

“Encouraging Neighborhood Walkability through Urban Design in India”–Critical Appraisal and Research Challenges

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Abstract—In the recent time the rapid pace of urbanization has thrown certain challenges for the urban planners and designers in order to achieve the Sustainable Living. The lifestyle has become a determinant for the urban form and the urban form in response has significantly influenced the lifestyle of the residents. This study focuses on the critical appreciation and understanding of the recent research done in the area of Active Living especially the Neighborhood Walkability. The study reveals that the choice of walking and other physical activities are influenced by the surrounding physical environment. The study also discusses the research challenges for various means of supporting the urban designers to come up with the interventions which can encourage the neighborhood walkability in Indian context like Development of Walkability Index, sources of data collection, influence of various socio economic status of a neighborhood on walkability and the influence of physical environment on walkability

1. INTRODUCTION

Increasing physical activity in youth is one of the key public health strategies to conquer the alarming rise of overweight, obesity and a cluster of risk factors associated with cardiovascular disease and type 2 diabetes. To achieve substantial health benefits for school aged youth, participation in physical activity of at least moderate to vigorous intensity for a minimum of 60 minutes per day is recommended. A large proportion of school-aged youth does not achieve the public health recommendations. In addition, adolescence is marked by a decline in time spent in physical activity which is more apparent in adolescent boys than in adolescent girls. Ecological models provide a framework for understanding. The Fig. 1 shows the percentage of overweight children less than five years of age.

Indian cities are primarily built for walking and cycling and are characterized by narrow collector streets with rampant organic growth. But due to rapid motorization and increasing car ownership, the transport scenario is rapidly changing resulting in high level of street congestion seizing mobility of

people, increasing rate of environmental pollution, fuel consumption and above all road fatalities and severe accidents. To arrest the situation, National Urban Transport Policy (NUTP) has emphasized on more pedestrian movement and organized public transport system to achieve a sustainable transport base in cities. The scope for pedestrian movement lies under the concept of walkability. As defined, walkability is the extent to which the built environment supports & encourages walking by providing for pedestrian comfort & safety.

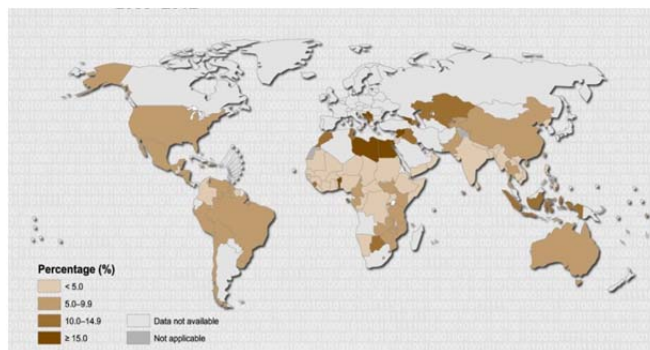


Fig. 1: Map showing % of overweight children < 5 Years. Source: WHO.

Considering the modern life style in developed countries, the term “sustainable living” is an oxymoron – as modern lifestyle of humans in urban areas causes environmental deterioration. Modern urban life in developed countries promote heavy use of fossil fuels by forcing people to commute by car to work, shop and recreation areas. However, until recently (the mid-20th century), cities in developed countries were walkable as they promoted compact development, mix of land uses, higher population densities, closer buildings and smaller lot sizes. Opportunities for recreation, shopping and employment (in addition to housing) were all be within neighborhoods. However with industrialization, technological change and

favorable government policies for the use of automobiles, people tend to leave the life in the city center and invade more and more land at the city periphery. Zoning ordinances in developed countries have encouraged the separation of housing areas from commercial and recreational areas. With this environmental transformation, people tend to prefer to live in places far from where they worked, shopped and frequently spend their recreational time. Such a life style brings automobile dependency (and heavy use of fossil fuels). According to World Bank data set, number of motor vehicles per 1000 people (Fig. 2) is in an increasing trend in every region and the situation is much worse when developing countries in each region is considered

An important construct among the physical environmental correlates is neighborhood “walkability”. Neighborhoods considered walkable are characterized by mixed land use, well-connected streets and high residential density. The research into the relationship between neighborhood walkability and physical activity has only recently been extended to young people and the current empirical evidence is not consistent.

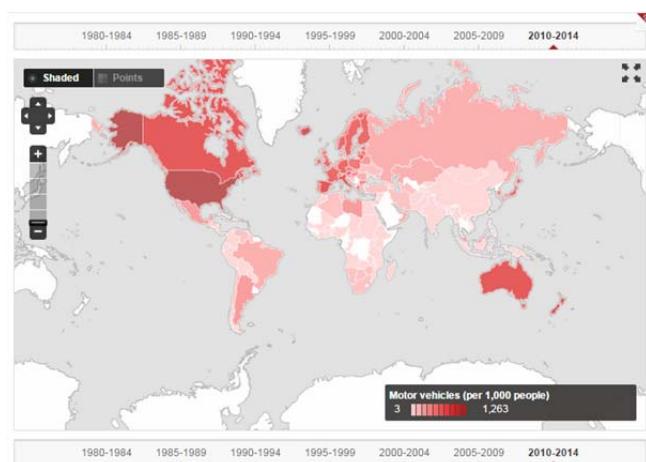


Fig. 2: Map showing number of motor vehicles per 1000 people Source: World Bank.

2. TERMINOLOGY

Walking

Walking refers to a physical activity done either for leisure or as a mode of transportation.

Walkability

Walkability measures the opportunity to walk, rather than actual walking behavior, and although there are some limitations to walkability measures, there is reason to believe that walkability measures can be parlayed into robust planning tools. It is vital to understand the difference between an individual who chooses to walk as a result of living in a “walkable” neighborhood and someone who, for financial

constraints or other reasons, has no choice but to walk in a neighborhood that may or may not be conducive to walking.

Neighborhood Walkability

Physical activity and obesity have been linked with physical attributes of neighborhoods. Neighborhoods considered walkable have nonresidential destinations (e.g., shops) close to residences and well-connected streets. Low walkability areas separate residences from destinations and have poorly connected street networks, so walking to destinations is difficult. People walk and bicycle more for transportation in high-walkability than low-walkability neighborhoods. The following built environment attributes, listed below, are cited as working in concert as predictors of active transportation participation (walking and cycling)

- Density of built environment
- Diversity of land use ,
- Distance to transit ,
- Design of street connectivity and built environment, and
- Destination accessibility.

Four potentially important factors that are not characteristics of the built environment are

- Crime
- Travel demand management,
- Demographics, and
- Individual preference

Walkability Index

The “Global Walkability Index” developed by H. Krambeck for the World Bank provides a qualitative analysis of the walking conditions including safety, security, and convenience of the pedestrian environment. It consists of a field walkability survey to assess pedestrian infrastructure in four areas: commercial, residential, educational, and public transport terminals. The survey also identified pedestrian preferences, and analyzes government policies and institutional setup. The methodology is qualitative but because it encompasses several key parameters, it provides a good insight into the current state of the walkability environment and enables the identification of areas for improvement.

3. POLICY FRAMEWORK

The National Urban Transport Policy of India encourages integrated land use and transport planning, public transport and non-motorized modes by giving them priority in investments. “The Central Government would, therefore, encourage measures that allocate road space on a more equitable basis, with people as its focus. This can be achieved by reserving lanes and corridors exclusively for public

transport and non-34 motorized modes of travel.” The Master Plan of Delhi 2021 specifies that all roads should be made pedestrian, disabled and bicycle-friendly; adequate pedestrian facilities should be provided and that encroachments from sidewalks should be removed. The National Policy on Urban Street Vendors, which was approved in 2009 legally recognizes street vendors as an “integral and legitimate part of the urban retail trade and distribution system.” It aims at incorporating hawking zones in the development of city or town master plans.

The Indian Central Motor Vehicles Rules 1989, Section 11 of the Rules of the road regulations states that “...pedestrians have the right of way at uncontrolled pedestrian crossings. When any road is provided with a footpath or cycle track especially for other traffic, except with permission of a police officer in uniform, a driver shall not drive on such footpath or track. (Government of India, Ministry of Road Transport and Highways. 1989.)” The Indian penal code Section 283 states that “by doing any act, or by omitting to take order with any property in his possession or under his charge, causes danger, obstruction or injury to any person in any public way or public line of navigation, shall be punished with fine which may extend to two hundred rupees.

The Indian “Persons with Disabilities Act” gives guidance on how nondiscrimination towards persons with disabilities can be promoted. It states that the appropriate Governments and the local authorities shall, within the limits of their economy capacity and development, provide for the installation of auditory signals at red lights in the public roads for the benefit of persons with visually handicap; causing curb cuts and slopes to be made in pavements for the easy access of wheel chairs users; engraving on the surface of the zebra crossing for the blind or for persons with low vision; engraving on the edges of railway platforms for the blind or for persons with low vision; devising appropriate symbols of disability; warning signals at appropriate places. It also has provisions on non-discrimination in the built environment and states that governments provide facilities such as ramps in public buildings, especially hospitals, health centers and rehabilitation institutions, toilets for wheel chair users, Braille symbols and auditory signals in elevators (Government of India, 1995).

4. LITERATURE REVIEW

Sa Eric de and Arden Chris I(2014) studied Neighborhood walkability, leisure-time and transport-related physical activity in a mixed urban–rural area of Canada. Physical activity parameters were taken as dependent variables and built environment parameters as independent variables. Results of the study suggest that participants living in neighborhoods with the highest scores on the walkability index are more likely to engage in LPA and TPA. Because many measures of urban form consider environmental features that are in close proximity, creation of a walkability index may be necessary to

avoid multi collinearity. Author concluded that Developing a walkability index can assist in exploring the associations between measures of the built environment and physical activity to prioritize neighborhood change.

D’Haese Sara, Dyck Delfien Van, Bourdeaudhuij Ilse De, Deforche Benedicte and Cardon Greet(2014) investigated the association between objective walkability and different domains of children’s physical activity, and the moderating effect of neighborhood socio-economic status in this relation. The results revealed that in low SES neighborhoods walkability was positively related to walking for transportation during leisure time and was negatively related to sports during leisure time. In high socio-economic status neighborhoods, walkability was unrelated to children’s physical activity. No relations of neighborhood walkability and neighborhood socio-economic status with cycling during leisure time, active commuting to school and objectively measured moderate- to vigorous-intensity physical activity were found.

Weinberger Rachel and Sweet Matthias N(2013), developed three models to understand the correlation between walk scores as indicators of walkability and walking. They used the data from www.walkscore.com, and taken in to consideration different types of Trips. The findings reveal that although walking has many benefits, in regard to both transportation and health, it is oddly neglected in most planning exercises. One reason for this neglect is that appropriate data collection and analysis are prohibitively expensive this paper explores the possibility of capitalizing on a relatively new source of data on walkability (from www.walkscore.com); these data are an important predictor of walking mode choice.

Cubukcu Ebru(2013) did a literature review on subjective (evaluations by residents) and objective measures (evaluations by experts or calculations via geographic information systems) of physical environmental factors influencing active living and found that Walkable communities and active living are quite related to the issue of sustainable living. This study highlighted the link between sustainable living and walkable communities. Walkable communities help to cut greenhouse gas and other emissions by requiring less driving, improve residents’ health by providing more opportunities for exercise, reduce crime by facilitating social interaction, support local economy by encouraging shopping in the neighborhood.

Ariffin Noriza Raja, Zahari Rustam Khairi(2013) taken a questionnaire based approach to study Perceptions of the Urban Walking Environments and to examine the characteristics or attributes that could promotewalking activity via people’s perception.. Findings indicate that the proximity of destinations, good weather condition, safety and well-designed pedestrian facilities can significantly contribute to better perceptions of the walking environment.

Azmi Diyanah Inani, Karim Hafazah Abdul, Mohd Zamreen(2012), Mohd Amin compared walking behaviour of residents between urban and rural neighborhood. The method

used in this study is known as walking distance test and the data were analyzed using the comparative approach. The findings show that there are slight differences of walking speed, walking time and walking speed between residents in the urban and rural neighborhood area.

Meester Femke De, Dyck Delfien Van, Ilse De, Bourdeaudhuij Benedicte Deforche, Sallis James F and Cardon Greet (2012) conducted a study in Ghent (Belgium) for 32 neighborhoods to analyze the interrelationship between neighborhood physical activity, individual physical activity and neighborhood Socio-Economic Standards. Physical activity was assessed using accelerometers and the Flemish Physical Activity Questionnaire. To analyze the associations between neighborhood walkability, neighborhood SES and individual physical activity, multivariate multi-level regression analyses were conducted. The findings say that the relation of built environment to adolescent physical activity may depend on the context as the low SES neighborhood were found more physically active.

Glanz Theresa, Nam Yunwoo and Tang Zhenghong(2012), after conducting a research in two neighborhoods of Lincoln, Nebraska concluded that the past twenty years have seen only a handful of federal policies designed to help communities increase walking and biking-opportunities within the United States. With a lack of policies that mandate compact, mixed-use, pedestrian friendly neighborhoods there are two tools that are especially important for planners – education and marketing. In the process four types of research methods were used to gather information for the case study; literature review, surveys, a walkability audit, and field observations of the two neighborhoods; Thus clearly advocating the amendments in the policy framework to attain walkability in the neighborhoods.

Dobesova Zdena and Krivka Tomas(2012) took the reference of the IPEN (International Physical Activity and the Environment Network) which suggested a methodology of calculating the Walkability Index for any settlement and used it for the Olomouc city as a case study and develop a walkability index for the same. This index consists of four partial indexes: Connectivity index, Entropy index, FAR index (floor area ratio) and Household density index. The paper concludes that the method, for example, does not consider the existence of public transport and its utilization by dwellers in everyday life however Calculation of the Walkability index is notably useful for urban planners in the designing stage of a new urban plan.

Kaczynski Andrew T., Glover Troy D(2012) examined the effect of neighborhood walkability and social connectedness on physical activity amongst the adults of Waterloo, Ontario, Canada. There were significant differences across the four walkability/social connectedness groups for both recreational and transport-related Physical activities. Participants perceiving both high walkability and social connectedness displayed the greatest levels of both recreational and transport-

related Physical activities. These findings underscore the relationship between physical and social dimensions of urban form and their association with health behaviors.

Nogueira Helena, Padez Cristina and Ferrão Maria Miguel(2012) attempted to clarify plausible pathways to sedentary lifestyles, highlighting the contextual determinants of physical activity at Micro level and Meso Level. The findings reveal that variations in levels of physical activity arise from individual characteristics such as gender, age, socioeconomic, health-related behaviors, location also plays a role in active living, and our results show that built and social environments are key focal points. The study concludes that If improvements to the local environment can increase physical activity, increased physical activity can also improve the local environment. Walkability is more than just a form of community. It is a way of life, one that is healthier, more ecologically sound and more neighborhood-friendly.

Azmi Diyanah Inani & Karim Hafazah Abdul (2011) Compared Walking Behavior to Community Facilities in Low-Cost and Medium Cost Housing and found that Residents in low cost neighborhood are more walkable compared to residents in medium cost neighborhood in reaching their community facilities. This shows that certain aspect need to be taken into consideration in providing the community facilities in the neighborhood such as the catchment area radius, accessibility, location, land use pattern because it can give huge impact in increasing the walkability of resident in neighborhood area.

5. RESEARCH CHALLENGES

Reviewing the various technical papers, Books and the relevant policy framework; it is observed that majority of the research is having the study area in either developed countries or in the planned communities. In India the nature of traffic composition is heterogeneous and the same influences each and every parameter discussed here in its own way. This provides a challenge for research to amend the existing findings to suit the Indian context in a generic manner. Also following are some of the specific research challenges in this area.

Development of Walkability Index

Influence of Low, Medium and High Socio Economic Status on Active Living.

Different sources of Data collection.

Effect of Physical Environment on Walkability.

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