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DEVELOPING A COLLABORATIVE FRAMEWORK FOR LINKINGWOMAN'S HEALTH, WALKABILITY WITH NEIGHBORHOODDESIGN: A PILOT STUDY IN BEIRUT

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Abstract

Urban environments, which lack adequate social environments suitable for walking, lead to spreading a culture of poor diet and minimal physical activity amongst its dwellers, and thus become one of the major contributing environmental factors that lead to obesity. Nevertheless, the evidence review findings on the association between urban parameters and health outcomes still needs to be investigated and requires integrated system approach for informed health planning. In a car dependent city, like Beirut, with a weak pedestrian infrastructure in addition to unhealthy modern lifestyle, there is significant health problems, particularly obesity, in women. Though genetic tendency is known to be a contributor to overweightness and obesity, environmental factors are often significant sponsors to its causes. The purpose of this study is to develop a framework to understand the link between physical characteristics of the neighborhood including land use mix, proximity to shops and recreational facilities, distance to public parks, and the quality of pedestrian infrastructure on one hand, and the daily travel patterns in relationship with the socioeconomic level on the other. Moreover, it seeks to correlate the level of walkability with the body mass index and hence obesity and to overall health status and chronic diseases such as hypertension, diabetes and cardiac diseases. A pilot study is to be conducted, where a survey is developed and is to be tested on a specific number of 50 women in order to evaluate some of the feasibility of crucial components of the full-scale study. The target urban area extends from Horsh Beirut till Beirut Municipal Stadium. This pilot study conducted prior to the main multidisciplinary research assesses the feasibility of the used tools including such as surveys, mobile applications and mapping analysis as well as testing the reliability and cultural acceptance of the survey.

Keywords

Collaborative, Beirut, women's health, walkability, Body Mass Index

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ABSTRACT: *Urban environments, which lack adequate social environments suitable for walking, lead to spreading a culture of poor diet and minimal physical activity amongst its dwellers, and thus become one of the major contributing environmental factors that lead to obesity. Nevertheless, the evidence review findings on the association between urban parameters and health outcomes still needs to be investigated and requires integrated system approach for informed health planning. In a car dependent city, like Beirut, with a weak pedestrian infrastructure in addition to unhealthy modern lifestyle, there is significant health problems, particularly obesity, in women. Though genetic tendency is known to be a contributor to overweightness and obesity, environmental factors are often significant sponsors to its causes. The purpose of this study is to develop a framework to understand the link between physical characteristics of the neighborhood including land use mix, proximity to shops and recreational facilities, distance to public parks, and the quality of pedestrian infrastructure on one hand, and the daily travel patterns in relationship with the socio-economic level on the other. Moreover, it seeks to correlate the level of walkability with the body mass index and hence obesity and to overall health status and chronic diseases such as hypertension, diabetes and cardiac diseases. A pilot study is to be conducted, where a survey is developed and is to be tested on a specific number of 50 women in order to evaluate some of the feasibility of crucial components of the full-scale study. The target urban area extends from Horsh Beirut till Beirut Municipal Stadium. This pilot study conducted prior to the main multidisciplinary research assesses the feasibility of the used tools including such as surveys, mobile applications and mapping analysis as well as testing the reliability and cultural acceptance of the survey.*

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1. INTRODUCTION

The past decade has witnessed an outbreak of a dangerous health phenomena: Obesity. According to the World Health Organization, "obesity associated with physical inactivity is the fourth leading risk factor for death in the world" and considered to be a key risk factor for non-communicable diseases (NCDs) such as cardiovascular diseases, cancer and diabetes. Governments and health institutions have dedicated programs to spread awareness regarding the dangers of living sedentary lifestyles that encourage minimal physical activity which are usually accompanied with improper intakes of low quality food. While food choice is a problem based on ignorance, it is still considered much easier to fix on the personal level simply by making healthier food choices.

Globally, around 23% of adults aged 18 and over were not active enough in 2010 (men 20% and women 27%). Unfortunately, physical activity no longer demands effort and dedication of time, it also requires the availability of space.

'Physical Activity' is defined as "any bodily movement produced by skeletal muscles that requires energy expenditure including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits." (WHO, 2018) However, most patients lack the chance to engage in physical activities throughout their day which is why some governments have taken action to provide individuals with age and occupation appropriate opportunities to be active. Such examples include opening public sport and recreational facilities, providing safe cycling routes within the city, organizing safe

pedestrian paths, etc. Yet, what is common between all these examples is that they all depend on the built environment. Therefore, it is fundamental to widely acknowledge the importance of integrating the built environment (Urban design and planning) and Public health (Health Sciences) (Sallis, Owen, & Fisher, 2015), into the solutions as it tackles the common problems that patients have with introducing physical activity into their daily lives. However, there is still lack of research in assessing the association between urban variables, daily travel pattern behavior, and the health conditions in a scientific manner. As more cities try to improve walkability, Beirut is still considered to be a 'car dependent' city. According to the World Health Organization, adults aged 18–64 years should do at least 150 minutes of moderate-intensity physical activity throughout the week, or do at least 75 minutes of vigorous-intensity physical activity throughout the week (WHO, 2018).

Therefore, this paper aims to examine the link between physical characteristics of the neighborhood, walkability, and body mass index (BMI) index targeting women in an attempt to take the first step towards promoting a healthier lifestyle for Lebanese women.

2. Background

2.1 The link between the physical characteristics of the neighborhood and walkability

Research shows that neighborhoods that are known to host mixed use architecture have a higher rate of walkability. This is because in developing cities, particularly in the middle east, the rapid and random urban expansion of cities, or urban sprawl, associated with the exponential growth of the population, or the baby boom, lead to unorganized spread of housing that is often crowded and inaccessible by vehicles. This encouraged some dwellers to open businesses that provide the day to day needs of the community while also offering the walkable proximity to their housing units. As a result, community members often perform a daily task of following a path on foot that suffices their everyday needs. Therefore, the more mixed uses of buildings, the more they cover the varied needs of the dwellers.
However, some places can still be salvaged enough to interfere with the urban fabric without disturbing the social development of the city. Such cities would allow and welcome some urban intervention, therefore exploiting the situation and opening the opportunity to shape the urban spaces to meet the walkability requirements. This means to create a sense of enclosure, a thematic path perhaps that captures the culture behind the dwellers while also making the walking person feel safe, secured, belonging if not accepted as well, and intrigued. Unfortunately, the rate of technological growth with respect to the impactful concern have directed most cities towards their tendency to become car-oriented, or 'no-walking zones'. It is noted that such cities, despite comprising of close categorized cultural communities, have a higher rate of crime than those that culture walkability. As it turns out, cities that value a pedestrian culture, such as those in Vancouver, Canada and Portland, open doors for teamwork and creativity, especially amongst its youth because residents believe that creating walking routes opens the chance for people to interact with each other more, thus forming friendship and creating constructive encounters between people. The aim is to nurture a culture using the urban fabric that encourages dwellers from all ages to interact, and improving walkability is an effective tool to reach that goal.

There are several techniques that can be used for increasing the walkability of densely populated cities. Taking into consideration the organization and the application of the physical characteristics of heavy neighborhoods as well as the social background of the area is an effective approach to generating walkable spaces in developing communities. However, it is not sufficient to apply solutions based only on a shallow understanding of the urban space. According to Jeff Speck, author of *Walkable City*, facilitating walkability can be accomplished by focusing on the elements already present in the neighborhood without dire need for any construction intervention.

2.2 Walkability and Human health specifically the Body Mass Index

A number of cross-sectional studies have shown that obesity is affected by behavioral, social and built environment factors. These studies were able to show that there is a direct association between walkability and obesity, even after controlling for the many confounding factors, such as diet, family history, etc…This relationship holds because living in less walkability areas are more likely to be associated with physical inactivity, which in turn is linked to overweight and obesity. It is noted that residents in areas which have a more walkable neighborhoods spent more time walking. A study done by (Pouliou & Elliott,

2010) found that individuals living in areas of higher walkability had a lower body mass index than those residing in areas of low walkability.

Physical inactivity is known to be associated with major adverse health effects, where based on a meta-analyses done it was shown that worldwide, physical inactivity was found to be responsible for 6% to 10% of the major non-communicable diseases such as coronary artery disease, type 2 diabetes, and breast and colon cancers.(Lee & Maheswaran, 2011)

According to the World Health Organization, around 2 million adults globally are categorized as overweight to obese (Bell, Wilson, & Liu, 2008). The problem is that the type of diseases that are overcoming the population are no longer infectious, but non-communicable, meaning that they are originated from poor choice of lifestyle and not viral sources. Unfortunately, this decade lone was enough to witness an explosion of populace who suffered from obesity even in the modest middle to low income countries. Some of these countries are battling such diseases alongside other infectious ones as well. Statistics show that obesity is responsible for 44% of the Type 2 Diabetes patients as well as 23% of the ischemic heart disease (Berke, Koepsell, Moudon, Hoskins, & Larson, 2007). Differences in the widespread of obesity in developing countries is often linked to the high and low income levels of educational attainment. This is why, in such countries, obesity is found more amongst women than men, where educating females is culturally secondary in priority to educating men. (Carr, Dunsiger, & Marcus, 2011). After reviewing the above evidence, there is no denying in the fact that neighborhood physical features and organization of urban fabric can have an effect on the residents such as pedestrian safety, proximity to destinations, availability of walkable paths, organization of traffic, and so on. Any constructive change in any of the mentioned points is enough to alter the wellbeing and zoning laws of the neighborhood. Yet, the fastest method to track these changes is by tracking the effect left on residents, which can be done using the Body Mass Index (BMI).

Obesity is highly prevalent among adults especially women, where based on the National Institutes of Health statistics, the prevalence of obesity and extreme obesity was higher in women (about 40 percent) when compared to men (35 percent) (https://www.niddk.nih.gov).

Eastern Mediterranean countries were not found to be immune to obesity, where the prevalence was also found to be high even in these countries based on the statistics that was done by the World Health Organization, in 2014, where more than 50% of the women were found to be overweight and 24% were obese. It was found that countries like Kuwait, Bahrain, Saudi Arabia and United Arab Emirates were on the list of top ten countries worldwide in term of obesity (WHO, 2014).

According to WHO data in 2014, the prevalence of overweight and obesity in Lebanon was 67.4% and 26.3%, respectively, with the Lebanese men showing higher prevalence rates of obesity at younger ages (20-49 years) while Lebanese women are at higher risks at older ages (above 50 years). (Chamieh et al., 2015)

Researches show that utilitarian walking which contributes to increasing physical activity has a connection with the BMI. In fact, adults and adolescents who live in areas that promote high walkability are more physically fit and are less likely to be obese (Jones, 2010).

3. BEIRUT NEIGHBORHOODS

Beirut, the capital of Lebanon, is the city with the biggest vehicular network in the country. Its rapid populace growth over the years has caused a consequent widespread of crowded and random architecture to appear causing the transportation routes to be unorganized and quite often dangerous with their proximity and intersection with pedestrian routes of movement. Yet some places in Beirut still respect the pedestrian pathways and encourage walkability.

Fig. 1 Beirut map showing the selected case study

3.1 Tarik el-Jdide as a pilot case study

Since it can be agreed upon that studying the walkability in Beirut is dependent on the physical characteristics, it is clear to any visitor of the city that not all its zones and sectors are homogenous and coherent. Therefore, in order to take the first step towards understanding the relationship between walkability and

the residents, it is necessary to divide the city into zones that are defined by the variables mentioned above (cultural distinction, income rate, etc.) It is also necessary to scope out a target age group which has the highest impact on society. In Lebanon, the highest percentage of impact falls upon women, who may be home builders, part time workers, full time workers, but also have families they care for. For this reason, Tarik el-Jdide can be taken as the first pilot case study that will shed light on the situation of walkability in Beirut for young to middle aged women. In order to pursue such a case study, it is important to formulate a general background idea regarding its current situation as a defined zone within Beirut. Tarik el-Jdide is considered to be home to middle to low income neighborhoods. It is one of the most densely populated areas of the city of Beirut. (Nahnoo, 2016).

4. STUDY METHODOLOGY

4.1 Study Design and settings

With the aim to address the complexity of urban variables and improve the health and wellbeing of these neighborhoods, an integrated systems approach is used. In order to commence such a study, a significant amount of geographic data and demographic data were collected. The data was used to filter out the number of women living in the area in order to deduce the extent of the impact of the physical characteristics of the zone on their walkability. The spatial analysis related to the neighborhood level characteristics is first conducted by mapping land use, traffic and geographical features to understand the existing urban conditions. Then, using Map My tracks mobile application, several routes are tracked from specific home location to various destinations.

After that, a pilot cross-sectional study that was carried out between May and June 2018. Data collection was done from April to July 2018. The study was conducted in Lebanon by interviewing 60 women participants aged 18-65 in defined neighborhood boundaries, and approval was obtained Beirut Arab University Institutional Review Board (IRB).

Variables of interest

A questionnaire was designed by a team of experts, each one took around 10 minutes to be completed. It aimed to get information on marital status, participant's height, weight and BMI, exercise status and nationality, educational level and occupation of participants. In addition, information was obtained about common modes of transportation used and walk commute, walk destinations, amount of housework done, their total sedentary time and if participants smoke and their current status of chronic diseases.

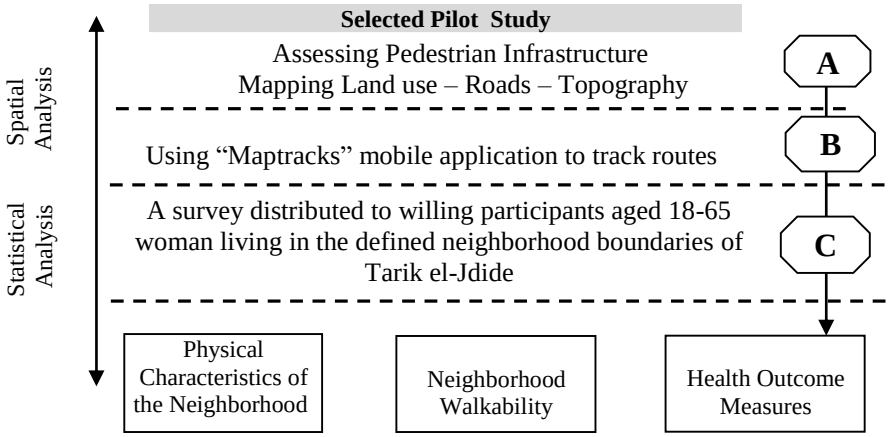

Fig. 1Methodology Flow Chart

4.2 Spatial Analysis

A- Mapping and Assessing pedestrian infrastructure

The analysis of the existing urban conditions including (road, nodes, land use variables, public spaces, width of sidewalks, connectivity, street slope) in order to identify the observed urban design variables.

Furthermore, the agglomeration of architecture in this area has allowed for the widespread of mixed use buildings that commonly hold unit housing in upper levels, and commercial retails on the street levels. Vehicular congestion is almost constant during the day and is accompanied with unorganized motorist

traffic with poor respect to traffic laws. Walkability elements, such as sidewalks, are available but are commonly used by the street sellers to sell their merchandise or by retailers that regard the space as extensions for their shops. Also, the pavements are not in ideal condition and do not often have shading elements nor landscaping. In many cases, the sidewalks are buffered away from the traffic by hoarding parking spaces for cars which often get out of hand and use the pedestrian sidewalk as a parking space. Still, Tarik el-Jdide is considered to be one of the parts of Beirut where the urban fabric, though close knitted, formulates a vibrant street life where residents can crowd the streets and interact. (Harb, 2016)

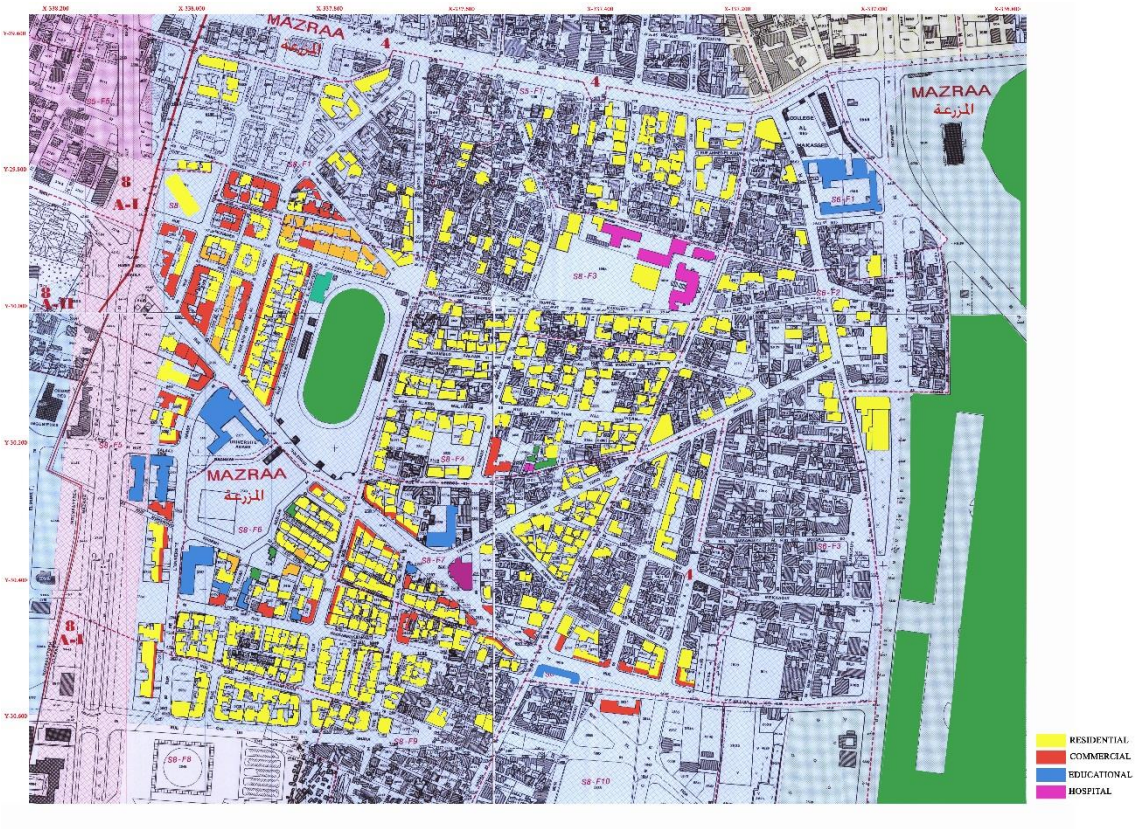

Fig. 2Land use Map (The author adapted from Municipal cadastrial map, Urban design and GIS courses at BAU).

The lack of pavements and crossings make the neighborhood less pedestrian-friendly. Physical characteristics alongside social open mindedness can improve the walkability of the neighborhood while encouraging a wider crowd of people, particularly middle aged active women, to participate in a daily activity that will help improve their health and consequently society.

Several urban parameters can put walkers into a challenge. This is due to several reasons:

1. Unreliable pavements
2. Steep terrains
3. Motor and Vehicular Traffic

Fig. 3Topography (left) and roads Network (right). The author adapted from Beirut Municipality cadastral maps

It is also important to take into consideration that there are durations of the day, as well as days during the week, which the city can be considered walkable.

The first issue is a problem that most densely populated Lebanese areas have. This is usually due to the government's inability to properly maintain and design sidewalks causing most of the pavements to be non-continuous, in a poor state of repair, or unsupervised so that locals disregard their actual use and use them as car parking spaces. The second issue is the steep terrains of Beirut. Though the city is coastal, it is still considered to be quite hilly resulting in terrains that do not support walkability in general. The third issue, which is the most dominant and repercussive, is the vehicular traffic situation that is found all along the city. For residents, the vehicular traffic and motor traffic is dangerous and unruly that is poses a real life risk to some residents. In 2015, it was recorded that most accidents that occurred in the area of Beirut where a clash between motorists and pedestrians or motorists and cars. (Najib, 2015).

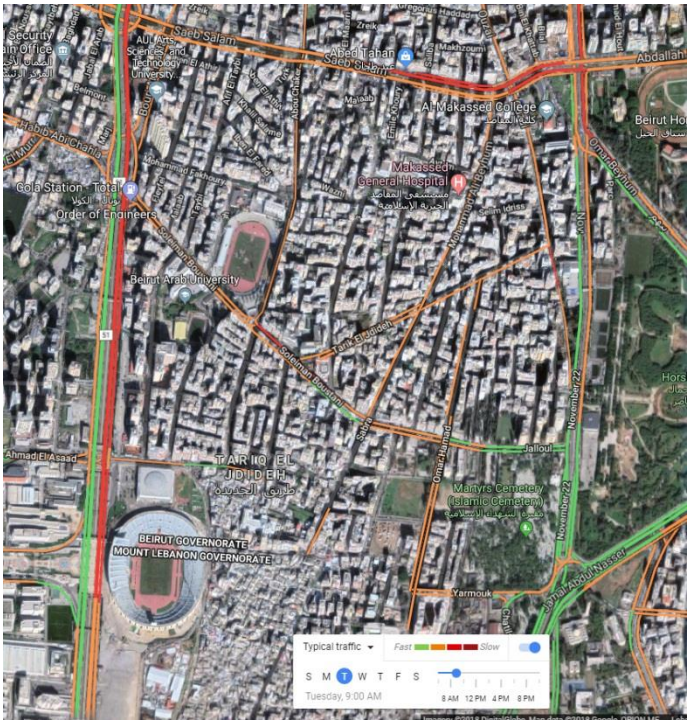

Fig. 4Typical Traffic Flow (Google, 2018)

B- Linking Daily Travel Behavior to the design of the built environment using GPS Mobile Application (measuring distance from a number of homes to various destinations (work, grocery, park…) + identifying what hinder the walkability with the routes+ defining barriers.

Home Location	Destination		Distance		Duration	
A	D1	Municipal Stadium	**322**	**meter**	4.50	minutes
A	D2	shops -pharmacy	**434**	**meter**	2.00	minutes
A	D3	Market	**483**	**meter**	5.50	minutes
A	D4	Bank	**182**	**meter**	1.50	minutes
A	D5	School	**1059**	**meter**	11.50	minutes
A	D6	Public Park	**1085**	**meter**	12.00	minutes

Home Location	Destination		Distance		Duration	
B	D1	Municipal Stadium	**795**	**meter**	11.00	minutes
B	D2	shops-pharmacy	**438**	**meter**	5.00	minutes
B	D3	Market	**159**	**meter**	2.00	minutes
B	D4	Bank	**681**	**meter**	8.00	minutes
B	D5	School	**626**	**meter**	7.50	minutes
B	D6	Public Park	**628**	**meter**	7.50	minutes

Fig. 6 Tracking routes using GPS (Maps my tracks) application from sources A and B to 6 destinations points (The author, 2018)

Mapmytracks mobile application was used to assess pedestrian trip quality within the neighborhood. From several interviewers home location to several destinations (work, park, retail). Figure 6 shows that the daily routes are within an urban area that is a mixed-use neighborhood blending residential, commercial, educational and institutional uses. As for the public space, it includes Beirut Municipal stadium and at the edge of the neighborhood Horsh Beirut the largest green park in the city. Low pedestrian infrastructure such as poor sidewalks, lack of signs, bus stops and shaded area, deficiency of trees in the streets, unsafe to cross traffic flow in the main streets) and low air quality. Since the topography of this neighborhood is considered significant (from 47m to 59m above sea level), the routes from the lower level to a higher destination level are taking more time.

4.3 Statistical Analysis

As mentioned before, a number of 60 women living in the Tarik el-Jdide area were selected at random to complete a survey that targeted different points that define their day to day lifestyle, their walkability rates if existent, their routes to and from their homes, and general information about their health. Figure 7 indicates the home location of the 60 interviewers.

The below survey was distributed to willing participants aged 18-65 woman living in the defined neighborhood boundaries of Tarik el-Jdide. The survey lists a number of 23 questions that target formulating a decent description of the health status of women whose ages are within the assigned age range. The final request is an attempt to understand the routes that these women walk from their homes to their destinations on a day to day basis.

Fig. 7 Home location of assessed woman based on the surveys (The author, 2018)

5. Result Analysis

60 women participants were included in our pilot study. The majority were Lebanese. The mean age of participants was 45 years, with an average body mass index (BMI) of 29.96, almost in the obese range. More than half were married and unemployed. 16% had HTN and 16% had diabetes mellitus. More than half smoke but the majority did not drink alcohol. On average they walk around 2 hours per week. Check Table 1 for detailed demographic information.

Table 1: Demographic characteristics

Variables	
Age (mean ± SD)	45.47 ± 3.54
Height in meters ((mean)	1.6
Weight in kg ((mean)	76.80
BMI (kg/m2) (mean ± SD)	29.96 ± 5.06
Marital status	
Single (n)	17
Married (n)	34
Divorced (n)	6
Widowed (n)	3
Education Level	
Primary school (n)	9
Secondary school (n)	30
University graduate (n)	20
Postgraduate studies (n)	0
Nationality	
Lebanese (n)	47
Palestinian (n)	9
Syrian (n)	4
Occupation	
Employed (n)	23
Not employed (n)	37
Chronic diseases	
Hypertension (n)	10
Diabetes (n)	10
Cardiovascular diseases (n)	4
Dyslipidemia (n)	13
Others	2
Smoking status	
Waterpipe (arguileh)	23
cigarettes	10
None	27
Alcohol drinking	
Yes	3
No	57
Mode of Transportation	
Very car dependent	14
Car Dependent	15
Somewhat Walkable	15
Very Walkable	16
Exercise status and if they exercise then where they exercise	
none	16
street	22
park	16
gym	6
Walking/Housework/ Sedentary time	
Average Walk commute hours/week	1.91
Average Walk destinations hours/week	3.88
Average Housework hours/week	20.93
Average sedentary time hours/week	23.44

As shown in Figure 8, our pilot study failed to show any significant relationship between participants' body mass index and the mode of transportation used (p =0.654).

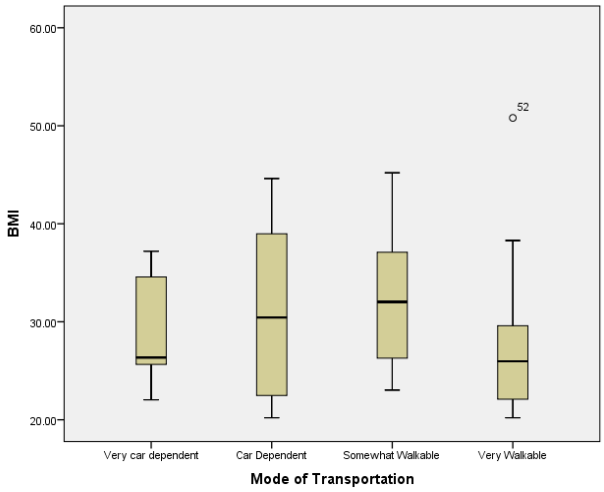

Fig. 8 Relation between body mass index (BMI) and mode of transportation used
Reference: Author June 2018

As for the relationship between walkability hours/week and chronic diseases, a significant relationship existed between hypertension and number of walkability hours per week, where it was found that the average walkability hours per week was significantly higher among hypertensive when compared to non-hypertensive participants (p=0.044). This could be due to the fact that hypertensives are encouraged to walk more as part of management of their hypertension. There was no significance in the relationship between walkability hours/week and diabetes, dyslipidemia or cardiovascular diseases. Please Check Table 2 for detailed information.

Table 2: Relation between chronic diseases and average walkability hours per week (Author, June 2018)

Chronic diseases	Average Walkability hours per week	P value
Hypertension	39.10	0.044
No Hypertension	24.24	
Diabetes	30.12	0.422
No diabetes	26.03	
Dyslipidemia	29.20	0.593
No Dyslipidemia	26.03	
Cardiovascular disease	35.75	0.201
No cardiovascular disease	26.07	

6. Discussion

Our pilot study showed that participants had a mean BMI close to the obese range. This was also shown in a systematic literature review of studies published in the Eastern Mediterranean countries between January 1990 and May 2011, where the mean BMI in the Middle East region was found to be 27.4 (Musaiger, 2011). In addition, the majority of our participants smoke and this is something noted to be very common in Lebanon especially with the increase in the numbers of shisha smokers. More than half of our participants, living in Tarik El-Jdide area were found to be car dependent. This is expected given the lack of walkability space allocated in that region. A study was conducted in Texas and showed that people living in Low-Income Housing Tax Credit households tend to be located in car-dependent neighborhoods and which are found to have undesirable walking-related built environment conditions compared with neighborhoods that are non- Low-Income Housing Tax Credit (Kim & Woo, 2016). The average walk hours per week were around 2 hours and this is considered to be very low. This could definitely be attributable to the lack of walkability available spaces in that area. In a study conducted in Brazil, which included individuals aged 18–65 years (52.0% were women), it was found that the proportion of those who walked for transportation for ≥2.5 hours/week was 21.1% in areas which are known to be low-walkability areas, but this increased to a range from 33.5% to 35.0% in areas which

are highly-walkable (Reis, Hino, Rech, Kerr, & Hallal, 2013). The pilot study showed that hypertensive individuals tend to have significantly higher average walkability hours per week when compared to non-hypertensive and this could be due to the fact that they are greatly encouraged to walk given their chronic disease. However, the incidence of hypertension was found to be reduced upon moving to a highly walkable environment as per the study conducted on Ontario residents in Canada (Chiu et al., 2016). Thus being in a highly walkable area is likely to be protective against the development of chronic diseases.

In order to make Tarik Jdideh a more walkable neighborhood, it is essential to improve the pedestrian infrastructure. Thus, the following urban design recommendations are provided:

- Enhancing the pedestrian networking by improving the sidewalks, curbs, ramps.
- Adding Traffic Signs for better cross walk safety.
- Implementing green infrastructure to provide shaded areas and to mitigate the summer heat especially on the main road (Soleiman El Boustany Road).
- Widening the pavement near the shops at the expense of the vehicular roads.
- Boosting economic and entertainment activities near the main public park (Horsh Beirut) for a better connectivity with the existing retails.

7. Conclusion

This research showed that a significant part of physical inactivity that Lebanese women suffer from could be explained by the physical conditions of the neighborhoods they live in such as topography, lack of pedestrian infrastructure. The relation between hypertension and walkability hours reflect an awareness of physical activity to control hypertension probably instead of medication. The conducted surveys haven't proved that the BMI of women who pursue walking on a daily basis is lower than those who didn't. Also, the BMI of those walked a route with farthest proximity to their homes was lower than those who walked generally. Therefore, a wider range of women should be studied in order to investigate the link between BMI to the walkability of a place. However, it is important to give regard to other social determinants such as cultural background (often explaining eating habits), level of education, income rates, and so forth that have some control over the lifestyle choices being made and evidently the amounts of physical movement of women.

8. Future Work

Based on the research and findings, there are many further questions and aspects to be tackled. Some of which target infusing the cultural context with the BMI rates and their relation to the walkability of the area. Other points might be to include the eating habits, the daily food content, as well as food sources in the research and compare it with other zones in Beirut. Another point is to see how far the impact of women is on the diets and daily transportation methods of the newer generation of youth. However, ideal walkability physical standards need to be studied and proposed as a base to set upon the other variables in this study. After all, in order to encourage walkability, the factors that allow it must be existent first, and they may differ between neighborhoods.

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APPENDIX 1 – Survey Sample (2 pages)

BEIRUT ARAB UNIVERSITY
Developing a collaborative framework for linking woman's health, walkability with neighborhood design: A pilot study in Beirut
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Walkability/Obesity Field Survey

1. Age (Woman between 18 and 65): .....
2. Height:.....m
3. Weight:.....Kg
4. Marital status
   a) Single
   b) Married
   c) Divorced
   d) Widowed
5. Nationality:
   a) Lebanese
   b) Palestinian
   c) Syrian
   d) Other, if yes please specify:
6. Educational Level:
   a) No school
   b) Primary school
   c) Secondary school
   d) University graduate
   e) Postgraduate studies
7. Occupation:
   a) Employed
   b) Unemployed
   c) Retired
8. Mode of Transportation
   a) Very car dependent
   b) Car Dependent
   c) Somewhat Walkable
   d) Very Walkable
9. Do you exercise?
   a) Yes
   b) No
10. If you exercise, how often do you exercise?
    a) Daily
    b) 3-6 days/week
    c) Once weekly
    d) Rarely
    e) Never
11. If yes, where do you exercise /walk (Park, street? .....
12. Walk commute
    .....hours/week
13. Walk destinations
    .....hours/week
14. Housework
    .....hours/week
15. Total sedentary time
    .....hours/week
16. Chronic diseases
    a) Hypertension
    b) Diabetes mellitus
    c) High cholesterol level
    d) Cardiovascular disease
    e) Others (please specify): ----------
17. Do you smoke?
    a) Yes
    b) No
18. If you smoke, what do you smoke?
    a) cigarettes
    b) Pipe
    c) Cigar
    d) Waterpipe (arguileh)
19. If you smoke what is the Number of cigarettes/day?
    a) <5
    b) 5-9
    c) 10-14
    d) 15-19
    e) 20-24
    f) >25
20. How long have you been smoking (years)?
    a- < 5
    b- 5-9
    c- 10-14
    d- 15-19
    e- >20
21. Do you drink alcohol
    a) Yes
    b) No
22. If yes, How many times do you drink alcohol per week?
    a) 1
    b) 2
    c) > 2

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Please indicate your Home Location