AMERICAN UNIVERSITY OF BEIRUT

ASSESSING THE IMPACT OF GREEN SPACE ON PHYSICAL ACTIVITY AND WELLBEING BEHAVIORS AMONG RESIDENTS IN A LOW-INCOME NEIGHBORHOOD: A CASE STUDY IN TRIPOLI, NORTH LEBANON

by
ZAYNAB RADY RADY

A thesis
submitted in partial fulfillment of the requirements
for the degree of Master of Science in Environmental Sciences
to the Department of Landscape Design and Ecosystem Management
of the Faculty of Agricultural and Food Sciences
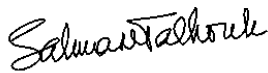at the American University of Beirut

Beirut, Lebanon
February 2022

AMERICAN UNIVERSITY OF BEIRUT

ASSESSING THE IMPACT OF GREEN SPACE ON
PHYSICAL ACTIVITY AND WELLBEING BEHAVIORS
AMONG RESIDENTS IN A LOW-INCOME
NEIGHBORHOOD: A CASE STUDY IN TRIPOLI, NORTH
LEBANON

by
ZAYNAB RADY RADY

Approved by:

_____
Signature

Dr. Salma N. Talhouk, Professor   Advisor
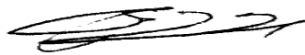Department of Landscape Design and Ecosystem Management

_____
Signature

Dr. Beata Dreksler   Member of Committee
Department of Landscape Design and Ecosystem Management

_____
Signature

Dr. Samer Kharroubi   Member of Committee
Department of Nutrition and Food Sciences

Date of thesis defense: December 6, 2021
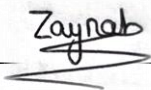
AMERICAN UNIVERSITY OF BEIRUT

THESIS RELEASE FORM

Student Name: Rady_____ Zaynab_____Rady_____

                 Last   First   Middle

I authorize the American University of Beirut, to: (a) reproduce hard or electronic copies of my thesis; (b) include such copies in the archives and digital repositories of the University; and (c) make freely available such copies to third parties for research or educational:

☒ As of the date of submission

☐ One year from the date of submission of my thesis.

☐ Two years from the date of submission of my thesis.

☐ Three years from the date of submission of my thesis.

_____February 7, 2022_____

Signature   Date

ACKNOWLEDGEMENTS

ABSTRACT
OF THE THESIS OF

Zaynab Rady Rady   for   Master of Sciences in Environmental Sciences
Major: Ecosystem Management

Title: Assessing the Impact of Green Space on Physical Activity and Wellbeing
Behaviors among Residents in a Low-Income Neighborhood: A Case Study in Tripoli,
North Lebanon

Urbanization is one of the leading global trends of the 21st century that has led to a rapid change in the way people live and interact with one another. In the age of urbanization, city living has led to more sedentary lifestyles. Physical activity has been incidental to daily living with less exposure to green spaces for outdoor activities. In addition, green spaces are unequally distributed in cities, with low-income neighborhoods having a lower density of green spaces. Disadvantaged groups living in low- income neighborhoods exhibit more health problems than more privileged groups and they tend to benefit the most from improved access to green spaces. The purpose of this study was to assess the impact of green space in a low-income neighborhood on physical activity and wellbeing behaviors in Tripoli, Northern Lebanon. The study employed an inductive qualitative approach, namely systematic direct observation using the Method for Observing pHysical Activity and Wellbeing (MOHAWk) for assessing three levels of physical activity (Sedentary, Walking, Vigorous) and two other evidence-based wellbeing behaviors (Connect: social interactions; Take Notice: taking notice of the environment). Key demographics were assessed through direct observation. Descriptive statistics were conducted on park user characteristics, activity type, activity level, and wellbeing behaviors. Chi square tests were used to determine the statistical association between variables. Cramer's V coefficient was used to measure the strength of the association. A total of 225 park users were observed. This study found significant positive associations between activity level with age, gender, overweight, disability, group size, activity type, and wellbeing behaviors ($p < .05$). The association between the level of activity with age group and activity type were comparatively the strongest. The results indicated that there were significant associations between wellbeing behaviors with age, disability, group size, activity type and level ($p < .05$). However, no significant associations were found between wellbeing behaviors with gender and overweight ($p > .05$). The association between wellbeing behaviors with group size and activity level were comparatively the strongest. This study found that park users engaged in sedentary activities were more likely to appreciate their surrounding environment. However, park users engaged in vigorous activities were more socially connected. The study also found few differences across demographics. Male park users were more physically active than females. Females were more socially connected and taking notice of the surrounding environment than males. The findings provide additional evidence on the importance of urban green space for low- income neighborhoods. Therefore, planning and developing such places are important for low-income neighborhoods as a strategy to contribute towards wellbeing.

2

TABLE OF CONTENTS

ILLUSTRATIONS

Figure

TABLES

Table

ABBREVIATIONS

CDC   Centers for Disease Control and Prevention

CDR   Council for Development and Reconstruction

WHO   World Health Organization

PHCCs   Primary Healthcare Centers

UNICEF   United Nations Children's Fund

UNRWEA   United Nations Relief and Works Agency for Palestine Refugees in

                the Near East

SOPARC   System for Observing Play and Recreation in Communities

MOHAWk   Method for Observing pHysical Activity and Wellbeing

SPSS   Statistical Package for the Social Sciences

MVPA   Moderate to vigorous physical activities

 N   Take notice

 C   Connect

 NC   Take notice and connect

CHAPTER 1
INTRODUCTION

1.1.Background Information

Over half of the world's population now lives in urban areas, and this proportion is expected to increase. In Lebanon, 86% of the population currently live in urban areas and a nonstop increase in the urban population is anticipated (World Population Review, 2020). Urban residents are exposed to high levels of urban-related environmental hazards including pollution, extreme temperature, crowding, degraded landscape, solid waste mismanagement (Moore *et al*., 2003; Recio *et al*., 2016; WHO, 2016). A significant portion of urban dwellers who are regularly exposed to such aversive living conditions, like time spent in crowds, consistent exposure to air and noise pollution, experience increased psychological distress (Dye, 2008; Sundquist, 2004). As cities expand, they harbor a substantial number of people who do not have access to nature and as a result many urban residents grow apart from nature. On the other hand, nature can improve human health and wellbeing of urban dwellers (Dearborn and Kark, 2010**;** Berto, 2014; Braubach *et al*., 2017).

Urban green spaces offer potential health benefits and "access to safe, inclusive and accessible green and public spaces" is recognized as one of the main aims of the UN Sustainable Development Goal 11: Cities ("Goal 11| Department of Economic and Social Affairs", n.d.). The impact of urban green spaces on human health was first reported by Ulrich (1984) who studied the postoperative stay of patients and reported a decrease in stay time, nurses' complaints and use of potent analgesics in patients with a view of nature from their window (Ulrich, 1984; Ulrich *et al.*, 1993).

Prior studies in this subject were mainly experimental, looking at short-term effects of being exposed to green space on mental health (Cohen *et al*., 2007; De Vries *et al*., 2003; Mitchell *et al*., 2015; Semenza *et al.*, 2007; Groenewegen *et al*., 2006; Mitchell and Popham, 2008). Recent epidemiological observational studies have focused on the long-term effects of green space on people's mental and physical health (de Keijzer *et al*., 2020; Kondo *et al*., 2018; Seo *et al*., 2019; Tillmann *et al*., 2018; Twohig-Bennett and Jones, 2018; Wood *et al*., 2017; Zhang *et al*., 2020).

An urban green space is defined as "all green space of public value, including not just land, but also areas of water such as rivers, canals, lakes and reservoirs which offer important opportunities for sport and recreation and can also act as a visual amenity" (Maidstone Borough Council, 2003, p. 2). An urban green space is typically an open and undeveloped land with natural vegetation (CDC, 2013) that exists as an urban park, a public open space, as well as street trees and greenery (Twohig-Bennet and Jones, 2018).

Disadvantaged groups worldwide, who live in low-income neighborhoods experience poorer health outcomes and exhibit more stress than privileged groups living in high-income neighborhoods. Research suggests that exposure and access to green spaces in urban neighborhoods have positive impacts on human health and wellbeing. For example, several studies have demonstrated that green spaces contribute to stress reduction (Nielsen and Hansen, 2007; Lafortezza *et al*., 2009; Van den Berg *et al*., 2010; Ward Thompson *et al*., 2012) and a decrease in the risk of psychosocial and psychological stress-related diseases (Francis *et al*., 2012; Adevi and Lieberg, 2012; Kuo, 2015) including depression (McCaffrey, 2007; Maas *et al*., 2009; Berman *et al*., 2012; Beyer *et al*., 2014), anxiety (Maas *et al*., 2009; Mackay and Neill, 2010; Beyer *et*

al., 2014), anger and aggression (Ulrich, 1979; Kuo and Sullivan, 2001; Bodin and Hartig, 2003). Exposure to green spaces is also positively associated with physiological wellbeing (Herzog and Strevey, 2008; Park *et al*., 2008). Exposure and access to green space support health, and quality of life (Richardson and Mitchell, 2010; Van Dillen *et al*., 2012; McFarland *et al*., 2008; Maas *et al*., 2006; Mitchell and Popham, 2008; Van den Berg *et al*., 2012; Ward Thompson *et al*., 2012; Shinew *et al*., 2004; Triguero-Mas *et al.*, 2015), promote positive health behaviors (Owen *et al.*,2004; Giles-Corti *et al.,* 2005) improve self-esteem and mood (Mitchell and Popham, 2008; Barton and Pretty, 2010), and enhance social wellbeing (Shinew *et al*., 2004).

Although studies have examined the relationships between green space and stress, depression, anxiety, general health, and well-being, most studied the quantity of green space (Van den Berg *et al*., 2015) and considered different types of green space as "simply green". In addition, studies examined the association between green space and health at individual and/or neighborhood-levels (Maas *et al*., 2006; 2009; Van den Berg *et al*., 2010; Stigsdotter *et al*., 2010; Richardson *et al*., 2010; Ward Thompson *et al*., 2012; Beyer *et al*., 2014; Triguero-Mas *et al*., 2015). While most studies (not all of them (see Richardson *et al*., 2010; Picavet *et al*., 2016) at the individual and/or neighborhood-level found that more green space is related to better mental and general health. City level studies did not find any relationship between more green space and health (Richardson *et al*., 2012).

How different population groups are affected by green spaces remain underexplored and has been suggested as an important focus for future research (Hartig *et al*., 2014; Van den Berg *et al*., 2015), especially because the few studies that considered subgroups within the population reported mixed findings (Van den Berg *et*

al., 2015). Studying the effect of neighborhood green spaces on the wellbeing of specific population groups is important, because it provides information about who might benefit the most from green interventions. For example, some studies reported a stronger, positive impact of green spaces on children, older people, housewives, and people with a lower socioeconomic status (De Vries *et al*., 2003; Dadvand *et al*., 2014). In fact, low income population groups reportedly benefit more from a green living environment because they spend more time in their neighborhood (Glass and Balfour, 2003; De Vries *et al*., 2003; Maas *et al*., 2008).

Furthermore, residents of low income neighborhoods might depend more on local green facilities for physical exercise and other activities than their counterparts, who, because of their better financial situation, are less dependent on the residential proximity to green spaces for the use of these spaces (De Vries *et al*., 2003; Dadvand *et al*., 2014). In addition, residents of low income neighborhoods may benefit more from local green spaces because they have an overall poorer health, they experience high levels of stress, and they tend to suffer from more health problems than the general population and therefore green spaces may offer more opportunity for health improvement (Marmot *et al*., 2008; Raphael, 2002; Ward Thompson *et al*. 2016; 2018; Bond *et al*., 2012; Allen and Balfour, 2014). On the other hand, disadvantaged populations often live in low-income neighborhoods with the last equitable distribution of green space (Mitchell *et al*., 2011).

While there have been numerous reviews of empirical studies on the link between green space/ nature and human health, very few have focused on the urban context, particularly deprived urban settings. This research is a first step toward assessing the possibility of causal relationships between nature and health in urban

settings among low income neighborhoods. Through this study, I will examine the impact that green space has on physical health and wellbeing among urban residents in low-income neighborhoods. It is important to take into consideration the impact of the built environment because it is an ever present aspect of life that influences the health of the population. Although there is a scientific evidence on the positive association between green space and human health, there is still a long road to understand the mechanisms underlying the health effects of green spaces that are relevant to socio-economic, environmental and individual characteristics.

1.2.Purpose of the Study

The aim of this research is to assess the impact of urban green space on physical activity and wellbeing behaviors among residents living in low-income neighborhood. Specifically, an observational research will be used to examine individual experiences of stress reduction in a green space. Exposure to green space has been correlated with positive health outcomes (Groenewegen *et al.*, 2012). Prior studies in this area were mostly quantitative and cross-sectional. However, there is a lack of qualitative studies investigating the correlation between green space and stress reduction in low-income neighborhoods.

A qualitative study is significant to understand the importance of green space on stress alleviation among people in low income neighborhoods. The experience of promoting wellbeing and physical activity will be investigated using a qualitative approach, particularly a systematic direct observation of green space users who will be observed during time spent in an urban green space. It is important to better understand how people experience this phenomenon and how it relates to their wellbeing and

13

physical activity. More specifically, the study measures the level of activity (sedentary, walking, and vigorous) and indirect indicators of wellbeing (connect: social interactions; Take Notice: taking notice of the environment).

This was an important inquiry because it helps increase the understanding of how urban green space will contribute to the wellbeing of people and whether aspects of the built environment support wellbeing and physical activity in these spaces. This understanding can inform urban designers, city planners, and policy makers as they invest in and plan urban green spaces. It was also anticipated that this research would be of interest to community groups who own or have stewardship over urban green spaces.

CHAPTER 2

RESEARCH HYPOTHESIS AND OBJECTIVES

2.1. Study Context

Situated on the Eastern shores of the Mediterranean, Lebanon has a total surface area of 10,452 km^2 with an estimated population of 6,848,925 and with 87% of its population residing in urbanized areas (World Bank, 2018; CDR, 2016). The rate of urbanization in Lebanon has increased over the last fifty years from 221 km^2 in 1963 to 741 km^2 in 2005 and is anticipated to reach 884 km^2 in 2030. This rise in urban population is centered in large cities, especially Beirut and Tripoli, although the populations of secondary cities also reflect significant growth (CDR, 2016; UN-Habitat, 2016).

The case study site is located in Tripoli, the largest city in North Lebanon with a crowded and densely built environment extending over an area of 24.7 square kilometers, including 13 kilometers of seashore (UN-Habitat, 2016). Land cover in Tripoli is estimated to include 32% built up space, 27% agriculture lands, 13% roads, 12% 'empty land', 7% industrial/commercial areas, 4% 'informal area' and 5% others (UN-Habitat, 2016) (Figure 2). Tripoli is distinguished by its relatively high percentage of street greenery, wide sidewalks, and large pedestrian spaces, and has several lots allocated to public gardens (Nazzal and Chinder, 2018). In the historic old city neighborhoods, however, most of these green spaces are either not owned by the municipality or are poorly maintained mainly due to maintenance and security expenses (Nazzal and Chinder, 2018). Therefore, the municipality awards temporary contracts to the private sector to manage and maintain these spaces. Many contractors

impose entry fees to these spaces pushing the most-deprived citizens to consider street trees and canopies as leisure spots, and privately or semi privately owned lands as picnic destinations during the weekend (Nazzal and Chinder, 2018).

Both aerial maps and Geographical Information System (GIS) were used to illustrate the urban areas within the city, along with the locations of current and future urban green spaces. Site visits were undertaken to describe these areas in terms of their economic status (income, level of poverty) and population density and to contextualize green spaces through assessing their conditions and maintenance.
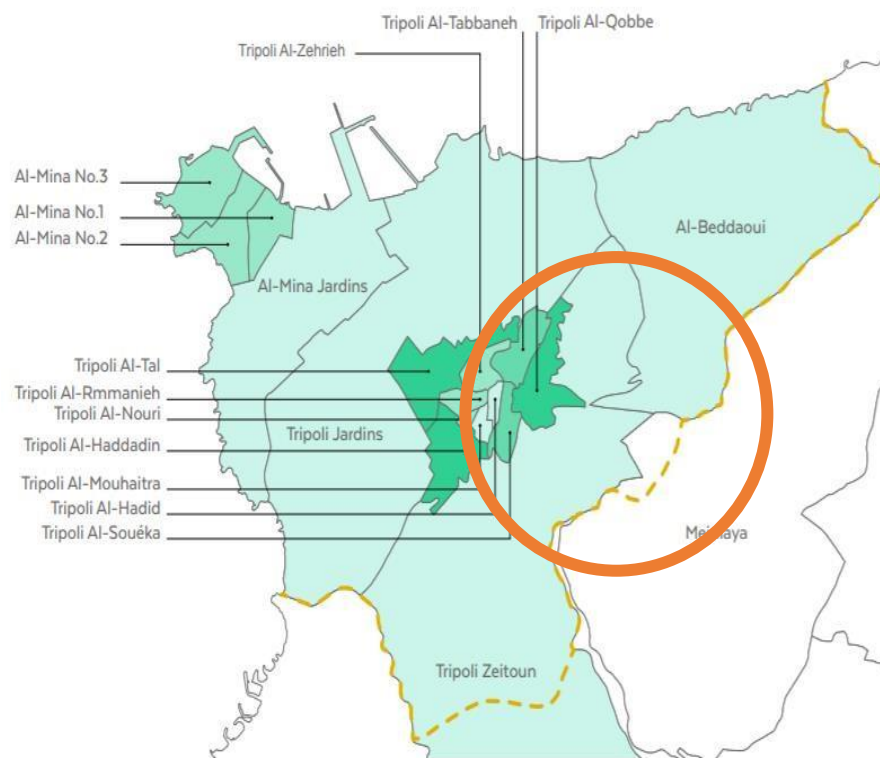
Figure 1. Population density in Tripoli by cadastre in 2014. Source: UN-Habitat, 2016.
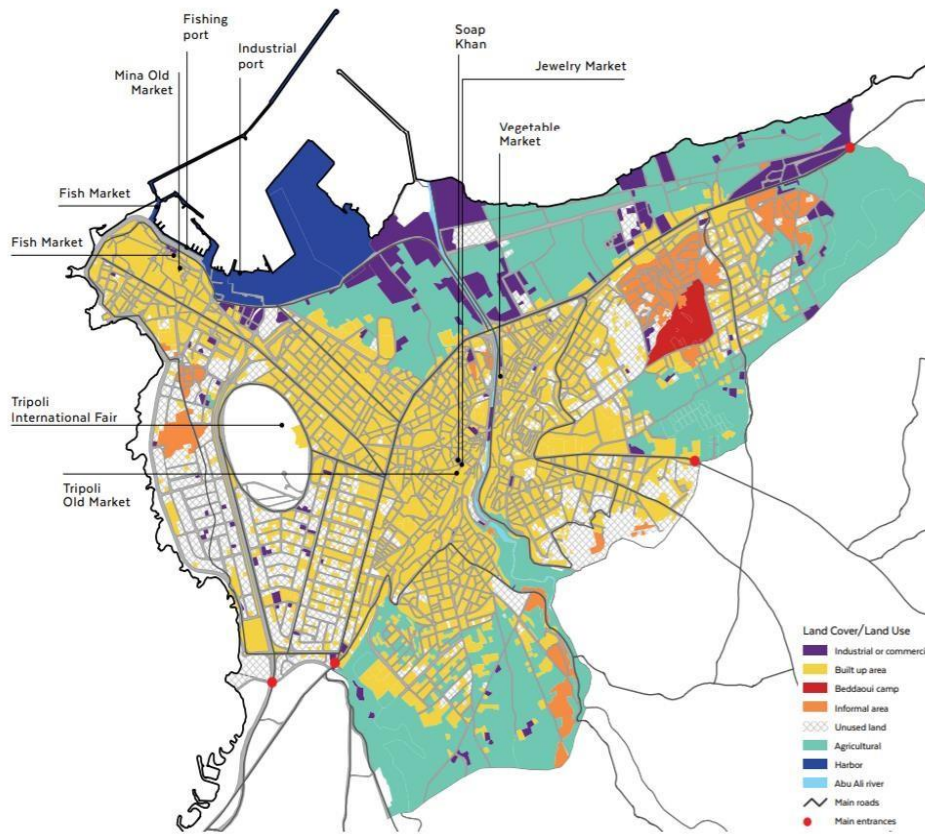
Figure 2. Map of green spaces and public gardens in Tripoli. Source: UN-Habitat, 2016.

Site visits and maps revealed that population density in Tripoli is mostly concentrated within the old city core, which consists of several neighborhoods including Al Tall, Al Qobbeh, Tabbaneh, and Jabal Mohsen among others. This area hosts the highest poverty levels in the city of Tripoli, as most of its residents have low socio-economic status; they are either unemployed or have low monthly incomes below the minimum wage. The vast majority of buildings in the old city core date back to the 70s and have a very poor quality either ruined or damaged due to the Civil war and conflicts that previously took place in the city.

Tripoli is known to be the most impoverished city in the country. However, some neighborhoods in the city are occupied by residents of privileged groups, including middle class and high income.

17

Figure 3. Neighborhoods of Tripoli. Source: UN-Habitat, 2016.

2.2. Area of the Study

This study was carried out in a green space of Jabal Mohsen, a low-income

neighborhood which includes residents of El-Zeitoun, Tabbaneh and El-Qobbeh,

covering around 5.5 percent of the 11.3 km^2 El-Zeitoun cadastral area. The

neighborhood covers 0.62 km^2 or around 2.5 percent of Tripoli City (continuously

built-up area) (UN- Habitat Lebanon, 2017). To its east, the neighborhood is close to

the Beddaoui Camp, run by the United Nations Relief and Works Agency for Palestine

Refugees in the Near East (UNRWA). The Old City of Tripoli lies to the south-west of

Jabal Mohsen, on the banks of Abu Ali River. El-Qobbeh cadastre—around 0.38 km^2

of which is part of Jabal Mohsen neighborhood—is identified as one of the 251 most

vulnerable cadastres in the country, according to a vulnerability map published by the

Inter-Agency Coordination Lebanon (2015).
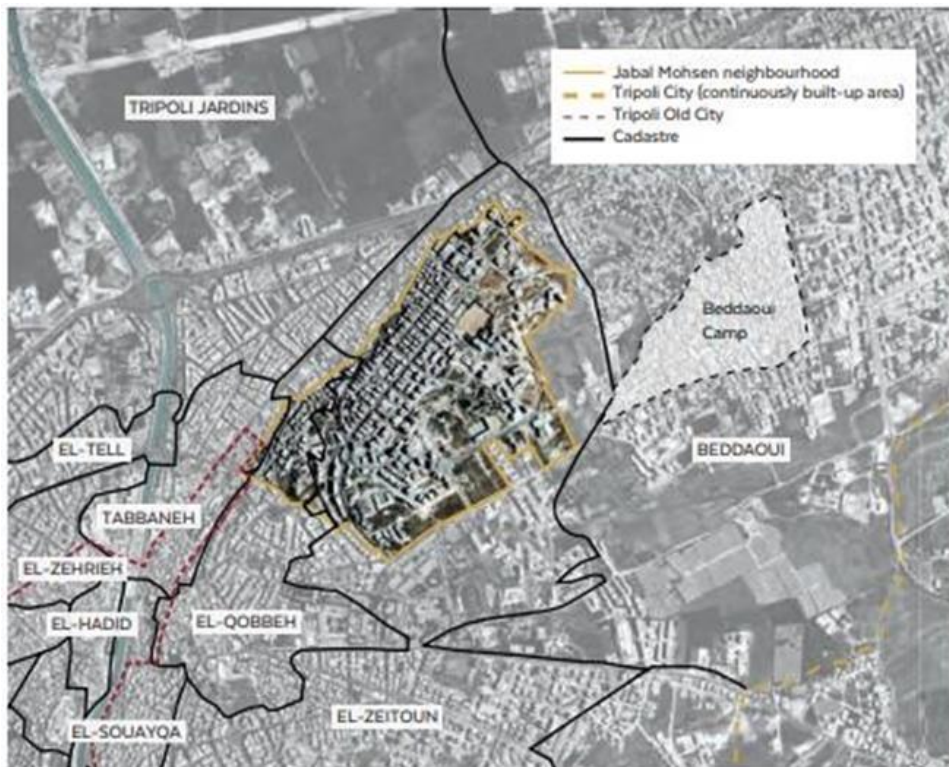
Figure 4. Neighborhood of Jabal Mohsen. Source: UN Habitat, 2018.

2.3. Green Spaces in Jabal Mohsen

Jabal Mohsen contains numerous open spaces, covering over 0.13 km^2 in total. This represents 21 percent of the 0.62 km^2 total area of the neighborhood. However, only 26.7 percent (by count) and 23 percent (by area) of these open spaces are publicly used. With limited safe and well-managed public space available, some non-public lands—like unused lots, landscaped areas and gardens—are appropriated and used by inhabitants as outdoor gathering spaces.

The majority of Jabal Mohsen's publicly used open spaces are located in the southern part of the neighborhood, while most informal street gatherings are located in the dense residential part of the Central Jabal Mohsen zone. The informal street

gatherings are used by male adults and older adults as coffee places. Gardens, playgrounds and sports fields are scarce, even though the neighborhood contains a lot of unbuilt areas, especially in the New Jabal Mohsen.

Based on site visits, social gatherings in the neighborhood occur mainly in an informal manner and by appropriating private lots. This underlines the scarcity of secure/managed public spaces available to inhabitants, which potentially has negative implications for health and social relations in the neighborhood.

Nine green spaces were available for consideration by researchers. These spaces were a playground (No. 1) that is only accessible during holidays and is restricted to specific activities for children and teens and includes play furniture. The second space is a 5,800 m^2 empty lot (No. 2) which has been turned into a football field (run by El-Harake Football Club) and is used by all residents— irrespective of age and gender.

During the site selection phase, the residents indicated that they do not find the space safe at night because it is not lit. The third space is a fenced public park established in 2014 with the support of the UNDP in Jabal Mohsen (No. 3). The park is accessible during the day from the main commercial street (Ghanem El-Khatib Street), it is managed by Tripoli Municipality, it offers shaded areas and its benches are in good condition, and it includes a central fountain and a small basketball field.

During the field visits, residents reported that the park to be secure and in good condition. They mentioned that all inhabitants— irrespective of age and gender — gather in the park. The fourth green space (No. 4) is a cemetery (El Shohada Cemetery). The fifth (No. 5) is a roundabout (The Robieh) used as a shared space for vehicle and pedestrian crossings. The neighborhood also has one fenced football field

(No. 6) which is in good condition, despite the noticeable presence of garbage around the field. The fenced football field is not freely accessible and it is managed by a resident. Green spaces No.2 and No.6 are football fields restricted only to a specific age group and gender (boy teens). El-American School has a playground (No. 7) and a sportsfield (No. 8) are open only during school time (five days a week, 12 hours a day) and are accessible to children who are enrolled in the school. The sportsfield offers shade and facilities for basketball and football, but there is no play equipment for children in the playground. The ninth open space is a public garden, El-Kowaa (No. 9) which was established by the municipality in the past few years and equipped with solar lighting in 2016 from a UNDP fund. However, this park does not include facilities, such as benches or play equipment for children, and it is polluted with garbage. Hence, it is not used by residents (UN-Habitat, 2018).

Wide unused private lots located in the southern part of Jabal Mohsen at the boundary with El-Qobbeh neighborhood remain unexploited (Figure 4). During the field visits, residents reported that some of these lots are unsafe; they mentioned the existence of signs of substance abuse. They also reported the occurrence of conflicts with the residents of Riva—a sub-neighborhood of El Qobbeh— affecting children's safety in this area (UN-Habitat, 2018).

Figure 5. Open Spaces in Jabal Mohsen. Source: UN Habitat, 2018

2.4. Green Space Selection

The public green space (No.3) was selected as a case study site based on several criteria. Bedimo-Rung *et al*. (2005) suggest that park characteristics including park activity areas, supporting areas, overall park environment and the surrounding neighborhood should be considered when assessing parks for their relationship to physical activity and in which data must be collected.

According to the authors, park activity areas include sports fields and courts, swimming pools, paths or trails, playgrounds, open green spaces, or other areas where physical activity occurs. Park supporting areas include those facilities and equipment

that make physical activity in parks attractive and safe to a variety of users. The overall park environment is important since a park is more than just the sum of its parts, it is necessary to consider an overall impression and meaning ascribed to the park as a whole such as aesthetic appeal, size, and diversity of programs. The surrounding neighborhood is taken into consideration when selecting a green space since people must cross through the surrounding neighborhood in order to enter the park. The conditions in the park's surrounding neighborhood are likely to have a strong influence on how a park is used (Bedimo-Rung *et al.*, 2005).

The selected case study site (No.3) is a public green space that is freely accessible, open to all regardless of age or gender, it contains basic elements of a park where physical activities may take place such as a sports field, a playground, and open green spaces. The green space includes supporting areas such as facilities and equipment that make physical activity attractive and safe to a variety of users. The overall green space environment is aesthetically pleasing. The size is relatively large and can accommodate a number of users with a variety of physical activities. Finally, the surrounding neighborhood is perceived as secure and safe by green space users.

Figure 6.The Public Park in Jabal Mohsen

2.5. Formulation of Research Hypothesis

The purpose of this research is to assess the impact of green space on physical activity and wellbeing behaviors in Jabal Mohsen in Tripoli, Northern Lebanon. It aims at assessing physical activity and wellbeing behaviors of users visiting the green space. Studying the impact of green space in Jabal Mohsen on physical activity and wellbeing behaviors will provide a tangible understanding on the influence of green space on residents of low-income neighborhood. As a result, it will help identify the importance of planning and developing such places for low-income neighborhoods as a strategy to contribute to wellbeing. On the other hand, this information will add a puzzle piece to the knowledge of green space in Tripoli, proven to be vital for low-income neighborhoods and for human overall wellbeing.

This research will test the hypothesis that:

> "Urban green spaces increase physical activity and promote wellbeing behaviors among residents of low-income neighborhood."

2.6. Research Objectives

The main objective of the present study is to assess the impact of urban green space on physical activity and wellbeing behaviors of residents in low-income neighborhood, namely Jabal Mohsen. The following are sub-objectives that aim to answering the research question of the study:

The specific objectives that this research will answer are:

Sub-objective 1: Explore the impact of urban green space on physical activity levels (sedentary, walking, and vigorous) of park users in low income neighborhood

Sub-objective 2: Explore the impact of urban green space on behavioral wellbeing (Take Notice, Connect, Take Notice and Connect) of park users in low- income neighborhood

Sub-objective 3: Examine gender differences in terms of physical activity and wellbeing behaviors among green park users of the low-income neighborhood

CHAPTER 3
RESEARCH METHODOLOGY

3.1. Methodological Approach

Guided by data collection and analysis methods described by Creswell (2016), the study employed one inductive qualitative approach, namely systematic direct observation. The research used the Method for Observing pHysical Activity and Wellbeing (MOHAWk) newly developed by Benton *et al*. (2020) which is designed for studies of urban spaces, especially spaces that have a lower number of users including residential streets, amenity, green spaces, green corridors, pocket parks, and urban squares. The method assesses three levels of physical activity (sedentary, walking, vigorous) and two other evidence-based wellbeing behaviors (Connect: social interactions; Take Notice: taking notice of the environment) in green space. It measures the total number of people, their characteristics (gender, age group, ethnicity), and the presence of incivilities in the environment when observations are carried out (e.g. graffiti, broken glass).

3.1.1. Systematic Observation

Systematic observation is an unobtrusive method that focuses on the visible behavior in relation to visible values of the environment (García-López, 1988). The researcher finds it useful to record both properties of environment-behavior events where participants are generally unaware that their behaviors are being assessed. As an objective method, systematic observation reduces possible reactivity of measurement

associated with self-report and device-based measures of physical activity and wellbeing (French and Sutton, 2010), reducing the risk of social desirability and recall bias. Contrary to self-reports, systematic observation is a direct method that is not susceptible to poor response rates reducing the risk of selection bias (Benton *et al*., 2016), and allows for simultaneous generation of information about the physical and social environment where the activity is taking place (McKenzie and van der Mars, 2015). Systematic observation is considered a primary means to study physical activity and identify key considerations for using it (McKenzie & van der Mars, 2015).

3.1.2. MOHAWk

MOHAWk is a method used to record the characteristics and behaviors of each person entering the green space during observation periods. The data in this study will be recorded using pen and paper. Observations were carried out in the case study area after scrutinizing the MOHAWk manual and following the instructions regarding MOHAWk procedures and coding conventions (e.g. how to distinguish between walking and vigorous activity levels, how to distinguish between age groups based on gait, clothing, and other physical attributes etc.). The instruction manual provided the necessary information regarding operational definitions, key coding conventions, how to use the observation form, and how to code site incivilities. Data was collected on park users from different ages entering the green space based on specific observation periods.

3.1.2.1. Park Mapping

The case study site was mapped to identify well-defined target areas that can be

scanned from left to right without encountering visual obstructions and that are of a

manageable size so that all individuals can be counted accurately. A map also

establishes a way to systematically observe the park so that the observer can collect data

from the same vantage point at each and every observation. The number of target areas

depends on the size of the park and the features it contains. Each target area usually has

a unique functionality (e.g., playground, basketball court). Target areas should be

ordered so that observations are done exactly the same way each time a park is

observed. Target areas were observed in the same rotational order during each

observation period (Arifwidodo and Chandrasiri, 2020).

Figure 7.The main target areas of the Public Park

The newly validated MOHAWk observation tool was used to assess three levels of physical activities and wellbeing behaviors (Benton *et al*., 2020). It is important when using direct observation to determine the optimal number and length of observation periods required to obtain an adequate sample of physical activity and wellbeing behaviors.

The adequacy of sampling must be weighed against cost of data collection and subject burden. Prior observational research collected data using a different observation system. Klesges *et al.* (1984) indicated that four observation sessions were needed to adequately estimate a child's physical activity. Prior studies collected data in each studied park during four 1 h observation periods (beginning at 7:30 am; 12:30 pm, 3:30 pm, and 6:30 pm) during 7 days of clement weather. In their study, observations were made during each day of the week in each park (i.e., Sunday through Saturday) (McKenzie *et al*., 2006; Cohen *et al*., 2007).

A study by Benton *et al*. (2018) found that shortened observation schedules using MOHAWk can provide reliable estimates of people using an urban green space across a week and across a day, albeit not for children. These findings are in line with a previous study that found shortened observation schedules using System for Observing Play and Recreation in Communities (SOPARC) can provide reliable estimates of park usage in the US (Cohen *et al*., 2011). They found that, on average, observing 4 hours per day can produce consistent approaches that are obtained by observing 10 hours per day for teens, adults and older adults. In terms of the days, they found that, on average, observing on 2 days a week (weekdays only) can produce consistency approaching that obtained by observing 5 days a week. As a general guide, observing at least four hours

29

a day, two days a week is recommended, although other schedules are also reliable (Benton, 2018; 2020).

Informed by the feasibility study observations , the study site was conducted over two weekdays, four times a day at each time point; providing a total of eight observation periods at each time point. Observing on two days, four times a day can provide a reliable estimation of activity (Benton *et al*., 2020). All observation periods were one hour: 10-11am (morning), 12-1pm (lunchtime), 3-4pm (afternoon), and 5-6pm (evening). These times were found to capture the biggest variations in older adults' activity across the day.

Arifwidodo and Chandrasiri (2020) conducted a study in a park to assess the associations between park characteristics and park based physical activity in Bangkok, Thailand. They conducted observations for two days, representing weekday and weekend. As suggested by Cohen *et al.* (2011), it is important to observe parks on weekdays and weekend days, at three to four specified times each day.

This research was conducted over a short term period i.e. during summer 2021 since the green park was closed for COVID-19 precautions. Based on the above literature, the selected park was observed for a total of four days, two on weekdays and two on weekend days. The two days, one on weekend and one on weekday were based on the literature and duplicate days were for the reliability of data. Observations for this study were conducted at four set observation periods per day: morning (10-11am), lunchtime (12-1pm), afternoon (3-4pm), and evening (5-6pm) on all four observation days to capture the full range of park users while maintaining consistency.

The MOHAWk tool requires observers to collect data at identified target area locations which comprise areal polygons used to split up park observation areas into smaller pieces. These target areas represent all standard locations that provide park users with the opportunity to be physically active, such as sports fields and courts, playgrounds and park trails. Park areas often associated with more sedentary activity like greenspace, plazas and sheltered picnic areas are also included in the assessment. Persons present on sidewalks bordering parks and in nearby areas are not counted as part of the inventory. A person must enter park grounds to be counted and that person is only counted if they are observed by the observer during target area scans.

During each scan, each individual in view within their target area were recorded according to their apparent age group (i.e., teen [13-20 years]), adult [21-59 years], older adult [60 years+]; gender (male or female); and the activity they are engaged in (i.e., lying down or sitting, standing, moderate activity, or vigorous activity), and whether they are socially connected or taking notice of the environment (i.e., Take Notice, Connect, Take Notice and Connect) (Veitch *et al*., 2014).

The extent of incivilities in target areas was coded as "None", "Hardly Noticeable", "Noticeable", or "Very Noticeable" to describe specific conditions for each Target Area. Scoring for the extent of incivilities was based on whether people using the green space were generally aware of its presence (Gidlow *et al*., 2012).

Table 1

Target Areas Incivilities

Incivility	None	Hardly noticeable	Noticeable	Very Noticeable
General litter	None visible	Hardly noticeable, a few items visible on the ground	Noticeable, several items are on the ground	Many items are on the ground
Evidence of alcohol	None visible	Hardly noticeable, a few items visible on the ground	Noticeable, Several items are on the ground	Many items are on the ground
Evidence of drug taking	None visible	Hardly noticeable	Noticeable, several items are on the ground	Very noticeable
Graffiti	None visible	Hardly noticeable, but it appears on up to a few pieces of furniture/ equipment	Noticeable, several small or large pieces, clearly visible	Very noticeable Several large pieces, on much of the park furniture/ equipment
Broken glass	None visible	Hardly noticeable, a few pieces of broken glass, does not really spoil enjoyment of space	Noticeable, several pieces of broken glass, affecting enjoyment of area	Many pieces of broken glass, affecting enjoyment of area
Vandalism	None visible	Hardly noticeable, but some evidence on up to a few pieces of furniture/ equipment	Noticeable, an area of the space has been rendered unusable by vandalism	Signs of vandalism are obvious
Dog mess	None visible	Hardly noticeable, perhaps a single example	Noticeable/ several dog refuse piles, affecting enjoyment of area	Very noticeable, seriously affecting enjoyment of area
Noise	Not aware of any	Some sound but hardly noticeable, not annoying	Sound(s) is (are) noticeable and interfere(s) with enjoyment of area	Noticeable sounds which are unpleasant. Seriously affecting enjoyment of area

This tool applies interval time sampling techniques using continuous observation of activities and characteristics of all individuals entering predefined target areas during hour-long observation periods. The observer also obtains information related to the following characteristics for all observed participants: age (Children= Individuals from infancy to 12 years old, Teen = Individuals aged 13 to 20 years of age, adult = Individuals aged 21 to 59 years of age and older adults defined as ≥60 years of age), gender (female or male) and whether they are overweight or have a disability (require assistance to move) (Figure 8).

Figure 8. Park users with disabilities playing in the basketball court

3.1.2.5. Activity Type

In addition, information related to the type of activity was also recorded as physical including cycling (riding, walking or standing with a bicycle), playing in the

basketball court or playground area, non-physical including eating or using phone

(holding and using a phone in some way e.g., texting, phone call, taking a picture or

recording a video, or wearing headphones), playing in the basketball court or

playground. These categorizations for physical activity levels, wellbeing behaviors, and

the activity type were a part of the standard procedure in conducting MOHAWk

observation (Benton *et al.*, 2018; 2020).

3.1.2.6. Activity Level

During observation, the physical activity levels were recorded as sedentary,

moderate, or vigorous. Sedentary activity included lying down, sitting or standing

(Figure 9). Moderate encompassed walking (Figure 10), and vigorous activity included

a brisk walk, climbing, running and other activity related with sports and exercise such

as playing in the basketball court or playground (Figure 11 &12).

Figure 9. Park users engaged in sedentary activities

Figure 10.Park users engaged in walking activities

Figure 11.Park users engaged in vigorous activities in the playground area

Figure 12. Park users engaged in vigorous activities in the basketball court

3.1.2.7. Behavioral Wellbeing Indicators

The behavioral indicators of wellbeing were recorded as Connect and Take Notice. Social connection includes conversing, being physically linked with someone, smiling and making eye contact when passing through a door or other narrow space, or participation in a group activity. Take Notice of the environment includes extended viewing of the scenery, an intentional pause in activity to look at or photograph something in the vicinity, or a pronounced head swivel to look at a specific object, view or person.

3.2. Statistical Analyses

To examine the relationship between park user characteristics, level of activity and wellbeing behaviors, models were estimated in which number of total users, number of users by age (Children, teens, adults and older adults), gender (male and

female), group size (alone, small, and large groups), disability/ overweight (yes or no), and numbers of users by the type of activity (cycling, playground, basketball, eating, phone use or other activities) included the independent variables. The dependent variables were the level of activity (sedentary, walking, and vigorous), and wellbeing behaviors (Take notice, Connect, Take notice and Connect). The day of the week and time of data collection were considered as confounders.

Descriptive statistics summarized park user characteristics and the proportions and distributions of the activity levels and wellbeing behaviors amongst park users. The data were statistically analyzed using IBM SPSS software version 23. The results of the research were evaluated and interpreted using the Chi square test to determine the statistical association between variables. The Cramer's V Coefficient was used to measure the strength of the association between variables. The alpha of significance level of 5% was chosen. As the computed p-value was lower than the significance level alpha = 0.05, the null hypothesis was rejected and the alternative hypothesis was accepted.

In the case of finding the dependence, its strength was subsequently interpreted using Cramer's V Coefficient based on the following scale: correlation up to 0 is considered as very weak, correlation from 0 to 0.05 is considered as weak, correlation from 0.05 to 0.1 is considered as moderate, and the correlation from 0.1 to 0.15 is strong and above 0.25 is considered very strong (Akoglu, 2018).

3.3. Ethical Considerations

Ethics approval was obtained from the Human Subject for Social and Behavioral Sciences adopted by the Institutional Review Board (IRB) at the American University of Beirut (AUB).

CHAPTER 4

THE WELLBEING IN JABAL MOHSEN

The World Health Organization (WHO) defines health as 'a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity' (WHO, 1948). This is consistent with the biopsychosocial model of health, which considers physiological, psychological and social factors in health and illness, and interactions between these factors.

Wellbeing is a multifaceted condition (Anand, 2016) that determines people's feelings (Guillen-Royo, 2019) and life satisfaction (Wang et.al. 2019).This is most often referred to as 'subjective wellbeing (Teghe and Rendell, 2005). It can be divided into personal, psychological, social, economic, and political dimensions (Guillen-Royo, 2019). This condition can further be examined in terms of objective dimensions (Anand, 2016). The objective dimension deals with areas associated with culture (Browne-Yung et.al. 2013), factors such as health, education, employment, leisure, personal security, management of goods and services, and physical and social environment (Australian Bureau of Statistics, 2002, Teghe and Rendell, 2020).

An interesting dimension associated with wellbeing, particularly in recent decades, is social wellbeing (Blanco and Díaz, 2007); social wellbeing demonstrates people's ability to meet basic needs and maintain peaceful coexistence in societies with the opportunity to progress (United States institute of peace, 2020). Moreover, it assesses peoples' condition in the future societies, the quality of their relationship with others (Keyes, 1998), and the definition of a good life feelings (Guillen-Royo, 2019).

Environments attract social opportunities (Vogelsang, 2016) and act as "social magnets" wellbeing (Wells and Donofrio, 2019) that increase people's chances of meeting and learning. It can also stimulate the formation of social capital (Colantonio and Dixon, 2011) and well-being and help build trust and social support in neighborhoods (Diener *et al.*, 2018). The rapid changes in the environment and the process of urbanization have drastically changed the social and environmental relationships (McGreevy *et.al*. 2019) and have had a profound impact on human health and wellbeing (Wells and Donofrio, 2019). Lack of attention to environmental quality based on human scale has led to social isolation, which is a major threat to wellbeing in modern societies (Diener *et al.*, 2018). In this regard, extensive studies in Europe and the United States have concentrated on the effect of environmental conditions on social and health- related behaviors (Colantonio and Dixon, 2011).

The scientific evidence reveals that wellbeing is linked to characteristics of the neighborhoods in which people live. Neighborhoods with poor-quality housing, few resources such as hospitals, public schools, retail stores, and unsafe conditions impose stress, which can lead to depression (Cutrona *et al.*, 2006). In addition, the characteristics of neighborhood influence people's behaviors such as crime, drug use, delinquency and childbearing (Leventhal & Brooks-Gunn, 2000).

 Low-income neighborhoods lack many resources, including health care, retail stores, and recreational facilities. Lack of access to needed resources is demoralizing because of the extra effort required to meet daily needs (Sampson *et al*., 2002). Therefore, the understanding of the impact of green space on wellbeing in low income neighborhoods necessitates the understanding of the characteristics of Jabal Mohsen

neighborhood in terms of wellbeing dimensions including personal and psychological, social, economic, and political.

4.1. Safety and security

4.1.1. Political and religious tensions

Jabal Mohsen is predominantly a low-income residential neighborhood located in eastern Tripoli and falls within the jurisdiction of Tripoli Municipality, in Lebanon's North Governate. The neighborhood was quite prosperous until the beginning of the 1975-1990 Lebanese Civil War. Jabal Mohsen was negatively affected when the country's rail network, including the routes passing from Tripoli, came to a permanent standstill (Bathish and Ghazal, 2007).

In the late 1970s and early 1980s, violent clashes took place between the neighborhoods of Jabal Mohsen and Tabbaneh. The Syrian military intervention during the civil war exacerbated the conflict (UN-Habitat Lebanon, 2017). Such clashes recurred after the end of Civil War in 2007-2008 following the assassination of Rafic Hariri in 2005, which instigated the withdrawal of Syrian forces from Lebanon the same year.

Such deteriorating events negatively affected the neighborhood's security situation and economic activity that include politico-sectarian tensions between Jabal Mohsen and Tabbaneh and conflicts in other parts of the North during the civil war (Jamali, 2016). Conflicts reappeared later in 2011 with the start of the Syrian war, with the displacement of Syrians in the area (Van der Molen and Stel, 2015). These conflicts were expressed with sporadic violence and street fights that led to heavily damaged buildings.

In 2014, the clashes took place again which made the Lebanese Army implementing a security plan including establishment of extra security points by strategic landmarks and streets along the boundary between the two adjacent neighborhoods. The tensions between both neighborhoods remain prevalent till today in terms of safety and security issues and in the collective memory and attitudes of residents in both neighborhoods.

Afterwards, however, various events negatively affected the area's security situation and economic activity, including politico-sectarian tensions between Jabal Mohsen and Tabbaneh and conflicts in other parts of the North during the civil war, the halting of the rail network, periodic armed clashes after the war (until the establishment of relative calm after 2014), and suicide bomb attacks in 2015.

4.1.2. Drug use

Drug abuse is another serious problem that has been witnessed in Jabal Mohsen. Drug abuse is a widespread problem in the neighborhood, particularly among male youth between the ages of 16 and 28. There are reasons for drug use including abundance of free time, stress, violence, family problems, ignorance, poverty, divorced parents, psychological factors, and peer pressure. However, the main reason for the prevalence of drug use is the low price of drug pills in the pharmacies in Tripoli. The drug use has led to major consequences including, unemployment, weapons' use, stealing, and raping. In addition, drug use led to spreading fear in the neighborhood, getting addiction, and committing murder and suicide.

4.2. Social and economic sectors

4.2.1. Health status of the population

The most commonly reported category of health conditions in Jabal Mohsen were chronic illnesses. Disabilities were also prevalent in the neighborhood, with difficulties in walking being the most common type, followed by difficulties with vision, hearing, speech, self-care or interaction with others.

The main types of illnesses that are witnessed in the neighborhood include allergies and asthma as well as malnutrition-related diseases, scabies, respiratory tract infections, and disabilities or malformations. The reasons for such health problems were related to changing of seasons, water and other types of environmental pollution, lack of hygiene, poverty and stress. There also exist several challenges in tackling such health problems including shortage of medication and support, denial by parents of their child's health problem, inability to explain to beneficiaries the importance of specialized care needed in certain cases, and unstable security setting in the area.

4.2.2. Provision of health services

Jabal Mohsen is considered one of the poorest and most vulnerable residential neighborhoods in Tripoli, exhibiting a relative weakness in terms of medical assistance. A number of public and private facilities, located within or just outside Jabal Mohsen, provide a range of healthcare and education services to the neighborhood's residents—often irrespective of nationality, age or gender. The health services are provided by three Primary Healthcare Centers (PHCCs) located within Jabal Mohsen—El-Zahraa Dispensary, El-Talaee Charity Centre and The Lebanese Saver—and two facilities

situated near the neighborhood: Tripoli Governmental Hospital and Tripoli PHCC (UN-Habitat and UNICEF Lebanon, 2018a; 2018b).

However, these health facilities face various challenges, including limited financial and human resources, shortage of equipment or personnel for specialized services, lack of awareness among residents about the existence of certain services, and a lack of will among some residents to access certain services.

4.3. Education

People living in Jabal Mohsen have access to a range of public and private education institutions, located within or near the neighborhood. There are children in the neighborhood who have never attended school or dropped out of school. The reason for children being out of school goes back to the lack of financial capacity since the child has to work in economic activities to earn money for the family. Children are not able to attend school since the school fees are too high and the transportation is too expensive. In other cases, children are out of school due to the bullying and violence experienced on the way to school, disabilities, the distance to school, early marriage and the frequent relocation of the family.

4.4. Child Protection

4.4.1. Child Labor

Children and youth are particularly the most vulnerable groups, experiencing various socioeconomic and other challenges, including child labor, child marriage, and scarcity of specialized healthcare and especially education services for children with

disabilities, various safety and security concerns, and lack of vocational training

opportunities or satisfying and stable work for youth. Children between the ages of 8

and 10 are involved either in economic activities including hairdressing, grocery

delivery, restaurants, cafés and electronics or mechanics shops.

Work carried out by children constitutes child labor if it deprives them:

"Of their childhood, their potential and their dignity, and … is harmful to physical and

mental development. It refers to work that is mentally, physically, socially or morally

dangerous and harmful to children; and interferes with their schooling by: depriving

them of the opportunity to attend school; obliging them to leave school prematurely; or

requiring them to attempt to combine school attendance with excessively long and

heavy work" (International Labor Organization, 2018).

Children were employed by some businesses in Jabal Mohsen to provide

financial support to their family, willingness to gain professional skills, and school

dropouts due to child lack of interest in education. However, the work of children in

such economic activities might be considered to be subjected to the worst forms of

child labor. For instance, the work in grocery stores for tobacco or alcohol may

potentially trigger substance abuse among children, or work in mechanics workshops

might expose children to the risk of injury or even death as the work involves handling

dangerous tools and equipment.

4.4.2. Child violence and discipline

Violence including psychological aggression or physical punishment to

discipline children is a common practice in Jabal Mohsen, particularly at household

level, but also in schools. At household level, children experience psychological and

physical discipline techniques that range from being deprived of pocket money or of favorite activities to being beaten. With regard to discipline at school, violence exerted by teachers and school directors on children- in the form of physical and verbal abuse is very prevalent. In addition, children witness violence among their peers at school, such as bullying, shoving, or hitting with hands, shoes or stones. Child violence in the streets and conflicts among children is also common in Jabal Mohsen. Children are subjected to swear words on the streets and how they frequently fight with one another, forcing parents to intervene.

4.4.3. Children with disabilities

Children under the age of 14 in Jabal Mohsen have disabilities including trisomy disorders, autism, epilepsy, as well as intellectual and physical disabilities such as difficulties related to walking, seeing, speaking and self-care.
Children with disabilities face discrimination and are exposed to both physical and verbal violence in the community due to their disabilities. In addition, they lack safe and well-equipped play areas and indoor recreational spaces that limit their inclusion. Jabal Mohsen lacks a specialized school, non-formal educational facilities and health centers for children with disabilities.

4.5. Built Sectors

4.5.1. Buildings

The condition of buildings in the neighborhood is mainly good or fair. However, major signs of deterioration are evident in the western and northern parts of

Jabal Mohsen. The inadequate access to basic urban services in the neighborhood is one factor contributing to poor living conditions, including where this arises from blocked and overflowing wastewater and stormwater networks. Public water supply reaches the majority of buildings and meets most basic household needs. While there are some notable instances of managed and safe open spaces in the neighborhood, they are limited in number.

4.5.2. Water and Sanitation at household Level

Jabal Mohsen lacks all water sources and the water provided is greatly polluted and not suitable for drinking. Residents in the neighborhood are not satisfied about the inaccessibility and the pollution of water.

4.5.3. Domestic water

Most of the buildings in Jabal Mohsen have access to State supply of domestic water, including drinkable and domestic use. However, some residents do not have access to domestic water since they refuse to register with the North Water Establishment due to the high one time registration costs with a yearly payment. However, buildings constructed within the last 15 years have dug their own boreholes as a direct water source and only pay for the operation and maintenance of their water pump. Unfortunately, some of residents are not connected to the network at all and require immediate attention.

4.5.4. Wastewater

The wastewater network is undersized and overloaded, leading to flooding of streets with sewage-contaminated water; these floods do not seem to be limited to places with a malfunctioning wastewater network. Many wastewater manhole covers are broken to receive stormwater during heavy rainfall, meaning the two networks are interconnected. The wastewater network in Jabal Mohsen is malfunctional with major defects. Malfunctioning parts of the wastewater network are scattered across the neighborhood and are not solely restricted to small alleyways.

4.5.5. Stormwater

Jabal Mohsen has a poor stormwater network, which can cause major negative impacts on buildings and road structures. In addition, the stormwater of Jabal Mohsen, located on a natural topographical slope, flows towards the lower parts of the neighborhood to the east, all the way into Tabbaneh towards Abu Ali River. During heavy rainfall, problems of flooding arise downstream in the most vulnerable streets of the neighborhood namely, El Mcherka and El-Muhajirin, as well as in their surrounding areas in the western part of the neighborhood. The accumulation of street garbage disposal across the neighborhood contribute to stormwater channel blockages and flooding, as well as attracting disease-spreading vectors.

4.6. Local economy and livelihoods

The local economy in Jabal Mohsen has limited interaction with other areas. Most of the workers and business owners are residents of the neighborhood, and the

enterprises mostly hire and provide inhabitants of the neighborhood. Most of the enterprises in Jabal Mohsen comprise food and grocery stores, restaurants, cafés, boutiques and salons —to a lesser extent— carpentry, bakeries and offices among others.

Jabal Mohsen has long been known for its tailors, who supply large clothing firms all over Lebanon. However, the negative impact of the conflicts with neighboring Tabbaneh on the economy—with 2007– 2008 and 2011–2014 being a notable period of recent clashes—has been felt in Jabal Mohsen's tailoring sector; anecdotally, many tailors have lost business contracts with the larger firms.

Many enterprises in Jabal Mohsen face the threat of poor basic urban service provision, which is potentially affecting business efficiency. The enterprises in the neighborhood face many constraints including lack of storm water drains, malfunctioning wastewater network and insufficient garbage collection.

4.7. Access and open spaces

Jabal Mohsen contains numerous open spaces. However, few of these open spaces are publicly used. With limited safe and well-managed public space available, some non-public lands—like unused lots, landscaped areas and gardens—are appropriated and used by inhabitants as outdoor gathering spaces. The lack of safe public open space in Jabal Mohsen particularly affects youth and children, who have limited access to gardens, playgrounds, sport fields and other safe and attractive pockets. People living in the low-income neighborhood of Jabal Mohsen have low exposure to green spaces for outdoor physical activities. Such disadvantaged groups, exhibit health problems and they tend to benefit the most from improved access to

green spaces. Therefore, green space are important as a strategy to contribute towards

wellbeing, particularly for low-income neighborhoods such as the case of Jabal

Mohsen neighborhood.

CHAPTER 5

RESULTS

To assess the impact of green space on park users, the target areas were visited 16 times to record each time the characteristics, physical activity and wellbeing behaviors of park users. Each target area was observed on two weekdays and on weekends, but the four days were not consecutive.

5.1. Target Area incivilities

The extent of incivilities in target areas was recorded as "None", "Hardly noticeable", "Noticeable", or "Very Noticeable" to describe specific conditions for each Target Area. Scoring for the extent of incivilities should be based on whether people using the green space would be generally aware of its presence (Gidlow *et al.*, 2012). The evidence of alcohol and drug taking, broken glass, and dog mess were none, the general litter was hardly noticeable, graffiti was noticeable, and vandalism and noise were very noticeable by park users.

Table 2

Results of Target Areas Incivilities

Incivility	None	Hardly noticeable	Noticeable	Very Noticeable
General litter		Hardly noticeable, a few items visible on the ground		
Evidence of alcohol	None visible			

Evidence of drug taking	None visible	
Graffiti		Noticeable, several small or large pieces, clearly visible
Broken glass	None visible	
Vandalism		Signs of vandalism are obvious
Dog mess	None visible	
Noise		Noticeable sounds which are unpleasant. Seriously affecting enjoyment of area

5.2. Descriptive results

5.2.1. Park user Characteristics

A total of 225 individuals were observed. Of these 147 were males, 78 were females. These users comprised 81 children, 35 teens, 77 adults and 32 who appeared to be seniors over the age of 60. Overall, 49 park users were overweight and 31 were disabled. Most park visitors consisted of small groups (72%), between two and five people, while very few came alone (16%) or in large groups (12%) (Table 3).

5.2.2. Time and Day of Visits

A larger number of park visitors were recorded on weekend days (75%). The proportions of visitors were 34% on Saturday and 41% on Sunday. There were less

visits recorded on weekdays with 12% on Monday and 13% on Wednesday. The majority of observed people visited the park in the evening between 5 to 6 pm (71%) while the number of visitors during the day was less in the afternoon (11%), morning (11%) and lunchtime (7%) (Table 3).

5.2.3. Activity type

Five predefined types of activities were recorded during the observations. Three of these activities were physical in nature and include cycling, playing in the playground and in the basketball court, while the other two are considered as non-physical that entail talking on the phone and eating. Some park users were engaged in other activities. The results indicate that 40% of park users were engaged in physical activities, 24 % in non-physical activities, and the remaining (36%) were engaged in others (Table 3).

The activity level was determined based on three criteria: sedentary, walking and vigorous. Individuals lying down, sitting, or standing in place were recorded as sedentary. Individuals walking at a casual pace were recorded as walking. Those engaged in an activity more vigorous than an ordinary walk (e.g., increasing heart rate causing them to sweat, such as jogging, cycling, playing basketball). The results indicated that 49 % were sedentary, 31% engaged in vigorous activities and the remaining 20% were walking in the park (Table 3).

People engaged in vigorous activities included cyclists (14%), playground users (26%), basketball players (44%), and the remaining were for were jogging or brisk walking (10%) and eating with a brisk walk (6%). Sedentary people in the park included talking on the phone (23%), standing or sitting in the playground (12%), those

sitting or standing watching basketball players (12%), eating (10%), or engaged in

other activities (43%). People walking in the park included those talking on the phone

while walking (16%), walking in the playground area (11%), eating while walking

(11%), or simply walking while engaging in other activities (61%) (Table 4).

Table 3
Descriptive Characteristics of the Study Sample

	N	Percent
Gender		
Male	147	65.3
Female	78	34.7
Age		
Child	81	36
Teen	35	15.6
Adult	77	34.2
Older adult	32	14.2
Disability		
Yes	31	13.8
No	194	86.2
Overweight		
Yes	49	21.8
No	176	78.2
Group size		
Alone	37	16.4
Small	161	71.6
Large	27	12
Day of the week		
Monday	26	11.6
Wednesday	30	13.3
Saturday	77	34.2
Sunday	92	40.9
Time of the day		

Morning	24	10.7
Lunchtime	15	6.7
Afternoon	25	11.1
Evening	161	71.6
Activity type		
Cycling	10	4.4
Using phone	33	14.7
Playground	36	16
Basketball	44	19.6
Eating	20	8.9
Others	82	36.4
Activity level		
Sedentary	111	49.3
Walking	44	19.6
Vigorous	70	31.1
Wellbeing		
N	38	16.9
C	62	27.6
NC	125	55.6

5.3. Statistical results

5.3.1. Activity level

As it was mentioned in the section of Research Methodology, I have focused on three research questions based on the level of activity, behavioral wellbeing indicators and gender differences. Hypothesis 1 was tested by Chi square test and Cramer's V. The results of the mentioned tests are presented in Table 4.

Variables of age, gender, overweight, disability, group size, activity type, and wellbeing behaviors were found to be in statistically significant association with the activity level ($p < .05$). The association between gender and the activity level was later explained in the section of Gender Differences.

Based on results shown in Table 4, (*p* value was .000, Cramer's V Coefficient was equal to .438), it can be stated that there exists a statistically significant and at the same time very strong dependence between the level of activity and the age group of park users. The results of the research declare that children were engaged in vigorous activities significantly more than teens, adults, and older adults. However, adults were engaged in sedentary activities more significantly than other age groups of park users.

Other questions regarding park user characteristics in terms of the level of activity include questions about overweight, disability and group size of park users. Concerning the overweight characteristic, the results shown in Table 4 (*p* value was .001, Cramer's V Coefficient was equal to .242, it can be stated that there exists a statistically significant and at the same time strong dependence between the level of activity and the overweight of park users. The results of the research declare that park users with overweight were engaged in sedentary activities more significantly than in walking or vigorous activities.

Similar results were found for the disability characteristic, the results shown in Table 5 (*p* value was .001, Cramer's V Coefficient was equal to .268, it can be stated that there exists a statistically significant and at the same time very strong dependence between the level of activity and the disability of park users. The results of the research declare that park users with disabilities were engaged in sedentary activities more significantly than in walking or vigorous activities.

Concerning the group size characteristic, the results shown in Table 5 (*p* value was .003, Cramer's V Coefficient was equal to .189, it can be stated that there exists a statistically significant and at the same time strong dependence between the level of activity and the group size of park users. The results of the research indicate that park

users visiting the park in small groups were more often seen in sedentary activities. However, large group visitors were more observed in vigorous activities than other in sedentary or walking activities.

In terms of the type of activity, the results shown in Table 5 (p value was .000, Cramer's V Coefficient was equal to .476, it can be stated that there exists a statistically significant and at the same time very strong dependence between the level of activity and the type of park users. The results of the research indicate that park users cycling and playing in the playground or in the basketball court were engaged in vigorous activities more significantly than the other types of activities. However, park users engaged in others were engaged in sedentary activities more significantly than in walking or vigorous activities.

In response to the wellbeing behaviors, the results shown in Table 5 (p value was .000, Cramer's V Coefficient was equal to .316, it can be stated that there exists a statistically significant and at the same time very strong dependence between the level of activity and behavioral indicators of wellbeing. The results of the research indicate that park users engaged in vigorous activities were seen in Connect behavior more significantly than those engaged in sedentary or walking activities. However, park users engaged in sedentary activities were more observed in Take Notice and Connect behaviors more significantly than those engaged in walking or vigorous activities.

Based on Cramer's V coefficients, the association between the level of activity with age group and activity type were comparatively the strongest, i.e. .476 and .438 respectively, which indicates a strong association.

Table 4

Chi Square Tests for Activity Level

	Sedentary	Walking	Vigorous	Mean	SD	*p* value	Cramer's V
Gender					.	.024*	.182
Males	63 (56.76)	31 (70.45)	53 (75.71)	1.93	.889		
Females	48 (43.24)	13(29.55)	17 (24.29)	1.60	.827		
Age						.000*	.438
Child	16 (14.41)	11 (25)	54 (77.14)	2.47	.808		
Teen	19 (17.12)	5 (11.36)	11 (15.71)	1.77	.910		
Adult	54 (48.65)	18 (40.91)	5 (7.143)	1.36	.605		
Older adults	22 (19.82)	10 (22.73)		1.31	.471		
Overweight						.001*	.242
Yes	30(27.03)	14(31.82)	5(7.143)	1.49	.681		
No	81(72.97)	30(68.18)	65(92.86)	1.91	.909		
Disability						.001*	.268
Yes	23(20.72)	8(18.18)	1(1.429)	1.31	.535		
No	88(79.28)	36(81.82)	69(98.57)	1.90	.899		
Group Size						.003*	.189
Alone	15(13.51)	10(22.73)	12(17.14)	1.92	.862		
Small group	85(76.58)	34(77.27)	42(60)	1.73	.850		
Large group	11 (9.91)		16 (22.86)	2.19	1.00 1		
Activity type						.000*	.476
Cycling			10(14.29)	3.00	.000		
Using phone	26(23.42)	7(15.91)		1.21	.415		
Playground	13(11.71)	5(11.36)	18(25.71)	2.14	.931		
Basketball	13(11.71)		31(44.29)	2.41	.923		
Eating	11(9.91)	5(11.36)	4(5.714)	1.65	.813		
Others	48(43.24)	27 (61.36)	7(10)	1.50	.653		
WBI						.000*	.316
N	19(17.12)	9(20.45)	10(14.29)	1.76	.852		
C	11(9.91)	13(29.55)	38(54.29)	2.44	.781		
NC	81(72.97)	22(50)	22(31.43)	1.53	.779		

Note: The total percentages are presented in parentheses

p ≤ .05

5.3.2. Wellbeing Behaviors

All park visitors were observed engaging in a behavior that promotes wellbeing namely Take Notice N, Connect C, or Take Notice and Connect NC. The results revealed that 55% were taking notice and connecting with others, 28% connecting with others and 17% taking notice of their surroundings (Table 3). Hypothesis 2 was tested by Chi square test and Cramer's V. The results of the mentioned tests are presented in Table 5. The results shown in Table 5 indicate that there were no significant associations between behavioral indicators of wellbeing with gender and overweight ($p<.05$).

Based on results shown in Table 5 (p value was .001, Cramer's V Coefficient was .230), it can be stated that there exists a statistically significant and at the same time strong dependence between behavioral wellbeing indicators and the age group of park users. The results of the research declare that children were engaged in Connect behavior (C) more significantly than teens, adults, and older adults. However, adults were engaged in Take Notice and Connect behavior (NC) more significantly than other age groups.

In terms of the disability characteristic, the results shown in Table 6 (p value was .003, Cramer's V Coefficient was equal to .227, it can be stated that there exists a statistically significant and at the same time strong dependence between behavioral wellbeing indicators and the disability of park users. The results of the research declare that park users with no disabilities were more significantly seen engaged in Connect behavior more than those with disabilities. Park users with disabilities were less seen in Connect behavior and more seen in Take Notice and Connect behaviors.

Concerning the group size characteristic, the results shown in Table 5 (p value was .000, Cramer's V Coefficient was equal to .412, it can be stated that there exists a statistically significant and at the same time very strong dependence between behavioral wellbeing indicators and the group size of park users. The indicator of Take notice was mostly seen in park users visiting the park by themselves while the Take notice and Connect behaviors (NC) were mostly observed among users coming to the park in small groups. The results of the research indicate that park users visiting the park in small groups were engaged in Take notice and Connect (NC) more significantly than other group sizes. However, park users visiting the park alone were more engaged in Take Notice behavior and large groups were more seen in Connect behavior.

Based on Cramer's V coefficients, the association between behavioral wellbeing indicators and the group size was comparatively the strongest, i.e. .412, which indicates a strong association.

In terms of the type of activity, the results shown in Table 5 (p value was .007, Cramer's V Coefficient was equal to .232, it can be stated that there exists a statistically significant and at the same time strong dependence between behavioral wellbeing indicators and the type of activity. The results of the research indicate that park users playing in the basketball court were more engaged in Connect behavior more significantly than other types of activities. However, park users engaged in others activities were observed in Take Notice and Connect more significantly than other activities.

Concerning the level of activity, the results in Table 5 (p value was .000, Cramer's V Coefficient was equal to .316), it can be stated that there exists a statistically significant and at the same time very strong dependence between

behavioral wellbeing indicators and the level of activity. The results indicate that park users engaged in sedentary activities were observed in Take Notice and Connect behaviors. Park users engaged in walking activities were more seen in Take Notice behavior, however, those engaged in vigorous activities were seen in Connect behaviors more significantly than other wellbeing behaviors.

Table 5

Chi Square Tests for Wellbeing Behaviors

	Take Notice	Connect	NC	Mean	SD	*p* value	Cramer's V
Gender					.	.073	-
Males	26(68.42)	47(75.81)	74(59.2)	2.33	.760		
Females	12(31.58)	15(24.19)	51(40.8)	2.50	.752		
Age						.001*	.230
Child	13(34.21)	36(58.06)	32(25.6)	2.23	.712		
Teen	3(7.895)	10(16.13)	22(17.6)	2.54	.657		
Adult	16(42.11)	13(20.97)	48(38.4)	2.42	.817		
Older adults	6(15.79)	3(4.839)	23(18.4)	2.53	.803		
Overweight						.223	-
Yes	8(21.05)	9(14.52)	32(25.6)	2.49	.767		
No	30(78.95)	53(85.48)	93(74.4)	2.36	.758		
Disability						.003*	.227
Yes	6(15.79)	1(1.613)	25(20)	2.59	.798		
No	32(84.21)	61(98.39)	100(80)	2.35	.750		
Group Size						.000*	.412
Alone	24(63.16)	5(8.065)	8(6.4)	1.57	.835		
Small group	14(36.84)	45(72.58)	102(81.6)	2.55	.651		
Large group		12 (19.35)	15 (12)	2.56	.506		
Activity type						.007*	.232
Cycling	3(7.895)	4(6.452)	3(2.4)	2.00	.816		
Using phone		7(11.29)	3(14.4)	2.30			

61

Playground	8(21.05)	12(19.35)	18(12.8)	2.22	.847		
Basketball	8(21.05)	21(33.87)	16(15.2)	2.34	.797		
Eating	4(10.53)	6(9.66)	19(8.8)	2.40	.645		
Others	3(7.895)	12(19.35)	58(46.4)	2.56	.754		
	12(31.58)				.739		
Activity Level						.000*	.316
Sedentary	19(50)	11(17.74)	81(64.8)	2.56	.771		
Walking	9(23.68)	13(20.97)	22(17.6)	2.30	.795		
Vigorous	10(26.32)	38(61.29)	22(17.6)	2.17	.659		

Note: The total percentages are presented in parentheses
    NC: Take Notice and Connect
    $p \leq .05$

5.3.3. Gender differences

The 225 park users of the study were distributed between 147 males and 78 females. The observed park users consisted of 81 Children (22 females and 59 males), 35 teens (12 females and 23 males), 77 adults (36 females and 41 males), and 32 older adults (8 females and 24 males) visited the green park. Hypothesis 3 was tested by Chi square test and Cramer's V coefficient. The results shown in Table 6 indicate that there were no significant associations between gender and each of the disability and behavioral indicators of wellbeing ($p > 0.05$).

Based on results shown in Table 6 (*p* value was .040, Cramer's V coefficient was equal 1.92), it can be stated that there exists a statistically significant and at the same time strong dependence between gender and the age group of park users. The results indicate that the distribution of males and females across age indicated that most of the females were adults and most of the males were children.

In terms of the overweight characteristic, the results shown in Table 6 (*p* value was .017, Cramer's V coefficient was equal to .159, it can be stated that there exists a

statistically significant and at the same time strong dependence between gender and overweight of park users. The results indicate that while the majority of males and females were not overweight, females were more seen overweight than males.

Concerning the group size characteristic, the results shown in Table 6 (p value was .001, Cramer's V coefficient was equal to .250, it can be stated that there exists a statistically significant and at the same time strong dependence between gender and the group size of park users. The results demonstrate that the majority of males and females visited the park in small groups. However, females were more seen in small groups than males. In contrast, males were more observed alone or in large groups compared to females.

In terms of the type of activity, the results shown in Table 6 (p value was .000, Cramer's V coefficient was equal to .332, it can be stated that there exists a statistically significant and at the same time very strong dependence between gender and the type of activity. The results indicate that females were more playing in the playground than males, however males were more seen playing in the basketball court than females.

Concerning the level of activity, the results in Table 6 (p value was .024, Cramer's V coefficient was equal to .182, it can be stated that there exists a statistically significant and at the same time strong dependence between the level of activity and gender of park users. The results of the research declare that males were engaged in vigorous activities significantly more than females. However, females were engaged in sedentary activities more significantly than males.

Table 6

Chi Square Tests for Gender Differences

	Male	Female	Mean	SD	*p* value	Cramer's V
Age					040*	.192
Child	59 (40.14)	22 (28.21)	1.27	.808		
Teen	23 (15.65)	12 (15.38)	1.34	.910		
Adult	41 (27.89)	36 (46.15)	1.47	.605		
Older adults	24 (16.33)	8(10.26)	1.25	.471		
Overweight					.017*	159
Yes	25(17.01)	24(30.77)	1.49	.505		
No	122(82.99)	54(69.23)	1.31	.462		
Disability					. 970	-
Yes	21(14.29)	11(14.1)	1.34	.483		
No	126(85.71)	69(85.9)	1.35	.477		
Group Size					.001*	.250
Alone	28(19.05)	9(11.54)	1.24	.435		
Small group	94(63.95)	67(85.9)	1.42	.494		
Large group	25(17.01)	2(2.564)	1.07	.267		
Activity type					.000*	. 332
Cycling	7 (4.762)	3 (3.846)	1.30	.483		
Using phone	19 (12.93)	14 (17.95)	1.42	.502		
Playground	18(12.24)	18(23.08)	1.50	.507		
Basketball	42(28.57)	2(2.564)	1.05	.211		
Eating	10(6.803)	10(12.82)	1.50	.513		
Others	51(34.69)	32(39.74)	1.38	.488		
WBI					.073	-
N	26(17.69)	12(15.38)	1.32	.471		
C	47(31.97)	15(19.23)	1.24	.432		
NC	74(50.34)	51(65.38)	1.41	.493		
Activity level					.024*	.182
Sedentary	63(42.86)	48(61.54)	1.43	.498		
Walking	31(21.09)	13(16.67)	1.30	.462		
Vigorous	53(36.05)	17(21.79)	1.24	.432		

Note: The total percentages are presented in parentheses

*p ≤ .05

CHAPTER 6

DISCUSSION

This study explores the hypothesis that green spaces contribute to wellbeing of residents by specifically focusing on a low income neighborhood park in Tripoli, Lebanon, and measuring the park visitors' physical activity (sedentary, walking and vigorous) and their wellbeing behaviors (Take notice, Connect, Take notice and Connect).

Many studies have previously examined the relationships between green space and stress, depression, anxiety, general health, and well-being and described the positive associations between green space and health suggesting that at the individual and/or neighborhood-level more green space is related to better mental and general health (Van den Berg *et al*., 2015; Maas *et al*., 2006, 2009; Van den Berg *et al*., 2010; Stigsdotter *et al*., 2010; Richardson *et al*., 2010; Ward Thompson *et al*., 2012; Beyer *et al*., 2014; Triguero-Mas *et al*., 2015; Picavet *et al*., 2016).

This study found significant positive associations with the levels of physical activity and wellbeing behaviors. The association between both variables indicates that park users engaged in sedentary activities were more likely to appreciate their surrounding environment (Take notice) while those engaged in vigorous activities were more likely to be more socially connected (Connect). Unlike other reported situations where neighborhood deprivation was found to be linked to differences in physical activity and wellbeing behaviors of park users (Mitchell and Poham, 2008), the accessible location of park in this study seems to contribute to the wellbeing of the

resident community despite it being amongst the most deprived in the city. Such access to green spaces by residents in poorer neighborhoods was previously reported as a positive factor promoting physical activity and wellbeing behaviors (Ward Thompson *et al.*, 2012). Findings of this study implying that wellbeing is influenced by access to public green space can also draw on Diez Roux and Mair (2010) who found a causal link between neighborhood deprivation and wellbeing.

Baseline information derived from the study indicated that 65% of the visitors were males and 35 % were females. The reason for gender differences in the use and access to green spaces may be influenced by methodological approaches because the literature suggests that women are often under-represented, both in organized and unorganized events (WHO, 2010; 2011; Freedman, 1999).

On the other hand, it is possible that even with equal availability of green space, females would be less likely to use the space than males. Richardson and Mitchell (2010) who investigated the impact on green spaces on adult populations, found positive health effects to apply exclusively for men, with little or no significant influences on women's health (Richardson and Mitchell, 2010). Cohen *at al*. (2007) found that males significantly outnumbered females in public parks in the USA, and that they were almost twice as likely as females to engage in vigorous physical activity (Cohen *et al*., 2007). This was previously reported by Hoyles (1994) and confirmed by the WHO (2010), that men and women are more likely to differ in terms of activities and/or the extent of such activities undertaken in recreational spaces.

There are a number of factors or considerations that may have been responsible for these gender differences, for example, women, even in contemporary society, are

more likely to undertake household chores and consequently, have relatively limited leisure time compared to men (Mitchell and Poham, 2008). Also although women spend considerable time within the neighborhood they are more involved in care and supervision of children, engaging in household chores and working part time (Ward Thompson, 2002). Consequently, they are underrepresented in their use of green spaces (Maas *et al.*, 2009; Madge, 1997) and their engagement may be limited by societal differences in gender roles (Freedman, 1999), and cultural beliefs and changes in health status at different stages of life (Mitchell and Poham, 2008).

With respect to observed levels and types of physical activities and wellbeing behaviors in the park, the study found that children park users, who were mostly males, engaged mostly in vigorous activities and connecting behaviors and were less often observed to relax. In contrast, adult park visitors who were mostly females, were seen performing sedentary activities and taking notice of their surrounding environment.

These findings are in line with a study by Parra *et al.* (2019) who found that children mostly practiced moderate to vigorous physical activities (MVPA) in parks while adults were more engaged in sedentary activities. Similar findings were reported by Spengles *et al.* (2011) who reported that children perform MVPA activities, most frequently in parks with playgrounds (Spengler *et al.*, 2011). Many studies have shown that children's activities in the park contributes to better mental health and wellbeing (Flouri *et al.*, 2014; Feng and Astell-Burt, 2017 ; McCormick, 2017; Vanaken and Danckaerts, 2018).

The study revealed a significant difference between the level of activity type and park visitors who were overweight and who tended to engage in sedentary

activities. This is in line with a prior study that found a significant association between exposure to green space and health indicators as overweight (Hartig *et al*., 2014).

It is important to discuss the precautionary closures of green parks in order to maintain social distancing. COVID-19 restrictions and the lockdown period have further increased the importance and the need for green spaces. The pattern of urban green space use varied substantially based on local context due to different levels of disease prevalence and government –imposed closures and restrictions.

Recent studies found a rise in the use of green space during the pandemic (Venter *et al*., 2020). However, some studies found a slight decrease in park visitation during the first COVID-19 lockdown, but significantly increased park use in the second lockdown (Day, 2020). Similarly, one recent study found that the use of urban parks declined during the pandemic and many residents lamented their limited access to green space (Ugolini *et al*., 2021).

The scientific evidence also found that the use of green space declined mostly in socially vulnerable communities and among individuals in the lower-income status (Larson *et al*., 2021). These conflicting findings highlight the importance for further research investigating the impact of COVID-19 pandemic on urban park use, particularly in low-income communities.

Although indicative of the park's role in promoting wellbeing, the study has many limitations which should be addressed in future research. First, the analysis is based on systematic direct observation, and therefore, the results should be interpreted with caution since it is based on subjective interpretation (van Ham and Manley, 2012). Second, it should be acknowledged that the study's systematic direct observation may

not capture possible long-term wellbeing effects of growing-up in low-income

neighborhoods (Miltenburg and van der Meer, 2018; Musterd *et al*., 2012). Third,

although the study uses established measures of wellbeing (N, C and NC) data are

based on single item indicators. Latent constructs may provide even greater accuracy

to the estimates. Fourth, the study was conducted in one season which is the summer

period.

CHAPTER 7

CONCLUSION

This research provides additional evidence on how urban green spaces in low income neighborhoods encourage physical activities amongst children and contribute to wellbeing of adult residents who may not engage in any activity but who are socially connected and taking notice of the surrounding environment. These findings address local authorities, aid agencies, non-governmental organizations and civil society highlighting the fact that establishing urban parks in low income neighborhoods is a need and not a luxury for poorer residents, who have fewer mobility options. It is also worth mentioning that in addition to its proximity, the fact that the case study park was regularly maintained meant that it may have been perceived as a safe place and hence encouraged physical activity and improved wellbeing, since perceived neighborhood characteristics are the strongest predictors of neighborhood wellbeing satisfaction (Cao *et al*., 2018; Lovejoy *et al*., 2010; Mouratidis, 2019; Permentier *et al*., 2011). A well-managed and accessible park may encourage daily routines and increase the health and wellbeing of residents by providing space for physical activities and social interaction.

REFERENCES

Akoglu, H. (2018). User's guide to correlation coefficients. *Turkish journal of emergency medicine*, *18*(3), 91-93.

Allen, J., & Balfour, R. (2014). Natural solutions for tackling health inequalities. *London: UCL Institute of Health Equity*.

Anand, P. (2016). Happiness, well-being and human development: The case for subjective measures.

Australian Bureau of Statistics, (2002). "Social Capital and Social Wellbeing". Retrieved from www.oecd.org

Bathish, H. and Ghazal, R. (2007) "Steam and Steel" Railway Era Evokes Feelings of Nostalgia. The Daily Star [online]. Available from: http://www.dailystar.com.lb/News/Lebanon-News/2007/ Nov-03/47189-steam-and-steel-railway-era-evokes-feelings-ofnostalgia.ashx

Barton, J., & Pretty, J. (2010). What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. *Environmental science & technology*, *44*(10), 3947-3955.

Bedimo-Rung, A. L., Mowen, A. J., & Cohen, D. A. (2005). The significance of parks to physical activity and public health: a conceptual model. *American journal of preventive medicine*, *28*(2), 159-168.

Benton, J. S., Anderson, J., Cotterill, S., Dennis, M., Lindley, S. J., & French, D. P. (2018). Evaluating the impact of improvements in urban green space on older adults' physical activity and wellbeing: protocol for a natural experimental study. *BMC public health*, *18*(1), 1-15.

Benton, J. S., Anderson, J., Pulis, M., Cotterill, S., Hunter, R. F., & French, D. P. (2020). Method for Observing pHysical Activity and Wellbeing (MOHAWk): validation of an observation tool to assess physical activity and other wellbeing behaviors in urban spaces. *Cities & Health*, 1-15.

Berman, M. G., Kross, E., Krpan, K. M., Askren, M. K., Burson, A., Deldin, P. J., ... & Jonides, J. (2012). Interacting with nature improves cognition and affect for individuals with depression. *Journal of affective disorders*, *140*(3), 300-305.

Berto, R. (2014). The role of nature in coping with psycho-physiological stress: a literature review on restorativeness. *Behavioral sciences*, *4*(4), 394-409.

Beyer, K. M., Kaltenbach, A., Szabo, A., Bogar, S., Nieto, F. J., & Malecki, K. M. (2014). Exposure to neighborhood green space and mental health: evidence from the survey of the health of Wisconsin. *International journal of environmental research and public health*, *11*(3), 3453-3472.

Blanco, A., & Díaz, D. (2007). Social order and mental health: A social wellbeing approach. Psychology in Spain.

Bodin, M., & Hartig, T. (2003). Does the outdoor environment matter for psychological restoration gained through running?. *Psychology of sport and exercise*, *4*(2), 141-153.

Bond, L., Kearns, A., Mason, P., Tannahill, C., Egan, M., & Whitely, E. (2012).

    Exploring the relationships between housing, neighborhoods and mental

    wellbeing for residents of deprived areas. *BMC public health*, *12*(1), 48.

Browne-Yung, K., Ziersch, A., & Baum, F. (2013). 'Faking til you make it': social

    capital accumulation of individuals on low incomes living in contrasting socio-

    economic neighborhoods and its implications for health and wellbeing. *Social*

    Science & Medicine, *85*, 9-17.

Braubach, M., Egorov, A., Mudu, P., Wolf, T., Thompson, C. W., & Martuzzi, M.

    (2017). Effects of urban green space on environmental health, equity and

    resilience. *In Nature based solutions to climate change adaptation in urban*

    areas (pp. 187-205). Springer, Cham.

Cao, X., Wu, X., & Yuan, Y. (2018). Examining built environmental correlates of

    neighborhood satisfaction: a focus on analysis approaches. *Journal of Planning*

    Literature, *33*(4), 419432.

Centers for Disease Control and Prevention (CDC). (2008). Healthy Places

    Terminology. Retrieved from

    https://www.cdc.gov/healthyplaces/terminology.htm

Centers for Disease Control and Prevention. (2006). Behavioral Risk Factor

    Surveillance System Operational and User's Guide. CDC, Atlanta.

Council for Development and Reconstruction (CDR). (2016). Habitat III National

    Report. Retrieved from http://habitat3.org/wp-

    content/uploads/NationalReport_LEBANON.pdf

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Cohen, D. A., McKenzie, T. L., Sehgal, A., Williamson, S., Golinelli, D., & Lurie, N. (2007). Contribution of public parks to physical activity. *American journal of public health*, *97*(3), 509-514.

Cohen, D. A., Setodji, C., Evenson, K. R., Ward, P., Lapham, S., Hillier, A., & McKenzie, T. L. (2011). How much observation is enough? Refining the administration of SOPARC. *Journal of Physical Activity and Health*, *8*(8), 1117-1123.

Colantonio, A., Dixon, T., (2011). *Urban Regeneration& Social Sustainability, Best practice from European cities*, John Wiley & Sons: 1-336.

Cutrona, C. E., Wallace, G., & Wesner, K. A. (2006). Neighborhood characteristics and depression: An examination of stress processes. *Current directions in psychological science*, *15*(4), 188-192.

Dadvand, P., Wright, J., Martinez, D., Basagaña, X., McEachan, R. R., Cirach, M., ... & Nieuwenhuijsen, M. J. (2014). Inequality, green spaces, and pregnant women: roles of ethnicity and individual and neighborhood socioeconomic status. *Environment international*, *71*, 101-108.

Day, B. H. (2020). The value of greenspace under pandemic lockdown. *Environmental and Resource Economics*, *76*(4), 1161-1185.

Dearborn, D. C., & Kark, S. (2010). Motivations for conserving urban biodiversity. *Conservation biology*, *24*(2), 432-440.

de Keijzer, C., Bauwelinck, M., & Dadvand, P. (2020). Long-term exposure to residential greenspace and healthy ageing: a systematic review. *Current environmental health reports*, *7*(1), 65-88.

De Vries, S., Verheij, R. A., Groenewegen, P. P., & Spreeuwenberg, P. (2003). Natural environments—healthy environments? An exploratory analysis of the relationship between greenspace and health. *Environment and planning A*, *35*(10), 1717-1731.

Diener, E., Biswas-Diener, R., & Lyubchik, N. (2018). Social well-being: research and policy recommendations. Global Happiness.

Diez Roux, A. V., & Mair, C. (2010). Neighborhoods and health.

Feng, X., & Astell-Burt, T. (2017). Do greener areas promote more equitable child health?. *Health & place, 46*, 267-273.

Flouri, E., Midouhas, E., & Joshi, H. (2014). The role of urban neighborhood green space in children's emotional and behavioral resilience. *Journal of Environmental Psychology, 40*, 179-186.

Francis, J., Wood, L. J., Knuiman, M., & Giles-Corti, B. (2012). Quality or quantity? Exploring the relationship between Public Open Space attributes and mental health in Perth, Western Australia. *Social science & medicine*, *74*(10), 1570-1577.

Freedman, D. A. (1999). Ecological inference and the ecological fallacy. *International Encyclopedia of the social & Behavioral sciences, 6*(4027-4030), 1-7.

French, D. P., & Sutton, S. (2010). Reactivity of measurement in health psychology: how much of a problem is it? What can be done about it?. *British journal of health psychology, 15*(3), 453-468.

García-López, M. D. C. (1988). Systematic observation of behaviors and environmental events using the lag method. *Perceptual and Motor Skills, 67*(1), 255-262.

Giles-Corti, B., Broomhall, M. H., Knuiman, M., Collins, C., Douglas, K., Ng, K., ... & Donovan, R. J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space?. *American journal of preventive medicine*, *28*(2), 169-176.

Gidlow, C. J., Ellis, N. J., & Bostock, S. (2012). Development of the neighborhood green space tool (NGST). *Landscape and Urban Planning, 106*(4), 347–358.

Glass, T. A., & Balfour, J. L. (2003). Neighborhoods, aging, and functional limitations. *Neighborhoods and health, 1*, 303-34.

Groenewegen, P. P., Van den Berg, A. E., De Vries, S., & Verheij, R. A. (2006). Vitamin G: effects of green space on health, well-being, and social safety. *BMC public health, 6(*1), 1-9.

Groenewegen, P. P., van den Berg, A. E., Maas, J., Verheij, R. A., & de Vries, S. (2012). Is a green residential environment better for health? If so, why? *Annals of the Association of American Geographers*, *102*(5), 996-1003.

Guillen-Royo, M. (2019). Sustainable consumption and wellbeing: Does on-line shopping matter?. *Journal of Cleaner Production*, *229*, 1112-1124.

Hartig, T., Evans, G. W., Jamner, L. D., Davies, D. S., & Gärling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology, 23*(2), 109–123.

Herzog, T. R., & Strevey, S. J. (2008). Contact with nature, sense of humor, and psychological well-being. *Environment and behavior, 40*(6), 747-776.

Hoyles, M. (1994). Future of urban parks and open spaces: Lost connections and new directions. The private garden and the public park. Working Paper No 6.

Keyes, C. L. M. (1998). Social well-being. *Social psychology quarterly*, 121-140.

Kondo, M. C., Fluehr, J. M., McKeon, T., & Branas, C. C. (2018). Urban green space and its impact on human health. *International journal of environmental research and public health, 15*(3), 445.

Kuo, F. E., & Sullivan, W. C. (2001). Aggression and violence in the inner city: Effects of environment on mental fatigue. *Environment and Behavior, 33*(4), 543–571.

Kuo, M. (2015). How might contact with nature promote human health? Promising mechanisms and a possible central pathway. *Frontiers in psychology, 6*, 1093.

International Labor Organization. (2018).What is Child Labor [online]. Retrieved from
https://www.ilo.org/ipec/facts/lang--en/%20index.htm

Jamali, R. (2016). Tripoli: The Conflict. Peace in Progress [online], "Bombarded
Cities" Issue, No. 26. Retrieved from http://www.icipperlapau.cat/numero26/en

Lafortezza, R., Carrus, G., Sanesi, G., & Davies, C. (2009). Benefits and well-being
perceived by people visiting green spaces in periods of heat stress. *Urban
forestry & urban greening, 8*(2), 97-108.

Larson, L. R., Zhang, Z., Oh, J. I., Beam, W., Ogletree, S. S., Bocarro, J. N., ... &
Wells, M. (2021). Urban park use during the COVID-19 pandemic: Are socially
vulnerable communities disproportionately impacted*?. Frontiers in Sustainable
Cities*, 103.

Lovejoy, K., Handy, S., & Mokhtarian, P. (2010). Neighborhood satisfaction in
suburban versus traditional environments: An evaluation of contributing
characteristics in eight California neighborhoods. *Landscape and urban
planning, 97*(1), 37-48.

Maas, J., Verheij, R. A., Groenewegen, P. P., De Vries, S., & Spreeuwenberg, P.
(2006). Green space, urbanity, and health: how strong is the relation?. *Journal
of Epidemiology & Community Health, 60*(7), 587-592.

Maas, J., Verheij, R. A., Spreeuwenberg, P., & Groenewegen, P. P. (2008). Physical
activity as a possible mechanism behind the relationship between green space
and health: A multilevel analysis. *BMC Public Health, 8*, 206-219.

Maas, J., Van Dillen, S. M., Verheij, R. A., & Groenewegen, P. P. (2009). Social

    contacts as a possible mechanism behind the relation between green space and

    health. *Health & Place, 15*(2), 586-595.

Mackay, G.J., Neill, J.T. (2010). The effect of green exercise on state anxiety and the

    role of exercise duration, intensity, and greenness: A quasi-experimental

    study.Psychol. Sport Exercise 11, 238–245.

Mackay, G. J., & Neill, J. T. (2010). The effect of "green exercise" on state anxiety and

    the role of exercise duration, intensity, and greenness: A quasi-experimental

    study. *Psychology of sport and exercise, 11*(3), 238-245.

Maidstone Borough Council. (2003). Green space provision and needs assessment.

Marmot, M., Friel, S., Bell, R., Houweling, T. A., Taylor, S., & Commission on Social

    Determinants of Health. (2008). Closing the gap in a generation: health equity

    through action on the social determinants of health. *The lancet, 372*(9650),

    1661-1669.

McCaffrey, R. (2007). The effect of healing gardens and art therapy on older adults

    with mild to moderate depression. *Holistic Nursing Practice*, *21*(2), 79-84.

McFarland, A. L., Waliczek, T. M., & Zajicek, J. M. (2008). The relationship between

    student use of campus green spaces and perceptions of quality of life.

    HortTechnology, 18(2), 232-238.

Miltenburg, E. M., & van der Meer, T. W. (2018). Lingering neighbourhood effects: A framework to account for residential histories and temporal dynamics. *Urban Studies*, *55*(1), 151-174.

Mitchell, R., Astell-Burt, T., & Richardson, E. A. (2011). A comparison of green space indicators for epidemiological research. *J Epidemiol Community Health*, *65*(10), 853-858.

Mitchell, R., & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: an observational population study. *The lancet*, *372*(9650), 1655-1660.

Mitchell, R. J., Richardson, E. A., Shortt, N. K., & Pearce, J. R. (2015). Neighborhood environments and socioeconomic inequalities in mental well-being. *American journal of preventive medicine*, *49*(1), 80-84.

McCormick, R. (2017). Does access to green space impact the mental well-being of children: A systematic review. *Journal of Pediatric Nursing*, *37*, 3-7.

McKenzie, T. L., Cohen, D. A., Sehgal, A., Williamson, S., & Golinelli, D. (2006). System for Observing Play and Recreation in Communities (SOPARC): reliability and feasibility measures. *Journal of Physical Activity and Health*, *3*(s1), S208-S222.

McKenzie, T. L., & Van Der Mars, H. (2015). Top 10 research questions related to assessing physical activity and its contexts using systematic observation. *Research quarterly for exercise and sport*, *86*(1), 13-29.

Mouratidis, K. (2019). Compact city, urban sprawl, and subjective well-being. *Cities, 92*, 261-272.

Moore, T. H. M., Kesten, J. M., López-López, J. A., Ijaz, S., McAleenan, A., Richards, A., ... & Audrey, S. (2018). The effects of changes to the built environment on the mental health and well-being of adults: systematic review. *Health & place, 53*, 237-257.

Musterd, S., Galster, G., & Andersson, R. (2012). Temporal dimensions and measurement of neighborhood effects. *Environment and Planning A, 44*(3), 605-627.

Nazzal, M., & Chinder, S. (2018). Lebanon Cities' Public Spaces. *The Journal of Public Space, 3*(1), 119–152.

Nielsen, T.S., Hansen, K.B. (2007). Do green areas affect health? Results from a Danish survey on the use of green areas and health indicators. *Health &Place 13*,839–850.

Owen, N., Humpel, N., Leslie, E., Bauman, A., & Sallis, J. F. (2004). Understanding 204 Environmental Influences on Walking: Review and Research Agenda. *American Journal of Preventive Medicine, 27(*1), 67–76.

Park, B. J., Tsunetsugu, Y., Ishii, H., Furuhashi, S., Hirano, H., Kagawa, T., & Miyazaki, Y. (2008). Physiological effects of Shinrin-yoku (taking in the atmosphere of the forest) in a mixed forest in Shinano Town, Japan. *Scandinavian Journal of Forest Research*, *23*(3), 278-283.

Parra, D. C., Van Zandt, A., Wang, P., Goodman, M., Abhishek, J., Haire-Joshu, D., & Brownson, R. C. (2019). Evaluating park use and satisfaction: The case of trojan park in St. Louis Missouri. *International journal of environmental research and public health, 16*(15), 2798.

Permentier, M., Bolt, G., & Van Ham, M. (2011). Determinants of neighborhood satisfaction and perception of neighborhood reputation. *Urban studies, 48*(5), 977-996.

Picavet, H. S. J., Milder, I., Kruize, H., de Vries, S., Hermans, T., & Wendel-Vos, W. (2016). Greener living environment healthier people?: Exploring green space, physical activity and health in the Doetinchem Cohort Study. *Preventive medicine*, *89*, 7-14.

Raphael, D. (2002). *Poverty, income inequality, and health in Canada*. CSJ Foundation for Research and Education.

Recio, A., Linares, C., Banegas, J. R., & Díaz, J. (2016). Road traffic noise effects on cardiovascular, respiratory, and metabolic health: An integrative model of biological mechanisms. *Environmental research, 146*, 359-370.

Richardson, E.A., Mitchell, R., 2010. Gender differences in relationships between urban green space and health in the United Kingdom. Soc. Sci. Med. 71,568–575.

Richardson, E. A., & Mitchell, R. (2010). Gender differences in relationships between urban green space and health in the United Kingdom. *Social science & medicine*, *71*(3), 568-575.

Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing "neighborhood effects": Social processes and new directions in research. *Annual review of sociology, 28*(1), 443-478.

Semenza, J. C., March, T. L., & Bontempo, B. D. (2007). Community-initiated urban development: an ecological intervention. *Journal of Urban Health*, *84*(1), 8-20.

Seo, S., Choi, S., Kim, K., Kim, S. M., & Park, S. M. (2019). Association between urban green space and the risk of cardiovascular disease: A longitudinal study in seven Korean metropolitan areas. *Environment international, 125*, 51-57.

Shinew, K. J., Floyd, M. F., & Parry, D. (2004). Understanding the relationship between race and leisure activities and constraints: Exploring an alternative framework. *Leisure sciences*, *26*(2), 181-199.

Spengler, J. O., Floyd, M. F., Maddock, J. E., Gobster, P. H., Suau, L. J., & Norman, G. J. (2011). Correlates of park-based physical activity among children in diverse communities: results from an observational study in two cities. *American Journal of Health Promotion, 25*(5), e1-e9.

Stigsdotter, U. K., Ekholm, O., Schipperijn, J., Toftager, M., Kamper-Jørgensen, F., & Randrup, T. B. (2010). Health promoting outdoor environments-Associations between green space, and health, health-related quality of life and stress based on a Danish national representative survey. Scandinavian journal of public health.

Tillmann, S., Tobin, D., Avison, W., & Gilliland, J. (2018). Mental health benefits of interactions with nature in children and teenagers: A systematic review. *J Epidemiol Community Health, 72*(10), 958-966.

Triguero-Mas, M., Dadvand, P., Cirach, M., Martínez, D., Medina, A., Mompart, A., ... & Nieuwenhuijsen, M. J. (2015). Natural outdoor environments and mental and physical health: relationships and mechanisms. *Environment international*, *77*, 35-41.

Twohig-Bennett, C., & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental research, 166*, 628-637.

Ugolini, F., Massetti, L., Pearlmutter, D., & Sanesi, G. (2021). Usage of urban green space and related feelings of deprivation during the COVID-19 lockdown: Lessons learned from an Italian case study. *Land Use Policy*, *105*, 105437.

Ulrich, R. S. (1979). Visual landscapes and psychological well-being. *Landscape research*, *4*(1), 17-23.

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*(4647), 420-421.

Ulrich, R. S., Lundén, O., & Eltinge, J. L. (1993, October). Effects of exposure to nature and abstract pictures on patients recovering from heart surgery. In *Thirty-third meeting of the Society of Psychophysiological Research, Rottach-Egern, Germany* (Vol. 30, No. 7).

UN-Habitat. (2016). Tripoli City Profile 2016. Retrieved from

https://data2.unhcr.org/en/documents/download/60482

UN-Habitat. (2018). Jabal Mohsen Neighborhood Profile, Tripoli, Lebanon.

Retrieved from:

https://reliefweb.int/sites/reliefweb.int/files/resources/68464-

compressed.pdf

UN-Habitat and UNICEF Lebanon (2018a). Tabbaneh Neighborhood Profile

2018, Beirut: UN-Habitat Lebanon.

UN-Habitat and UNICEF Lebanon (2018b) El-Qobbeh Neighborhood Profile

2018, Beirut: UN-Habitat Lebanon.

Teghe, D., & Rendell, K. (2005). Social wellbeing: a literature review. *School Of
Social Work & Welfare Studies. doi*, *10*.

Van Ham, M., & Manley, D. (2012). Neighborhood effects research at a

crossroads. Ten challenges for future research introduction. *Environment
and Planning A, 44*(12), 27872793.

Van den Berg, A. E., Maas, J., Verheij, R. A., & Groenewegen, P. P. (2010).

Green space as a buffer between stressful life events and health. *Social
science & medicine, 70*(8), 1203-1210.

Van Dillen, S. M., de Vries, S., Groenewegen, P. P., & Spreeuwenberg, P. (2012).

Greenspace in urban neighborhoods and residents' health: adding quality

to quantity. *J Epidemiol Community Health, 66*(6), e8-e8.

Van den Berg, M., Wendel-Vos, W., van Poppel, M., & Maas, J. (2015). Health

    benefits of green spaces in the living environment: A systematic review of

    epidemiological studies. *Urban Forestry and Urban Greening, 14*(4), 806-

    816.

Vanaken, G. J., & Danckaerts, M. (2018). Impact of green space exposure on

    children's and adolescents' mental health: A systematic review.

    International journal of environmental research and public health, 15(12),

    2668.

Van der Molen, I., & Stel, N. (2015). Conflict and environment in North

    Lebanon: vulnerability and resilience from a multi-disciplinary

    perspective.

Veitch, J., Carver, A., Hume, C., Crawford, D., Timperio, A., Ball, K., & Salmon,

    J. (2014). Are independent mobility and territorial range associated with

    park visitation among youth? *International journal of behavioral nutrition*

    and physical activity, 11(1), 1-6.

Venter, Z. S., Barton, D. N., Gundersen, V., Figari, H., & Nowell, M. (2020).

    Urban nature in a time of crisis: recreational use of green space increases

    during the COVID-19 outbreak in Oslo, Norway. *Environmental research*

    letters, *15*(10), 104075.

Vogelsang, E.M., (2016). "Older adult social participation and its relationship

    with health: Rural urban differences", *Health & Place, 42*, 111–119

Wang, D., Schwanen, T., & Mao, Z. (2019). Does exposure to richer and poorer neighborhoods influence wellbeing?. *Cities*, *95*, 102408.

Thompson, C. W., Aspinall, P., Bell, S., Findlay, C., Wherrett, J., & Travlou, P. (2004). Open space and social inclusion: local woodland use in central Scotland. *Forestry Commission, Edinburgh, Scotland*.

Ward Thompson, C. W., Roe, J., Aspinall, P., Mitchell, R., Clow, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and urban planning, 105*(3), 221-229.

Wells, N. M., & Donofrio, G. A. (2011). Urban planning, the natural environment, and public health. In *Encyclopedia of environmental Health* (pp. 565-575). Elsevier Inc..

Wood, L., Hooper, P., Foster, S., & Bull, F. (2017). Public green spaces and positive mental health–investigating the relationship between access, quantity and types of parks and mental wellbeing. *Health & place*, *48*, 63-71.

World Bank. (2018). Population, total - Lebanon. Retrieved from

https://data.worldbank.org/indicator/SP.POP.TOTL?locations=LB

World Health Organization. (1948). Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the

representatives of 61 States (Official Records of the World Health

Organization, no. 2, p. 100) and entered into force on 7 April 1948.

Retrieved from

https://www.who.int/governance/eb/who_constitution_en.pdf

World Health Organization (2010). Global recommendations on physical activity

for health. Retrieved from

http://apps.who.int/iris/bitstream/10665/44399/1/9789241599979_eng.pdf

World Health Organization. (2011). Gender. Geneva, Switzerland. Retrieved from

https://www.who.int/%20topics/gender/en/

World Health Organization. (2016). Global report on urban health: equitable,

healthier cities for sustainable development. Retrieved from

https://www.who.int/sustainable-development/cities/health-risks/urban-

greenspace/en/

World Population Review. (2020). Population of Cities in Lebanon. Retrieved

from http://worldpopulationreview.com/countries/lebanon-

population/cities/

Zhang, Y., Mavoa, S., Zhao, J., Raphael, D., & Smith, M. (2020). The

Association between Green Space and Adolescents' Mental Well-Being: A

Systematic Review. *International journal of environmental research and

public health, 17*(18), 6640.