DETERMINANTS OF PHYSICAL ACTIVITY AMONG ADULTS IN KOTTAYAM DISTRICT OF KERALA, INDIA: A SOCIO-ECOLOGICAL APPROACH

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A THESIS PRESENTED BY

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TO

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To Mom*……..who brought out the best in me!*
You loved me unconditionally
You cared for me even in your thoughts
You never asked anything for yourself
And He heard you…..

CERTIFICATE

I, Shalini Garg hereby certify that I had personally carried out the work depicted in the thesis entitled, "Determinants of Physical Activity among Adults in Kottayam District of Kerala, India: A Socio-Ecological Approach". No part of this thesis has been submitted for the award of any other degree or diploma prior to the date.

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The thesis entitled, "Determinants of Physical Activity among Adults in Kottayam District of Kerala, India: A Socio-Ecological Approach" was carried out under my direct supervision. No part of the thesis was submitted for the award of any degree or diploma prior to this date.

28-01-2021

Signature

APPROVAL OF THESIS

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LIST OF ABBREVIATIONS

ACSM	American college of sports medicine
AMOS	Analysis of moment structures
BC	Before Christ era
BMI	Body mass index
C.R	Critical ratio
CFI	Comparative Fit Index
CVD	Cardio vascular disease
FGD	Focus group discussion
GFI	Goodness of fit index
GPAQ	Global physical activity questionnaire
INR	Indian rupees
KDPP	Keralal diabetes prevention programme
LDL	Low density lipids
LTPA	Leisure time physical activity
MET	Metabolic Equivalent Of Task
MVPA	Moderate to vigorous physical activity
NCD	Non communicable diseases
PA	Physical activity
RMSEA	Root mean square of approximation
SD	Standard deviation
SEM	Structural equation modelling
SEP	Socio-economic position
SES	Socioeconomic status
TPA	Transport physical activity
WHO	World health organisation
α	Cronbach's alpha
β	Regression weight

SYNOPSIS

of the

PhD Dissertation

titled

"Determinants of physical activity among adults in Kottayam district of Kerala, India: A socio-ecological approach"

Submitted by

Shalini Garg

PhD scholar (PhD/2016/05)

Under the supervision of

Professor V Raman Kutty

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AMCHSS, SCTIMST.

"Lack of activity destroys the good condition of every human being while movement and methodical physical exercise save it and preserve it"

-

Plato

Background: Non communicable diseases are a leading cause of death and disability in the world. In order to target these diseases, a major approach has been to improve lifestyle behaviour-such as diet, physical activity, and tobacco and alcohol abuse. Physical activity can reduce the risk of cardiovascular diseases, diabetes, colon and breast cancer, and depression in addition to controlling weight and preventing osteoporosis and reducing the risk of hip fractures. A public health approach to physical activity is important because of its contribution to the mental, social and physical well being of a population. This study tries to identify the determinants of physical activity among adults focussing on the domain that is amenable to intervention that is the leisure time physical activity. Additionally, this study enhances our understanding by testing both moderator and mediator mechanisms based on ecological and social cognitive frameworks. The use of structural equation model against correlational design permits us to test many variables within one comprehensive model.

Objectives of the study are 1. To investigate various individual, social and environmental determinants of physical activity in an adult population (18-65years) in Kottayam district, Kerala.

2. To test both moderator and mediator effects of various determinants of physical activity based on ecological and social-cognitive frameworks.

3. To establish the determinants of participation in physical activity in supervised programs and study critical interactions which cause variations in effect size across groups.

4. To test an alternative methodology for data collection on a pilot sample

Methods used: Part1: Qualitative (Focus group discussions and key informant interviews) methods were used to understand the perceptions, facilitators, barriers and motivators of physical activity in the community. This part was used to scope the factors that affect physical activity in the local context especially social and cultural norms. Thematic analysis with constant comparison methods were employed for analysis.

Part2: All the adults in the age group of 18-65 years (both inclusive) in the district of Kottayam, Kerala constituted the population from which the sample for this part of the study was drawn. The estimated sample size was 500. Adults for the sample were selected using stratified cluster sampling. Equal number of clusters was selected from rural and urban strata to get a representative sample. A detailed interview schedule containing four domains of physical activity viz, individual details, family background, details of daily physical activity, social and physical environment, scales measuring self efficacy and motivation were administered to the study participants. There were 467 completed response forms, out of these 466 were included for analysis. The response rate was 93%. The investigator personally interviewed all the participants after receiving written informed consent forms.

Statistical analysis: Data were entered in Microsoft Excel and analysed in SPSS and Excel. The outcome variable considered for overall descriptive was physical activity

in domains of work, transport and leisure. Mediator and moderator pathways were tested using structural equation modelling. The outcome variable was leisure time physical activity.

Part3: Secondary data analysis of a community trial using peer support as intervention aimed at understanding the factors that cause variations in effect size across groups.

Statistical analysis: Tests were conducted to see any difference in effect across intervention and control groups over time using SPSS and R software.

Part4: A pilot study was undertaken to test the feasibility of telephone mode for data collection in study setting. A sample of 50 subjects was randomly selected from the survey sample in Part 2 of the study. Analysis was done to check difference in response rates and whether responses were similar using both the methods.

Major findings of the study: The first part of the study revealed a general lack of awareness among participants regarding benefits of physical activity (PA). Most women participants believed that household and childcare activities were enough to take care of their daily activity requirements. The study also revealed different motivations for exercising among men and women: men exercised for fitness and health while body appearance was the main motivation for exercise among women. Social restrictions imposed in form of family and gender norms were a major barrier for women. Diagnosis of disease and advice by a physician were major motivators among men. Health communication placed more emphasis on diet and medication for management of most chronic diseases. There was lack of or insufficient information regarding preventive role of physical activity in most health communications. Built

environment was identified as a major barrier as most of the facilities like parks and playgrounds were not accessible, affordable or were not well managed.

Second part of the study demonstrated a survey of 466 adults, 198(43%) were males and 268(57%) were females. Among the subjects, 199(43%) were educated up to secondary level and 32(7%) had post graduate degrees. Of all respondents, 63(14%) were employed in manual labour and 114(24%) were doing sedentary jobs. A total of 131(28%) participants owned no vehicle, 4(1%) people owned bicycle and the rest owned some kind of motorised vehicle. The prevalence of inactivity in each domain was: leisure (80%), work (34%), and transport (73%). The study found declining occupational physical activity and increase in leisure time physical activity with increasing household income.

Overall sample had very low self-efficacy and motivation levels for physical activity. Perceptions of social and physical environment differed significantly with age, sex and area of residence. A common regression model for leisure time physical activity participation was created. The significant predictors for participation in the active group were fitness motivation, self efficacy, friend and family support and being married explaining 71% of the total variability.

Cluster analysis demonstrated two clusters. Cluster 1 was inactive in leisure time, demonstrated low self efficacy and motivation, mostly women, involved in non-sedentary and manual jobs, educated mostly up to secondary level, low household income (lesser than INR 10000per month), reported receiving no information regarding physical activity from health professionals and did not perceive their social and physical environment favourably. However, Cluster 2 was found to be active

during leisure time, demonstrated higher self efficacy and motivation levels than cluster1.This cluster perceived the physical and social environment favourably.

Path analysis for testing moderator and mediator pathways was undertaken. Direct and indirect pathways were analysed for testing the hypotheses. In mediated pathway for full sample which explained 72% of the variance, self efficacy and motivation mediated the pathway between environmental support and physical activity. In separate model for women, only motivation mediated this pathway. The environmental support factor strengthened the positive relation between social motives and physical activity levels ($p<.001$).There was a significant moderation effect of environmental support on social motives motivation and physical activity among males ($p=0.003$).There was no such significant moderation effect among females.

Part 3 of the study found no significant effect of intervention on the study population. There was no significant variation in effect size across groups.

Part 4 of the study found that the responses with telephone mode were highly correlated on most of the outcome variables. The response rate with telephone mode was 62%.

Significance and implications of study findings: From the study it emerged that adults of Kottayam have low leisure time physical activity levels. Self efficacy and motivation levels were low in the study population. There is a gender difference between self efficacy and motivation levels of the population. There are also gender and urban –rural differences in the perception of social and physical environment. These findings also point towards societal norms which are more difficult to address.

Specifically, women and younger adults and those engaged in sedentary occupations choosing not to be physically active. Observing others engaging in physical activity may mould the perceptions around normative expectations regarding physical activity, and hence encourage such behaviour in others. Such findings suggest changing norms related to physical activity behaviours may be a salient target for future interventions. The socio-ecological approach provides an opportunity to examine multiple levels of factors that affect physical activity. Social support and physical environment predicted physical activity indirectly through its effect on self efficacy and motivation. Any efforts to improve physical activity levels in this population must be concentrated on improving these factors first. Both self efficacy and motivation were significant predictors for men and women. These factors also influenced the perception of physical and social environment. Among women, social support may influence physical activity indirectly through motivational reasons for engaging in activity.

Self-efficacy was the strongest direct correlate of activity in this study. This finding provides support for investigating social cognitive variables and their effect on physical activity. A mediated model which emphasizes on individual level factors like self efficacy and motivation would be an adequate model for this population for future interventions. The pathways seem to be different for men and women and this should be considered for future interventions.

The researcher has utilised various methods to determine factors affecting physical activity among adults to improve the robustness of the findings. The qualitative exercise brought out some broad areas of determinants like different motivations for exercise among men and women and importance of extrinsic motivators like health

and fitness. These found support in the quantitative survey where we found that self efficacy and extrinsic motivation were principal correlates of physical activity. The pathway analysis revealed that the mediated pathway would be an adequate model for improving physical activity among adults was corroborated by the secondary data analysis exercise which demonstrated insignificant direct effect of social support on physical activity among participants.

The study tries to fill the gap in contextual evidence required to carry out fundamental intervention strategies in the local scenario. The conceptual model might help in developing future intervention strategies in similar populations. Secondary data analysis revealed that approaches imported from different context might fail in the local setting.

This study further supports the growing area of active living phenomena which is the current approach to improve the population physical activity levels. Years of research and interventions have demonstrated that it is difficult to improve moderate to vigorous intensity physical activity levels of population for a long duration. This approach requires multi-sectoral involvement to adapt the physical environment for small and sustainable changes in the physical activity levels of the population. These indirectly help in changing the societal and cultural norms towards physical activity.

Some of the unique findings need further exploration in different populations and settings. This could be effective in planning future interventions aimed at lifestyle interventions to promote health and prevent disease among both individual and population settings.

1. INTRODUCTION

1.1. The extent of the problem

Physical inactivity is a significant public health problem, contributing to over more than 5·3 million of the 57 million deaths that occurred worldwide in 2008 (Lee et al., 2012). In 2009, physical inactivity was identified as the fourth leading risk factor of NCDs. Recent studies reveal that an estimated one third of adults do not reach recommended levels of physical activity. Notable disparities exist in the prevalence of physical activity; in most countries inactivity is higher in females compared with males and older adults are less active than younger age groups. Data from low and middle income countries is largely insufficient to study patterns and trends of physical activity in these countries. Regular physical activity helps in reducing risk of common chronic diseases. In addition, it helps to decrease stress and improves quality of life, social interaction and sleep as well. In addition, walking and cycling for travel are beneficial for the environment, which again influence the health positively (Das and Horton, 2012). Data from countries representing 96% of the world‘s population revealed that 28% of adults are not active (Guthold et al., 2018a). The High-Level Independent Commission on NCDs, have alarmed over the inadequate response to the current emergency (Dain, 2018; WHO, 2019b).

Physical inactivity was responsible for 6% of burden of cardiovascular diseases, 7% of type 2 diabetes and 10% of breast cancer. Additionally, physical inactivity was responsible for 9% of all premature deaths. However, it is estimated that a 10-25% increase in PA could prevent deaths of 533, 000 to more than 1.3million (Lee et al., 2012).

In 2016, cardiovascular diseases, respiratory diseases, and diabetes killed around 4 million Indians, mainly among ages 30–70 years. These premature deaths signify the enormous health and economic loss to the country (Arokiasamy, 2018).

WHO global health observatory data shows prevalence of insufficient physical activity levels in India at 14% (WHO, 2019a). Most of the studies conducted in India put the figure around 17-30%. A large scale study done in India found the prevalence of inactivity as 54% in selected states (Anjana et al., 2014). In Kerala, 22% of study population reported low levels of physical activity. Only 30% of study population reported leisure related physical activity and it seems to reduce as age increases. (AMCHSS Research Team, 2018: 57).

Conventionally, Indians have been engaged in labor intensive occupations like agriculture and cattle rearing. Leisure time physical activity (LTPA) has not been a popular concept here. However, with occupations becoming labor saving and mechanization taking over almost every sphere of our life, individuals'physical activity levels have gone down drastically. This has forced many to derive their physical activity from recreation and travel domains. Studies reporting physical activity levels among Indians have found that a very low proportion of adults (3 to 15%) are active in leisure time (Anjana. et al, 2014) are physically active in their leisure time. This implies that overall physical activity levels in India are expected to decline in future. In recent years, the prevalence of overweight and obesity among adults has been rising (IIPS and ICF, 2017), encouraging epidemiologists and social scientists to enquire about the factors that affect adult physical activity so that health promotion programs and policies can be directed at particular contributing factors. In this context, it is crucial to obtain data on determinants of physical activity so that public health initiatives are designed to improve activity levels in the country.

Even though it is broadly acknowledged that physical activity is influenced by both environmental and individual factors, it remains to be seen how these variables work together in explanatory models. This is an emerging area of research with few studies looking at how these types of factors are interacting to explain activity (Baranowski et al., 1998; Sallis and Owen, 1998: 178–181).

1.2. Rationale of the study

A review on various physical activity interventions concluded that physical activity interventions were effective only in a modest way. Most of the interventions lacked theoretical foundations and most studies did not account for the mediating mechanisms. Based on the above conclusions, Baranowski et al. (1998) recommended changing the focus of research to more basic behavioral and social sciences and mediator and moderator change mechanisms.

Although the significance of social context may be less obvious in primarily white populations, middle and high income countries (where intervention models have been developed and tested), they are vital in programmes that target socio-economically disadvantaged populations. There is a lack of focus on the social context in these programmes which might be the reason for modest effect sizes seen in these populations (Bauman et al., 2012; Pratt et al., 2015).

Investigating why and under what conditions people select to be physically active are imperative for understanding the opportunities and barriers for activity. Therefore, the aim of this study is to investigate the physical and social environmental and individual level factors that facilitate or hinder physical activity especially leisure time physical activity. In an attempt to enhance the area of physical activity research, this study assesses environmental factors such as availability and quality of leisure time facilities; social environment like support from family and friends; and psycho-cognitive factors like self-efficacy and motivation for physical activity. This study also increases our understanding of moderator and mediator mechanisms explaining physical activity. The use of advanced statistical technique such as structural equation modeling permits us to test many variables within a single model.

As societies move away from traditional labor intensive occupations and lifestyle activities including motorized travel, leisure time takes over as the chief component in variability of physical activity. The findings and conclusions may assist in making adults more active and help in developing future intervention strategies. –There is much scope for additional determinants research on physical activity, with a priority

on examining factors that influence readiness to be more active, and the ways in which environmental and structural factors may influence both sedentary behaviors and physical activity participation‖ (Sallis and Owen, 1998: 180).

1.2.1. Rationale for selecting the study setting

Kerala is one of the most developed states in India in terms of human development indices**.** The state has high literacy (90.9%) and has a high proportion of older adults. The state is well ahead in the stages of demographic and epidemiological transition compared to other states in India and shares a large burden of NCDs, including diabetes (GOI, 2011). Clinical and anthropometric risk factors (Ramachandran et al., 2006) which are largely attributable to rapidly changing lifestyle, consuming rural and urban areas alike (Daivadanam et al., 2013) make Kerala a perfect setting to test and develop novel strategies to control and prevent NCDs. Since rest of the country is expected to follow Kerala in terms of lifestyle transition, theoretical approaches developed and tested in Kerala might help in designing interventions for rest of the country too (Thankappan et al., 2010) .

1.3. Need for developing alternate methodology

Telephone surveys are a popular mode of collecting research data in developed countries; however, this method has not been able to gain its popularity among health and social science researchers in India. The reason being: low telephone coverage mostly in rural and difficult to reach areas. In recent years, with improving telephone coverage, it holds the potential of becoming an efficient method of data collection. Telephone interviews aid in covering a wider geographical area within less time and minimum costs (Dillon, 2010). However doubts abound regarding the response rate to telephone interviews. People in western countries have responded to non sensitive issues like diet, education, morbidity, physical activity etc. A lot has been written about strengths and weaknesses of different modes of data collection which is useful for researchers to decide based on the purpose of their research (Groves, 1990). Nowadays the cost of survey is increasing due to extra efforts required to contact busy subjects and encouraging the reluctant subjects to cooperate (Groves, 1990). Telephone surveys are appealing in terms of bringing down costs of

data collection especially in low resource settings (Pariyo et al., 2019). To assess the use of telephone surveys, a survey on a subset of the questionnaire on physical activity was therefore conducted.

1.4. Statement of the problem

In order to improve physical activity levels of populations in low and middle income countries, knowledge of multiple levels of determinants is required. More than two third global deaths from chronic diseases is reported from low and middle income countries (Pratt et al., 2012) .The existing evidence regarding the factors that affect physical activity is derived mainly from studies and theoretical constructs developed in high income countries. There is paucity of research in this area from developing countries. Therefore we are unable to evaluate the effect of interventions and strategies in these countries. Contribution of physical activity promotion to the future health –physical, social and mental is the foundation of the proposed study. Measurement of physical activity determinants at various levels remains a major challenge especially psycho-cognitive and physical environmental variable. Assessing these factors at the multiple levels of intrapersonal, physical and social environment and trying to develop a conceptual model for future interventions which looks at the interactive role of these variables in attaining recommended levels of physical activity is the major task attempted in this study. Based on the evidence generated, the study expects to propose evidence based intervention levels for physical activity promotion. Today, chronic disease prevention requires a consorted effort and lifestyle interventions like physical activity promotion. Physical activity promotion entails a synchronized multispectral approach integrating efforts from departments of education to health to transport and urban planning.

1.5. Objectives

Primary Objective

The primary objective of this study is to investigate various individual, social and environmental determinants of physical activity in adult population (18-65years) in Kottayam district, Kerala.

Secondary objectives

1. To test both moderator and mediator effects of various determinants based on ecological and social-cognitive frameworks.

2. To establish what are the determinants of participation in physical activity in supervised programs and study critical interactions which cause variations in effect size across groups.

3. To test an alternative methodology for data collection on a pilot sample

The overall aim of the study is to gain an understanding of the various intrapersonal, physical and social environment influences on physical activity in this population and also test various pathways through which they impact physical activity.

1.6 Hypothesis

1. The relationship between environmental support, and physical activity would be mediated by intrapersonal factors-self efficacy and motivation
2. Environmental support would influence intrapersonal factors --self- efficacy and motivation directly, which in turn would influence physical activity.
3. Environmental factors would influence physical activity directly.

The hypotheses with the conceptual model have been discussed in detail in Section 2.8.2

1.7. Chapter scheme

This thesis is divided into six chapters. The first chapter introduces the study. The following chapter (Chapter 2) provides a comprehensive review of literature on the physical activity promotion and determinants of physical activity available from different parts of the world. For ease of exposition this chapter is divided into nine broad sections. The first section introduces the various topics relevant to the field including the latest trends in research. Section 2.2 and 2.3; focus on various

perspectives to the study of physical activity including evolutionary and historical perspective. Section 2.4 sums up the current issues in determinant research. The next section (2.5) tries to review the literature on various levels of physical activity influences. Major public health evidences on physical activity promotion from different parts of the world are included in the subsequent sections of the chapter.

Section 2.8 focuses on the theoretical underpinnings of the study including some basic concepts on the broad area of physical activity promotion. Theories on the various levels of determinants are included in the section.

Chapter3 provides a detailed description of the methodology used in the study. The study was completed in four parts and different methods were used. In the first part, it gives an understanding of overall awareness and attitudes of physical activity among adults. This process involves qualitative techniques like key informant interviews and focus group discussions to facilitate our understanding of their perceptions. The second part of this chapter is on methodology adopted in the cross sectional survey conducted in Kottayam district using standardized tools and quantitative methods to identify the determinants among adults. This part includes the methodology employed to build the conceptual model of the leisure time physical activity. The third part employs secondary data from a community trial on high risk group of adults to promote lifestyle intervention and reduce the risk of diabetes in the intervention arm. The fourth part of the study explores the feasibility of using telephone as a data collection mode by testing the tool on a pilot sample. In the final section of the chapter, tools used in the study have been described. Overall this chapter provides a detailed picture of the process undertaken throughout.

In Chapter 4, the results of the study are described in five parts. The first part is on the findings of the qualitative study. The second part gives the overall picture of the data the preliminary analysis of the data as well as the nature of the results is Obtained from the data. The levels of physical activity in different domains, patterns with respect to socio-demographic variables and differences in the self efficacy and motivation levels with respect to socio demographic variables are given. Cluster analysis describes the unique nature of different clusters and the distribution of different variables in each cluster. The differences in perceived social and physical

environment have also been reported. Section 4.3 describes the path analysis. This analysis tests the hypotheses developed on empirical evidence gathered from the literature. The model developed tests mediator and moderator pathways. Section.4.4. presents the findings from the secondary data of KDPP trial and tries to compare the findings with evidence from the cross sectional study in the previous section. The next section present the findings of the pilot study using telephone mode.

Chapter 5 discusses the study results in the light of the existing literature. This chapter is also divided into sections based on the results section. The first section examines the perceptions attitudes and scopes the barriers, facilitators and motivators of physical activity in the community. This also helps to identify the relevant factors for assessment in the cross sectional study. In the following section, overall levels and patterns of physical activity in various domains and their predictors are discussed. Some of the modifiable factors like environment and social norms are identified. Next section deals with the path analysis. Direct and indirect pathways as to how environment affect physical activity levels through personal level factors is discussed and feature the interactive role of environmental influences on physical activity. Some of the strongest predictors like self efficacy are highlighted. The following section presents the model put forth by the study. The secondary data analysis which uses peer support as an intervention strategy does not reveal any significant outcomes on physical activity levels and so findings are discussed attempting to probe the possible limitations in the underlying theory or need assessment of the study The next section describes the possibilities of telephone mode weighing across the limitations in a low income country like India.

2. REVIEW OF LITERATURE

"Lack of activity destroys the good condition of every human being while movement and methodical physical exercise save it and preserve it"

--Plato

2.1. Introduction

Physical activity has well- recognized health benefits yet majority of people worldwide are increasingly becoming sedentary, raising concerns for public health. This chapter reviews existing research on the determinants of physical activity. It also examines the implications of this knowledge for future intervention strategies at various levels. Since physical activity behavior is a complex, dynamic process, with its own different phases like adoption, cessation and relapse, it is important to understand the multiple facets and also the context in which it is practiced (Sallis and Hovell, 1990). Physical activity is a largely neglected aspect of health promotion worldwide, and particularly in low-income and middle-income countries. Little importance has been given to the social and physical environments that facilitate the take-up of such activity. A Lancet series on physical activity elucidates how multispectral efforts will be essential to improve population physical activity levels. This will present social and cultural challenges which are more difficult to address (Das and Horton, 2012).

Scarcity of knowledge regarding determinants of physical activity is the primary barrier to effective promotion of physical activity (Dishman and Sallis, 1994).

Bauman et al (2002) , summarizing the research on physical activity determinants asked a relevant question two decades ago –Why do some people exercise‖. The authors hypothesized that determinants of adoption and maintenance might differ and should be studied separately. They also went on to call for a more comprehensive theoretical framework including, personal social and environmental

factors (Sallis and Hovell, 1990). The answer to this complex question could not be reached even 20 years later when the team asked the same question differently –Why are some people active and others not (Bauman et al., 2012).

Enough evidence exists to support the multifold benefits of exercise. It has been described as a miracle drug (DoH, 2009). Evidence suggests the role of physical activity in reducing the risk of chronic diseases like coronary heart disease, diabetes, stroke obesity, osteoporosis, certain cancers, musculoskeletal disorders, hypertension, hyperlipidemia etc. (CDC, 2019) It has also proven effects on the overall mental and physical health and wellbeing. Organizations such as the American College of Sports Medicine, the American Diabetes Association, the American Heart Association, and the World Health Organization have developed recommendations for guidelines for different age groups and various disease conditions (CDC, 2019).

New evidence is mounting on benefits of physical activity on preventing liver diseases and osteoarthritis. Longer life expectancy has been found to be associated with regular fast pace walking (Zaccardi et al., 2019)

Despite evidence of such health benefits, physical activity levels among adults are declining globally. This may be due to urbanization, mechanization and consequent change in lifestyle patterns throughout the world but more specifically the developing world. There is a huge shift in the epidemiological patterns in these countries including India (Yadav and Krishnan, 2008). Over five million deaths each year are attributable to physical inactivity (Lee et al., 2012). Worldwide trends in insufficient physical activity from 2001 to 2016, record insufficient physical activity as 28%. Prevalence of low activity was almost twice more in high income countries than (36·8%) than low-income countries (16·2%). Prevalence of insufficient inactivity in India was 34% (Guthold et al., 2018b). India seems to be the most resistant to declines in PA among the five countries studied (US, UK, China, Brazil), but there is an evident decline, mostly in occupational PA, projected into 2030 (Ng and Popkin, 2012).

Sedentary behavior

As evidence gathers on the effects of sitting time on mortality and other chronic diseases (Eriksen et al., 2015; Proper et al., 2011; van Uffelen et al., 2010) , scientists have embarked on the research on sedentary behavior concerned with occupational sitting time. Sedentary behavior is being investigated as a behavior irrespective of the physical activity behavior (Ekelund et al., 2016; Myers et al., 2016). Significant advances have been made in the field using technology and conventional education methods--standing desktops, mobile reminder apps and Point-of-choice prompting software on work computers, wellness facilities inside the worksite are making modest inroads (Evans et al., 2012; Healy et al., 2013) . Attempts are on to intervene at more specific levels once the research advances in time.

Table 2.1. Role of Physical activity in reducing the risk of common diseases

Disease	**Effect of physical activity**
Coronary heart disease	Moving to moderate activity could reduce risk by10%
Stroke	Moderately active individuals have a 20% lower risk of Stroke incidence or mortality
Type2-diabetes	Active individuals have a33–50% lower risk
Colon cancer	The most active individuals have a 40–50% lower risk
Breast cancer	More active women have 30% lower risk
Osteoporosis	Decreases the risk of hip fracture by 50%

Sources: Chief Medical Officer‘s report on physical activity, 2009, Haskell, 2007, Donovan, 2011

Table 2.2.Evidence on effectiveness of regular physical activity in diabetes management and control

Study Findings	Author, year
Controlling blood sugar levels, blood pressure, and Low Density Lipids (LDL) can decrease the risk of long-term complications among people with diabetes	Hawley, 2004; Riddell et al., 2013
increases glycemic control and prevents type 2 diabetes, co morbidities	Colberg et al., 2016; Bazzano et al., 2005; Castaneda, 2003
reduces HbA1c--- decrease in co morbidities.	Smowling et al., 2006; Umpierre D et al., 2011

2.1.1. Analogy with smoking

The new quote -- "sitting is the new smoking" underscores the risks of physical inactivity analogous to smoking. In addition to the increased risk of developing several chronic diseases, studies have also shown that effects of long-term sitting are not reversible (Levine, 2014). Physical activity advocates complain of the complacent attitude of policy makers by not holding it as harmful as smoking (Din et al., 2015). Some are even suggesting legislations to reprimand people who are inactive in track with passive smoking as they make others inactive too (Wen and Wu, 2012). Efforts are in progress to medicalise physical inactivity by naming it, Sedentary Death Syndrome (MacAuley et al., 2015).

2.1.2. Advice to physical activity

Exercise is a crucial feature chronic disease management. ‒Providing multimorbid patients with an exercise prescription is therefore the duty of any healthcare provider, particularly in the primary care setting‖ (Orrow et al., 2012). Most of the healthy adults thought that their physicians believed that they should exercise and were motivated to abide by this advice (Godin et al., 1994). Physicians' physical activity (PA) was related with their inclination to advice PA (Patra et al., 2015). Most physicians in primary care considered PA counseling as important and felt that they should promote PA among their patients but this seemed limited to people with risk factors such as obesity and overweight (Barbosa et al., 2017). Such advice has been shown to vary by nature of disease, socioeconomic status of the patient, gender, age and also occupation (Barbosa et al., 2017; Kalda et al., 2015; Loprinzi and Beets, 2014; Morrato et al., 2006) and provider characteristics (exercising behavior, physician age, beliefs and education) (Grimstvedt et al., 2012; Majra, 2013; Sherman, 1993) . In Kerala, only 30% of diabetes patient were advised by their health care providers to increase or start exercising (Garg and Kutty, 2019)

Studies have also looked into the barriers perceived by health care providers in giving such advice: inadequate skills and resources (Bull et al., 1997; McParlin et al., 2017), attitude (Sherman, 1993; Wechsler et al., 1983), lack of adequate knowledge (Bolarinde and Olagbegi, 2005; Burdick et al., 2015; Persson et al., 2013), time (Walsh et al., 1999), focus on acute management rather than preventive care, competing care demands (Venkataraman et al., 2009), and less important than other health promotion activities such as smoking cessation (Din et al., 2015).

Interventions involving advice from health professionals to start or increase physical activity include, writing PA prescriptions (Sanchez et al., 2015) , access to information about self-management (Kaissi and Parchman, 2009) , use of a PA Vital Sign application in which every patient's exercise habits are assessed and documented in their medical record (Sallis et al., 2015) have all been encouraging. Considering the potential benefits of physical activity in preventing and treating several conditions, it seems appropriate for healthcare providers to talk about physical

activity with their patients (Barnes, and Schoenborn, 2012; Polak et al., 2015). Recent concepts such as ‒Exercise is Medicine, ‖ initiated by the American College of Sports Medicine, and ‒Health Enhancing Physical Activity, ‖ started by WHO Europe, are playing guiding role for doctors in promoting exercise (Balducci et al., 2014)

2.1.3. Barriers to physical activity

A common method to better understand attitude and underlying self efficacy among people is studying their perceived barriers towards the behavior of interest. Studies have tried to assess these barriers which hinder participation in exercise. These are only perceptions and so could lead away from real barriers. But they are still helpful in understanding a part of the problem.

Some of main reasons for inactivity among people with diabetes were: tiredness, time constraints, lack of access to facilities (Thomas et al., 2004), other priorities, lack of companion to exercise, laziness and poor health (Ghadzi, 2011).

Interventions can only be implemented with a fair knowledge of facilitators and motivators as well. Facilitators to participate in exercise included trust in care providers, use of culturally appropriate exercise, dietary advice and family participation (Jones et al., 2014; Sohal et al., 2015) , weight reduction, perceived physical and mental well being and social interaction (Korkiakangas et al., 2011) . Family and social relationships were reported as acting either as barriers or facilitators in diabetes self-care (Laranjo et al., 2015).

2.2. Historical perspective

Although the recent interest in physical activity epidemiology started with the epic research by Jeremy Morris in 1950s, the foundation for physical activity prescription for health and disease prevention has roots that began in ancient times more than two million years ago (Tipton, 2014). People have been interested in physical fitness for thousands of years, only the reason and value for being fit have

changed over time. Overall all cultures believed in the value of physical activity for some reason or the other (Tipton, 2014) .This helps us in understanding the importance and evolution of physical activity: for health and agility in ancient China, peace of mind in ancient India, training for battle in ancient Mediterranean, improving the body in Greece and for the glory in Rome.

Ancient Indian scriptures document Susruta (600 B.C.) and Charaka (250–100 BC) who prescribed physical activity for patients suffering from obesity and diabetes (Sharma and Dash, 1977: 119). In Greek "physis" meant nature or natural and was the basis of the term "physic" or physician. Till mid 19th century, drugging, bleeding, and purging practiced by trained physicians were common alongside alternative practices of water and herb cures and hygiene instruction. In pre-Civil War America, a new literature and profession devoted to physical education‖ for task of teaching the Laws of Health, '' or instruction about how one's physical body worked came into being. By late 19th century, the American Association for the Advancement of Physical Education was founded. By the early 1900s, the "Heroic" medical practices were replaced with less invasive treatments. Medical education shifted to more specialized courses and replaced "physical education". Physical activity began to elude the interest of many physicians. 1900s saw the rise of sports as prime physical activity and physical education changed its importance from body and health instruction to sports. Sport education required a different kind of expertise so new sport coaches were getting recruited in schools and colleges (Berryman, 2010).

During mid 20th century, research in the field of physical activity started gathering momentum. Findings emerging from these studies associated physical inactivity and several chronic diseases (Morris, 1994). Data showed that more than one third of all deaths in the United States were due to unhealthy lifestyle (Blair, 2009).

Consequently, new wellness, self-help, and holistic health standards ensued with recognition of complementary and alternative medicines. Jogging and other fitness activities like aerobics, bicycling, and running became popular. Physical activity became fashionable and popular, and fostered a whole new range of clothing and footwear brands. Today physical activity research stands on strong and rigorous

evidence base with proliferating journals, associations, books, publications, laboratories and new and emerging technologies and research methods.

Physical activity has been considered essential for human health since ancient times and revival of interest in physical activity is mainly due to the fact that it can prevent many diseases in a very inexpensive and natural way.

2.3. Evolutionary perspective

Having known the development of physical activity and its relevance through the development of human civilization, it would be prudent to know whether evolution had any role in deciding the adaptation of human body to the physical activity needs of their times. Almost 100, 000 years ago, modern Homo sapiens originated in Africa and went on to colonize most of the world. Ancient Homo sapiens lived by means of hunting and food gathering for their subsistence resulting in high levels of physical activity. Physical activity was essential for surviving. Physically active also seemed to survive long enough to reproduce and care for their off springs for longer time (Kirchengast, 2014). Consequently physical activity was an adaptive behavior. Ethnographic analyses of the few remaining contemporary forager populations in Asia and Africa have enriched our knowledge about lifestyle of these hunter-gatherer populations as a physically active one. Australian Aborigines following a traditional hunter gatherer lifestyle were found to have lower rates of non communicable diseases like obesity , diabetes and cardiovascular diseases (O'Dea, 1991) .

Neolithic transition transformed human lifestyle, about 20, 000 years ago (McKeown, 2009). The prevalence of atherosclerosis during this phase led to the so called first epidemiologic transition. Men started to engage in farming activities which changed their physical activity levels substantially. These physical activity patterns stayed unchanged till the late 19th century Industrial revolution which brought about the new health risks that came with industrial development and increasing urban living. This led to the second transition phase (McKeown, 2009). During the 20th and 21st century, living standard and health standard improved and

led to the so called third epidemiologic transition. Infectious diseases declined, non-communicable diseases increased noticeably during this phase. Rapid urbanization and migration of populations to urban areas to live alone or in small nuclear families, technology advancements and mechanization of lifestyle have made us sedentary. The daily energy effort to survive is nearly zero. Mechanized transportation, desk top jobs and labor-saving household technologies reduce physical activity to a considerable amount (Dunstan et al., 2012; Owen, 2012). The result of this dramatic change related to sedentary life style have contributed significantly to a range of non communicable diseases, like diabetes, cardiovascular diseases, and obesity (Sherwood and Jeffery, 2000) . World Health Organization recommends a physical activity level of 1.75 which is very close to the levels of Paleolithic times (Eaton and Eaton, 2003). The evolutionary perspective explains that people became physically active out of necessity and biological adaptation, and then had to reduce activity because of mechanization and low energy expenditure. (Eaton and Eaton, 2003) .The exceptional success of African runners in recent sports meets is a corroboration of this perspective. It might be a result of multiple influences; anthropometric, environmental and psycho-social (Santos-Lozano et al., 2017).

The latest revolution of artificial intelligence has added to the complexity of sedentariness in our lives. The arrival of this technology promises infinite possibilities from healthcare to education. The technology is taking over almost all functions of our occupational and daily lives, making it likely that more of the world‘s population will become sedentary in coming future.

“In many ways, humans are adapted to be physically active. Overall, however, natural selection has shaped a flexible, but energy conscious system that responds to cues of resource scarcity and high levels of obligatory physical activity, and conserves energy to favor allocation in ways that increase the likelihood of reproductive success and survival’ (Caldwell, 2016) .

2.4. Correlates/determinant research

In behavioral research, it is difficult to determine specific causal factors that cause an outcome. Nevertheless there is always a possibility of multiple factors affecting an outcome and also reverse causation. Moreover, causal factors in behavioral sciences are only factors that greatly enhance the likelihood of the behavior of interest, but seldom ―guarantee them. Studies have used the term ―determinant‖ in the viewpoint of findings that determine strong reproducible associations analytically rather than a causal association (Bauman et al., 2002) .

Understanding factors that are related with physical activity is a fundamental research interest. Several studies have tried to explain and predict this behavior. Studies have also attempted to test hypotheses drawn from various theories. Cross- sectional studies on personal, social, and environmental variables have increased considerably in the last decade. However, there is a lack of contextual evidence in the way these studies have been conducted. A multi-country review on interventions identified only eight reviews including studies done in low and middle income countries out of a total of 95 primary reviews (Pratt et al., 2012). Commentators suggest on use of better methods, multilevel theories, tests of causal mechanisms of mediators, and more rigorous statistical measurement of the multiple levels of factors affecting physical activity (Bauman et al., 2012).

The primary purpose of determinants research is to study factors influencing on physical activity behavior. To address specific needs of people in different categories of exposure an enhanced understanding of mediator and moderators would be required (Bauman et al., 2002). Unlike physiology studies where identifying a mediator is clear-cut, these mechanisms are ambiguous in behavioral sciences. In behavioral research, the pathway to identify how variables interact and influence behavior is rarely practiced. This is partly due to the reciprocal determinism acting between variables. For example, self-efficacy could be a mediator, moderator, or confounder depending on the situation (Bauman et al., 2002). Longitudinal studies are a usual method utilized in studying determinants, but cross sectional studies could also help in developing hypotheses about likely causal relations and mediators that

could be possible targets in future interventions. Cross-sectional studies are a competent and practical method of deciding on numerous potential correlates (Bauman et al., 2002).

2.4.1. Measurement issues in correlate research

Determinant/correlate research has grown remarkably in the last few years; yet physical activity behavior cannot be predicted using the present models. This limitation arises partly from the lack of specificity in the existing theoretical models (Sallis et al., 2006). There are also issues regarding measurement of physical activity methods. Both subjective and objective methods come with their own limitations (Dishman et al., 2001; Epstein, 1998). One major issue lies with the measurement of intensity of physical activity. Several studies have attempted to understand the complexity in measuring various attributes of physical activity. While studies have reported different perceptions of intensity of various activities among women and men, there are also age-related changes in the perception of intensity of physical activities (Vaz and Bharathi, 2004). Validity study by Mathews et al (2016) have demonstrated an over reporting of physical activity levels by at least 20% using self report methods. Another measurement issue in physical activity studies is whether occupational physical activity balances out for inactivity during leisure time or use occupational PA as an indicator of attaining recommended amounts of physical activity. Studies indicate that leisure time physical activity varies with socioeconomic status; people from low socioeconomic backgrounds achieve less amounts of total physical activity even after adjusting for occupational activity (Vaidya and Krettek, 2014). Studies have supported the notion that walking and standing at work, both aerobic activities, decreases the risk of coronary heart disease, whereas heavy manual work like lifting or carrying heavy loads increases the risk. This relation has to be examined in detail(Baranowski et al., 1998). This is also true for vigorous training sports like football and boxing where injuries are a common hazard and many sports persons suffer from sudden death due to the negative impact of such vigorous activity (Hoffman, 2009).

2.5. Ecological, Social, Intrapersonal Correlates of Physical Activity

2.5.1. Intra-Personal Factors

2.5.1.1. Socio-demographic Factors

Age, gender, occupation, household income, education, vehicle ownership are some of the factors that have been studied in different countries. Women seem to be inactive in all the domains globally. Age (negative) was the main predictor for inactivity in both males and females (Siegel et al., 2011; Gobbi et al., 2012). Age is another global factor with an inverse relationship with physical activity except some countries (i.e., New Zealand, Australia, China and some East Asian countries) (Assah et al., 2015; Katulanda et al., 2013; Moniruzzaman et al., 2017; Uijtdewilligen et al., 2011) .

Physical activity participation also varied with family history of diabetes, socioeconomic position, marital status and type of family (Parajuli et al., 2014). Mexican urban men were found to be more active on weekdays than weekends, suggesting PA may be more related to necessity of going to work rather than recreation. This was also related with vehicle ownership (negative) among men (Salvo et al., 2014).

There is substantial evidence on association between socioeconomic conditions during childhood and physical activity behavior later in life. These associations seem to be positive for leisure-time physical activity and negative for transports and occupational PA (Juneau et al., 2015). However, similarity between migrants and urban non-migrants physical activity levels further suggests that structural determinants might play a major role in predicting adult life physical activity than early life environment (Sullivan et al., 2011). Urbanization and high income have also been reported as main determinants of low physical activity (Najdi et al., 2011). Also, low-income individuals in higher urbanicity areas were found to be inactive (Attard et al., 2015).

Physical activity variation seemed to be affected by the type of occupation as ; those working in labor intensive jobs were highly active when compared to ‒white collar jobs‖. Levels of education were also associated with levels of vigorous PA (Bosdriesz et al., 2012)

2.5.1.2. Motivation

Determinants research of physical activity is driven by a key question: what are the motives for people to spend their time doing physical activity. Intrinsic and extrinsic motivations are familiar concept in behavioral sciences. Intrinsic motivation is believed to be essential for long term involvement in health behavior. Intrinsic motivation is ‒motivation to do something for its own sake in the absence of external (extrinsic) rewards: fun, enjoyment and interest, such as recreational sport and hobbies**”** (CM Frederick and Ryan, 1993). The enjoyment is in the activity itself rather than any extrinsic reward such as money, award, reputation or pressure from others. Extrinsic motivation refers to motivation guided by rewards, money, social pressure or other external factors. This implies that if these external factors were taken away, motivation would decline in the lack of any intrinsic motivation. Humans crave for satisfaction of their needs for competence, autonomy and social relationships (CM Frederick and Ryan, 1993). Motivation can be improved by designing environments that support these three needs. Motivators for participation in physical activity also depend on the kind of activity they participate in. People whose primary physical activity was sports were more motivated by interest and enjoyment whereas whose primary physical activity was fitness related activities were more motivated by physical appearance and social motives (CM Frederick and Ryan, 1993)**.** The main motivators for engaging in physical activity have been extrinsic motivators. Role models were a special motivation for people who were low in self confidence (Alvarado et al., 2015; Devereux-Fitzgerald et al., 2016; Jepson et al., 2012; Korkiakangas et al., 2011; Veldhuijzen van Zanten et al., 2015). Early studies on adherence among adults (Dishman et al., 1985) proposed that main motivations for adoption might be health but intrinsic feelings of enjoyment and competence are responsible for further continuation of participation. Health was

rarely a primary motivation for being active for women. They saw improved fitness, as an additional benefit (Garg and Kutty, 2019; Giles-Corti and Donovan, 2003).

2.5.1.3. Self Efficacy

Exercise self-efficacy is an individual‘s belief in his/her ability to engage in physical activity overcoming barriers or other circumstances (DuCharme and Brawley, 1995). Bandura defines perceived self-efficacy as ‒belief in one‘s ability to successfully accomplish something (Bandura, 1997: 15). Physically active persons seem to be more competent of overcoming barriers like pain and tiredness. Therefore, interventions to promote self-efficacy for exercise might result in long-term sustenance of physical activity behavior (Veldhuijzen van Zanten et al., 2015) .Studies among older adults, children and adolescents reveal the importance of self efficacy in adopting and sustaining physical activity (Beets et al., 2007; Booth et al., 2000; Deforche et al., 2010; Lewis et al., 2002) .

2.5.2. Social Environment

Key physical activity determinants at this level include social support from family, friends, and health care providers.

2.5.2.1. Social Support

Social support has been recognized as a major predictor of health behavior. It is a key construct in socio-ecological models to influence physical activity. Studies have reported most common form of social support as verbal forms such as talking about exercise, and inviting to exercise together. An increase of 10 points in social support was linked with a 5 min increase in weekly exercise (Oka et al., 1995). Studies emphasize that intervention strategies might also look at ways to address the social environment in addition to the physical environment.

Social support has shown a significant effect on health behaviour like diabetes self management and stroke rehab (Tulloch et al., 2013) Social support from friends had a significant positive association with increased LTPA (Chen et al., 2011). Research data demonstrate that both subjective and objective indices of support are associated with physical activity levels especially among women (Eyler et al., 1999; Vaccaro et al., 2014). Social support is usually seen in terms of emotional, informational and material support; Taylor, Baranowski and Sallis 1994). Social support could also sometimes inhibit or restrict physical activity. For example, parents and families, on young people‘s physical activity. Safety concerns regarding busy roads or crime might lead to replacing active travel with motorized transport, such as travel to school. Therefore, parents as a social environment could also be unfavorable to children‘s physical activity. Similarly, shifting responsibilities and roles of families in modern society has also reduced. PA such as work related to caring of children and older adults in the family.

The WHO programme called Peers for Progress promotes peer support strategies world over using group based and individual based formats. They employ modern technology as well as telephone devices and face to face visits in settings like community to clinical to introduce the buddy programme. The results so far have been encouraging (Boothroyd and Fisher, 2010).

2.5.2.2. Social and cultural issues

Long-standing social traditions and cultural values could influence physical activity patterns in society and populations (Dishman et al., 2005). For example, every society has expectations about appropriate or desirable behavior. Norms differ across societies, and within groups. So a particular social group might have different norms relating to physical activity than others (Bauman et al., 2012).

A number of prevailing norms in Kerala impact how people perceive and engage in physical activity (Garg and Kutty, 2019). For example, leisure-time physical activity is regarded as wastage of time and energy, and females are expected to fulfill their daily need of physical activity by doing household work. These norms

are internalized right from young age and persists even after migrating to other cultures However, exercising to restore your health after a diagnosed illness is considered as important (Daivadanam et al., 2013). Few studies have explored the effect of acculturation on physical activity levels. This has implications on research exploring physical and social environment factors. Do people change their physical activity behaviour if they move to a more favorable physical activity environment? A study among South Asians living in Canada found that physical activity was likely to be more in the integrated culture groups (Walker et al., 2015). Cycling trends and patterns among adults in certain European countries are very high compared to other developed countries of the world. This may be attributed to well-built infrastructure and also beliefs about physical activity. Social norm change strategies aim to modify human behavior by creating a social environment where healthy behavior becomes convenient, desirable and a norm (Ball et al., 2015: 11).

2.5.3. Physical Environment

Physical environment includes natural and built spaces that we live and move around in. While the natural attributes of our environment are difficult to manipulate, it is the built environment that is receiving attention of the researchers as a potent modifiable factor in influencing physical activity at a large scale. Built environments are places built by humans, for use during their everyday lives. These built environments are related with risk factors for chronic diseases such as obesity and physical inactivity (Sallis et al., 1997).

Physical environments affect our physical activity in two ways-one is through travel to and from work places, schools and nearby destinations and the other way is through recreation facilities-parks, jogging trails, playgrounds and indoor exercise facilities. Accessible and available recreation facilities and increasing habitual physical activity by travel are key aspects of enhancing physical activity through physical environment. Efforts to integrate active living into people‘s daily routine can be an effective means to improve physical activity in populations: for instance, by using stairs in place of elevators, parking away from work place, and alighting

from public transport one stop early (Giles-Corti and Donovan, 2003) .Physical activity is believed to be a critical mechanism by which built environments can influence future health and disease (Sallis et al., 2012: 2).

2.5.3.1. Active Recreation facilities

Public facilities such as parks and play grounds are common settings for leisure time activities for children, and adults (Sallis et al., 2012). Availability of and proximity to such facilities is associated with physical activity among adults, adolescents and children (Adlakha et al., 2017; Jáuregui et al., 2016; Pratt et al., 2015) . Urban places are also being recognized as important determinants for health with green spaces affecting both physical and mental health positively (Kleinert and Horton, 2016).

2.5.3.2. Active Transportation

Walking and bicycling for transportation or active travel has demonstrated clear association with several features of the built environment (Sallis et al., 2012). Residential density, bus stops nearby, parks and facilities close by were associated with physical activity levels (Sallis et al., 1997). Public bus and rail stops nearby have been positively associated with active transportation. Users of public transportation were less likely to be physically inactive and overweight (Dons et al., 2018). Studies have indicated that high walkability of an area was associated with high transport walking and leisure-time physical activity (Siqueira Reis et al., 2013). Studies expanding on obesogenic environments have found strong associations between high density of parks and public sport facilities and lower obesity among adults (Jaime et al., 2011; Mason et al., 2018).

2.5.3.3. Inequities in Access to Activity-Enabling Environments

Studies reflect the socioeconomic inequities growing with the urbanization and resulting effects on health and health behavior (Kolbe-Alexander et al., 2015, Sibai

et al., 2013). This is most evident in the distribution of transport PA. Whereas studies have reported socioeconomic disparity in the distribution of leisure time PA, transport PA has produced inconsistent findings. At least one study in India has reported higher travel PA among less socially advantaged populations (Adlakha et al., 2016). It could be that people living in low SES neighborhoods are more likely to undertake transport PA because of some external factors like availability of public transport. There is need for more research in this area in order to get a better understanding of determinants of active transport (Beenackers et al., 2012). Men were more likely to commute actively than women among low-income individuals. Active commuting was less likely among older workers in low and medium-income strata and among married individuals in high-income strata. Adults with lower education working in small companies were more likely to commute actively (Adlakha et al., 2016; da Silva et al., 2016).

There is a need to exercise caution however in generalizing findings from one country to other countries due to the importance of context-specific research (Ball et al., 2015: 7). The mixed findings attest to differing local contexts or urban designs across settings. There are recent examples of environmental changes at community level that had positive outcomes but broader changes in environment and policy will bring about major shift in risk for cardiovascular diseases of populations (Pratt et al., 2015; Sallis et al., 1997). .

2.6. Genetic determinants

Genetics is a potential determinant of physical activity—i.e., a hereditary factor shapes our activity behaviour. Animal studies indicate that neurological mechanisms might play a role in controlling physical activity. Twin studies, and studies in small and extended families, have presented heritability effects ranging from 15% to 60% for total physical activity, sedentary behavior and leisure-time activity (Maia et al., 2002).

Family studies using objective measures show active heritability estimates in the range of 0.25. Twin studies among monozygotic and dizygotic pairs have

demonstrated higher heritability estimates than the family studies. However, the studies were unable to find any association between intergenerational physical activity. The reasons for this might be environmental: social and cultural rather than genetic factors (Harrison and Lightfoot, 2010). Recent developments in genetics and molecular biology have made identification of specific physical activity genes an achievable target (Frederiksen and Christensen, 2003). The knowledge on genetic regulators of physical activity could extensively influence health promotion strategies based on physical activity improvement and obesity reduction specifically for those at high risk of inactivity and its consequences (Harrison and Lightfoot, 2010).

2.7. Policy Environment

Physical activity interventions have been recognized at several levels- intrapersonal to legislative. (Sallis, Bull, et al., 2016). Although physical activity is widely recognized as a key element in health promotion and disease prevention, it is only recently that there has been some political and governmental concern. The Fit India Movement initiated recently by the Indian government alludes to the importance of physical activity as the mainstay of health and well being. India joins the small congregation of countries where governments have promoted physical activity as a health priority. However, as King (1994) points out, physical activity is a free-choice behavior and not a product that can be controlled like cigarettes or certain foods. Government action on physical activity has been rather lukewarm until the historic emergence of the WHO global strategy on diet, physical activity and health. It is a reminder to the governments that inactivity is not just a problem for developed countries (World Health Organization 2004). WHO recognized the declining physical activity levels worldwide --a result of industrialization, urbanization and economic development. The strategy calls for WHO member states to develop national policy, adapted to local cultural needs. Even after adoption of various strategies like the ‒Global Strategy on Diet, Physical Activity and Health‖ and the ‒Sustainable Development Goals 2025‖ (10% relative reduction in physical inactivity), policy action in most countries is still inadequate (Bull and Bauman, 2011).

In 2018, of the total countries which were reviewed 76% had policies to promote PA. Of the 37 countries with PA policies, only 24% had policies that promoted the WHO recommendations for daily PA (Darfour-Oduro et al., 2018; Puggina et al., 2018).

In India, certain initiatives taken by the government of India to promote health through physical activity in recent years are also mentioned below:

The Khelo India programme has been introduced to revive the sports culture in India at the grass-root level by building a framework for sports played in the country. Khelo India School Games are held annually to promote sports and physical activity (kheloindia.gov.in).

Initiative on mainstreaming health and physical education in schools with the aim of well balanced growth in mental, physical and social performance of the children, the Central Board of Secondary Education has made health and physical education compulsory in all schools (CBSE, 2019).

Recognizing the significance of yoga in promoting physical and mental health and well being of people all around the world, United Nations declared 21st June as the International Yoga day. Yoga is beneficial for medical conditions such as hypertension, carpal tunnel syndrome, arthritis, and mental health disorders. Studies have established that regular yoga can significantly lower both systolic and diastolic blood pressure. (Desveaux et al., 2015; Wu et al., 2019)

2.8. Conceptual framework

2.8.1. Definitions

Physical activity has been defined as any bodily movement that results in expenditure of energy. It can be divided into categories of work, leisure and transport (Caspersen et al., 1985). Exercise is planned, structured and repetitive physical activity and is generally undertaken to meet a goal. Leisure time activity

like sports, swimming, walking, hiking, biking, jogging, dancing, etc are generally for fun and enjoyment. Both terms are used interchangeably when research objective is leisure time physical activity. However, when the goal is health and physical fitness, any task which is performed in a repetitive and structured manner may be categorized as exercise (Caspersen et al., 1985).

Calculation of physical activity- Physical activity is measured in several ways. It can be assessed either as a behavior or energy cost of any movement (Ainsworth et al., 2000). It can be either categorized by type, frequency or intensity. Physical activity be further dichotomized in a variety of ways such as work, travel or leisure; aerobic/anaerobic; resistance/active. These are quantified using METs or Metabolic Equivalent of Tasks. One MET is considered to represent energy expenditure of a resting body that is 3.5ml/kg/min in terms of oxygen consumption (Ainsworth et al., 2011; Caspersen et al., 1985). These estimates can be used to rank individuals from least active to most active. Any activity can now be measured in a standardized way according to the oxygen consumption. However there is a limitation with this method as it does not take into account the fitness levels of body. For example, a moderate intensity activity could be less challenging for an athlete whereas even light intensity activity might be demanding for an unfit person (Welk, 2002: 5).

2.8.1.1. Measurement of Physical Activity

Various methods are employed in the measurement of physical activity, such as self-report, observation, and motion sensors, physiologic measures like heart rate and cardio- respiratory fitness and direct and indirect calorimetry. Each method comes with its own strengths and weaknesses. The use of a particular method depends upon the purpose of the study being undertaken (Welk, 2002: 1). Certain factors such as context, type, duration, frequency and intensity of physical activity have to be considered (Dishman et al., 2001). The selection of methods may depend on age, gender, body weight and any co morbid conditions. If the objective is to study physical activity in adults, self reports can be a reliable measure (Blair et al., 1991; Sylvia et al., 2014). Self-report methods have their own strengths like reduced cost, large samples, availability of several valid and reliable tools, and ease of modifying

the instrument to meet population needs and study goals. Weaknesses include inaccuracies ranging from no response to wrong response, over-reporting activity levels, use of non applicable responses, difficult to use with children and failure to compare results across studies (Welk, 2002: 1) . One solution that has been tested in various settings is validation of self reports with objective measures for example accelerometers and motion sensors (Sallis, 2010).

2.8.1.2. Environmental Support

Environmental support is a multidimensional construct conceptualized as physical, social and cultural environment for increasing physical activity. Social support might be perceived or received. Both kind of support have been linked to reduced symptomology (Cohen et al., 2000). This study uses a mix of both using standardized scales. Instrumental support means physical support from family or friends in terms of taking up the jobs or responsibilities in place of the person. It might range from giving money for the membership of club or cost of equipment or picking up grocery or children so that spouse could go for physical activity programme. Informational support means any information regarding the benefits or harms of exercise is available through various media like health workers or popular media like television or social media like message groups or public platforms or in school and college education. Emotional support comprises of support from family and friends. It might range from verbal encouragement to participation along with the personal support (Cohen et al., 2000).

Physical environment may occur in either the neighborhood or work setting or other recreation facilities. The neighborhood can also be conceptualized within the context of a physical environment regarding the quality of facilities, perceptions of safety of facilities, access and availability, neighborhood design, road or traffic environment, and aesthetics. Accessibility means the areas that are open when a person wants to go to them in terms of timing and cost. They are well maintained to be used by the public. There should be no discrimination in membership for using the facilities. Availability and quality of facilities is also important as some facilities might be far away from home and not available to people of certain groups. Quality of such

facilities may also impede people to participate in any kind of exercise for example fear of traffic and stray animals may drive away people from walking on nearby roads. Similarly well lit pathways may allow people to walk where they are able to see clearly (Brownson et al., 2000; King et al., 2000).

Social and cultural issues like gender norms, acceptability of exercise in the community and whether women are allowed to go out for exercising are important measures in the Indian context. Some people might be bothered by mocking by community or family members.

2.8.1.3. Intrapersonal Factors

Intrapersonal factors were conceptualized as a multidimensional construct and included two variables, motivation and self-efficacy.

Motivation has been conceptualized as an individual‘s motive to participate in an exercise programme that may range from intrinsic motivation which reflects a person‘s intention for fun and interest in the activity itself or it may be for external reasons like health or body weight reduction or to satisfy family or peer pressure. It may also be done for social reasons like meeting friends and peers (CM Frederick and Ryan, 1993).

Self-efficacy in regards to physical activity refers to a person‘s confidence to do physical activity in specific circumstances (Sallis and Owen, 1998). For example, a person who has high self efficacy to be active may set aside time to participate in activity, exercising when tired or depressed, or when it is raining or cold.

2.8.1.4. Mediators and moderators: Definitions and approaches

Several approaches have been used for the last 50 years for testing the mediator relationships between variables (MacKinnon et al., 2007). One reason for rising popularity of testing mediation is to understand the mechanism through which one variable affects another in what is described as the ― *process analysis.* In statistics, a

mediation model aims to ascertain the pathway that causes a relation between two variables by adding a third variable, known as the mediator variable. This model proposes that the predictor variable influences the (non-observable) mediator variable, which consecutively affects the dependent variable. Baranowski et al (1998) stressed the need for identifying the mediators which produce significant changes in the physical activity outcomes. For example, self-efficacy can be considered a mediator if it meets the following criteria:

1. The intervention results in an increase in self-efficacy.

2. Self-efficacy is associated with physical activity.

3. The association between the intervention and physical activity diminishes when controlling for self-efficacy.

Baron and Kenny (1986) suggested a four step method in which we perform several regression analyses and test the significance of the each of the coefficients. Several issues have been cited with this method. One potential drawback is that significance of the indirect pathway is never tested and we never test true mediation effects. Another approach suggested by Judd and Kenny is to calculate the difference between two regression coefficients. Sobel, 1982 recommended computing the indirect effect by multiplying two regression coefficients. The present methods to test indirect effect are bootstrap methods or –nonparametric resampling" and the Monte Carlo method or –parametric resampling". While using bootstrap method we get two options to test the indirect effects-- "percentile" bootstrap, and the bias corrected bootstrap methods. Structural equation modeling (SEM or covariance structure analysis) is intended to test complex models in a single analysis instead of multiple regression analyses. Indirect effects using one of these approaches can be availed from latest SEM software programmes like AMOS. In addition, the SEM analysis approach provides model fit information. (Newsom, 2018).

Research data clearly demonstrated that behavioral processes like self efficacy are possible mediators between certain factors and physical activity. Lewis et al., 2002 recommended PA intervention studies employing statistical methods to test these mediator mechanisms. Bauman et al, 2002 in their study on correlates of physical activity underlined the need for more research on mediators and moderators. Improved understanding of these processes might enable effective physical activity interventions in future.

2.8.2. Conceptual models

First, we present the models that represent the proposed relationship between various variables and then the hypotheses for physical activity are presented.

Description of the Proposed Conceptual Model

Separate models were developed for direct and indirect effects of various factors on leisure time physical activity outcome of full sample, men and women. These models were developed to test the hypothesized relationships between individual (e.g., self-efficacy and intrinsic and extrinsic motivation), social environmental (e.g., social support), and physical environmental correlates (e.g., neighborhood quality and availability of facilities) of physical activity. The correlates used in developing the models are based on models and theories of health behavior (Bandura, 1999; Stokols, 1996) in addition to empirical evidence that demonstrates a relationship between these factors and physical activity (Bauman et al., 2002; Dishman et al., 1985; MacAuley et al., 2015; McNeill et al., 2006). On the basis of this evidence, we proposed three major hypotheses.

1.The relationship between environmental support, and physical activity would be mediated by intrapersonal factors-self efficacy and motivation (Duncan and Stoolmiller, 1993; McNeill et al., 2006).

2. Environmental support would influence intrapersonal factors --self-efficacy and motivation directly, which in turn would influence physical activity. (Cleland et al., 2010; Dishman et al., 2005; Eyler et al., 1999).

3. Environmental factors would influence physical activity directly (Bauman et al., 2012; Sallis et al., 2012).

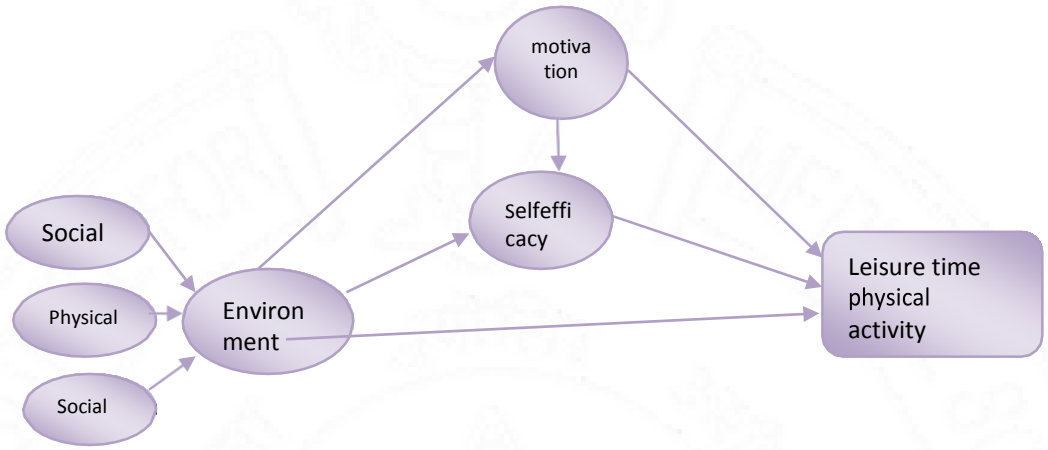

Figure 2.1: Proposed conceptual model showing influences on leisure time physical activity

2.8.3. Theoretical Foundations

An ecological framework identifies that there are multiple levels of influence on health behavior like intrapersonal aspect, interpersonal processes, organization and community level factors; national and international policy level (Abdi et al., 2015)

The social-ecological model built upon the efforts of previous researchers on developing a comprehensive theory to explain health behavior. These include:

- Ecological Systems Theory developed by Urie Bronfenbrenner (1979), which focused on the relation between individuals and their environment.
- Ecological Model of Health Behaviour developed by Kenneth McElroy (1988), which categorize factors into five different levels but did not include the physical environment.

- Social Ecology Model of Health Promotion developed by Daniel Stokols (1992, 2003) , identified the main assumption which underscore the social-ecological model

Ecological frameworks examine interactions between the individual (e.g. knowledge, cognitions) and multiple levels of the environment (social, organizational, community, and policy). Bronfenbrenner (1989) suggested that it is "……worth considering human development in its wider perspective''

2.8.3.1. Need for theoretical approach

Sallis and Owen (1999) outlined the need to develop theories, models, and hypotheses to help researchers focus on the specific variables believed to be the most highly related to physical activity. They summarized the intrapersonal, social, and physical environment constructs along with the most common theoretical frameworks and models utilized in current physical activity research. Some of the theoretical perspectives used in this area include: the Health Belief Model; the Theory of Planned Behavior; the Trans-theoretical Model, Social Cognitive Theory and ecological models (Abdi et al., 2015; McLeroy et al., 1988; Stokols, 1996). The authors point towards the importance for ‒broader‖ theories including social cognitive theory and ecological models, which covered intrapersonal, social, and physical environment variables on physical activity. The authors also emphasized the importance of identifying modifiable and nonmodifiable variables. Some of the variables which could be modified by intervention are: self-efficacy, perceived barriers, family and peer influences, work place and community interventions (Sallis and Owen, 1998).

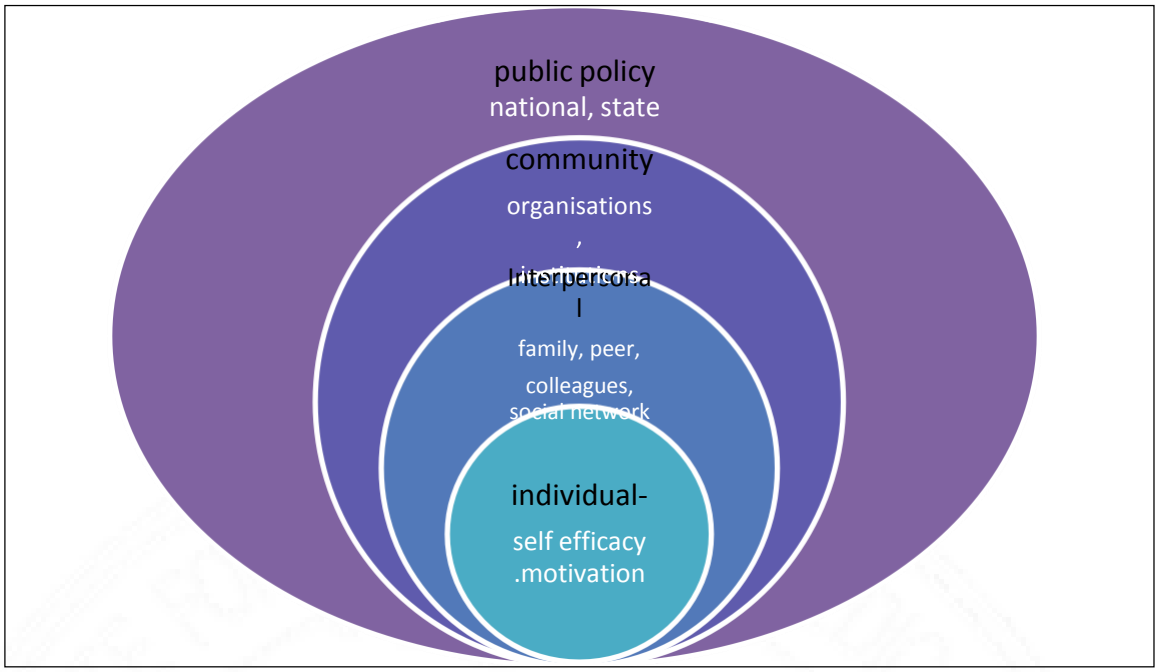

Figure 2.2: The Social Ecological Model

Source: Adapted from McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs Health Educ Q 1988, 15:351–37

2.8.3.2. Socio ecological theory

A review of theoretical models used in physical activity research reflects on studies utilizing theoretical foundations: trans-theoretical model, theory of planned behavior and social cognitive theory were supported extensively by data. Existing theories did not seem to include a number of variables identified to be significant predictors and so could not be used as a foundation for understanding physical activity behavior (Bauman et al., 2002). Similarly, Baranowski (1998) in his extensive review has recommended for a completely new approach towards understanding physical activity behavior especially employing comprehensive models like ecological models.

A social ecological model proposes four key domains --intrapersonal, interpersonal, community, society) for understanding determinants of health behavior. So far the emphasis has been on individual to make changes in health behavior. However these have been ineffective in addressing large scale inequities in health behaviour and

their outcomes. Models such as social ecological model stress the importance of upstream determinants in addressing such disparities. They emphasize the importance of all levels of influence including individual characteristics on human behaviour. Tobacco cessation and alcohol reduction campaigns have all been successful as they considered multiple levels of influence. These upstream factors are of concern for population groups that are at special disadvantage and unable to change the circumstances in which they live.

In their review on investigation of correlates of PA, Bauman et al investigated 32 reviews. The categories of association were labeled as demographic and biological; psycho-cognitive; behavioral; social and cultural; physical environment; physical activity characteristics. The authors concluded that innovative frameworks such as ecological models have not been utilized to their full potential, advanced statistical methods and improved study designs could contribute to the next generation of correlate research. They concluded that no single category or variable explained why people engage in physical activity. There is an urgent need for more research in this area in the developing countries (Bauman, 2012).

–Research should continue to investigate theoretical frameworks and variables which show consistent association with physical activity and to further investigate mediating and moderating relations accounting for more of the variability as to why people are active‖ (Bauman et al., 2002) .

3. METHODOLOGY

This study is set in the state of Kerala and combines quantitative and qualitative research methods to achieve its objectives. Part one of the study involves qualitative techniques to gather information about attitudes, perceptions and social norms of physical activity through focus group discussions and key informant interviews. In part two of the studies, quantitative methods are used, mainly a cross sectional study using stratified cluster sampling to measure the extent and pathways of interaction among various intrapersonal, social and physical environment determinants of physical activity. Here I also analyzed secondary data on physical activity levels of a cluster randomized community trial which involves social support as an intervention strategy among high risk groups. Part three of the study aims at testing feasibility of a different method for data collection.

Ethical aspects:

Institute Ethics Committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum gave ethical clearance for this study. Written informed consent was obtained from all the participants before commencing the study. Personal details or identity of the participants has not been used in any kind of analyses. All information pertaining to the respondents collected as part of the study is under my safekeeping.

3.1. Part 1: A qualitative study exploring factors affecting leisure time physical activity

Objective: To examine the perceptions of adults in Kerala of the importance of health promoting physical activity and identify various facilitators, motivators and barriers to physical activity.

We carried out a qualitative study to comprehend the importance and norms associated with physical activity in the daily lives of an average Malayali adult. The

aim was to explore the social and cultural norms surrounding the concept of physical activity. The need for exploration of normative behavior made us use the focused groups for creating a discussion among various viewpoints of the community. Physical activity is a non sensitive subject and could be debated openly, so focus group discussions were chosen as the primary source of data collection (Creswell, 2013; Krueger, & Casey, 2009). This focus group allowed insight into opportunities for physical activity interventions to address the issue of increasing chronic disease burden.

We employed insights from socio-ecological theories of health promotion (Bandura, 1999; McLeroy et al., 1988; Stokols, 1992). Interviews with key informants like fitness instructors and frontline health worker supplemented the information gained from these focus group discussions. A total of 28 adults participated in four focus group discussions in addition to three key informants. These were conducted between April-May 2018 in Kottayam district. The groups were carefully selected to represent views of active as well as inactive people and represented both sexes and different socioeconomic backgrounds for composition of focus groups and key informants(see Table 3.1). We asked them about the importance of exercise or physical activity in their lives and various facilitators, motivators, and barriers to physical activity.

3.1.1 Sampling

A total of 28 participants were recruited into the study. The purposeful sample included men and women between 18 and 65 years of age who were healthy enough to perform moderate amount of physical activity, not having any physical, mental, or hearing or speech deficiencies. The sample was restricted to men and women between 18-65 years of age, allowing for diversity in experiences. We sampled participants from the urban and rural centres of Kottayam district. We recruited pre-existing or natural groups like women and men exercising together, child care groups, and patients of chronic diseases to reflect a range of gender, age, socioeconomic status, and occupational backgrounds. Table 3.1 presents details of the focus group characteristics.

Table 3.1 Characteristics of the focus groups

Membership group	Characteristics	Description of the group
Focus group1-M	Men‘s group participating in a recreational physical activity programme	Men‘s group were mostly men in the age group of 30-45 who were suffering from either chronic disease like obesity or diabetes or hypertension. They had joined the programme after being advised by their doctors or family members and gaining knowledge from social media. Most of them had lived in western or gulf countries and had past experience of sport or exercising in gymnasium. Three of them were practicing clinicians or surgeons. One was a nurse. Others were employed in various marketing and sales jobs. All the men were married and had children. Only one of them was participating with his kids. All men had participated in sports or body building activities before marriage but after marriage physical activity declined. They chose this facility as it was within a short distance from their houses.

Focus group2-F	Women‘s group participating in a recreational physical activity programme	The women‘s group mainly consisted of working women aged 30-45 years but one young girl was also a part of a group. The members preferred a form of exercise which was a heavy intensity dance cum exercise called the zumba; only two women were working out on treadmill and other gym equipment. The group instructor was also leading the discussion where she was emphasizing the importance of health promoting exercise
Focus group3-W	Community members from low socioeconomic background.	Members of community mostly included women age30-60 years, all of them had one or more person in their families living or dead of a chronic disease. Cancer was a common cause in almost 80% of the deaths. One person was a patient of breast cancer. All of them were homemakers and educated at least till class 10.None of them were participating in any form of leisure time physical activity. All were married and had children or grandchildren
Focus group4-G	Patients of NCD clinic	Patients suffering from one or more chronic diseases, mostly diabetes and cardiovascular diseases. Mostly men; all married and above the age of 40 years. They belonged to different socioeconomic backgrounds.

Key informant1	Instructor	Woman aged 30 years, working as Zumba instructor for the last 10 years in an outdoor facility
Key informant2	Instructor and owner	Man 60 years old, worked as fitness consultant in many countries, and currently owns business in this sector for last two years
Key informant3	Health care worker	Woman aged 55 years, working for last 15 years as community health worker.

Our sample also included key informants who brought in a variety of perspectives from other stake holders (See Table 3.1). These were generally group leaders or gatekeepers who gave a general overview of the need for such a facility or service. They also gave insights into the barriers and road ahead for physical activity promotion.

3.2. Part 2: Quantitative cross-sectional survey examining various determinants of physical activity

Objectives:

- To investigate various individual, social and physical environmental determinants of physical activity in an adult population (18-65 years) in Kottayam district, Kerala.

- To test both mediator and moderator effects of various determinants based on ecological and social-cognitive frameworks.

3.2.1. Pretesting

I pre-tested the tool on 20 subjects and conducted cognitive interviews to test the tool for clarity and timeliness. Most of the participants expressed inability to answer the scales; few also found difficulty in interpreting the questions regarding intensity levels and motivations. A few questions needed to be simplified and modifications were made accordingly. None of the questions were deleted after the pre-test. I decided to administer the questionnaire myself to facilitate smooth and correct comprehension of the questions. After modification the tool was administered to five people from the same pretest, the data collected was timely and accurate. The respondents expressed their clarity regarding the questions asked. This data was not included in the study.

Study population

I conducted this part of the study among adults in the age group of 18-65 years in the Kottayam district of Kerala, considered the most literate and highly developed state on most human development indices in India (GOI, 2011). According to various studies conducted in India the prevalence of physical inactivity is 30-40% (Anjana et al., 2014; Thankappan et al., 2015; Tripathy et al., 2016). Assuming this prevalence rate the sample size was calculated using the formula (n=1.96*0.7*0.3/0.06^2), where 1.96 represents μ±2SD in the standard normal distribution,

p=assumed prevalence=0.7

q=1-p=0.3

D=1/2x distance from assumed prevalence (0.7) x the worst acceptable (0.18)

=0.06.If we consider variance inflation due to cluster sampling as equivalent to a factor of 2, sample size should be 440. Adding a non response rate of 10%, the

3.2.2. Study setting

The data collection period was from July 2018-December 2018. Kottayam district has a total population of 19, 74, 551 according to the Census 2011. The district is more or less representative of Kerala state.

Table 3.2 Characteristics of the study population at a glance

Characteristics	Kottayam	Kerala
Urban: rural ratio	1:2	1:1
Sex ratio	1039	1084
Literacy rate	97%	94%

(Government of India, Census, 2011)

The district is divided into geo-political units of panchayats (rural) and municipalities (urban).The rural areas of the district consist of 86 panchayats comprising 71% of the total population (14, 09, 158) and urban population (5, 65, 393) resides in 4 municipalities. For the purpose of this study, I used stratified cluster sampling with separate sampling from rural and urban population. I divided the number of clusters so that we get almost equal subjects from rural and urban areas. I selected two urban and two rural units. The primary sampling unit was the panchayats in rural and municipalities in urban areas. The final sampling unit was individuals in the age group of 18-65 years. The number of clusters selected from each panchayat and municipality was equal that is five each. Within each selected municipality or panchayat, I employed the voters list available in each panchayat and municipality office. Each list was screened for age criteria and 25 random numbers were selected from each list. All random subjects selected from the list were approached for participation and if they did not agree to participate, substitution was made by the next person on the voters list. People who have

changed residence or migrated due to marriage, education, employment etc., were substituted with the next person on the voters list. However, people not present at the time of contact were approached twice and if found absent were counted as non respondents. Response rate was 93%. Two disabled people, one visually and the other physically were excluded from the study. Two women who had problems with comprehension (development delay) of the questions were retained in the sample and responses were recorded with the help of their immediate kin. Subjects who were not residing at the address for the last six months were also excluded from the study. Three people denied consent to participate in the study. I personally interviewed all the participants after receiving written informed consent. There were total 467 returned forms. I called participants on phone for any missed or incomplete information or clarifications.

Statistical analysis: Data were entered in Microsoft Excel and analyzed in SPSS version 21.1 I used R software (R Core Team (2013) to plot some graphs in the thesis and AMOS (Analysis of Moment Structures) 25.0 (IBM, 2017) for path analysis to build the model of leisure time physical activity. Cluster analysis, univariate, bivariate and multivariate methods as well as path analysis were used to analyze the data. The first step of the analysis was to get an overall understanding of the groups of subjects showing some homogenous characteristics. For this purpose overall descriptive, mean, and median and standard deviations of all continuous variables and frequencies and proportions for all categorical variables were calculated. The second method was to use cluster analysis which identifies how combinations of different variables categorize subjects into different clusters. For further analysis of the data set, Mann Whitney U test and chi-square tests were done assuming different domains of physical activity and various intrapersonal and environmental variables as outcome variable and socio-demographic variable as the independent variables. Multi variable logistic regression modeling was done to establish the predictors of leisure time physical activity.

3.2.3. Path analysis using structural equation modeling (SEM)

In social and behavioral sciences, we seldom infer causality perfectly. In order to create a model of factors affecting leisure time physical activity out of the data collected, I hypothesized the causal relationships between the variables for the purpose of identifying the significant variables. In order to evaluate the causal hypotheses, we used path diagrams. The path diagram drawn based on the multiple regressions provides the hypothesized estimates of the significance and magnitude of the causal relationships between the variables.

In multiple regressions, it is difficult to assess the effects of predictor variables on a number of different outcomes; there is only one dependent variable in multiple regressions. Secondly, a variable is either a predictor or an outcome. In real life, these variables influence each other in multiple ways. Path analysis is a straightforward method of multivariate regression to solve these problems.

Structural Equation Modeling (SEM) is ―a statistical methodology that takes a confirmatory (i.e., hypothesis testing) approach to the analysis of a structural theory bearing on some phenomenon‖ (Byrne, 2009) . SEM is one of the most advanced statistical techniques used in social sciences; however its use in understanding influences on physical activity is new (Kenny, 2015). This statistical design allows for understanding the direct, indirect, and total effects of different constructs on the variable of interest. This enables better understanding of the proposed causal hypothesis of effect of various factors on behavior of interest (Byrne, 2009). Two features of this method are emphasized: (a) a sequence of structural equations correspond to the causal processes under study (b) a visual representation of these relations can facilitates a clearer conceptualization of the theory under study. The structural model identifies the associations among the unobserved variables and spells which specific latent variables cause change in other latent variables (Byrne, 2009: 12). This overall model which defines these inter-relationships is the structural model.

Maximum likelihood estimate method was used to test the models. Confirmatory factor analysis was attempted for testing the stability of the measurement model. Some of the factors which did not reach critical ratios had to be dropped from the final model. These include motivation of enjoyment, and competence. The standard errors were then analyzed. The overall fit of the measurement model was adequate based on standard fit index criteria (NNFI > .90, CFI > .90, RMSEA < .08, SRMR < .08).

The confirmatory factor analysis factor loadings were significant at the 0.001 level and ranged between 0.75 and 0.98, 0.75and 0.95, 0.991 and0.998, and 0.24 and 0.63, for body related and social motivation, self-efficacy, environment support, respectively. The overall fit of the structural models predicting moderate-to vigorous- intensity leisure time physical activity was also adequate based on the same standard fit criteria. Finally, the significance of the parameter estimates is analyzed by the critical ratio (C.R.) test statistic. The C.R. should be >± 1.96 ($p <$ .05) such that the parameter is significant in the model (Appendix A-1)

Goodness-of-fit tests were used to test the stability of the path models. The chi-square statistic, based on the maximum likelihood method of estimation was used to assess the fitness of the path model. However, since the test is sensitive to sample size, significant chi-square should not be used alone as an indicator to modify the model (Tanaka, 1993). Therefore, other indices such as goodness-of-fit (GFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA) were analyzed to determine model fit. The GFI and CFI range from zero to 1.00 with values above 0.90 being representative of good model fit .RMSEA values of less than 0.05 indicate good model fit and values up to 0.01 suggest an adequate model fit (Tanaka, 1993)

Since the data could not meet the assumption of multivariate normality, we applied bootstrap procedures using bias-corrected confidence intervals to confirm the stability of parameter estimates (Bollen and Stine, 1993). The bootstrap confidence intervals (set at 95% and a default of 1000 bootstrap samples) were found to be stable.

Variables in Structural Equation Analysis

Separate models were developed for testing: 1) direct effects 2) mediated pathways for physical activity; 3) a moderated model for physical activity

First, the direct effects models for physical activity consisted of environmental support (emotional support and instrumental support from family and friends, physical environment quality, availability and accessibility), extrinsic and intrinsic motivation and self-efficacy. Pearson-r correlations were performed to ascertain the consistency of predicted relationships.

3.3. Part 3 Secondary analysis of data from an intervention to establish determinants of physical activity in a supervised programme and study effect size variations across groups

Since the obvious next step would be to design an intervention based on the findings of the above studies, I thought it prudent to analyze an already implemented programme. As there were no ongoing interventions solely for the purpose to improve physical activity a recently concluded lifestyle intervention programme among high risk group was selected. The data for these variables have not been analyzed before.

Objective: To establish the determinants of participation in physical activity in a supervised programme and study critical interactions which cause variations in effect size across groups.

3.3.1. Data Source

The data was sourced from Kerala Diabetes Prevention Programme. KDPP .This was a cluster randomized trial in Trivandrum district of Kerala. Participants aged 30–60 years having high risk of diabetes were invited to participate in the study sedentary people in the intervention arm were intervened with peer support from

community members for a period of 24 months. Participants in the intervention arm were given group activities and education on prevention and management of chronic diseases. Post intervention follow-up was conducted at 12 and 24 months after intervention (Sathish et al., 2013).

Statistical analysis

Intervention effectiveness was assessed using statistical software IBM SPSS, Version21. Bivariate analysis was done using SPSS to estimate the proportion of individuals who became active at each time point. Chi-square test was done to examine whether the baseline parameters such as age, educational status, occupation and marital status were significantly different between intervention and control arms. Multiple comparisons were made between the mean physical activity level at each time point in the intervention and control arm using Repeated Measures ANOVA, Chi square test for trends was used to detect any change in proportion of low activity adults in intervention and control arms at baseline and post intervention.

3.4. Part 4: Pilot study to test feasibility of telephone interviews as a method for data collection

A pilot study was conducted for studying an alternate methodology in a small sample of 50 adults to check the feasibility of conducting telephone interviews as a method of data collection.

Objective: To test an alternative methodology for data collection on a pilot sample.

A subsample of 50 participants was used to test alternative methodology for data collection in future studies. A random sample was taken from the survey list and telephone interviews undertaken using the modified GPAQ. Since all the participants had responded in the face to face interviews, there was little difficulty related to responsiveness during the telephone interviews. The study sample consisted of 50 adult participants who took part in face to face interviews held during July through December 2018.Telephone interviews were conducted on the

same sample January through March 2019. The time for interviewing during weekdays was in the evening from 5 PM to 8 PM and during weekends we interviewed in the morning from 10AM to 12 noon, as working men and women are likely to be at home at this time. The primary researcher conducted all the telephone interviews in January through March 2019.

3.5. Data Collection Tools used in each phase of the study

3.5.1. Part 1

Key informant Interview guide: consists of open ended questions. The guide is given in Appendix A-3

Focus group Discussion guide: FGD guide was used to conduct the FGDs. The guide is given in Appendix A-3

3.5.2. Part 2

3.5.2.1. Physical activity

Physical activity was assessed using self-reports. Participants were asked questions from the modified physical activity questionnaire which has demonstrated acceptable validity and reliability. Physical activity of a usual week over the domains of activity such as work/domestic, transport and leisure are measured. The physical activity score classifies adults into light, moderate and high active. The main outcome of the analysis was leisure time physical activity since the intervention can only be targeted to activities that individuals may be able to increase by choice rather than activities that form a part of occupational duties. Total physical activity was calculated by adding physical activity outcomes in domains of occupation, travel-related and leisure time. Walking and leisure time minutes were combined for analysis in the study as walking was the most preferred recreational activity. Sitting time (mins/day) was used as a proxy for sedentary behavior. The

participants were classified as active and inactive depending on the GPAQ criteria: 600 MET minutes per week or 150 minutes per week of moderate to vigorous intensity physical activity (CDC, 2019; Gradidge et al., 2014).

Factors affecting physical activity were assessed at intrapersonal, interpersonal and community /environmental level based on the socio-ecological model. At intra personal level, motivation and self efficacy toward physical activity behavior were assessed. At interpersonal level, social support from family and friends was investigated. At the level of community physical and social environment variables like availability and social norms were assessed.

Consulting the experts in the field, I ensured face validity which is concerned with whether the instrument appears to be assessing the desired qualities on the face of it.

The questionnaire (see Appendix A-4) included the domains of physical activity, environmental supports which included social and environmental support, self efficacy and motivations for engaging in physical activity.

Factor validity-exploratory and confirmatory, was established for each construct prior to beginning the analysis. Reliability was assessed using internal consistency approach (Cronbach‘s alpha).

Demographic characteristics of age, gender, household income, marital status, education, occupation of the participants were also assessed.

3.5.2.2. Environmental support.

Environmental support was operationalised as a multidimensional construct consisting of four indices –instrumental support, emotional support, physical environment quality, availability and accessibility and social and cultural norms towards physical activity.

For assessing instrumental support, participants were asked questions like whether they had information regarding the benefits of physical activity. Participants could

respond by answering yes or no. To assess emotional support, questions like whether they had someone to take care of their responsibilities if they wanted to engage in physical activity were asked. Participants‘ perceptions of quality of their environment was measured using questions like whether they found their neighborhood safe and pleasant for engaging in physical activity. Participant‘s perception of availability of facilities was measured using questions like if their neighborhood had walking/biking trails, parks, and outdoor/indoor places to exercise. Participants responded by answering yes or no. Social and cultural norms were assessed using questions like whether they saw many people exercising in their neighborhood. Again they could respond by saying yes or no. The scores for these scales were combined to create the environmental support factor (4 items, $\alpha = 0.52$).

3.5.2.3. Individual-Level Variables: Self-Efficacy and Motivation

Self efficacy: This construct was measured using several items developed by Resnick and Jenkins. Participants were asked to rate their level of confidence using a 10-point Likert scale from 0 (not confident) to 10 (very confident) that they can be physically active under the following conditions: feeling too tired, stressed, depressed to be physically active, poor weather conditions, lack of time, having pain, had to exercise alone, did not enjoy the activity or getting bored by the program. Internal consistency of the scale was 0.92.

Motivation: Intrinsic and extrinsic motivation for physical activity was measured using items from the Motivation for Physical Activities Measure scale which consists of a total of 30 items (reliability=0.94). Intrinsic motivation is behavior engaged in for fun and enjoyment, whereas extrinsic motivation is behavior engaged in for reasons outside the activity itself. Participants were asked to rate their level of motivation using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree) for various motives like fun, appearance, controlling body weight or to meet friends. Exploratory factor analysis identified four factors: body-related motivation for health (11 items, $\alpha = 0.985$), motivation for social reasons (5 items, $\alpha = 0.94$), intrinsic motivation for enjoyment (7 items, $\alpha = 0.987$), intrinsic motivation for competence (7 items, $\alpha = 0.96$).Intrinsic motivation for enjoyment and

competence did not reach the significant factor loadings in confirmatory factor analysis and had to dropped from the final model (Appendix A-1)

3.5.3. Part 3

A questionnaire was employed to gather information on socio demographic variables, health status, and factors affecting physical activity. For information regarding physical activity levels the Global Physical Activity Questionnaire was used. (Appendix A-4)

3.5.4. Part 4

Initially, the interviewer introduced herself and stated the purpose of the study as following: "A telephone survey is being done to assess your daily living physical activity levels for which we came for a personal interview during the month of July to December2018. Kindly respond to a few questions." They were asked about their daily routine physical activity and time they spent in any activity that lasted more than ten minutes using the modified Global Physical Activity Questionnaire. Correlation analyses were conducted to test if the responses of the two modes were similar.

4. RESULTS

This study involves four parts and the results are divided into different sections. In the first section 4.1, results from the analysis of focus group discussion results have been presented. The second part of the study involves a cross-sectional survey in the community .Section 4.2 presents the descriptive findings and regression models; section 4.3 presents results of path analysis using Structural Equation Modeling from the survey. Section 4.4 describes and compares the findings from secondary analysis of a community trial. Findings of the pilot study on use of telephone mode for data collection have been presented in section 4.5.

4.1. Focus group Discussions

This part of the study focused on understanding the perceptions of physical activity in the community using focus group discussions and key informant interviews. Analysis of the qualitative data derived out of the focus group discussions brought out several new insights into the views about physical activity in the community. These discussions highlighted the importance of physical activity, their main barriers, motivators and also the process by which people adopt physical activity. Besides, these key informants also gave inputs regarding the various issues and suggestions regarding sustainable physical activity in future as coming generations become more sedentary. Results are presented in terms broad themes and supporting evidence.

1. The most common forms of exercise

Most of the participants considered walking as a preferred form of exercise as it was acceptable in their society, not expensive, could be done anywhere, although a companion would be necessary for safety from stray animals during walking. It was also appropriate for older people. .

Women thought that taking care of the household and small children was in itself a full time activity.

Men talked about sports as their favourite form of physical activity. They liked organized activity like swimming, cycling, badminton or football. Men seemed to be concerned about time and fear of injuries while doing vigorous forms of activity like hiking and trekking (which they enjoyed in their youth).

Main sources of information regarding exercise were mass media like television, newspaper, health magazines, social media and social network (friends, spouse).

W2: I think this is enough for us, we are old and these kids make us run all day. Do you think we need more exercise?

Focus group3: community

M1: What do you think is the best form of exercise, I have seen people abroad, they hike and trek

M3: I have joint problems, swimming is the best exercise for people like me, and also if we start doing these things now we might fall or something and then we won't do anything ever.

Focus group2 Men's group, supervised facility.

Women talked about going to the gym and using indoor gym equipment as something prohibited for them. They preferred yoga and zumba dance as more subtle and feminine forms of exercise compared to pushing weights. Very few took to treadmill and other gym equipment.

F1: My mother was very shy to take up gym exercises but I pushed her into it. I know it's much better if you really want to lose weight. I have been living in (mega

city) my whole life so it s okay for me but people here find it hard to see women pushing weights.

F3: I love dancing so weight reduction is just a plus.
Focus group1 women's group-supervised facility
2. Main motivators

Participants talked about health benefits like mental, physical and, social; however diagnosis of disease and doctors'advice were main motivators for them to join physical activity programme. Past experience and passion for sport and upcoming of a new facility which is accessible and affordable were other factors.

M4: It's a good source of social interaction, I love making new friends, I am passionate about swimming since my childhood and so my kids have taken after me.

M6: I have lost 30 kilos of weight in last 3 years, which is an ongoing motivation for me

M7: I have hypertension for last 3 years and doctors have advised me lifestyle modification; also these blogs and social media messages motivate me to stay healthy.

*Focus group*2 *Men's group- supervised facility*

Many men appeared to do activities with their children when they came to a supervised facility; however women were not so keen on coming with their children. They said they joined the group while they returned from work.

3. Perceived barriers

Low awareness about health benefits of exercise, people spending too much time on electronic gadgets (screen time) and attitude (laziness, need of exercise meant only for people with obesity) were considered as barriers for participating in recreational

physical activity. Participants agreed on time, role and responsibilities as major barriers to exercise. There was also a lack of attitude among members as they said that exercise is only for others not for them. They also talked about having time and energy but still being lazy and forgetful. Few participants thought that their work or household activities were enough physical work for them. Many members did not know the exact importance of exercising. Some also talked about weather prohibiting walking or playing outside on most days. Safety was another issue for some people. Lack of skills was also a barrier for participants.

Women talked about their husband‘s attitude, fear of injuries and consequent loss of work as barriers to physical activity.

W3: We will die anyway so let’s eat and enjoy, what’s so much ado about, my husband says, he is a diabetic. We are also lazy and forgetful after getting old.

W4; I think a lot of people also anticipate pain and injury. I started doing yoga sometime back and next day I had pain in my legs and back, I had to take leave from work, couldn’t do anything for a week , after that never tried..... I have heart disease now; I can’t walk for a long distance. I think I should take rest rather than exercise.

W5: Why me, I don’t have any diseases or anything, I don’t need exercise.
Focus group3 community
4. Affordability of recreational physical activity

Participants consented upon the fact that middle class population cannot afford the cost of exercise facilities. Participants who had lived in western countries discussed about lack of culture of saving for recreation activities. Most of the women were spending on such activities at the moment as it was really important for them to care for their health now than later. They suggested that the cost has to come down for most of the middle class to be able to use these facilities. Women suggested that Yoga in nearby anganwadi or local clubs could increase participation and awareness.

M4: In western societies there is a trend for investing and spending on recreational activities just like we save for gold

K1: I have worked in various places. It's difficult to sustain a business like this. I want to build a franchise of this fitness chain in Kerala. People have start accepting this; fitness culture has been here but very limited to young men and upper class. I want to take it to everybody. There has to be a dramatic shift in thinking culture, it's happening slowly.....There is a stark difference in money spending habits of women and men here .....where people spend so much money each month on recharging mobile and cable connections but are not aware of the benefits to health by investing the same money in physical activity.....I use my trainers to run community programmes in low socioeconomic groups They are the ones who are hit the hardest and thus left with unhealthy lifestyles

Key Informant1 K1: Outdoor facility owner

5. Body image

A main factor for women to start exercising was dissatisfaction with their body image (Laus et al., 2011; Pruis and Janowsky, 2010). Most working women felt that positive body appearance improved their confidence and self-esteem at work place (which is very discriminative of older and ugly looking women). For younger women it was important for them to reduce weight to avoid future difficulties in finding match for marriage and avoid embarrassment at social and family gatherings. Although they understood the importance of health benefits of exercise like improving efficiency of daily activities, body image was a very strong motivation to exercise. One key informant who was an instructor in an outdoor facility kept stressing the importance of lifelong health promoting physical activity. However the participants were candid about their body image and self esteem as main motivators for joining the gym.

F1: My wedding is three months away; I want to look good for my marriage. Moreover, those meds for weight loss are not healthy. .....as the saying goes ―no pain no gain‖

F6: I want to look younger than my husband everyone tells me I look older than him

F7: I have been told to reduce weight as I don't look good in my dresses and my family feels ashamed when guests come over. (11 year old girl) appearance

6. Social, cultural and gender norms

These were important especially for women participants. Although men were not averse to the idea of exercising, they thought exercising is a western concept and habitual physical activity should be enough for body health.

Women talked about the traditional roles of women in labor intensive household work and extensive walking for fodder and collecting water and firewood. Lately, all these activities have become mechanized and lives have grown more sedentary. Women believed that family responsibilities are her primary concern and she herself considers her health secondary to kids and family. Society does not appreciate women who go out for exercise and waste time and money for such luxury. Walking has become acceptable now, however they require someone to accompany them for safety purposes. Some women go to exercise without informing their families. There is a lot of social pressure on women on how to live and behave. In order to avoid the humiliation and public shaming, women sit at home and watch television rather than go out with kids and play. Schools train sport teams but there are no concerted efforts to improve the physical fitness of students in schools. Women suggested including lifestyle education in school so that girls are aware of their lifestyle choices right from the beginning not when it's very difficult for them to change.

Some women believed that such leisure activities are an upper class thing and not for all. Lower social class work hard as it is a necessity for them, however middle

class neither has money to afford health promoting activities nor is involved in manual labor.

F6: We have to get kids ready for school, pack lunch boxes, get hot water ready for the man to take bath, men are taking their walk at this time

F5: Society scares us, we want freedom

F4: We can't tell people we are going to a gym to exercise; there will be a lot of talk about it

W4: Our primary duties are home and family, where is the time and energy after that.

K2:Schools are supposed to inculcate healthy habits right from the beginning, they should teach lifestyle choices just like they teach traffic rules and environment saving , I guess this is a priority now.

K2 Key informant2: Instructor

7. Attitude

Some of the comments regarding reasons for not exercising were: laziness, not having time and no need for exercise.

W7:'Exercise is meant for overweight or others, it's not for me,
W3:'Will die eventually, what is the point of exercising'
G4: Medicines will cure us we don't need ex'

8. Awareness about physical activity and chronic diseases

There seemed to be low awareness about health benefits of physical activity. People were aware about chronic diseases as almost all members were either living with a

disease or had a living or dead family member with chronic disease but physical activity figured rarely in their accounts. Main emphasis was on diet and pollution. People had conflicting ideas about risk factors of disease: heredity, behavior, psychological, social. There seemed to be misconceptions regarding causes of disease like migration and drinking sugary juices. Assumptions like need for exercise only after a diagnosis and advice by a health professional were also frequent. Women believed that household activities were enough to take care of their daily physical activity requirements as child care demands too much energy, and also because they don‘t need to reduce weight. People believed disease makes them tired and exhausted, so they are left with no energy to exercise and they should rest more. Moreover, in old age people are supposed to rest.

G1: I have been an avid sportsman and a body builder my whole life but now I don't feel the energy after all the diet control

W9: Physical activity helps in diabetes but I am not sure about other diseases.
W8: My father has diabetes and blood pressure I didn't know I have a risk too.
W1: Earlier there was no treatment, people were scared of chronic disease, but now treatment is easily available, so nobody worried.

A participant who is a surgeon by profession lamented upon the fact that even after doctor‘s advice few people went out for exercising

G1: Health professionals advice more medicines, every time I go; they change medicine, now I am trying (alternative medicine).

There were conflicting ideas about causes of diseases like;

G1: Migration causes change in lifestyle; but when I came back home, there was no work, and so I think I got all these problems.

G6: I drank a lot of sugary juices after my surgery and so I got this disease

Focus group4-NCD clinic patients

There was more emphasis on diet restriction like salt and fatty foods

M6: I have turned to vegetarian diet now, these food habits are the real problems, you should watch the lectures of Prof (a renowned oncologist).

W5: All diseases can be cured by dieting, All this pollution and pesticides are causing the disease.....Government should do something about all this plastic and pesticides.

9. Health communication: professional and mass media

Most participants pointed out that health professional described medicines as the main pillar of treatment. Two doctors who were part of the groups perceived various barriers like time and attitude for giving advice on lifestyle modification. There was a general lack of awareness about how physical activity helps in preventing diseases. Participants‘accounts revealed that doctors‘advice about exercise was almost always insufficient with respect to time and intensity. They were also not referring the patient to an expert for consultation.

G3: My doc asked me to walk for 5-10 minutes every day slowly. I am old and also could hurt myself.

G4: My doc asked me to start exercising but nothing else.

M5: I asked my doc whether I could exercise, he said if you can you should.

K2: There is no physical education in our school; they only ask children who are fat to reduce their weight.

Health communication in schools was limited to reduction of weight. Television programmes dedicated to certain diseases emphasized on exercising but only in few cases and so people believed exercise is only for people with certain diseases. Health communication mainly emphasized on diet control and soil and water pollution as main contributors to disease.

W3: I have never seen any physical activity promotion on TV, I have read sometimes in magazines but it is only for people with obesity.....

Few participants suggested that health communication should be done in a friendlier and acceptable manner, to include role models and communicate in everyday comprehensible way as in the case of immunization.

K3: Yes I think if physical activity is also promoted like immunization as a preventive measure; roping in celebrities, people will pay attention

K3: Key informant 3: health worker in the community

4.2. Overall description of the data

The overall descriptives provide insights into how the physical activity levels are influenced by different variables. The dependent variable, physical activity level has been categorized into two categories; active (those who achieve =>600 Mets per week) and inactive (those who achieve less than 600 METs per week. The descriptive characteristics of the sample have been shown in Table 4.2.1.

A total of 467 adults participated in the study. The sample consisted of healthy adults (healthy enough to be able to perform light to moderate intensity physical activity) from two urban and two rural units of Kottayam district. The mean age of the study population was 44.13±12.15.The response rate of the survey was 93%.

Table 4.2.1 Descriptive characteristics of the study sample

Characteristic	Overall		Rural N=232		Urban N=234	
	N	%	n	%	n	%
Age						
18-44	228	48.9	115	49.6	113	48.3
45-65	238	51.1	117	50.4	121	51.7
Sex						
Male	198	42.6	115	49.6	83	35.5
Female	268	57	117	50.4	151	64.5
Education						
Secondary	199	42.8	108	46.6	91	38.9
Senior secondary	104	22.3	47	20.3	57	24.4
Graduation	131	28.1	63	27.2	68	29.1
Above graduation	32	6.9	14	6	18	7.7
Occupation						
Sedentary	114	24.4	50	21.5	64	27.4
Non sedentary	72	15.4	49	21	23	9.8
Manual labor	63	13.5	44	19	19	8.1
Home making	190	40.8	76	32.8	114	48.7
Unemployed	27	5.8	13	5.6	14	6
Vehicle ownership						
Bicycle	4	0.9	0	0	4	1.7
Two-wheeler motorized	161	34.5	90	38.8	71	30.3

Characteristic	Overall		Rural N=232		Urban N=234	
	N	%	n	%	n	%
3/4wheeler	67	14.4	39	16.8	28	12
Combination	103	22.1	44	19	59	25.2
None	131	28.1	59	25.4	72	30.8
Household income						
<10000	260	55.8	139	60.1	121	51.7
10000-20000	114	24.5	59	25.3	55	23.5
20000-30000	85	18.2	33	14.2	52	22.2
>30000	7	1.5	1	0.4	6	2.6
Marital status						
Married	397	85	200	86.2	197	84.2
Unmarried	57	12	28	12.1	29	12.4
Widowed/divorced	12	2.6	4	1.7	8	3.4
Total PA						
Low	76	16.3	40	17.2	36	15.4
Moderate-high	390	83.7	192	82.8	198	84.6

MVPA-moderate to vigorous physical activity

LTPA-leisure time physical activity

TPA-transport physical activity

Total PA-total physical activity

Low - less than600 MET mins per week

Moderate-high ->=600 MET mins per week

4.2.1. Physical activity

The participants reported engaging in an average sum of 1282 minutes per week in moderate to vigorous intensity physical activity in all domains of physical activity. The sample reported engaging in leisure time physical activity and walking mean duration per week of 83 minutes which is less than the recommended levels of physical activity for health benefits (Table4.2.2).

Table 4.2.2 Summary statistics of physical activity in various domains

Domain (N=466)	Mean± SD	Median	Minimum	Maximum
Total PA (minutes per week)	1282±1013.6	1112	20	3150
Work domain (minutes per week)	1104.2±1040.3	905	10	3150
Travel domain (minutes per week)	126.8±216.7	60	10	2160
Sedentary time (minutes per day)	213.54±142.7	180	30	720
Leisure time (minutes per week)	82.5±148.04	0	0	840

Table 4.2.3 Summary statistics of intrapersonal factors affecting leisure time physical activity

Characteristic (N=466)	Mean±SD	Median	Minimum	Maximum
Interest motivation score	1.51±1.45	1	1	7
Competence motivation	1.27±0.91	1	1	7
Fitness motivation	2.71±2.51	1	1	7
Appearance motivation	1.72±1.66	1	1	7
Social motives	1.30±1.07	1	1	7
Self efficacy	15.13±25.78	0	0	90

4.2.1.2. Socio-demographic disparities in different domains of physical activity

The prevalence of inactivity in each domain was: leisure (80%), work (34%), and transport (73%). Prevalence of physical inactivity in various domains and their distribution by various socio-demographic factors has been presented in Tables 4.2.4--4.2.7.The difference in physical activity in the domains of work and leisure time with respect to household income per month have been presented in Figure 4.2.1.

Table 4.2.4 Distribution of low and moderate to vigorous physical activity: domains and area of residence

Domain		Overall N (%)	Rural N (%)	Urban n (%)	χ^2	*P*value
Total PA	Inactive	76 (16.2)	40 (17.2)	36 (15.4)	0.294	0.617
	Active	390 (83.3)	192 (82.8)	198 (84.6)		
Transport PA	Inactive	339 (72.7)	169 (72.8)	170 (72.6)	0.002	0.962
	Active	127 (27.3)	63 (27.2)	64 (27.4)		
Leisure time PA	Inactive	372 (79.8)	191 (82.3)	181 (77.4)	1.79	0.204
	Active	94 (20.2)	41 (17.7)	53 (22.6)		
Work time PA	Inactive	159 (34)	71 (30.6)	88 (37.6)	2.54	0.119
	Active	307 (65.9)	161 (69.4)	146 (62.4)		

Inactive- less than600 MET mins per week

Active->=600 MET mins per week

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Table 4.2.5 Distribution of low and moderate to vigorous physical activity: domains and sex differences.

Domain	Level of PA	Male n (%) N=198	Female n (%) n=268	χ^2	*P* value
Total PA	Inactive	58 (33.3)	18 (6.7)	42.5	0.000
	Active	140 (66.7)	250 (93.3)		
Transport PA	Inactive	146(73.7)	193 (72)	0.170	0.680
	Active	52 (26.3)	75 (28)		
Leisure time PA	Inactive	146 (73.7)	226 (84.3)	7.93	0.005
	Active	52 (26.3)	42 (15.7)		
Work PA	Inactive	113 (57.1)	46 (17.2)	80.67	0.000
	Active	85 (42.9)	222 (82.8)		

Inactive- less than600 MET mins per week

Active->=600 MET mins per week

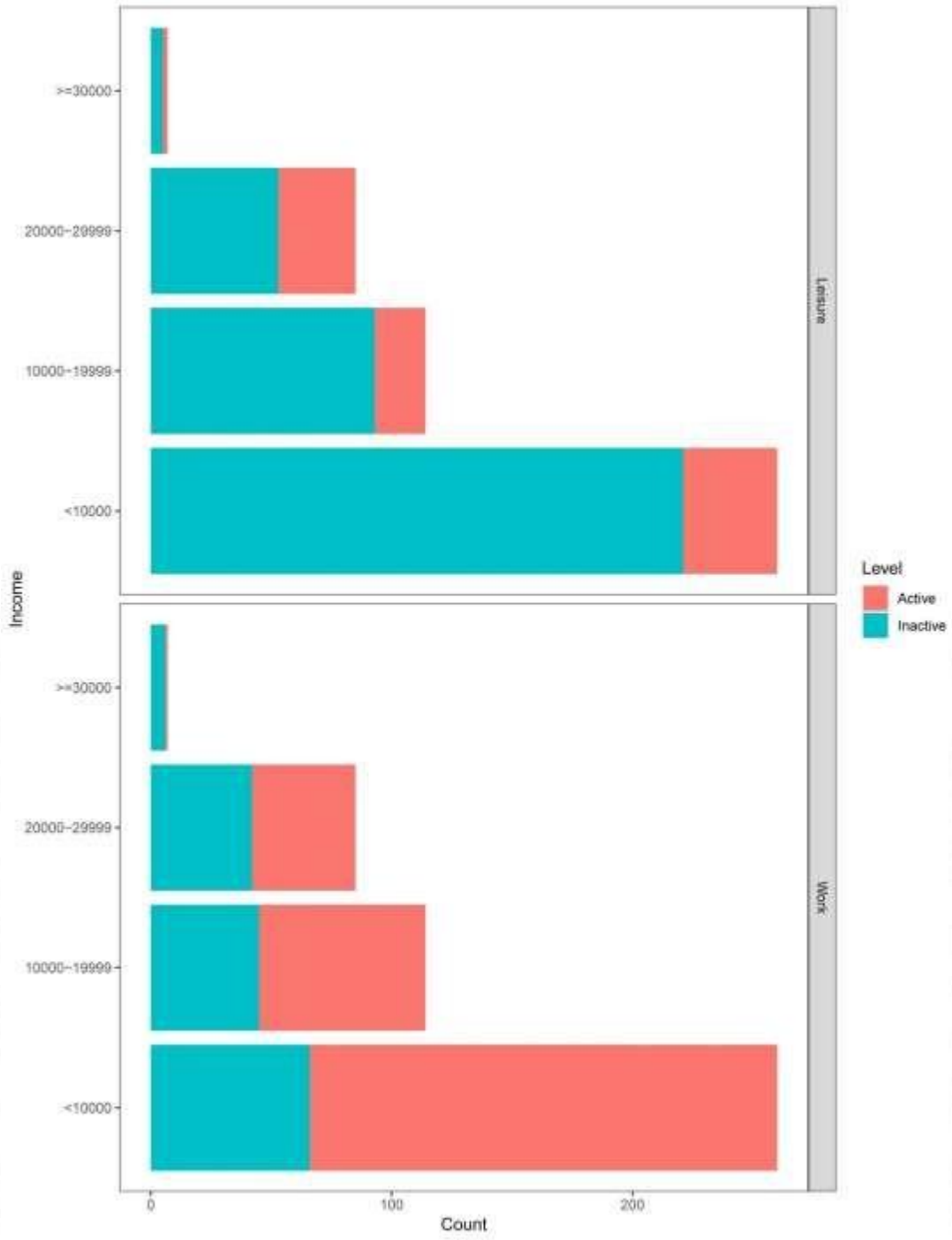

Figure 4.2.1: Distribution of low and moderate to vigorous physical activity: domains and household income per month

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Table 4.2.6 Distribution of low and moderate to vigorous physical activity: domains and age differences

Domain	Level of PA	18-44 years N=228	45-65years N=238	χ^2	*P* value
		n (%)	n (%)		
Work PA	Inactive	81 (35.5)	78 (32.8)	0.393	0.531
	Active	147 (64.5)	160 (67.2)		
Total PA	Inactive	43 (18.9)	33 (13.9)	2.128	0.145
	Active	185 (81.1)	205 (86.1)		
Leisure time PA	Inactive	188 (82.5)	184 (77.3)	1.91	0.166
	Active	40 (17.5)	54 (22.7)		

Inactive- less than600 MET mins per week-low physical activity

Active->=600 MET mins per week-moderate to vigorous physical activity

PA-physical activity

Table 4.2.7 Occupational physical activity and type of occupation

Level of PA	Sedentary*	Non sedentary**	Manual labor	*P* value
	n (%)	n (%)	n (%)	
Inactive	104 (73.8)	54 (20.6)	1 (1.6)	.000
Active	37 (26.2)	208 (79.4)	62 (98.4)	

*Includes unemployed, desk jobs, sales, driving

**Includes, homemaking, jobs that require lot of walking like nurses, doctors

4.2.2. Factors affecting physical activity

This study measured the participants'self efficacy and motivation objectively as well as their perceptions of social and physical environment. I have presented the distribution of factors affecting physical activity in the intrapersonal, physical and social environment levels. The mean scores for self efficacy and motivation were low in overall study population

The mean scores of self efficacy and motivations have been presented in Table 4.2.8-10

Table 4.2.8 Distribution of motivation and self efficacy scores of study population by gender

Factor	Overall (N=466)	Male (n=198)	Female (n=268)	95%CI of difference	*P* value
Self efficacy (0-90)	15.13±25.71	22.37±29.7	9.78±20.93	7.9-17.20	.000*
Interest motivation (1-7)	0.84±1.74	1.29±2.11	0.51±1.32	0.467-1.094	.000*
Competence (1-7)	0.60±1.21	0.88±1.44	0.40±.956	0.269-.0707	.000*
Fitness motivation (1-7)	1.05±1.99	1.39±2.19	0.79±1.807	0.230-0.959	.000*
Appearance motivation (1-7)	2.05±3.03	2.81±3.28	1.49±2.72	0.767-1.864	.000*
Social motives (1-7)	0.63±1.33	0.97±1.70	0.38±0.901	0.35-0.83	.000*

*indicates significant p values for linear by linear association chi square for trends by this variable at<0.05level

Table 4.2.9 Distribution of motivation and self efficacy scores by area of residence

Factor	Rural (n=232)	Urban (n=234)	95%CI of the difference	*P* value
Self efficacy	15.65±26.37	14.62±25.22	-3.6-5.72	0.666
Interest motivation	0.87±1.79	0.81±1.69	-0.25-.38	0.697
Competence	.59±1.44	0.62±0.956	-0.25-.188	0.766
Fitness motivation	1.84±2.94	2.26±3.13	-0.965-.142	0.145
Appearance motivation	1.06±2.06	1.04±1.93	-0.347-.382	0.925
Social motives	0.66±1.39	0.61±.1.28	-0.195-0.292	0.697

Table 4.2.10 Distribution of motivation and self efficacy scores by age

Factor	18-44 years (N=228)	45-65yrs (N=238)	95%CI	*P* value
Self efficacy	15.56±26.16	14.72±25.44	-3.86-5.538	0.726
Interest motivation	1.07±2.03	0.62±1.36	0.137-0.768	0.005
Competence	0.75±1.44	0.46±.912	0.068-0.507	0.010
Appearance motivation	1.25±2.22	0.85±1.736	0.034-0.760	0.032
Fitness motivation	2.01±2.99	14.27±2.72	-0.638-0.471	0.767
Social motives	0.84±1.69	0.43±0.828	0.164-0.646	0.001

Environmental factors:

I have presented the distribution of perceptions of social support and quality, availability and accessibility of their physical environment in Tables 4.2.11-13. The regression models for predictors of leisure time physical activity have been presented in Tables4.2.14. The tables show all the variables that are significant in the models.

Table 4.2.11 Physical and social environmental factors by gender

Variable	Response	Male N (%)	Female N (%)	*P*value
Many people exercising in the neighborhood	Yes	123 (62.1)	157 (58.6)	0.446
Perception of daily activity as enough exercise	Yes	96 (48.5)	154 (57.5)	0.060
Acceptability of exercise in the community	Yes	184 (92.9)	251 (93.7)	0.851
Should women exercise	Yes	179 (90.4)	237 (88.4)	0.547
Bothered about mocking	Yes	10 (5.1)	21 (7.8)	0.263
Perceptions of ex as a upper class fashion	Yes	14 (7.1)	14 (5.2)	0.435
Is your neighborhood safe to walk	Yes	156 (78.8)	196 (73.1)	0.191
Is your neighborhood pleasant for walking	Yes	154 (77.8)	187 (69.8	0.058
Do traffic, crime and stray animals prevent you from walking in neighborhood	Yes	27 (13.6)	57 (21.3)	0.022

Do you have any walking trails, parks or facility to exercise in neighborhood	Yes	29 (14.6)	13 (4.9)	.000
Distance of such facility from home	<2km	31 (15.7)	15 (5.6)	.000
Somebody to help with your responsibilities	Yes	129 (65.2)	106 (39.6)	.000
Family and friends supportive of your exercise	Yes	177 (89.4)	182 (67.9)	.000
Do you think you would be more active if family and friends participated with you	Yes	100 (50.5)	138 (51.5)	0.852
Do you have full information regarding benefits of exercise	Yes	35 (17.7)	42 (15.7)	0.614
Do you think you would be more active if you had more info	Yes	105 (53)	135 (50.4)	0.575
Did you get any health messages regarding physical activity from your health care provider or any mass media	Yes	115 (58.1)	140 (52.2)	0.222
Do you think exercise is good for health	Yes	194 (98)	266 (99.6)	0.435

Table 4.2.12 Physical and social environment factors by area of residence

Variable	response	Rural n(%)	Urban n(%)	*P* value
Many people exercising in the neighbourhood	Yes	139(59.9)	141(60.3)	1.00
Perception of daily activity as enough exercise	Yes	137(59.1)	113(48.3)	0.021
Acceptability of exercise in the community		216(93.1)	219(93.6)	0.855
Should women exercise	Yes	195(84.1)	221(94.4)	0.000
Bothered about mocking	Yes	13(5.6)	18(7.7)	0.458
Perceptions of ex as a upper class fashion	Yes			
Is your neighbourhood safe to walk	Yes	200(86.2)	152(65)	.000
Is your neighbourhood pleasant for walking	Yes	196(84.5)	145(62)	.000
Do traffic, crime and stray animals prevent you from walking in neighbourhood	Yes	22(9.5)	62(26.5)	.000
Do you have any walking trails, parks or facility to exercise in neighbourhood	Yes	8(3.4)	34(14.5)	.000
Distance of such facility from home	<2km	9(3.9)	37(15.8)	.000
Somebody to help with your responsibilities	Yes	120(51.7)	115(49.1)	0.580
Family and friends supportive of your exercise	Yes	175(75.4)	184(78.6)	0.442
Do you think you would be more	Yes	106(45.7)	132(56.4)	0.026

active if family and friends participated with you				
Do you have full information regarding benefits of exercise	Yes	33(14.2)	44(18.8)	0.212
Do you think you would be more active if you had more info	Yes	118(50.9)	122(52.1)	0.853
Did you get any health messages regarding physical activity from your health care provider or any mass media	Yes	127(54.2)	128(54.7)	1.00
Do you think exercise is good for health	Yes	228(98.7)	232(99.1)	0.684

Table 4.2.13.Physical and social environment factors by age groups

Variable	response	18-44 years N (%)	45-65years n (%)	***P* value**
Many people exercising in the neighbourhoodsci2	Yes	141 (61.8)	139 (58.4)	.451
Perception of daily activity as enough exercisesci5	Yes	118 (51.8)	132 (55.5)	0.458
Acceptability of exercise in the community	Yes	206 (90.4)	229 (96.2)	0.015
Should women exercise	Yes	209 (91.7)	207 (87)	0.134
Bothered about mocking	Yes	24 (10.5)	7 (2.9)	0.001
Perceptions of ex as a upper class fashion	Yes	14 (7.1)	14 (5.2)	0.435
Is your neighborhood safe to walk	Yes	172 (75.4)	180 (75.6)	1.00
Is your neighborhood pleasant for walking	Yes	166 (72.8)	175 (73.5)	0.917
Do traffic, crime and stray animals prevent you from walking in neighborhood	Yes	38 (16.7)	46 (19.3)	0.472
Do you have any walking trails, parks or facility to exercise in neighborhood	Yes	18 (7.9)	24 (10.1)	0.424
Distance of such facility from home	<2km	18 (7.9)	28 (11.8)	0.214
Somebody to help with your responsibilities	Yes	117 (51.3)	118 (49.6)	0.712
Family and friends supportive of your exercise	Yes	166 (72.8)	193 (81.1)	0.037
Do you think you would be more active if family and friends participated with you	Yes	128 (56.1)	110 (46.2)	0.034
Do you have full information regarding benefits of exercise	Yes	45 (19.7)	32 (13.4)	0.081
Do you think you would be more active if you had more info	Yes	125 (54.8)	115 (48.3)	0.166
Did you get any health messages regarding physical activity from your health care provider or any mass media	Yes	114 (50.0)	141 (59.2)	0.051
Do you think exercise is good for health	Yes	223 (97.8)	237 (100)	0.028

Table 4.2.14 Regression model for the predictors of leisure time moderate to high physical activity (MVPA)

Variables	Categories	Odds Ratios	95%CI	*P* value
Fitness motivation	Hig h Low	8.45 Ref	1.58-11.34	0.000
Self efficacy	Hig h Low	3.771 Ref.	1.75-8.08	0.000
Friends and family support	Yes No	4.46 Ref.	1.09-18.20	0.037
Marital status	living with spouse Not living with spouse	2.59 Ref	1.08-6.23	0.017

4.2.3. Cluster analysis

In order to get an overall understanding of the structure of the relationships between variables in terms of patterns of influence of other variables on physical activity levels, I did cluster analysis. It helped to identify groups of subjects that are similar to each other in terms of physical activity levels. I used clustering algorithm, two step clustering to tract the clusters of related variables considering the mixed nature of the data which contains both continuous and categorical variables [distance measure: log likelihood, Statistics: Descriptive by clusters]. I could find homogeneous groups clusters based on socio demographic and social and

environmental factors and how physical activity level varies across the clusters. The analysis revealed two clusters.

The first cluster reported comparatively lower scores of mean self efficacy and motivation. The participants were inactive in leisure time, active in total physical activity, reported receiving no information regarding physical activity from health professionals. The first cluster considered daily activity to be enough for health and did not perceive availability of walking trails in the neighborhood. They also reported no social support from family or friends.

Cluster two reported higher frequency of leisure time physical activity, mostly perceived availability of neighborhood facilities for walking, reported observing others in the neighborhood exercising, did not perceive daily activity as enough for health, perceived support from family crucial to participate in exercising. This cluster also found the quality of neighborhood pleasant and safe for walking and did not fear for stray animals or traffic or crime. This cluster also reported more social support for participation. This cluster also reported higher mean self efficacy and motivation scores.

The characteristics of variables in the clusters are presented in Table 4.2.15.

Table 4.2.15 Characteristics of variables in clusters 1&2

Variable		Cluster1	Cluster2
Leisure time PA category			
	Active	0 (0)	94 (100)
	Inactive	318 (85.7)	53 (14.3)
Many people exercising in the neighbourhood	Yes	176 (62.9)	104 (37.1)
	No	142 (76.8)	43 (23.2)
Perception of daily activity as enough exercisesci5	Yes	219 (88)	30 (12)
	No	99 (45.8)	117 (54.2)
Acceptability of exercise in the community	Yes	302 (69.6)	132 (30.4)
	No	16 (51.6)	15 (48.4)
Should women exercise	Yes	271(65.3)	144 (34.7)
	No	47 (94)	3 (6)
Bothered about mocking	Yes	27 (87.1)	4 (12.9)
	No	291(67.1)	143 (32.9)
Perceptions of ex as a upper class fashion	Yes	18 (64.3)	10 (35.7)
	No	300 (68.6)	137 (31.4)

Is your neighbourhood pleasant for walking	Yes	231 (67.9)	109 (32.1)
	No	87 (69.6)	38 (30.4)
traffic, crime and stray animals do not prevent you from walking in neighbourhood	Yes	268 (70.3)	113 (73.2)
	No	50 (59.5)	117 (40.5)
Do you have any walking trails, parks or facility to exercise in neighbourhood	Yes	11 (26.8)	30 (73.2)
	No	307 (72.4)	117 (27.6)
Somebody to help with your responsibilities	Yes	136 (58.1)	98 (41.9)
	No	182 (78.8)	49 (21.2)
Family and friends supportive of your exercise	Yes	221 (61.7)	137 (38.3)
	No	97 (90.7)	10 (9.3)
Do you think you would be more active if family and friends participated with you	Yes	132 (55.5)	106 (44.5)
	No	186 (81.9)	41 (18.1)
Do you have full information regarding benefits of exercise	Yes	37 (48.1)	40 (51.9)
	No	281 (72.4)	107 (27.6)

Do you think you would be more active if you had more info	Yes	114 (60)	96 (40)
	No	174 (77.3)	51 (22.7)
Did you get any health messages regarding physical activity from your health care provider or any mass media	Yes	131 (51.4)	124 (48.6)
	No	187 (89)	23 (11)
Do you think exercise is good for health	Yes	315 (68.5)	145 (31.5)
	No	3 (60)	2 (40)
Self efficacy		0.4±3.69	47.1±24.15
Fitness motivation		0.12±0.84	6.24±1.441
Interest motivation		0.04±0.41	2.57±2.21
competence motivation		0.02±0.14	1.86±1.51
Appearance motivation		0.03±0.311	3.24±2.32
Social motivation		0.03±0.17	1.95±1.75

4.3. Path analysis using Structural Equation Modeling

Variables in Structural Equation Analysis

We analyzed the hypotheses: 1) direct effects for leisure time physical activity; 2) a mediated model for physical activity 3) a moderated model for physical activity. Separate models were developed for male and female.

First, the direct effects for physical activity consisted of environmental support (emotional support, instrumental support from family and friends, physical environment availability and accessibility) , social motives and body-related motivation and self-efficacy, The mediating model consisted of social motives; body-related motivation and self-efficacy mediating the relationships between environmental support and physical activity (see Figure4.3.1). This model was found most similar to the conceptual framework. Pearson-r correlations were conducted to determine whether the relationships between the variables were consistent with the theoretical predictions. A table of all means and standard deviations can be found in Appendix1 (Table A1.10). Tables for correlations among the variables for the entire sample and for both men and women separately can be found in Appendix1 (Table A1.8-10).

4.3.1. Direct effects for physical activity –Full Sample

The initial structural model resulted in adequate model fit ($\chi 2/=98.5$, df =3, p <0.001, GFI = 0.938, CFI = 0.947, RMSEA = 0.260 [90% CI = 0.222, 0.312, PCLOSE = 0.004]). The model explained 80% of the variance in leisure time physical activity. The direct pathway from intrapersonal factors was significant predictors for physical activity. Higher levels of self efficacy, social motives and

body-related motivations yielded higher levels of physical activity (β =0.362, 0.225, 0.307, C.R. 8.76, 7.29, 6.71 p <0.001). Environmental support factors were also significantly related to leisure time physical activity levels (β =0.088, C.R. 2.34, p <0.05).

4.3.2. Direct effects for physical activity –Males

The structural model for the direct effects of the variables on total physical activity for males resulted in adequate model fit ($\chi 2$ = 96.93, df =6, p <.001, GFI = 0.945, CFI = 0.955, RMSEA = 0.173[95% CI = 0.142, 0.207, PCLOSE = 0.000]). The model explained 74 % of the variance of leisure time physical activity for males. The direct pathways from intrapersonal factors of self efficacy and motivation for social reasons and body-related were significant. Higher levels of intrapersonal factors indicated higher levels of physical activity (β =0 .411, 0.233, 0.242 C.R. = 6.34, 4.89, 3.50, p <.001). Environmental factors were not significantly related with leisure time physical activity.

4.3.3. Direct effects for physical activity – Females.

The model explained 77% of the variance of physical activity in females

Intrapersonal factors were significantly related to levels of physical activity. Higher levels of intrapersonal factors like self efficacy, social motives and body-related motivation indicated higher levels of physical activity (β = 0.222, 0.108, 0.242 C.R. = 4.33, 2.55, 8.66, p <.05). Environmental factors were not significantly related with leisure time physical activity.

Direct effects models have been presented in Appendix 1 (Figures A 1.1-A1.3)

4.3.4. Mediation Pathways for Physical Activity – Full Sample

For the full sample, intrapersonal factors mediated the relationships between environmental factors to levels of physical activity and represented an adequate fit for the data ($\chi 2$= 75.33, *df* =1, *p*=0.000, GFI=0.942, CFI=0.956, RMSEA=0.406[95%CI=0.332, 0.48, PCLOSE=0.000]. The two-tailed significance bias corrected p-values for the indirect effects are as follows: environmental factors, *p* = 0.018; body related motivation, *p* = 0.004; self efficacy (*p=0*.018), social motives (*p=0*.015) Direct pathways for environmental support factors (p=*0*.005), and body related motivation (*p*=0.020), social motives (*p=0*.017) and self efficacy (*p* =0.004) to levels of physical activity are also significant in the model. The model explains 72% of the variance for physical activity in this sample. The final model with standardized regression coefficients and critical ratios for the significant and non- significant pathways is shown in Figure 4.3.1.

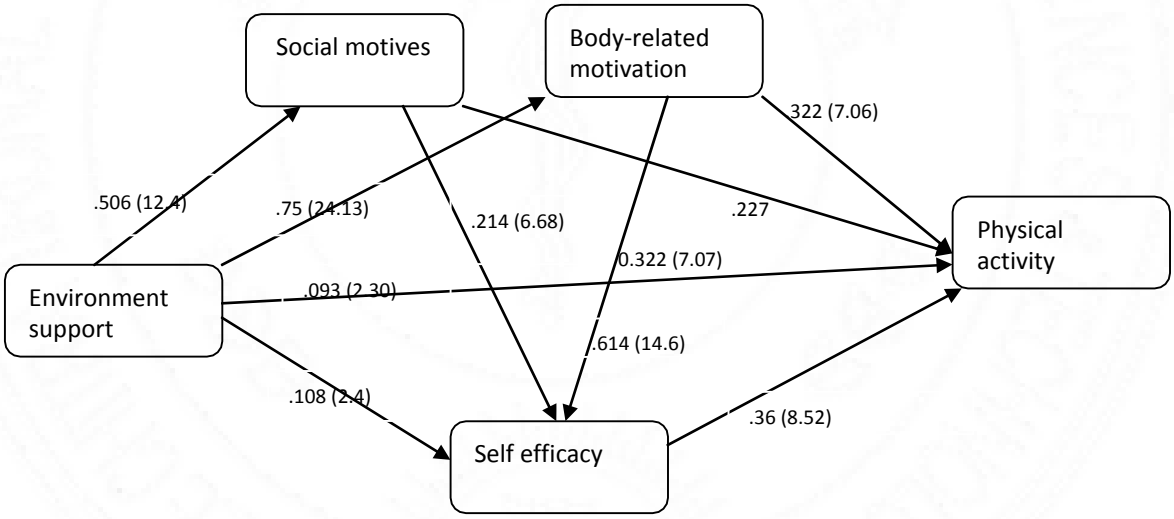


Figure 4.3.1.Indirect effects– Full Sample.

Note. Solid lines represent significant paths ($p < 0.05$). The standardized regression coefficients are reported with critical ratio values in parentheses. Correlation paths between the variables and error terms have been omitted from the figure. The direct (unmediated) effect of social support on physical

activity is significantly different from zero at the 0.01 level (p=.005 two-tailed). This is a bootstrap approximation obtained by constructing two-sided bias- corrected confidence intervals

4.3.5. Mediation Pathways for Physical Activity—males

For males, intrapersonal factors mediated the relationships between environmental factors to levels of physical activity and represented adequate fit for the data ($\chi 2$=128.06, *df* =4, *p*=0.000, GFI=0.912, CFI=0.928, RMSEA = 0.263[90% CI = 0.225, 0.303, PCLOSE=0.000]). The two-tailed significance bias corrected p-values for the indirect effects are as follows: environmental factors, *p* = 0.019; body-related motivation *p= 0*.012, motivation for social motives reasons, *p=0*.005. The direct pathway for intrapersonal factors, self-efficacy *p=0*.012, social motives motivation *p=0*.036, body-related motivation *p=0*.015 for physical activity were significant. The direct pathway for environmental support factors on physical activity was not significant.

The model explains 71% of the variance for leisure time physical activity in this sample. The final model with standardized regression coefficients and critical ratios for the significant and non-significant pathways is shown in Figure 4.3.2.

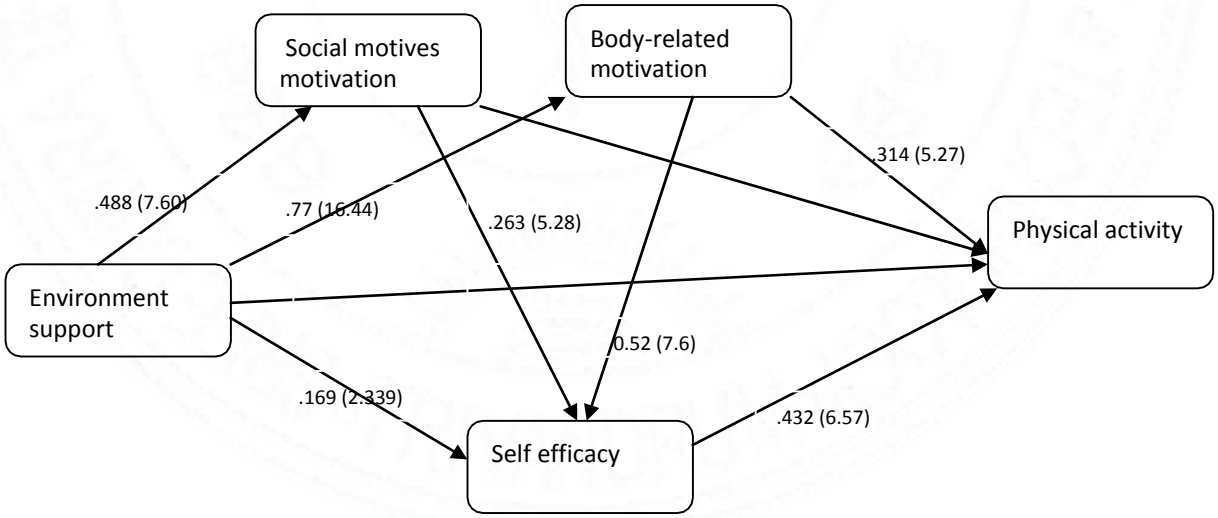


Figure 4.3.2: Indirect effects– Males. Solid lines represent significant paths (p<0.05).

Note. Dashed lines are insignificant paths. The standardized regression coefficients are reported with critical ratio values in parentheses. Correlation paths between the variables and error terms have been omitted from the figure.

4.3.6. Mediation Pathways for Physical Activity—females

The two-tailed significance bias corrected p-values for the indirect effects are as follows: environmental factors, p =0.009, motivation for appearance=0.05 to physical activity. Indirect pathways for self efficacy and social motives motivation were not significant.

Direct pathways for environmental factors and social motives motivation to levels of physical activity were not significant in the model. The direct pathway for intrapersonal factors self efficacy *p=0*.045 and body-related motivation *p=0*.012 for physical activity were also significant.

The model explains 74% of the variance for leisure time physical activity among females in this sample. The final model with standardized regression coefficients and critical ratios for the significant and non-significant pathways is shown in Figure 4.3.3.

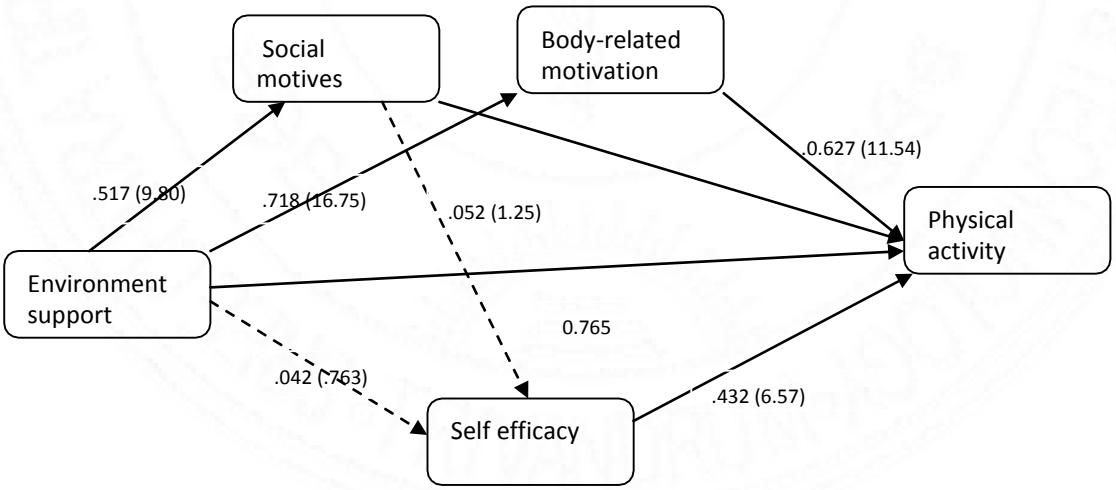


Figure 4.3.3: Indirect effects–Females. Solid lines represent significant paths (p<0.05).

Note. Dashed lines are insignificant paths. The standardized regression coefficients are reported with critical ratio values in parentheses. Correlation paths between the variables and error terms have been omitted from the figure.

4.3.7. Moderation effects

The hypotheses of the role of environmental support factors as moderators of the effects between intrapersonal factors and physical activity were tested. The environmental support factor strengthened the positive relation between social motives motivation and physical activity levels (p<.001).There was a significant moderation effect of environmental support on social motives motivation and physical activity among males (*p=0*.003).There was no such significant moderation effect among females.

Table 4.3.1 Model fit indices relating to the path models

Model	CMIN/DF	GFI	CFI	RMSEA
Direct group	14.48	0.945	0.955	0.173
Direct full	32.85	0.938	0.947	0.266
Indirect group	32.01	0.912	0.928	0.263
Indirect full	40.67	0.937	0.953	0.290

CMIN/DF- relative/normed chisq. Assess overall fit and the discrepancy between the sample and fitted covariance matrices<0.5

GFI is the proportion of variance accounted for by the estimated population covariance. Analogous to R2. AGFI favors parsimony GFI ≥ 0.95 AGFI ≥0.90

CFI Comparative Fit Index Compares the fit of a target model to the fit of an independent, or null, model. CFI ≥.90

RMSEA Root Mean Square Error of Approximation. A non centrality-based index. Values closer to 0 represent a good fit.

4.4. Secondary analysis of an intervention trial (KDPP)

The mean age of the study participants in the intervention group was 46 years (SD=7.5) and 46 years (SD= 7.4) in the control group.

Table 4.4.1 General characteristics of the study participants at baseline

Characteristic	Category	N (%)
Sex	Male	475 (47.1)
	Female	532 (52.8)
Religion	Christian	365 (36.2)
	Muslim	46 (4.6)
	Hindu	596 (59.2)
Marital status	Married	958 (95)
	Separated	6 (0.6)
	Divorced	4 (0.4)
	Widowed	28 (2.8)
	Single	11 (1.1)
Education categories	Up to primary	253 (25.1)
	Middle school	272 (27.0)
	Secondary	237 (23.5)
	Higher secondary	85 (8.4)
	Vocational education	59 (5.9)
	College or above	101 (10.0)

Occupation categories	Skilled/unskilled labor	728 (72.2)
	Homemaker	268 (26.6)
	Unemployed/retired	11 (1.1)
Age category (completed years)	30-45years	488 (48.4)
	46-60years	519 (51.5)
Monthly expenditure Rs/pm	<5000	175 (17.4)
	5000-10, 000	699 (69.3)
	>10, 000	133 (13.2)
PA levels	Low	56 (5.6)
	Moderate	167 (16.6)
	High	784 (77.9)
	Total	1008 (100)

Table 4.4.2 Change in the proportion of physical activity over the study period (24 months)

Time point	PA category	Control arm N=482	Intervention arm N=482	*P* value *
Baseline	Low	35 (7.3)	18 (4)	0.032
	Moderate	72 (15)	91 (19)	
	High	375 (78)	373 (77)	
12 months	Low	24 (5)	12 (2.5)	0.07
	Moderate	79 (16.4)	81 (17)	
	High	378 (78.4)	384 (79)	
24 months	Low	17 (3.5)	15 (3.1)	0.10
	Moderate	75 (15.6)	101 (21)	
	High	390 (81)	366 (76)	

*Chi square *p value* comparing the proportion between intervention and control group. Adults who expend more than or equal to 0-600MET min/week are termed as ‑low‖, 600-1500 MET min/week are termed as moderate and >1500 MET min/week are termed as high.

The mean physical activity levels of intervention and control group showed no significant differences at baseline (*p=0.319*). Similarly, the proportion of participants engaged in low physical activity declined to 5% in the control group

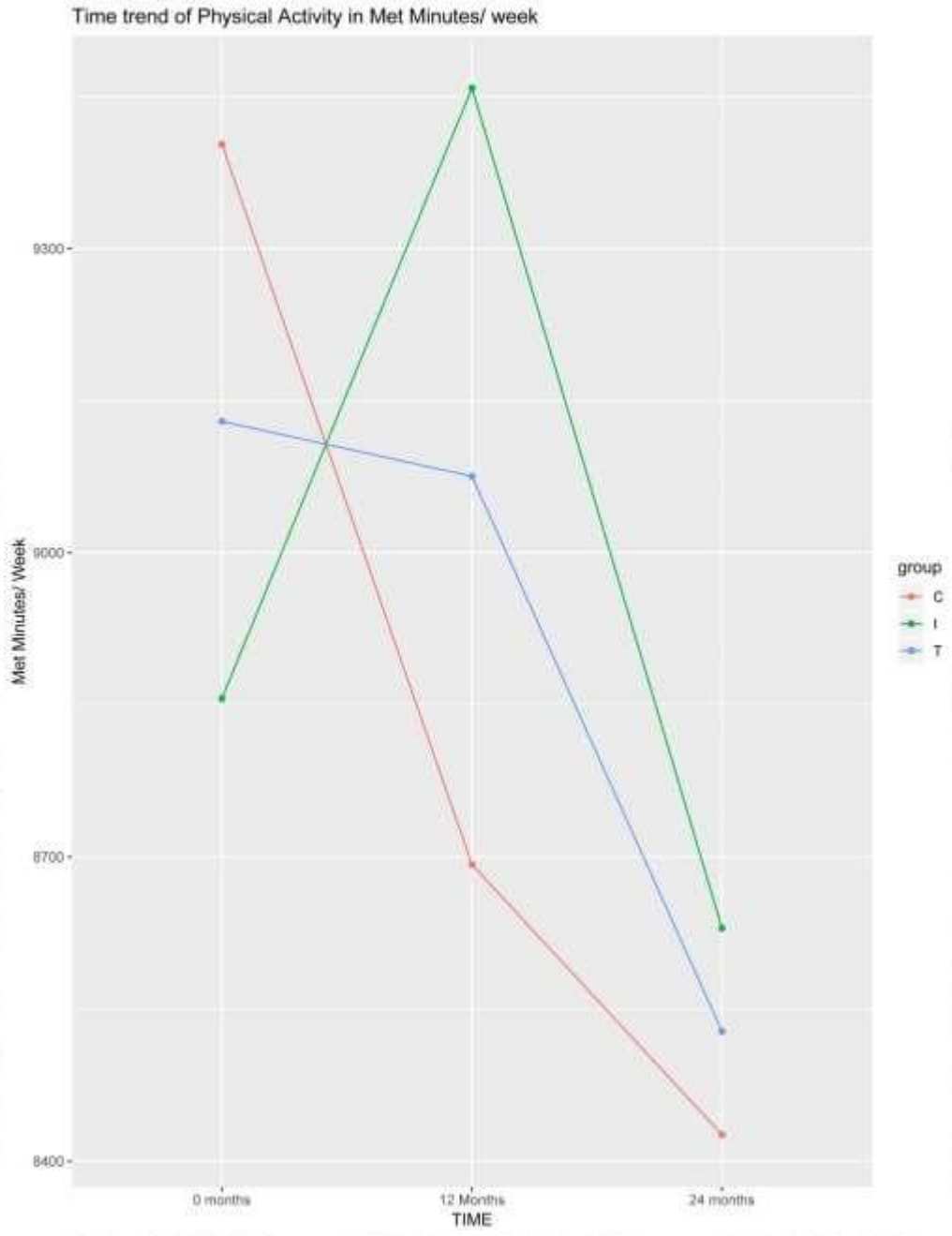
which was double the proportion of such adults in the intervention group (2.5%) but the difference was not significant after 12 months. The proportion declined further after 24 months in the control arm (3.5%); however there was a slight increase in the proportion of low activity individuals in the intervention arm (3%). Mantel-Hanszael Chi square test was utilized to verify for trends in the proportion of low active participants. The results showed that there was no significant trend.

Table 4.4.3 Trends in proportion of participants having low activity levels at baseline, 12 and 24 months

Group	Baseline (%)	12 months (%)	24 months (%)	Chi sq	*P* value
Control	7.3	5	3.5	0.03	0.85
Intervention	4	2.5	3.1		

Repeated measures ANOVA was used to test the difference in mean physical activity levels over the intervention period. Mauchly's test indicated that assumptions of sphericity had been violated Chi sq (2) =54.6, therefore degrees of freedom were corrected using Huynh-Feldt estimates of sphericity (Ɛ=0.95) The results show that there was no significant effect of intervention at 12 and 24 months of follow up on physical activity levels F (1.89, 1828.7) =1.982, p=0.141. An interaction between intervention group and follow-up time points was tested to

check whether time was a factor in influencing the intervention but the interaction was found to be insignificant ($p=0.146$) (Figure4.4.1).



C-control group I-intervention group T-Total

Figure 4.4.1: Mean physical activity of intervention and control groups at baseline and follow-up

4.5. Feasibility of telephone interviews as a tool for data collection

A sample of 50 participants was used for these interviews. A total of 31 telephone numbers responded, (8 were nonexistent, 2 were non residential, and no response was found from 7 numbers, 2 respondents did not consent for the survey). The response rate of telephone surveys (62%) was much less than the face-to-face surveys (100 %). Of the 50 subjects who consented to participate in the telephone survey, 3 expressed dissatisfaction by interrupting with questions like –How many more questions?‖ and –Why do you need the responses again?‖ Responses of the remaining 30 were complete.. All subjects who consented completed the survey. The length of time taken for each questionnaire was 5-10 minutes in the telephone survey compared to face-to-face survey (25-45minutes). All 50 adults who had verified phone numbers during the personal interviews. The survey results are given in Tables 4.5.1 and 4.5.2. The physical activity levels in various domains were similar in both the survey methods (Table 4.3.1).

Table 4.5.1.Respondent characteristics

	Personal interviews N=50	Telephone interviews N=31
Male: Female ratio	0.814	0.923
Mean age (range)	44 (20-62)	46 (20-62)
Proportion of graduates and post graduates	40%	41.3%
married	84%	86%
Urban	56%	54%

Table 4.5.2 Physical activity levels compared by two modes of data collection.

Variable	Mean±SD. personal interview	Mean±SD. telephone interview	t-value	p-value	correlations
Sitting hours per day	233.5±138.6	256±140.1	0.940	0.356	0.587
Walking minutes per week	70.71±118	64.29±105.2	1.38	0.179	0.982
Transport PA minutes per week	90.56±109.1	88.33±109.2	1.18	0.247	0.996
TPA-METs per week	353.3±437.1	313.7±412.5	1.68	0.104	0.994
LTPA METs per week	248.57±442.3	171.43±83.5	1.36	0.184	0.961

Note. All correlations are significant ($p < .000$).

5. DISCUSSION

The chapter has been divided into various sections devoted to each part of the study. Each section demands a separate discussion. The overall key results and comparisons have been summarized .Then, strengths and weaknesses of this research, future directions for research in this area have been discussed.

Summary of findings

On the whole, the analysis shows that leisure time physical activity of adults under study is low: it could be improved through different levels of interventions. This low status is aggravated by factors like low self efficacy and motivation. This study also strengthens the evidence on socioeconomic disparity in physical activity distribution among adults. Another key finding was lack of awareness among participants regarding benefits of physical activity. This could be explained by two reasons: one is the actual neglect of physical activity advice in health communication via health professionals or popular media; the other is disregard of such information by individuals. This may be due to attitudes and long standing cultural beliefs. Perceptions regarding own physical activity levels as enough for health is a major barrier in achieving recommended activity levels for a majority of population. A further novel finding is the different motivations for exercising among men and women. Women were motivated by waning body image and want to lose weight whereas men are motivated by health and fitness. This study also strengthens the evidence on role of extrinsic motivation to promote physical activity in sedentary populations. Research has shown that health behaviour are multifaceted, influenced by cultural and social factors, in addition to intrapersonal and interpersonal factors (Sallis & Glanz, 2009).The current results provide an in-depth evaluation of determinants of physical inactivity among adults of Kerala. This population segment represents a particularly important study target given its elevated risk of having chronic diseases. The inclusion of study variables representing different domains (e.g., socio-demographic, health related, psychosocial, and environmental) , along with the fact that significant correlates emerged from virtually all of these domains, underlines the significance ecological models in expanding our knowledge of influences on physical inactivity in adult men and women.

5.1 Determinants of physical activity

.

The qualitative study among adults in Kottayam explored potential barriers and motivators to leisure time physical activity. First, social and gender norms seemed to restrict women from participating in physical activity. Time as a barrier has been recounted several times in the past and needs to be explored in future studies as people tend to forget the amount of time spent in front of the screen (watching sports, social medial, virtual games, watching other kinds of visual media) which could be effectively used for community sports or family leisure time physical activity. It also needs to be examined whether time consumption varies by age, sex and socioeconomic background. Also time spent in travelling to and from workplaces is a major concern for people citing time as a major barrier. Cultural norms associated with disease like taking rest rather than exercising may impede uptake of physical activity by people living with chronic disease especially older groups.Further, role of a physician as a prescriber of pills also hinders health workers from encouraging physical activity among patients. Some of the motivators like body image and health were similar to general populations elsewhere in the world, (Alvarado et al., 2015; Caperchione et al., 2015). Diagnosis of disease and advice by a physician were major motivators which meant that there is a need for increasing awareness among masses and health professionals about the adequacy of physical activity in primary as well as secondary prevention. This could be a challenge as health professionals are trained and oriented more for treatment rather than preventive care (Banu et al., 2014; Morrato et al., 2006; Peek et al., 2008). Some of the barriers identified like roles and responsibilities, attitude, lack of social support and cost of recreational facilities are also similar to the findings in studies done in other populations (Alvarado et al., 2015; Daniel Manju and Wilbur JoEllen, 2011; Jepson et al., 2012; Thankappan et al., 2015). Built environment also came out as a major barrier as most of the facilities like parks and playgrounds were not accessible or not well managed. Rain, traffic, and stray dogs led people to walk early in the morning. The study demonstrated a survey of 466 adults, (mean age =44.13±12.15) where 198(43%) were males and 268(57%) were females. Among the subjects, 199(43%) were educated up to secondary level and 32(7%) had post graduate degrees. Of all respondents, 63(14%) were employed in manual labor and 114(24%) were doing sedentary jobs. A total of 131(28%) participants owned no

vehicle, 4(1%) people owned bicycle and the rest owned some kind of motorized vehicle.On an average both males and females reported engaging in the recommended amounts of physical activity. Total activity (average time spent doing an activity in all domains-leisure, work and transport) minutes per week were 1282 minutes (more than forty hours per week). The prevalence of inactivity in each domain was: leisure (80%), work (34%), and transport (73%). The results are similar to various studies from the country (AMCHSS Research Team, 2018; Anjana et al., 2014) Thankappan et al., 2015).Work domain explained most of the activity among adults. Physical activity levels differed by gender in the work and leisure time domains. It is likely that many of the participants engaged in manual labour, are engaging in physical activity as part of their job responsibilities (e.g. labourer, cleaner, construction etc.); household chores formed a major part of PA in women. Similar findings have been reported in a study in Kerala, especially in middle aged women (Thankappan et al., 2015). Adults who owned a motorized vehicle (two, three or four wheeler) were less active in the transport domain. Car ownership was related with rising rates of sedentariness and obesity (Douglas et al., 2011). Leisure time physical activity showed familiar patterns with men reporting more moderate to vigorous physical activity than women (Lian et al., 2016; Teh et al., 2014). Gender differences were one of the most consistent findings in the literature. Promoting physical activity among women appears to be a specific challenge. One possible reason for the gender difference could be the socialization of boys and girls at a young age to believe that physically challenging activities are male-oriented, such as contact sports (Biddle and Mutrie, 2001).

The current study also found significant association between household income, leisure time PA and occupational PA—strengthening the evidence on socioeconomic inequities in PA behavior. This might be a result of differences in our knowledge about various health outcomes of physical activity or the economic cost associated with leisure-time PA, such as membership fees for various facilities or cost of such equipment to practice at home (Beenackers et al., 2012;Uijtdewilligen et al., 2011)

Among the psychological correlates of exercise that have been examined, exercise self-efficacy has emerged as the strongest and most consistent predictor of exercise behavior. Overall, the sample had very low self-efficacy levels for physical activity (M=15, SD=25.7). It was expected that self efficacy will emerge as an important predictor for physical activity (Dlugonski and Motl, 2014). Review of correlates of

physical activity in adults demonstrated that the people most likely to engage regularly in exercise are more likely to show high self efficacy and self-motivation. (Dishman et al., 2009)

Self efficacy presents trends in the predicted direction with men and rural participants, reporting higher self efficacy than women and urban residents respectively(Kim et al.,2018) Adults less than 45 years of age reported higher self efficacy than adults over 45 years old. Literature suggests that self-efficacy for exercise declines with age. Older participants have been found to be less competent in overcoming emotional and physical barriers to exercise (Anderson-Bill et al., 2011; Langan and Marotta, 2000).

Motivation levels were also low in the study population. There were gender and age differences in motives for participation in physical activity. Men participated with motives of interest, competence and fitness, whereas women participated in exercise with more appearance related motives. Younger adults (18-44 years) participated in physical activity with motives of fun, interest and social relations; however adults 45-65 years old participated with reasons related to health and fitness. Studies have demonstrated similar patterns (Jepson et al., 2012). It is quite reasonable to understand that younger adults who were either attending college or newly joined jobs or had small children would enjoy sports or any physical activity for fun and interest and meeting peers more than their older counterparts (Huffman and Szafron, 2017). With advances in age, daily physical activity diminishes and is hardly substituted with activity in other domains. With rising burden of chronic diseases in Kerala, external motives of health and fitness might play an important role when habitual activity starts declining.Regarding physical environment determinants, rural participants perceived their neighborhoods as safe and pleasant to walk. In urban areas, traffic and stray animals prevented people from walking in the neighbourhood. Urban areas had more facilities to exercise nearby than rural areas such as sports stadia, railway stations and new highways with footpaths, school grounds which people could access to walk or exercise. Since traffic is lesser in rural areas, people find it convenient to take a walk around their neighbourhoods. Few studies have tried to estimate rural-urban differences in physical environment perception. Urban settings in countries like India witness heavy traffic, congested roads and lack of green spaces, these conditions discourage active travel (World Health Organization, 2013; Adlakha et al., 2016; Solanki etal. 2016). Developing

countries face the dual dilemma of development versus sustainability as more green spaces are making way for housing and infrastructure to accommodate the growing population, thus limiting places for leisure PA especially for socioeconomically disadvantaged (Adlakha et al., 2017) .Men and women perceived their physical environment differently. Female participants found traffic and stray animals as barriers to their physical activity. This has been cited as one of the reasons for increasing prevalence of inactivity among women since 2006 (Thankappan et al., 2015). Neighbourhood safety is an important aspect of physical environment studies. Men perceived the availability and accessibility of facilities more positively than women. A similar study in India has reported access to facilities as a significant correlate of activity (Thankappan et al., 2015).

Support from friends and family and sharing of responsibilities was significantly associated with gender. Men felt that instrumental support, say for example, somebody to share their responsibilities while they go for exercise as important whereas women found that emotional support from family and friends was more important. (Brownson et al., 2000; King et al., 2000; Mathews, Lakshmi, et al., 2016) . Support from family and friends has also been reported to overcome individual and normative barriers especially for women (Thankappan et al., 2015).

More women and rural participants felt that their daily activity was enough for health benefits. Women in a similar study perceived their activity levels as enough for health benefits (Mathews, Salvo, et al., 2016). Another study confirmed the gender differences in perception of daily activity intensity (Vaz and Bharathi, 2004). Mathews et al have estimated that people overestimation their physical activity levels by at least 20% in an accelerometer-validated study. This is a major barrier in achieving the recommended levels of physical activity. Addressing such misconceptions through health communication could help people improve their physical activity.

Observing others engage in walking or other leisure time activity was more common in urban areas. Simply observing others being active in the local neighbourhood was associated with more leisure-time physical activity and walking for leisure among women (Eyler et al., 1999). This might be due to change in perceptions and normative expectations subsequently, persuading other people to follow. Future interventions, thus, might target cultural attitudes and norms regarding the value and benefits of exercise.

For leisure time physical activity, participation in the active group was predicted by fitness motivation, self efficacy, friend and family support and being married. In previous studies, being married was associated with physical activity among women as married women who have children bear more childcare and household responsibilities compared to single or divorced women (Hawkins et al., 2009; Pettee et al., 2006; Teh et al., 2014) .

5.2. Gender disparities in pathways affecting leisure time physical activity

I attempted path modeling using series of multiple regressions in order to prove the hypothesized relationship among the different levels of influences on physical activity. I first attempted to test the direct relationships between intrapersonal variables, environmental supports and physical activity. I then attempted to verify these pathways separately for men and women. I tested mediation and moderation effects among these variables. The models help to unravel the interaction and the mediating processes of these variables on physical activity. The significance of these indirect pathways was verified by the secondary data analysis later.

Self efficacy showed the strongest relationship with physical activity($r=0.788$, $p<.001$), followed by body related motives, environmental support and social motives. When comparing the physical activity models between men and women, it was found that the intrapersonal factors--self efficacy and motivation were associated with physical activity however environmental support did not affect physical activity in either men or women. Among men, self efficacy and motivation partially mediated the relationship between environmental support and physical activity. Among women, only body-related motivation mediated the relation between environmental support and physical activity. Body-related motivation was a strong correlate for self efficacy in this model. No previous research has reported on gender differences in mediation pathways. Studies conducted among women populations suggest that self efficacy moderated or mediated the relationship between environmental support and physical activity (Dishman et al., 2009; Rovniak et al., 2002). Self-efficacy is believed to play a dynamic role; with each

stage of adoption, maintenance and relapse by acting as a mediator, moderator or predictor (Schwarzer, 2008). It is notable for intervention purposes since adherence and compliance interventions have emphasized the role of improving self efficacy to improve the physical activity levels (Gizaw et al., 2017; McAuley et al., 2003; McNeill et al., 2006). Environmental support was also associated with extrinsic motives of health, appearance and social interaction. Engaging in activity for health as well as social reasons has been found to be the main motivators in other studies (McNeill et al., 2006). We also found extrinsic motivation as an important factor of self-efficacy. Health care professional advice to engage in physical activity was the single most motivator for most individuals (Garg and Kutty, 2019) Advice from health professionals and other rewards may increase one‘s confidence in the ability to be physically active and encourage people to initiate physical activity(C Frederick and Ryan, 1993). The environmental support factor strengthened the positive relation between social motives and physical activity levels. This effect was significant only among males. At least one study has reported self efficacy as a moderator between social support and physical activity among females (Dishman et al., 2009). It implies that environmental support could encourage individuals by providing opportunities to be active.

Environmental support factors predicted physical activity indirectly through its effect on self efficacy and motivation. Our main argument was that environmental factors cannot work in isolation i.e., building parks, walking trails and providing social support, is not simply enough. Therefore, a mediated model which emphasizes on individual level factors like self efficacy and motivation would be an adequate model for this population for future interventions keeping in mind the insignificant direct effect of social and physical environment. The pathways seem to be different for men and women and this should be considered for future implications. Social and cultural environment which was a novel factor explored in this study might act in the similar fashion. It is significant to determine the social norms and cultural issues in developing countries as the communities are closely knit and work through these norms. Unless these norms are studied and reasons for bias against physical activity as a leisure time pursuit are explored, it is very difficult to change the lifestyles of certain disadvantaged groups like women, older people and low socioeconomic groups (Eyler et al., 1999)

5.3. Determinants of participation in physical activity in a supervised programme and study critical interactions which cause variations in effect size across groups.

The study was a community intervention trial undertaken with the objective of introducing lifestyle intervention in a high risk group in the study population. The intervention employed peer support based on the needs assessment study done prior to the implementation which emphasized on the more social aspects of lifestyle adoption. The intervention focused on empowering the community leaders, citizens, organizations, volunteers and other resources, and supporting their role in creating social norms; and planning and developing local environments that would enable more healthy lifestyles.

At twelve months, there was a marginal difference in the physical activity levels

The main theory underpinning the intervention program was the Health Action Process Approach model. The model involves both mediator and a continuum model (Sathish et al., 2013). However the impetus on social support for intervention was a direct one and did not consider role of environment and psychosocial factors. The analysis of the quantitative survey in section 2 is significant as it implies use of mediator and moderator models and considering gender differences in such interventions. This also suggests that ecological models focusing on multiple levels could be more fruitful in context specific intervention

5.4.. Feasibility of telephone interviews as a method for data collection

With the advent of mobile phones, the tele-density in India (combined urban and rural) has increased from 8.6% in 2004 to 86.25% at the end of October 2016 .The improving tele-density allows the option for using telephones as a survey instrument. Lack of studies in India exploring different methods in research devoid us of the capacity to compare the results with any other study. The data collected via two modes was not statistically significantly different. Compared to the original sample, there was an under representation of women in the telephone mode sample. A study in Puducherry (response rate=94%) found that telephone surveys are feasible for less sensitive topics in the Indian scenario and it is a time-saving, useful tool in a population with good telephone coverage (Thulasingam and Cheriyath, 2008). Few studies exploring the feasibility of using telephone for following up

patients treated for chronic illnesses like cancers, stroke and neurological ailments, found the mode effective and acceptable in the Indian scenario. The two interviews in the present study were conducted six months apart so there is least possibility of bias. Also, daily living physical activity is same for people involved in jobs like homemaking, office work, people employed in regular jobs throughout the week, however it might not be same throughout the year for people involved in seasonal jobs or jobs that are relate to yearly breaks like schools and colleges. It might lead to change in responses if the surveys are conducted at different time of the year.
. Another reason for the success of telephone interviews in this study seems to be the personal interviews conducted prior to telephone interviews. We did not have a sampling frame of telephone numbers as discussed earlier and so this limitation might dissuade rigorous research using this mode. But it can definitely be a possibility for places with single company operations. Network coverage was a great concern for us in rural areas and also due to unpredictable weather. This could have introduced a selection bias.

5.5. Study Limitations and Strengths

Several study limitations warrant consideration. One weakness was that the sample for the survey was taken from predominantly two rural and two urban communities located in Kottayam. It is possible the relationships examined do not apply or fit to other cultures or regions in the state or across the country. It is also plausible that environmental and family supports would be different in different settings (considering the hilly terrain of Kottayam district). Second, the explanatory model proposed in this study is only one of many potential models explaining physical activity. Also, this study was cross-sectional. Causality was only hypothesized and we cannot warrant the temporality of these pathways. We assessed only few variables that are of interest in the local context. An additional issue with such study designs is model misspecification, due to added or omitted variables. The current study used self-reports for data collection. This introduces social desirability and recall biases (Welk, 2002) Self-reports are flexible for use in diverse populations can include many variables at the same time however other methods like motion sensors and pedometers were cost-prohibitive and culturally inappropriate for the study (Mathews, Salvo, et al., 2016) .

As mentioned previously, measuring levels of physical activity is difficult and involves issues of validity and feasibility as, there are a variety of ways to measure physical activity such as personal diaries, logs, questionnaires etc (Welk, 2002) ..

The questionnaire used for the current study was a modified, validated, adapted for the local situations and expanded on the various domains of activities to make it more understandable for the participants. The question on physical activity used in this study asked participants if they participated in a particular set of different physical activities. Strength of this research was its proposed conceptual model using an advanced statistical technique. Structural equation modeling is based on a confirmatory approach which test multiple regressions and determines whether the proposed framework fit the data (Byrne, 2009). The analysis helped in recognizing the dynamic influences of adult physical activity better than correlational methods. Underlining the ecological theory, physical activity is influenced by intrapersonal attributes, physical and social environment. In this research, social cognitive variable such as self-efficacy was important (direct and indirect effects) for predicting physical activity, ecological variables like social and environmental support were important for predicting physical activity. This study was an attempt to establish how the variables may directly or indirectly influence levels of physical activity. In addition, most physical activity models are tested in predominantly high income and white populations; low and middle income countries tend to be underrepresented in population-based studies of physical activity

5.6. Future Directions

This study presents a strong case for continued efforts to undertake rigorous research in this area. With increasing mechanization and urbanization in developing nations populations are going to become more sedentary in their lifestyles in near future and demography and epidemiological transitions will set in. This will call for strategic interventions in the area of chronic diseases and lifestyle modification. Although the population in this study was fairly active, sedentary levels were also high. Research should undertake self reports and then validate with objective methods in a small sample. It is also important to note that some of the factors reported were just perceptions and there could be an error in information. The developed nations after years of substantive research, have moved the focus from physical activity levels of whole populations to occupation time sitting and interventions targeting such sedentary populations, it s time for us to take the cues and build our research in a direction that provides locally effective solutions. We should find our own priorities through well designed studies and evidence built on rigorous research. Physical activity in conjunction with sedentary behavior should be the focus of future research, it is possible to look at the various configurations of the two behaviors together and try to determine how the influencing factors may differ between the groups. Specifically related to these findings, as new research emerges on effect of paternal metabolism on offspring metabolism, studies exploring the effect in parent child dyads could be investigated. Although studies have only used parental and social modeling of behavior as variable of interest, future studies could investigate the status of disease in off springs as potential outcome of interest. Related to influencing social norms, mass media communication is a potential area of research. Health promotion campaigns should be evaluated in terms of their content and impact in terms of increasing awareness levels or actually transforming intentions into action.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

This study titled "Determinants of physical activity among adults in Kottayam district of Kerala, India" attempted through a series of steps to examine the determinants of physical activity in an adult population using a socio ecological approach.

- Explore various factors affecting physical activity, facilitators, barriers to leisure time physical activity in adults in the community through focus group discussions
- Assessing the intrapersonal and environmental determinants of physical activity among adults through a cross sectional study.

- Identifying the mediating and moderating pathways for influence of various variables on physical activity.
- Comparing the findings of a community trial to improve social support with the cross sectional study
- To test the feasibility of using telephone mode for data collection in the Indian scenario

The methodology involved both quantitative as well as qualitative techniques. The focus group discussions, key informant interviews were the qualitative techniques used. Quantitative techniques used were the cross sectional survey, secondary data analysis, and telephone interviews. These methods helped in informing and validating the findings. The qualitative exercise brought out some broad areas of determinants like different motivations for exercise among men and women and importance of extrinsic motivators like health and fitness. These found support in the quantitative survey where we found that self efficacy and extrinsic motivation were

principal correlates of physical activity. The pathway analysis revealed that the mediated pathway would be an adequate model for improving physical activity among adults corroborated by the secondary data analysis exercise which demonstrated insignificant direct effect of social support on physical activity among participants.

The factors determining physical activity were studied among adults in the age group of 18-65 years by using a stratified two- stage cluster random sample. All the data was collected by the researcher herself from April to March 2019. The analysis presents differences in the physical activity levels in various domains by gender and different economic backgrounds.

The study found support for the inequity in distribution of leisure time physical activity in this population. It seems that low economic status means more manual labor and as economic status improves, manual labor declines in occupational setting and people take up physical activity in recreation time. The current approach on chronic disease prevention and control in developing countries is to target high risk group for interventions which reinforces the curative rather than preventive approach. Bearing in mind the colossal burden of chronic diseases in these countries primordial prevention should be the way to go.

Physical activity is influenced not only by health promotion approaches but also by development in other sectors like transport, food, education and work place policies. Unless orientation of the health policies changes and becomes intersectoral, physical activity will remain a neglected potential.

The analysis of physical activity levels on the basis of the important socio-demographic variables also showed that there are gender differences in how these factors affect physical activity adoption and maintenance. This directs to a fundamental issue in the society that physical activity is not a main concern or not desirable. Likely, the best place to start changing such attitudes would be among children and youth. In combination with assuring that adults in Kerala who want to exercise have access to appropriate means to do so, it is imperative to deal with more fundamental issues like social and cultural norms that are apparent in this data.

The major argument of this thesis relates to locating correlates of physical activity at various levels-intrapersonal, social and physical environment levels and the pathways in which they influence physical activity. Both environmental and individual factors influence leisure time physical activity significantly, however the former act through intrapersonal variables- self efficacy and motivation. It is quite apparent through the data that multiple level approaches will be required to bring in significant changes. Environmental factors will only complement the influence of other intrapersonal attributes.

Secondary data analysis exercise showed that social support strategies targeting high risk groups could also fail to provide significant changes in the behavior of populations. This again emphasizes the significance of the proposed theoretical model from this study, which affirms the importance of indirect influence of various influences on physical activity. Interventions aimed at improving lifestyle Modifications imported directly from developed countries need to consider other interventions like tobacco cessation, infectious diseases and diabetes self care to seek relevant models in India.

The key objective of the thesis is to discover the determinants of physical activity that are amenable to interventions as well as those groups which help in recognizing characteristic group for intervention. This will help in identifying areas which respond to interventions in relatively shorter time and with minimum resources, at individual and community levels.

Health communication— Strategies for encouraging physical activity among adults in Kerala need to recognize that at present the attitude of people and health professionals is that physical activity has to be taken up after a certain stage in their lives such as, when diagnosed with a disease and advised by a health professional. They mostly perceive their habitual activity as sufficient and are unaware about the required amounts of physical activity for accruing health benefits with respect to intensity, frequency and duration. So the strategy should emphasize health care professional knowledge and motivate them for opportunistic counseling regarding physical activity to all patients regardless of age and sex. PHC has become

increasingly oriented towards prevention; therefore physical activity can more easily be promoted alongside other health behaviors, such as smoking cessation and dietary modification. Healthcare providers are thought to be particularly influential in changing attitudes and behavior since they are often viewed as credible sources of information. But this information sharing should not stop at mere facts telling; rather it should build into a proper prescription based therapy. Health professionals could act as the best social support in adoption and maintenance of exercise.

Built environment—the findings from this study suggest that one priority at various levels of government should be to assure that future development plans include the creation and maintenance of safe and attractive places to engage in physical activity. Considering the hilly terrain and prolonged rainy season in Kerala, covered walking tracks, and partially-covered facilities might also encourage activity for some. Local governments need to ensure that recreational spaces like parks and sidewalks are free from abuse and are kept clear, and well maintained, so that there are opportunities for people to walk and bike. Employers should also consider incentives for those who choose to commute by walking and cycling and maintain a healthy life style.

Self efficacy and motivation-- Research needs to be done on promoting exercise and physical activity as enjoyable ways of spending one‘s time. There is no better way than to inculcate this habit at an early age: Either through promoting physical activity among parents or introducing recreational sports in schools, or reviving community-based traditional sports during festivals. Special focus has to be directed on girls especially in the pre-adolescent age. A state which produces maximum women athletes in national sports should set a precedent in promoting physical activity among children and youth. As far as motivating older and working segments to exercise, small changes in the habitual activity could go a long way. Active living could be integrated in daily life such as using stairs instead of elevator, taking frequent breaks at work, walking during lunch break, can all be promoted through targeted efforts at work and school policy levels. Habitual physical activity is easy to start and maintain rather than an additional activity. Future research should look at the processes of adoption and maintenance of physical activity in this population. Lack of awareness and socio-cultural beliefs

tend to demean physical activity especially among older adults, women and not so affluent. Nevertheless motivations like health and appearance might trigger adoption. However for maintaining long term physical activity, it is important that physical activity be included in regular life, like school, community and worksite activities, replacing mechanized travel with active travel. Beliefs like leisure time physical activity is only for well to do, have to be replaced.

This study derives its importance from the fact that physical activity models have so far been developed and tested in developed countries. Low and middle income Countries are underrepresented in this field. Secondary data analysis showed that models adopted from western countries might fail in the local settings. This presents a gap in contextual evidence that is important for future interventions. This study advances the area of research by providing a conceptual model for future interventions in similar settings.

The promotion of a physically active lifestyle as an affordable and effective means to prevent and treat chronic disease and to improve quality of life and well-being should be a priority for, government agencies, policy makers and health professionals especially in low resourced settings which are hardly in a position to take the burden of chronic diseases. To bring about broad and sustainable effects, environmental and policy level interventions are essential. Ecological models are the conceptual foundation for such wide-ranging interventions complemented with socio-cognitive factors and efforts to transform social and cultural norms.

6.2. Recommendations

1. Socioeconomic disparities call for a dramatic shift in the approach from curative to preventive inclusive of high risk as well as population approaches. Gender and age differences point to a social normative bias against physical activity as a desirable leisure time pursuit especially for women and younger people. One target for future interventions, thus, may be social norms and cultural attitudes regarding the significance and value of exercise
2. Extrinsic motivation of health and fitness has emerged as a strong determinant in this study. This could be used in strategies to strengthen health communication regarding lifestyle intervention. Health professionals could be instrumental in motivating people

to take up physical activity regardless of age and sex. Consideration has to be given to the training and setting roles and defining components of such communication. Information on levels and required intensity of exercise should be the key components.

3. It is quite apparent through the data that multiple level approaches will be required to bring in significant changes. Built environment plays a complementary role in promoting motivation and self efficacy levels. Secondary data analysis revealed that simply providing environmental support will not improve physical activity levels. Major concerns regarding safety and affordability of facilities need to be addressed. Moreover these need to be fostered through habitual physical activity like active travel and need multi-sectoral collaboration. Habitual activities hold the promise to moving people from being sedentary to active, since they require minimal self efficacy promotion than structured exercise programmes. This study strengthens the evidence base gathered from developing countries that it is difficult to increase moderate to vigorous leisure time physical activity levels at population levels and thereby structural and multi-sectoral changes like urban planning need to be considered which improve active living for all in a long and sustainable way.
4. New approaches need to be developed for local practice instead of importing western models and research should be fostered in this area

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Ethical committee approval

Institutional Ethics Committee, Sree Chitra Tirunal Institute for Medical Sciences and Technology, India organised and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council Of Medical Research (ICMR) approved the study. Order no:IEC/1175 dated February2018

List of publications

Paper presentations:

‖Advice to be active: ethical responsibility of the health care providers‖ – 7th World Bioethics Congress, Bangalore, Dec, 2018

NCD crisis: Is the health system ready! Need for promotion of physical activity by healthcare professionals in India.‖ At 3rd World Diabetes Congress, Jaipur, Feb, 2019

–Do *I* need exercise?‖ A qualitative study on factors affecting leisure -time physical activity in India accepted for Qualitative Research Conference-January 2020, USA

Poster on –NCD crisis: Is the health system ready! Need for promotion of physical activity by healthcare professionals in India –accepted for ECTIMH, Liverpool, September 2019

Publications from the thesis

Garg, S., & Kutty, V. R. (2019). –Do I need exercise?‖ A qualitative study on factors affecting leisure-time physical activity in India. *The Qualitative Report, 24* (5).

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Appendices

A-1 Supporting Tables

Table A-1.1 Proportion of low and moderate to vigorous physical activity by household income in different domains

Domain	Level of PA	<10, 000 n (%)	10000-20000 n (%)	20000-30000 n (%)	>30000 n (%)	χ^2	*p*value
Work PA	Inactive	66 (25.4)	45 (39.5)	42 (49.4)	6 (85.7)	27.4	.000*
	Active	194 (74.6)	69 (60.5)	43 (50.6)	1 (14.3)		
Total PA	Inactive	34 (13.1)	22 (19.3)	17 (20)	3 (42.9)	7.19	.062*
	Active	226 (86.9)	92 (80.7)	68 (80)	4 (57.1)		
Leisure time PA	Inactive	221 (85)	93 (81.6)	53 (62.4)	5 (71.4)	20.69	.000
	Active	39 (15)	21 (18.4))	32 (37.6)	2 (28.6)		

Inactive- less than600 MET mins per week

Active->=600 MET mins per week

. *Linear by linear association chi sq p<.05

Table A-1.2.Proportion of low motivation and self efficacy by socio-demographic variables

	Self efficacy	Interest motivation	Competence motivation	Appearance motivation	Fitness motivation	Social motives
Age						
18-44 years	176 (77.2)	193 (84.6) **	214 (93.9) **	186 (81.6) **	161 (70.6) **	207 (90.8) **
45-65yrs	185 (77.7)	185 (77.7)	233 (97.9)	212 (89.1)	163 (68.5)	234 (98.3)
Sex						
Male	133 (67.2) **	164 (82.8) **	185 (93.4) **	162 (81.8)	117 (59.1) **	180 (90.9) **
Female	228 (85.1)	253 (94.4)	262 (97.8)	236 (88.1)	207 (77.2)	261 (97.4)
Marital status						
Not living with spouse	45 (65.2) **	54 (78.3) **	62 (89.9) **	54 (78.3)	41 (59.4) **	55 (79.7) **
Living with spouse	316 (79.6)	363 (91.4)	385 (97)	344 (86.6)	283 (71.3)	386 (97.2)
Occupation						
Sedentary	95 (67.4) **	116 (82.3) **	133 (94.3)	116 (82.3)	84 (59.6) **	124 (87.9) **
Non sedentary	213 (81.3)	242 (92.4)	253 (96.6)	224 (85.5)	189 (72.1)	255 (97.3)
Manual labour	53 (84.1)	59 (93.7)	61 (96.8)	58 (92.1)	51 (81)	62 (98.4)
Household income INR (p.m)						
<10000	218 (83.8) **	244 (93.8) **	252 (96.9)	231 (88.8) **	204 (78.5) **	249 (95.8) **
10000-20000	84 (73.7)	101 (88.6)	110 (96.5)	98 (86)	73 (64)	111 (97.4)
20000-30000	54 (63.5)	65 (76.5)	78 (91.8)	64 (75.3)	43 (50.6)	74 (87.1)
>30000	5 (71.4)	7 (100)	7 (100)	5 (71.4)	4 (57.1)	7 (100)

*indicates significant p values for differences in proportion by this variable at<0.05level

Table A-1.3. Mean Physical activity at baseline, 12 and 24 months in intervention and control group (secondary data analysis)

Outcome	Study arm	N	Mean	Std. Deviation
Total METs baseline	Control	482	9402.86	8697.357
	Intervention	482	8856.33	8331.771
	Total	964	9129.59	8516.493
TotalMETs-12 months	Control	482	8692.53	6954.556
	Intervention	482	9458.38	7885.536
	Total	964	9075.46	7440.642
Total METs-24 months	Control	482	8426.18	6435.714
	Intervention	482	8629.79	6759.702
	Total	964	8527.99	6597.055

Table A-1.4 Unstandardised regression weights relating to path model depicted in Figure.4.3.1

Paths			Estimate	S.E.	C.R.	P
Social motives	<---	Socialsupport	.848	.068	12.445	***
Body-related motivation	<---	Socialsupport	3.763	.156	24.136	***
Selfeff	<---	Socialsupport	.596	.248	2.400	.016
Selfeff	<---	Social motives	.706	.106	6.680	***
Selfeff	<---	Body-related motivation	.678	.046	14.671	***
Physical activity	<---	Body related motivation	17.373	2.458	7.067	***
Physical activity	<---	Social motives	36.596	4.848	7.549	***
Physical activity	<---	Selfeff	17.570	2.061	8.524	***
Physical activity	<---	Socialsupport	25.253	10.932	2.310	.021

Table A-1.5 Adjusted R square for each variable depicted in figure 4.3.1

Variable	R square
Body related motivation	.564
Social motives	.256
Selfeff	.657
Physical activity	.724

Table A-1.6 Confirmatory factor loadings of variables in the proposed model

Regression Weights: (Group number 1 - Default model)

		Estimate	S.E.	C.R.	P
M12	<--- motiv2	1.112	.042	26.396	***
M9	<--- motiv2	.983	.037	26.878	***
M8	<--- motiv2	1.075	.042	25.717	***
M4	<--- motiv2	1.177	.039	30.150	***
M3	<--- motiv2	1.097	.037	29.437	***
M24	<--- motiv3	1.000			
M20	<--- motiv3	1.041	.014	73.504	***
M17	<--- motiv3	1.057	.013	83.009	***
M10	<--- motiv3	1.000	.014	70.936	***
M5	<--- motiv3	.957	.014	69.622	***
M15	<--- motiv4	1.000			
M30	<--- motiv4	.942	.043	21.657	***
M28	<--- motiv4	1.134	.038	29.932	***
M21	<--- motiv4	.874	.043	20.472	***
M6	<--- motiv4	1.096	.032	33.798	***
M14	<--- motiv2	1.016	.038	26.610	***
M25	<--- motiv2	1.000			
M27	<--- motiv3	.978	.013	73.234	***

		Estimate	S.E.	C.R.	P
M1	<--- motiv3	.669	.024	28.342	***
M13	<--- motiv3	.632	.024	25.933	***
SE9	<--- Selfeff	.999	.007	137.012	***
SE8	<--- Selfeff	.994	.007	151.709	***
SE6	<--- Selfeff	1.003	.005	203.048	***
SE5	<--- Selfeff	1.001	.005	184.278	***
SE4	<--- Selfeff	.995	.005	220.283	***
SE3	<--- Selfeff	.997	.005	206.861	***
SE2	<--- Selfeff	1.000			
SOCIALSUPPORT_INSTRUMENTAL	<--- socialsupport	1.000			
SOCIALSUPPORT_EMOTIONAL	<--- socialsupport	1.079	.129	8.365	***
SOCIALISSUESTOTAL	<--- socialsupport	.786	.127	6.211	***
ltpawalkingmin	<--- e50	1.000			
PE_new	<--- socialsupport	.265	.070	3.807	***

Table A-1.7Standardized Direct Effects - Two Tailed Significance

	Social support	motiv3	motiv4	Selfeff
motiv3	.008	...	...	...
motiv4	.012	...	...	...
Selfeff	.005	.010	.023	...
ltpawalkingmin	.005	.020	.017	.004

This is a bootstrap approximation obtained by constructing two-sided bias- corrected confidence intervals

Table A-1.8 Standardized Indirect Effects - Two Tailed Significance

	Social support	motiv3	motiv4	Selfeff
motiv3	...	...	...	...
motiv4	...	...	...	...
Selfeff	.018	...	...	...
ltpawalkingmin	.018	.004	.015	...

This is a bootstrap approximation obtained by constructing two-sided bias- corrected confidence intervals

Table A-1.9 Reliability estimates of independent variables

Variable	No of items	Cronbach‘s alpha
Environmental support	4	0.52
Self efficacy	9	0.92
Motivation	30	0.94
Interest and enjoyment subscale	7	0.987
Competence subscale	7	0.96
Body related motivation (fitness and appearance subscale)	11	0.985
Social subscale	5	0.94

Table A-1.10.Correlations (Female)

	Environment support	Body-related motivation	Social motives motivation	Self efficacy	Physical activity
Environment support	1.000				
Body-related motivation	0.718	1.000			
Social motives	0.517	0.371	1.000		
Self efficacy	0.619	0.815	0.358	1.000	
Physical activity	0.642	0.846	0.422	0.769	1.000

Table A-1.11.Correlations (Male)

	Environment support	Body-related motivation	Social motives	Self efficacy	Physical activity
Environment support	1.000				
Body-related motivation	0.770	1.00			
Social motives	0.488	0.376	1.00		
Self efficacy	0.699	0.750	0.541	1.00	
Physical activity	0.660	0.727	0.590	0.796	1.00

Table A-1.12.Correlations, Mean and Standard Deviation-full sample

	Environment support	Body-related motivation	Social motives	Self efficacy	Physical activity
Environment support	1.000				
Body-related motivation	0.751	1.000			
Social motives	0.506	0.308	1.000		
Selfefficacy	0.677	0.776	0.502	1.000	
Physical activity	0.694	0.758	0.578	0.788	1.000
Mean	1.22	2.58	1.35	1.46	72.14
SD	0.462	2.31	0.775	2.63	129.4

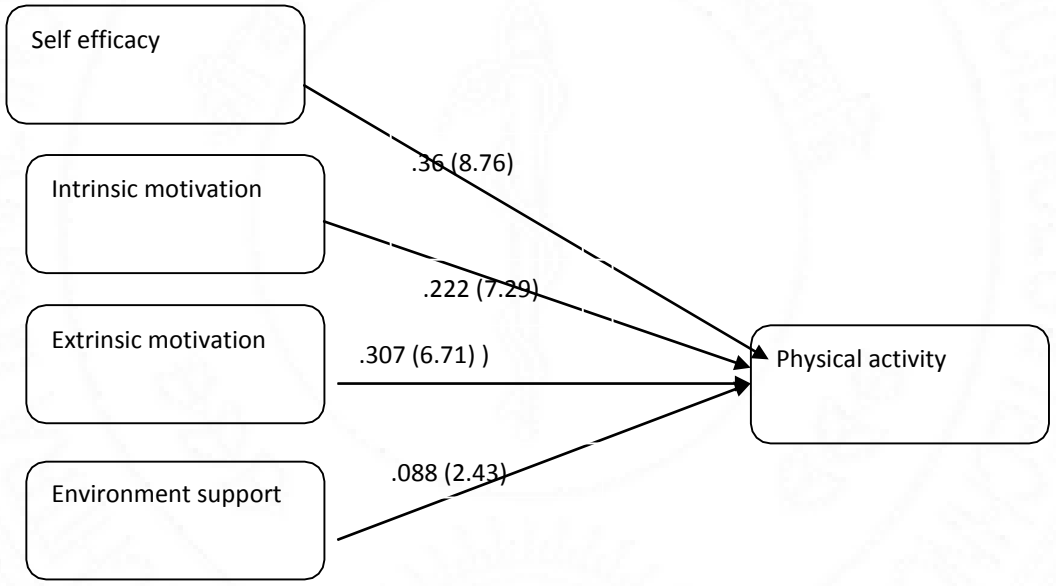
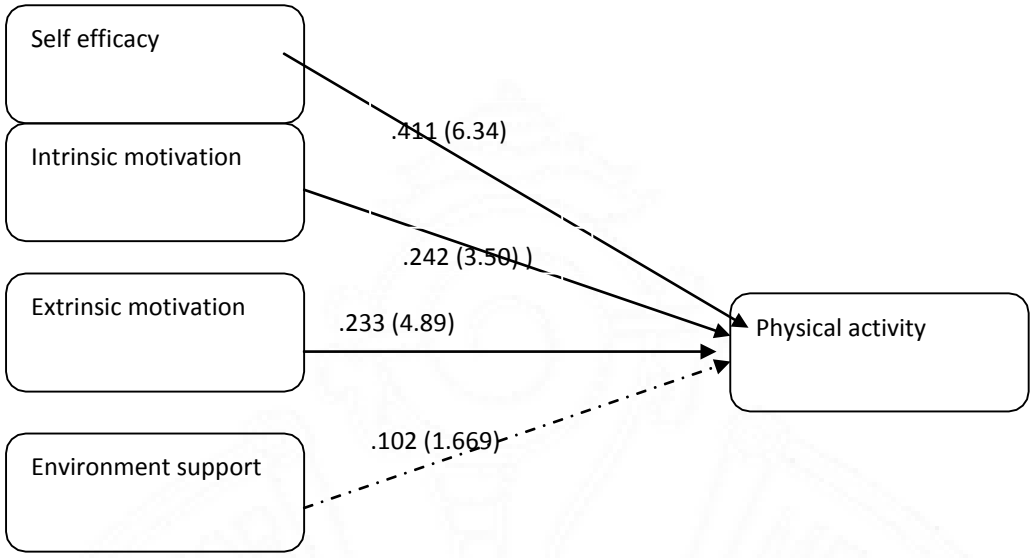


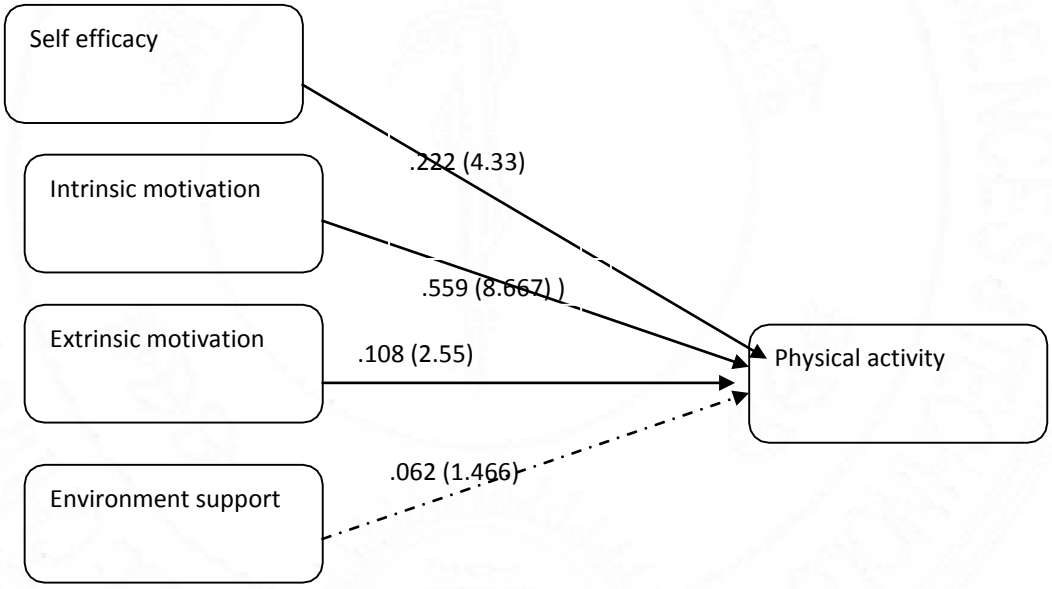
Figure A-1.1.Physical Activity Direct Effects - Full Sample.

Note. Solid lines represent significant paths ($p < 0.05$). Dashed lines are insignificantpaths. The standardized regression coefficients are reported with critical ratio values inparentheses. Correlation paths between the variables and error terms have been omittedfrom the figure.



FigureA-1.2. Physical Activity Direct Effect – Males.

Note. Solid lines represent significant paths (p < 0.05). Dashed lines are insignificantpaths. The standardized regression coefficients are reported with critical ratio values inparentheses. Correlation paths between the variables and error terms have been omittedfrom the figure.



FigureA-1.3: Physical Activity Direct Effect – Females.

Note. Solid lines represent significant paths (p < 0.05). Dashed lines are insignificantpaths. The standardized regression coefficients reported with critical ratio values inparentheses. Correlation paths between the variables and error terms have been omittedfrom the figure

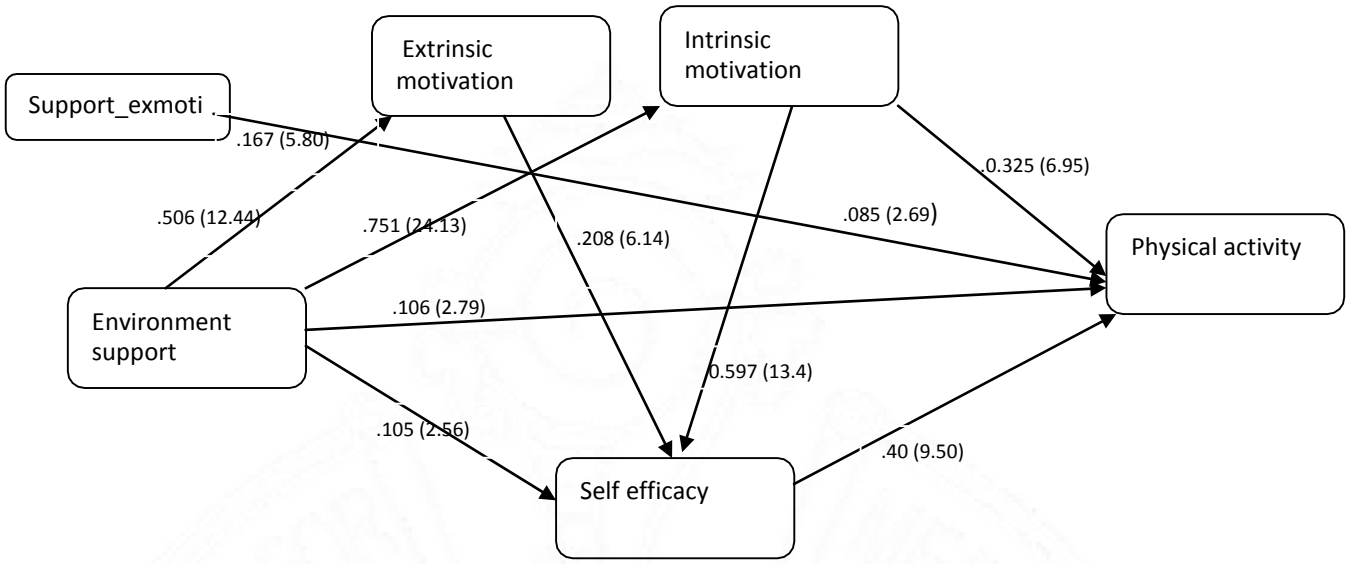


Figure A-1.4: Moderated Model –Full sample. Solid lines represent significant paths ($p<0.05$).Note. Dashed lines are insignificant paths. The standardized regression coefficients are reported with critical ratio values in parentheses. Correlation paths between the variables and error terms have been omitted from the figure

A-2 Stratified cluster sampling of Kottayam district

Rural clusters	Total population	Participants selected
Panachikad	43595	25
Ward 06	1932	25
Ward 10	1808	25
Ward 08	1673	25
Ward 20	2167	25
Ward 16	1967	25
Vakathanam	23316	25
Ward 17	1371	25
Ward 01	1746	25
Ward 12	1678	25
Ward 02	1134	25
Ward18	1731	25
Urban clusters		25
Kottayam	55374	25
Ward 13	1422	25
Ward 19	1106	25

Rural clusters	Total population	Participants selected
Ward 15	1653	25
Ward 10	1215	25
Ward 30	1507	25
Changanasherry	47685	25
Ward 12	971	25
Ward 17	1399	25
Ward 03	1281	25
Ward 34	1030	25
Ward 21	1592	25

A-3 Focus Group Guide

FOCUS GROUP GUIDE-Women: Participants of a physical activity programme , i.e. gymnasium

Selection criteria: Female, 18-65 years of age , participating in gym programme for at least a month

Copies of informed consent forms should be provided to each participant and read aloud for the benefit of those who cannot read. Participants should be provided an opportunity to ask any questions. The following is a guide. Try to ask all the questions below in the order given, but it is more important to maintain the flow of discussion. Suggested probes have been included. You should try to encourage participation of all group members in the conversation. Start by explaining the ground rules as follows: Before we start, I would like to remind you that there are no right or wrong answers in this discussion. We are interested in knowing what each of you think, so please feel free to be frank and to share your point of view, regardless of whether you agree or disagree with what you hear. It is very important that we hear all your opinions. You probably prefer that your comments not be repeated to people outside of this group. Please treat others in the group as you want to be treated by not telling anyone about what you hear in this discussion today. Let's start by going around the circle and having each person introduce herself. (Members of the research team should also introduce themselves and describe each of their roles.)

1. What do you think about the topic that has brought us here today (physical activity).
2. According to you what is the most important reason for you to join the gym.
3. According to you what are the reasons for

   Doing exercise?

   Not doing exercise?

4. According to you what are the needs and services required to make more people exercise as you do? (child support, moral support, social norms, role models)

5. Do you have any past experience of sport or physical activity participation?

6. What is your source of information about physical activity? (health professional, media, children, relatives other networks)

7. Let‘s summarize some of the key points from our discussion. Is there anything else?

8. Do you have any questions?

Thank you for taking the time to talk to us!!

Adapted from: ACQUIRE Project. 2005. Community Awareness of and Attitudes toward LAPMs in Guinea.. New York: The ACQUIRE Project/EngenderHealth.

FOCUS GROUP GUIDE: MEN‘S GROUP

Selection criteria: men, aged 18-65, who participate in gym programme for over a month.

Copies of informed consent forms should be provided to each participant and read aloud for the benefit of those who cannot read. Participants should be provided an opportunity to ask any questions. The following is a guiools and de. Try to ask all the questions below in the order given, but it is more important to maintain the flow of discussion. Suggested probes have been included. You should try to encourage participation of all group members in the conversation. Start by explaining the ground rules as follows: Before we start, I would like to remind you that there are no right or wrong answers in this discussion. We are interested in knowing what each of you think, so please feel free to be frank and to share your point of view, regardless of whether you agree or disagree with what you hear. It is very important that we hear all your opinions. You probably prefer that your comments not be repeated to people outside of this group. Please treat others in the group as you want to be treated by not telling anyone about what you hear in this discussion today. Let's start by going around the circle and having each person introduce herself. (Members of the research team should also introduce themselves and describe each of their roles.)

1. What do you think about the topic that has brought us here today (physical activity).
2. According to you what is the most important reason for you to join the gym.
3. According to you what are the reasons for

   Doing exercise?

   Not doing exercise?

4. According to you what are the needs and services required to make more people exercise as you do? (child support, moral support, social norms, role models)

5. Do you have any past experience of sport or physical activity participation?

6. What is your source of information about physical activity? (health professional, media, children, relatives other networks)

7. Do you think of continuing this participation for another six months? Why?

8. What do you think about women doing exercise in your community?

9. Let‘s summarize some of the key points from our discussion. Is there anything else?

10. Do you have any questions?

Thank you for taking the time to talk to us!!

FOCUS GROUP GUIDE: NCD clinic patients

Selection criteria: Patients 18-65 years of age , diagnosed with any of the chronic diseases and attending NCD clinic at least for the second time.

Copies of informed consent forms should be provided to each participant and read aloud for the benefit of those who cannot read. Participants should be provided an opportunity to ask any questions. The following is a guide. Try to ask all the questions below in the order given, but it is more important to maintain the flow of discussion. Suggested probes have been included. You should try to encourage participation of all group members in the conversation. Start by explaining the ground rules as follows: Before we start, I would like to remind you that there are no right or wrong answers in this discussion. We are interested in knowing what each of you think, so please feel free to share your point of view, regardless of whether you agree or disagree with what you hear. It is very important that we hear all your opinions. You probably prefer that your comments not be repeated to people outside of this group. Please treat others in the group as you want to be treated by not telling anyone about what you hear in this discussion today. Let's start by going around the circle and having each person introduce herself. (Members of the research team should also introduce themselves and describe each of their roles.)

1. What do you think about the topic that has brought us here today (physical activity).
2. According to you what is the most important reason for people doing exercise. Do you exercise?
3. According to you what are the reasons for

   Doing exercise?

   Not doing exercise?

4. According to you what are the needs and services required to make more people exercise ? (child support, moral support, social norms, role models)

5. Do you have any past experience of sport or physical activity participation?

6. Has any health professional advised you to increase your physical activity?

   If yes, what are the things that were told?

How many times were you asked about your physical activity? (number of visits, initial or many)

Do you think that advice form a health professional had a role in improving your physical activity?

7. Let‘s summarize some of the key points from our discussion. Is there anything else?

8. Do you have any questions?

Thank you for taking the time to talk to us!!

FGD GUIDE: MIXED GROUP

Selection criteria: 18-65 years of age, men/women, healthy enough to exercise.

Copies of informed consent forms should be provided to each participant and read aloud for the benefit of those who cannot read. Participants should be provided an opportunity to ask any questions. The following is a guide. Try to ask all the questions below in the order given, but it is more important to maintain the flow of discussion. Suggested probes have been included. You should try to encourage participation of all group members in the conversation. Start by explaining the ground rules as follows: Before we start, I would like to remind you that there are no right or wrong answers in this discussion. We are interested in knowing what each of you think, so please feel free to be frank and to share your point of view, regardless of whether you agree or disagree with what you hear. It is very important that we hear all your opinions. You probably prefer that your comments not be repeated to people outside of this group. Please treat others in the group as you want to be treated by not telling anyone about what you hear in this discussion today. Let's start by going around the circle and having each person introduce herself. (Members of the research team should also introduce themselves and describe each of their roles.)

1. What do you think about the topic that has brought us here today (physical activity).
2. According to you what is the most important reason for people to participate in physical activity?
3. According to you what are the reasons for

   Doing exercise?

   Not doing exercise?

4. According to you what are the needs and services required to make more people exercise as you do? (child support, moral support, social norms, role models)

5. Do you have any past experience of sport or physical activity participation?

6. What is your source of information about physical activity? (health professional, media, children, relatives other networks

7. What kind of physical activity is most valued in your community?

8. Let‘s summarize some of the key points from our discussion. Is there anything else?

9. Do you have any questions?

Thank you for taking the time to talk to us!!

A-4 Tools for cross sectional survey

Section 1: Demographic details

1.1	Name	
1.2	Phone number	
1.3	Age in completed years	
1.4	Sex	1.male 2.female
1.5	Complete residential address	
1.6	Ward name	
1.7	Number of years of schooling	
1.8	Occupation	1. sedentary (mostly sitting during work) 2.non sedentary (mostly moving around during work, e.g , nurses, postman, bus conductor) 3. manual labour 4. homemaking
1.9	Marital status	1.married 2.Unmarried 3.divorced /widowed/separated
1.10	Household Income per month.	
1.11	Ownership of vehicle	1.bicycle 2.motorised two-wheeler 3.motorised 4-wheeler 4.combination of above. 5.none of the above

MODIFIED GLOBAL PHYSICAL ACTIVITY QUESTIONNAIRE

(Instruction to the interviewer: Please ask the questions carefully and fill up the boxes appropriately)

I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.

At Work

Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. *[Insert other examples if needed]*. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.

Code	Questions	Response	
P1	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like *[carrying or lifting heavy loads, digging or construction work*] for at **least 10 minutes** continuously?	Yes ☐ No ☐	If Yes Go to P1A Else go to P2
P1A	Please note the number of days a week and time spent each day on the following activities listed below which are considered to be vigorous. Write aside only those activities that is carried out by you in a **typical week**		

	Activity	**Number of days a week**	**Time spent in a day**
P1A1	Carrying, loading or stacking wood	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A2	Drawing water from the well and bringing water from other house	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A3	Laying crushed rock	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A4	Ural - Manual grinding	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A5	Pounding grains	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A6	Chopping wood-splitting logs	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A7	Carrying heavy loads such as bricks	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A8	Any other…….. (Please specify)	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋

	Activity	**Number of days a week**	**Time spent in a day**
P1A9	Any other…….. (Please specify)	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋
P1A10	Any other…….. (Please specify)	⌊_⌋⌊_⌋	hrs ⌊_⌋⌊_⌋ :mins ⌊_⌋⌊_⌋

Code	**Questions**	**Response**	
P2	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking *[or carrying light loads*] for at least 10 minutes continuously?	Yes ☐ No ☐	If Yes Go to P2A Else go to P3
P2A	Please note the number of days a week and time spent each day on the following activities listed below which are considered to be moderate. Write aside only those activities that is carried out by you in a **typical week**		

P2A	Activity	Number of days a week	Time spent in a day
P2A1	Washing clothes	⌊_⌊_⌋	hrs ⌊_⌊_⌋ :mins ⌊_⌊_⌋
P2A2	Sweeping floor (inside or outside house)	⌊_⌊_⌋	hrs ⌊_⌊_⌋ : mins ⌊_⌊_⌋
P2A3	Mopping floor (bend on knees and using hand)	⌊_⌊_⌋	hrs ⌊_⌊_⌋ : mins ⌊_⌊_⌋
P2A4	Drawing and bringing water from outside tap	⌊_⌊_⌋	hrs ⌊_⌊_⌋ : mins ⌊_⌊_⌋
P2A5	Animal care: feeding animals, washing animals , cleaning animal house, etc)	⌊_⌊_⌋	hrs ⌊_⌊_⌋ : mins ⌊_⌊_⌋
P2A6	Walking to bring grass, leaves, etc for feeding animals	⌊_⌊_⌋	hrs ⌊_⌊_⌋ : mins ⌊_⌊_⌋
P2A7	Milking cow	⌊_⌊_⌋	hrs ⌊_⌊_⌋ : mins ⌊_⌊_⌋

P2A	Activity	Number of days a week	Time spent in a day
P2A8	Gardening: watering plants, pruning, sowing seeds, cleaning, etc	⌊_⌊_	hrs ⌊_⌊_ : mins ⌊_⌊_
P2A9	Patient and elderly care	⌊_⌊_	hrs ⌊_⌊_ : mins ⌊_⌊_
P2A10	Tailoring	⌊_⌊_	hrs ⌊_⌊_ : mins ⌊_⌊_
P2A11	Child care-standing, dressing, bathing, grooming, feeding and occasional lifting of the child	⌊_⌊_	hrs ⌊_⌊_ : mins ⌊_⌊_
P2A12	Multiple household task all at once-vigorous effort	⌊_⌊_	hrs ⌊_⌊_ :mins ⌊_⌊_
P2A13	Sweeping the garage, sidewalk and outside the house	⌊_⌊_	hrs ⌊_⌊_ :mins ⌊_⌊_
P2A14	Cooking or food preparation	⌊_⌊_	hrs ⌊_⌊_ : mins ⌊_⌊_
P2A15	Shopping grocery without a grocery cart and carrying packages	⌊_⌊_	hrs ⌊_⌊_ : mins ⌊_⌊_

P2A	**Activity**	**Number of days a week**	**Time spent in a day**
P2A16	Any other…… (Please specify)	☐☐	hrs ☐☐ :mins ☐☐
P2A17	Any other…… (Please specify)	☐☐	hrs ☐☐ :mins ☐☐
P2A18	Any other…… (Please specify)	☐☐	hrs ☐☐ :mins ☐☐
Code	Questions	Response	
P3	Do you walk or use a bicycle (*pedal cycle*) for at least 10 minutes continuously to get to and from places?	Yes ☐ No ☐	If Yes go to P3A If No, go to P 4

P2A	Activity	Number of days a week	Time spent in a day
Walking to and from places			
P3A1	To work	☐☐	hrs ☐☐ : mins ☐☐
P3A2	To market	☐☐	hrs ☐☐ : mins ☐☐
P3A3	To shops	☐☐	hrs ☐☐ : mins ☐☐
P3A4	To bring children from school	☐☐	hrs ☐☐ : mins ☐☐
P3A5	To see friends, relatives or others	☐☐	hrs ☐☐ : mins ☐☐
P3A6	To temple or church	☐☐	hrs ☐☐ : mins ☐☐
P3A7	Any other…… (Please specify)	☐☐	hrs ☐☐ : mins ☐☐
P3B Bicycling from and to places			
P3B1	To work	☐☐	hrs ☐☐ : mins ☐☐
P3B2	To market/shops	☐☐	hrs ☐☐ : mins ☐☐
P3B3	Any other…… (Please specify)	☐☐	hrs ☐☐ : mins ☐☐
P3B4	Any other…… (Please specify)	☐☐	hrs ☐☐ : mins ☐☐

P2A	Activity	Number of days a week	Time spent in a day
Recreational activities The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure)			
P4	Do you do any vigorous-intensity sports, fitness or recreational (*leisure*) activities that cause large increases in breathing or heart rate like [*running or football, badminton,]* for at least 10 minutes continuously?	Yes ☐ No ☐	If Yes go to P5 If No, go to P7
P5	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (*leisure*) activities?	Number of days ⌊__⌋	
P6	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs: mins	

P2A	Activity	Number of days a week	Time spent in a day
P7	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that causes a small increase in breathing or heart rate such as brisk walking, cycling, swimming, volleyball for at least 10 minutes continuously?	Yes ☐ No ☐	If Yes go to P8 If No go to P10
P8	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities	Number of days ⌊__⌋	
P9	How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋	

Sedentary Behaviour: The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.		
P10	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋
P11	How many hours do you sleep on average during night?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋

Section2: Questionnaire on various factors influencing physical activity

Individual factors

Motivation

MPAM-R scale

The following is a list of reasons why people engage in physical activities, sports and exercise. Keeping in mind your primary physical activity, respond to each question (using the scale given) , on the basis of how true that response is for you.

1 2 3 4 5 6 7

not at all very true for me true for me

2.1. Because I want to be physically fit.

2. 2. Because it‘s fun.

2.3. Because I like engaging in activities which physically challenge me.

2.4. Because I want to obtain new skills.

2.5. Because I want to look or maintain weight so I look better.

2.6. Because I want to be with my friends.

2.7. Because I like to do this activity.

2.8. Because I want to improve existing skills.

2.9. Because I like the challenge.

2.10. Because I want to define my muscles so I look better.

2.11. Because it makes me happy.

2.12. Because I want to keep up my current skill level.

2.13. Because I want to have more energy

2.14. Because I like activities which are physically challenging.

2.15. Because I like to be with others who are interested in this activity.

2.16. Because I want to improve my cardiovascular fitness.

2.17. Because I want to improve my appearance.

2.18. Because I think it‘s interesting.

2.19. Because I want to maintain my physical strength to live a healthy life.

2.20. Because I want to be attractive to others.

2.21. Because I want to meet new people.

2.22. Because I enjoy this activity.

2.23. Because I want to maintain my physical health and well-being.

2.24. Because I want to improve my body shape.

2.25. Because I want to get better at my activity.

2.26. Because I find this activity stimulating.

2.27. Because I will feel physically unattractive if I don‘t.

2.28. Because my friends want me to.

2.29. Because I like the excitement of participation.

2.30. Because I enjoy spending time with others doing this activity.

Self efficacy scale

In answering the following questions you will be asked to think about **HOW CONFIDENT** you are that you can participate in a variety of physical. The word ―confident‖ refers to your belief that you can do something well.

1 2 3 4 5 6 7 8 9 10

not at all very confident

confident

How confident are you right now that you could exercise three times per week for 20 minutes if:

1. The weather was bothering you
2. You were bored by the program or activity
3. You felt pain when exercising
4. You had to exercise alone
5. You did not enjoy it
6. You were too busy with other activities
7. You felt tired

8. You felt stressed

9. You felt depressed

Physical Environmental Variables: Participants' perceptions of their environment

Neighborhood Quality

1. Is your neighbourhood safe to walk?Yes No

2. Do you find your neighbourhood pleasant for engaging in physical activity? Yes No

3. Does traffic/crime/stray animals in your area prevent you from doing physical activity? Yes No

Availability of facilities

1. Does your neighbourhood have any facility such as walking/biking trails, parks, outdoor/indoor places to exercise? Yes no

2. Please specify how far is it from your house (rough estimate).

Social Environment

Social Support

Emotional support

1. Do you have anybody to help you with your other responsibilities if you want to do physical activity? Yes No

2. Are your family and friends supportive of your physical active? Yes No

3. Do you think you would be more active if your friends or family participated with you? Yes No

Informational support

1. Do you think you have full information regarding benefits of physical activity Yes No
2. Do you think you would be more active if you had full information regarding physical activity Yes No
3. Do you remember any health messages by media or HP suggesting exercise is good for health

Yes No if yes specify

Social and cultural issues :

1. Do you think exercising is good for health Yes No
2. Do you see many people in your neighbourhood exercising Yes No
3. Do you think it is a culture of upper class, modern and western societies Yes No
4. Is exercising acceptable in your community Yes No
5. Do you think day to day activity is enough for our health Yes No
6. Do you think women should exercise Yes No
7. Are you bothered about mocking or questioning by family and neighbours if you go for exercise. Yes No

A-5 Consent form for participants

Information sheet for participant

—Determinants of physical activity among adults in Kottayam district of Kerala, India: A socio-ecological approach‖

Achutha Menon Centre for Health Science Studies,

Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum, Kerala-695011

Namaskaram

I am Shalini Garg, doing my Doctor of Philosophy (PhD) at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum requesting your participation in a research study involving physical activity and health. My doctoral research looks into the various factors that affect people‘s participation in various physical activity programmes

You have been approached for this study as a member of the community. I am interested in knowing how much physical activity do you accumulate during a regular day in your life and also assess whether it is sufficient for you to get health benefits If not what are the factors that prevent you from participating in forms of physical activity for health benefits during your leisure time. This information will guide me and others in the development of future interventions which are intended to promote health and prevent the growing number of non communicable diseases like cancer, diabetes, obesity, stroke etc. in Kerala.

Participation in this interview will take about 30-45 minutes of your time. You are free to refuse to participate in the interview at anytime during the course of the interview and you are also free to refuse to answer any question at any time. You may not directly benefit from participating in this interview, but the dissemination of the results of the research study may help developing future interventions which are intended to promote health and prevent the growing number of non communicable diseases like cancer, stroke etc.in Kerala. The information provided by you will be kept strictly confidential. Details of this interview will be transcribed and used

exclusively for research. Your name, other personal details and details of your community will not be identified in the transcripts used for analysis. Records and transcripts of the interviews will be kept in safe custody by me (Principal Investigator) and will be destroyed at the end of the study

If you agree to participate in the study, please indicate your agreement in the consent statement after reading it carefully. If you need any more information pertaining to any aspect of the study, please feel free to contact the following people.

You can contact me, the Principal Investigator, Shalini Garg at 9562597509 or mail at gargshalini1978@gmail.com.

If you have any questions or concerns regarding this study later and would like to talk to someone other than me (the principal investigator) , you may contact the Member secretary of the Institutional Ethics Committee of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum : Dr Mala Ramanathan, Phone: 0471-2524234 or email to iec.mem.sec@sctimst.ac.in

Thank you

Interviewer‘s Name:

Interviewer‘s signature:

Consent Statement

I have read out the information in the information sheet. The nature of the study and my involvement has been explained and all my questions have been answered. By signing this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises.

❑ Yes, I am agreeing to the interview

Signature: _____

OR

If you are not willing to participate, then thank you for your time.

Name of the respondent: _____

Address:_____

_____

Interviewer's Name:

Interviewer's signature:

Respondent's Unique Identification Code:

Date:

Place:

A-6 Telephone Interview consent script

Information and Consent Script for Telephone Interviews

Introduction Part I

Hello, My name is Shalini Garg calling from Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum

I am doing my PhD research on physical activity and health. My doctoral research looks into the various factors that affect people‘s participation in recreational physical activity . Your phone number was selected at random and we do not need your name and address. All your responses will be confidential and the questions I need to ask will take only few minutes.Ok? Before we continue I need to know if you are 18 years of age or older.

If yes, ask: what is your age?_____years

If no, ask: ―Is there anyone 17 years of age or older with whom we may talk?‖

If Yes, repeat Introduction and continue interview

If no, Terminate Interview ―Thankyou.We need to talk to someone 18 years or older‖.

If yes

Introduction Part II

We are interested in knowing how much physical activity do you accumulate during a regular day in your life and also assess whether it is sufficient for you to get health benefits You m.ay choose not to answer a question or simply say don‘t know if that‘s appropriate. In all cases all your answers will be kept confidential. You have been chosen as a part of the community and your cooperation is especially important.

A-7 Tools and consent forms – Malayalam

ഭാഗം 1. ജനസംഖ്യാപരമായ വിശദാംശങ്ങൾ (**Demographic Details**)

1.1	പേര്	
1.2	ഫോൺ നമ്പർ	
1.3	വയസ്സ് പൂർണ്ണമായ വർഷത്തിൽ	
1.4	ലിംഗം	പുരുഷൻ സ്ത്രീ
1.5	പൂർണ്ണമായ മേൽവിലാസം	
1.6	വാർഡിന്റെ പേര്	
1.7	സ്കൂളിൽ പോയതെത്ര വർഷം	
1.8	തൊഴിൽ	1. കായികാദ്ധ്വനമില്ലാത്തജോലി – ഓഫീസ് 2. ശരീരം അനങ്ങിയുള്ള ജോലി– പോസ്റ്റ്മാൻ, കണ്ടക്ടർ 3. കായികാദ്ധ്വാനം അധികമുള്ള തൊഴിൽ 4. വീട്ടുപണി
1.9	വൈവാഹികാവസ്ഥ	വിവാഹം കഴിച്ചു വിവാഹം കഴിച്ചിട്ടില്ല വിവാഹമോചിതം/വൈധവ്യം/ വേർപിരിഞ്ഞത്
1.10	കുടുംബത്തിന്റെ വരുമാനം	1. മാസം 10,000 രൂപയിൽ കുറവ് 2. മാസം11000മുതൽ 25000 വരെ 3. മാസം 25000 രൂപയിൽ കൂടുതൽ
1.11	വാഹന ഉടമസ്ഥത	1. സൈക്കിൾ 2. യന്ത്രവൽകൃത ഇരുചക്രവാഹനം 3. യന്ത്രവൽകൃത നാലുചക്രവാഹനം 4. മുകളിലുള്ളവയെല്ലാം 5. മുകളിലുള്ളവയൊന്നുമില്ല

ശാരീരിക പ്രവർത്തനമൂല്യനിർണ്ണയം

(അഭിമുഖം നടത്തുന്നയാൾക്കുള്ള നിർദ്ദേശം: ദയവായി ചോദ്യങ്ങൾ ശ്രദ്ധയോടെ ചോദിക്കുകയും കളങ്ങൾ കൃത്യമായി പൂരിപ്പിക്കുകയും ചെയ്യുക)

ഒരു സാധാരണ ആഴ്ചയിൽ വിവിധതരത്തിലുള്ള ശാരീരിക പ്രവർത്തനങ്ങൾക്കായി നിങ്ങൾ ചെലവഴിക്കുന്ന സമയത്തെക്കുറിച്ച് ഞാൻ ചോദിക്കാൻ പോകുകയാണ്. നിങ്ങൾ ശാരീരികമായി കാര്യക്ഷമതയുള്ളയാളാണെന്ന് നിങ്ങൾ അംഗീകരിക്കുന്നതിൽ പോലും ദയവായി ഈ ചോദ്യങ്ങൾക്ക് ഉത്തരം നൽകുക.

ജോലിയിൽ

നിങ്ങൾ ജോലിചെയ്യാനായി ചെലവഴിക്കുന്ന സമയത്തെക്കുറിച്ച് ആദ്യം ചിന്തിക്കുക. ശമ്പളമുള്ളതോ ഇല്ലാത്തതോ ആയ ജോലി, പഠനം/പരിശീലനം, വീട്ടിലെജോലി, ഭക്ഷണം/വിളകൊയ്യൽ ഭക്ഷണത്തിനായി, തൊഴിലന്വേഷണം മുതലായവയെപ്പോലെയുള്ള നിങ്ങൾ ചെയ്യുന്ന പ്രവർത്തനങ്ങളെക്കുറിച്ച് ചിന്തിക്കുക. താഴെകൊടുത്തിട്ടുള്ള ചോദ്യങ്ങളുടെ ഉത്തരം എഴുതുമ്പോൾ കഠിനമായ കായികപ്രവൃത്തികൾ എന്നാൽ ശാരീരികമാധ്വാനമുള്ള, ശ്വാസോച്ഛ്വാസം വളരെയധികം കൂടുന്നതാണ് , മിതമായ കായികപ്രവൃത്തികൾ എന്നാൽ ശ്വാസോച്ഛ്വാസം നേരിയതോതിൽ കൂടുന്നതാണ്.

കോഡ്	ചോദ്യങ്ങൾ	പ്രതികരണം	
P1	താങ്കളുടെ ജോലി, തുടർച്ചയായി പത്ത് മിനിറ്റെങ്കിലും അടുപ്പിച്ച് കഠിനമായ കായികപ്രവൃത്തികൾ (ശാരീരികമാധ്വാനമുള്ള, ശ്വാസോച്ഛ്വാസം വളരെയധികം കൂടുന്ന) ഉള്ളതാണോ (ഉദാ: വളരെഭാരമുള്ളവ എടുക്കുകയും, ഉയർത്തുകയും ചെയ്യുക, കുഴിക്കുകയോ നിർമ്മാണ പ്രവർത്തനമോ ചെയ്യുക)	അതെ ☐ ഇല്ല ☐	അതെയെങ്കിൽ P1A യിലേക്കും മറിച്ചായാൽ P2 വിലേക്കും പോവുക

P1A	ഒരാഴ്ചയിൽ എത്ര ദിവസവും, ഒരോ ദിവസവും എത്ര സമയവും താഴെപ്പറയുന്ന കഠിനമായ ജോലികളിൽ ചെലവഴിച്ചു എന്നുള്ളത് രേഖപ്പെടുത്തുക. ഒരു സാധാരണ ആഴ്ചയിൽ ചെയ്യുന്ന കഠിനമായ ജോലികൾ മാത്രം രേഖപ്പെടുത്തുക.

കോഡ്	പ്രവർത്തനം	ആഴ്ചയിൽ എത്ര ദിവസം ചെലവഴിച്ചു	ഒരുദിവസം എത്ര സമയം ചെലവാക്കി
P1 A1	ഭാരം എടുക്കൽ, ഭാരംചുമക്കൽ അല്ലെങ്കിൽ തടികൾ കൂട്ടിയിടൽ	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A2	കിണറിൽനിന്ന് വെള്ളം കോരുകയും മറ്റുവീട്ടിൽനിന്ന് വെള്ളം കോരി കൊണ്ടുവരികയും	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A3	പൊട്ടിച്ചപാറക്ഷണങ്ങൾ ഇറക്കുക	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A4	അമ്മിക്കല്ലിൽ ആട്ടുക, അരയ്ക്കുക	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A5	ധാന്യങ്ങൾ ഉരലിൽ പൊടിക്കുക	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A6	മരം മുറിക്കുക , തടി കഷണങ്ങളാക്കുക	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A7	ഇഷ്ടികപോലെയുള്ളതോരുള്ള വസ്തുക്കൾ എടുക്കുക	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P1 A8	മറ്റുള്ളവ എന്തെങ്കിലും ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
	മറ്റുള്ളവ എന്തെങ്കിലും		

P1 A9	(ദയവായി വിശദമാക്കുക)		മണിക്കൂർ ___ മിനിറ്റ് ___
P1A10	മറ്റുള്ളവ എന്തെങ്കിലും ....(ദയവായി വിശദമാക്കുക)	________	മണിക്കൂർ ___ മിനിറ്റ് ___

കോഡ്	ചോദ്യങ്ങൾ	പ്രതികരണം	
P2	താങ്കളുടെ ജോലി, തുടർച്ചയായി പത്ത് മിനിറ്റെങ്കിലും മിതമായ കായികപ്രവൃത്തികൾ (ശ്വാസോച്ഛ്വാസം നേരിയതോതിൽ കൂട്ടുന്ന) ഉള്ളതാണോ (ഉദാ: വേഗത്തിലുള്ള നടത്തം, ചെറിയ തോതിലുള്ള ഭാരം ഉയർത്തുക, സാവധാനം സൈക്കിൾ ചവിട്ടുക തുടങ്ങിയവ)?	അതെ ☐ ഇല്ല ☐	അതെയെങ്കിൽ P2A യിലേക്കും മറിച്ചായാൽ പി 3യിലേക്കും പോവുക
P2 A	ഒരാഴ്ച്ചയിൽ എത്ര ദിവസവും, ഒരോ ദിവസവും എത്ര സമയവും താഴെപ്പറയുന്ന മിതമായ ജോലികളിൽ ചെലവഴിച്ചു എന്നുള്ളത് രേഖപ്പെടുത്തുക. ഒരു സാധാരണ ആഴ്ച്ചയിൽ ചെയ്യുന്ന മിതമായ ജോലികൾ മാത്രം രേഖപ്പെടുത്തുക.		

കോഡ്	പ്രവർത്തനം	ആഴ്ച്ചയിൽ എത്ര ദിവസം ചെലവഴിച്ചു	ഒരുദിവസം എത്ര സമയം ചെലവാക്കി
P2 A1	തുണികഴുകൽ	________	മണിക്കൂർ ___ മിനിറ്റ് ___
P2 A2	തറ തുടക്കുക (വീട്ടിനകത്തോ പുറത്തോ)	________	മണിക്കൂർ ___ മിനിറ്റ് ___
P2 A3	തറ വൃത്തിയാക്കൽ (കാൽമുട്ടിൽ കുനിഞ്ഞുനിന്ന് കൈഉപയോഗിച്ച്)	________	മണിക്കൂർ ___ മിനിറ്റ് ___

P2 A14	പാചകം അല്ലെങ്കിൽ ഭക്ഷണം തയ്യാറാക്കൽ	_____	മണിക്കൂർ ____ മിനിറ്റ് ____
P2 A15	കടയിൽനിന്ന് സാധനങ്ങൾ വാങ്ങിച്ച് ചുമന്നുകൊണ്ടുവരിക	_____	മണിക്കൂർ ____ മിനിറ്റ് ____
P2 A16	മറ്റുള്ളവ എന്തെങ്കിലും. ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ ____ മിനിറ്റ് ____
P2 A17	മറ്റുള്ളവ എന്തെങ്കിലും. ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ ____ മിനിറ്റ് ____
P2 A18	മറ്റുള്ളവ എന്തെങ്കിലും ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ ____ മിനിറ്റ് ____
P2 A19	മറ്റുള്ളവ എന്തെങ്കിലും ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ ____ മിനിറ്റ് ____

ഒരിടത്തുനിന്നും മറ്റൊരിടത്തേക്ക് യാത്ര

താഴെകൊടുത്തിരിക്കുന്ന ചോദ്യങ്ങളിൽ ജോലിസംബന്ധമായ ശാരീരിക പ്രവർത്തനങ്ങൾ ഉൾപ്പെടുന്നില്ല

ഞാൻ ഇനി ചോദിക്കുവാൻ പോകുന്നത് ഒരു സാധാരണ ആഴ്ച്ചയിൽ ഒരിടത്തുനിന്നും മറ്റൊരിടത്തേക്കുള്ള യാത്രയെകുറിച്ചാണ് (ഉദാ: ജോലിസ്ഥലം, മാർക്കറ്റ്, അമ്പലം അഥവ പള്ളിയിൽ പോകുന്നത്)

കോഡ്	ചോദ്യങ്ങൾ	പ്രതികരണം	
P3	നിങ്ങൾ ഒരിടത്തുനിന്ന് മറ്റൊരിടത്തെത്താൻ തുടർച്ചയായി പത്ത് മിനിറ്റെങ്കിലും നടക്കുകയോ, സൈക്കിൾ ചവിട്ടുകയോ ചെയ്യുന്നുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐	P3 a യിലേക്ക് പോവുക ഇല്ലെങ്കിൽ P4 ലേക്ക് പോവുക
ഒരിടത്തുനിന്നും മറ്റൊരു സ്ഥലത്തേക്ക് നടന്നത്			
		ആഴ്ച്ചയിൽ എത്ര	ഒരുദിവസം എത്ര

ഒരിടത്തുനിന്നും മറ്റൊരിടത്തേക്ക് യാത്ര			
താഴെകൊടുത്തിരിക്കുന്ന ചോദ്യങ്ങളിൽ ജോലിസംബന്ധമായ ശാരീരിക പ്രവർത്തനങ്ങൾ ഉൾപ്പെടുന്നില്ല ഞാൻ ഇനി ചോദിക്കുവാൻ പോകുന്നത് ഒരു സാധാരണ ആഴ്ച്ചയിൽ ഒരിടത്തുനിന്നും മറ്റൊരിടത്തേക്കുള്ള യാത്രയെകുറിച്ചാണ് (ഉദാ: ജോലിസ്ഥലം, മാർക്കറ്റ്, അമ്പലം അഥവ പള്ളിയിൽ പോകുന്നത്)			
കോഡ്	ചോദ്യങ്ങൾ	പ്രതികരണം	
P3	നിങ്ങൾ ഒരിടത്തുനിന്ന് മറ്റൊരിടത്തെത്താൻ തുടർച്ചയായി പത്ത് മിനിറ്റെങ്കിലും നടക്കുകയോ, സൈക്കിൾ ചവിട്ടുകയോ ചെയ്യുന്നുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐	P3 a യിലേക്ക് പോവുക ഇല്ലെങ്കിൽ P4 ലേക്ക് പോവുക
ഒരിടത്തുനിന്നും മറ്റൊരു സ്ഥലത്തേക്ക് നടന്നത്			
		ആഴ്ച്ചയിൽ എത്ര	ഒരുദിവസം എത്ര

P3 A	പ്രവർത്തനം	ദിവസം ചെലവഴിച്ചു	സമയം ചെലവഴിച്ചു
P3 A1	ജോലിക്ക്	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 A2	പഞ്ചായിലേക്ക്	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 A3	കടകളിലേക്ക്	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 A4	കുട്ടികളെ കൂട്ടികൊണ്ടുവരാൻ സ്കൂളിലേക്ക്	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 A5	സുഹൃത്തുക്കളെ, ബന്ധുക്കളെ അല്ലെങ്കിൽ മറ്റുള്ളവരെ കാണാൻ	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 A6	ക്ഷേത്രത്തിലേക്കോ, പള്ളിയിലേയ്ക്കോ	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 A7	മറ്റുള്ളവ എന്തെങ്കിലും ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 B	ഒരിടത്തുനിന്നും മറ്റൊരിടത്തേക്ക് സൈക്കിളിൽ പോയത്		
P3 B1	ജോലിക്ക്	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 B2	പഞ്ചായിലേക്ക്/കടകളിലേക്ക്	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 B3	മറ്റുള്ളവ എന്തെങ്കിലും ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ _____ മിനിറ്റ് _____
P3 B4	മറ്റുള്ളവ എന്തെങ്കിലും ..... (ദയവായി വിശദമാക്കുക)	_____	മണിക്കൂർ _____ മിനിറ്റ് _____

വിനോദ പ്രവർത്തനങ്ങൾ

നിങ്ങൾ നേരത്തേസൂചിപ്പിച്ച ജോലി, സഞ്ചാര പ്രവർത്തനങ്ങളെ അടുത്ത ചോദ്യങ്ങളിൽ ഉൾപ്പെടുത്തരുത്. കളി, വിനോദ/വിശ്രമ വേളയിലുള്ള പ്രവർത്തനങ്ങളെക്കുറിച്ചാണ് ഞാനിപ്പോൾ നിങ്ങളോട് ചോദിക്കാൻ പോകുന്നത്.

P4	തുടർച്ചയായി പത്ത് മിനിറ്റെങ്കിലും ശ്വാസഗതിയുടെയോ, ഹൃദയമിടിപ്പിന്റെയോ വലിയവർധനയ്ക്കു കാരണമാകുന്ന കഠിനമായ കളികൾ (ഓട്ടം, ഫുട്ബോൾ, ബാഡ്മിന്റൺ എന്നിവയെപ്പോലെ) വിനോദം/ വിശ്രമ വേളകളിൽ നിങ്ങൾ ചെയ്യാറുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐	ഉണ്ടെങ്കിൽ P5ലേക്ക് പോവുക ഇല്ലെങ്കിൽ P7ലേക്ക് പോവുക
P5	ഒരു സാധാരണ ആഴ്ച്ചയിൽ എത്രദിവസം നിങ്ങൾ കഠിനമായ കളികൾ ചെയ്യാറുണ്ട്?	ദിവസങ്ങളുടെ എണ്ണം ____	
P6	ഒരു സാധാരണ ദിവസത്തിൽ എത്രസമയം നിങ്ങൾ കഠിനമായ കളികൾ ചെയ്യാൻ വിനിയോഗിക്കുന്നുണ്ട്?	മണിക്കൂർ ____ മിനിറ്റ് ____	
P7	തുടർച്ചയായി പത്ത് മിനിറ്റെങ്കിലും ശ്വാസഗതിയുടെയോ, ഹൃദയമിടിപ്പിന്റെയോ നേരിയവർധനയ്ക്കുകാരണമാവുന്ന വേഗത്തിലുള്ള നടത്തം, സൈക്കിൾ ചവിട്ടൽ, നീന്തൽ, വോളിബോൾ എന്നിവയെപ്പോലുള്ള മിതമായ കളികൾ, വിനോദം/ വിശ്രമ വേളകളിൽ നിങ്ങൾ ചെയ്യുന്നുണ്ടോ?	ഉണ്ട് ☐ ഇല്ല ☐	ഉണ്ടെങ്കിൽ P8ലേക്ക് പോവുക ഇല്ലെങ്കിൽ P10ലേക്ക് പോവുക
P8	ഒരു സാധാരണ ആഴ്ച്ചയിൽ എത്ര ദിവസം നിങ്ങൾ മിതമായ കളികൾ ചെയ്യും?	ദിവസങ്ങളുടെ എണ്ണം ____	
P9	ഒരു സാധാരണ ദിവസം എത്രസമയം നിങ്ങൾ മിതമായ കളികൾ ചെയ്യും?	മണിക്കൂർ ____ മിനിറ്റ് ____	

ഇരിക്കുന്ന സമയം:

ജോലിയിൽ, വീട്ടിൽ, ഒരിടത്തുനിന്ന് മറ്റൊരിടത്തേക്കുപോവുക അല്ലെങ്കിൽ സുഹൃത്തുക്കളോടൊപ്പമിരിക്കുക [ഇരുന്നുള്ള ഓഫീസ് ജോലി, സുഹൃത്തുക്കളോടൊപ്പമിരിക്കുക, കാർ, ബസ്, തീവണ്ടി മുതലായവയിൽ സഞ്ചരിക്കുക, വായിക്കുക, ചീട്ടുകളിക്കുക അല്ലെങ്കിൽ ടെലിവിഷൻ കാണുക] എന്നിവയ്ക്കായി ചെലവാക്കുന്ന സമയത്തെക്കുറിച്ചുള്ളതാണ് താഴെകൊടുത്തിരിക്കുന്ന ചോദ്യം. പക്ഷേ, ഉറങ്ങാൻ വിനിയോഗിക്കുന്ന സമയത്തെ ഉൾപ്പെടുത്തിയിട്ടില്ല.

P10	ഒരു സാധാരണ ദിവസത്തിൽ നിങ്ങൾ ഇരിക്കുന്നതിനോ കിടക്കുന്നതിനോ എത്രസമയം വിനിയോഗിക്കുന്നു?	മണിക്കൂർ ____ മിനിറ്റ് ____
P11	ദിവസവും രാത്രിയിൽ ശരാശരി എത്ര മണിക്കൂർ ഉറങ്ങുന്നു?	മണിക്കൂർ ____ മിനിറ്റ്

ഭാഗം 2 കായികപ്രവർത്തനത്തെ സ്വാധീനിക്കുന്ന വിവിധ ഘടകങ്ങളെപ്പറ്റിയുള്ള ചോദ്യാവലി (**Questionnaire on various factors influencing physical activity)**

വ്യക്തിപരമായ ഘടകങ്ങൾ

(Individual factors)

പ്രചോദനം

എം.പി.എ.എം–ആർ സ്കെയിൽ

ജനങ്ങൾ കായികപ്രവർത്തനത്തിലും കളികളിലും വ്യായാമത്തിലും ഏർപ്പെടുന്നതിന്റെ കാരണങ്ങളുടെ ഒരു പട്ടികയാണ് താഴെ നൽകുന്നത്. താങ്കളുടെ പ്രധാന കായികപ്രവർത്തനം മനസ്സിൽ വച്ചുകൊണ്ട്, താങ്കളടെ കാര്യത്തിൽ ആ പ്രതികരണം എത്ര സത്യമാണ് എന്നതിനെ അടിസ്ഥാനമാക്കി, ഓരോ ചോദ്യത്തോടും (തന്നിരിക്കുന്ന തോതുപയോഗിച്ച്) പ്രതികരിക്കുക,

1	2	3	4	5	6	7
എന്നെ സംബന്ധിച്ച് ഒട്ടും സത്യമല്ല						എന്നെ സംബന്ധിച്ച് വളരെ സത്യമാണ്

2.1 എനിക്ക് കായികക്ഷമതയുണ്ടാകാൻ

2.2 അത് രസകരമായതിനാൽ

2.3 കായികമായ വെല്ലുവിളികളെ നേരിടുന്ന പ്രവർത്തികളിൽ പങ്കെടുക്കുന്നത് എനിക്ക് ഇഷ്ടമായതിനാൽ

2.4 എനിക്ക് പുതിയ വൈദഗ്ദ്ധ്യങ്ങൾ നേടാൻ വേണ്ടി

2.5 എന്റെ ആകാരവും ഭാരവും നിലനിർത്തുന്നതിലൂടെ കൂടുതൽ സുഭഗമാകുവാൻ

2.6 എന്റെ സുഹൃത്തുക്കളോടെപ്പം ചേരാൻ.

2.7 എനിക്ക് ഈ പ്രവർത്തി ഇഷ്ടമായതിനാൽ

2.8 എന്റെ നിലവിലുള്ള വൈദഗ്ദ്ധ്യത്തെ മെച്ചപ്പെടുത്താൻ

2.9 എനിക്ക് വെല്ലുവിളി ഇഷ്ടമായതിനാൽ

2.10 എന്റെ പേശികളെ ദൃഢമാക്കുന്നതിലൂടെ എന്റെ ആകാരം മെച്ചപ്പെടുത്താൻ

2.11 അത് എന്നെ സന്തോഷിപ്പിക്കുന്നതിനാൽ

2.12 എനിക്ക് എന്റെ ഇപ്പോഴുള്ള വൈദഗ്ദ്ധ്യം നിലനിർത്താൻ

2.13 എനിക്ക് കൂടുതൽ ഊർജ്ജം വേണ്ടതിനാൽ

2.14 കായികമായ വെല്ലുവിളി ഉയർത്തുന്ന പ്രവർത്തികൾ എനിക്ക് ഇഷ്ടമായതിനാൽ

2.15 ഈ പ്രവർത്തിയിൽ താത്പര്യമുള്ളവരോടൊപ്പം ചേരാൻ എനിക്ക് ഇഷ്ടമായതിനാൽ

2.16 എന്റെ ഹൃദയാരോഗ്യം മെച്ചപ്പെടുത്താൻ

2.17 എന്റെ ശരീരവടിവ് മെച്ചപ്പെടുത്താൻ

2.18 ഇത് രസകരമെന്ന് ഞാൻ വിചാരിക്കുന്നതിനാൽ

2.19 ആരോഗ്യകരമായ ജീവിതം നയിക്കാൻ വേണ്ടി എന്റെ കായികശക്തി നിലനിർത്താൻ

2.20 ഞാൻ മറ്റുള്ളവർക്ക് ആകർഷകമാകാൻ

2.21 എനിക്ക് പുതിയ ആളുകളെ സന്ധിക്കാൻ വേണ്ടി

2.22 ഞാൻ ഈ പ്രവർത്തി ആസ്വദിക്കുന്നതിനാൽ

2.23 എന്റെ കായിക ആരോഗ്യവും സൗഖ്യവും നിലനിർത്താൻ

2.24 എന്റെ ശാരീരിക ആകൃതി മെച്ചപ്പെടുത്തുവാൻ

2.25 എന്റെ പ്രവർത്തികളിൽ മെച്ചപ്പെടുത്തലുണ്ടാകാൻ

2.26 ഈ പ്രവർത്തി പ്രചോദിപ്പിക്കുന്നതായി കണ്ടതിനാൽ

2.27 ഞാനിതുചെയ്തില്ലെങ്കിൽ കായികമായി ആകർഷകം അല്ലാത്തതായി എനിക്കു തോന്നുമെന്നതിനാൽ

2.28 എന്റെ സുഹൃത്തുക്കൾക്ക് വേണ്ടതിനാൽ

2.29 പങ്കെടുക്കുന്നതിലുള്ള ആവേശംകൊണ്ട്

2.30 മറ്റുള്ളവരോടൊപ്പം ഈ പ്രവർത്തി ചെയ്തുകൊണ്ട് സമയം ചിലവഴിക്കുന്നത് എനിക്ക് ആസ്വാദ്യമായതിനാൽ

സ്വന്തം കാര്യക്ഷമതയുടെ തോത് **(Self efficacy scale)**

താഴെപ്പറയുന്ന ചോദ്യങ്ങൾക്കുത്തരം നൽകുമ്പോൾ, വ്യത്യസ്ത കായിക പ്രവർത്തനങ്ങളിലേർപ്പെടാൻ എത്രത്തോളം ആത്മവിശ്വാസം താങ്കൾക്ക് ഉണ്ട് എന്ന് ആലോചിക്കുവാനാവശ്യപ്പെടും. ആത്മവിശ്വാസം എന്ന വാക്കുകൊണ്ട് ഉദ്ദേശിക്കുന്നത് എന്തെങ്കിലും നന്നായി ചെയ്യാമെന്നുള്ള താങ്കളുടെ വിശ്വാസത്തെയാണ്.

1	2	3	4	5	6	7	8	9	10
ഒട്ടും ആത്മ വിശ്വാസമില്ല									നല്ല ആത്മ വിശ്വാസം

താഴെപ്പറയുന്ന സാഹചര്യങ്ങളിൽ, ആഴ്ചയിൽ മൂന്ന് പ്രാവശ്യം 20 മിനിട്ടുനേരം വീതം വ്യായാമം ചെയ്യും എന്നുള്ള ആത്മവിശ്വാസം ഇപ്പോൾ താങ്കൾക്കുണ്ട്

1. കാലാവസ്ഥ താങ്കളെ ശല്യപ്പെടുത്തയാൽ
2. പരിപാടികൊണ്ടോ പ്രവർത്തികൊണ്ടോ താങ്കൾക്ക് വിരസതയുണ്ടായാൽ
3. വ്യായാമം ചെയ്യുമ്പോൾ താങ്കൾക്ക് വേദന തോന്നിയാൽ
4. താങ്കൾക്ക് ഒറ്റയ്ക്ക് വ്യായാമം ചെയ്യേണ്ടിവന്നാൽ
5. താങ്കളത് ആസ്വദിക്കാഞ്ഞാൽ
6. താങ്കൾ മറ്റ് പ്രവർത്തികളാൽ വളരെ തിരക്കിലായാൽ
7. താങ്കൾക്ക് ക്ഷീണം അനുഭവപ്പെട്ടാൽ
8. താങ്കൾക്ക് സമ്മർദ്ദം അനുഭവപ്പെട്ടാൽ
9. താങ്കൾക്ക് വിഷാദം അനുഭവപ്പെട്ടാൽ

(Physical environmental variables)

ഭൗതീക സാഹചര്യങ്ങളിൽ വരുന്ന മാറ്റങ്ങൾ: പങ്കെടുക്കുന്നയാളുടെ സാഹചര്യങ്ങളെപ്പറ്റിയുള്ള ധാരണ

ചുറ്റുപാടുകളുടെ ഗുണമേന്മ :

നടക്കാൻ താങ്കളുടെ ചുറ്റുപാടുകൾ സുരക്ഷിതമാണോ? അതെ അല്ല

കായികപ്രവർത്തനത്തിലേർപ്പെടാൻ സന്തോഷകരമായ ചുറ്റുപാടുകളാണോ താങ്കളുടേത്? അതെ അല്ല

ഗതാഗതം/കുറ്റകൃത്യങ്ങൾ/അലഞ്ഞുനടക്കുന്ന മൃഗങ്ങൾ എന്നിവ താങ്കളുടെ പ്രദേശത്ത് കായിക പ്രവർത്തനങ്ങൾ നടത്തുന്നതിന് തടസ്സമാകുന്നുണ്ടോ? ഉണ്ട് ഇല്ല

സൗകര്യങ്ങളുടെ ലഭ്യത :

താങ്കളുടെ പ്രദേശത്ത് നടക്കാൻ/ സൈക്കൾചവിട്ടാനുള്ള പാത, കളിസ്ഥലങ്ങൾ, അകത്ത്/തുറസ്സായ സ്ഥലത്ത് വ്യായാമം ചെയ്യാനുള്ള സ്ഥലങ്ങൾ എന്നിവയുണ്ടോ?
ഉണ്ട് ഇല്ല

സാമൂഹ്യ പിന്തുണ

വൈകാരിക പിന്തുണ

താങ്കൾക്ക് വ്യായാമം ചെയ്യണമെങ്കിൽ താങ്കളുടെ മറ്റ് ഉത്തരവാദിത്വങ്ങളിൽ സഹായിക്കാൻ ആരെങ്കിലുമുണ്ടോ? ഉണ്ട് ഇല്ല

താങ്കളുടെ കായിക പ്രവർത്തനങ്ങളിൽ താങ്കളുടെ കുടുംബവും സുഹൃത്തുക്കളും പിന്തുണയ്ക്കുന്നവരാണോ? അതെ അല്ല

താങ്കളുടെ സുഹൃത്തുക്കളും കുടുംബവും പങ്കെടുക്കുകയാണെങ്കിൽ താങ്കൾ കൂടുതൽ സജീവമാകുമെന്ന് കരുതുന്നുണ്ടോ? ഉണ്ട് ഇല്ല

വിവര ലഭ്യതയിലൂടെയുള്ള പിന്തുണ
കായികപ്രവർത്തനങ്ങളുണ്ടാക്കുന്ന നേട്ടത്തെപ്പറ്റി താങ്കൾക്ക് പൂർണ്ണമായ വിവരമുണ്ടെന്ന് താങ്കൾ കരുതുന്നുണ്ടോ? ഉണ്ട് ഇല്ല
കായിക പ്രവർത്തനങ്ങളെ സംബന്ധിച്ച് താങ്കൾക്ക് പൂർണ്ണമായ വിവരങ്ങളുണ്ടെങ്കിൽ താങ്കൾ കൂടുതൽ സജീവമാകുമെന്ന് കരുതുന്നുണ്ടോ? ഉണ്ട് ഇല്ല

സമൂഹത്തിലെ അംഗങ്ങൾക്കിടയിലെ സർവ്വേക്കു വേണ്ടി
കാര്യബോധത്തോടെയുള്ള സമ്മതപത്രം
Informed Consent for administering the survey among members of the community

പങ്കെടുക്കുന്നവർക്കുള്ള കാര്യവിവരണപത്രം
Information sheet for participants

പഠന ശീർഷകം. *"ഇന്ത്യയിൽ കേരളത്തിലെ കോട്ടയം ജില്ലയിലെ പ്രായപൂർത്തിയായവരുടെ കായികപ്രവർത്തനങ്ങളെ നിർണ്ണയിക്കുന്ന ഘടകങ്ങൾ. ഒരു സാമൂഹിക-പാരിസ്ഥിതിക സമീപനം"*

അച്യുതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്, ശ്രീചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആന്റ് ടെക്നോളജി, തിരുവനന്തപുരം, കേരളം 695011

നമസ്കാരം

ശ്രീചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആന്റ് ടെക്നോളജി, തിരുവനന്തപുരത്തെ, അച്യുതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിൽ ഡോക്ടർ ഓഫ് ഫിലോസഫിക്ക് (പിഎച്ച്ഡി) വേണ്ടിയുള്ള ഗവേഷണം നടത്തുന്ന ശാലിനി ഗാർഗ് എന്ന ഞാൻ കായികപ്രവർത്തിയും ആരോഗ്യവും ഉൾക്കൊള്ളുന്ന ഒരുഗവേഷണ പഠനത്തിൽ താങ്കളുടെ പങ്കാളിത്തം അഭ്യർത്ഥിക്കുകയാണ്. എന്റെ ഗവേഷണം വിവിധ കായിക പ്രവർത്തന പദ്ധതികളിലെ ജനങ്ങളുടെ പങ്കാളിത്തത്തെ ബാധിക്കുന്ന വ്യത്യസ്ത ഘടകങ്ങൾ പരിശോധിക്കുകയാണ്.

സമൂഹത്തിലെ അംഗമെന്ന നിലയിലാണ് താങ്കളെ ഈ അഭിമുഖത്തിനായി സമീപിക്കുന്നത്. താങ്കളുടെ ജീവിതത്തിൽ, ഒരു സാധാരണ ദിവസം എത്രത്തോളം കായികപ്രവർത്തനം താങ്കൾ നേടുന്നു എന്നറിയാനും ആയത് താങ്കൾക്ക് ആരോഗ്യപരമായ നേട്ടങ്ങൾ കിട്ടാൻ പര്യാപ്തമാണോ എന്ന് വിലയിരുത്താനും എനിക്ക് താത്പര്യമുണ്ട്. അങ്ങിനെയല്ലെങ്കിൽ താങ്കളുടെ ഒഴിവു സമയത്ത് കായിക പ്രവർത്തനങ്ങളിൽ പങ്കെടുക്കുന്നതിന് തടസ്സമാകുന്ന ഘടകങ്ങൾ എന്തൊക്കെയാണ്? ഈ വിവരങ്ങൾ കേരളത്തിലെ ആരോഗ്യത്തെ പരിപോഷിപ്പിക്കുന്നതിനും കാൻസർ, പ്രമേഹം, അമിതവണ്ണം, പക്ഷാഘാതം തുടങ്ങിയ പകർച്ചേതര രോഗങ്ങളെ തടയുന്നതിനും ലക്ഷ്യമിട്ടുള്ള ഭാവിയിലെ ഇടപെടലുകൾ വികസിപ്പിക്കുന്നതിന് എനിക്കും മറ്റുള്ളവർക്കും മാർഗദർശകമാകും.

ഈ അഭിമുഖത്തിൽ പങ്കെടുക്കാൻ താങ്കളുടെ 30-45 മിനിട്ട് സമയം വേണ്ടിവരും. അഭിമുഖത്തിനിടയിൽ എപ്പോൾ വേണമെങ്കിലും താങ്കൾക്ക് പങ്കെടുക്കുന്നതിൽ നിന്നും പിൻമാറാനും ഏതു സമയത്തും ഏതു ചോദ്യത്തിനും മറുപടി പറയാതിരിക്കാനും സ്വാതന്ത്ര്യമുണ്ട്. ഈ അഭിമുഖത്തിൽ പങ്കെടുക്കുന്നതുകൊണ്ട് താങ്കൾക്ക് നേരിട്ട് നേട്ടമുണ്ടായേക്കില്ല പക്ഷേ ഗവേഷണ പഠന ഫലങ്ങളുടെ പ്രചാരം സമൂഹത്തിലെ ജനങ്ങൾക്ക് കൂടുതൽ സജീവമാകാനും, ഭാവിയിൽ മസ്തിഷ്കാഘാതവും കാൻസറും പോലുള്ള പകർച്ചേതരരോഗങ്ങളുടെ നിയന്ത്രണത്തിനുള്ള സാമൂഹികമായ ഇടപെടൽ വികസിപ്പിക്കുവാനും വിലയിരുത്തുവാനും സഹായകമായേക്കാം.

താങ്കൾ നൽകുന്ന വിവരങ്ങൾ കർശനമായും രഹസ്യമായിരിക്കും. ഈ അഭിമുഖത്തിന്റെ വിശദാംശങ്ങൾ രേഖപ്പെടുത്തുകയും ഗവേഷണാവശ്യത്തിനുമാത്രം ഉപയോഗിക്കുകയും ചെയ്യും. താങ്കളുടെ പേര്, മറ്റ് വ്യക്തി വിവരങ്ങൾ, താങ്കളുടെ സമൂഹത്തിന്റെ വിവരങ്ങൾ എന്നിവ വിശകലനം നടത്തുന്ന രേഖകളിലുണ്ടാവില്ല. അഭിമുഖത്തിന്റെ ശബ്ദരേഖകളും രേഖകളും ഞാൻ (പ്രധാന ഗവേഷക) സുരക്ഷിതമായി വയ്ക്കുകയും പഠനത്തിനവസാനം നശിപ്പിക്കുകയും ചെയ്യും.

താങ്കൾ പഠനത്തിൽ പങ്കെടുക്കാൻ സമ്മതിക്കുന്നു എങ്കിൽ ശ്രദ്ധാപൂർവ്വം വായിച്ചശേഷം യോജിപ്പ് സമ്മത പത്രത്തിൽ അറിയിക്കുക. ഈ അഭിമുഖം ശബ്ദലേഖനം ചെയ്യാനും താങ്കളുടെ സമ്മതം ഞാനഭ്യർത്ഥിക്കുന്നു.

ഈ പഠനത്തിന്റെ ഏതു വശത്തെപ്പറ്റിയും താങ്കൾക്ക് കൂടുതൽ വിവരം ആവശ്യമെങ്കിൽ ദയവായി താഴെപ്പറയുന്ന ആളുകളെ ബന്ധപ്പെടാൻ മടിക്കരുത്.
താങ്കൾക്ക് എന്നെ (പ്രധാന ഗവേഷക) 9562597509 എന്ന നമ്പരിലോ gargshalini1978@gmail.com എന്ന ഇമെയിലിലോ ബന്ധപ്പെടാം.
പിന്നീട് ഈ പഠനസംബന്ധമായി എന്തെങ്കിലും ചോദ്യങ്ങളോ ഉത്കണ്ഠകളോ ഉണ്ടാവുകയും എന്നോടല്ലാതെ മറ്റാരെങ്കിലുമായി സംസാരിക്കാൻ താത്പര്യപ്പെടുകയുമാണെങ്കിൽ സ്ഥാപനത്തിലെ നൈതീക കമ്മിറ്റി മെമ്പർ സെക്രട്ടറി ഡോ. മാലരാമനാഥനുമായി ബന്ധപ്പെടാം ഫോൺ 0471 -2524234 ഇമെയിൽ mala@sctimst.ac.in

നന്ദി
അഭിമുഖം നടത്തുന്നയാളുടെ പേര്

അഭിമുഖം നടത്തുന്നയാളുടെ ഒപ്പ്

സമ്മത പത്രം (Consent Statement)

കാര്യവിവരണപത്രത്തിൽ നൽകിയിട്ടുള്ള വിവരങ്ങൾ ഞാൻ വായിച്ചു. പഠനത്തിന്റെ സ്വഭാവത്തെപ്പറ്റിയും എന്റെ പങ്കാളിത്തത്തെപ്പറ്റിയും വിശദീകരിക്കുകയും എന്റെ എല്ലാ ചോദ്യങ്ങൾക്കും ഉത്തരം നൽകുകയും ചെയ്തു. ഈ സമ്മതപത്രം ഒപ്പിടുന്നതിലൂടെ, എന്നിൽനിന്നും എന്താണ് പ്രതീക്ഷിക്കുന്നതെന്നു ഞാൻ മനസ്സിലാക്കിയെന്നും ഈ പഠനത്തിൽ പങ്കെടുക്കാൻ എനിക്ക് സമ്മതമാണെന്നും അറിയിക്കുകയാണ്. എനിക്ക് ഏതുസമയത്തും പിൻമാറാമെന്ന് എനിക്കറിയാം. ആവശ്യമുണ്ടാകുകയാണെങ്കിൽ ആരെ ബന്ധപ്പെടണമെന്നും എന്നെ അറിയിച്ചിട്ടുണ്ട്.

അഭിമുഖത്തിന് ഞാൻ സമ്മതിക്കുന്നു. അതെ ❑

ഒപ്പ് ……..

അല്ലെങ്കിൽ
താങ്കൾക്ക് പങ്കെടുക്കാൻ സമ്മതമല്ലെങ്കിൽ, താങ്കൾ ചിലവഴിച്ച സമയത്തിന് നന്ദി

പ്രതികരിച്ചയാളുടെ പേര്……

മേൽവിലാസം……

അഭിമുഖം നടത്തുന്നയാളുടെ പേര്

അഭിമുഖം നടത്തുന്നയാളുടെ ഒപ്പ്

പ്രതികരിച്ചയാളുടെ സവിശേഷ തിരിച്ചറിയൽ സങ്കേതം തിയതി സ്ഥലം

ഫോൺ മുഖേനയുള്ള അഭിമുഖത്തിന്റെ സമ്മതപത്രം

(Consent Script for Telephone Interviews)

ഭാഗം 1

ആമുഖം

ഹലോ, ഞാൻ ശാലിനി ഗാർഗ്, ശ്രീചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആന്റ് ടെക്നോളജി, തിരുവനന്തപുരത്തെ, അച്യുതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസിൽ നിന്നും വിളിക്കുന്നു.
ഞാൻ, കായികപ്രവർത്തനവും ആരോഗ്യവും എന്ന വിഷയത്തിൽ പിഎച്ച്ഡി ഗവേഷണം നടത്തുകയാണ്.

എന്റെ ഗവേഷണം വിവിധ കായിക പ്രവർത്തന പദ്ധതികളിലെ ജനങ്ങളുടെ പങ്കാളിത്തത്തെ ബാധിക്കുന്ന വ്യത്യസ്ത ഘടകങ്ങൾ പരിശോധിക്കുകയെന്നതാണ്. താങ്കളുടെ ഫോൺ നമ്പർ ക്രമമില്ലാതെ തിരഞ്ഞെടുത്തതാണ്, താങ്കളുടെ പേരോ മേൽവിലാസമോ ഞങ്ങൾക്കാവശ്യമില്ല. താങ്കളുടെ പ്രതികരണങ്ങളെല്ലാം രഹസ്യമായിരിക്കും ഞാൻ എനിക്കാവശ്യമുള്ള ചോദ്യങ്ങൾ ചോദിക്കാൻ കുറച്ചു മിനിട്ടുകളെടുക്കും. സമ്മതമാണോ? നമ്മൾ തുടരുന്നതിനുൻപ് താങ്കൾ 18 വയസ്സോ അതിലേറെയോ പ്രായമുണ്ടോയെന്ന് ഞങ്ങൾക്കറിയണം.

അതെയെങ്കിൽ, ചോദിക്കുക. താങ്കളുടെ പ്രായമെത്ര ?.....വർഷത്തിൽ
അല്ലെങ്കിൽ ചോദിക്കുക. ഞങ്ങൾക്ക് സംസാരിക്കാൻ, താങ്കളോടൊപ്പം 17 വയസ്സോ അതിലേറെയോ പ്രയമുള്ള ആരെങ്കിലും ഉണ്ടോ?
ഉണ്ടെങ്കിൽ ആമുഖം ആവർത്തിച്ചിട്ട് അഭിമുഖം തുടരുക.

ഇല്ലെങ്കിൽ അഭിമുഖം അവസാനിപ്പിക്കുക.
നന്ദി . ഞങ്ങൾക്ക് 18 വയസ്സോ അതിലേറെയോ പ്രയമുള്ളവരോട് സംസാരിക്കണം.

അതെയെങ്കിൽ

ആമുഖം ഭാഗം 2

താങ്കളുടെ ജീവിതത്തിൽ, ഒരു സാധാരണ ദിവസം എത്രത്തോളം കായികപ്രവർത്തനം താങ്കൾ നടത്തുന്നു എന്നറിയാനും ആയത് താങ്കൾക്ക് ആരോഗ്യപരമായ നേട്ടങ്ങൾ കിട്ടാൻ പര്യാപ്തമോണോ എന്ന് വിലയിരുത്താനും ഞങ്ങൾക്ക് താത്പര്യമുണ്ട്. താങ്കൾക്ക് ഉത്തരം പറയാതിരിക്കാനും സന്ദർഭോചിതമെങ്കിൽ അറിയില്ലെന്ന് പറയാനുമാകും. എല്ലാ കാര്യത്തിലും താങ്കളുടെ ഉത്തരങ്ങൾ രഹസ്യമായിരിക്കും. സമൂഹത്തിന്റെ ഭാഗമെന്ന നിലയിലാണ് താങ്കളെ തിരഞ്ഞെടുത്തത്, താങ്കളുടെ സഹകരണം വളരെ പ്രധാനമാണ്.

FOCUS GROUP GUIDE: FEMALES

ലക്ഷ്യമിടുന്ന സംഘത്തിനുള്ള മാർഗ്ഗരേഖ. കായിക പ്രവർത്തന പദ്ധതികളിൽ പങ്കെടുക്കുന്നവർ. ഉദാ. ജിംനേഷ്യം

തിരഞ്ഞെടുപ്പ് മാനദണ്ഡം. സ്ത്രീകൾ. 18–65 വയസ്സുള്ള ഒരുമാസമെങ്കിലും ജിം പദ്ധതികളിൽ പങ്കെടുക്കുന്നവർ

കാര്യബോധത്തോടെയുള്ള സമ്മതപത്രത്തിന്റെ കോപ്പികൾ ഓരോ പങ്കാളിക്കും നൽകുകയും വായിക്കാനാവാത്തവർക്ക് ഉച്ചത്തിൽ വായിച്ചുകൊടുക്കുകയും വേണം. ഏതു ചോദ്യം ചോദിക്കാനും പങ്കാളികൾക്ക് അവസരം നൽകണം. വാക്കാലുള്ള സമ്മതം ശബ്ദലേഖനം ചെയ്യണം. താഴെപ്പറയുന്നത് മാർഗരേഖയാണ്. എല്ലാ ചോദ്യങ്ങളും ക്രമാനുഗതമായി ചോദിക്കാൻ ശ്രമിക്കണം , പക്ഷേ ചർച്ചയുടെ ഒഴുക്ക് നിലനിർത്തുകയെന്നതാണ് കൂടുതൽ പ്രധാനം. നിർദ്ദേശിക്കപ്പെട്ട അന്വേഷണങ്ങൾ ഉൾപ്പെടുത്തിയിട്ടുണ്ട്. സംഘാംഗങ്ങളെല്ലാവരെയും സംഭാഷണത്തിൽ പങ്കെടുക്കുന്നതിന് പ്രോത്സാഹിപ്പിക്കാൻ താങ്കൾ ശ്രമിക്കണം. താഴെപ്പറയുന്നതുപോലെ അടിസ്ഥാന നിയമങ്ങൾ വിശദീകരിച്ചുകൊണ്ട് തുടങ്ങണം.

നമ്മൾ തുടങ്ങുന്നതിന് മുൻപ്, ഈ ചർച്ചയിൽ ശരിയായതോ തെറ്റായതോ ആയ ഒരുത്തരവുമില്ലെന്ന് താങ്കളെ ഓർമ്മിപ്പിക്കുവാൻ ഞാനാഗ്രഹിക്കുന്നു. നിങ്ങളോരോരുത്തരും എന്ത് വിചാരിക്കുന്നു എന്നറിയാനാണ് ഞങ്ങൾക്ക് താത്പര്യം, ആകയാൽ താങ്കൾ കേട്ടതിനോട് യോജിക്കുന്നോ ഇല്ലയോ എന്ന പരിഗണനയില്ലാതെ ദയവായി താങ്കളുടെ അഭിപ്രായം തുറന്ന് പങ്കുവെയ്ക്കുക. നിങ്ങളുടെ എല്ലാ അഭിപ്രായങ്ങളും കേൾക്കുക എന്നത് ഞങ്ങൾക്ക് വളരെ പ്രധാനമാണ്. താങ്കളുടെ ഈ അഭിപ്രായങ്ങൾ സംഘത്തിനുപുറത്തുള്ള ആളുകളോട് ആവർത്തിക്കരുതെന്ന് നിങ്ങൾ താത്പര്യപ്പെട്ടേക്കാം. ഇന്നത്തെ ഈ ചർച്ചയിൽ നിങ്ങൾകേട്ടത് മറ്റാരോടും പറയാതെ, താങ്കളോട് എങ്ങനെ പെരുമാറണമെന്ന് ആഗ്രഹിക്കുന്നോ അതുപോലെ സംഘത്തിലുള്ള മറ്റുള്ളവരോടും പെരുമാറുക. ഓരോരുത്തരും സ്വയം പരിചയപ്പെടുത്തിക്കൊണ്ട് നമുക്കാരംഭിക്കാം (ഗവേഷണ സംഘത്തിലുള്ളവരും സ്വയം പരിചയപ്പെടുത്തുകയും ഓരോരുത്തരുടെയും പങ്ക് വിശദീകരിക്കുകയും ചെയ്യണം).

1. ഞങ്ങളെ ഇന്നിവിടെ വരാനിടയാക്കിയ വിഷയത്തെപ്പറ്റി (കായിക പ്രവർത്തനം) നിങ്ങളെന്ത് വിചാരിക്കുന്നു?
2. താങ്കളുടെ അഭിപ്രായത്തിൽ ജിമ്മിൽ ചേരാനുള്ള ഏറ്റവും പ്രധാന കാരണമെന്ത്?
3. താങ്കളുടെ അഭിപ്രായത്തിൽ എന്തുകാരണങ്ങളാലാണ് വ്യായാമം ചെയ്യുന്നത് ?

വ്യായാമം ചെയ്യാതിരിക്കുന്നത്?

4. താങ്കളുടെ അഭിപ്രായത്തിൽ, താങ്കൾ വ്യായാമം ചെയ്യുന്നതുപോലെ കുടുതലാളുകൾ ചെയ്യാൻ എന്തൊക്കെ ആവശ്യങ്ങളും സേവനങ്ങളും വേണ്ടതുണ്ട് (കുട്ടിയെ നോക്കുന്നതിലുള്ള സഹായം, ധാർമ്മിക പിന്തുണ, സാമൂഹിക മാനദണ്ഡങ്ങൾ, അനുകരിക്കാവുന്ന മാതൃകകൾ) ?
5. കായികവിനോദത്തിലോ കായിക പ്രവർത്തികളിലെ പങ്കാളിത്തത്തിലോ താങ്കൾക്ക് പൂർവ്വ പരിചയമുണ്ടോ?
6. കായികപ്രവർത്തിയെപ്പറ്റി താങ്കൾക്ക് വിവരം കിട്ടിയതെവിടെ നിന്ന് (ആരോഗ്യ പ്രവർത്തകർ/ മാദ്ധ്യമങ്ങൾ/ കുട്ടികൾ/ ബന്ധുക്കൾ/ മറ്റ് ബന്ധങ്ങൾ) ?
7. നമ്മുടെ ചർച്ചയിൽനിന്നുള്ള ചില പ്രധാന ആശയങ്ങൾ നമുക്ക് സംഗ്രഹിക്കാം. മറ്റെന്തെങ്കിലുമുണ്ടോ?
8. നിങ്ങൾക്കെന്തെങ്കിലും ചോദ്യങ്ങളുണ്ടോ ?

ഞങ്ങളോട് സംസാരിക്കാൻ സമയം ചിലവഴിച്ച നിങ്ങൾക്ക് നന്ദി.

FOCUS GROUP GUIDE: MEN'S GROUP

ലക്ഷ്യമിടുന്ന സംഘത്തിനുള്ള മാർഗ്ഗരേഖ. പുരുഷന്മാരുടെ സംഘം
കായിക പ്രവർത്തന പദ്ധതികളിൽ പങ്കെടുക്കുന്നവർ ഉദാ. ജിംനേഷ്യം
തിരഞ്ഞെടുപ്പ് മാനദണ്ഡം. പുരുഷന്മാർ . 18–65 വയസ്സുള്ള ഒരുമാസത്തിലേറെയായി ജിം പദ്ധതികളിൽ പങ്കെടുക്കുന്നവർ

കാര്യബോധത്തോടെയുള്ള സമ്മതപത്രത്തിന്റെ കോപ്പികൾ ഓരോ പങ്കാളിക്കും നൽകുകയും വായിക്കാനാവാത്തവർക്ക് ഉച്ചത്തിൽ വായിച്ചുകൊടുക്കുകയും വേണം. ഏതു ചോദ്യം ചോദിക്കാനും പങ്കാളികൾക്ക് അവസരം നൽകണം. വാക്കാലുള്ള സമ്മതം ശബ്ദലേഖനം ചെയ്യണം. താഴെപ്പറയുന്നത് മാർഗരേഖയാണ്. എല്ലാ ചോദ്യങ്ങളും ക്രമാനുഗതമായി ചോദിക്കാൻ ശ്രമിക്കണം, പക്ഷേ ചർച്ചയുടെ ഒഴുക്ക് നിലനിർത്തു കയെന്നതാണ് കൂടുതൽ പ്രധാനം. നിർദ്ദേശിക്കപ്പെട്ട അന്വേഷണങ്ങൾ ഉൾപ്പെടുത്തി യിട്ടുണ്ട്. സംഘാംഗങ്ങളെല്ലാവരെയും സംഭാഷണത്തിൽ പങ്കെടുക്കുന്നതിന് പ്രോത്സാ ഹിപ്പിക്കാൻ താങ്കൾ ശ്രമിക്കണം. താഴെപ്പറയുന്നതുപോലെ അടിസ്ഥാന നിയമങ്ങൾ വിശദീകരിച്ചുകൊണ്ട് തുടങ്ങണം.

നമ്മൾ തുടങ്ങുന്നതിന് മുൻപ്, ഈ ചർച്ചയിൽ ശരിയായതോ തെറ്റായതോ ആയ ഒരുത്തരവുമില്ലെന്ന് താങ്കളെ ഓർമ്മിപ്പിക്കുവാൻ ഞാനാഗ്രഹിക്കുന്നു. നിങ്ങളോരോരുത്തരും എന്ത് വിചാരിക്കുന്നു എന്നറിയാനാണ് ഞങ്ങൾക്ക് താത്പര്യം, ആകയാൽ താങ്കൾ കേട്ടതിനോട് യോജിക്കുന്നോ ഇല്ലയോ എന്ന പരിഗണനയില്ലാതെ ദയവായി താങ്കളുടെ അഭിപ്രായം തുറന്ന് പങ്കുവെയ്ക്കുക. നിങ്ങളുടെ എല്ലാ അഭിപ്രായങ്ങളും കേൾക്കുക എന്നത് ഞങ്ങൾക്ക് വളരെ പ്രധാനമാണ്. താങ്കളുടെ ഈ അഭിപ്രായങ്ങൾ സംഘത്തിനുപുറത്തുള്ള ആളുകളോട് ആവർത്തിക്കരുതെന്ന് നിങ്ങൾ താത്പര്യപ്പെട്ടേക്കാം. ഇന്നത്തെ ഈ ചർച്ചയിൽ നിങ്ങൾകേട്ടത് മറ്റാരോടും പറയാതെ, താങ്കളോട് എങ്ങനെ പെരുമാറണമെന്ന് ആഗ്രഹിക്കുന്നോ അതുപോലെ സംഘത്തിലുള്ള മറ്റുള്ളവരോടും പെരുമാറുക. ഓരോരുത്തരും സ്വയം പരിചയപ്പെടുത്തിക്കൊണ്ട് നമുക്കാരംഭിക്കാം (ഗവേഷണ സംഘത്തിലുള്ളവരും സ്വയം പരിചയപ്പെടുത്തുകയും ഓരോരുത്തരുടെയും പങ്ക് വിശദീകരിക്കുകയും ചെയ്യണം).

1. ഞങ്ങളെ ഇന്നിവിടെ വരാനിടയാക്കിയ വിഷയത്തെപ്പറ്റി (കായിക പ്രവർത്തനം) നിങ്ങളെന്ത് വിചാരിക്കുന്നു?
2. താങ്കളുടെ അഭിപ്രായത്തിൽ ജിമ്മിൽ ചേരാനുള്ള ഏറ്റവും പ്രധാന കാരണമെന്ത്?
3. താങ്കളുടെ അഭിപ്രായത്തിൽ എന്തുകാരണങ്ങളാലാണ് വ്യായാമം ചെയ്യുന്നത്?

വ്യായാമം ചെയ്യാതിരിക്കുന്നത്?

4. താങ്കളുടെ അഭിപ്രായത്തിൽ, താങ്കൾ വ്യായാമം ചെയ്യുന്നതുപോലെ കുടുതലാളുകൾ ചെയ്യാൻ എന്തൊക്കെ ആവശ്യങ്ങളും സേവനങ്ങളും വേണ്ടതുണ്ട് (കുട്ടിയെ നോക്കുന്നതിലുള്ള സഹായം, ധാർമ്മിക പിന്തുണ, സാമൂഹിക മാനദണ്ഡങ്ങൾ, അനുകരിക്കാവുന്ന മാതൃകകൾ) ?
5. കായികവിനോദത്തിലോ കായിക പ്രവർത്തികളിലെ പങ്കാളിത്തത്തിലോ താങ്കൾക്ക് പൂർവ്വ പരിചയമുണ്ടോ?
6. കായികപ്രവർത്തിയെപ്പറ്റി താങ്കൾക്ക് വിവരം കിട്ടിയതെവിടെ നിന്ന് (ആരോഗ്യ പ്രവർത്തകർ/ മാദ്ധ്യമങ്ങൾ/ കുട്ടികൾ/ ബന്ധുക്കൾ/ മറ്റ് ബന്ധങ്ങൾ) ?
7. ഈ പങ്കാളിത്തം അടുത്ത ആറുമാസത്തേക്കുകൂടി തുടരണമെന്ന് താങ്കൾ കരുതുന്നുണ്ടോ? എന്തുകൊണ്ട്?
8. താങ്കളുടെ സമൂഹത്തിൽ സ്ത്രീകൾ വ്യായാമം ചെയ്യുന്നതിനെപ്പറ്റി താങ്കളുടെ അഭിപ്രായമെന്ത്?
9. നമ്മുടെ ചർച്ചയിൽനിന്നുള്ള ചില പ്രധാന ആശയങ്ങൾ നമുക്ക് സംഗ്രഹിക്കാം. മറ്റെന്തെങ്കിലുമുണ്ടോ ?
10. നിങ്ങൾക്കെന്തെങ്കിലും ചോദ്യങ്ങളുണ്ടോ ?

ഞങ്ങളോട് സംസാരിക്കാൻ സമയം ചിലവഴിച്ച നിങ്ങൾക്ക് നന്ദി.

FOCUS GROUP GUIDE: NCD clinic patients

ലക്ഷ്യമിടുന്ന സംഘത്തിനുള്ള മാർഗ്ഗരേഖ. എൻസിഡി ക്ലിനിക്കിലെ രോഗികൾ

തിരഞ്ഞെടുപ്പ് മാനദണ്ഡം. രോഗികൾ, 18–65 വയസ്സുള്ള വിട്ടുമാറാത്ത ഏതെങ്കിലും രോഗം നിർണ്ണയിക്കപ്പെട്ടവരും എൻ. സി. ഡി ക്ലിനിക്കിൽ കുറഞ്ഞത് രണ്ടാമത്തെ പ്രാവശ്യം സന്ദർശിക്കുന്നവരും

കാര്യബോധത്തോടെയുള്ള സമ്മതപത്രത്തിന്റെ കോപ്പികൾ ഓരോ പങ്കാളിക്കും നൽകുകയും വായിക്കാനാവാത്തവർക്ക് ഉച്ചത്തിൽ വായിച്ചുകൊടുക്കുകയും വേണം. ഏതു ചോദ്യം ചോദിക്കാനും പങ്കാളികൾക്ക് അവസരം നൽകണം. വാക്കാലുള്ള സമ്മതം ശബ്ദലേഖനം ചെയ്യണം. താഴെപ്പറയുന്നത് മാർഗരേഖയാണ്. എല്ലാ ചോദ്യങ്ങളും ക്രമാനുഗതമായി ചോദിക്കാൻ ശ്രമിക്കണം , പക്ഷേ ചർച്ചയുടെ ഒഴുക്ക് നിലനിർത്തുകയെന്നതാണ് കൂടുതൽ പ്രധാനം. നിർദ്ദേശിക്കപ്പെട്ട അന്വേഷണങ്ങൾ ഉൾപ്പെടുത്തിയിട്ടുണ്ട്. സംഘാംഗങ്ങളെല്ലാവരെയും സംഭാഷണത്തിൽ പങ്കെടുക്കുന്നതിന് പ്രോത്സാഹിപ്പിക്കാൻ താങ്കൾ ശ്രമിക്കണം. താഴെപ്പറയുന്നതുപോലെ അടിസ്ഥാന നിയമങ്ങൾ വിശദീകരിച്ചുകൊണ്ട് തുടങ്ങണം.

നമ്മൾ തുടങ്ങുന്നതിന് മുൻപ്, ഈ ചർച്ചയിൽ ശരിയായതോ തെറ്റായതോ ആയ ഒരുത്തരവുമില്ലെന്ന് താങ്കളെ ഓർമ്മിപ്പിക്കുവാൻ ഞാനാഗ്രഹിക്കുന്നു. നിങ്ങളോരോരുത്തരും എന്ത് വിചാരിക്കുന്നു എന്നറിയാനാണ് ഞങ്ങൾക്ക് താത്പര്യം, ആകയാൽ താങ്കൾ കേട്ടതിനോട് യോജിക്കുന്നോ ഇല്ലയോ എന്ന പരിഗണനയില്ലാതെ ദയവായി താങ്കളുടെ അഭിപ്രായം തുറന്ന് പങ്കുവെയ്ക്കുക. നിങ്ങളുടെ എല്ലാ അഭിപ്രായങ്ങളും കേൾക്കുക എന്നത് ഞങ്ങൾക്ക് വളരെ പ്രധാനമാണ്. താങ്കളുടെ ഈ അഭിപ്രായങ്ങൾ സംഘത്തിനുപുറത്തുള്ള ആളുകളോട് ആവർത്തിക്കരുതെന്ന് നിങ്ങൾ താത്പര്യപ്പെട്ടേക്കാം. ഇന്നത്തെ ഈ ചർച്ചയിൽ നിങ്ങൾകേട്ടത് മറ്റാരോടും പറയാതെ, താങ്കളോട് എങ്ങനെ പെരുമാറണമെന്ന് ആഗ്രഹിക്കുന്നോ അതുപോലെ സംഘത്തിലുള്ള മറ്റുള്ളവരോടും പെരുമാറുക. ഓരോരുത്തരും സ്വയം പരിചയപ്പെടുത്തിക്കൊണ്ട് നമുക്കാരംഭിക്കാം (ഗവേഷണ സംഘത്തിലുള്ളവരും സ്വയം പരിചയപ്പെടുത്തുകയും ഓരോരുത്തരുടെയും പങ്ക് വിശദീകരിക്കുകയും ചെയ്യണം).

1. ഞങ്ങളെ ഇന്നിവിടെ വരാനിടയാക്കിയ വിഷയത്തെപ്പറ്റി (കായിക പ്രവർത്തനം) നിങ്ങളെന്ത് വിചാരിക്കുന്നു?
2. താങ്കളുടെ അഭിപ്രായത്തിൽ, ഏറ്റവും പ്രധാനപ്പെട്ട എന്തു കാരണത്താലാണ് ആളുകൾ വ്യായാമം ചെയ്യുന്നത് ? താങ്കൾ വ്യായാമം ചെയ്യാറുണ്ടോ?
3. താങ്കളുടെ അഭിപ്രായത്തിൽ എന്തുകാരണങ്ങളാലാണ്

വ്യായാമം ചെയ്യുന്നത്?

വ്യായാമം ചെയ്യാതിരിക്കുന്നത്?

4. താങ്കളുടെ അഭിപ്രായത്തിൽ, കുടുതലാളുകൾ വ്യായാമം ചെയ്യാൻ എന്തൊക്കെ ആവശ്യങ്ങളും സേവനങ്ങളും വേണ്ടതുണ്ട് (കുട്ടിയെ നോക്കുന്നതിലുള്ള സഹായം, ധാർമ്മിക പിന്തുണ, സാമൂഹിക മാനദണ്ഡങ്ങൾ, അനുകരിക്കാവുന്ന മാതൃകകൾ) ?
5. കായികവിനോദത്തിലോ കായിക പ്രവർത്തികളിലെ പങ്കാളിത്തത്തിലോ താങ്കൾക്ക് പൂർവ്വ പരിചയമുണ്ടോ?
6. ഏതെങ്കിലും ആരോഗ്യവിദഗ്ദ്ധൻ താങ്കളുടെ കായിക പ്രവർത്തനം വർദ്ധിപ്പിക്കാൻ ഉപദേശിച്ചിട്ടുണ്ടോ ?

   ഉണ്ടെങ്കിൽ എന്തൊക്കെ കാര്യങ്ങളാണ് പറഞ്ഞത്?

   എത്ര പ്രാവശ്യം താങ്കളുടെ കായിക പ്രവർത്തികളെപ്പറ്റി ചോദിച്ചിട്ടുണ്ട് (സന്ദർശനങ്ങളുടെ എണ്ണം, ആദ്യം അല്ലെങ്കിൽ അനേകം) ?

   താങ്കളുടെ കായിക പ്രവർത്തനം കൂട്ടുന്നതിൽ ഉപദേശത്തിന് ഒരു പങ്കുണ്ടെന്ന് താങ്കൾ കരുതുന്നോ?
7. നമ്മുടെ ചർച്ചയിൽനിന്നുള്ള ചില പ്രധാന ആശയങ്ങൾ നമുക്ക് സംഗ്രഹിക്കാം. മറ്റെന്തെങ്കിലുമുണ്ടോ ?
8. നിങ്ങൾക്കെന്തെങ്കിലും ചോദ്യങ്ങളുണ്ടോ ?

   ഞങ്ങളോട് സംസാരിക്കാൻ സമയം ചിലവഴിച്ച നിങ്ങൾക്ക് നന്ദി.

എഫ്ജിഡി മാർഗ്ഗദർശി. ഇടകലർന്ന സംഘം (FGD GUIDE: MIXED GROUP)

തിരഞ്ഞെടുപ്പ് മാനദണ്ഡം. 18–65 വയസ്സുള്ള, വ്യായാമം ചെയ്യാൻവേണ്ട ആരോഗ്യമുള്ള പുരുഷന്മാർ, സ്ത്രീകൾ.

കാര്യബോധത്തോടെയുള്ള സമ്മതപത്രത്തിന്റെ കോപ്പികൾ ഓരോ പങ്കാളിക്കും നൽകുകയും വായിക്കാനാവാത്തവർക്ക് ഉച്ചത്തിൽ വായിച്ചുകൊടുക്കുകയും വേണം. ഏതു ചോദ്യം ചോദിക്കാനും പങ്കാളികൾക്ക് അവസരം നൽകണം. വാക്കാലുള്ള സമ്മതം ശബ്ദലേഖനം ചെയ്യണം. താഴെപ്പറയുന്നത് മാർഗരേഖയാണ്. എല്ലാ ചോദ്യങ്ങളും ക്രമാനുഗതമായി ചോദിക്കാൻ ശ്രമിക്കണം , പക്ഷേ ചർച്ചയുടെ ഒഴുക്ക് നിലനിർത്തുകയെന്നതാണ് കൂടുതൽ പ്രധാനം. നിർദ്ദേശിക്കപ്പെട്ട അന്വേഷണങ്ങൾ ഉൾപ്പെടുത്തിയിട്ടുണ്ട്. സംഘാംഗങ്ങളെല്ലാവരെയും സംഭാഷണത്തിൽ പങ്കെടുക്കുന്നതിന് പ്രോത്സാഹിപ്പിക്കാൻ താങ്കൾ ശ്രമിക്കണം. താഴെപ്പറയുന്നതുപോലെ അടിസ്ഥാന നിയമങ്ങൾ വിശദീകരിച്ചുകൊണ്ട് തുടങ്ങണം. നമ്മൾ തുടങ്ങുന്നതിന് മുൻപ്, ഈ ചർച്ചയിൽ ശരിയായതോ തെറ്റായതോ ആയ ഒരുത്തരവുമില്ലെന്ന് താങ്കളെ ഓർമ്മിപ്പിക്കുവാൻ ഞാനാഗ്രഹിക്കുന്നു. നിങ്ങളോരോരുത്തരും എന്ത് വിചാരിക്കുന്നു എന്നറിയാനാണ് ഞങ്ങൾക്ക് താത്പര്യം, ആകയാൽ താങ്കൾ കേട്ടതിനോട് യോജിക്കുന്നോ ഇല്ലയോ എന്ന പരിഗണനയില്ലാതെ ദയവായി താങ്കളുടെ അഭിപ്രായം തുറന്ന് പങ്കുവെയ്ക്കുക. നിങ്ങളുടെ എല്ലാ അഭിപ്രായങ്ങളും കേൾക്കുക എന്നത് ഞങ്ങൾക്ക് വളരെ പ്രധാനമാണ്. താങ്കളുടെ ഈ അഭിപ്രായങ്ങൾ സംഘത്തിനുപുറത്തുള്ള ആളുകളോട് ആവർത്തിക്കരുതെന്ന് നിങ്ങൾ താത്പര്യപ്പെട്ടേക്കാം. ഇന്നത്തെ ഈ ചർച്ചയിൽ നിങ്ങൾകേട്ടത് മറ്റാരോടും പറയാതെ, താങ്കളോട് എങ്ങനെ പെരുമാറണമെന്ന് ആഗ്രഹിക്കുന്നോ അതുപോലെ സംഘത്തിലുള്ള മറ്റുള്ളവരോടും പെരുമാറുക. ഓരോരുത്തരും സ്വയം പരിചയപ്പെടുത്തിക്കൊണ്ട് നമുക്കാരംഭിക്കാം (ഗവേഷണ സംഘത്തിലുള്ളവരും സ്വയം പരിചയപ്പെടുത്തുകയും ഓരോരുത്തരുടെയും പങ്ക് വിശദീകരിക്കുകയും ചെയ്യണം).

1. ഞങ്ങളെ ഇന്നിവിടെ വരാനിടയാക്കിയ വിഷയത്തെപ്പറ്റി (കായിക പ്രവർത്തനം) നിങ്ങളെന്ത് വിചാരിക്കുന്നു?
2. താങ്കളുടെ അഭിപ്രായത്തിൽ, ഏറ്റവും പ്രധാനപ്പെട്ട എന്തു കാരണത്താലാണ് ആളുകൾ കായികപ്രവർത്തികളിൽ പങ്കെടുക്കുന്നത് ?
3. താങ്കളുടെ അഭിപ്രായത്തിൽ എന്തുകാരണങ്ങളാലാണ്

   വ്യായാമം ചെയ്യുന്നത്?

   വ്യായാമം ചെയ്യാതിരിക്കുന്നത്?

4. താങ്കളുടെ അഭിപ്രായത്തിൽ, താങ്കളെപ്പോലെ കുടുതലാളുകൾ വ്യായാമം ചെയ്യാൻ എന്തൊക്കെ ആവശ്യങ്ങളും സേവനങ്ങളും വേണ്ടതുണ്ട് (കുട്ടിയെ നോക്കുന്നതിലുള്ള സഹായം, ധാർമ്മിക പിന്തുണ, സാമൂഹിക മാനദണ്ഡങ്ങൾ, അനുകരിക്കാവുന്ന മാതൃകകൾ) ?
5. കായികവിനോദത്തിലോ കായിക പ്രവർത്തികളിലെ പങ്കാളിത്തത്തിലോ താങ്കൾക്ക് പൂർവ്വ പരിചയമുണ്ടോ?
6. കായികപ്രവർത്തിയെപ്പറ്റി താങ്കൾക്ക് വിവരം കിട്ടിയതെവിടെ നിന്ന് (ആരോഗ്യ പ്രവർത്തകർ/ മാദ്ധ്യമങ്ങൾ കുട്ടികൾ/ ബന്ധുക്കൾ/ മറ്റ് ബന്ധങ്ങൾ) ?
7. എന്തു തരം കായിക പ്രവർത്തനമാണ് താങ്കളുടെ സമൂഹത്തിൽ ഏറ്റവും കൂടുതൽ വിലമതിക്കപ്പെടുന്നത് ?
8. നമ്മുടെ ചർച്ചയിൽനിന്നുള്ള ചില പ്രധാന ആശയങ്ങൾ നമുക്ക് സംഗ്രഹിക്കാം. മറ്റെന്തെങ്കിലുമുണ്ടോ ?
9. നിങ്ങൾക്കെന്തെങ്കിലും ചോദ്യങ്ങളുണ്ടോ ?

ഞങ്ങളോട് സംസാരിക്കാൻ സമയം ചിലവഴിച്ച നിങ്ങൾക്ക് നന്ദി.