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Socioeconomic Determinants of Physical Activity among Adult Arab Immigrants in Edmonton, Alberta

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Abstract

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

Little is known about leisure-time physical activity (LTPA) habits of Arab immigrants in Canada. Leisure-time physical activity has been linked to decreased risks for cancer, cardiovascular disease, and all causes mortality and increased life expectancy. Socioeconomic status has been recognized as a significant factor affecting health and wellbeing due to its impact on individuals' attitudes, experiences, and exposure to several risk factors. The purpose of this cross-sectional descriptive study was to explore the levels of participation in LTPA among adult Arab immigrants in central Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation. Electronic surveys were used to collect data from a sample of 376 adults. The socioecological model and systems theory were used as the theoretical foundations to guide this research. Descriptive and multiple regression analyses were performed using SPSS. Around 40% of participants were physically active. As participants attained higher degrees, earned more money, and had occupations requiring less physical effort, their levels of LTPA increased. The social conditions in which the participants live also affected their levels of LTPA. Being more familiar with the health benefits and having fewer barriers to exercise predicted an increase in LTPA, whereas higher self-efficacy seemed to predict a decrease in LTPA. Family and friends' support for exercise increased the levels of LTPA of participants. And finally, more environmental support for exercise predicted a decrease in LTPA levels among participants. Findings from this research have the potential to design and implement targeted LTPA recommendations and interventions for Arab immigrants.

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Dedication

I dedicate this work to my Dad and Mom, Yehia and Samar, for their unconditional love and constant motivation; you have always kept me in your prayers. To my brothers, sisters, family, and friends, for their love, enthusiasm, and support. To IMK, for being there for me, challenging me, and pushing me forward; you have always been my biggest supporter.

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Chapter 1: Introduction to the Study

Introduction

Physical activity is considered a vital component for healthy living (World Health Organization, 2016). The benefits of physical activity for preventing and managing nontransmissible diseases are well recognized (Alves et al., 2016; Richard, Martin, Wanner, Eichholzer, & Rohrmann, 2015; Smith, Crippa, Woodcock, & Brage, 2016). Leisure-time physical activity (LTPA) has been linked to decreased risks for cancer, cardiovascular disease, and all causes mortality (Arem et al., 2015; O'Donovan, Lee, Hamer, & Stamatakis, 2017), and increased life expectancy (Holtermann et al., 2013). Socioeconomic status has been recognized as a significant factor affecting health and wellbeing due to its impact on individuals' attitudes, experiences, and exposure to numerous risk factors (O'Donoghue et al., 2018). Curtin, Loitz, Spencer-Cavaliere, and Khalema (2016) indicated that the socioeconomic challenges of being new to a country might have implications for participation in physical activity. Research exploring the levels of participation in LTPA for adult Arab immigrants in Canada is lacking. The same is true for the socioeconomic factors predicting engagement in LTPA. My goal for this study was to explore the levels of participation in LTPA among adult Arab immigrants in Edmonton, Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation.

Positive social change is endorsed in this study by determining if adult Arab immigrants in Edmonton, Alberta, Canada are meeting the Canadian physical activity

guidelines, providing a basis for future LTPA initiatives. Participation in this study may have provided adult Arab immigrants with knowledge of local activities that promote LTPA. I start this chapter with background information on the physical activity among Arab immigrants in Canada. Additionally, in Chapter 1 I discuss the research problem, purpose of the study, and research questions that need to be answered. Next, a concise overview of the theoretical framework and the nature of the study are provided. Afterwards, I discuss the operational definitions, assumptions, delimitations, limitations, and significance of the study. Finally, a summary of the chapter is provided.

Background

The Public Health Agency of Canada reported in 2016 that just over 20% of Canadian adults meet the recommendations for physical activity as set out by the Canadian physical activity guidelines (Public Health Agency of Canada, 2016). Canadian adults spend only around 4 hours being physically active every day, where the majority of this time is spent doing light activities (Statistics Canada, 2016). Disadvantaged residents of Canada have higher premature deaths due to chronic diseases compared to those of higher socioeconomic status, despite universal healthcare coverage and major public health campaigns (Roberts, Rao, Bennett, Loukine, & Jayaraman, 2015). Similar results were noticed in participation in physical activity where the more educated and individuals with higher incomes were more likely to be physically active than the less educated and the less fortunate (Abichahine & Veenstra, 2017).

Socioeconomic status has been recognized as a significant factor affecting health and wellbeing due to its impact on individuals' attitudes, experiences, and exposure to

numerous risk factors (O'Donoghue et al., 2018). Immigrants are also often considered as socioeconomically disadvantaged when compared to native-born individuals (Li & Li, 2013). The socioeconomic challenges of being new to a country might have implications for the participation in physical activity. Several studies in Canada (Curtin et al., 2016; Ramos Salas, Raine, Vallianatos, & Spence, 2015) and other developed countries (Joshi, Jatrana, & Paradies, 2017; O'Driscoll, Banting, Borkoles, Eime, & Polman, 2014) indicated that financial expenses such as purchasing gym memberships and exercise equipment and paying for transportation were considered as a barrier to LTPA participation among immigrants.

Previous Canadian research indicated that the health and well being of immigrants decline considerably the longer they stay in Canada (Kukaswadia, Pickett, & Janssen, 2014; Sanou et al., 2014). One of the proposed indicators for this deterioration was a decrease in levels of physical activity (Kukaswadia et al., 2014). Results from a recent Canadian study disclosed that new immigrants were two times more likely to meet the Canadian guidelines for physical activity compared to their non-recent counterparts (Yu & Teschke, 2018). A 2006 report revealed that only 16% of recent immigrants and 20% of established immigrants in Canada reported participation in LTPA (Tremblay, Bryan, Pérez, Ardern, & Katzmarzyk, 2006). Nonetheless, these results are 13 years old and only report levels of participation in LTPA without looking into the associated socioeconomic factors. This study was needed to provide updated information on the levels of participation in LTPA among adult Arab immigrants in Edmonton, Alberta, Canada, to

examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation.

Problem Statement

Canada is a popular destination for migrants; over 250,000 immigrants come to Canada every year (Zilio, 2016). Sanou et al. (2014) indicated that the health of newcomers to Canada deteriorates noticeably the longer they stay in the country; being overweight or obese are the main causes for this deterioration in health. Tremblay, Pérez, Ardern, Bryan, and Katzmarzyk (2005) stated that adult immigrants who have been in Canada for more than 10 years are more overweight and obese than their recent counterparts as a result of a shift from cultural diets and lifestyles to western diets and sedentary lifestyles. Yu and Teschke (2018) supported these ideas by indicating that recent immigrants have continually showed higher physical activity levels than established immigrants to Canada.

Up to this point, the available literature has not exclusively investigated the levels of LTPA among adult Arab immigrants in Edmonton, Alberta, Canada. In Canada, a few reports exist based on community health surveys that describe general levels of physical activity and obesity rates (Tremblay et al., 2005; Tremblay et al., 2006). However, these studies do not describe the socioeconomic determinants of LTPA within this population and are over a decade old. In order to understand where Arab adult immigrants living in Edmonton, Alberta, Canada stand among Canadians in terms of LTPA levels, it was crucial to explore the levels of participation in LTPA among this population, to examine

the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation.

Purpose of the Study

The purpose of this quantitative research was to explore the self-reported levels of participation in LTPA among adult Arab immigrants in Edmonton, Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation. I measured the dependent variable, LTPA, by calculating a score in terms of Metabolic Equivalents (METs) using the Godin and Shephard Leisure-Time Physical Activity Questionnaire (Godin & Shephard, 1985). The independent variable, socioeconomic status, was assessed using self-report measures on three separate indicators: income, education, and occupation (American Psychological Association, n.d.). Individual contributors to LTPA participation were measured using the Self-Efficacy and Exercise Habits Survey (Sallis, Pinski, Grossman, Patterson, & Nader, 1988) and the Exercise Benefits/Barriers Scale (Sechrist, Walker, & Pender, 1987), social contributors were assessed using the Social Support and Exercise Survey (Sallis, Grossman, Pinski, Patterson, & Nader, 1987), and the environmental contributors were assessed using the Physical Activity Neighborhood Environment Survey (PANES; Sallis et al., 2010). I used a cross-sectional quantitative design to obtain information about LTPA habits among adult Arab immigrants in Edmonton, Alberta, Canada as they relate to socioeconomic status. Additionally, multiple regression analysis was done to investigate the individual, social, and environmental

contributors to LTPA participation after controlling for demographic and socioeconomic variables.

Research Questions and Hypotheses

My goal for this study was to explore the relationship between LTPA and the socioeconomic factors in adult Arab immigrants in Edmonton, Alberta, Canada and describe the individual, social, and environmental contributors to LTPA. The research questions were as follows:

Research Question 1 (RQ1): What is the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada as computed using the Godin and Shephard Leisure-Time Physical Activity Questionnaire? The first research question is descriptive and therefore no hypotheses are being tested.

Research Question 2 (RQ2): Does the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada vary between recent (less than 10 years) and non-recent (10 or more years) immigrants?

Null Hypothesis ($H_0$2): There is no statistically significant difference in the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada between recent (less than 10 years) and non-recent (10 or more years) immigrants.

Alternative Hypothesis (H_a2): There is a statistically significant difference in the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada between recent (less than 10 years) and non-recent (10 or more years) immigrants.

Research Question 3 (RQ3): Can education predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

Null Hypothesis ($H_0$3): There is no statistically significant association between education and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

Alternative Hypothesis (H_a3): There is a statistically significant association between education and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

Research Question 4 (RQ4): Can different levels of occupational physical activity predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

Null Hypothesis ($H_0$4): There is no statistically significant association between different levels of occupational physical activity and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

Alternative Hypothesis (H_a4): There is a statistically significant association between different levels of occupational physical activity and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

Research Question 5 (RQ5): Can income predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

Null Hypothesis ($H_0$5): There is no statistically significant association between income and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

Alternative Hypothesis (H_a5): There is a statistically significant association between income and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

Research Question 6 (RQ6): To what degree do individual, social, and environmental factors predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income)?

Null Hypothesis ($H_0$6): Individual, social, and environmental factors do not significantly predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income).

Alternative Hypothesis (H_a6): Individual, social, and environmental factors significantly predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income).

Theoretical Framework

In order to explain the complexity between LTPA, socioeconomic status, and individual, social and environmental factors, I implemented a socioecological model coupled with systems theory analysis. A person's behavior, according to the socioecological model, is a product of several factors functioning across a number of influence levels. In addition to individual characteristics, this model also takes into account social and cultural factors, the physical environment, and policies. In designing

research projects and interventions that have higher chances of ensuing behavior change at the population level, Sallis et al. (2006) advocates for using the socioecological model over other models that only focus on intrapersonal factors. Nevertheless, the socioecological model's elements presented at each level of influence are distinct, which usually limits evaluating interactions within the different elements. Similarly, the model establishes boundaries between the different levels of influence, also blurring possible associations and causal pathways between the different levels (Garcia, Diez Roux, Martins, Yang, & Florindo, 2017). In order to overcome the limitations of the socioecological model, I used systems theory to understand the socioeconomic determinants as well as the individual, social, and environmental influences on LTPA. This theory is powerful for assessing the social relationships between individuals and their environments. Additionally, systems theory is capable of collapsing the barriers between the different levels of influence of the socioecological model, permitting deeper appraisal of the socioeconomic determinants of LTPA (Garcia et al., 2017). A more detailed description of the theoretical framework is provided in Chapter 2.

Nature of the Study

This study was quantitative in nature. I used a cross-sectional study design utilizing electronic self-administered questionnaires for data collection. The population of interest for this study was adult (18 years and older) Arab immigrants in Edmonton, Alberta, Canada. I used a volunteer sampling strategy for data collection. Recruitment flyers containing a universal link to the questionnaire were posted at Arab general-purpose establishments in different regions of Edmonton, Alberta, Canada. Cross-

sectional study designs are useful for conducting prevalence studies and descriptive research, which illustrate a population regarding an outcome of interest (LTPA levels) for the purposes of future public health planning (Levin, 2006). This type of research holds several advantages, as it is fairly inexpensive and requires little time to complete, loss to follow-up is not an issue as study participants are not followed and allows for evaluating numerous outcomes and risk factors (Creswell, 2014). Nonetheless, major limitations of cross-sectional studies include the inability to infer causality, and the fact that they only portray a snapshot of the population holds the possibility of reaching different results if another time frame had been chosen (Levin, 2006).

Definitions

The following section contains definitions for the major variables used in this research project.

Adult: An individual 18 years or older.

Arab: An individual with ancestry, culture, ethnicity, language, family, or heritage ties to one or more of the 22 Arab League countries including Algeria, Bahrain, Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen (League of Arab States, n.d.).

Immigrant: A person who migrates into a different environment/country to which they are not native in order to settle there as permanent residents or future citizens (Taylor, Lopez, Martínez, & Velasco, 2012).

Leisure-time physical activity: Denotes all exercises, sports, or recreation activities that people engage in during their freely disposable time that is not related to regular work, housework, or transport activities (Meseguer, Galán, Herruzo, Zorrill, & Rodríguez-Artalejo, 2009).

Socioeconomic status: Refers to the social standing of individuals or groups and it is often measured in terms of income, education, and occupation (American Psychological Association, n.d.).

Assumptions

I assumed that seemingly healthy adult Arab immigrants in Edmonton, Alberta, Canada are capable of engaging in some type of physical activity. Additionally, I assumed that the socioeconomic factors, including education, occupation, and income of adult Arab immigrants in Edmonton, Alberta, Canada would not improve dramatically. I also assumed that there would be no dramatic change in the individual, social, and environmental contributors to LTPA in Edmonton, Alberta, Canada. Finally, I assumed that all participants would honestly disclose their practices on all self- reported measures.

Scope and Delimitations

Participants in this study were delimited to immigrants of Arab descent who had immigrated to Canada, who were 18 years or older, and who were living in Edmonton, Alberta, Canada at the time of the study. Arabs born in Canada, younger than 18 years, and not living in Edmonton, Alberta, Canada were excluded from this study. Immigration often poses socioeconomic hardships on the migrants (Li & Li, 2013). Furthermore, O'Donoghue et al. (2018) indicated that socioeconomic factors are important

determinants of health. Accordingly, I chose the socioeconomic correlates as a focus for this study. Finally, the findings from this study may not be generalizable to all immigrant groups in Canada because it consists of a distinct subgroup: Arab immigrants 18 years and above.

Limitations

A major limitation to this study was the use of a correlational design, cross-sectional study. The reasoning behind using this design was to establish whether a relationship exists between LTPA and socioeconomic factors, and LTPA and individual, social, and environmental factors. Consequently, causation was beyond the scope of this research. Another limitation was the use of a small and homogenous sample. The results of this study are limited to adult Arab immigrants in Edmonton, Alberta, Canada and therefore might not be generalized to other migrant groups throughout Canada. Nonetheless, the results of this study may guide further research into the area of LTPA among the ever-expanding population of immigrants. Furthermore, in order to avoid selection bias and have a representative sample, Pannucci and Wilkins (2010) indicate that it is required to have a full list of qualified participants and then proceed to sample subjects using a simple random sampling where each subject has an equal chance of being selected. Regrettably, this is very impractical and almost impossible to achieve. In this study, I used a volunteer sampling strategy for data collection.

Significance

Understanding what motivates this Canadian cohort to engage in LTPA is indispensable to plan interventions directed at reducing health inequalities in

underprivileged populations, and this study filled this gap in the research literature. Minority groups in Canada, including Arabs, represent a large percentage of Canada's population growth. The exclusivity of this research endeavor lied in investigating characteristics of essential determinants of health among a minority group in Canada (Ramos Salas et al., 2015). In 2011, over six million individuals identified themselves as members of visible minority groups in Canada. These groups included African Americans, Filipinos, Arabs, Latin Americans, Chinese, South Asians, West Asians, Southeast Asians, Koreans, and Japanese (Statistics Canada, 2016). Findings from this study have the opportunity to inform effective public health programs and policies tailored to the needs of this specific group of Canadians.

Summary

In Chapter 1, I offered brief background information on LTPA as it relates to socioeconomic status of adult Arab immigrants in Edmonton, Alberta, Canada. Afterwards, I explained the aim of this study. I also introduced the research problem, questions, theoretical framework, and methodology. In the following chapter I will discuss the theoretical framework in more detail and review the current literature related to key variables of the study.

Chapter 2: Literature Review

Introduction

Previous research indicated that the health and well being of immigrants decline substantially the more they stay in Canada (Kukaswadia et al., 2014; Sanou et al., 2014). A decrease in levels of physical activity was proposed as an indicator for this deterioration (Kukaswadia et al., 2014). A recent Canadian study revealed that new immigrants to Canada were two times more likely to meet the Canadian guidelines for physical activity compared to their nonrecent counterparts (Yu & Teschke, 2018). Only 16% of recent and 20% of established Arab immigrants in Canada conveyed active participation in LTPA (Tremblay et al., 2006). However, these results are over a decade old and only report levels of participation in physical activity. Socioeconomic status has been recognized as a significant factor affecting health and wellbeing due to its impact on individuals' attitudes, experiences, and exposure to numerous risk factors (O'Donoghue et al., 2018). Curtin et al. (2016) indicated that the socioeconomic challenges of being new to a country might have implications for the participation in physical activity.

The purpose of this study was to explore the levels of participation in LTPA among adult Arab immigrants in central Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation. My goal for the literature review was to synopsise and synthesize the existing literature on LTPA and its socioeconomic determinants as it relates to adult Arab immigrants. I start this review with an explanation of the strategy used for searching the literature and key search terms, followed by a

description of the theoretical framework serving as a foundation for this study, a review of the current literature related to key variables, and a summary of the major themes in the literature.

Databases and Literature Sources Used

I conducted this literature review investigating the determinants of LTPA among adult Arab immigrants residing in Edmonton, Alberta, Canada through searching six databases namely MEDLINE, CINHAL, PsycINFO, PubMed, Biomed Central, and SAGE Journals, Google Scholar, and governmental websites. I restricted the exploration to articles and sources published in English, between 2014 and 2019, and included both quantitative and qualitative reports presenting the relationship between at least one marker of socioeconomic status (education, occupation, and/or income) and one domain of physical activity as measured, either in terms of frequency, duration, and/or intensity. The population of interest was Arab immigrants, and as such, I evaluated sources probing socioeconomic determinants of physical activity among this population for inclusion. Furthermore, I excluded sources describing physical activity among children under 18 years, as well as other sources that stimulated concerns about the quality of the information such as discrepancies between the findings in the text and those in the tables.

Key Search Terms

Key search terms about LTPA for this review included *physical activity, leisure-time physical activity, physical movement, physical exercise, aerobic exercise,* and *sport.* Socioeconomic status included the terms *socioeconomic, economic, social class, income, salary, expense, education, occupation, employment, work,* and *job.* The determinants

included the terms *determinant, correlate, contributor, factor, association, pattern,* and *predictor.* As for the Arab population, the search terms included *Arab, Arabic, Arabian, immigrant, emigrant, migrant, settler, refugee,* and *newcomer.*

Theoretical Framework

This research is mainly grounded in the socioecological model, in conjunction with systems theory to address the limitations of socioecological model. The socioecological model dates back to the 1970s when Bronfenbrenner proposed it as a conceptual model for studying human development (Bronfenbrenner, 1977) and later formalized it into a theory in the mid 1980s (Bronfenbrenner, 1986). Bronfenbrenner's theory suggests that an entire ecological system in which an individual lives is needed to understand human development. This theory places the individual at the center and surrounds him by concentric circles of microsystems. At the core of the socioecological model is the individual's biological and psychological makeup. The inner circle surrounding the individual constitutes the immediate physical and social environments, which exert the strongest influences on the individual. The mesosytem constitutes the second circle and involves interactions with individuals at school, work, and neighbourhood. The third circle represents the exosystem that encompass broader social, political, and economic conditions, which do not affect the individual directly but exert pressure on the structure and availability of microsystems including social networks and community contexts. The outermost circle represents the macrosystem that includes social, religious, political, economical conditions, and cultural values.

The socioecological model broadly conceptualizes the idea of health focusing on major contributors influencing it. In particular, the theory indicates that an interaction between the microsystems of the individual, immediate social and physical environments, social institutions and organizations, community, and the society influence health (Bronfenbrenner, 1986). Since its conception, the socioecological model has been adapted and applied to several public health promotion and prevention endeavours such as studying the correlates of sedentary behaviours among adults (O'Donoghue et al., 2016) and predicting physical activity behaviour among university students (Essiet, Baharom, Shahar, & Uzochukwu, 2017). Several other projects utilized the socioecological model, for example Ramos Salas et al. (2015) and Curtin et al. (2016) used the socioecological model for its inclusiveness of several factors on the personal, cultural, organizational, and environmental factors influencing physical activity participation among newcomers in Canada.

Nevertheless, the socioecological model's elements presented at each level of influence are distinct, which usually limits evaluating interactions within the different elements. Similarly, the model establishes boundaries between the different levels of influence, also blurring possible associations and causal pathways between the different levels (Garcia et al., 2017). Systems theory was incorporated to overcome these limitations and help identify the socioeconomic determinants of LTPA. The origins of systems theory can be traced to works of numerous scientists in the 20th century, for example Von Bertalanffy and Ashby and Bateson, who among several others developed this field of inquiry across multiple disciplines including computer science, mathematics,

physics, management, anthropology, biology, and psychology (Peters, 2014). Developing systems theory required transferring methods from one discipline to another, which facilitated knowledge acquisition through a broad array of stakeholders. Systems theory refers to the interdisciplinary study of systems, which proposes that in order to solve problems they cannot be approached in isolation from the interrelated components, and as such, places importance on the value of integrating parts of the issue to be solved (Anderson, 2016). Therefore, this model is powerful for assessing the social relationships between individuals and their environments. Additionally, it is capable of collapsing the barriers between the different levels of influence of the socioecological model, which permits deeper appraisal of the socioeconomic determinants of LTPA (Garcia et al., 2017).

Previous research on physical activity suggested that investigating this practice is better understood through an ecological lens, viewing physical activity as being influenced by factors within and outside the individual (Yip, Sarma, & Wilk, 2016). Internal factors include aspects of the individual, such as sociodemographic attributes including age, sex, and socioeconomic status. Whereas external aspects are found in the social environment of peoples' daily experiences, including family, friends, and community. It is very important to investigate these stimuli across different tiers to understand physical activity behaviour; this is because they influence physical activity simultaneously (Yip et al., 2016). However, establishing a connection across these different layers of factors is what systems theory strives for. The scientific community is acknowledging this broadened focus on multidisciplinary approach. Speake et al. (2016)

discussed how population levels of physical activity could be promoted using whole-systems perspective.

Literature Review Related to Key Concepts

Physical Activity

Physical activity represents energy expenditure for producing body movements utilizing skeletal muscles. Physical activity includes a wide range of activities varying from light movements to active and vigorous workouts (World Health Organization, 2015). Leisure-time physical activity is a subdivision of physical activity and refers to any activity done at an individual's discretion that improve or maintain fitness or health (Moore et al., 2016). The Canadian Physical Activity Guidelines recommends that adults between the ages of 18 and 64 years should participate in at least 150 minutes of moderate-to-vigorous intensity aerobic physical activity every week, in sessions of 10 minutes or more. The guidelines also endorse adding muscle and bone strengthening activities using major muscle groups for at least two times per week (Canadian Society for Exercise Physiology, 2011). Moderate-intensity physical activities are defined as those activities that will cause adults to sweat a little and to breathe harder; examples include brisk walking, playground activities, and bike riding. As for vigorous-intensity physical activities, they include activities that will cause adults to sweat and be out of breath, examples include jogging, swimming, and cross-country skiing (Canadian Society for Exercise Physiology, 2011).

Physical activity is considered, alongside other behaviours such as proper nutrition and good mental status, as a central element for healthy living (World Health

Organization, 2016). The benefits of physical activity for preventing and managing nontransmissible diseases such as diabetes, depression, and cardiovascular conditions are well recognized (Alves et al., 2016; Richard et al., 2015; Smith et al., 2016). In fact, physical inactivity is considered the fourth leading risk factor for death globally and responsible for over three million mortalities each year (World Health Organization, 2016). Leisure-time physical activity has been linked to decreased risks for cancer, cardiovascular disease, and all causes mortality (Arem et al., 2015; O'Donovan et al., 2017). Furthermore, studies showed that individuals participating in moderate intensity LTPA live around 1.5 to 3.5 years longer than less active adults, and individuals participating in vigorous intensity LTPA live 2.5 to 4.5 years longer than individuals participating in moderate intensity LTPA (Holtermann et al., 2013).

Physical Activity in Canada

Canada is prominently involved in endorsing health-enhancing physical activity (Public Health Agency of Canada, 2016) for the whole population across genders, age groups, and socioeconomic statuses. Nevertheless, in Canada, sedentary lifestyles are assumed by a large percentage of the population (Statistics Canada, 2015a), putting them at increased risks for developing nontransmissible diseases. Additionally, obesity has been significantly linked to reduced physical activity levels, jeopardizing the health of individuals even further (Wiklund, 2016). A 2014 Canadian study revealed that individuals who walked in their leisure time at least 30 minutes every day reduced their body mass index (BMI) score between 0.11 and 0.2 points as compared to physically inactive participants (Sarma, Zaric, Campbell, & Gilliland, 2014). In Canada, just over

20% of adults meet the Canadian physical activity guidelines (Public Health Agency of Canada, 2016). Findings from the 2012 and 2013 cycle of the Canadian Health Measures Survey showed that Canadian adults spend only just over 4 hours being physically active every day, where the majority of this time is spent doing light activities. In contrast, around 10 hours pass by every day being sedentary (Statistics Canada, 2016). Physical activity levels among Canadian adults tend to decline with age, and are lower among women and less advantaged individuals (Watts & Masse, 2012). As for compliance with the daily recommendations for physical activity, it was greater among individuals who attained a postsecondary education and earned more than 70,000 Canadian Dollars ($CAN) a year (Whelan et al., 2017). Taking into consideration the well-documented benefits related to physical activity engagement and the wide ranging health problems linked to sedentary behaviours, physical inactivity puts too much strain on the Canadian healthcare system, which accounts for around seven billion dollars annually for healthcare costs (Yip et al., 2016).

Socioeconomic Determinants of Physical Activity

Socioeconomic status refers to the social standing of individuals or groups and it is often measured in terms of income, education, and occupation (American Psychological Association, n.d.). Socioeconomic status has been recognized as a significant factor affecting health and wellbeing due to its impact on individuals' attitudes, experiences, and exposure to numerous risk factors (O'Donoghue et al., 2018). Bukman et al. (2014) reported that identifying barriers to physical activity related to socioeconomic factors are essential for developing and implementing future interventions

and policies. A 2016 study found that individuals of lower household income groups, as compared to those of higher household income groups, experienced monetary expenses as a barrier to participation in LTPA. Additionally, financial expenses were seen as barriers among unemployed individuals when compared to employed counterparts (Borodulin et al., 2016).

Despite universal access to health services and the abundance of wide-reaching public health campaigns, disadvantaged persons in Canada endure higher rates of premature deaths associated with chronic diseases compared to their counterparts of higher socioeconomic status (Roberts et al., 2015). A recent study in Canada indicated that individuals with a university degree compared to those with less education, and individuals with household income over $CAN80, 000 compared to those with less income had higher likelihoods of being physically active (Abichahine & Veenstra, 2017). Parallel findings are prevalent across developed countries, for example, Ball, Carver, Downing, Jackson, and O'Rourke (2015) reported in a literature review that socially distributed physical activity levels and health outcomes where individuals with higher education, occupation, and income engage more in physical activity and experience less adverse health outcomes. Similarly, Glorioso and Pisati (2014) indicated that the likelihood of adopting healthy lifestyles, such as participation in physical activity, among Italian adults was positively associated with education level. Interestingly, the higher risks for developing diseases and dying prematurely are not unique to poor individuals, instead a social gradient exists in which the lower the position an individual has on the social ladder the poorer the health (Ball, 2015). Within Canada, there is approximately a

5-year difference in life expectancy between those with lowest and highest income groups (Statistics Canada, 2015b). Furthermore, Ball (2015) argues that in addition to dying sooner, socioeconomically disadvantaged individuals spend more of their shorter lives living with disabilities and illnesses.

Immigrants and Arabs in Canada

Canada is a popular destination for immigrants from around the world; over 250,0000 immigrants from over 200 ethnic groups arrive in Canada each year (Zilio, 2016). The Arab population in Canada refers to individuals with ancestry, culture, ethnicity, language, family, or heritage ties to one or more of the 22 Arab League countries including Algeria, Bahrain, Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen (League of Arab States, n.d.). Statistics Canada (2016) estimated the Arab population in Edmonton, Alberta, Canada at 24,845 in 2016. Previous research indicated that the health and well being of immigrants show sizable decline the more they stay in Canada (Kukaswadia et al., 2014; Sanou et al., 2014). Among the indicators proposed for this deterioration are overweight and obesity (Sanou et al., 2014; Wang & Palacios, 2017) and decreased physical activity (Dogra, Meisner, & Ardern, 2010; Kukaswadia et al., 2014).

Tremblay et al. (2005) described established adult immigrants (living in Canada for more than ten years) as having greater prevalence of overweight and obesity when compared to fresh migrants (living in Canada for ten years or less). Around one third of adult Arab immigrants in Canada are considered overweight, and 11 % are categorized as

obese (Tremblay et al., 2005). As for participation in LTPA for Arab immigrants in Canada, only 16% of recent immigrants and 20% of established immigrants conveyed active participation in exercise (Tremblay et al., 2006). The low levels of participation in physical activity for Arab immigrants compared to native-born individuals mirror those for non-English speaking immigrants in the Australia (Joshi et al., 2017), United States (Taverno Ross, Larson, Graham, & Neumark-Sztainer, 2014), and United Kingdom (Williams, Stamatakis, Chandola, & Hamer, 2011). According to the 2006 report by Tremblay et al., the levels of participation in physical activity among Arab immigrants in Canada tended to increase the longer they stayed in the country. On the one hand, an Australian study found similar results in which Asian migrants tended to engage more in physical activity the longer they stayed in Australia (Guo, Lucas, Joshy, & Banks, 2015). Additionally, Ramos Salas et al. (2015) reported that only one quarter of recent and 41.7% of non-recent immigrant women of Latin origins to Canada were considered sufficiently physically active. These studies are supported by a recent Canadian study, which described that recent immigrants tended to be more inactive when compared to established immigrants (Mahmood, Bhatti, Leon, & Gotay, 2018). Furthermore, Mahmood et al. (2018) also described this inactivity to be higher among immigrants of visible minority compared to Whites. On the other hand, a recent Canadian study revealed that new immigrants to Canada were two times more likely to meet the Canadian guidelines for physical activity through active commuting compared to their non-recent counterparts (Yu & Teschke, 2018). Findings from Australia (Joshi et al., 2017) and the United States (Taverno Ross et al., 2014) indicated similar results where

immigrants' participation in physical activity tended to decrease the longer they stayed in the country. Furthermore, Étémé, Girard, Massé, and Sercia (2016) observed a deterioration of self-declared overall state of health among first generation immigrants, and the development of sedentary living styles, fairly high levels of stress, and depressive episodes.

Brazeau, Hajna, Joseph, and Dasgupta (2015) found that Canadian adults with type 2 diabetes spend on average 308 minutes sitting per day across all seasons. Immigrants, however, spent almost one hour less sitting every day compared to non-immigrant counterparts. Beside the lower sedentary behaviors reported above, in response to a gestational diabetes diagnosis, Banerjee et al. (2016) indicated that ethnic minority women were more likely to report changes in health behaviors through reducing their meal portion sizes and increasing their physical activity compared to Caucasian women. On the other hand, according to Cooper Brathwaite and Lemonde (2016), cultural practices were a significant factor in the number of daily servings of fruits and vegetables consumed and engagement in physical activity to stay healthy among African immigrants. Even though participants agreed on the importance of participation in physical activity to stay healthy, they preferred consuming high glycemic index foods (Cooper Brathwaite & Lemonde, 2016).

Immigrants are often considered as socioeconomically disadvantaged when compared to native-born individuals (Li & Li, 2013). The socioeconomic challenges of being new to a country might have implications for participation in physical activity. Curtin et al. (2016) indicated that financial expenses such as purchasing gym

memberships and exercise equipment and paying for transportation were considered as barriers to LTPA among immigrants to Canada. Ramos Salas et al. (2015) reported similar findings; resources were perceived as important barriers for engaging in physical activity. One systematic review reported parallel results among culturally and linguistically diverse immigrants where costs were perceived as barriers among individuals belonging to lower socioeconomic status groups (O'Driscoll et al., 2014). Another study from Australia also reported expenses as a barrier for LTPA engagement (Joshi et al., 2017). Even though subsidy programs for low-income families exist in Canada supporting participation in physical activity, newcomers voiced problems qualifying for such plans. Immigrants contended once they are in Canada, both parents needed to have full-time jobs in order to meet the financial family needs, which put them over the threshold to qualify for governmental support (Curtin et al., 2016). Results from a qualitative study about challenges of being new to Canada indicated that participants reported reduced daily activities as compared to their home countries due to the availability of conveniences and time saving activities. Being active in their native countries was considered to be a necessity for their daily lives and there was no need to participate in LTPA, but in Canada they have to seek exercise in their leisure time (Curtin et al., 2016). Van Duyn et al. (2007) observed similar results among immigrants in the United States; participants indicated that being physically active was intrinsic to their daily lives and the concept of LTPA was unfamiliar (Van Duyn et al., 2007).

Physical activity and BMI were implicated in some racial health inequalities between Blacks and White populations both immigrants and non-immigrants (Patterson

& Veenstra, 2016), however, discrimination was not associated with infrequent physical activity according to (Siddiqi, Shahidi, Ramraj, & Williams, 2017). Conversely, immigrant patients' perceived expectations of their doctors were significantly related to their perceived quality of care, which was associated with improved health behaviors including physical activity maintenance (Whittal & Lippke, 2016). Similarly, interventional studies aimed at testing and implementing a culture- and gender-specific physical activity among immigrant populations proved to be promising. Vahabi and Damba (2015) reported that South Asian women who participated in a Bollywood dance exercise program showed improvements in their physical, mental, and social health. The participants also benefited from decreased bodily measurements and described being less stressed, more energetic, more robust mentally and physically, and feeling a sense of fulfillment and self-satisfaction.

Summary

In this chapter, I discussed the national recommendations for physical activity among adults alongside their benefits, levels, and barriers. Research examining the socioeconomic factors that influence physical activity for immigrants in Canada is limited. The only available reports describing physical activity levels among Arab immigrants are over a decade old and only described the percent of physically active adults via a community health survey (Tremblay et al., 2006). Taking into consideration the continuing surge of immigration to Canada and immigrants being an important part of the country's health profile and economy (Yip et al., 2016), it was necessary to study determinants of modifiable health-related behaviors, such as physical activity, among

immigrants and how these behaviors evolve between recent and established immigrants. Such information is significant to design and implement targeted health promotion and disease prevention interventions. Chapter 3 follows and it I will discuss in it the study questions, design, sample, instrumentation, materials, data collection, and analysis procedures.

Chapter 3: Research Method

Introduction

The purpose of this study was to explore the levels of participation in LTPA among adult Arab immigrants in central Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation. In Chapter 3 I include an overview of the study's methodology, including the research methods and design, a description of the participants, sample size, the study instrument, materials, and study's procedures. A description of data analysis plan is provided and followed with a discussion about any threats to validity and ethical considerations. I conclude the chapter with a concise summary.

Research Design and Rational

I used a descriptive quantitative methodology for this study utilizing a cross-sectional research approach through electronic self-administered questionnaires. I chose this design to elicit self-declared levels of LTPA as they relate to socioeconomic factors describing individual, social, and environmental contributors to this relationship among adult Arab immigrants in Edmonton, Alberta, Canada. Cross-sectional studies deliver quick results and no loss to follow-up occurs in such studies, as participants are interviewed only once. Cross-sectional studies are also particularly appropriate for estimating the occurrence of behaviour such as LTPA (Sedgwick, 2014).

Methodology

Population and Sampling Procedures

The population of interest for this study was Arab immigrants in Edmonton, Alberta, Canada. Only Adult participants 18 years and older were included in this research. Participants also needed to be immigrants and hence, not born in Canada. Participants also needed to be of Arab descent and residents of Edmonton, Alberta, Canada; otherwise, they were excluded from the study. I used a volunteer sampling strategy for data collection and pre-screened the research participants to ensure that they meet the eligibility criteria for the study. I did not ask for proof of participants' immigration status and did not collect any immigration status information.

Power Analysis

In 2016, the total Arab population in Edmonton, Alberta, Canada was 24,845 (Statistics Canada, 2016). Bearing in mind that one third of the population are assumed to be below 18 years old or were born in Canada, this leaves around 16,600 adult immigrants. I calculated the sample size using the G*Power program utilizing a correlation model. There is no clear consensus on the value to use for power in calculating sample size, however, a power of 80% is generally accepted. Additionally, I used a standard two-tailed 95% confidence interval with a 5% significance level. The minimum sample size needed for this research project was 376.

Procedures For Recruitment, Participation, and Data Collection

I completed the sampling procedure by posting recruitment flyers (Appendix A) on bulletin boards at Arab commercial establishments in different regions of Edmonton,

Alberta, Canada. I carefully chose the locations to reach the target community as much as possible while trying to cover all categories of adult population of both genders with different educational, occupational, and income levels. The recruitment flyers contained a brief description of the study alongside a universal link to the electronic questionnaire. Participants who read the flyer and wanted to volunteer their time had to use the universal link to access the online questionnaire, which was provided in a tear-off form in the flyers. The electronic questionnaire was made up of three sections. Section 1 was the informed consent page where participants needed to agree to its contents in order to move forward to the next section. Section 2 included the pre-screening questions that the participants needed to answer "Yes" to all five of them in order to proceed to the survey (Appendix B). Section 3 contained the survey items, and was partitioned into six pages. Page 1 asked about demographic information including questions on age, gender, height, weight, self-rated health status, marital status, household size, household income, highest level of education completed, occupation, country of origin, and number of years living in Canada (Appendix C). Page 2 contained the Godin and Shephard Leisure-Time Physical Activity Questionnaire (Appendix D), Page 3 contained the Self-Efficacy and Exercise Habits Survey (Appendix E), Page 4 contained the Exercise Benefits/Barriers Scale (Appendix F), Page 5 contained the Social Support and Exercise Survey (Appendix G), and page six contained the Physical Activity Neighborhood Environment Survey (Appendix H). The questionnaire concluded with a thank you page, and the participant was able to close the browser. Participants had to complete the self-reported questionnaire only once and there was no need for any form of follow up.

Instrumentation and Operationalization of Constructs

In order to measure the levels of LTPA of participants, I used the Godin and Shephard Leisure-Time Physical Activity Questionnaire published by Godin and Shephard in 1985 (Appendix D). This simple self-reported questionnaire categorizes different types of leisure-time exercises into mild, moderate, and strenuous physical activity levels (Godin & Shephard, 1985). This questionnaire is in the public domain, but I sought permission from the author, and the permission letter is included in Appendix I. This instrument is regarded as one of the most used questionnaires in research for assessing LTPA, including oncology research (Amireault, Godin, Lacombe, & Sabiston, 2015). The current questionnaire has been cited more than 1,160 in the Scopus database for articles published after 1995 (Amireault & Godin, 2015). I intended to measure the levels of LTPA among apparently healthy Adults in Edmonton, Alberta, Canada. This instrument was initially developed and validated on seemingly healthy adult volunteers in eastern Canada (Godin & Shephard, 1985), which made it an appropriate tool to be implemented in the research under study.

I measured the individual contributors for participation in LTPA using the Self-Efficacy and Exercise Habits Survey (Appendix E) and the Exercise Benefits/Barriers Scale (Appendix F). In 1988, Sallis et al. developed the Self-Efficacy and Exercise Habits Survey. The survey development went through two stages where in the first stage interviews were conducted with 40 individuals to identify behavioral and situational components of exercise change. The second stage involved administering the items derived from to the first stage to 171 subjects. The survey instrument consists of 12 items

individuals might do while trying to motivate themselves to increase or continue regular exercise. A five-response Likert scale is available to choose from, ranging from *I know I cannot* (1) to *I know I can* (5) with an additional option of *does not apply* (Sallis et al, 1988). This instrument is available in the public domain, permission to use the questionnaire can be found in Appendix J. Sechrist et al. developed the Exercise Benefits/Barriers Scale in 1987 as an instrument for determining individuals' perceptions regarding the benefits and barriers to physical activity participation. The scale consists of 43 items with a four-response, forced-choice Likert scale where responses range from 1 (*strongly disagree*) to 4 (*strongly agree*; Sechrist et al., 1987). Permission to use the Exercise Benefits/Barriers Scale is available in Appendix K.

I assessed the social contributors using the Social Support and Exercise Survey (Appendix G). The Social Support and Exercise Survey was developed in 1987 by Sallis et al. as a measure of perceived social support specific to exercise behaviors. As in The Self-Efficacy and Exercise Habits Survey, the Social Support and Exercise Survey was developed in two stages. Stage 1 involved identifying specific supportive and non-supportive behaviors via interviews with 40 subjects. Stage 2 involved administering the items derived from the interviews to 171 individuals to assess support for exercise from family and friends. The scale consists of 13 items that need to be rate for family and friends support separately. Answer choices range from *none* (1) to *very often* (5) with an additional response of *does not apply*. This scale is available in the public domain and permission can be found in Appendix J. As for the environmental contributors, I measured them using the Physical Activity Neighborhood Environment Survey

(Appendix H). The Physical Activity Neighborhood Environment Survey was developed in 2002 based on ecological models by the International Physical Activity Prevalence Study group to assess the built and social environmental factors related to physical activity (Oyeyemi et al., 2013). Items in this questionnaire were developed based on previously evaluated surveys assessing the perceived neighborhood environments (Sallis et al., 2010). The benefits of this tool lie in its conciseness and the inclusion of variables that showed association with physical activity (Oyeyemi et al., 2013). This tool is available in the public domain and permission can be found in Appendix J.

Operationalization of Variables

Demographics. The following demographics were included in the study.

Age: Age was classified into six categories: 18–24, 25–34, 35–44, 45–54, 55–64, and 65 years and over (Appendix C, question 1).

Gender: Gender was recorded a dichotomous variable with either male or female as answer choices (Appendix C, question 2).

Height: Height was recorded using the International System of Units (SI) in meters for easily calculating BMI (Appendix C, question 3).

Weight: Weight was recorded using the SI units in kilograms for easily calculating BMI (Appendix C, question 4).

BMI: BMI was calculated according to the formula BMI = kg/m^2 where kg is the individuals' weight in kilograms and m^2 is their height in meters squared. A BMI of less than 18.5 was considered underweight, 18.5–24.9 as normal weight, 25.0–

29.9 as overweight, and 30.0 or more as obese (U.S. Department of Health and Human Services, n.d.).

Self-rated Health Status: Self-rated health status was recorded as an ordinal variable with four categories (excellent, good, fair and poor) (Appendix C, question 5).

Marital Status: Marital status included four categories; single, married, widowed, and divorced/separated (Appendix C, question 6).

Household Size: The number of people living at the same house was recorded as a discrete interval level variable (Appendix C, question 7).

Household Income: Yearly household income was categorized into six categories in Canadian Dollars ($CAN) including less than $CAN20, 000, $CAN20, 000 to less than $CAN40, 000, $CAN40, 000 to less than $CAN60, 000, $CAN60, 000 to less than $CAN80, 000, $CAN80, 000 to less than $CAN100, 000, and $CAN100, 000 and over (Appendix C, question 8).

Highest Level of Education Completed: Educational level was categorized into six categories including participants who did not complete high school, high school, some college, college degree, graduate degree, and advanced degree or PhD (Appendix C, question 9).

Occupation: Occupation was classified into three categories: job that needs low occupational activity (e.g. office work, engineer, teacher), job that needs intermediate occupational activity (e.g. cook, health worker, mechanic), and job

that needs high occupational activity (e.g. construction labourer, waiter, cleaner) (Appendix C, question 10).

Country of Origin: The respondents recorded the Arab country he/she immigrated from (Appendix C, question 11).

Number of Years Living in Canada: Number of years living in Canada was recorded as a discrete interval level variable (Appendix C, question 12).

Leisure-time physical activity. I assessed LTPA levels by asking the participants to indicate how many times on the average do they engage in each category of LTPA (mild, moderate, and strenuous) for 15 minutes or more using the Godin and Shephard Leisure-Time Physical Activity Questionnaire (Appendix D). The frequency of each physical activity category was multiplied by the value in METs. According to Godin (2011), "the METs concept represent a simple, practical, and easily understood procedure for expressing the energy cost of physical activities as a multiple of the resting metabolic rate. Strenuous activities are estimated to have a METs value of 9, moderate activities have a METs value of 5, and light activities have 3 METs" (p.18). I calculated the total weekly LTPA score by adding the products of the separate categories. For example, a participant who indicated engaging in mild exercise five times per week, moderate exercise two times per week, and strenuous exercise three times per week, had a total weekly LTPA score of (5x3) + (2x5) + (2x9) = 43 units. A score less than 14 was considered insufficiently active, between 14 and 23 was considered moderately active, and 24 and above was considered active (Godin, 2011).

Individual correlates. I assessed the self-efficacy part of the individual correlates for the relationship between LTPA and socioeconomic groups through asking participants to rate from 1 to 5 how confident they feel they could really motivate themselves on 12 questions of the Self-Efficacy and Exercise Habits Survey (Appendix E). Afterwards, I calculated a mean score for the 12 questions, with higher scores representing more self-efficacy attitudes towards exercise (Sallis et al. 1988). As for the benefits and barriers to exercise part, I asked the participants if they strongly agree, agree, disagree, or strongly disagree to 43 ideas about exercise (Appendix F). Barriers scale items (4, 6, 9, 12, 14, 16, 19, 21, 24, 28, 33, 37, 40, and 42) are reverse coded. The scores on the scale range from 43 to 172, with higher scores mean that the individual more positively perceives physical activity (Sechrist et al., 1987).

Social correlates. For the social correlates, I asked the participants to rate separately for family members and friends/coworkers how often during the past three months did they say or describe 13 actions as described by the Social Support and Exercise Survey (Appendix G). Answer choices ranged from *none*, *a few times*, *often*, *very often*, to *does not apply*. Then, I calculated the family and friends participation scores by adding the scores of items 1, 2, 3, 4, 5, 6, 10, 11, 12, and 13. Higher scores indicated more social support for physical activity. As for the family rewards and punishment scores, I calculated them through adding the scores of items 7, 8, and 9. Lower scores indicated more social support for exercise (Sallis et al., 1987).

Environmental correlates. The Physical Activity Neighborhood Environment Survey (Appendix H) consists of 17 items with the main constructs evaluating residential

density, access to destinations, pedestrian and bicycling infrastructure, proximity to recreational facilities, aesthetic qualities, social cues for exercise, street connectivity, traffic safety, crime safety, and availability of household automobile. Items are rated on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) plus a choice for *doesn't know/not sure* response. Scoring of the instrument started with grouping responses 4 and 5 for item 1, reverse scoring items 1, 7, 8, 15, and 16, and then taking a mean score of all items. The final score ranges from 1 to 4, with higher values indicating greater environmental support for physical activity (Sallis et al., 2010).

Data Analysis Plan

For the purposes of data analysis, I used the IBM Statistical Package for Social Sciences (SPSS) version 23. Data cleaning helps the researcher identify and correct errors in the data collected or at least to minimize their impact on study results. Screening the data objectively and systematically is very crucial; it allows the researcher to better understand the data (Van den Broeck, Argeseanu Cunningham, Eeckels, & Herbst, 2005). I screened the data through simple descriptive statistics shortly after collecting the responses. Predefined parameters about normal ranges, distribution shapes, and strength of relationships were set to detect suspect data. I used descriptive statistics tools including; numerical, e.g. frequency distributions and cross-tabulations, and graphical methods, e.g. histograms and box plots. After the data have been checked, I diagnosed each troublesome data point as erroneous, true extreme, true normal, or idiopathic. The choices for dealing with errors in data are limited to correcting, deleting, or leaving unchanged. I corrected impossible values if a correct value was found otherwise they

were deleted. As for suspect data and extreme values, I examined them individually and as a group to determine their effect on the results and determine whether to delete or leave unchanged (Van den Broeck et al., 2005).

As noted in Chapter 1, this research has six overarching research questions:

RQ1: What is the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada as computed using the Godin and Shephard Leisure-Time Physical Activity Questionnaire? The first research question is descriptive and therefore no hypotheses are being tested.

RQ2: Does the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada vary between recent (less than 10 years) and non-recent (10 or more years) immigrants?

$H_0$2: There is no statistically significant difference in the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada between recent (less than 10 years) and non-recent (10 or more years) immigrants.

H_a2: There is a statistically significant difference in the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada between recent (less than 10 years) and non-recent (10 or more years) immigrants.

RQ3: Can education predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

$H_0$3: There is no statistically significant association between education and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

H_a3: There is a statistically significant association between education and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

RQ4: Can different levels of occupational physical activity predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

$H_0 4$: There is no statistically significant association between different levels of occupational physical activity and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

$H_a 4$: There is a statistically significant association between different levels of occupational physical activity and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

RQ5: Can income predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

$H_0 5$: There is no statistically significant association between income and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

$H_a 5$: There is a statistically significant association between income and the total weekly LTPA score prediction in participating adult Arab immigrants in Edmonton, Alberta, Canada.

RQ6: To what degree do individual, social, and environmental factors predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income)?

$H_0$6: Individual, social, and environmental factors do not significantly predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income).

H_a6: Individual, social, and environmental factors significantly predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income).

Descriptive and preliminary analysis. I used descriptive statistics to summarize the demographic data describing the characteristics of the sample. Analysis of descriptive categorical variables, e.g. sex and level of education, was expressed as numbers (percentages). As for continuous variables, e.g. household size, I transformed them into categorical variables and then expressed as numbers (percentages). I considered a p-value < 0.05 as statistically significant. Sample data are presented and displayed in Chapter 4.

Analysis of leisure-time physical activity. In order to assess the effects of the different indicators for socioeconomic status (education, income, and occupation) on the mean LTPA score, I ran ANOVA tests with subsequent post-hoc analyses. For self-efficacy, perceived benefits and barriers, social support, and environmental factors, I calculated an aggregate score for each element through totalling the answers on all items; afterwards an average score was taken through dividing the total score by the number of elements in each variable. Then, I used the average scores to run multiple regression

analysis to assess the association of the mean LTPA score with the individual, social, and environmental factors. I dummy coded categorical variables including age, gender, BMI, self-rated health, marital status, household size, household income, education, occupation, and number of years living in Canada before entering them in the model. As for self-efficacy, perceived benefits and barriers, and environmental factors, I entered them into the model as continuous variables.

Threats to Validity

The Godin and Shephard Physical Activity Questionnaire was developed in the mid 1980s in Toronto, Canada where the researchers tested its validity and reliability. The validity of this instrument is comparable to other simple methods of predicting physical activity, such as the 5-level categorization of habitual activity. As for its reliability, this instrument was found to be 0.94 reliable for the strenuous activity score and 0.74 for the total LTPA score, using the kappa index (Godin & Shephard, 1985). Principal-components factor analysis of the Self-Efficacy and Exercise Habits Survey produced two meaningful exercise self-efficacy factors where their test-retest reliabilities and internal consistencies were then studied. The self-efficacy scales were significantly associated with reported exercise behaviors, providing evidence for validity and reliability (Sallis, 1988). The Exercise Benefits/Barriers Scale has been tested for internal consistency, validity of its constructs, and test-retest reliability. Calculation of Cronbach's alpha for the Exercise Benefits/Barriers Scale produced a standardized alpha of .954. The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866. Test-retest reliability of the whole instrument was .89,

.89 for the Benefits Scale, and .77 for the Barriers Scale (Sechrist et al., 1987). The test-retest and internal consistency reliabilities of the Self-Efficacy and Exercise Habits Survey showed satisfactory results.

The social support scales were correlated with self-reported exercise habits, which provided evidence for concurrent criterion-related validity. The test-retest reliability of the Physical Activity Neighborhood Environment Survey has been demonstrated in several countries (Alexander, Bergman, Hagströmer, & Sjöström, 2006; Oyeyemi, Adegoke, Oyeyemi, & Fatudimu, 2008, Oyeyemi et al., 2013; Sallis et al., 2010). Additionally, each single item of the survey has been validated against a relevant multi-item subscale of the abbreviated Neighborhood Environment Walkability Scale yielding Spearman correlations that ranged from 0.27–0.81 (Sallis et al., 2010). Due to the limitations of this current study, the findings from this research are restricted to adult Arab immigrants in Edmonton, Alberta, Canada and as a result, might not be generalized to other immigrant groups throughout Canada. However, these results may prove to be useful in directing future research on LTPA among other immigrant groups in Canada.

Ethical Procedures

I intended to use self-administered electronic questionnaires in this research, and therefore, privacy and confidentiality were the most important ethical concerns to consider. The survey tool was anonymous; such that I did not collect any names or contact information, and the information obtained were recorded in a way that the subjects couldn't be identified. Furthermore, I did not interact with the participants at all since a volunteer sampling strategy was used. Such a research with less than minimal risk

to the participants might be exempt from the regulations governing human subject research (U.S. Department of Health & Human services, 2018), nevertheless, I sought ethical committee approval for performing the proposed research from Walden University, approval number: 05-10-19-0596254. Furthermore, I obtained electronic informed consents from all participants indicating their understanding and willingness to participate in the survey.

Summary

In Chapter 3 I presented a description of the methodology that was used in the study including the research methods and design, a description of participants, sample size, survey tools, and procedures for data collection. Afterwards, I explained the procedures for data analysis. Then, I described the study's validity and reliability and provided a discussion concerning the ethical considerations involved in conducting this study. In the following section I will present the findings from this research.

Chapter 4: Results

Introduction

The purpose of this study was to explore the self-reported levels of participation in LTPA among adult Arab immigrants in central Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation.

Six research questions guided this study:

RQ1: What is the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada as computed using the Godin and Shephard Leisure-Time Physical Activity Questionnaire?

RQ2: Does the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada vary between recent (less than 10 years) and non-recent (10 or more years) immigrants?

RQ3: Can education predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

RQ4: Can different levels of occupational physical activity predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

RQ5: Can income predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada?

RQ6: To what degree do individual, social, and environmental factors predict the total weekly LTPA score of participating adult Arab immigrants in Edmonton, Alberta, Canada after controlling for socioeconomic status (education, occupation, and income)?

I start Chapter 4 by describing the time frame for data collection and reporting baseline descriptive and demographic characteristics of the sample. Next, I report descriptive characteristics that characterize the sample, evaluate the statistical assumptions, and report findings of statistical analysis. I conclude the chapter with a concise summary.

Data Collection

I recruited the participants in this study using a flyer that was posted at several Arab commercial establishments around the city of Edmonton, Alberta, Canada. The flyer included a description of the study alongside a universal link to go online and complete the questionnaire. Recruitment started on May 13, 2019 and ended on July 15, 2019 when the number of completed questionnaires fulfilled the sample size requirement of the study. A total of 376 questionnaires were completed.

Baseline Descriptive and Demographic Characteristics

Demographic characteristics of the study sample are presented in Table 1. In total, 207 (55.05%) men and 169 (45.95%) women completed the questionnaire. These figures are very comparable to the numbers of Arab immigrants in Edmonton where 52.6% and 47.4% of the population are men and women, respectively (Statistics Canada, 2016). Most respondents were between the ages of 35 and 44 years (31.65%), followed by those aged 25 to 34 years (21.55%), whereas participants 65 years of age or older constituted

only 4.26% of the study sample. The majority of respondents were married (62.50%) and over half of the sample had some education beyond high school (55.59%), while 18.88% of participants did not graduate from high school. Two hundred and nine participants (55.59%) reported occupations requiring low physical activity, and 120 (31.91%) declared high occupational physical activity. The most household income level reported was between CAN$60,000 to less than CAN$80,000 (31.64%). Only 12 (3.19%) and 25 (6.65%) respondents declared income level below CAN$20,000 and CAN$100,000 or more, respectively. Two hundred and thirty three respondents (61.97%) lived in a household of four people or less, and the majority of participants (91.49%) reported good or excellent health, with only 12 (3.19%) respondents reported bad health status. Around three quarters (72.9%) of the study sample were either overweight or obese according to the BMI classification, and just over half of the respondents (51.3%) have been living in Canada for less than 10 years.

Table 1

Demographic Characteristics of the Study Sample

Characteristic	*N*	%
Gender		
Male	207	55.05
Female	169	44.95
Age		
18–24	45	11.96
25–34	81	21.55
35–44	119	31.65
45–54	59	15.69
55–64	56	14.89
≥65	16	4.26
Marital Status		
Single	110	29.26
Married	235	62.50
Divorced/Separated	26	6.91
Widowed	5	1.33
Education Level		
Less than high school	71	18.88
High school	96	25.53
Some college or university	78	20.74
College or university	123	32.72
Graduate/Advanced degree	8	2.13
Occupation		
Low activity	209	55.59
Medium activity	47	12.50
High activity	120	31.91
Yearly Household Income (CAN$)		
<20,000	12	3.19
20,000–39,999	58	15.43
40,000–59,999	107	28.46
60,000–79,999	119	31.64
80,000–99,999	55	14.63
≥100, 000	25	6.65
Number of People in household		
4 people or less	233	61.97
5 people or more	143	38.03
Self-rated overall health status		
Bad	12	3.19
Fair	20	5.32
Good	142	37.77
Excellent	202	53.72
BMI		
Normal weight	102	27.13
Overweight	182	48.40
Obese	92	24.47
Years living in Canada		
<10	193	51.33
≥10	183	48.67

Results

Table 2 shows the average LTPA scores in METs and the proportion of respondents with sufficient LTPA levels categorized by the demographics of participants. A chi square test of independence was done to compare the LTPA levels by demographic characteristics. The mean LTPA scores and percentage of respondents reporting sufficient LTPA levels declined as the age groups got older, with participants in the youngest age group having a mean LTPA score of 33.87 (*SD* =16.59) METs compared to a score of 3.38 (*SD* = 3.26) METs for those in the eldest age group. Participants in the age ranges of 18 to 24 and 25 to 34 years were more likely to be classified as sufficiently active, χ^2 (10, 376) = 102.247, $p < .001$. Similarly, both the mean LTPA score and proportion of people classified as sufficiently active decreased as BMI got higher, with those in the normal BMI range were more likely of being sufficiently active, χ^2 (4, 376) = 31.841, $p < .001$. Males and females had comparable mean LTPA scores, 18.79 (*SD* = 16.23) and 21.15 (*SD* = 15.72) METs, respectively. Even though, females were more likely to be classified as sufficiently active, this difference was not statistically significant, χ^2 (2, 376) = 5.865, $p = .053$. Single respondents had the highest mean LTPA score, 26.45 (*SD* = 16.50) METs, amongst all marital status categories, and they were more likely to be sufficiently active, χ^2 (6, 376) = 36.678, $p < .001$. As the educational level of participants increased, the mean LTPA score and the proportion of people who were sufficiently active increased, with those having a college/university or higher degree being more likely to be sufficiently active, χ^2 (8, 376) = 79.971, $p < .001$.

Table 2

Mean LTPA Scores and Proportion of Respondents Classified as Active

Characteristic	Mean LTPA (*SD*)	Active *N* (%)	χ^2	*p*
Age				
18–24	33.87 (16.59)	32 (71.11)		
25–34	25.59 (14.43)	51 (62.96)		
35–44	19.17 (17.40)	52 (43.70)	102.247	< .001
45–54	14.97 (10.40)	11 (18.64)		
55–64	11.61 (8.79)	7 (12.50)		
≥65	3.38 (3.26)	0 (.00)		
BMI (kg/m^2)				
Normal weight	24.60 (17.17)	60 (58.82)		
Overweight	20.06 (15.04)	74 (40.70)	31.841	< .001
Obese	14.18 (14.93)	19 (20.65)		
Gender				
Male	18.79 (16.23)	74 (35.75)	5.865	.053
Female	21.15 (15.72)	79 (46.75)		
Marital Status				
Single	26.45 (16.50)	62 (56.36)		
Married	18.28 (15.49)	90 (38.30)	36.678	< .001
Divorced/Separated	8.77 (6.06)	1 (3.85)		
Widowed	6.44 (5.13)	0 (0.00)		
Education Level				
Less than high school	11.27 (10.10)	10 (14.08)		
High school	13.67 (12.61)	21 (21.88)		
Some college or university	21.51 (16.07)	35 (44.87)	79.971	< .001
College or university	27.74 (16.77)	82 (66.67)		
Graduate/Advanced degree	32.86 (15.63)	5 (62.50)		
Yearly Household Income (CAN$)				
<20,000	13.75 (19.33)	1 (8.33)		
20,000–39,999	11.71 (12.10)	12 (20.69)		
40,000–59,999	16.70 (13.98)	36 (33.64)	58.929	< .001
60,000–79,999	21.80 (15.64)	50 (42.02)		
80,000–99,999	26.45 (17.70)	35 (63.64)		
≥100, 000	31.40 (15.52)	19 (76.00)		
Occupation				
Low activity	24.45 (15.60)	116 (55.50)		
Medium activity	20.98 (21.01)	16 (34.04)	70.568	< .001
High activity	11.42 (10.17)	21 (17.50)		
Self-rated overall health status				
Bad	10.25 (12.85)	2 (16.67)		
Fair	11.00 (9.38)	3 (15.00)	105.984	< .001
Good	10.91 (8.96)	17 (11.97)		
Excellent	27.59 (16.59)	131 (64.85)		
Years living in Canada				
<10	20.32 (14.15)	86 (44.56)	2.548	.280
≥10	19.36 (17.81)	67 (36.61)		
Number of People in household				
4 people or less	19.15 (16.52)	88 (37.77)	2.188	.335
5 people or more	21.01 (15.16)	65 (45.45)		

Similar trends emerged for income level where the mean LTPA and the percentage of people engaging in sufficient LTPA increased as the yearly household income increased. Participants who earned CAN$80,000 or more each year were more likely to be sufficiently active, χ^2 (10, 376) = 58.929, $p < .001$. The mean LTPA score and the percentage of sufficiently active participants decreased as the occupational physical activity level of participants increased, with those reporting low occupational physical were more likely to be sufficiently active, χ^2 (4, 376) = 70.568, $p < .001$. Respondents who declared excellent health status had higher mean LTPA score, 27.59 (*SD* = 16.59) METs, than all other respondents, and were more likely to be sufficiently active, χ^2 (6, 376) = 105.984, $p < .001$. People living in Canada for 10 years or less had comparable mean LTPA score to those who immigrated more than 10 years ago, 20.32 (*SD* = 14.15) and 19.36 (*SD* = 17.81) METs, respectively. While recent immigrants were slightly more likely to be classified as sufficiently active compared to established immigrants, this difference was not statistically significant, χ^2 (2, 376) = 2.548, $p = .280$. Finally, individuals living in a households with four people or less had very similar mean LTPA score to those living in households with five people or more, 19.15 (*SD* = 16.52) and 21.01 (*SD* = 15.16) METs, respectively. Even though, individuals belonging to households of five people or more were slightly more likely to be sufficiently active, this difference was not statistically significant, χ^2 (2, 376) = 2.188, p = .335.

Statistical Analysis Findings Organized by Research questions

Research question 1. RQ1 was descriptive in nature and aimed to examine the total weekly LTPA score of participants using the Godin-Shephard Exercise Questionnaire. The overall sample's LTPA scores ranged from 0 to 103 METs per week, with a mean value of 19.85 METs (*SD* = 16.02) and a median of 15.00. A METs score of 24 and above is considered active, a score of 14 to 23 is considered moderately active, and a score of 13 or less is considered insufficiently active (Godin & Shepard, 1985). Only 153 (40.7%) participants accumulated enough METs to be classified as active, with 179 (47.6%) participants classified as insufficiently active.

Research question 2. RQ2 explored whether the total weekly LTPA score of participants varied between recent (less than 10 years) and non-recent immigrants (10 years or more). I conducted an independent-samples *t*-test to compare the total weekly LTPA score among recent and established immigrants. On average, established immigrants scored .961 METs lower than recent immigrants. However, there was no significant difference in the scores between recent (*M*=20.32, *SD*=14.15) and established (*M*=19.36, *SD*=17.81) immigrants, $t\ (374) = .577$, $p = .564$.

Research question 3. RQ3 probed whether education can predict the total weekly LTPA score of participants. I conducted a one-way between groups ANOVA to compare the impact of educational level on the mean LTPA score. Participants were categorized into four groups according to their educational attainment (Group 1: less than high school; Group 2: high school; Group 3: some college/university; Group 4: college/university degree or higher). Upon examining the dependent variable, it was not

normally distributed, however, the ANOVA test is robust to violations of normality. Results from the *Levene* test of normality were significant (F (3, 372) = 8.561, $p < .001$), indicating that homogeneity of variances cannot be assumed. These findings suggest that running a standard ANOVA test would not produce trustworthy results. Therefore, I conducted a robust test of equality of means (Welch) to overcome these violations of assumptions. According to the results of Welch test, there was a statistically significant difference in mean LTPA scores for the four educational levels (F (3, 194.855) = 30.795, $p < .001$). Post-hoc comparisons using the Games-Howell test indicated that the mean LTPA score for Group 1 was significantly different from Group 3 ($p < .001$) and Group 4 ($p < .001$). However, the mean LTPA score for Group 1 did not differ significantly from group 2 ($p = .524$). Additionally, Group 2 was significantly different from Group 3 ($p = .003$) and Group 4 ($p < .001$), and Group 3 was significantly different from Group 4 (p = .029). In general, as the educational level of participants increased, so did the amount of exercise on their leisure time. Participating in or completing some post-secondary education is a positive predictor for higher levels of LTPA. Table 3 presents the Games-Howell test comparisons alongside the means, standard deviations, and confidence intervals for educational levels.

Table 3

Games-Howell Comparisons of Educational Levels

				Games-Howell Comparisons		
Group	*N*	Mean (*S*D)	95% CI	1	2	3
1	71	11.27 (10.10)	8.88–13.66			
2	96	13.67 (12.61)	11.11–16.22	.524		
3	78	21.51 (16.07)	17.89–25.14	< .001	.003	
4	131	28.05 (16.69)	25.17–30.94	< .001	< .001	.029

Research question 4. RQ4 explored whether occupational physical activity can predict the total weekly LTPA score of participants. I conducted a one-way between groups ANOVA to compare the impact of occupational physical activity levels on the mean LTPA score. Participants were categorized into three groups (Group 1: low occupational physical activity; Group 2: moderate occupational physical activity; Group 3: high occupational physical activity). Results from the *Levene* test of normality were significant (F (2, 373) = 26.935, $p < .001$), indicating that homogeneity of variances cannot be assumed. As such, I conducted Welch test, which showed a statistically significant difference in mean LTPA scores for the three occupational physical activity levels (F (2, 115.660) = 42.427, $p < .001$). Post-hoc comparisons using the Games-Howell test indicated that the mean LTPA score for Group 1 was significantly different from Group 3 ($p < .001$), however it did not differ significantly from group 2 ($p = .538$).

Furthermore, Group 2 was significantly different from Group 3 (p = .012). Overall, as participants' occupations became more physically demanding, the amount of physical activity spent on their leisure time decreased. Having an occupation that requires low or moderate physical activity is a positive predictor for higher levels of LTPA. Table 4 presents the Games-Howell test comparisons alongside the means, standard deviations, and confidence intervals of occupational physical activity levels.

Table 4

Games-Howell Comparisons of Occupational Physical Activity Levels

				Games-Howell Comparisons	
Group	*N*	Mean (*SD*)	95% CI	1	2
1	209	24.45 (15.60)	22.32–26.57		
2	47	20.98 (21.01)	14.81–27.15	.538	
3	120	11.42 (10.17)	9.58–13.26	< .001	.012

Research question 5. RQ5 explored whether the yearly household income of participants can predict their total weekly LTPA score. I conducted a one-way between groups ANOVA to compare the impact of yearly household income on the mean LTPA score. Participants were categorized into three groups (Group 1: less than CAN$40,000; Group 2: between CAN$40,000 and CAN$79,999; Group 3: CAN$80,000 or more). Results from the *Levene* test of normality were significant (F (2, 373) = 4.402, p = .013), indicating that homogeneity of variances cannot be assumed. Accordingly, I conducted a

Welch test, which showed a statistically significant difference in mean LTPA scores for the three income groups (F (2, 147.783) = 20.365, $p < .001$). Post-hoc comparisons using the Games-Howell test indicated that the mean LTPA score for Group 1 was significantly different from Group 2 ($p = .001$), and from Group 3 ($p < .001$). Furthermore, Group 2 was also significantly different from Group 3 ($p < .001$). Overall, as the yearly household income of participants increased, the amount of exercise on their leisure time increased. Higher yearly household income emerged as a positive predictor for higher levels of LTPA. Table 5 presents the Games-Howell test comparisons alongside the means, standard deviations, and confidence intervals of income levels.

Table 5

Games-Howell Comparisons of Income Levels

				Games-Howell Comparisons	
Group	N	Mean (SD)	95% CI	1	2
1	70	12.06 (13.46)	8.85–15.27		
2	226	19.39 (15.06)	17.41–21.36	.001	
3	80	28.00 (17.11)	24.19–31.81	< .001	< .001

Research question 6. RQ6 explored to what degree do individual, social, and environmental factors predict the total weekly LTPA score of participants. I conducted a hierarchical multiple regression analysis to assess the ability of individual, social, and environmental factors to predict LTPA score after controlling for age, gender, BMI,

health status, marital status, number of people in the household, income, education, and occupational physical activity. Table 6 displays the results from the hierarchical multiple regression analysis. Preliminary analyses were done to meet the assumptions of normality, linearity, multicollinearity, and homoscedasticity. I entered demographic variables (age, gender, BMI, health status marital status, and number of people in household) in Step 1 of the model and they contributed significantly to the model, F (13, 362) = 15.770, $p < .001$, explaining 36.2% of the variance in LTPA. In Step 2, income, education, and occupational physical activity were entered in the model, also contributing significantly to it, F (20, 355) = 16.058, $p < .001$, and explaining an additional 11.3% of the variance in LTPA. After entry of the individual, social, and environmental factors in the model in Step 3, the total variance explained by the model increased to 69.4%, and this change was significant, F (26, 349) = 30.418, $p < .001$. The individual, social, and environmental factors explained an additional 21.9% of the variance in LTPA after controlling for age, gender, BMI, health status marital status, number of people in household, income, education, and occupational physical activity, R^2 change = .219, F change (6, 349) = 41.576, $p < .001$.

Table 6

Results of Hierarchical Multiple Regression of Predictors of LTPA

Variables	Step 1	Step 2	Step 3
Age (years)			
25–34	-.248**	-.204**	-.103*
35–44	-.507**	-.335**	-.130
45–54	-.386**	-.259**	-.110
55–64	-.367**	-.215**	-.089
≥65	-.339**	-.322**	-.175**
Gender			
Male	.007	.089*	.043
BMI (kg/m^2)			
Overweight	.048	.004	-.031
Obese	.034	-.0032	.037
Health status			
Bad/Fair	-.211**	-.151**	-.088
Good	-.450**	-.398**	-.064
Marital status			
Married	.244**	.138*	.127*
Divorced/Separated/Widowed	.027	.051	.064
Number of people in household			
5 or more	.012	.005	-.001
Income (CAD$)			
Below 40,000		-.079	-.055
Between 40,000 and 79,999		-.090	-.041
Education			
Less than high school		-.108*	-.087*
High school		-.130*	-.142**
Some college/university		-.063	-.064
Occupational Physical Activity			
Low activity		.317**	.108*
Moderate activity		.173**	.080*
Individual Factors			
Self Efficacy			-.174**
Exercise Benefits/Barriers			.286**
Social Factors			
Family Participation			-.013
Family Rewards and Punishment			.318**
Friends Participation			.131*
Environmental Factors (PANES)			-.100**
R^2	.362	.475	.694
R^2 Change	.362	.113	.219

*$p < .05$; **$p < .01$

In the final model, both measures for individual factors were statistically significant, with the exercise benefit/barriers score having a positive influence on LTPA, beta = .286, $p < .001$, and the self-efficacy score having a negative impact on LTPA, beta = -.174, $p < .001$. On the one hand, with every-standard deviation increase in the exercise benefits/barriers score (*SD* = 20.11), there was a .286 standard deviations increase in the LTPA score (*SD* = 16.02). On the other hand, with every standard deviation increase in the self-efficacy score (*SD* = .96), there was a .172 standard deviations decrease in the LTPA score (*SD* = 16.02). Having more knowledge about the benefits and experiencing fewer barriers to exercise seemed to predict an increase in LTPA, while having higher feelings of self-efficacy seemed to predict a decrease in LTPA of participants. Furthermore, two of the three measures for social factors were statistically significant in the final model. The family rewards and punishment score and the friends' participation score had a positive impact on LTPA, with a higher beta value for the family rewards and punishment score (beta = .318, $p < .001$) than the friends' participation score (beta = .131, $p = .015$). With every standard deviation increase in the family rewards and punishment score (*SD* = 1.08), there was a .318 standard deviations increase in the LTPA score (*SD* = 16.02) of participants. And with every standard deviation increase in the friends' participation score (*SD* = 10.23), there was a .131 standard deviations increase in the LTPA score (*SD* = 16.02) of respondents. Having more family and friends' social support seemed to predict an increase in the LTPA of participants, with the familial support having around two and half times (2.43) the impact of that of friends' support. Finally, environmental factors were also statistically significant predictors of LTPA,

however this impact was negative, beta = -.100, p = .004. With every standard deviation increase in the PANES score (SD = .32), there was a .100 standard deviations decrease in the LTPA score (SD = 16.02). Having greater environmental support for physical activity seemed to predict a lower LTPA score among participants.

Summary

In Chapter 4 I presented a description of the study results. Around 40% of the study sample accumulated enough METs to be classified as active. Although recent immigrants scored on average .961 METs points more than established immigrants, this difference was not statistically significant. Participating in or completing some post-secondary education appeared to be a positive predictor for LTPA. Also, having an occupation that requires low or moderate physical activity showed to be a positive predictor for LTPA. Additionally, income emerged as a positive predictor for LTPA, where the amount of LTPA of participants increased as the yearly household income increased.

After controlling for age, gender, BMI, health status marital status, number of people in household, income, education, and occupational physical activity, in the hierarchical regression model, the individual, social, and environmental factors explained around 22% of the variance in LTPA. Having more knowledge about the benefits and experiencing fewer barriers to exercise seemed to predict an increase in LTPA, while having higher feelings of self-efficacy seemed to predict a decrease in LTPA of participants. In addition, having more family and friends' social support seemed to predict an increase in the LTPA levels of participants, while having greater

environmental support for physical activity seemed to predict a lower LTPA score among the participants. In the following chapter I discuss the study findings, limitations, recommendations, and implications for social change.

Chapter 5: Discussion, Recommendations, and Conclusions

Introduction

The purpose of this study was to explore the self-reported levels of participation in LTPA among adult Arab immigrants in central Alberta, Canada, to examine the socioeconomic determinants of LTPA, and to investigate which individual, social, and environmental factors contribute to LTPA participation. I used a cross-sectional study design for data collection utilizing electronic self-administered questionnaires from a sample of volunteers. Just over 40% of participants accrued sufficient METs to be classified as active. Recent and established immigrants had comparable LTPA scores resulting in non-significant differences. Education, income, and occupational physical activity appeared to be positive predictors for LTPA. As the participants attained higher degrees, earned more money, and had occupations requiring less physical effort, their level of LTPA increased. The social conditions in which the participants live also affected their levels of LTPA. On the individual level, being more familiar with the benefits and having fewer barriers to exercise appeared to predict an increase in LTPA, whereas increased participants' beliefs of their capabilities to produce desired effects seemed to predict a decrease in LTPA. On the interpersonal level, familial and friends' support for exercise increased the levels of LTPA of participants. And finally, on the environmental level, more environmental support for exercise predicted a decrease in LTPA levels among participants. In Chapter 5, I will offer interpretations of the study results, discuss the limitations of the study, provide recommendations for future research, describe the implications for social change, and provide a concise summary.

Interpretation of the Findings

Around 40% of Arab immigrants in Edmonton, Alberta, Canada were classified as physically active during their leisure time. These figures are almost double of those reported by Mahmood et al. (2018) of immigrants to Canada from all ethnic backgrounds, and also double of those of all Canadian adults (Public Health Agency of Canada, 2016). This higher level of participation in LTPA among adult Arab immigrants in Edmonton, Alberta, Canada also seems to surpass that of immigrants in Australia (Joshi et al., 2017), the United States (Taverno Ross et al., 2014), and the United Kingdom (Williams et al., 2011). Although the observed levels of LTPA among adult Arab immigrants in Edmonton, Alberta, Canada might reflect the true prevalence in this population, one possible explanation for observing higher levels of LTPA in the population of interest compared to other immigrant populations might be the disproportionally higher representation of younger adults (younger than 45 years) in the study sample. Adults younger than 45 years represented 65.16% of the study sample, and 55.10% of them conveyed active participation in LTPA. This higher representation and higher participation among younger adults might have skewed the overall levels of LTPA in the adult Arab population. Another possible rationalization to consider is the sampling strategy used for recruitment. Self-selection bias could have been introduced into the sample due to the volunteer sampling strategy employed, where the characteristics of respondents might have differed from those of non-respondents. Respondents who were leading active lifestyles might have been more likely to be interested in the topic being

studied, and as a result enrolled in this research at higher rates than the less active participants.

A higher percentage of recent Arab immigrants in the study sample (44.56%) reported participation in LTPA than established immigrants (36.61%). These levels of participation in LTPA are much higher than the levels of LTPA of Arab immigrants to Canada reported by Tremblay et al. (2006) over a decade ago and those reported by a more recent study of all immigrants to Canada by Mahmood et al. (2018). Records from 2006 estimated that only 16% of recent Arab immigrants were found to be physically active compared to 20% of established Arab immigrants (Tremblay et al., 2006). And records from 2018 found that 18.2% of recent and 22.6% of established immigrants of all backgrounds were physically active (Mahmood et al., 2018).

Interestingly, the trends of LTPA between recent and established Arab immigrants in Edmonton, Alberta, Canada are consistent with a 2018 Canadian study evaluating physical activity of immigrants in terms of active commuting, where the longer the immigrants stayed in Canada, the less active they became (Yu & Teschke, 2018). Findings from Australia (Joshi et al., 2017) and the United States (Taverno Ross et al., 2014) indicated similar results where immigrants' participation in physical activity tended to decrease the longer they stayed in the country. Conversely, a 13-year-old record from Canada revealed a higher percentage of active established adult Arab immigrants than their recent counterparts (Tremblay et al., 2006). Other Canadian studies supported these findings: Mahmood et al. (2018) found recent immigrants of all ethnicities were more inactive than established immigrants, and Ramos Salas et al. (2015) reported that

established immigrant Latinas were more physically active than their recent counterparts. Internationally, results from an Australian study found that Asian immigrants participated more in physical activity the longer they stayed in Australia (Guo et al., 2015).

Noticeably, the levels of participation in LTPA and time since immigration observed in this current study confirm some published research and contradict other literature. Among the presented literature, probably the only almost-true comparison of the observed results could be done with those of Tremblay et al. (2006). This is because the figures reported by Tremblay et al. (2006) are from a comparable population (West Asians and Arabs). Nevertheless, these results date back to the 2000/2001 and 2003 cycles of the Canadian Community Health Survey and the LTPA levels among Arab immigrants in Edmonton might have changed during the past 16 years. One reason that might account for this change is the surge of immigrants to Edmonton in the past few years from war-torn countries such as Syria, Libya, and Iraq. Additionally, the results reported by Tremblay et al. (2006) describe the levels of LTPA among Arab immigrants all over Canada. There could be in fact a difference in LTPA levels between Arab immigrants in Edmonton and other regions of Canada. Sadly, there are no reported levels of LTPA for adult Arab immigrants in Edmonton that can be found in the literature to compare the findings from this study with. The other studies conducted in Canada showing an inverses relationship of LTPA levels and time since immigration to what was observed in this current research refer to immigrants from all ethnic backgrounds (Mahmood et al., 2018) and to Latin women (Ramos Salas et al., 2015). The diversity of ethnic backgrounds in the immigrant sample reported by Mahmood et al. (2018) might

have diluted the levels of LTPA among Arab immigrants, and the differences in the social norms between Arabs and Latin women might account for the results observed.

For the purposes of investigating the impact of socioeconomic status on LTPA, I assessed three indicators as a proxy for socioeconomic status of participants in this research: education, occupational physical activity, and yearly household income. Generally, as the educational level and the yearly household income of participants increased and as their occupations required less physical effort, they participated more in LTPA. Participating in or completing some post-secondary education, earning higher yearly household income, and having an occupation requiring low or moderate physical activity emerged as positive predictors for higher levels of LTPA. These results are not surprising due to the strong evidence in the literature highlighting the measures of socioeconomic status as predictors of participation in physical activity (O'Donoghue et al., 2018). One recent Canadian study showed that individuals with a university degree compared to those with less education, and individuals with household income over $CAN80, 000 compared to those with less income had higher likelihoods of being physically active (Abichahine & Veenstra, 2017). Another study from 2017 revealed that Canadians with post-secondary education and those who earn more than CAN$70,000 a year were more likely to comply with the national recommendations for physical activity (Whelan et al., 2017). These trends are not unique to Canada; in fact, they are prevailing across developed countries. For example, one literature review showed that levels of physical activity are socially distributed where individuals with higher education and income and with better occupations participate more in physical activity (Ball et al.,

2015). Another study from Italy indicated that the likelihood of adopting healthy lifestyles, such as participation in physical activity, were positively associated with education level (Glorioso & Pisati, 2014). Socioeconomically disadvantaged immigrants to Canada and other developed countries have repeatedly mentioned financial expenses as barriers for participation in physical activity (Curtin et al., 2016; O'Driscoll et al., 2014; Ramos Salas et al., 2015). When asked about subsidized programs that support participation in physical activity, immigrants to Canada expressed difficulties qualifying for these programs (Curtin et al., 2016). Oftentimes, both parents had to work full-time jobs to support their families, which put them over the threshold to qualify for governmental support (Curtin et al., 2016).

I measured the individual factors affecting the LTPA levels of participants by calculating a score for the knowledge and barriers to exercise participation and score for self-efficacy. Both scores were significantly associated with LTPA of participants. Having more knowledge about the benefits and experiencing fewer barriers to exercise seemed to predict an increase in LTPA. These results were not surprising since perceived benefits and barriers to exercise have consistently shown to be strong predictors of physical activity in the literature (Mertens et al., 2019; Nategh, Malek, Sadegh, & Davoud, 2017; Nazaruk, 2014; Rundle-Thiele, Kubacki, & Gruneklee, 2016). Self-efficacy, on the contrary, showed to be a negative predictor of LTPA among adult Arab immigrants in Edmonton. Having more confidence in their ability to motivate themselves did not make Arab immigrants in Edmonton participate in more LTPA. These results are interesting because self-efficacy is usually reported in the literature as a facilitator for

participation in physical activity (Mertens et al., 2019; Nategh et al., 2017; Nazaruk, 2014). This peculiar relationship between self-efficacy and LTPA participation indicates that self-efficacy is not a strong enough motivator for adult Arab immigrants in Edmonton to exercise on their leisure time. This observation suggests the presence of more important variables, such as socioeconomic status and perceived benefits and barriers to exercise, or other unstudied factors that play a role in participation in LTPA.

Findings from this research showed that the family rewards and punishment score and the friends' participation score had a positive impact on LTPA. Experiencing more familial and friends' social support seemed to predict an increase in the LTPA levels of Arab immigrants in Edmonton, although support from family members showed to be over twice as impactful as that of friends. These results are consistent with the literature on the effects of social support on the levels of physical activity of populations (Keegan, Middleton, Henderson, & Girling, 2016; Lindsay Smith, Banting, Eime, O'Sullivan, & van Uffelen, 2017; Nategh et al., 2017). When it came to the effect of the built environment on the LTPA scores in the current research, more environmental support for physical activity did not produce higher LTPA scores among Arab immigrants in Edmonton. Numerous examples in the literature show contrasting results to what has been observed in this current study where pedestrian and cyclist friendly environments promoted higher levels of physical activity (Keegan et al., 2016; Mertens et al., 2019; Sallis et al., 2016). Nevertheless, some other studies did not find consistent evidence for the impact of the built environment on participation in physical activity. For example, a recent study from Thailand did not find conclusive evidence of the importance of aspects

of the environment on physical activity (Liangruenrom, Craike, Biddle, Suttikasem, & Pedisic, 2019). Although one would deliberate that greater environmental support, such as the availability of trails and parks for walking and biking and the proximity of shops and businesses, might encourage people to be more active, other factors related to the natural environment might play a role in LTPA participation. The weather in Edmonton is very different from the Arab countries. Edmontonians endure long and severe winters with short days, lots of snow, and temperatures reaching minus 35 degrees Celsius on the coldest days (University of Alberta, n.d.), making it almost impossible to go for a walk or a bike ride. These harsh winter conditions might also impact driving safety and peoples' preferences to drive to go the gym after long days at work. As for the warmer seasons in Edmonton, rain showers and scattered thunderstorms are very common during the afternoons and mosquitos are very prevalent (University of Alberta, n.d.) making it unpleasant to exercise outdoors.

Theoretical Context of Findings

I chose the socioecological model and systems theory as the theoretical foundations guiding this research. The application of these theories allowed me to examine the different levels of influence on LTPA habits among adult Arab immigrants in Edmonton, Alberta, Canada. The use of these theories also allowed for better understanding of the correlates of LTPA in this population. In particular, I observed that the different layers of the socioecological model exerted distinct influence of LTPA habits of participants. For example, on the individual level, participants' beliefs of their ability to engage in exercise were negatively correlated with LTPA levels, whereas

having more knowledge about the benefits of exercise encouraged greater participation in LTPA. Additionally, the levels of participation in LTPA increased as the participants' socioeconomic status improved. Interactions with individuals also influenced the participants' levels of participation in LTPA. Positive social encounters, both immediate like family members' support and external like friends' encouragement, boosted the participants' LTPA levels. Elements of the built environment also seemed to influence the participants' LTPA outcomes, where more environmental support predicted lower engagement in LTPA. These independent influences of the different levels of the socioecological model are also worth understanding as a whole, as suggested by systems theory (Garcia et al., 2017). Although improvements on one level of influence of the socioecological model might boost participation in LTPA, achieving optimal levels of LTPA engagement requires concomitant development on all levels of influence (Bronfenbrenner, 1986). I observed in this study that certain microsystems impact participation in LTPA more than others. For example, familial social support showed to influence LTPA levels of participants around two and half times that of friends' social support. Focusing on family encouragement seems like a good first option to enhance LTPA habits of participants, however, it also provides an opportunity to investigate further why friends' support didn't matter as much for this population and how it can exert more influence. The use of the socioecological model and systems theory facilitated drawing a sharper picture of the different influences and their interdependencies on LTPA habits of adult Arab immigrants in Edmonton, Alberta, Canada.

Limitations of the Study

I used a cross-sectional correlational design for this study, and as such, causation could not be inferred from this research. Despite achieving the minimum sample size indicated in the power analysis, I used a volunteer sampling method, which might have resulted in self-selection bias. I opted to use this purposive non-random sampling technique because it was impractical to reach out to the complete sampling frame. Even though voluntary selection bias could have been introduced into the study, there were no forms of undue influence or coercion used for recruitment of participants. Some interested candidates could have had issues with Internet literacy and access requirements to complete the electronic questionnaire, preventing them from participation in this research. This might have been evident in low number of participants 65 years and older.

Using self-administered questionnaires to report LTPA behavior might have also introduced recall bias into the study, as participants might have under- or overestimated their LTPA habits over the past few months. Another limitation of this research was the requirement of fluency in the English language for participants, in order to be able to fully comprehend and complete the study questionnaire. An unknown percentage of the immigrant Arab population in Edmonton, Alberta, Canada might not be fluent in English and as such, they might not have been represented in this research. Finally, I recruited all Arab immigrants from Edmonton, Alberta, Canada, which might limit the generalizability of the findings to Arab immigrants to other provinces or to other migrant groups throughout Canada. However, findings from this research might be beneficial in guiding future research among different immigrant groups in regards to LTPA.

Recommendations for Future Research

According to the results of this study, I recommend several actions for future research on the correlates of LTPA among Arab immigrants in Edmonton specifically, and in Canada generally. These are:

1. The current study was cross-sectional observational in nature and I would recommend follow-up research to utilize more robust research designs. Prospective longitudinal research, which follows immigrants' LTPA levels from the time they arrive in Canada, have the potential to produce valuable insights into the patterns of LTPA, how they change over time, and what factors affect these changes.
2. Future research utilizing both quantitative and qualitative techniques could provide more outlooks about the attitudes, perceptions, and lived experiences of participants influencing their LTPA levels.
3. Experimental research could also be designed to evaluate LTPA interventions among immigrants in Canada.
4. Future studies should include direct measures of LTPA, such as individual pedometers, instead of self-reported measures in order to allow for accurate measurements of LTPA levels and to reduce the likelihoods of recall bias.
5. Future research into the subject could benefit from random sampling techniques in recruiting participants in order to minimize potential self-selection bias.
6. Expanding the subjects' pool outside of Edmonton could aid in obtaining a larger sample size and the ability to generalize the results more comfortably.

Implications

Results from the current research brought greater awareness of the correlates of LTPA among adult Arab immigrants in Edmonton, Alberta, Canada. The implications for positive social change from this study include better understanding of LTPA practices in this population. Utilization of the socioecological model and systems theory to study the determinants of LTPA could help develop interventions that are holistic in nature to improve LTPA participation among Arab immigrants in Edmonton. There is a potential to reduce the barriers and boost the facilitators for LTPA as means for supporting healthful behaviors in this population. On the individual level, participation in this research might have made the respondents more conscious of their own LTPA levels and made them aware of personal, social, and environmental barriers influencing their LTPA habits. On the organizational level, public health and health promotion professionals can also benefit from the findings of this study in designing and implementing tailored and targeted LTPA interventions to this growing population. Results from the current research revealed that Arab immigrants tend to engage less in LTPA as they age, have higher BMI, are not single, do not enjoy excellent health status, and are socioeconomically disadvantaged. Additionally, self-efficacy levels of respondents had a negative association with LTPA participation. Using this information, health promotion practitioners can tailor LTPA interventions for older Arab immigrants in Edmonton, develop LTPA interventions suited for people with higher BMI, target married, divorced, and widowed individuals, and involve those who are socioeconomically disadvantaged.

Furthermore, there is an opportunity to translate the already existing self-efficacy into behavior change.

Conclusion

Despite the methodological drawbacks, the findings from this current research showed for the first time a preview of LTPA levels among adult Arab immigrants in Edmonton, Alberta, Canada. It also revealed an array of individual, social, environment, and socioeconomic factors facilitating and inhibiting engagement in LTPA. Building on the results of this study, further research into the subject could be enhanced, and tailored and targeted interventions promoting LTPA in this population could be designed. Improving the LTPA levels of immigrants to Canada would help in decreasing the risks for chronic diseases, cancers, and all cause mortalities in this population. Which in return would be reflected in longer and healthier lives, more productivity, less strain on the Canadian healthcare system, and major economic gains for the country.

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Appendix A: Recruitment Flyer

Adult Arab Immigrants Needed for a Research Study

You are invited to take part in a research study evaluating the factors affecting participation in physical among adult Arab immigrants in Edmonton, Alberta.

This study involves completing a one-time 10-15 min survey.

This research is being conducted by Samer Kobrosly, who is a doctorate student at Walden University.

This research is supervised by Dr. Clarence J. Schumaker, Walden University, School of Health Sciences. The study has been reviewed and approved by the Institutional review board at Walden University.

To participate you need to be:

- 18 years old and above
- Arab
- Born in an Arab country
- Living in Edmonton
- Fluent in English

To participate, please visit the following link on your phone or computer:

www.surveymonkey.com/r/Y8PL9LG

www.surveymonkey.com/r/Y8PL9LG
www.surveymonkey.com/r/Y8PL9LG
www.surveymonkey.com/r/Y8PL9LG
www.surveymonkey.com/r/Y8PL9LG
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www.surveymonkey.com/r/Y8PL9LG
www.surveymonkey.com/r/Y8PL9LG
www.surveymonkey.com/r/Y8PL9LG

Appendix B: Pre-Screening Questions

Inclusion Criteria:

1. Are you 18 years or older?

   □Yes

   □No

2. Do you self-report as an Arab?

   □Yes

   □No

3. Were you born outside Canada?

   □Yes

   □No

4. Do you live in Edmonton, Alberta, Canada?

   □Yes

   □No

5. Are you fluent in English

   □Yes

   □No

If the individual meets the above criteria by answering yes to all four questions, then he/she can proceed to the questionnaire items.

Appendix C: Demographic Questions

1. Which one of the following categories classifies your age?

   □18–24
   □25–34
   □35–44
   □45–54
   □55–64
   □65 and over

2. What is your gender?
   □Female
   □Male

3. What is your height?
   _____ cm

4. What is your weight?
   _____ kg

5. How do you rate your overall health status?
   □Excellent
   □Good
   □Fair
   □Bad

6. What is your martial status?
   □Single
   □Married
   □Divorced/Separated
   □Widowed

7. How many people live in your house including you?

   _____

8. What is your yearly household income from all sources before taxes?

   □Less than $20,000

   □$20,000 to less than $40,000

   □$40,000 to less than $60,000

   □$60,000 to less than $80,000

   □$80,000 to less than $100,000

   □$100,000 and over

9. What is your highest education level completed?

   □Less than high school

   □High School

   □Some college or university

   □College or university degree

   □Graduate degree (e.g. MBA, MS,…)

   □Advanced degree (e.g. PhD, MD,…)

10. How do you classify your occupation?

    □Job needs low occupational activity (e.g. office work, student, engineer, teacher)

    □Job needs intermediate occupational activity (e.g. cook, health worker, mechanic).

    □Job needs high occupational activity (e.g. construction labourer, waiter, cleaner).

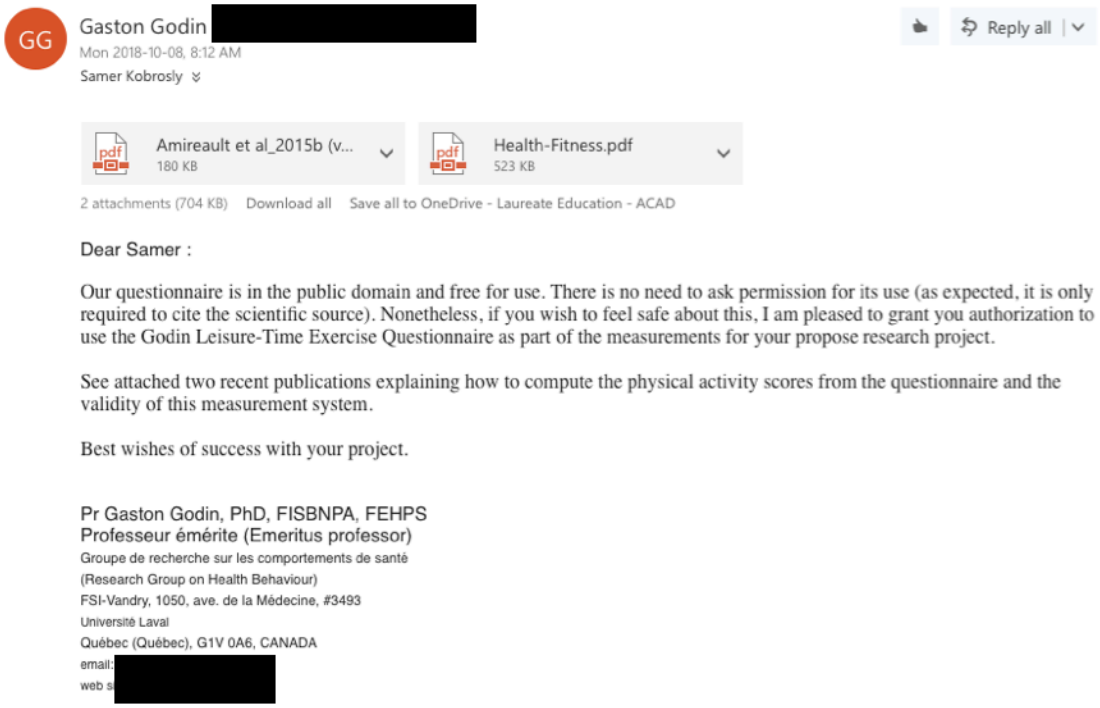
11. What is your country of origin?

    _____

12. How many years have you been living in Canada?

    _____

Appendix I: Permission to Use the Godin and Shephard Leisure-Time Physical Activity Questionnaire



GG

Gaston Godin [redacted]

Mon 2018-10-08, 8:12 AM

Samer Kobrosly

Reply all

Amireault et al_2015b (v... 180 KB

Health-Fitness.pdf 523 KB

2 attachments (704 KB) Download all Save all to OneDrive - Laureate Education - ACAD

Dear Samer :

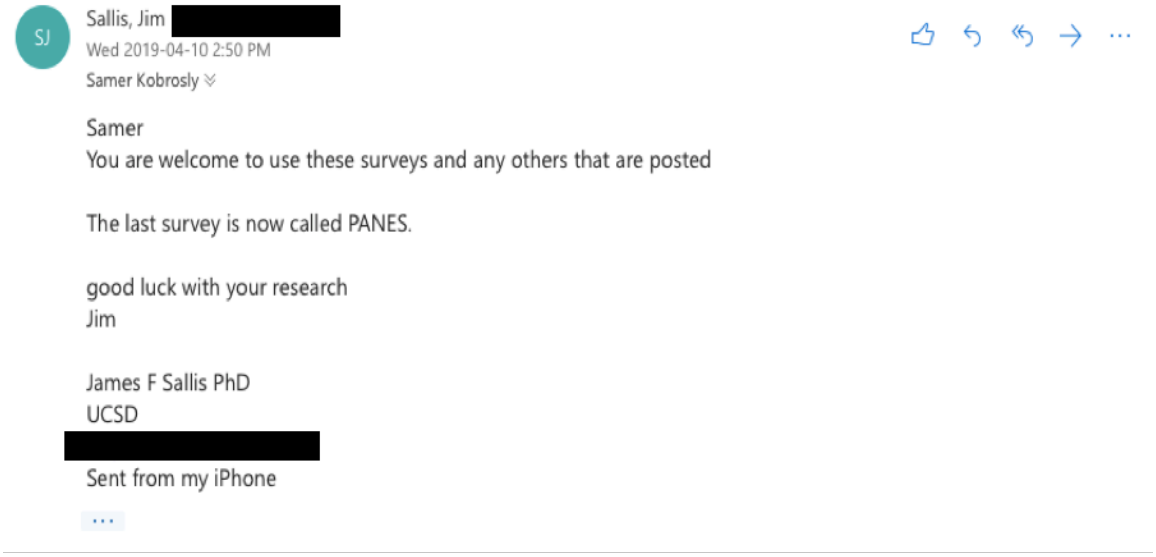
Our questionnaire is in the public domain and free for use. There is no need to ask permission for its use (as expected, it is only required to cite the scientific source). Nonetheless, if you wish to feel safe about this, I am pleased to grant you authorization to use the Godin Leisure-Time Exercise Questionnaire as part of the measurements for your propose research project.

See attached two recent publications explaining how to compute the physical activity scores from the questionnaire and the validity of this measurement system.

Best wishes of success with your project.

Pr Gaston Godin, PhD, FISBNPA, FEHPS
Professeur émérite (Emeritus professor)
Groupe de recherche sur les comportements de santé
(Research Group on Health Behaviour)
FSI-Vandry, 1050, ave. de la Médecine, #3493
Université Laval
Québec (Québec), G1V 0A6, CANADA
email: [redacted]
web s

Appendix J: Permission to Use the Self-Efficacy and Exercise Habits Survey, the Social Support and Exercise Survey; and the Physical Activity Neighborhood Environment Survey



SJ

Sallis, Jim [redacted]
Wed 2019-04-10 2:50 PM
Samer Kobrosly

Samer
You are welcome to use these surveys and any others that are posted

The last survey is now called PANES.

good luck with your research
Jim

James F Sallis PhD
UCSD
[redacted]
Sent from my iPhone

Appendix K: Permission to Use the Exercise Benefits/Barriers Scale

Health Promotion Model Instrumentation Group

Nola J. Pender, PhD, RN, FAAN • Susan Noble Walker, EdD, RN, FAAN • Karen R. Sechrist, PhD, RN, FAAN

Dear Colleague:

Thank you for your interest in the Exercise Benefits/Barriers Scale (EBBS). The EBBS was developed in response to a need for an instrument designed to determine perceptions of individuals concerning the benefits of and barriers to participating in exercise. Items for the scale were obtained inductively from interviews and from the literature.

The EBBS is a 43-item summated rating scale consisting of two subscales, Benefits and Barriers. Ratings are obtained using a four-point response system. The EBBS has been tested for internal consistency, validity of its constructs, and test-retest reliability. A sample of 650 individuals over 18 years of age, primarily from northern Illinois, participated in the initial testing of the EBBS. Calculation of Cronbach's alpha for the 43-item instrument yielded a standardized alpha of .954. The 29-item Benefits Scale has a standardized alpha of .954 and the 14-item Barriers Scale has a standardized alpha of .866. Factor analysis yielded a nine-factor solution initially with an explained variance of 65.2%. Second order factor analysis yielded a two-factor solution, one a benefits factor and the other a barriers factor. Test-retest reliability was accomplished with a sample of 66 healthy adults at a two-week interval. Test-retest reliability was found to be .89 on the total instrument, .89 on the Benefits Scale and .77 on the Barriers Scale. Additional information on the development and initial testing of the EBBS can be found at in the following article:

> Sechrist, KR, Walker, SN, and Pender, NJ. (1987). Development and psychometric evaluation of the Exercise Benefits/Barriers Scale. *Research in Nursing & Health, 10,* 357-365.

You have our permission to download and use the EBBS for non-commercial data collection purposes such as research or evaluation projects as long as the following conditions are met:

- The EBBS will be used without any modifications other than translation into a language other than English (see information on translation, if required);
- The copyright statement will appear on the bottom of all copies of the EBBS; and
- All study participants will be over 18 years of age since the EBBS was not validated in younger populations.

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A copy of the EBBS with scoring information is available for download. A Spanish translation of the EBBS is also available. If you need additional information, you may contact Dr. Karen Sechrist by e-mail [redacted]

Best wishes with your research,

Karen R. Sechrist

Karen R. Sechrist, PhD, RN, FAAN
for Pender/Walker/Sechrist