]. In this review, sedentary behaviour was time spent in a day without doing any activity that leads to energy expenditure beyond that at rest. The studies used in this review used self-reported physical inactivity.

In heart failure patients, reduced physical activity levels was linked to poor cognitive function and reduced flow of blood to the brain [49]. This study was in heart failure patients aged over fifty years and the results cannot be generalised to younger populations.

Mortality from stroke was found to be higher in less active individuals [50]. There was also an association between reduced physical activity levels and increased morbidity as a result of a stroke [50]. This prospective cohort study investigated associations between risk of stroke and disability after a stroke to BMI. Participants were monitored for fourteen years with biennial interviews on activity levels and activities of daily living (ADL) performance [50]. The use of an objective measure of activity would have reduced potential recall bias in this study.

Physical inactivity led to a reduction in scores of health related quality of life on 144 adolescents in a two-year longitudinal study [51]. Inactivity was described in this study as activity levels that fell short of the World Health Organisation (WHO) recommended dosage [51]. In total the researchers carried out three follow ups over two years. These may have coincided with periods of increased physical activity related to increased sports participation at the schools the 14 to 18 year-old adolescents were drawn from.

Physical inactivity has been linked to all-cause mortality. It is also a risk for non-communicable diseases [27, 52]. However, there are barriers to physical activity participation which may help explain the high rates of physical inactivity.

### 2.1.1. History of Physical Activity as a Health Intervention

Physical activity has been used for over two millennia as a health intervention. Several physicians from antiquity to modern civilisations advised, recorded and used exercises for their patients for various health reasons [53]. Exercises were used to prevent and to treat diseases by ancient physicians [54]. Appropriate dosages are not specified in the texts but most physicians had advocated for moderate exercise and discouraged strenuous activities [30, 33, 53].

Susrata (600 BCE), an Indian physician is the first recorded practitioner to 'prescribe' daily exercises for his patients [53, 55]. He believed that exercise could be used to prevent diseases and prescribed it for diabetes and obesity [53]. He advised against strenuous exercises as he believed these could have negative consequences to the body [55]. More physicians who came after him independently held the same belief in the negative effects of vigorous exercise [33, 53, 55, 56].

Greece, the origin of modern medicine, had gymnasiums established 300 years before Hippocrates' time [53]. During the time of the city state of Sparta, young boys of around seven years of age would be encouraged to engage in physical fitness training while women also performed exercises to stay fit and be able to bear strong warriors [53]. Whether exercises were performed during pregnancy is not specified. Exercise was also important for the warriors of the time together with athletes [57].

Herodicus (500BCE) is recorded as the first to advocate for strenuous exercise [53, 58]. He was a sports teacher who later trained as a physician and taught medicine [58]. This may explain his stance on strenuous exercise. He is credited as the father of sports medicine in that he used exercise in rehabilitation of sports injuries and recovery from diseases [53, 58].

Hippocrates (460 – 370 BCE), regarded by many as the father of modern western medicine, provided written exercise prescription for his patients [30]. He used exercise in the treatment

and prevention of diseases [53]. The precise identity of these diseases are not specified, but Galen (129 – 210 CE), a physician who contributed much to the development of modern medicine, followed Hippocrates' methods and used exercises to treat arthritis, epilepsy, gout, tuberculosis and vertigo [53]. Galen used running, jumping, horse riding and ball games as exercises. It is important to note that Galen wrote against athleticism and vigorous training as done by athletes as he believed it had bad effects on the body [56].

Christobal Mendez (1553) a Spanish physician and Francis Fuller (1700), a London physician, both advocated for the use of exercise in their medical writings [30]. In the early 20th century, exercise prescription shifted from physicians to being the responsibility of coaches and athletes in games and sports [30]. It was during this time that even research activity into exercise was very little. The 1960s saw the re-emergence of interest in exercise by the medical community [30]. From then on, the contribution of medical professionals and scientists into physical activity research and advocacy has been increasing [30].

The regimen as prescribed by these early physicians is not recorded but there is evidence that exercise was used as a health initiative. Physicians prescribed exercise in the same way they prescribed medications [30]. In this regard, physicians played a pivotal role in preventing and combating diseases. It is clear from this that exercise was used to improve health and increase fitness and prevent or manage diseases.

In summary, the use of exercise to enhance health is not a new phenomenon. It is as old as the practice of medicine [53]. Many physicians in history used exercise in the management of their patients. Though these were not backed by scientific and intervention studies, it formed the basis of what is now a notable public health message: the importance of physical activity.

## 2.1.2 Benefits of Physical Activity Participation

### 2.1.2.1 Physiological benefits of Exercise

From the given definition of physical activity, the body moves in response to skeletal muscle contraction [23]. This movement leads to energy expenditure. The energy is provided to the exercising muscles by the cardiovascular system which delivers the oxygen and other substrates in blood that is required for continued muscle contraction [59]. This system adapts

to increased demands and these adaptations form the basis for the health benefits of physical activity.

The heart and blood vessels play the most important function in the energy delivery system. As the body is subjected to more exercise training, plasma and total blood volume increases after the first week [59]. This increased volume leads to increases in end-diastolic volume in the left ventricle and increases in stroke volume, cardiac output and enhanced cardiac function [60]. Parasympathetic activity in the heart is increased by training while sympathetic tone is reduced [61]. The results of this increased parasympathetic tone is a reduction in heart rate at rest which leads to improved cardiac health [62].

The oxygen delivery system is enhanced by continued regular exercise as the body has to adapt to the increased demands of exercise. The body releases nitric oxide which is important in the functioning of blood vessels. Nitric oxide leads to vessel dilatation and therefore improves peripheral circulation [63]. This reduces peripheral blood pressure at rest and thus is one mechanism by which exercise reduces hypertension and increase $VO_2$max [63, 64]

Regular exercise improves both central and peripheral nervous system functions. Exercise leads to increased firing rates in motor neurons and helps decrease presynaptic inhibition [65]. This leads to improved motor function which helps in enhancing coordination and balance [65]. In the central nervous system, exercise helps increase cerebral metabolism which increases cognitive function in trained individuals [66]

#### 2.1.2.2. Health Benefits of Exercise

Numerous benefits of engaging in physical activity have been recorded in the medical literature [10, 11, 42, 67-69]. While the reports of exercise prescription by ancient physicians lacked scientific research, modern medical scientists have produced evidence of the effects of engaging in physical activity on the human body. In a systematic review, Warburton, Charlesworth, Ivey, Nettlefold & Bredin (2010) assessed past studies on the health benefits of various forms of physical activity [70]. They identified that engaging in physical activity reduced the risk of cardiovascular diseases which include hypertension, ischaemic stroke and chronic diseases like type 2 diabetes mellitus (T2DM) [10].

Other authors concur with these findings. A meta-analysis of over 93 studies published between 2003 and 2012 found out that reductions in blood pressure (BP) related to physical

activity were dose dependent [71]. As amount of physical activity increases, the BP levels drop in response. The authors looked at different forms of physical activity and grouped them into endurance training, resistance training, isometric training and a combined group [71]. Systolic BP dropped during endurance training, isometric training and resistance training [71]. These findings have been described in other studies [31, 32].

Engaging in regular activity reduces both breast and colorectal cancers [72, 73]. A prospective cohort study assessed the relationship between physical activity levels and breast cancer [72]. This study however used self-administered questionnaires for physical activity levels. The women in this study may have over- or under-reported their activity levels in the questionnaire thereby introducing bias into the study. Qiu Jiang & Zhou (2019) looked at the role of physical activity in colorectal cancer in a systematic review of 18 studies [73]. They found a reduction in colorectal cancer in participants who engaged in moderate aerobic exercise among the prospective studies they reviewed. They also found out that mortality in colorectal cancer was reduced in those who engaged in regular physical activity.

Numerous studies have been done on the effect of exercise on type 2 diabetes mellitus (T2DM). Aune, Norat, Leitzmann, Tonstad & Vatten (2015), in a systematic review of eight studies found that leisure time physical activity reduced the risk of T2DM. Exercises that were found to have this effect were walking and low, moderate and vigorous intensity physical activity [35]. Strength training was also studied as a potential tool in the management of type 1 diabetes mellitus (T1DM)[74]. This systematic review of both randomised and non-randomised trials found a reduction in the impact of T1DM mellitus with endurance and resistance training [74]. Improved glycaemic control was also reported in a study on physical activity and T2DM [37]. Either endurance exercise alone or a combination of endurance, resistance training and isometric training led to improvements in glycaemic control. Precise dosage was not described.

Heart disease is a major cause of mortality in the population and is listed as a non-communicable disease. Participating in physical activity leads to improved quality of life and enhanced physical fitness in people with symptomatic coronary heart disease (CHD)[75]. A prospective study of 12 314 Copenhagen city residents for up to 33 years reported an association between increased physical activity levels and decreased risks of CHD [76]. The types of physical activity done in this group included jogging, running and recreational sports

such as tennis, badminton, swimming and soccer [76]. An earlier prospective study over twelve years had demonstrated a 41% reduction in risk of CHD in participants who had high physical activity participation levels [77]. These results were also reported by a later study on the association between physical activity dosage and CHD [78]. In this twenty-year prospective study, Chomistek, Henschel, Eliassen, Mukamal & Rimm (2016) observed that total dosage of physical activity was inversely related to CHD risk.

Physical activity participation has also been observed to improve midlife cognitive function [79]. A prospective study of 3596 children in Finland followed up in three to nine years' intervals, with their cognitive functioning assessed in midlife, reports high cognitive function in midlife for children who engaged in high physical activity in childhood [79]. A previous study of 1826 subjects in California reported an improvement in cognitive function among adults who participated in physical activity regardless of dosage [80]. Carvalho, Rea, Parimon & Cusack (2014) performed a systematic review and found improvements in cognitive function in adults of at least sixty years with benefits on cerebral blood flow and reduction in risk of developing diseases like Alzheimer [81].

The many benefits of physical activity have been described above. Physical activity is an effective tool in the fight against non-communicable diseases and enhances cognitive function in aging and midlife [82].

## 2.1.4. Barriers to Physical Activity Participation

### 2.1.4.1. Language Barrier/ Lack of effective Health Communication

We have discussed the numerous benefits of physical activity above and associated dangers of physical inactivity. While the benefits of engaging in physical activity have been scientifically described, this information is not easily accessible to some populations [83, 84]. In a systematic review on communities of older adults in South Asia, Horne & Tierney (2012) found the issue of language to be a barrier to physical activity information dissemination by healthcare professionals to their patients [83]. Most of the participants in this study were immigrants to the area [83]. Evenson, Moos, Carrier & Siega-Riz (2009) had similar finding in a mixed methods study in which pregnant women were paid to participate in the study [84]. The

population was homogenous and the results from this low income community may not be applied to all populations.

In some communities, programs that promote physical activity are absent [85]. These individuals feel side-lined from the rest of the population and left out in physical activity endeavours. They have low community support to engage in physical activity [85].

#### 2.1.4.2. Safety and Security Factors

Safety concerns have been raised as hindering participation in physical activity [80]. Participants in a qualitative study noted that there was crime in their community that made them feel insecure to engage in physical activity outside their homes [80]. The study was done in a high crime area of Greenville in South Carolina in the United States. The same can be applied to communities with increased rates of violence and crime like South Africa [86]. Insecurity may deter participation in outdoor physical activity.

#### 2.1.4.3. Financial considerations

In some communities, engaging in physical activity may mean extra costs for the individual. These costs have been cited as a perceived barrier to physical activity [85, 87]. Rimmer, Riley, Wang, Rauworth & Jurkowski (2014) looked at physical activity participation levels in people living with disabilities. The results of focus group interviews showed that people living with disabilities have challenges in affording facilities to engage in physical activity due to lower income [87]. A mixed methods study of thirty-two black, single mothers from various backgrounds found that some cited lack of income as a potential barrier to engaging in physical activity [85].

#### 2.1.4.4. Negative Self-image

Some individuals are deterred by their body image to participate in physical activity programs [88, 89]. Obese adolescents were less physically active compared to their non-obese peers [88]. This cross-sectional study on 14 to 17-year-old adolescents used questionnaires to describe perceived barriers to exercise participation. The sample may not be representative of the population as the study had only 143 participants. Obese women may need other alternative motivational factors for exercise participation besides weight loss [89]. Enjoyment can be used to increase participation in exercise by obese women [89].

#### 2.1.4.5. Lack of Facilities

A lack of facilities is cited as a potential barrier to participation in physical activity [84, 85, 87, 88, 90]. Two of these studies were done in people living with disabilities [87, 90]. A third one was in adolescents and the others in homogenous populations of pregnant women and black single mothers [84, 85, 88]. Some environments may also be so filthy that participants find it difficult to participate in community physical activities in such environments [80].

#### 2.1.4.6. Time Factors

A number of studies noted a lack of time as a barrier to physical activity engagement [84, 88]. The first study was done in pregnant women and the second in adolescents. Pregnant women may be caring for other family members in this poor neighbourhood of Greenville, South Carolina, USA but no explanation for the lack of time was given for the adolescents. Women cite caring for children as a barrier to physical activity [85].

Several barriers have been outlined which include security, lack of facilities and unaffordability of physical activity programs and facilities. It is important that healthcare and public physical activity advocates take these perceived barriers into account to improve physical activity participation.

### 2.1.5. Strategies to Improve Physical Activity Participation

#### 2.1.5.1 Goal Setting

Promoting physical activity is a goal of public health efforts in the modern world where physical activity levels are low. Health professionals and others involved in this drive use several means to encourage participation in physical activity. Most of these are employed to curb the barriers listed above.

In a mixed methods study of African-American women and their daughters, Reed et al. (2017) found that goal setting by participants is one method that can be used to enhance participation in physical activities by the participants [91]. A desire to achieve these goals may drive physical activity participation. Group formats were also associated with increased participation in physical activity [91]. This was suggested by participants due to safety concerns in their neighbourhood. The participants also suggested the use of rewards and prizes in an effort to stimulate physical activity. However, this study only had twenty-four pairs of mother

and daughter conveniently sampled from only one school in a low-income community in Chicago, USA.

#### 2.1.5.2. Social Support

The family plays an important role in promoting physical activity behaviour [92-94]. A systematic review of methods to enhance increased physical activity participation among teenagers in Europe found that the family and the community at large, when involved in school-based programs to increase physical activity levels result in increased participation [92]. This study looked at physical activity in teenagers. While the results may not apply to adults, it does apply to other teenagers in schools. Peers and family members were also associated with increased physical activity among adolescents in a further systematic review [95]. The phenomenon of social support has no age limit. A systematic review of 27 papers of the association of physical activity and social support found family social support to be a determinant of physical activity participation [94]

#### 2.1.5.3 Education

Dissemination of information on physical activity benefits is important as increased knowledge of the importance of physical activity was found to be associated with better participation [96]. Older women in a qualitative study employing in-depth interviews of 20 women cited a lack of knowledge of physical activity participation [97]. It is pertinent that the barriers to physical activity participation are elucidated for proper formulation of strategies to improve physical activity participation. The challenge remains in keeping populations motivated to participate in physical activity.

### 2.1.6. Physical Activity Behaviour and Trends in South Africa

South Africa is a heterogeneous country with diverse cultures and people of different socioeconomic strata. Physical activity levels are low in South Africa compared to the global averages, including averages in other developing countries [41, 98]. Joubert et al. (2016) estimated a 49% physical inactivity rate in the adult population of South Africa in 2000. They also reported that physical inactivity was the ninth highest cause of mortality in South Africa with 3.3% of deaths directly attributable to inactivity [41].

A review of the literature in 2009 opined that non communicable diseases were on the rise in rural communities in South Africa with a related increase in physical inactivity [7]. This trend was later blamed on increased rates of urbanisation in the country [98].

A cross sectional study of self-reported physical activity levels of 26 339 participants aged at least 15 years found that 57.4% of this sample were classified as being inactive [99]. The authors went on to suggest an association between low economic status and low physical activity levels [99]. McVeigh et al (2004) found that children from low income families in Johannesburg, South Africa were less active [100]. This study used a sample of 381 children born over a six-week period in 1990. These children were from a variety of backgrounds and socioeconomic regions of Johannesburg [100].

Data on physical inactivity levels in South Africa have varied depending on the study population and design of the research study. More than 57% of a sample of 7348 urban based learners aged between eight and fourteen years were found to engage in moderate physical activity levels [101]. Around 31% of this study population were regarded as physically inactive as they did not self-report activity dosages meeting the international recommendations [101]. A 2016 study dubbed the South Africa Report Card on Physical Activity for children and youth reports that more than 50% of children met recommended levels of physical activity [102]. This was based on information drawn from literature on physical activity among kids in South Africa. An earlier version of the Report Card reported that less than 50% of children met recommended physical activity levels [103].

Higher levels of physical inactivity were associated with obesity in a study conducted in the North West Province of South Africa [29]. In this study, a comparison was done between a rural population and an urban population. A sample of 1040 women took part in the study. The researchers looked at the effect of 'transition and health during urbanisation of South Africa' [29]. The rate of obesity was 28.6% among the women studied and there was an association between low physical activity and low economic status and obesity [29]. Physical activity participation was found to be highly associated with 'favourable body composition' in a sample of 318 learners in another North West province study [104]. This study had methodological limitations. The authors purposefully sampled these learners from only two schools in a township in North West province. They then concluded that higher physical activity levels are associated with body composition. The schools they selected were from

areas with children from low economic families and who were known to be stunted [104]. Based on these limitations, these data cannot be extrapolated to the general population of South Africa.

A local study of nearly a million subscribers to South Africa's largest medical insurance services provider found out that engaging in physical activity was associated with lower healthcare costs [105]. A later study using the same data and analysing the association of healthcare costs and participation in a physical activity plan identified that physically active members had a 7.4% lower risk of cardiovascular diseases [106]. They also report a 13.2% decreased risk of cancers and 20.7% lower incidence of endocrine and metabolic diseases [106]. These results from these members of Discovery Health demonstrate the benefits of engaging in physical activity. A reduction in healthcare costs is ultimately achievable through engaging in regular physical activity. The only difficulty in applying these results to the general population is that the 948 974 subscribers in this study engaged in physical activity with incentives to do so [106].

Medical insurance in South Africa is inaccessible to a large section of the population [107]. Most medical aid insurers provide incentives for their members to participate in health-related physical activity. For example, they have gym membership subsidies of up to 80% and get extra 'points' for participating in other health enhancing activities [106, 107].

South Africa is a country with diverse cultures and a heterogeneous population. Sociodemographic factors and age have been linked to differences in physical activity levels.

## 2.2. Mass Participation Events

One phenomenon used to enhance public participation in physical activity behaviour is mass participation events [14]. These are large scale physical activity events organised for the public which usually attract scores of people. Walking, running and cycling are examples of activities mainly used in mass participation events. Motivation for participation in these events could be for charity or to increase physical activity [108]. Clinicians should also encourage their patients to participate in such events or they must lead by example and participate

themselves in order to inculcate in their patients the sense of participating in these events [14].

The debate around the organisation of these events has been whether they attract the section of the society who are less active. There were observations that mass participation events attract over forty percent of less active individuals in the USA [109]. Over 15.5 million participants took part in running events in the USA in 2012 and the number has been increasing each year [109]. They have been shown to motivate a change in physical activity behaviour before and for a few months after the event [109, 110].

### 2.2.1 Motivation for Participation in Mass Events

Most mass participation events are carried out for charity or leisure reasons, or as an awareness campaign for various issues [14, 109-111]. Five hundred and sixty runners took part in a cross-sectional study to assess the motivation for participation in a mass running event in Poland [112]. Most participants reported socialisation as their primary motivation. Others participated to gain recognition from the community or to escape from their daily routine [112].

Participants in a Fun Run in the Midlands in the United Kingdom were surveyed before and four weeks after the event [111]. They assessed individual goals for participating in the Fun Run and assessed achievement of those goals four weeks post event. Participants in the study were more likely to participate for health and fitness goals [111]. Social reasons were also cited as the run provided an opportunity to create new social affiliations and connections [111]. Only 119 participants took part in the study which was a comparatively small sample of the population that usually took part in the event.

Participants in a run and later walk event in the UK were more interested in performance in the run event. They also took part to relate to the wider community by socialising [113]. The running event had prizes and this may have led to the desire to finish the race and do well.

Mass participation events are sometimes organised by charitable organisations [114]. Participation in these events may be for both charity and recreation motives [114]. Separate studies were conducted for the 2007 LAF Livestrong Challenge and the 3M Half Marathon and Relay in Austin, Texas USA. A sample of 568 participants from the Livestrong Challenge and 672 participants from the 3M Half Marathon and Relay were recruited [114]. The results

showed that participation was for recreational and charity reasons. Social interaction, self-esteem, a need to assist others and a desire to contribute to the charity were cited as reasons for participation in the mass physical activity events [114].

A qualitative study in Australia with 19 participants in five groups found that participation in charity events was associated with positive emotions during the event [115]. Participation also resulted in relationships being forged during the event and resulted in a feeling of accomplishment [115]. The participants in this focus group were from the same region and were contacted by email. Some of the participants contacted the researchers for inclusion into the study. The sampling methods employed may have resulted in bias in this study. Some groups had only two participants.

## 2.3. *Parkrun*

### 2.3.1. Introduction

In 2004 in Bushy Park (Teddington, United Kingdom), a group of thirteen runners and three volunteers came together to run a 5 km track in the park [15]. This became a weekly run and the event grew in number to become what is now known as *parkrun* [15]. *Parkrun* Global manages these events and is now present in 20 countries [15] with over three million participants and 375 000 volunteers. Junior 2km events were also introduced for the 4 – 14 year-old age group [116]. Participants can choose either to walk or run during the event and can participate with their pets [117].

The broad aim of *parkrun* Global is to provide access to physical activity opportunities to all populations [15]. Prospective participants register for free online and receive a personal barcode [15, 118]. They then join any of the more than 240 000 *parkrun* events near them and after the 5 km event they present the barcode to volunteers who upload times and identity of the participant to the online *parkrun* database [15].

Participation in *parkrun* is free and previous physical activity profile is not considered as participants can either run or walk during the event [116, 119]. All ages are welcome to participate. Whether they are walkers or runners during the event is their choice [118]. General

practitioners in the UK have been advised to prescribe *parkrun* for their patients to enhance physical activity [120].

### 2.3.2. *Parkrun* in South Africa

There is a paucity of scientific literature on *parkrun* in South Africa. Much of the information on the South African *Parkrun* is from the *parkrun* South Africa website and the press.

The first *parkrun* event was held at Delta Park in Johannesburg (South Africa) in 2011 [22, 121]. Bruce Fordyce, a nine-times Comrades Marathon winner started the event that attracted 22 runners [122]. Nearly nine years later this year, the number of registered participants has grown to over 750 000 members with 223 event locations across the country [122].

Participation in the South African events is identical to other global *parkrun* events. The events have multiplied in number as people from all walks of life can join *parkrun*. From Olympians who run the 5 km in less than fifteen minutes to soldiers and school kids, all age groups are represented in *parkrun* events [123]. The *parkrun* phenomenon has evidently grown in South Africa from the time of the first race. Thousands of *parkrunners* took part in the recent Comrades Marathon [122]. As noted earlier, no scientific information is available to assess these trends. It is unclear whether participating in *parkrun* led to competing in Comrades Marathon or whether these *parkrunners* were runners before joining *parkrun*.

*Parkrun* South Africa reports advantages of being a safe environment and easy for participants to join [122]. It is also open to people of all ages and is conducted in 'pleasant parkland surroundings' [122]. Studies done in Australia and the United Kingdom identified that *parkrun* attracts more educated people who are mostly overweight but with a previous history of physical activity [17, 21, 22, 124]

### 2.3.3. Benefits of *Parkrun*

*Parkrun* lead to increased weekly physical activity levels in Australia among 21 participants in in-depth interviews [118]. Participants also reported the benefit of opportunities to interact and make new connections by taking part in *parkrun* [118]. Similar results have been found in other studies elsewhere with different methodologies and larger samples [22, 125]. The social effects were strengthened if the participants identified with a group during *parkrun* [22].

Participation in *parkrun* leads to higher perceived health and wellbeing [117]. Women also reported improvements in their mental health levels after taking part in *parkruns* [117]. Older participants reported superior self-health compared to national averages in a national online survey in 2015. Only three indicators of perceived health were used which included physical health, mental health and socialisation [117]. These were not validated as perception of health measures in this study.

*Parkrun* participation was found to increase confidence among twenty participants in a qualitative study in the UK [126]. The sample was drawn from persons with a history of mental health problems. The researcher used semi-structured interviews to explore the benefits of *parkrun* among this group of people. A total of seven males and 13 females took part in the study [127]. Participants also reported decreased stress, decreased depression and greater freedom to exercise their mental aptitude [127]. Another positive finding reported by earlier studies was socialisation with others. Participation in *parkrun* resulted in opportunities to connect and interact with others. Fourteen of the participants were interviewed by telephone, five through skype and one had a face to face interview.

A twelve month prospective study of 878 *parkrunners* in the UK assessing changes in physical activity behaviour related to *parkrun* showed that participants reported a reduction of body mass index (BMI) as a benefit of participation in *parkrun* [128]. An average weight loss of 6.4% was reported and was more marked among participants who were overweight before joining *parkrun*. *Parkrun* also resulted in improvements in stress scores and increase in perception of happiness [128]. This study also reported increases in the volume of physical activity for up to 6 months since joining *parkrun* [128]. Total physical activity levels then plateau or drop off at twelve months but remain higher than *pre-parkrun* levels [128]. The study suffered from a noticeable attrition in the participants. The study sample decreased from 878 to 553 at six months and to 354 respondents at twelve months. No explanation for this dropout was given by the authors. This may affect the validity of the study. However, this study was the first of its kind as a prospective study of participants in *parkrun* events.

A large study in 2014 of 7308 adult *parkrun* participants demonstrated improvements in fitness, BMI reduction and mental health benefits as benefits of participating in *parkrun* [17]. In this cross sectional study with an online based questionnaire, the authors retrieved data on race completion from the *parkrun* database to track improvements in race completion

times [17]. This further strengthens the study together with a sample that was over 46% of the average number of adult *parkrunners* in the UK per week. There was a motivation to participate in the study as participants entered a draw with a potential to win prizes made available by Adidas.

### 2.3.4. Motivation for *Parkrun* Participation

There are a few studies that have been done elsewhere in the UK and in Australia that sought to describe factors associated with greater *parkrun* participation and the motivation to participate in *parkrun*. These will be reviewed in greater detail and recommendations for improvement given and their applicability to the South African situation.

Cleland, Nash, Sharman & Claflin (2019) looked at the benefits of *parkrun* and factors that are associated with greater participation in these weekly free events in Tasmania (Australia) [125]. There were 5500 registered participants at the time. Four hundred and thirty-one people responded and answered the online based questionnaire [125]. The researchers also retrieved participation history for 78% of the participants after obtaining consent. All the variables that were being investigated in the questionnaire were based on self-reports.

The study showed that there was a balance of both men and women in the sample [125]. They also found that there was greater participation by participants who were married or those with partners [125]. They also reported that higher education levels were associated with increased participation [125]. The perceived benefits of *parkrun* including enjoyment, socialisation and safety of the *parkrun* environment were found to be associated with greater participation [125].

The results of this study were derived from a single region of Australia. These may not be generalisable to the entire country of Australia. These results may also not be applicable to a country with a heterogeneous population like South Africa. The results indicated that there was greater participation by educated participants [125]. The online nature of the study may help explain this trend. Internet use may be more prevalent in well-educated sections of the society.

This study was followed by a qualitative study to explore the motivation for participation in *parkrun* among a sample of ten participants drawn from the above research [118]. The results were similar to the earlier findings of the environment for socialisation during *parkrun* as a

motivation for continued participation [118]. The participants also noted the desire to improve fitness as a motivation for participation including the positive atmosphere provided by *parkrun* [118]. The easy access to *parkrun* was a motivation for participation among these ten participants.

A large UK-wide study in 2014 of 7308 registrants of *parkrun* sought to trace the public health potential of *parkrun* [17]. This prospective study has been described above as an analysis of participants at registration, at six months and at 12 months post-registration [17]. This research identified that participation increased in people from a low socioeconomic community and that people who were not active runners were motivated to join *parkrun* [17]. The authors of this study used data from *parkrun* to trace running time behaviours of the participants. The prospective nature of the study improved the quality of the data collected and allowed authors to describe the changes in motivation and other variables. The participants were also recruited at registration and described their initial motivation for joining *parkrun* and subsequent participation in the events. Participation running time history was tracked from the online *parkrun* database [17]. This verification of race times further strengthens the study, as does the large sample size.

A subsequent study was done to investigate how *parkrun* is used as a health practice [129]. Nineteen participants drawn from the large 2014 study took part in this qualitative study. The authors used purposive sampling to represent contrasting geographical and economical UK zones [129]. The results showed greater participation was a result of enjoyment, an effort to beat personal records and the concept of running in a group and interacting with other *parkrunners* [129]. Health reasons were also stated by these 19 participants as a motivation to participate in *parkrun* [129].

The phenomenon of identifying as a *parkrunner* was a strong motivation for participation in *parkrun* events [22]. Participants also reported increased participation if they identified with a certain group during *parkrunning* [22]. These findings were from a UK study of 289 participants who took part in an online based questionnaire. The study sought to show the relationship of 'group identification' and participation in *parkrun* among UK participants [22]. The sample of 289 in this study contained over 94% of white people. The study instrument used a single measure of each exercise satisfaction and group cohesion [22]. These were closed questions where participants had to agree or disagree with the questions. The measuring instrument

was not validated for this population and closed ended questions pose problems as participants have limited choices and will often agree to these leading questions.

Another study assessed factors contributing to increased participation in *parkrun* events [21]. A sample of 48 participants drawn from an earlier study were selected for participation. The authors used purposive sampling to represent all geographic locations in this qualitative study. Semi-structured interviews were used to answer the research question. They found that participation was a result of the welcoming nature of *parkrun* [21]. Other health factors like the added advantage of losing weight and improved physical fitness were discussed [21]. Some participated due to the beauty of the environment in which *parkruns* are held [21]. This was in contrast to a study by Rogerson, Brown, Sandercock, Wooller & Barton (2016) which found no link between increased participation and the environment [130]. In this study, the authors compared four *parkrun* locations in the UK located in different areas including a beach, a park, a riverside and a heritage site [130]. The results from this study of 331 *parkrun* participants showed that location of the *parkrun* does not affect participation [130]

## 2.4. Summary

This literature review has described the importance of physical activity in general as a health initiative [117].

Health related physical activity behaviour has also been shown to be changed by participation in *parkruns*. There were reductions in BMI and improvements in mental health among participants [127, 128]. Participation was found to be associated with increased levels of physical activity compared to *pre-parkrun* levels [128]. This positive health related behaviour adds to the many benefits of *parkrun*. There is need to describe the health related changes in detail and to identify the physical activities the participant engaged in before joining *parkrun* and the total weekly amount of time spend on each activity. These are gaps that this research in South Africa will seek to address. To our knowledge, there is also no literature on *parkrun* in South Africa.

Various factors are associated with increased participation in *parkrun* events. Safety, health outcomes, socialisation and the welcoming nature of *parkrun* have been described in previous studies [17, 125]. These have been from Australia and the United Kingdom, two developed countries. It is unclear whether these factors would be the same motivators for participation in a developing country like South Africa with marked differences in the population and environment. Further research is needed to assess the motivations for participation in *parkrun* in South Africa.

# CHAPTER 3: METHODOLOGY

## 3.1 Research Design

A descriptive, cross sectional study design was used for this study.

### 3.1.1 Participants

#### 3.1.1.1. Inclusion Criteria

Participants were included in this study if they were over 18 years of age and registered with *parkrun* South Africa at any of the 37 sites in the Western Cape Province of South Africa. Only participants who had also completed at least two *parkrun* events in the last six months were eligible for inclusion in the study.

#### 3.1.1.2 Exclusion Criteria

*Parkrun* South Africa website exclusively uses English. All participants who were not able to read or understand English were excluded from the study.

#### 3.1.1.3. Sample Size

As of 7 January 2020 the number of registered *parkrunners* in South Africa was in excess of 753,800 [131]. A similar study in Australia [19] yielded a 12% response rate. Out of 5500 registered participants, only 456 participants responded. In the United Kingdom a study on participants yielded a 46.8% response rate [17].

Taking account of the above results and considering a 95% confidence level and a 5% margin of error yielded a required sample size of 384 participants. However, the two previous had an average response rate of 29.4%. When taking this response rate into account, a minimum of 1306 participants needed to be recruited for the study to achieve the required sample size for statistical significance.

### 3.1.2. Sampling and Recruitment

Formal ethical approval for this study was obtained from the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee (HREC) (HREC REF 119/2019) (Appendix A). Permission to access *parkrun* participants in the Western Cape Province of South Africa and to use the *parkrun* mailing list to distribute an online questionnaire link was requested from *parkrun* Global (Appendix B). Once formal permission was obtained from *parkrun* Global (Appendix C), *parkrun* South Africa was consulted about the study. Careful engagement with

*parkrun* South Africa was essential to ensure support for the research study from all *parkrun* stakeholders and to assist with dissemination of study information and participant recruitment.

Two recruitment strategies were used for this study. The primary recruitment strategy was electronic. A link to the online version of the questionnaire (Appendix D) was sent via *parkrun* South Africa mailing lists to all registered members from the 37 *parkrun* South Africa sites in the Western Cape. The link was to the LimeSurvey platform which hosted the questionnaire. The link was sent on 16/08/2019 and was active for less than two weeks. There was an unprecedented and overwhelmingly positive response rate, with 2553 participants completing the online questionnaire within 11 days. We therefore closed the online survey early and informed the HREC of the high, unforeseen response rate. The HREC considered that it was ethical to include data from all participants, despite the required sample size being exceeded; to maximise the utility of all responses received and to promote respect for persons.

Face-to-face data collection was performed by a University of Cape Town undergraduate research group, as a sub-study to the Masters research project. The sub-study was also approved by the HREC (HREC REF 147/2019) (Appendix E). The main purpose of incorporating face-to-face data collection was to include participants who may not have had access to data or electronic resources required to complete the online questionnaire. *Parkrun* South Africa provided contact details of *parkrun* organisers at three sites in the Western Cape for face-to-face data collection, namely Green Point, Kayamandi and Zandvlei. Data were collected using a paper-based questionnaire that was identical to the online questionnaire (Appendix D). Face-to-face data collection took place at eight *parkrun* events over a five-week period. Participants were recruited through short announcements made by *parkrun* organisers before the start of each event. *Parkrun* organisers briefly explained the study and asked interested participants to approach the student researchers on completion of the *parkrun* event if they wanted to take part in the study. After each race, participants who gave written informed consent completed the questionnaire in hard copy. Face-to-face data collection yielded 277 participants from the three *parkrun* sites. Participants who completed the online questionnaire were not included in the face-to-face survey to prevent duplication of results and vice versa.

## 3.2 Measurement Instruments

### 3.2.1 Informed Consent Form

For all online respondents, the first page of the online questionnaire informed the participants of the aims of the study and described briefly the expected risks and benefits (Appendix F1). There was also a section where participants were asked to confirm that they had not participated in the paper-based version of the study. Participants confirmed their consent to participate before being directed to the next section with questions of the study. No further action was required if a participant declined to take part in the study.

For the paper-based survey, the participants signed the informed consent (Appendix F2) form prior to receiving the questionnaire (Appendix D). A summary of the study, benefits to the participant and risks associated with participation in the study were described in the form. After signing consent to participate in the study, participants then received the paper-based questionnaire.

### 3.2.2: Questionnaire

The study questionnaire (Appendices D) was adapted from a previous *parkrun* research study in Australia [(19)]. The questionnaire was used to obtain demographic history, *parkrun* participation history, motivations for participation, and physical activity related behaviour changes associated with *parkrun* participation. Minor adaptations were made to improve the contextual relevance of the questionnaire to South African *parkrunners*; and included information on Discovery Health Vitality points[1] . The student researcher also noted poor connectivity to internet in some parts of South Africa; and in an effort to improve response rates, the questionnaire was compressed into the smallest functional size, and took from as little as 3.7 min to complete the online questionnaire. For the paper-based questionnaire, some participants requested assistance from members of the undergraduate research group while other participants completed the questionnaire independently.

[1] *Discovery Health is South Africa's biggest health insurer. It offers incentives/points to members who are registered in their Vitality Programme when they engage in health/fitness related activities e.g. gym membership, health screening, participating in parkrun etc. For each parkrun event completed, members get 300 points. Once accrued, points can be redeemed for discounts for services and purchases*

#### 3.2.2.1 Validation of the Questionnaire

Once ethical approval had been obtained from HREC, the questionnaire was sent to experts in physical activity and wellness in public health for the assessment of content and construct validity. A letter to the experts is included (Appendix G). Three experts gave feedback on the clarity and relevance of the questions. They also recommended additions of the section on socialisation as a motivation for participation together including comments for participants regarding motivation and physical activities before joining *parkrun* and after joining *parkrun*. The questionnaire was refined based on feedback from the expert panel and the revised questionnaire was returned to the expert panel to ensure consensus on the final version that was used in this study.

The paper-based questionnaire was piloted at a single Green Point *parkrun*. Thirty-one participants took part in the pilot study. Based on the feedback from pilot study participants, no substantive amendments were made to the questionnaire. However, minor amendments were made to the layout and wording of the questionnaire to improve readability and to facilitate the accuracy of responses to specific questions. Data from pilot study participants were not included for analysis.

## 3.4 Statistical Analyses

Online questionnaire responses were exported to a Microsoft Excel spreadsheet. Paper-based questionnaire responses were manually entered on the data spreadsheet. All data were coded for analysis. Statistical analyses were performed using TIBCO Software's STATISTICA application version 13.5.0.17 and Graphpad Prism software version 8.3.0 (538). The Shapiro-Wilk's test was used to assess for normality among continuous variables of age, height, weight and body mass index (BMI). All data were found to be not normally distributed. As such, non-parametric statistics were used for data analysis. Categorical data were analysed based on frequency and grouped in relation to gender, educational level and motivation for participation. Associations between categorical variables were assessed using the Chi-square test of association. The Kruskal-Wallis H test was used to determine differences between at least three independent groups on total activity times (dependent variable). The Wilcoxon signed rank test and the Mann-Whitney U were used to compare physical activity levels

before and after joining *parkrun*. Independent variables used for this analysis include gender, education level and gym membership. For all statistical analyses, a p-value less than 0.05 was accepted as statistically significant.

## 3.5 Ethical Considerations

The study was approved by the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences, University of Cape Town (UCT) (HREC REF: 119/2019) (Appendix A).

### 3.5.1. Privacy and Confidentiality

Data were collected anonymously and confidentially. No personal information was collected and for the online participants, no IP (internet protocol) addresses were captured. All participants were also clearly advised that they could withdraw from the study at any point during completing either the online or paper based questionnaires.

Data were stored in password protected files on personal computers to preserve confidentiality. All paper-based responses were kept in lockable files. Respondents who expressed interest in receiving the study results had their e-mail addresses stored in password protected folders on a personal computer.

### 3.5.2. Risks to Participants

No physical risks were associated with participation in this study. Confidentiality was preserved at all times of the study. No information on individual responses was shared with any third parties. Participants who expressed interest in receiving the results of the study had their e-mail addresses kept in a password protected electronic file that was only accessible to the student researcher.

### 3.5.3. Benefits to Participants

There were no direct benefits to individual participants in the study. Participants will receive the results of the study if they indicated interest in the results. The results will also be shared with *parkrun* South Africa and *parkrun* Global.

# CHAPTER 4: RESULTS

## 4.1 Descriptive characteristics

A total of 2553 and 277 participants responded to the online and paper-based questionnaires respectively. Among the online based participants, 627 participants did not provide informed consent while 169 did not meet the inclusion criteria. A further 222 had incomplete details. The single participant who responded as 'other' for gender was excluded from all analysis due to the group 'other' having insufficient statistical power. Figure 1 provides a summary of the final study sample (n=1787) included for analysis.

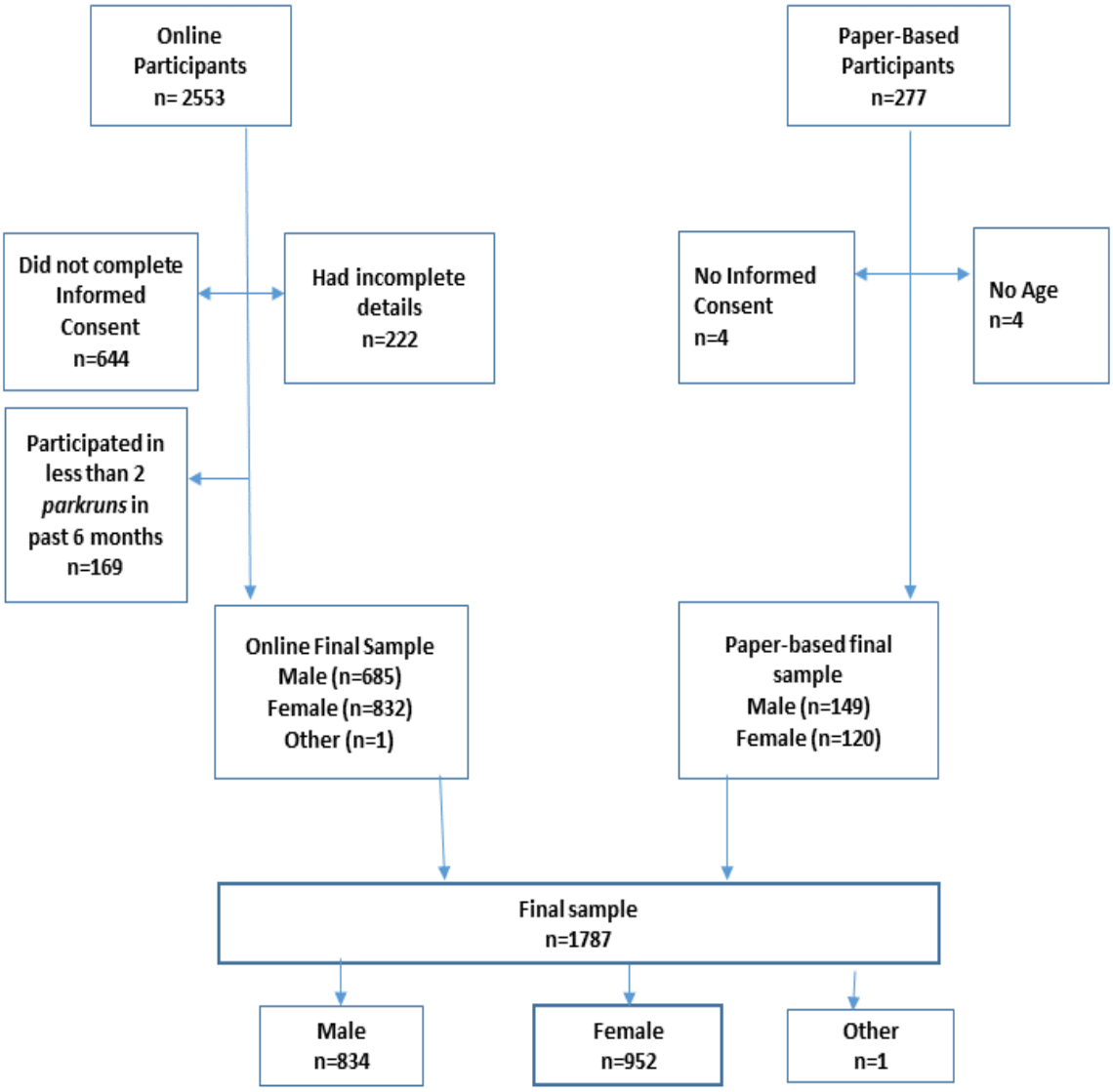


**Figure 1:** ***Final recruitment flow chart***

The descriptive characteristics for all participants are shown in Table 1.

***Table 1: Descriptive characteristics of all Participants (n=1786). Data are expressed as median (inter-quartile range).***

| Descriptive Characteristic | All Participants (n=1786) | Males (n=834) | Females (n=952) | U value (P value) |
|---|---|---|---|---|
| **Age (years)**** | 50 (38-59) | 52 (40-62) | 48 (37-58) | 346425.0 (<0.00001) |
| **Height (m)**** | 1.71 (1.65-1.78) | 1.79 (1.74-1.83) | 1.65 (1.60-1.7) | 81260.5 (<0.00001) |
| **Weight (kg)**** | 75 (65-86) | 83 (75-92) | 67 (60-78) | 326905.5 (<0.00001) |
| **BMI ($kg/m^2$)**** | 25.30 (22.9-28.4) | 25.9 (23.7-28.7) | 24.7 (22.1-28.1) | 162812.0 (<0.00001) |

*****p<0.01***

Median age of males was significantly higher than for females($p<0.0001$). Males had higher median height, weight and BMI values than females.

The other descriptive characteristics of the participants are summarised in Table 2.

***Table 2: Descriptive characteristics of parkrun participants (n=1786). Data are presented as numbers and percentages [n (%)].***

| Descriptive Characteristic | Total Sample (n=1786) | Males (n=834) | Females (n=952) | P value |
|---|---|---|---|---|
| **Relationship Status** | | | | |
| *Never Married* | 394 (22.1) | 172 (20.6) | 222 (23.3) | |
| *Married* | 1130 (63.3) | 578 (69.3) | 552 (58.0) | <0.00001** |
| *Separated/Divorced* | 228 (12.7) | 70 (8.39) | 158 (16.6) | |
| *Missing* | 34 (1.9) | 14 (1.68) | 20 (2.1) | |
| **Educational Level** | | | | |
| *No Schooling* | 4 (0.22) | 1 (0.12) | 3 (0.32) | |
| *General Education* | 12 (0.67) | 7 (0.81) | 5 (0.52) | |
| *Further Education* | 258 (14.4) | 122 (14.6) | 136 (14.3) | =0.718 |
| *Higher Education* | 1500 (84.0) | 701 (84.1) | 799 (84.0) | |
| *Missing* | 12 (0.67) | 3 (0.36) | 9 (0.95) | |
| **Employment Status** | | | | |
| *Employed* | 1267 (71.0) | 588 (70.5) | 679 (71.3) | |
| *Working Student* | 42 (2.35) | 15(1.80) | 27 (2.84) | |
| *Non-Working Student* | 56 (3.14) | 31 (3.71) | 25(2.63) | =0.0013* |
| *Retired* | 324 (18.14) | 171 (20.50) | 153 (16.1) | |
| *Unemployed* | 55 (3.10) | 15(1.80) | 40 (4.20) | |
| *Missing* | 42 (2.35) | 14 (1.70) | 28 (2.94) | |
| **Gym Membership** | 910 (51.0) | 423 (50.7) | 487 (51.2) | =0.8411 |
| **Disability** | 29 (1.62) | 9 (0.95) | 20 (2.40) | =0.0154* |
| **Illness** | 86 (4.82) | 36 (4.32) | 50 (5.25) | =0.3569 |
| **Injury** | 200 (11.2) | 104 (12.5) | 96 (10.1) | =0.1106 |

**p<0.05; **p<0.001*

The percentage of married males was higher than that for females. There were more female participants who reported being separated/divorced than males [$\chi^2$ (3, n=1786) =34.32; p<0.00001].

More males reported being retired than females. There were more unemployed females than males [$\chi^2$ (5, n=1786) =19.93; p=0.0013]. More female participants (2.4%) reported having a disability than the males (0.95%) [$\chi^2$ (1, n=1786) =5.87; p=0.0154].

Median age for gym members was significantly lower (48.0 years) than for non-gym members (51.0 years) (U = 350957, $p < 0.001$). Although gym members had lower median weight, the difference compared to non-gym members was not statistically significant (p=0.412).

Gym membership was higher among the employed groups with 54% and 55% of the employed and working student groups reporting being members of a gym respectively. Only 42% of the retired group and 41% of unemployed respondents reported being gym members. There was a significant association between employment status and gym membership [$\chi^2$ (5, n=1786) = 19.88, p=0.0013].

Participants self-reported their perceived health on a Likert-type scale from 'Poor' to 'Excellent' (Figure 2). A total of 64.8% of the participants reported very good to excellent health. There were no associations between gender and self-reported health.

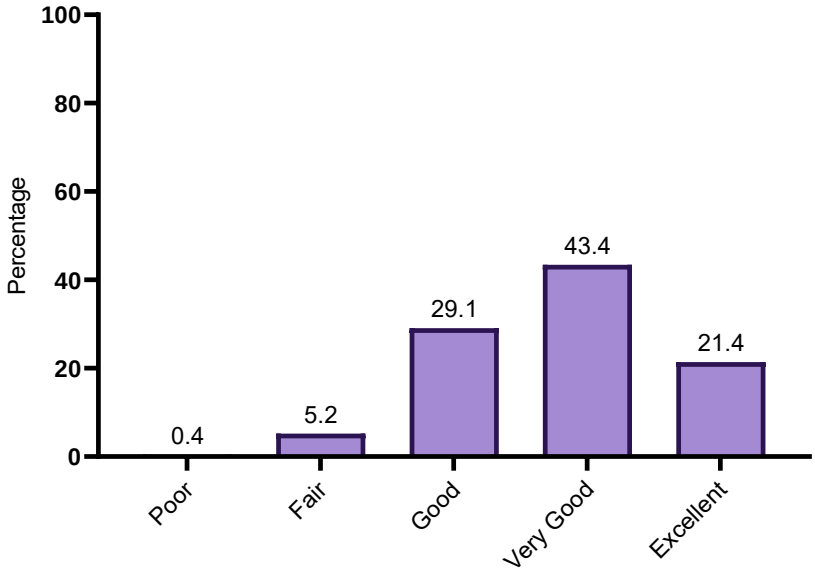


**Figure 2:** ***Self-reported Health. Data are shown as percentage of total sample.***

## 4.2. Motivation for *parkrun* Participation

Participants' motivations for *parkrun* participation are shown in Figure 3. The most reported motivation for participation was health/fitness (86.1%). A total of 71.8% of the participants reported enjoyment as a motivation for *parkrun* participation. The safe environment provided by *parkrun* was a motivation for 58.7% of the participants. Competition with others was reported as a motivation for participation by only 21.8% of the participants. These results are illustrated in Fig 3 below.

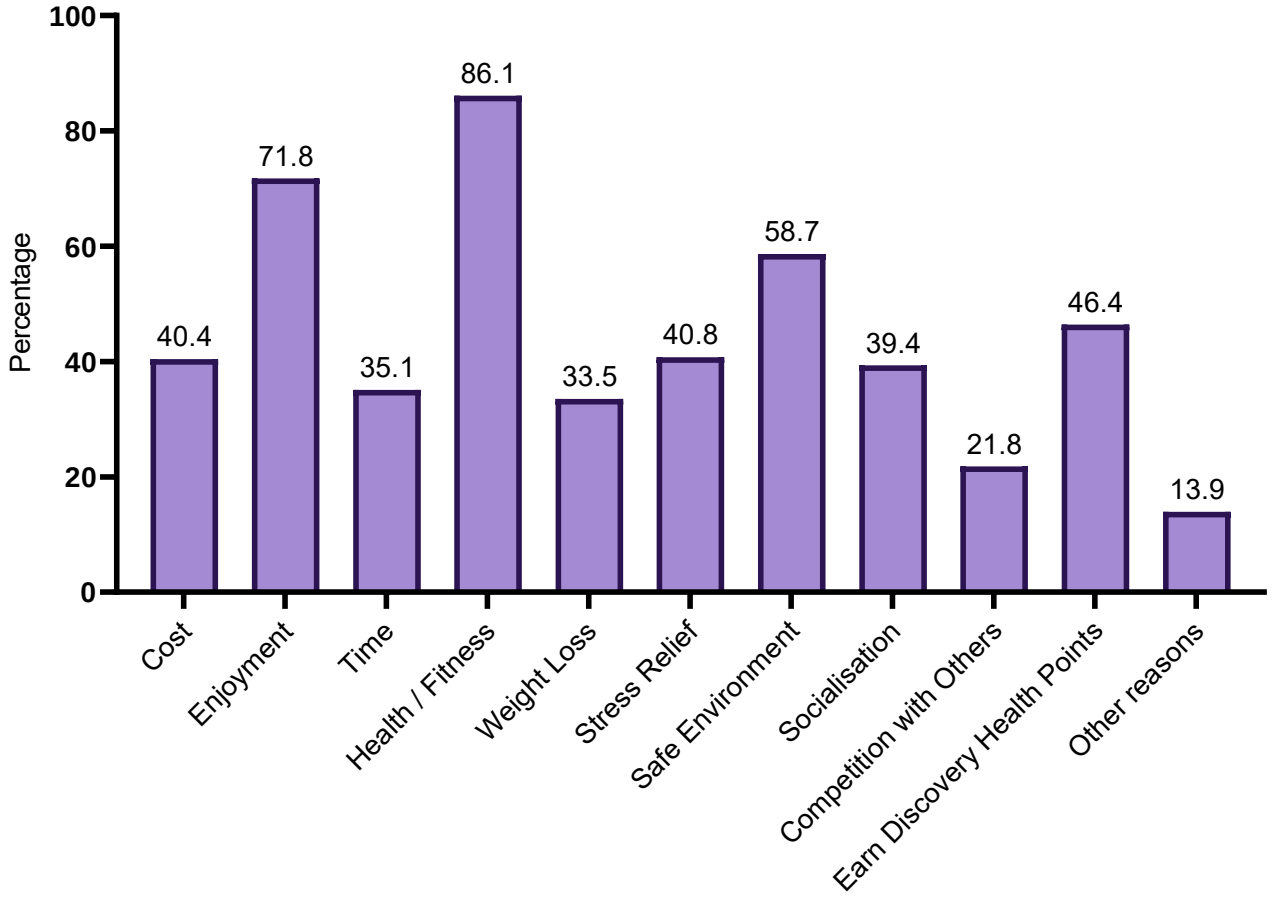


**Figure 3:** ***: Motivation for participation in parkrun. Data are presented as a percentage of the total sample (n = 1786)***

The differences in motivation for participation in *parkrun* was compared according to gender. More women reported being motivated by cost, time, weight loss factors, stress relief, safe environment factors and the potential to earn Discovery Health Vitality points than their male counterparts. Competition with others was the only motivation reported by more males than females. Table 3 below summarises these results.

***Table 3: Motivations categorized according to gender. Data are shown as percentage of males (n=834) and females (n=952) together with the $\chi^2$ statistic and the p value***

| Motivation | Male n(%) | Female | $\chi^2$ statistic (p value) |
|---|---|---|---|
| **Cost** | 278 (33.3) | 444 (46.6) | 32.68 (<0.00001)** |
| **Time** | 262 (31.4) | 365 (38.3) | 9.359 (=0.0022)* |
| **Weight Loss** | 249 (28.9) | 350 (36.9) | 9.519 (=0.0020)* |
| **Stress Relief** | 302 (36.2) | 426 (44.7) | 13.42 (<0.00001)** |
| **Safe Environment** | 388 (46.5) | 660 (69.3) | 95.35 (<0.00001)** |
| **Competition with Others** | 218 (26.1) | 172 (18.1) | 16.97 (<0.00001)** |
| **Earn Discovery Health Points** | 366 (43.9) | 463 (48.6) | 4.032 (=0.0446)* |

**p<0.05: **p<0.001*

More women reported cost as a motivation by more women than men [$\chi^2$ (1, n=1786) =32.68; p<0.00001].

Each motivation was assessed according to the age of the participants. The median age differences (in years) were categorised according to motivation and tested for statistical significance. Table 4 below summarises the findings.

***Table 4: Median age differences and motivation. Data show median age for the group that answered YES to the motivation and the NO group and p value***

| Motivation | YES median age in years(IQR) | NO median age in years (IQR) | p-value |
|---|---|---|---|
| **Cost** | 47 (37-57) | 52 (40-61) | < 0.00001** |
| **Enjoyment** | 50 (39-59) | 50 (37-60) | = 0.504 |
| **Time** | 48 (38-57) | 51 (39-60) | = 0.004* |
| **Health/Fitness** | 50 (38-60) | 49 (40-49) | = 0.864 |
| **Weight Loss** | 48 (37-56) | 52 (39-61) | < 0.00001** |
| **Stress Relief** | 47 (36-56) | 52 (40-62) | < 0.00001** |
| **Safe Environment** | 50 (39-59) | 50 (38-60) | = 0.734 |
| **Socialisation** | 49 (38-59) | 50 (39-60) | = 0.443 |
| **Competition with Others** | 47 (34-58) | 50 (40-60) | = 0.00001** |
| **Earn Discovery Points** | 47 (38-57) | 52 (39-61) | < 0.00001** |
| **Other** | 52 (40-60) | 50 (38-59) | = 0.275 |

** p<0.05: **p<0.001*

There were significant differences in median age between participants motivated by cost, time, weight loss factors, stress relief potential, the possibility of competing with others, and seeking Discovery Health Vitality Points. Younger participants were motivated by these factors.

Participants also included comments on the various motivation for participation. Some of these comments are included in Table 5 below.

***Table 5: Some of the participants' comments on the different categories of motivation for participation.***

| ***Cost Motivation*** | ***Enjoyment Motivation*** | ***Time Motivation*** | ***Health/fitness Motivation*** | ***Weight Loss Motivation*** | ***Stress Relief Motivation*** |
|---|---|---|---|---|---|
| *'its free and timed and published!'*<br><br>*'Love that it is free. Relatively close to home'*<br><br>*'Love the freedom, of wearing what you want and no required items'* | *'I enjoy the camaraderie'*<br><br>*'Fresh air, meeting new people and lots of fun'*<br><br>*'It's become a family ritual.'*<br><br>*'Volunteering is part of the fun'* | *'Short enough to not take up too much time'*<br><br>*'Difficult in winter but great in summer. Gets the weekend off to a good start.'*<br><br>*'Short'*<br><br>*'I can take part and return home in an hour and a half'* | *Doctor's orders after diabetes diagnosis'*<br><br>*'Weekends are usually full of indulgence, so it is a good way to feel better about it.'*<br><br>*'Walking helps with pain in my back after a fusion'*<br><br>*'When I started Parkrun I was sedentary, but now I run 3 times a week excluding Parkrun.* | *'Although not considered overweight, I was unhappy with my body and this allowed me to lose weight'*<br><br>*'In 2016, weekly parkruns helped me to lose weight & helped maintain it until I had a baby in 2018'*<br><br>*' 'Parkrun changed my life I was 135kg with poor health I am now 95kg with good health'* | *'Prescribed for my depression'*<br><br>*'I feel less anxious and destressed'*<br><br>*'Who can stress if you spend time with friends and have a beautiful scenery around you.'*<br><br>*'If I miss a Parkrun, I am grumpy all week until the next Parkrun'* |
| ***Safe Environment Motivation*** | ***Socialisation Motivation*** | ***Competition With Others Motivation*** | ***Earn Discovery Health Vitality Points*** | ***Other Motivation Factors*** | |
| *''Able to allow my 12yr old son to go ahead without having to be concerned about his safety (or mine)'*<br><br>*'I'm a woman. YES, THIS ONE IS MY MAIN REASON.'*<br><br>*'Yes. Volunteers are marvellous.'* | *Great opportunity to chat amongst fellow "runners" of similar fitness level'*<br><br>*'I'm a volunteer and have met nice people'*<br><br>*'having coffee afterwards with other park runners'* | *Competition makes me push harder'*<br><br>*'My partner and I like to see whose time is better than the other one.'*<br><br>*'I secretly compete with the other park runners'* | *'main reason'*<br><br>*'I did not realise initially how many points I was getting. A pleasant surprise.'*<br><br>*300 points to walk, run, crawl or walk backwards easy peasy'* | *'Love the incentives - milestone shirts and tourist status'*<br><br>*'Community building'*<br><br>*'To get my 250 shirt '*<br><br>*'Friendly hard working volunteers'* | |

The comments were mostly supporting the stated motivations.

## 4.3. Physical Activity related Behaviour Change

### 4.3.1 *Pre-parkrun* self-reported perception of Physical Activity

Participants reported their levels of physical activity before joining *parkrun* in order to compare their *preparkrun* activities to their post *parkrun* activities and describe physical activity related behaviour change.

Participants reported their self-perception of physical activity levels before they joined *parkrun*. Regular exercisers (participants who engaged in exercises more than three times a week before *parkrun*) made up 48.9% of the sample. A total of 34.5% of the participants reported being occasional exercisers (participated in exercises 1 – 2 times a week before *parkrun*) and 15.6% reported being non exercisers (did not engage in any form of exercises before joining *parkrun*).

Only 52% of the sample reported their *pre-parkrun* total weekly physical activity times. The median time was 180 min (IQR: 120-340). An analysis was performed to determine total weekly *preparkrun* physical activity amounts based on reported activity levels before joining *parkrun*. Those who reported being regular exercisers had a median weekly time of 260 min (IQR: 160-420). Those who reported being occasional exercisers had a median total weekly time of 120 min (IQR: 70-180).

Regular and occasional exercisers were asked the type of physical activity they participated in before joining *parkrun.* The weekly total minutes spend on each physical activity before joining *parkrun* is shown in Table 6.

**Table 6: : *Physical activities and total weekly time spent doing various activities before joining parkrun. Data are given as percentages of total participants and the median of total weekly time together with the interquartile ranges.***

| ***Pre-parkrun* Activity** | **n(%)** | **Median weekly time (min)** | **Interquartile range (min)** |
|---|---|---|---|
| **Running** | 746 (41.8) | 90 | (60-150) |
| **Swimming** | 179 (10.0) | 60 | (30-90) |
| **Aerobics** | 144 (8.1) | 60 | (60-120) |
| **Walking** | 775 (42.9) | 100 | (60-180) |
| **Recreational Sports** | 176 (9.8) | 120 | (60-240) |
| **Gym workout** | 633 (35.6) | 120 | (60-180) |
| **Cycling** | 208 (11.8) | 120 | (60-180) |
| **Other Activities** | 425 (23.9) | 72.5 | (60-180) |

Walking was the most common *preparkkrun* activity (42.9%) followed by running (41.8%). The median total weekly running duration before joining *parkrun* was 90 minutes. The least number of participants reported being members of an aerobics class (8.1%).

## 4.3.2. Post *parkrun* Activities

Participants were asked if they took up new exercises or increased their weekly physical activity levels after joining *parkrun*. A total of 857 (48%) participants reported increasing their physical activities after joining *parkrun.* Half of these (n=428) participants reported taking up new physical activity programmes after joining *parkrun*. The rest (n=429) of the participants reported increasing their physical activity levels after joining *parkrun*.

All participants who reported increasing their physical activity levels after joining *parkrun* were grouped according to demographic characteristics. The results are in Table 7.

**Table 7:** ***Postparkrun physical activity increases categorised according to demographic characteristics. Data are given as n (%) with the $\chi^2$ test statistic and the p value***

| **Demographic Characteristic** | **Increased physical activity after *parkrun*** **n(%)** | **$\chi^2$ Statistic** | **P value** |
|---|---|---|---|
| **Gender** | | | |
| *Male (n=834)* | 373 (44.7) | 7.331 | 0.0256* |
| *Female (n=952)* | 485 (50.9) | | |
| **Relationship Status** | | | |
| *Never Married (n=394)* | 214 (54.3) | | |
| *Married (n=1130)* | 524 (46.4) | 13.65 | =0.0085* |
| *Separated/Divorced (n=228)* | 100 (44.0) | | |
| **Employment Status** | | | |
| *Employed (n=1267)* | 642 (50.7) | | |
| *Working Student (n=42)* | 25 (59.5) | | |
| *Non-working Student (n=56)* | 34 (60.7) | 35.06 | <0.00001** |
| *Retired (n=324)* | 116 (35.8) | | |
| *Unemployed (n=55)* | 18 (32.7) | | |
| **Self-reported perception of health** | | | |
| *Good (n=519)* | 258 (49.7) | | |
| *Very Good (n=776)* | 382 (49.2) | 7.382 | =0.0607 |
| *Excellent (n=382*) | 179 (46.9) | | |
| **Self-Reported Physical Activity Level** | | | |
| *Non Exerciser (n=279)* | 203 (72.8) | | |
| *Occasional Exerciser (n=616)* | 343 (55.8) | 135.3 | <0.00001** |
| *Regular Exerciser (n=874)* | 311 (35.6) | | |

**p<0.05; **p<0.001*

Significantly more women (51%) reported increasing their *extra-parkrun* activities or taking up new physical activities ($\chi^2$ = 7.24, p = 0.007). A statistically significant association was found between relationship status and uptake of physical activity after joining *parkrun*. A total of 54% of the never married group took up more physical activity compared to 46% in the married group and 44% in the separated group ($\chi^2$ (2, n=1786) =10.45, p = 0.005).

Being a student was associated with taking up more physical activity followed by being employed, $\chi^2$ (4, n=1786) =35.06, p < 0.001. Unemployment was associated with lower physical activity uptake.

Of the 280 participants who were non exercisers before joining *parkrun*, 203 (72.5%) reported taking up new physical activities after joining *parkrun*. Median *postparkrun* weekly physical activity duration for participants who reported being non exercisers was 130 minutes (IQR: 60-240). A total of 343 (56% of *pre-parkrun* occasional exercisers) participants who were occasional exercisers before joining *parkrun* reported increasing their activity levels after joining *parkrun*. Among those who were regular exercisers before joining *parkrun*, 35.6% (311) increased their physical activity levels after joining *parkrun*.

Further analysis was performed in order to quantify the increases in physical activity levels among the participants and demographic characteristics after joining *parkrun*. The results are included in the appendix (Appendix I) as these were not primary objectives of this study and due to inconsistencies in the reporting patterns by the participants.

An analysis was performed to describe the association between motivation for *parkrun* participation and post *parkrun* activity uptake. Statistically significant results are summarised in the Table 8.

***Table 8: : Association between motivation for parkrun participation and uptake of physical activity postparkrun. Data are expressed as n (%) with the $\chi^2$ Statistic and the p value***

| Motivation | Increased Uptake of physical Activity n(%) | $\chi^2$ Statistic | P value |
|---|---|---|---|
| **Enjoyment (n=1282)** | 643 (50.2) | 9.37 | =0.002 |
| **Health/Fitness (n=1538)** | 759(49.4) | 7.30 | =0.0069 |
| **Weight Loss (n=599)** | 328 (54.7) | 18.13 | <0.00001 |
| **Stress Relief (n=728)** | 402 (55.2) | 25.9 | <0.00001 |
| **Socialisation (n=703)** | 372 (52.9) | 11.78 | =0.001 |
| **Earn Discovery Health Points (n=829)** | 442 (53.2) | 16.88 | <0.00001 |

Participants who enjoyed *parkrun* were more likely to take up additional physical activities ($\chi^2$ = 9.37, p=0.002). Over 54% participants who were motivated by weight loss potential of participating in *parkrun* took up extra physical activity ($\chi^2$ = 18.13, p<0.00001). Participating in *parkrun* for Discovery Health points was associated with taking up more physical activity after joining *parkrun* ($\chi^2$ = 16.88, p<0.00001).

Participants also reported the new physical activities that they took up after joining *parkrun*. The common activity taken up after joining *parkrun* was running (18.2% of participants). Walking (6.9%) and gym workouts (6.9%) were the other physical activities that were taken. The others activities attracted less than three percent of the sample. These results are summarised in Fig 4.

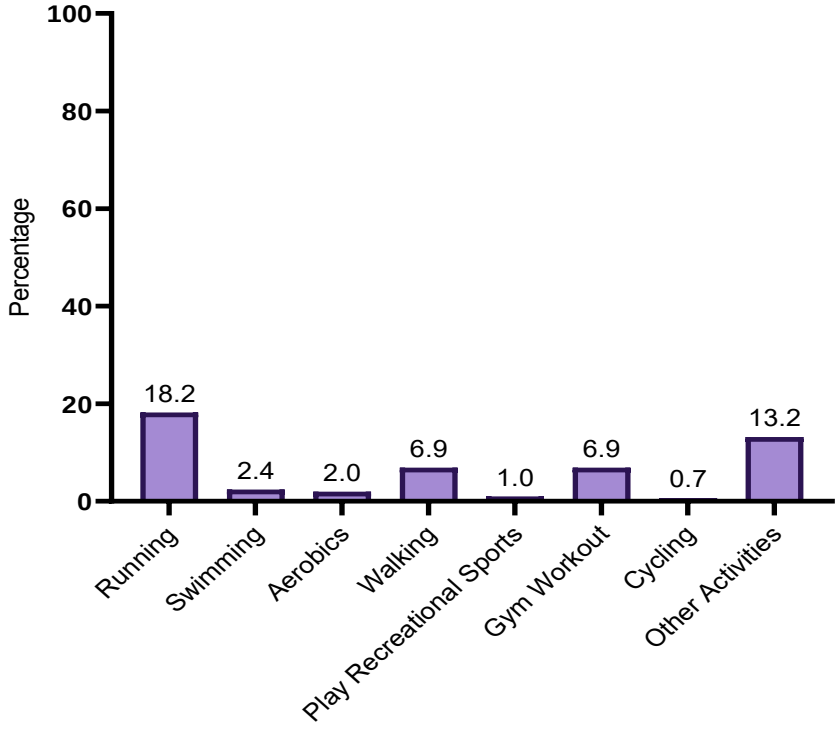


***Figure 4: Uptake of new physical activities after joining parkrun. Data are represented as percentage of total sample***

Twenty-four percent of all participants simply their physical activity levels after joining *parkrun*. The biggest increases were recorded in running with 33% of *preparkrun* runners increasing their weekly total running duration after joining *parkrun*. A total of 24.1% of participants who reported being walkers before joining *parkrun* increased their weekly walking levels after joining *parkrun*. The results are summarised in Fig 5.

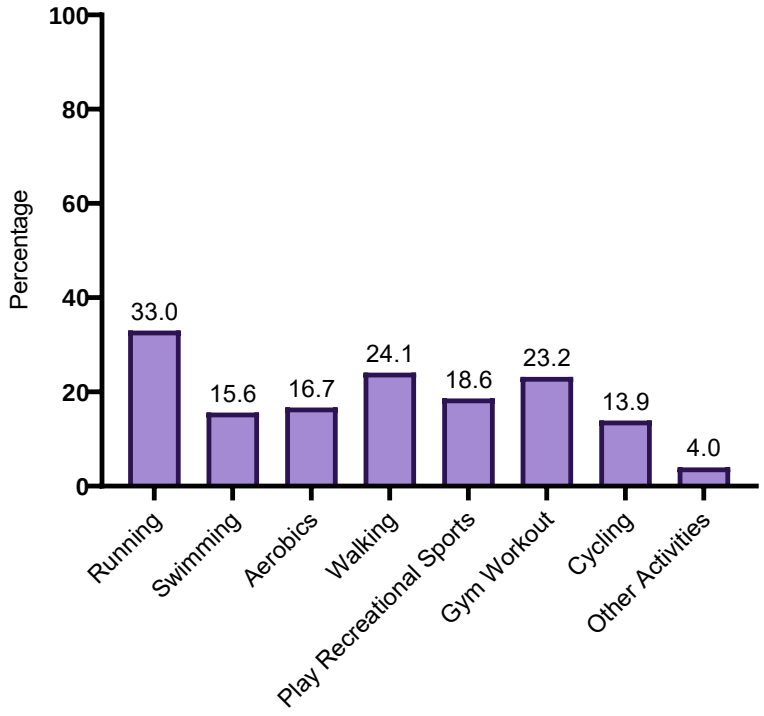


**Figure 5:** ***: Increase in physical activity among participants. Data are represented as percentages of participants who reported participating in these physical activities before joining parkrun.***

## 4.5 Summary of results

### 4.5.1 Descriptive characteristics

Over 53% of the sample were females. Median age and BMI was higher in males than in females ($U = 346425$, $p<0.00001$ for age and $U = 326905.5$, $p<0.00001$ for BMI). More than 80% of the sample reported attaining a higher education qualification. Seventy percent of the sample was employed. Over 60% of participants reported very good and excellent health. Forty-nine percent of the participants were regular exercisers.

Health/fitness (86.1%) was the common motivation reported. Other motivating factors were enjoyment (71.8%), safe environment (56.7%), earning Discovery Health points (46.4%) and cost

(40.4%). A larger percentage of women were motivated by the safe environment provided by *parkrun*.

More than 42% of the study sample participated in walking before joining *parkrun.* Participants also reported a previous history of running (41.8%) and gym workouts (35.6%). Before joining *parkrun*, the median weekly total activity time was 180 minutes (interquartile range: 120-340)

A total of 24% of the sample took up completely new physical activity programs after joining *parkrun*. A further 24% increased their total weekly physical activity levels.

Over 72% of previously non exercisers reported taking up new physical activities after joining *parkrun*. Fifty-six percent of pre*parkrun* occasional exercisers increased their physical activity levels. Running was taken up by 18.2% of the participants who were previously non-runners while 33% of *preparkrun* runners increased their weekly running duration after joining *parkrun*.

There was a significant increase in total weekly post *parkrun* physical activity times among the 857 participants who increased their physical activity levels after joining *parkrun* when compared to their *pre-parkrun* levels ($U = 314435$, $p<0.001$).

# CHAPTER 5: DISCUSSION

The reported health benefits of participating in physical activity include reduced prevalence of non-communicable diseases, improvement in health and wellbeing indices and reduced mortality [27, 132, 133]. Research has shown that a small amount of physical activity is beneficial when compared to being sedentary and that 'weekend warriors' do get benefits for participating in irregular physical activity [53, 134].

In this study, we aimed to describe motivation for participation in *parkrun* and health related behaviour change as a result of taking part in the 5 km *parkrun* weekend race. We assessed the factors associated with greater participation in *parkrun*. We found 49% of *parkrun* participants in our sample increased their activity levels after joining *parkrun*. This is the first study assessing *parkrun* activity in South Africa and the results may help future public health efforts aimed at increasing participation in physical activity. We discuss these results below.

## 5.1 Generalisability of the results

The study was conducted using a *parkrun* South Africa database for the 40 locations in the Western Cape province of South Africa. Three of these locations were assessed via a paper-based questionnaire and face-to-face data collection. The Western Cape province is one of the most economically active provinces of South Africa contributing over 13% to the national gross domestic product and providing 23.6% of the country's employment in 2018 [135]. As such, these results may not be generalisable to all the registered *parkrun* participants in the country due to diversity in the South African socioeconomic demographics. However, the province has both a rural and urban setting and the 37 locations are located in both settings with greater concentration in urban, densely populated areas.

Most participants had inconsistencies in their self-reported total physical activity times probably due to recall bias as some had been registered for more than a year with *parkrun* [136]. As such, caution was taken in interpreting quantitative values of *preparkrun* physical activity levels. In

most instances, total number of participants in different categories were analysed instead of continuous data like physical activity times.

Another caution in interpreting these results is that internet connection in the province is erratic in some areas [137]. As such, those with poor access to the internet may have a lower representation in the study especially in the rural areas of the province. However, all members of *parkrun* need to register online, which is why an online based survey was considered to be an adequate method of data collection for this study.

## 5.2 Participants

A total of 1787 participants took part in this study. This sample size was 0.56% of registered participants in the *parkrun* South Africa Western Cape database. Our sample size calculation had required a minimum sample of at least 1304 participants for a survey of the national *parkrun* South Africa database. As such, this sample was adequate for the purposes of this study, and recruitment was closed once the required sample size was reached. Lower representations in the sample of subgroups such as no schooling on the education category and students in the employment category impacted on statistical power in certain analyses. Previous cross sectional studies have been conducted in Australia and yielded a 6.7% response rate and in the United Kingdom with response rates above 40%[17, 19].

Motivation for participation has been described previously in qualitative studies in the UK and in Australia with lower sample sizes based on the qualitative nature of the studies. This study is to our knowledge the first one in South Africa with a cross-sectional study design to assess the Western Cape *parkrun* participants.

Our sample was comparable to previous studies in *parkrun* participants in Australia and the United Kingdom [19, 119].

## 5.3 Descriptive characteristics of participants

The participants in this sample were predominantly in their 6th decade of life and more than half were slightly overweight according to their BMI. The males, who were fewer than females, were significantly taller, heavier and older. Previous studies on *parkrun* had similar samples with greater numbers of female participants [18, 19].

Over 84% of participant reported having a higher education qualification (Technikon/College/University). The sample was predominantly of educated participants. This compares with and is even higher than previous studies on *parkrun* in Australia and UK [18]. However, this figure is also higher than the national average of graduates in South Africa as reported in a study on health determinants [138]. The high number of educated participants may either imply that the predominantly online nature of the questionnaire may bias towards people with high education. Another explanation may be that the economic activity of the Western Cape province is greater, with a lower unemployment rate than other provinces of South Africa [139]. Therefore, the education level may be a direct reflection of such activities.

Over 70% of participants were employed, which is comparative to previous studies on *parkrun* in the UK and Australia [18, 19]. The unemployed group were slightly more than three percent in stark contrast to the official national average unemployment which is above 29% [140]. The high percentage of participants with higher education qualifications help explain the high employment rates observed in the study participants. Employment is South Africa is high among graduates, with an unemployment rate of less than two percent [140].

More than half of the participants reported being members of a gym. The national average is only two percent [141]. Gym locations are located predominantly in urban settings and this sample was drawn from all *parkrun* locations in the province [141]. The high number of gym memberships may be attributable to the other demographics of the sample. Gym membership fees are beyond the reach of many but as this sample consisted of mostly employed people who may have been able to afford the gym subscription. Membership was asked but the study did not seek to find out how many times the participants attend the gym. Those who reported being members of a

gym spent a median of 120 min (IQR: 60-180) per week in the gym before joining *parkrun*. Fifteen percent of our sample either took up or increased gym participation after joining *parkrun*. Regardless of the circumstances, gym membership was higher than the national average [107, 141].

The age of gym members was lower than for non-gym members. Gym membership may appeal to the younger population. An expected finding was the lower weight of gym members. As physical activity increases, it is expected that weight goes down [42, 132, 142]. Although these differences were not statistically significant, they show us how the fitness industry is playing its part in the fight against overweightness.

The sample had more than 63% of participants reporting very good to excellent health. This compares to earlier studies in other countries [19, 117]. A small percentage reported being of poor health. This implies that *parkrun* attracts all participants of any ability regardless of background of physical activity level [19, 131].

Injury levels reported in this study compares to earlier studies which found similar trends [19]. The percentage of those living with disabilities was lower than the national average of slightly above seven percent [143]. There may be need for more measures aimed at increasing participation in *parkrun* by people living with disabilities.

## 5.4 Motivation for *Parkrun* Participation

The highest motivation for participation was observed for health and fitness reasons. The health benefits of *parkrun* include positive changes in weight, increases in cardiorespiratory fitness and improvements in mental health [18, 117, 126]. Many participants commented on having lost weight after participating in *parkrun*. These claims though may not entirely be as a result of participating in *parkrun* only but other health related behaviours that come with the participation. Others reported how *parkrun* has helped them improve their mental health. The common observation of the comments that were given by participants is that there were no adverse comments about *parkrun.* Most comments were a reflection of the benefits the participants were getting from *parkrun.*

Just as previous studies showed, enjoyment was cited as the second most common motivation for participation in *parkrun* [21, 144]. *Parkrun* also provides a safe environment for exercise participation. Over 79% of households in South Africa feel unsafe in their neighbourhoods due to the high crime rates [145]. *Parkrun* is a community event with community members and volunteers to ensure safety for participants. As such, many people chose *parkrun* for the safety benefits.

There were more women motivated by cost, time, weight loss potential, stress relief factors and the desire to compete with others. Women felt safer during *parkruns* and joined it for those reasons. A study in the USA on barriers to physical activity participation in women identified the lack of safety of the neighbourhood and time as a factor in reduced physical activity [146, 147]. *Parkrun* addresses these issues and is a safe space for exercise for all groups which appeals more to women. As more women were employed in this sample, this explains the higher percentage mentioning the convenience of *parkrun* times as ideal for their schedules. Some comments given about time include that *parkrun* does not take much time and the participant will have the rest of the weekend to do other things fully satisfied that they would have taken part in a healthy activity.

Age differences were noticeable in the various motivation categories. The younger participants were more motivated by most factors than the older ones. It shows how age may play a part in encouraging participation in physical activities. Younger people need a motivation to attend a physical activity programme than the older generation.

## 5.5 Physical Activity related Behaviour Change

### 5.5.1. *Preparkrun* Self-Reported Perception of Physical Activity

A total of 83.4% of the participants reported being physically active before joining *parkrun* with 49% of these reporting regular physical activity. This finding was also observed in previous *parkrun* populations in Australia [19]. Combining this with the high number of gym membership, we could assume that the previous level of physical activity may play a role in *parkrun* participation. Physically active individuals may seek to increase their physical activities.

Only 52% of the sample recorded their weekly *preparkrun* physical activity times. This could be as a result of recall bias as most participants had been registered with *parkrun* for more than a year [136]. However, those who included their total weekly physical activity dosage before joining *parkrun* and reported being regular exercisers had a median duration of 180 minutes a week (IQR: 160-420). This mean more than 75% (n=696) of this subgroup (52% of total participants) exceeded recommended weekly physical activity guidelines before joining *parkrun* [148]. The level of education in this sample was very high and most reported being employed. High education and socioeconomic status has been found to be associated with increased physical activity levels [149].

The rates reported for non-exercisers are lower than the national average of non-exercisers in South Africa[138, 150]. *Preparkrun* exercise patterns had no association to gender. This is in contrast to previous studies of physical activity in South Africa that showed that physical inactivity was as high as 49% for women and 43% for men [41].

A total of 42.9% of the sample reported engaging in walking before joining *parkrun*. Walking is a common source of physical activity and transport in most African countries [151]. In this study, walking was a common *pre-parkrun* activity for non-exercisers and occasional exercisers though the participants in the study are less likely to use walking as a means of transport due to their socioeconomic status. *Preparkrun* median weekly walking duration was 100 minutes (IQR: 60-180). More than 50% of the 929 participants who recorded their *preparkrun* weekly activity times and engaged in walking did not meet recommended physical activity guidelines of at least 150 minutes of light to moderate activity [9, 148].

Running was reported by 41.8% of the all participants as a *pre-parkrun* activity. Since *parkrun* activities are run and walking based, this finding is not unusual. It may be appealing to runners to join *parkrun*. Running has been cited as a common leisure time physical activity in South Africa [152]. Weekly running duration *preparkrun* had a median of 90 minutes (IQR: 60-150) in the participants who recorded their running times pre*parkrun* (n=456). Therefore more than half of the 929 participants who reported their physical activity times and were *preparkrun* runners met

the recommended weekly dosages of physical activity of at least 75 minutes a week of vigorous activity [148].

Over half of the total sample reported being members of a gym. This does not tally well with *pre-parkrun* gym workouts reported by only 35.6% of the sample. Median times spend in the gym doing workouts were a weekly total less than the WHO recommended guidelines [148]. It is possible that these participants were members who enrol into a gym and seldom do any workouts. Studies on the Discovery Vitality programme which incentivises members' gym subscriptions reported that despite the many rewards and benefits offered for gym use, two thirds of members of Discovery Health do not make use of the gym facilities [107, 153]. This corresponds with this finding in our study. Our sample had an employment rate above 70% and these were likely to be on medical aid as medical aid is sometimes subsidised by the employer in South Africa [153]. This explains as well the high gym membership as many medical aids and employers provide incentives for gym participation.

More than 75% of those who engaged in aerobics and swimming had significantly lower physical activity dosages. It is only when total physical activity is summed up from different categories that more than half of the sample meets recommended weekly total activity levels. This shows that physical activity should be encouraged from a broad spectrum of possible activities.

Median participation time in total weekly physical activities before joining *parkrun* was 180 minutes a week (IQR: 120-340) for the subsample of 52% of the participants who reported their physical activity duration. This is  a very high number and the more than half exceeded the recommendations by the World Health Organisation of at least 150 minutes a week [148]. .

### 5.5.2. Post *parkrun* physical activities

After joining *parkrun*, 44.7% of male participants and 50.9% of females increased their physical activity levels. Females had lower *pre-parkrun* physical activity levels and earlier studies in Australia and the UK showed that the physical activity increases after joining *parkrun* were higher in previously less active groups [18, 154]. In this study as well, 72.8% of *preparkrun* non exercisers took up physical activities after joining *parkrun* further confirming the finding in previous studies as outlined above. These previously inactive individuals had a median weekly physical activity

participation of 130 minutes. While this is below recommended physical activity guidelines, engaging in minimum exercise has some health benefits and is better than no exercise at all [13, 134, 148]. These participants will therefore have reduced their risks of NCDs by taking up new physical activities after joining *parkrun* [27, 142, 155].

Students increased their physical activity dosage more than all other groups. Analysis of the motivations for participation showed that younger participants were motivated by enjoyment, weight loss, health/fitness benefits and competition with others than the older participants. Being motivated by enjoyment, health/fitness, weight loss, stress relief, socialisation and the potential to earn Discovery Health points were associated with greater uptake of physical activity after joining *parkrun*.

Running (18.2% of all participants) attracted the largest number of new participants with walking (6.9%) and gym workout (6.9%) being other common *postparkrun* physical activities. The uptake of running may be due to *parkrun* being a running based activity and participants find it easier to continue with this form of exercise. There was lower uptake in swimming, aerobics, recreational sports and cycling. These were not common *pre-parkrun* physical activities either.

There was a positive association between increasing physical activity levels after *parkrun* and being motivated by some factors for *parkrun* participation. People who reported being motivated by health/fitness, enjoyment, weight loss, stress relief and the desire to earn Discovery Health Vitality points took up more exercises than those who were not motivated by these factors. These factors can be used to work around strategies to deal with barriers to exercise participation [80, 85, 146, 156]. Further studies are advised to look into the motivation factors and *postparkrun* participation physical activity uptake.

Previously active participants also increased their physical activity levels. The biggest increases were in the running activity (33% of *preparkrun* runners increased their weekly *postparkrun* running duration) followed by walking (24.1% of pre*parkrun* walkers) and those who worked out in the gym (23.2% of pre*parkrun* gym exercisers). It cannot be entirely attributed to *parkrun* participation as due to the limitations of this study as discussed under limitation.

## 5.6: Limitations of This Study and Recommendations for Future Studies

The first limitation of our study is that of response and recall bias [157]. Our study used self-reported data. More than 85% of participants had been registered with *parkrun* for more than a year. The study sought to describe their physical activity behaviours more than 12 months ago or in some cases many years ago before they joined *parkrun*. While efforts have been to use estimates and include close ended questions, some participants may have lost count of their total weekly minutes. This may also help explain why so many participants did not include time values when talking about their *pre-parkrun* physical activity behaviours. The study could have been open to those with less than a few weeks after joining *parkrun* so as to minimise this bias, or as a prospective study assessing newcomers to *parkrun*, and assessing changes in the future.

The second limitation of our study is the cross-sectional nature of the design. We are unable to determine a cause and effect relationship in describing the various variables in the study. While there were instances where people reported losing weight after *parkrun*, this could be as a result of other factors and not due to *parkrun* alone. A longitudinal prospective study is advised to improve a closer look into the health related behaviour changes and motivations.

The third limitation was that the study, due to logistics reasons was limited to one province of South Africa. As a result, some population groups have lower representation, for example the unemployed and the less educated groups who may be participants in other provinces. We recommend a national survey with that can effectively compare the different groups in the South African context. The demographic details in this study, however, compares to previous studies in Australia [19]. Our study used only those who had participated in *parkrun* and are registered with *parkrun*. The results may not be applicable to non *parkrunners*.

The fourth limitation was the language factor. *Parkrun* registration requires that potential participants understand English and are proficient enough to register online and this is a challenge to individuals with low literacy levels and some who do not use English as a first language. Also, the *parkrun* model assumes internet access in potential and registered

participants which is a limitation in south Africa where internet connectivity levels and literacy levels are low [158, 159].

# CHAPTER 6: SUMMARY AND CONCLUSION

Physical inactivity, the world's fourth leading cause of mortality, is a burden to public and private healthcare systems around the globe costing over 53 billion international dollars in 2013 [160, 161]. Public health initiatives have been devised to deal with the ever growing effect of physical inactivity. *Parkrun,* a weekly 5 km free participation run is one such initiative aimed at encouraging participation in physical activity. Mental health, health and fitness goals and weight loss are some of the health benefits for participating in *parkrun* [18]. In South Africa, the first *parkrun* event was held in Johannesburg in 2011. Since then, *parkrun* has grown to 223 event sites in the country with more than 750 000 registered participants [162]. To our knowledge, no research has been conducted to describe the motivation for participation in *parkrun* and if *parkrun* leads to health related behaviour change among participants.

In this study, we have addressed the study objectives described in Section 1.2.2 as follows:

*To identify demographic characteristics of Parkrun participants in the Western Cape*

In our study, more female participants took part in *parkrun* than males. Male participants were older, and had greater mass and greater stature than their female counterparts. Around half of our participants were aged less than 50 years and less than a quarter were under 38 years old. More than half were classified as obese.

More than 84% of the male participants and 83% of female participants had higher education (Technikon/College/University) and over 70% were employed. Over half reported being members of a gym but only 35.6% reported doing gym workouts.

This study showed that more than 64% of participants had very good to excellent self-reported health.

*To describe the motivations for participating in parkrun in the Western Cape Province of South Africa*

Health/fitness was the biggest motivation for participating in *parkrun* in over 85% of participants. Significant numbers were motivated by enjoyment. The safe environment at *parkrun* sites was a source of motivation for over 58% of participants.

> *To investigate physical activity related behaviour changes as a result of participating in parkruns in South Africa's Western Cape Province based on pre and post participation physical activity (PA) levels*

In this study, 48% of participants reported increasing their physical activity levels after joining *parkrun.* Among those who were non exercisers before joining *parkrun*, 72.8% took up new physical activities. Running (18.2% of participants) was the most widely adopted new physical activity programme. Thirty-three percent of *preparkrun* runners reported increasing their weekly running volumes after joining *parkrun*. Other increases in *postparkrun* physical activities were noted in *preparkrun* walkers where 24.1% increased their weekly walking volumes.

In conclusion, we found that *parkrun* in the Western Cape is mostly taken up by participants in their sixth decade of life with half of them being overweight. Most participants are physically active before joining *parkrun* with more than half exceeding recommended global physical activity levels. These results described in previous studies in Australia and the UK. We also found health/fitness to be the biggest motivation for *parkrun* participation followed by enjoyment and the safe environment provided at *parkrun* sites. Running and walking are the common activities that are taken up by participants after joining *parkrun*. Further prospective studies are recommended to determine cause and effect models and describe health related physical activity behaviour change in detail.

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# APPENDIX A: HREC APPROVAL LETTER

**UNIVERSITY OF CAPE TOWN**
**Faculty of Health Sciences**
**Human Research Ethics Committee**

**Room E53-46 Old Main Building**
**Groote Schuur Hospital**
**Observatory 7925**
**Telephone** (021) 406 6626
**Email:** shuretta.thomas@uct.ac.za
**Website:** www.health.uct.ac.za/fhs/research/humanethics/forms

05 March 2019

**HREC REF: 119/2019**

**Dr Theresa Burgess**
Physiotherapy
F-floor, OMB

Dear Dr Burgess

**PROJECT TITLE: MOTIVATION AND BEHAVIOUR CHANGE IN PARKRUN PARTICIPANTS IN SOUTH AFRICA (MSc Candidate - Mr E Chivunze)**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until the 30 March 2020.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

**Please quote the HREC REF in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

***The HREC acknowledge that the student, Mr Edgar Chivunze will also be involved in this study.***

***Yours sincerely***

**PROFESSOR M BLOCKMAN**
**CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE**
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938

# APPENDIX B: LETTER TO *PARKRUN* SOUTH AFRICA



**Department of Health and Rehabilitation Sciences**

**Faculty of Health Sciences**

Divisions of Communications Sciences and Disorders,
Nursing and Midwifery, Occupational Therapy, Physiotherapy

F45 Old Main Building, Groote Schuur Hospital,

Observatory 7925

Tel: +27 (0) 21 406 6401 Fax: +27 (0) 21 406 6323

Internet: www.uct.ac.za


**9 April 2019**

Dear Manager / Country Director

*Parkrun* South Africa

**Re: Request for Assistance in Distribution of a Research Questionnaire to Registered Participants of *Parkrun* South Africa**

My name is Edgar Chivunze. I am a second year MSc Exercise and Sports Physiotherapy Student with the University of Cape Town. I am conducting a research among *Parkrun* participants to describe motivations for participation in *parkruns* and resultant health related behaviour change. This study has been granted ethical approval from the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee - **HREC REF 119/2019**. The study is being supervised by Miss Kim Buchholtz and Dr Theresa Burgess of the Division of Physiotherapy, University of Cape Town.

Health related dangers of physical inactivity have been well established. These include a higher incidence of likelihood of most lifestyle diseases like type 2 diabetes, high blood pressure and heart diseases. Your organization is doing a splendid job in propagating efforts in helping citizens of South Africa to participate in physical activity.

However, the reasons that *parkrunners* take part in the weekly *parkruns* have not been studied scientifically in South Africa. This study seeks to describe the motivations for participating in *parkruns* and the health-related behaviour change associated with participation in *parkruns*. The results of this

study will go a long way in encouraging even more participation in *parkruns* and other physical activity programs, as well as allowing us to develop strategies to remove the barriers to exercise participation.

We would like to approach all registered members on your website to take part in a short survey. I request your permission to include a link to the online survey questionnaire and also mail the link to members on your mailing list. We also request permission to interview participants at a few *parkrun* locations in Cape Town. The same questionnaire will be used for the online study and the interview. This is to improve the response rate of the questionnaire.

In an effort to boost participation in this scientific study, I kindly request your organisation sponsors to help with small tokens like sweat wristbands, T-shirts, water bottles etc. as tokens for the participants. I have also noted that Discovery Vitality offers 300 points for their members who participate in *parkruns*. I kindly request a few additional points to those who would have participated in this study.

If you have any questions in relation to the study or require further information, please feel free to contact the undersigned:


Researcher: Edgar Chivunze email: edgarphysio@yahoo.com

Supervisor: Miss K. Buchholtz email: kim.buchholtz@uct.ac.za

Supervisor: Dr T. Burgess email: Theresa.Burgess@uct.ac.za


You can also contact the Human Research Ethics Committee of the University of Cape town on the following contacts:

The Human Research Ethics Committee

Floor E53, Room 46

Old Main Building

Groote Schuur Hospital

Observatory, 7925

Thanking you in advance for your cooperation.

Kind regards

Edgar Chivunze

# APPENDIX C: APPROVAL FROM *PARKRUN* INTERNATIONAL

## Certificate of approval

APPROVED

**parkrun Research Board**

**Title of study:** Motivations and behavior change in parkrun participants in South Africa.

**Lead Investigator:** Kim Bucholtz (Lecturer, University of Cape Town, South Africa).

**Other investigators:** Dr Theresa Burgess (Senior lecturer, University of Cape Town, South Africa); Edgar Chivunze (MSc student, University of Cape Town, South Africa); Autumn Abrahams (4th year physiotherapy student, University of Cape Town, South Africa); Brian Brummer (4th year physiotherapy student, University of Cape Town, South Africa); Carla Erasmus (4th year physiotherapy student, University of Cape Town, South Africa); Candace Nel (4th year physiotherapy student, University of Cape Town, South Africa); Chandré Herman (4th year physiotherapy student, University of Cape Town, South Africa); Ricki-Lee Hamman (4th year physiotherapy student, University of Cape Town, South Africa).

**Date of approval:** 14th June 2019

**Valid until:** 14th December 2019

**Extent of approval:** The researcher and their team have permission promote their research project in person to the parkrun communities of Kayamandi, Green Point, Zandvlei in South Africa, and through parkrun's email channels.

*This is to certify the parkrun Research Board has approved this study to go ahead as long as the code of conduct for researchers is adhered to at all times.*

Steve Haake

**Professor Steve Haake**

Chair of the parkrun Research Board

# APPENDIX D: QUESTIONNAIRE

## QUESTIONNAIRE: online version

**Instructions for Participants**

- ***Please read each question carefully to assist in obtaining accurate information***
- ***Please answer all questions as truthfully and accurately as possible (all personal information will be kept confidential)***
- ***If you have any questions or require any assistance, please feel free to contact the researchers as advised in the consent document***

---

## SECTION A: DEMOGRAPHICS

1. **HAVE YOU PARTICIPATED IN THIS STUDY BEFORE EITHER ONLINE OR AT ONE OF THE *PARKRUN* EVENTS? (***tick your answer below)***

   **YES** ☐

   **NO** ☐

**(If a participant answered yes, the system will automatically not allow for further participation in the study and would thank them for their time for participant=ting in the study. If a participant chose NO, the system would direct them to the rest of the questionnaire.)**

2. **Gender**

   ***Male*** ☐

   ***Female*** ☐

3. **Age** ……

4. **Relationship status**

***Never married*** ☐

***Married*** ☐

***Separated/divorced/Widowed*** ☐

5. **Height (metres)** …….

6. **Weight (kg)** …….

7. **Highest level of Education (***please tick appropriate)*

***No schooling*** ☐

***General Education (completed schooling until grade 9)*** ☐

***Further education (Grade 10 to Matric)*** ☐

***Higher Education (Technikons/College/University)*** ☐

8. **Employment Status (***please tick appropriate***)**

***Employed*** ☐

***Student***

***Working Student*** ☐

***Non-working Student*** ☐

***Retired*** ☐

***Unemployed*** ☐

9. **Are you a member of a health club / gym (***tick appropriate***)?**

***Yes*** ☐

***No*** ☐

10. **Are you an Elite Athlete [An elite athlete is defined as someone who plays at an advanced level within a sport (Lorenz et al., 2013) for example a person who has represented their province or country within the last 12 months]?**

***Yes*** ☐

***No*** ☐

11. **Self-Rated Health: Please rate how good or bad your overall health is in your opinion** (*tick the most appropriate*)

***5. Excellent*** ☐

***4. Very good*** ☐

***3. Good*** ☐

***2. Fair*** ☐

**1. *Poor*** ☐

12. **Do you have any injury/ disability/ illness limiting physical activity participation (***please choose appropriate***)?**

**Injury** ☐

**Disability** ☐

**Illness** ☐

**Not Applicable** ☐

**SECTION B: *PARKRUN* PARTICIPATION**

***13.*** **For how long have you been registered with *parkrun* (***please tick appropriate)***

***Less than 1 year*** ☐

***More than one year*** ☐

**14. How many *parkrun* events have you attended in the past 6 months……?**

**15. What motivates you to participate in *Parkrun* events (***please tick all that apply to you***)?**

| **Reason for *Parkrun* Participation** | **Tick if it Applies to you** |
|---|---|
| **Cost** | |
| **Enjoyment** | |
| **Time** | |
| **Health/ Fitness** | |
| **Weight Loss** | |
| **Stress Relief** | |
| **Safe environment to participate in physical activity** | |
| **Socialisation** | |
| **Competition with others** | |
| **To earn Discovery Vitality Points** | |
| **Other (specify other reasons) ……..** | |

**PHYSICAL ACTIVITY BEFORE JOINING *PARKRUN***

16. **Before joining *parkrun* what were your physical activity levels:** (*please choose appropriate)*

***Regular exerciser (engages in exercises at least 3 times a week)*** ☐

***Occasional exerciser (participates in exercises 1 – 2 times a week)*** ☐

***Non-Exerciser (does not engage in any form of exercises)*** ☐

17. **If you answered 1 or 2 above, please specify which activities you participated in before joining *parkrun*:** (***please select all that apply to you****)*

**[B2] PHYSICAL ACTIVITY AFTER JOINING *PARKRUN***

| **Type of Exercise** | **Please Tick** | **Number of minutes spent on the activity a week** |
|---|---|---|
| **Running** | | |
| **Swimming** | | |
| **Aerobics Class** | | |
| **Walking** | | |
| **Play recreational Sport** | | |
| **Work out in a gym** | | |
| **Other (*please add what apply to you and time spend on each activity)……*** | | |

***18.*** **After joining *parkrun*, have you taken up other exercises? (***please tick appropriate)*

***Yes*** ☐ ***No*** ☐

**19. If yes, please specify which exercises you engage in and total amount of time spent on each (***please select all that apply to you***)**

| Please Tick | Type of Exercise | Number of minutes spent on the activity a week |
|---|---|---|
| | **Running** | |
| | **Swimming** | |
| | **Aerobics Class** | |
| | **Walking** | |
| | **Play recreational Sport** | |
| | **Work out in a gym** | |

**20. Would you like to receive the results of this study via email** *(please tick appropriate)***?**

**Yes** ☐ **No** ☐

**If yes, please write down your email address……**

# APPENDIX E: HREC APPROVAL FOR UNDERGRADUATE STUDY

**UNIVERSITY OF CAPE TOWN**
**Faculty of Health Sciences**
**Human Research Ethics Committee**

**Room E53-46 Old Main Buildin**
**Groote Schuur Hospit**
**Observatory 792**
**Telephone** [021] 406 662
**Email:** shuretta.thomas@uct.ac.z
**Website:** www.health.uct.ac.za/fhs/research/humanethics/form

15 March 2019

**HREC REF: 147/2019**

**Dr Theresa Burgess**
Physiotherapy
Health & Rehab
F-floor, OMB

Dear Dr Burgess

**PROJECT TITLE: DOING MORE WITH PARKRUN: AN EXPLORATION OF MOTIVATIONS AND POTENTIAL BEHAVIOUR CHANGE IN PARKRUN PARTICIPANTS IN THE WESTERN CAPE, SOUTH AFRICA**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until the 30 March 2020.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

**Please quote the HREC REF in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

***The HREC acknowledge that the following undergraduate students will also be involved in this study: Autumn Abrahams, Chandre Herman, Carla Erasmus, Candace Nel, Ricki-Lee Hamman and Brian Brummer.***

***Yours sincerely***

**PROFESSOR M BLOCKMAN**
**CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE**

Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
NHREC-registration number: REC-210208-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95 and FDA Code Federal Regulation Part 50, 56 and 312.

# APPENDIX F1: INFORMED CONSENT FORM (online version)



**Department of Health and Rehabilitation Sciences**

**Faculty of Health Sciences**

Divisions of Communications Sciences and Disorders, Nursing and Midwifery, Occupational Therapy, Physiotherapy

F45 Old Main Building, Groote Schuur Hospital,

Observatory 7925

Tel: +27 (0) 21 406 6401 Fax: +27 (0) 21 406 6323

Internet: www.uct.ac.za


**Dear Participant**

My name is Edgar Chivunze. I am a MSc Exercise and Sports Physiotherapy Student. I am conducting a research among *Parkrun* participants to describe motivations for participation and health related behaviour change associated with participation in *parkruns*. This study has been approved by the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee. The study is being supervised by Miss Kim Buchholtz and Dr Theresa Burgess of the division of Physiotherapy, University of Cape Town.

**Why is this study being done?**

We are trying to understand why people choose to do *parkruns*. The findings of this study will be used to better understand what drives participation, helping to promote physical activity among South-Africans.

In this research, we aim to better understand the following:

- To understand what types of people participate in these *parkruns*
- To determine why people, choose to participate in these *parkruns*
- To understand whether participation in *parkrun* is associated with other changes in healthy behaviour

**Why are you being asked to take part?**

As a participant of *parkrun,* we would like to ask about your demographics: age, gender, height, weight, if you are on medical aid, level of education, employment status and if you are a member of a health club. Secondly, *parkrun* participation: how long you've been registered, *pre-parkrun* physical activity levels, reason for participating and other exercises that you do besides *parkrun*.

**How long will the questioning last?**

Taking part in the study will only take you five to ten minutes of filling out a questionnaire form that we will hand to you.

**What do we do to decide if you are eligible to be take part?**

You may take part in this study if you are:

- 18 years old or older
- A registered participant of *parkrun* South-Africa
- Have participated in two or more *parkruns* in the last 6 months

**What will happen if you decide to take part in the study?**

You will be requested to sign this form, confirming that you give consent to taking part in the study. We will hand you a questionnaire that you can fill out and return it to one of the group members on completion.

**What are the risks and discomforts of this study?**

There are no risks to filling out this questionnaire, except the time it takes.

**Are there any benefits to you for being in the study?**

You will be given an information pamphlet on completion of the questionnaire and in filling out the questionnaire you can help us improve our understanding of the motivations and behaviour changes people go through when participating in *parkrun* South-Africa.

**What other choices do you have?**

Taking part in this research is voluntary and you can choose to not take part or to withdraw at any moment without further consequences. If there is any question you do not wish to answer, you can move on to the next question freely.

**Will the results of the research be shared with you?**

On the questionnaire there is a question regarding whether you would like to receive the results of this study. If you choose to tick “yes” for this question and add your email address, we would be glad to share the results with you as soon as the study is completed at the end of 2019.

**Will you receive any reward for taking part in this study?**

We are giving away educational pamphlets about physical activity to all the participants of the study.

**Who will see the information which is collected about you during the study?**

We will not share your personal information with anyone besides our group and our supervisors. All of the questionnaires and consent forms will either be locked up in an office drawer or on a password protected computer to keep your information safe. The information will then be analysed to form a summary and your identity will not be revealed in that form.

**Who do I speak to (or contact) if I have any questions about the study?**

You are free to ask us any questions while answering the questionnaire or contact us at another time using the details below:

**Researcher:** Edgar Chivunze email: chvedg002@myuct.ac.za

**Supervisors:**

Miss K. Buchholtz email: kim.buchholtz@uct.ac.za

Dr T. Burgess email: Theresa.Burgess@uct.ac.za

By clicking **NEXT** on the button below you affirm that you have read and understood the purpose of the study, the contents of this consent form and consent to participate in this research study.

Thank you,

Edgar Chivunze

# APPENDIX F2: INFORMED CONSENT (paper based)



**Department of Health and Rehabilitation Sciences**

**Faculty of Health Sciences**

Divisions of Communications Sciences and Disorders, Nursing and Midwifery, Occupational Therapy, Physiotherapy

F45 Old Main Building, Groote Schuur Hospital,

Observatory 7925

Tel: +27 (0) 21 406 6401 Fax: +27 (0) 21 406 6323

Internet: www.uct.ac.za


**Dear Participant**

My name is Edgar Chivunze. I am a MSc Exercise and Sports Physiotherapy Student. I am conducting a research among *Parkrun* participants to describe motivations for participation and health related behavior change associated with participation in *parkruns*. This study has been approved by the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee. The study is being supervised by Miss Kim Buchholtz and Dr Theresa Burgess of the division of Physiotherapy, University of Cape Town.

**Why is this study being done?**

We are trying to understand why people choose to do *parkruns*. The findings of this study will be used to better understand what drives participation, helping to promote physical activity among South-Africans.

In this research, we aim to better understand the following:

- To understand what types of people participate in these *parkruns*
- To determine why people choose to participate in these *parkruns*
- To understand whether participation in *parkrun* is associated with other changes in healthy behaviour

**Why are you being asked to take part?**

As a participant of *parkrun,* we would like to ask about your demographics: age, gender, height, weight, if you are on medical aid, level of education, employment status and if you are a member of a health club. Secondly, *parkrun* participation: how long you've been registered, *pre-parkrun* physical activity levels, reason for participating and other exercises that you do besides *parkrun*.

**How long will the questioning last?**

Taking part in the study will only take you five to ten minutes of filling out a questionnaire form that we will hand to you.

**What do we do to decide if you are eligible to be take part?**

You may take part in this study if you are:

- 18 years old or older
- A registered participant of *parkrun* South-Africa
- Have participated in two or more *parkruns* in the last 6 months

**What will happen if you decide to take part in the study?**

You will be requested to sign this form, confirming that you give consent to taking part in the study. We will hand you a questionnaire that you can fill out and return it to one of the group members on completion.

**What are the risks and discomforts of this study?**

There are no risks to filling out this questionnaire, except the time it takes.

**Are there any benefits to you for being in the study?**

You will be given an information pamphlet on completion of the questionnaire and in filling out the questionnaire you can help us improve our understanding of the motivations and behaviour changes people go through when participating in *parkrun* South-Africa.

**What other choices do you have?**

Taking part in this research is voluntary and you can choose to not take part or to withdraw at any moment without further consequences. If there is any question you do not wish to answer, you can move on to the next question freely.

**Will the results of the research be shared with you?**

On the questionnaire there is a question regarding whether you would like to receive the results of this study. If you choose to tick "yes" for this question and add your email address, we would be glad to share the results with you as soon as the study is completed at the end of 2019.

**Will you receive any reward for taking part in this study?**

We are giving away educational pamphlets about physical activity to all the participants of the study.

**Who will see the information which is collected about you during the study?**

We will not share your personal information with anyone besides our group and our supervisors. All of the questionnaires and consent forms will either be locked up in an office drawer or on a password protected computer to keep your information safe. The information will then be analysed to form a summary and your identity will not be revealed in that form.

**Who do I speak to (or contact) if I have any questions about the study?**

You are free to ask us any questions while answering the questionnaire or contact us at another time using the details below:

**Researcher:** Edgar Chivunze email: chvedg002@myuct.ac.za

**Supervisors:**

Miss K. Buchholtz email: kim.buchholtz@uct.ac.za

Dr T. Burgess email: Theresa.Burgess@uct.ac.za

By signing on the space provided below, you affirm that you have read and understood the purpose of the study, the contents of this consent form and consent to participate in this research study.

Signature of Participant…… Date…….

Thank you,

Edgar Chivunze

# APPENDIX G: LETTER TO EXPERT PANEL MEMBERS

Dear Sir/Madam

How are you?

My name is Edgar Chivunze. I am a second year MSc Exercise and Sports Physiotherapy Student with the University of Cape Town. I am conducting a research entitled **MOTIVATION AND BEHAVIOUR CHANGE IN *PARKRUN* PARTICIPANTS IN SOUTH AFRICA**. The aim of the study is to describe the motivations for participating in *Parkrun* runs and physical activity related behaviour changes among *Parkrun* participants in South Africa. The specific objectives are as outlined below:

- To identify demographic characteristics of *Parkrun* participants
- To describe the motivations for participating in *Parkrun* runs in South Africa
- To investigate physical activity related behaviour changes as a result of participating in *parkruns* in South Africa based on pre and post participation physical activity (PA) levels

This study has been granted ethical approval from the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee - **HREC REF 119/2019**. The study is being supervised by Miss Kim Buchholtz and Dr Theresa Burgess of the Division of Physiotherapy, University of Cape Town.

The measurement instrument for this study is a questionnaire – both online and paper based. I have send the questionnaire to you based on your expertise in the area of physical activity and wellness in public health. I request for your input to help review the questionnaire, give feedback and advise on clarity and relevance of the questions. Please, also include possible additions.

I can furnish you with further details if needed. Please also feel free to contact my supervisor, Miss Kim Buchholtz copied on this email.

Kind regards

Edgar Chivunze

# APPENDIX H: QUANTITATIVE ANALYSIS OF PRE*PARKRUN* AND *POSTPARKRUN* ACTIVITY LEVELS AMONG PARTICIPANTS WHO REPORTED INCREASING THEIR PHYSICAL ACTIVITY LEVELS (n=857)

Participants who reported increasing their physical activity levels after joining *parkrun* (n=857) also reported their total weekly physical activity levels *post-parkrun*. These were compared to their *pre-parkrun* weekly physical activity duration to assess the differences in the increases and the results categorised according to demographic characteristics. The median weekly total *parkrun* activity in participants who reported increasing Table 7 below summarises the findings.

| **Descriptive Characteristic** | **Pre*parkrun* Total Weekly Activity Time (min)** **Median (IQR)** | **Post *parkrun* Weekly Total activity Time (min)** **Median (IQR)** | **T value (Z Value)** | **P value** |
|---|---|---|---|---|
| **Gender** | | | | |
| *Male* | 150 (60-270) | 180 (90-330) | 2.11 | =0.0346* |
| *Female* | 100 (90-270) | 100 (90-292.5) | 0.88 | =0.3791 |
| **Relationship Status** | | | | |
| *Never Married* | 155 (73.8-241) | 180 (90-365) | 2102.5(3.20) | =0.0014* |
| *Married* | 150 (80-266.5) | 150 (90-285) | 9540.5 (0.26) | =0.7923 |
| *Separated/Divorced* | 150 (60-360) | 180 (112.5-360) | 166 (2.05) | =0.0408 |
| **Self-Reported Activity Level** | | | | |
| *Non-Exerciser* | NA | 130 (60-240) | NA | NA |
| *Occasional Exerciser* | 120 (60-180) | 135 (60-232.5) | 4219.5 (3.47) | =0.0005** |
| *Regular Exerciser* | 180 (90-337) | 252.5 (150-420) | 5193 (4.22) | =0.000025** |

*p<0.05; **p<0.001

When the total weekly pre*parkrun* and *postparkrun* times were compared (in the 857 participants who reported increases in physical activity *postparkrun*) the differences were statistically significant for males (Z=2.11, p=0.0346). The never married and the separated/divorced groups significantly increased their physical activities levels (Z=3.2, p=0.0014 and Z=2.05, p=0.0408 respectively). The non-exercisers had a median weekly total physical activity level of 130 minutes after joining *parkrun*.