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Assisted Living Facilities' Accessibility Challenge in the Beirut Urban Area

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Assisted Living Facilities' Accessibility Challenge in the Beirut Urban Area

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Abstract: This article aims to construct an underpinning for interdisciplinary aging and environment studies in Lebanon, as well as the Middle East and North Africa (MENA) region, in order to contextualize neighborhood accessibility and the invitation quality assessment tool in relationship with older adults' physical and social activities. The main purpose of this study is to evaluate the urban physical settings and the landscape infrastructure quality of the Ras Beirut neighborhood, around the case study "Moadieh Assisted Living Facility," to understand constraints of the residents' ease of access to the outdoor environment. The SAFE (Safety, Attractiveness, Friendliness, Efficiency) Assessment tool was applied to measure key qualitative and quantitative objective urban measures that related to older adults' accessibility and connectivity to their needs and services in the immediate neighborhood, specifically for those residing in assisted living facilities (ALFs). Direct observation was used as the data collection instrument to record the key outdoor characteristics of urban settings within a 300-meter radius (about two blocks) of the case study. In order to distinguish various neighborhood characteristics for the study area within the indicated urban context, the study employed the GIS spatial analysis technique. The GIS technology enabled us to manage a database for the spatial relationships between the neighborhood features through explanatory maps. The GIS maps helped to determine the spatial factors' quality, their geographical locations, and the contextual relationships in the study area, such as street and sidewalk features, building facades, and landscape buffers.

Keywords: Older Adults, Neighborhood, Community, Invitation Quality, SAFE Assessment Tool, Built Environment

Research Background

Hodge believes that neighborhood features, transportation availability, pedestrian accessibility, and spatial connectivity are the main elements of the built environment. They are the most significant contextual factors for vulnerable people, such as older adults, to communicate with their immediate environment. He uses Lawton's concepts about the relationship between aging and the environment and also Lawton's theory of person environment, arguing that, in addition to geographical factors, other aspects of the built environment are necessary to keep older adults involved with their community (Glass and Balfour 2003; Hodge 2008). These characteristics can be neighborhood features (including sidewalks, streets, vegetation, building height, building facade, etc.), urban-form attributes (including land use, zoning, density, etc.), or both (Ewing et al. 2005; Hodge 2008; Knox and Pinch 2006). Hodge has also adapted geographer Graham Rowles's spatial geography concept and life spaces theory to identify eight categories for older adults' spatial geography according to people's activities within a geographic space: the home, surveillance zone, vicinity or neighborhood, community, sub-region, region, nation, and abroad (Hodge 2008). Nonetheless, this study is more concerned with older adults' comfort distances from their residence (ALF) to the instant community via pedestrian pathways and public transportation networks (Rowles 2005).

Knox and Pinch argue that the design or modification of the neighborhood features and the built environment affordances is not always the product of the designers' recommendations according to a socio-spatial dialectic, but it can be the outcome of urban planning policies, as well as the urban design regulations and guidelines that are mandated by policy makers and

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elected officials (Knox and Pinch 2006). Furthermore, Gehl argues that urban planning and design policies can improve or eliminate some unhealthy built environment characteristics to restructure a neighborhood or even the urban form. He believes that those policies not only control people's outdoor physical and social activities, but they can also transform public spaces to public places or neighborhoods to communities (Knox and Pinch 2006; Gehl 2011). He indicates that, if designers and policy makers give interdisciplinary attention to the urban composition in terms of the social and behavioral qualities for the designed physical features, at the intersection of a person and the environment, it can transform urban settings to a higher level of physical and social activities, ultimately providing greater public well-being (Gehl 2011). Gehl looks deeper into the quality dynamics by evaluating relevant factors of the built environment characteristics that meet higher public activities in a neighborhood environment. By assessing those characteristics, he offers the "invitation quality" of a built environment instead of its "demand quality." He argues that there are built environment characteristics that place more emphasis on the invitation quality as a key component of outdoor public activities. Gehl believes that, if the spatial structure of a neighborhood invites the dwellers to be outside and provides them with socio-spatial connections to the spaces, it will change the behavior of people toward outdoor public activities and will create public places. He also claims that a neighborhood's invitation quality can transform it to a community by offering public places that people can reach, understand, and navigate (Gehl 2011).

Accordingly, this study evaluated the invitation quality of the outdoor environment for a case study (Moadieh Assisted Living) in Ras Beirut, Beirut, Lebanon in order to understand the stance of older adults' ease of access to their immediate environment. This article also aimed to initiate a milestone that would lead to future studies of older adults' urban socio-spatial behavior in the relevant fields of sociology, psychology, public health, landscape architecture, urban design, and planning.

Older Adults in Lebanon and Importance of Their Outdoor Accessibility

Aging in an urban setting is a dynamic and adaptive phenomenon that is best understood as an outcome of ongoing interactions among complex factors, such as environmental settings and older adults' individual characteristics (Birren 1991). The Lebanese society is experiencing a dynamic demographic shift toward a fast-growing aging population. Lebanon's population was estimated to be 4,457,357 by the end of 2014, indicating an increase of 0.24 percent compared to the year before (United Nations Statistics Division 2014). Currently, the older adults who are sixty-five and over constitute 9 percent of the total population (401,162); this number is expected to rise to 25.7 percent by 2050. In addition, numerous Lebanese immigrants choose to spend their final years in their home country, a factor, which resulted in an increase for the older adults' percentage of the general Lebanese population. This means that the older adult population will replace the younger population as the main cohort in the future community structure (Sibia, Rizk, and Kronfol 2014).

The influence of modern life on the Lebanese society is inevitable. In fact, recent trends which are caused by global economic and socio-political changes, such as expensive living costs (that force both male and female household members to work outside the home and to spend less time with family members); insufficient local job opportunities (that encourage the young generation to move outside the country and leave their parents); and, finally, expanded life expectancy and longevity (as an outcome of improved hygiene and public health) result in older adults being more active. As such, they are less dependent and contribute to the modern society. In order to be more active and independent, older adults need appropriate urban physical settings that address their limited physical abilities to access the outdoor environment, regardless of living in their homes or ALFs. Considering these trends, it is predictable that, in the near future, the Lebanese society will have an extensive need for ALFs. Although the traditional culture still disrespects the concept of separating older adults from the core family and placing

them in ALFs, Lebanon's older adults often express that they have become a burden to their families, both physically and financially, and that they desire to be independent (Sibai, Rizk, and Kronfol 2014).

If that desire does not get anywhere, it could cause isolation from family members, a proliferation of physical and mental morbidities, the postponement of medical treatment, and a declining quality of life. Thus, there is a significant need for older adults to acquire more autonomy by having easy access to their immediate built environment performing daily physical and social activities if they live in their own homes (aging in place) or reside in assisted living facilities. Handy et al. categorize the built environment in three distinct dimensions for the purpose of measuring its characteristics: land-development patterns, micro-scale urban design, and transportation system (Handy et al. 2002). Accordingly, this research employs these characteristics to verify different types of neighborhood land use, public activities happening in those neighborhoods, the spatial distance, and independent accessibility of older adults to the destinations and services. Therefore, the independency can be developed with adequate built environment settings and the landscape infrastructure quality that allow the aging residents to be active in their community, to have access to needs and services, and to feel that they are integrated with the community, not just live in a neighborhood. Hodge argues that the distinction between neighborhood and community is based on the physical mobility and social activities of older adults, considering contextual factors of public spaces, which might act as public places for older adults. Although the level of disability and functional ability play significant roles in older adults' use of the outdoor environment, the quality of the built and social environments is very important in the interaction between older adults and their outdoor environment (Knox et al. 2000; Hodge 2008; Mendes et al. 2009).

Assisted Living Facilities in Lebanon

The assisted living facility is a relatively new concept that started two decades ago as the most preferred and fastest-growing long-term care option for older adults who want to avoid the characteristics of a nursing home (Hawes et al. 2003; Hodlewsky 1998; Zimmerman et al. 2005). Although there is no concrete definition of an ALF and it varies in different geographical locations, the Assisted Living Federation of America (2010) defines an ALF as a long-term care option that combines housing, support services, and healthcare, as needed. This definition covers other labels, such as residential care, boarding home, independent home, adult foster care, etc. (Madani 2015). Whether warranted or not, some definitions for the ALF emphasize an age-in-place concept that can inspire older adults' desire to consider these facilities based on the aversion to nursing homes (Hodlewsky 1998; Whittington 2011; Zimmerman et al. 2005).

Whittington argues that a major reason for the fast-growing number of ALFs is that older adults prefer any living arrangement other than a nursing home. According to Whittington, older adults choose to live in an ALF due to its philosophy emphasizing personal dignity, autonomy, independence, and privacy in the least restrictive environment by enhancing people's abilities (Whittington 2011). In Lebanon, 99 percent of older adults still live in their own homes or their children's homes, often being cared for by their family members or in-house caregivers. Only the severely ill and dependent Lebanese older adults, as well as individuals without family members or caregivers, move to ALFs or nursing homes (NHs) because the family unit is very dominant in Lebanon. Children are terrified to become stigmatized as ungracious if they send their parents to long-term care facilities, and for many families, the long-term care facility means the last option (Hospers, Chahine, and Chemali 2007). Despite the general dreadful feeling that most Lebanese people have about sending older family members to a long-term care facility, many are faced with situations where they have no alternative, meaning that the majority of older people who move to long-term facilities do so because their close relatives cannot look after them (Kronfol, Rizk, and Sibai 2015). Also, there are some residents whose family is abroad, those who are

unmarried or divorced with no immediate family member around them, or who are financially desperate. In some cases, there are healthy older adults who only need social/emotional support; their children are generally swamped with problems and daily work, meaning that their children simply have no time for them (Adra, Hopton, and Keady 2015).

According to Adra, Hopton, and Keady, there was an increase in the number of residents at long-term care facilities, despite the stigma. Presently, there are about fifty long-term care homes, with various definitions, in Lebanon (16 percent in Beirut, 56 percent in Mount Lebanon, 20 percent in North Lebanon, 2 percent in South Lebanon, and 6 percent in the Bekka Valley), which accommodate over 4,000 residents. Those residents constitute about 1 percent of the aging population in Lebanon. Institutional care for the country's elderly mainly depends on the civil and private sectors for funding; the formal government sector takes minimal responsibility for this age group (Adra, Hopton, and Keady 2015; Khoury 2015). There is no clear definition for the various long-term care facilities in Lebanon; specifically, the differentiation between an ALF and an NH is vague, causing the aging population to suffer from a lack of legislation for elderly care and the needed accommodations. Due to the growing population of more independent older adults with fewer functional limits and higher daily activities, older adults prefer to live in a home-like setting, such as an ALF, instead of an institutional setting, such as a nursing home. According to Eid, the current evidences indicate that the number of new ALFs is increasing in urban settings, and existing NHs or geriatric homes are adding ALF units to their current divisions because ALFs provide more autonomy for the residents, although some of them have limitations with activities of daily living (ADL), such as eating, bathing, dressing, toileting, and transferring, or with instrumental activities of daily living (IADL), such as shopping, housekeeping, and transportation (Hawes et al. 2003; Eid 2015). Whittington believes that the degree of older adults' dependency on ADLs and IADLs determines residence choices (Whittington 2011). Therefore, it is significant to find out how older adults can be reconnected to the community and be part of society even though they, inevitably, have to live in ALFs. It is essential to provide the appropriate neighborhood amenities to support older adults' ease of access to daily needs and everyday public activities.

Research Methodology/Strategy

In this study, research questions were designed to measure the accessibility of Moadieh's residents to their outdoor environment, including whether neighborhood characteristics provided easy access and what is the neighborhood's level of invitation quality. The research findings will create a foundation for future research to assess the characteristics of the built environment's invitation quality in other Beirut neighborhoods, as well as other cities in the MENA region, to understand how urban settings influence older adults' outdoor public life. To answer these questions, this study needed empirical data to realize if there are significant deficiencies for the necessary accessibility features and to locate them in an accurate geographical location by applying a GIS spatial analysis. Hence, the research strategy that was needed to connect the empirical data to the initial research questions was a case study. This approach is appropriate to answer research questions of "what," "where," "how," "who," and "why" (Caronna, Pollack, and Scott 1997; Stake 1995; Yin 2003). A case study is utilized to investigate real-time events and to provide a means of integrating quantitative and qualitative methods into an empirical study, allowing an investigator to retain meaningful neighborhood characteristics (Yin 2003). As an empirical inquiry, a case study also enables the investigation of phenomena within a context to be used as an action plan (Stake 1995; Yin 2003).

Research Sample

In this study, the sample was the Moadieh ALF's immediate neighborhood, including twelve streets within a 300-meter radius, in Ras Beirut, Beirut, Lebanon. In order to assess the invitation

quality of the ALF's surrounding built environment, the units of observation were the immediate neighborhood's characteristics and street features. Accordingly, this study collected data about the ALF's immediate neighborhood characteristics by using a purposive sampling approach with controlled characteristics that indicate the ALF and the residents are not the units of analysis within the context. For this study, the Moadieh ALF in Beirut was purposely selected from a cluster of different types of long-term care facilities. The selected facility provided minimum support for older adults to accomplish activities of daily living. The facility was selected based upon the definition used by the Assisted Living Federation of America, according to the level of residents' independence, their physical and mental functionality, and the facilities' services and characteristics. These characteristics included the residents' dependency on ADLs and IADLs, the number of units, the type of units, the number of residents, the age ratio, etc (Assisted Living Federation of America 2010).

Research Variables/Assessment Criteria

The assessment criteria for this survey consisted of twenty-five independent variables to measure four dependent variables, including safety, attractiveness, friendliness, and efficiency through the SAFE Assessment Tool, which have been used for several urban design projects around the world (Curtin University and Geografia 2006). The safety measure was designed to assess passive or active surveillance in public spaces and to measure the characteristics of the pedestrian footpaths and streets. The safety measure consisted of eight criteria with four rating possibilities (N/A=zero, poor=one, average=two, and good=three) for each variable that were categorized to assess safety, with a possible total score of twenty-four (Curtin University and Geografia 2006). For instance, the criterion for rating the active surveillance of a site was as follows. If there were security guards, police, and surveillance cameras at a site, the observer should rate the location as a three, a site with a high level of active surveillance. If there were only two of those factors at a site, it received a score of two. A score of one was given if only one of those factors was present, meaning that the site had poor active surveillance. A zero was given if there were no factors.

The other invitation quality measure was attractiveness. The attractiveness measure was used to evaluate aesthetic features and neighborhood appropriateness, such as building frontage visibility and transparency, design elements and landmarks, human-scale features, and the quality of the footpaths and streetscape. This measure contained six criteria and had a possible total score of eighteen (Curtin University and Geografia 2006). For instance, if a site's average building height was one to two stories, the observer should rate the location as a three, a significant condition for a human-scale neighborhood. If the average height was three to five stories, the score should be a two. If there were five to ten stories, the score should be one. If there were more than ten stories, a score of zero was given, indicating a poor human-scale site.

The friendliness measure addressed the nature of street activities and the possible social life. The friendliness measure used criteria such as the level of active land use (mixed or single-use), inviting smells or sounds, neighborhood public spaces, and the type of land uses as opportunities for people watching. This measure consisted of six criteria and had a possible total score of eighteen. For instance, if there were three or more active land uses along the street at the studied site, it was considered as a good mixed land use, receiving a score of three. If there were two active land uses along the street, the location should be rated as a two. A site with a single active land use was rated as a one. If there were no active land use, the location received a score of zero, a poor site for active land use.

The efficiency measure focused on pedestrian crossing times and amenities. It consisted of five criteria and had a possible total score of fifteen (Curtin University and Geografia 2006). These criteria included the ease of navigating to destinations, the number of pedestrian crossings, the pedestrian crossing time, the pedestrian crossing signals, and the nearby transportation options. For instance, if public transportation were available within a street block (approximately 100 meters), the area was considered to have good accessibility and given a score of three. If

transportation were available within two blocks (a 100 to 200-meter radius), it was in the average category, a two. If transportation options were within 200-300 meters, the area received a score of one, for poor public transportation accessibility. If transportation options were further than 300 meters, the area was considered to have a critical situation for public-transportation accessibility, scoring a zero. In general, the data were collected at the street level based on key socio-spatial elements of the built environment, such as the land-use type, the unit density, and the quality of the neighborhood's physical features.

Data Collection Instrument

Multiple sources of data and data collection instruments helped to organize a database and to maintain a chain of evidence for the data analyzing procedure. Two general sets of data were collected from the case and its context: a) information about the ALF's characteristics from the Moadieh administration and b) data about the neighborhood quality measures from the case study context. These data were collected by using empirical data collection methods, such as archival records and direct observation, which have been employed in similar previous studies. The archival record method was utilized to obtain data in two categories: a) the ALF's characteristics (information from the ALF representatives) and b) an existing GIS database of spatial locations for the neighborhood features. Also, the direct observation method was used to collect data for the neighborhood assessment of the Moadieh center's outdoor environment.

Archival Records

The first type of data collected by the AR method was facility records, which were produced by the facility's director. These records illuminated the detailed information about the facility's characteristics, including the number of units, the type of units, the size of units, the type of accepted financial sources, etc. Information from the facility was collected through personal meetings with the facility director. The documents revealed general information about the facility, not the residents. The GIS data were from classified information prepared by the American University of Beirut's (AUB) Neighborhood Initiatives (2010), including various GIS layers: topographic contour lines, parcels, building footprints, roads, landmarks, etc. (American University of Beirut 2010). This study applied the existing database in three main categories (Base Map, Specialized Maps, and Raster Maps), which were provided by the Neighborhood Initiatives and included the study area for the years of 2009 and 2010. This helped to establish a common, shared database to avoid redundant efforts with data collection.

Direct Observation

The site area was observed during a four-week study period in order to identify the neighborhood characteristics, according to the applicable assessment criteria. The observers conducted the study in the morning and afternoon. Observations began on April 9, 2015 and finished on May 8, 2015, allowing a week for each assessment measure. The observation days were selected randomly among the weekdays and weekends. Observations were scheduled for two hours in the morning (10 a.m.–12 p.m.) and two hours in the afternoon (2–4 p.m.) to collect data about the quality measures of each site. The observation for each site was started at the ALF's entry door toward the outside, following the possible paths for the residents to access the neighborhood. Those paths could be sidewalks, ramps, or street passages. The observation was continued for each path's access to the adjacent street and then crossing the street at the designated pedestrian crossing, or any other possible crossing, continuing to access twelve surrounding streets. The first stage of the observational survey was done by taking photos of the neighborhood features and different views on both sides of the access ways, as well as recording any details that each

resident may perceive if he or she wants to explore the outdoor environment and, especially, cross the street.

The second stage of the observational survey began by drawing sections of the surrounding streets to assess the street type, the components of each street, and the relationship between those components. Each street section focused on the existence and size of every street component and how the ALF residents can perceive them. The key components of each section were the sidewalk, landscape buffer, parking lanes, and automobile lanes for every street. The observational instruments made justifying the rating scores easier by providing a holistic review of the site as well as detailed assessment quality measures. For instance, the adequacy of the sidewalk quality for older adults was assessed based on the observations made in the study area for each street and, according to the number of disconnected and uncovered surfaces, which made the residents' movement smooth, difficult, or impossible. Those disconnections and uncovered surfaces were evaluated based on the requirements of the residents who were using mobility aids.

The observational instruments utilized assessment criteria that were adapted from the SAFE assessment tool. There were twenty-five assessment criteria totaled on each observation sheet for each street, covering the characteristics of the ALF's neighborhood. The rating system had a degree of subjectivity, but this subjectivity was identical for all streets because the same two people performed the ratings. The observational data from each site were grouped into scores for the independent variables for each street feature, based on the assessment criteria, and scores for the dependent variables, each measure on every street that was a summation of the scores for all features on the street. The total scores for all measures as the summation of the street's invitation quality directed the researcher to compare the invitation quality of various streets according to the statistical analysis tools and the neighborhood quality index.

Data Analysis Tools

The key task of the data analysis stage is to turn the collected data into meaningful summaries that indicate relationships within the data and can be interpreted as research findings (Lyons and Doueck 2010; Silverman 2000; Yin 2003). Also, it is important to deduce the association between variables within the site. Therefore, this study appraised the correlation between each assessment measure and the invitation quality of the built environment for all neighborhood streets.

GIS Spatial Analysis

The GIS spatial analysis was applied to understand where things are located at the site, how they relate, what it all means, what is missing, and what actions to take. Accordingly, GIS helped to a) verify where the site is located related to its context; b) define the characteristics of the site's integral elements, such as streets and sidewalks, and the distribution of their features; c) determine how they are related and their spatial relationship; d) detect and quantify data patterns and how they can be used to find hot spots and outliers for critical site issues; and e) make predictions which require design solution.

Spatial analysis was performed based on data collected during the field study and stored in Excel sheets, while the acquired accurate point records were scanned by the digital global positioning system. This process was utilized for all streets and was based on the SAFE assessment tool's measures and criteria. Each street was analyzed for safety, attractiveness, efficiency, and friendliness; detected issues were tracked and displayed relative to each attribute. Recorded measurements for street and sidewalk width were analyzed and graphically illustrated along with the number of lanes and parking spots. Building distribution and usage information were extracted from the GIS database provided by the Neighborhood Initiatives project done by the American University of Beirut (2010). Spatial analysis was completed with ArcGIS to show

the distribution of the data listed above along the extent of the streets. The displayed information presented the streets' total evaluation rank relevant to each other, as well as the rank for each attribute. The locations of site issues were also displayed for each attribute on every street in the study area. Finally, many additional variables (such as the bus stops, bus networks, and traffic lights) were mapped in relation to the streets in order to analyze the spatial relationships and to rank the variables in comparison with other attributes.

Correlation Coefficient

To study the spatial relationships between the site's attributes and the neighborhood streets' invitation qualities, correlation coefficients were calculated for each SAFE assessment measure and for the total invitation qualities of the study area's streets. The correlation measured the degree to which one set of data relates to another set. With a possible range of -1–1, high scores indicated a strong positive relationship (i.e., an increase for one set of data was associated with an increase for another one) (Gehl 2006). The correlation coefficient (r) was calculated for all measures to understand how, statically, safety, attractiveness, friendliness, and efficiency of the neighborhood streets were correlated with the total invitation qualities for different streets. To calculate the correlation coefficient (r), the degrees of freedom (df) and the p value were needed. If $p < .05$, the correlation coefficient exceeded the critical value found in the table, and the study was 95 percent confident that a relationship existed. On the other hand, $p > .05$ meant that the correlation coefficient was less than the critical value in the table, and the research could not be 95 percent confident that a relationship existed.

Results

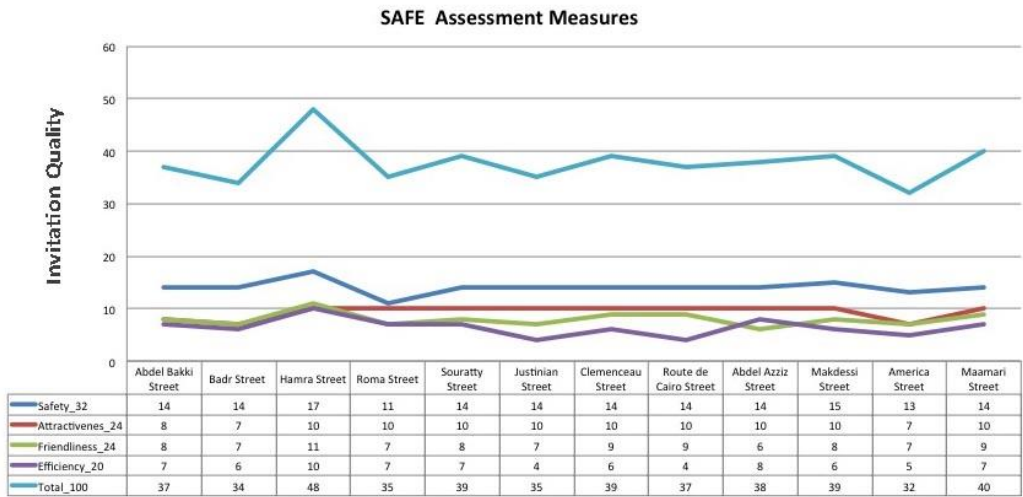
Overview

The findings revealed that the invitation qualities for the streets around Moadieh Assisted Living, a radius of 300 meters, were significantly lower than the possible scores for SAFE assessment measures according to the neighborhood quality index. That implied the assessed streets scarcely provided the demand quality of neighborhood features to accommodate the general population's necessary activities, let alone having an invitation quality for older adults' public activities. Also, data analysis findings showed that while safety, friendliness, and efficiency have statistically meaningful associations with the neighborhood invitation quality, the friendliness measure was highly correlated with the invitation quality for streets in the study area. In other words, a street with higher friendliness scores had a better invitation quality. As a context to understand these findings, comparisons for twelve streets are presented, to distinguish the difference between assessment measures and the invitation qualities for those streets and to determine the relationships between the assessment criteria (independent variables) and the quality measure (dependent variable).

Comparing the Assessment Measures for Neighborhood Streets

As described, the key measures of neighborhood invitation quality (safety, attractiveness, friendliness, and efficiency) were estimated with assessment criteria that were adapted from the SAFE assessment tool; the assessment was done in a 300-meter radius. According to the SAFE assessment tool, the neighborhood invitation quality for each street was assessed as the summation of four measures scores, as illustrated in Figure 1. The average scores for the neighborhood assessment measures and the invitation quality are shown in the four categories and are significantly different for the two streets.

Figure 1. Streets' Invitation Qualities and the Assessment Measures' Scores



Source: Madani and Sibai

Safety

The first assessment measure was safety. The lowest average score for this measure was for Roma Street, eleven of twenty-four, whereas the average for Hamra Street was seventeen (see Figure 1). The major differences with the safety assessment criteria for both samples were the adequacy of the passing traffic speed and traffic flow, if they were safe for older adults; the adequacy of sidewalk quality; the adequacy of the landscape along the street to provide a buffer between pedestrians and passing vehicle traffic; and the level of neighborhood residential unit density that generated a feeling of personal security for older adults. Roma Street was located in a medium-density residential area, whereas Hamra Street was located in a mixed-use area with high unit density. Hamra Street was dominantly a two-car-lane street with one lane of parking (about eight meters wide) that had wide sidewalks (about 3.5 meters wide) on two sides, and the traffic flow was more than 4,900 trips per day. The street's average speed limit was forty kilometers per hour with a high volume of traffic jams most of the day, which creates a hassle for crossing the street. Roma Street had the same number of car lanes (seven meters wide) with a speed limit of fifty kilometers per hour, narrow sidewalks, and numerous obstructions. Also, the average quality of the sidewalks—in terms of disconnections, the number of barriers, and the slope ratio—for Hamra Street was significantly better than Roma Street.

Attractiveness

The attractiveness measure was very low, with close average rating scores for all streets. The rating was seven to ten, with a possible score of eighteen, while there were differences between the scores for the assessment criteria on some streets. For instance, the building facades, the building height along streets, and the overall proportion of windows to the walls along the adjacent street in study areas were different for various streets, but in general, they all had similar qualities. Hamra Street had more tall buildings (three to five stories) with shorter ground-floor frontages that had more than a 50 percent proportion of building entry and also had higher building transparency along the street (more than 50 percent) than Bader Street with three to five story buildings, 10-30 percent building frontage, and 10-30 percent transparency along the streets. Therefore, the buildings along Hamra Street were more appealing to pedestrians, providing more active environments and transparent facades when compared to Bader Street. There were no sitting areas or benches at any site. On average, Hamra Street had a higher number

of trees on two sides, compared to Bader Street with no landscape buffer. The architectural design, building quality, and visible landmarks on the streets received very low scores, which were relatively similar.

Friendliness

The friendliness measure received very distinctive average scores for Hamra and Abdel Aziz Streets. Hamra Street received an average score of eleven, with eighteen possible; there were higher ratings for active, outdoor public spaces and opportunities to encourage older adults to go outside and people watch for Hamra Street than Abdel Aziz Street. In addition, Hamra Street had more active and diverse land uses along the street, inviting older adults outside, while Abdel Aziz Street, with average scores of six, only had an adequate sidewalk on one side with no curb-cuts for older adults using mobility aids. There were more various land uses—such as office, institutional, general commercial, retail, and residential—on Hamra Street that could provide an active, outdoor environment to encourage older adults to go outside than there were for Abdel Aziz Street. For most streets, there were three different land uses within the study area: high-density residential (more than fifty units per hectare), medium-density residential (twenty-five to fifty units per hectare), general commercial, and offices.

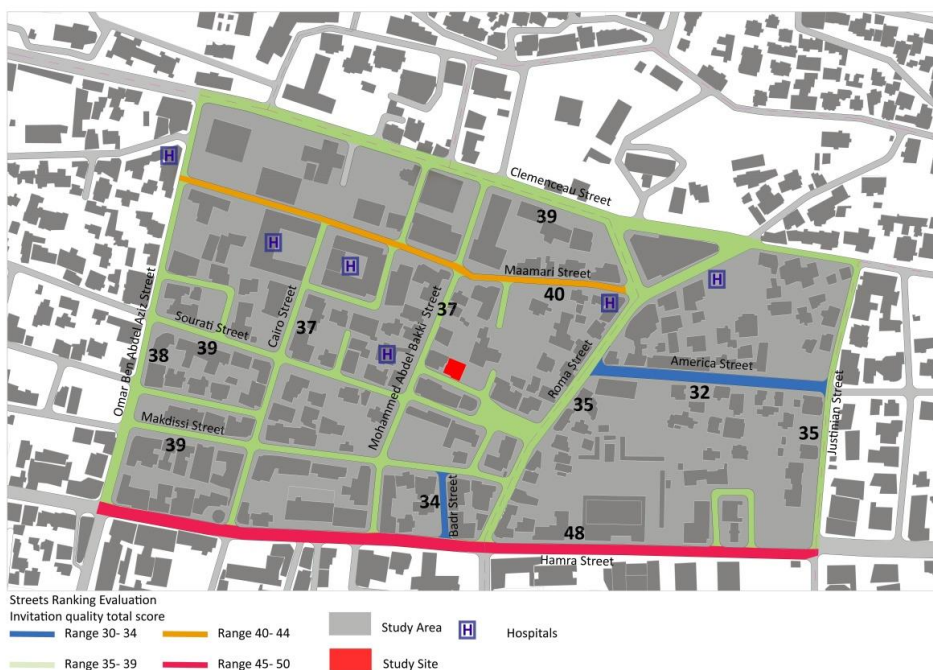
Efficiency

The efficiency measure assessed the ease of navigation along each street and the level of comfort that ALF residents could perceive in terms of the adequacy of the street infrastructure to integrate into their immediate neighborhood. The assessment tool estimated the lowest average scores (four of fifteen for Cairo and Justinia Streets' efficiency), a big difference compared to Hamra Street with an average score of ten. Hamra Street had higher average scores for the efficiency measure's major assessment criteria, such as easy navigation to destinations, more pedestrian crossing signals, and a shorter distance from transportation options when compared to Cairo and Justinia Streets, although no streets had sufficient pedestrian crossings.

Invitation Quality

In sum, the descriptive comparison showed that, even though the average invitation quality of all streets was in the low-rating category of the neighborhood invitation quality index, Hamra Street, with average scores of forty-eight of seventy-five possible, had the highest invitation quality. It was close to the average moderate-rating category for the neighborhood quality index (rating scores between fifty and sixty), when compared to Bader and America Streets that had average scores of thirty-four and thirty-two and were in the low-rating category of the neighborhood quality index (rating scores between one and forty-nine), as illustrated in Figure 2. The descriptive comparison indicated that, according to the means (M) and standard variances (SD) of the invitation qualities for twelve streets, Hamra Street could be categorized very close to the moderate-rating neighborhood quality index; other streets were in the low-rating category of the neighborhood quality index.

Figure 2. Streets' Total Invitation Quality Scores



Source: Madani and Sibai

Correlation Coefficient of Assessment Measures

At the end, the correlation coefficient (CC) was calculated to understand the statistical relationship between each SAFE assessment measure and the invitation quality for all observations on twelve streets. The correlation coefficient value (r) indicated a meaningful statistical relationship for three assessment measures (safety, friendliness, and efficiency) with invitation quality, while friendliness had a very significant, positive relationship with the invitation qualities of the ALF’s neighborhood for the studied streets, as illustrated in Table 1.

Table 1: Descriptive Statistics for the Overall Correlations between the Assessment Measures and the Invitation Quality

Quality Measure Correlation	Safety	Attractiveness	Friendliness	Efficiency	Invitation Quality
Safety	1				
Attractiveness	0.16432	1			
Friendliness	0.65	0.32863	1		
Efficiency	0.40215	0.1909	0.36194	1	
Invitation Quality	0.77042	0.5504	0.80392	0.73078	1

Source: Madani and Sibai

Considering the degree of freedom (df=10) for all observations, the correlation coefficient for each assessment measure (safety r=0.77, attractiveness r=0.55, friendliness r=0.80, and efficiency r=0.73), only safety, friendliness, and efficiency exceeded the critical value found in the table (0.576) and by p < .05, the study was 95 percent confident that meaningful relationships existed between those assessment measures and the invitation quality.

In sum, assessing the correlation coefficient (r) values of meaningful measures, including safety, friendliness, and efficiency, based on the objective criteria of those measures suggested

that there were some key neighborhood characteristics which were significantly critical in forming the invitation quality of the studied streets surrounding the Moadieh ALF. Therefore, some neighborhood characteristics, such as active land uses, sidewalk width, sidewalk slope, and street width, had a greater inviting impact for the use of outdoor environments in terms of easy accessibility and connectivity.

Conclusion

Despite the increasing population of Lebanese older adults moving to ALFs and the expanding number of ALFs that have been built in recent years, there is limited knowledge about the suitability of urban settings for integrating ALF residents to their communities, particularly when residents face greater risks related to physical-ability limitations that can impact people's interactions with the community and their recreational and social stimulations. Thus, there is increased interest in understanding whether the neighborhood characteristics enhance or hinder outdoor physical/social activities for older adults residing in ALFs. The broader question relevant to the research questions is as follows: Do sidewalks and streets make a good fit between ALF residents and their neighborhood environments to provide the ease of access? Overall, the study findings revealed that the Ras Beirut neighborhood characteristics around the Moadieh ALF had low invitation quality that could create destructive attitude toward performing outdoor public activities by residents. The findings also showed that the neighborhood safety, friendliness, and efficiency measures have meaningful correlations with the invitation quality of the built environment while the friendliness measure was highly correlated with the invitation quality of the immediate neighborhood.

In another study by Neighborhood Initiatives (NI) in 2010, researchers indicated that, although walking is the ultimate form of sustainable public transportation, Beirut is one of the most pedestrian-unfriendly cities in the world (Myntti and Mabsout 2014). If the city is not pedestrian-friendly for the general population, how can older adults manage navigating the city? If the sidewalks are not safe and pleasant for ordinary people, the sidewalks severely restrict the mobility of vulnerable people, such as individuals with disabilities, older adults, and parents with children. Considering the streets and sidewalks as Beirut's main public spaces, limited access to them means ignoring the fundamental right of this vulnerable group to the city, simply cutting connections to the outdoor communities. The current literature indicates that promoting social activity and community engagement is important to prevent disabilities and mental disorders among older adults (Buchman et al. 2009; Hillier and Barrow 2007; Menec et al. 2011). Therefore, an urgent emphasis for national policy makers, including the Beirut Municipality, elected officials, and active nongovernmental organizations, must be on the outdoor public activity of older adults who reside in ALFs and how changes in the potentially modifiable, outdoor built environment qualities are associated with reducing the degree of disability and, ultimately, the healthcare costs of the ALF residents. Thus, it is important to educate neighborhood inhabitants, ALF residents, and policy makers about the implications of the various choices in urban landscape planning, and to discover how older adults can be reconnected to the community and be part of society through a system of urban policies and design strategies.

Implications for Future Research and Practice

By using the SAFE assessment tool, this study generated knowledge for further research in the region to examine what kind of urban settings and amenities impact the neighborhood invitation quality and, ultimately, affect the outdoor public activities for older adults who reside in ALFs located in an urban environment. The results of future study can also be used to evaluate how improving the public realm can change how ALF residents use neighborhood amenities and city services. Therefore, future studies are needed to test the effects of socio-spatial neighborhood

characteristics on the public life of ALF residents who live in different urban forms. In this regard, relationships between individuals using the outdoor environment, and ADL and IADL capacities are important to understand the level of older adults' environmental dependency. The findings will suggest how the structural effects of urban form work on ALF residents' social networks at the level of concentration or dispersion in various neighborhoods and how the level of the ALF residents' environmental dependency defines their outdoor public activities.

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