Active Mobility as a Response to Physical Inactivity in Cities

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1 ABSTRACT

In an era of increasing urbanization intertwined with growing motorized transport modes, one of the main challenges that both developed and developing countries face is physical inactivity and sedentary lifestyle of people, which may negatively affect their health due to overweight and obesity. Since the built urban environment both concentrates human activities and shapes activity patterns, its characteristics can have a significant mediating role in reducing or enhancing physical activities as well as active mobility of residents such as walking and cycling. To stimulate physical activity and active mobility across all social groups, planners and policymakers should address context- and people-specific health-related aspects in planning and governing the built environment in cities and urban neighborhoods, defined as health-oriented urban planning. The importance of this approach will be multiplied by considering urbanization as the predominant way of life for most people in the world on the one hand, and active mobility as an inclusive alternative compared to other individual-based interventions in the area of health on the other. On this base, this research aims to explore and explain the relationship between built environment characteristics and the active mobility of residents in urban communities. It will do so by a literature review on how built environment characteristics and context and socioeconomic conditions are associated to enact physical activity/active mobility.

Keywords: Physical Activity, Built Environment, Active Mobility, Health-Oriented Urban Planning, City

2 INTRODUCTION: THE BUILT ENVIRONMENT AND ACTIVE MOBILITY

The built environment can be explained as a physical form of community and its anthropogenic surroundings that provide the setting for human activity, ranging in scale from buildings to neighborhoods and cities. Urbanism is integral to human ecology, and physical activity patterns of human populations who live in urban areas are now affected by forms and functions of cities. Pervasive and rapid urbanization and simultaneously industrialization, mechanization, and motorized transportation, have reduced the level of physical activity (Ulijaszek, 2018).

In return, physical activity has numerous health benefits and is key to preventing or reducing non-communicable diseases, and especially overweight, obesity, and depressive symptom. Adults need 150 min of moderate physical activity per week, and children with less than 18 years old require 60 min of moderate-vigorous physical activity per day (Day, 2018; Lin, 2018). Accordingly, "World Health Organization advocates strategies that target entire populations, including the design of environments to promote physical activity for transportation and recreation as part of everyday life, or active living" (Day, 2018, p. 303).

These strategies have identified active mobility as an alternative for minimizing sedentary lifestyles, reducing risks of consequent chronic diseases such as obesity and diabetes, and improving health standards by increasing physical activity levels (Gao et al. 2018; Vich, Marquet, and Miralles-Guasch, 2019). Unlike passive travel, active travel, concerns which includes the physical activity of locomotion such as walking and biking, have environmental benefits such as a decrease in carbon emission and reduction of traffic congestions (Helbich, 2017; Lin, 2018). It also has numerous benefits regarding the wellbeing of people, including happiness, contentment, engagement, and relaxation (Bornioli, Parkhurst, and Morgan, 2019).

Meanwhile, improvements in built environment characteristics can be a good part of this transition through health-oriented urban planning. Poor quality of sidewalks, limited access to recreational facilities, and lack of available nearby destinations are possible causes of inactivity by decreasing physical activity/active mobility. Besides, built environments have long lasting, positive or negative, effects on the health outcomes of entire populations (Day, 2018; Sallis et al. 2018). On the other hand, built environment characteristics vary in

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supporting physical activities, including active mobility and especially walking. Bornioli, Parkhurst, and Morgan (2019) state that "a strategy to promote active mobility in the built environment can be constructed around safety, comfort, and moderate sensory stimulation" (p. 200).

Therefore, active mobility, which relates to health, physical activity, and chronic disease prevention, has been considered increasingly in transportation and urban planning studies aimed at alternatives for motorized transport. Hence, many studies show evidence of the relationship between neighborhood-scale built environmental characteristics, such as density, land-use, and connectivity, and travel behavior centered on active transportation modes. The pervasive effect of density, land-use, type of urban fabric, and slope of terrain on urban mobility, especially concerning automobile travel reduction and non-auto trip encouraging, are some of the findings that are being assessed by these studies. Safe walking and cycling accessibility about well-connected streets, walking paths, sidewalks, bike infrastructures and bike lanes, traffic safety, and less motorized traffic are other neighborhood features that have been considered (An et al. 2019; Ferrer and Ruiz 2018; Gao et al. 2018; Helbich, 2017; Lindelow et al. 2017).

In short, there is a crucial opportunity for urban planners to plan and design cities and neighborhoods which are conducive to physical activity, especially by active mobility. Nevertheless, this great goal would not be realized without significantly understanding the relationship between built environment characteristics and physical activity patterns, especially active mobility. The quality and nature of diverse types of neighborhood scale-built environment may diversely affect active lifestyle among residents (An et al. 2019). Thus, findings must be assayed more to gain more insight into the associations between built environment characteristics and the active mobility of residents in urban neighborhoods (Gao et al. 2018). Supplementing with neighborhood scale-built environment measures could acquire more reliable and valid understanding and filling the knowledge gap concerning the context and socioeconomic based significant relationship between environmental characteristics and active mobility. Therefore, facing the challenge of increasing physical inactivity and subsequently overweight and obesity, yet it is necessary to explain the role and impact of the built environment, aimed at increasing physical activity and active mobility and reversing that growing threatening tendency in terms of motorized transport and passive lifestyle (Lin, 2018).

This paper aims to explore and explain the relationship between built environment characteristics and active mobility of residents in urban communities. It carries out a literature review to find the answer to the critical question as, "how do the built environment characteristics affect the active mobility as physical activity in urban neighborhoods?" Thus, we focus on recent scientific articles that are more significant to the topic regarding the relationship between the built environment and active mobility. The selection was made by reviewing the title, abstract, and content among some of the sources and to reach an initial theoretical framework for presenting at the conference and getting feedback from the audience.

3 ASSOCIATION BETWEEN THE BUILT ENVIRONMENT AND ACTIVE MOBILITY

Relationships between physical activity and health status are more and more recognized in the literature (Ulijaszek, 2018). Successful health advance includes educational supports as well as environmental backgrounds concerning the behavior as a function of both personal factors and environmental necessities (Poortinga et al. 2011). The built environment plays a vital role in supporting both recreational and utilitarian physical activity behavior in terms of going walking or walking to a destination (Chaudhury et al. 2016). The walkable community encourages active mobility by walking or bicycling to destinations and accordingly contributes to residents' physical activity (Sallis et al. 2018). Lindelow et al. (2017) say that "the travel behavior of residents in a neighborhood can partly be explained by the fact that residents have selected to live in a neighborhood that they perceive lives up to their preferences of, for instance, walkability. Consequently, neighborhoods with a large share of walking could be understood as consisting of residents that have chosen to live where they perceive walking to be feasible, pleasant, etc., in addition to the built environment itself encouraging walking" (p. 520-521).

Lee at al. (2015) believe that "there is growing evidence that neighbourhood environment, such as green space, parks and pedestrian environment, is associated with physical activity and various health outcomes, especially obesity-related diseases. However, among the possible factors contributing to physical activity and obesity-related diseases, little is known about the urban neighbourhood environment, such as slopes or street patterns, and trigger factors that encourage residents to walk" (p. 1205). So, all the factors should be

evaluated in two mutual hypotheses. The first hypothesis demonstrates that obesogenic environments[1] in terms of low-walkable and automobile-oriented neighborhoods with few facilities for physical activity may direct residents to be inactive based on spending more time in their cars or doing more sedentary recreation, including television viewing and computer gaming. Regarding increasing physical activity as a key health-based strategy, the second hypothesis as an alternative indicates the physical activity as a possible mechanism for achieving health outcomes influenced by the neighbourhood environment. Nevertheless, socioeconomic status disparities in built environment variables are essential as effect modifiers of the relationship between built environment characteristics and health-related outcomes (Lee, 2015; Sallis et al. 2018).

According to focus on walking and cycling as suitable types of physical activities for all age groups, which allow them to change the inactive and sedentary lifestyles through their favorite intensity, three classifications are possible concerning purposes, factors and characteristics, and the mechanism of impact. Regarding the purposes, these two modes of active mobility can be further divided into two categories of transport, aims at reaching a destination, and leisure, addresses achieving entertainment. Moreover, it is necessary to identify and distinguish between personal and social factors as well as natural and built environmental characteristics that have a significant role in this regard. Meanwhile, some physical built environment conditions and features act as motivators or incentives, and some act as barriers or obstacles to physical activities. The motivators and barriers that affect each other are as following (Wang, Chau, and Leung, 2016):

(1) Motivators or incentives: Opportunities including availability and suitability of facilities and shortening the distance, Safe accessibility such as improving personal security, and improving transport safety, and Physical setting in terms of increasing comfort level and provision of supporting facilities;

(2) Barriers or obstacles: Opportunity barriers such as limited foot and cycling paths and lack of land for recreation, Accessibility barriers including travel distance, poor access to the facilities, and no interesting destinations, Safety barriers in terms of unsafe foot or cycling paths, traffic safety, and security of exercise place, and Physical setting barriers such as lack of pleasant routes, discomfort, and no supporting facilities.

Further, regarding the widely accepted influence of environmental factors on usual physical activity, the conceptual framework should be contextualized to local conditions, and local targeting of health-based policies might be more effective in promoting active mobility. So, it is necessary to analyze the area-specific significant association between built environmental and socioeconomic factors and active mobility in forms of walking and cycling to or from work, in different locations. The socioeconomic levels or individual factors of the environment are expected to be related to physical activity as well as active mobility. They can be considered as a percentage of foreign residents, unemployed, part-time workers, university graduates, homes occupied by their owners, car owners, households with a parking space, and median income. The built environment factors which are associated with transportation-based physical activities are as following (Feuillet et al. 2015):

(1) Land use and facilities including the percentage of area covered by individual housing, collective housing, vegetation cover, as well as proximity facilities density;

(2) Level of walkability and bikeability such as walk and bike paths conditions and bike-sharing facilities;

(3) Public transport availability in terms of the distance to the nearest subway, bus or train station from each home;

While many research studies provide evidence for the relationship between neighborhood design and active mobility, the impacts happen at the neighborhood level. Ferrer and Ruiz (2018, p. 111) believe that “in addition to meso-scale (or neighborhood scale) built environmental factors such as residential density, land use mix or street connectivity, special attention should be given to micro-scale (or street level) built environment characteristics, such as the presence of trees, the width of the sidewalks, and the quality of the streets, as the roles of micro-scale elements are not well understood due to limited data availability”. They

[1] Obesogenic environments descibe specific aspects of living environments which facilitate overeating relative to need and partaking in sedentary activities. They are characterized as involving a great preponderance of motorized transport and sedentary occupations and encouraging the consumption of high-fat and energy-dense foods (Poortinga et al. 2011; Ulijaszek, 2018).

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have analyzed factors of the built environment affecting the decision to walking in the form of a short trip as less than 30-45 min walking distance. On this base, main characteristics of the built environment influencing walking as an active mobility are safety from crime (street lighting, people's presence, cleanliness), traffic safety (traffic volume and speed and times of crossing waiting), walking facilities (sidewalk width, obstacles), aesthetics (green elements, buildings, noise), convenience, and other perceptions (car parking availability, hills, and pedestrian volume, open and wide spaces, and length). Meanwhile, they are also could be classified as barriers or deterrents and facilitators or motivators to walking. Insecurity from crime (absence of people, inadequate lighting at night or walking along a conflictive area), the density of traffic lights, walking along large avenues, lack of sidewalks, and steep streets are the main barriers or deterrents to the decision to walking. On the other side, lack of car parking space at the destination, pleasant walking routes, city with short distances, pedestrian streets and hard to drive (driving restriction zones or stress due to traffic congestion) are the primary facilitators or motivators to the decision to walking (Ferrer and Ruiz, 2018).

In another study, Zandieh et al. (2016) indicated that outdoor walking level is the most common type of health-beneficial physical activity associated with the built environment in a residential neighborhood. However, most previous analyses have considered macro built environment characteristics as inclusive design and structure, including residential density, mixed land-use, and route connectivity. Accordingly, it is necessary to focus also on micro built environment characteristics, which can be modified more easier than macro ones. They include safety (well lighting, people's presence, and crime rate), pedestrian infrastructure (traffic condition, sidewalk condition, and amenities) and aesthetics (trees, attractive sights, and buildings) in the neighborhood. Moreover, spatial inequalities in perceived built environment characteristics may affect disparities regarding neighborhood support for walking (Zandieh et al. 2016). In addition to the walking, studies show the association of the individual or sociodemographic attributes as well as the built and natural environmental characteristics with cycling transportation as a type of physical activity. However, it seems that this relationship is context-specific, primarily based on small, medium, and large-sized cities and urban areas. Besides, the purposes of cycling transportation are different, as travel-related cycling and recreational cycling. Gender, age, household structure, household income, education, ethnicity, and car ownership are the main individual variables concerning the significant relationship between environment and cycling. Address density, land use diversity, street density, number of bus stops, and distance to train station are important built environmental variables. Finally, the proportion of green space (parks, agricultural and natural areas), water spaces, daily max air temperature, daily precipitation sum, and daily average wind speed are the critical natural ones in this regard (Gao et al. 2018).

4 CONCLUSION

There is no doubt about the key role of the everyday living environment in personal and public health. This issue has become more and more important in recent decades due to the predominance of mechanized life and sedentary lifestyles. The built environment can motivate the physical activity of individuals as an inevitable necessity or demotivate them as a serious challenge. Active mobility as a type of physical activity is one of the critical areas in this vision due to its multiple roles and functions in addition to promoting health through physical activity. Therefore, focusing on active mobility is a vital opportunity for researchers in various fields, including urban planners and designers, who also need to analyze the mechanism of its effectiveness and improvement as a great response.

Accordingly, it is necessary to explore and explain the significant association between the built environment characteristics and active mobility. To this end, the first step is to develop a conceptual framework for addressing and clarifying the various aspects of this relationship. Based on the literature review, it is possible to achieve this framework at the theoretical level by considering some areas. First, active mobility as the most usual physical activity can be regarded as walking, cycling, and other forms based on a human-powered street vehicle. Second, Active mobility can have different purposes as utilitarian transport or travel for reaching a destination and attractive leisure or recreation for achieving entertainment. Meanwhile, if we focus on the association between active mobility and substantial characteristics, categorizing factors into two categories of motivators, incentives, and facilitators and barriers, obstacles, and deterrents can well direct us to achieve the practical results.

Besides, focusing on the factors requires a few critical points to consider. On the one hand, socioeconomic or sociodemographic attributes such as gender, age, household structure, education, income, and car ownership are important that differently affect the relationship between the built environment and active mobility. On the other hand, there are significant environmental characteristics that encourage or inhibit the tendency for active mobility. These characteristics can be analyzed in two distinct ways, with the possibility of integration. In the first approach, we can scrutinize the built environmental aspects such as residential density, route connectivity, safety, and sidewalk condition than the natural ones, including slope, air temperature, and presence of trees. Meanwhile, we can peruse all of them from the perspective of macro and meso characteristics which act at the city or neighborhood scale such as residential density, route connectivity, slope, and air temperature than micro ones which have a role at the place or street level including safety, sidewalk condition, and presence of trees. The ultimate key to this approach is acceptance and belief in the fact that the association between the built environment characteristics and the active mobility is context-specific, which leads to disparities in the evidence concerning distinct urbanism and various lifestyle. So, performing numerous and repeated empirical studies in different and diverse contexts completes this path. Efficient and innovative solutions, rather than general and perhaps ineffective, will be the consequence of this orientation.

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