Role of Public Spaces in Promoting Urban Wellbeing in Post-Pandemic Indian Cities

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Abstract— The role of urban public spaces is to promote social interaction, recreation, sense of place, and help build healthy communities. With the increasing urbanization, space crunch in cities, and the recent pandemic situations, cities are experiencing a change in health and wellbeing. After being confined to homes and imposed restrictions on movement in public spaces, people are experiencing stress which is eventually affecting their health. The urban public spaces have a role to play in the present scenario and in the post-pandemic city to make cities resilient. This study aims to find out the theoretical and practical parameters of understanding the role of public spaces in promoting urban wellbeing. Through literature review, case studies of current practices in different contexts, this study formulates a theoretical framework for evaluating the nature and design of the public space. The findings of this study help to reconfigure the existing public spaces in cities and design future public spaces to promote health and wellbeing.

Keywords— *Urban wellbeing; Public spaces; Post-pandemic city; health; physical activity; urban Design; Indian cities*

I. INTRODUCTION

One of the primary advantages of city living is better healthcare facilities than rural areas (Vlahov, 2005); this situation is because urban residents are more prone to numerous health issues than rural residents. The urban environment poses various physicochemical hazards. pollution, traffic hazards, and the "urban heat island" amplification of heat waves, shortage of space for walking, cycling, and active living also combine to make cities epicenters of the non-communicable diseases epidemic and drivers of climate change (McMichael1, 2000) (WHO, Urban health, n.d.)There are multiple reasons for this situation: Pollution, improper sanitation, increasing stress levels, food habits, and lack of physical exercise. City planning and design play an essential role in health and wellbeing. In the world's wealthier countries, cities in the 19th and at the turn of the 20th century were plagued by infectious diseases associated with crowding. Epidemics of influenza, typhus and tuberculosis killed millions of people in cities with poor sanitation and squalid living conditions (David Vlahova, 2003). The world has been experiencing many epidemics and pandemics, and the Coronavirus is one such virus that is now killing millions of people (LePan, 2020) (Sara Eltarabily, 2020). The epidemics and pandemics played a vital role in the evolution of urban planning and design. Some notable interventions introduced to improve the living conditions in cities are sanitation and hygiene, the introduction of broader boulevard streets, zoning regulations to segregate the industrial functions from the residential areas. So it is

necessary to make our cities resilient, improve the quality of spaces, and make adequate arrangements to meet future needs. The Human built environment can influence physical and mental Health (Vlahov, 2005) (Emily J.Flies, 2019). The built environment features can affect human behavior, interpersonal behavior, and actual mental states (Y-F, 1977). The current pandemic has created a fear of accessing public spaces because of the overcrowding in public spaces. At the same time, the public space is a critical tool to rethink urban health and wellbeing because of the numerous advantages and opportunities it can offer. This study critically looks at the possibilities of improving urban health in Indian cities through spatial transformations in the existing public spaces and explores the desired design interventions for the new public spaces in cities. This study interprets the terms urban wellbeing in relation to the public space through a theoretical review of the literature. It then analyses various typologies of public spaces that are important in promoting health and wellbeing. Each typology of public space is analyzed with the help of case examples, best practices, and necessary facts from the existing surveys in the public domain. From the analysis, a theoretical framework is proposed that helps in understanding the wellbeing of people in the urban areas from the lenses of the built environment.

II. LITERATURE REVIEW

A. Urban Wellbeing

The wellbeing as a term does not have a fixed definition. It means different things to different people (Health, n.d.). It is a term that can be used to express how one feels about one's own self and one's life (Department of Health S. G., n.d.) (mind, 2020). It is also referred to as a holistic idea of how an individual feels about experiences across areas like cognitive, emotional, social, physical, and spiritual wellbeing (ANDERSEN, 2019). Wellbeing is a multifaceted term that can be interpreted in various categories like Physical wellbeing, Psychological wellbeing, and social wellbeing, and emotional wellbeing. When wellbeing is seen from a perspective of people's physical and mental health in urban areas, the urban physical environment is one of the key attributes in promoting urban wellbeing. The way the urban environment influences physical and mental wellbeing is often interconnected and interdependent.
Physical activity is proven to positively result in physical and mental wellbeing (Moor, 2013) (Prof. Jules Pretty, 2006). Physical activity is any bodily movement produced by skeletal muscles that require energy expenditure. Physical activity can be structured and planned like exercising

regularly, or it can also be an unstructured activity of daily life that includes playing, recreation, working, transportation, and house chores (WHO, 2016). The unstructured activity is the most common in everyone's life, and recently structured regular exercising is becoming a habit because of increasing health consciousness in urban areas. Along with physical activity, the perception of spaces like streets, open spaces, or any shared community space influences our wellbeing (Jennifer Adams, 2016). The way we interact with the places, how we value them, our respect for the ecosystem and surroundings is vital to form a sense of place. A strong belonging and a feeling of connectedness to our surroundings are important for a sense of psychological and social wellbeing.

B. Public Spaces for Urban Wellbeing in the post-pandemic city

Public space refers to space where people usually have unrestricted access (Marušić, 2012). Public spaces are essential components of a thriving city because of their role in promoting a sense of community, social life, civic identity, economic activity, health, and wellbeing (Garau, 2016) (Silvia G. Tavares, 2020). The public spaces include a wide range of built and unbuilt spaces like streets, sidewalks, parks, squares, traditional markets, and small plazas (Debra Efroymson, 2009).

The daily habits of people are changing because of the ongoing COVID-19 pandemic scenario. People are avoiding long-distance travel and staying in their locations. The pandemic restrictions lead many people to start walking and cycling more (Elliott, 2021) (Quiros, 2020) (Mathew, 2020). Western countries majorly experience this shift of modes of transportation; for example, motor traffic congestion has dropped by 30-70% in Milan (Laker, 2020). The city has started to transform almost 35 kilometers of streets to avoid congestion. Sufficiently wider sidewalks and expansion of cycling tracks are the primary interventions to prepare the post-pandemic city for a new normal. This transformation is not only limited to sidewalks and cycle tracks; it also extends to other types of public spaces both at the micro and macro level.

- **Accessible Green Outdoor Spaces**

Physical activity alone is insufficient in delivering good health unless combined with exposure to nature and outdoor spaces, which are public spaces. Researchers at the University of Essex in England are advancing the notion that exercising in the presence of nature has added benefit, particularly for mental Health (Letter, 2010). A study comparing indoor versus outdoor activities suggests that the outdoor activity conducted in natural or green environments causes more remarkable revitalization and positive engagement, decreasing tension, confusion, anger, depression, and increased energy (Thompson Coon J, 2011). Walking, Exercising outdoors, and contacting with urban green spaces like parks, gardens can have a positive restorative effect on mental health and wellbeing (Lee A, 2015) (Elliott, 2021) (JULES PRETTY, 2005). Exercising outdoors is called green exercise, and the role of access to green open spaces is emphasized because of its advantages in reducing stress and improve physical, mental, and

psychological Health (Sara Eltarabily, 2020) (Vlahov, 2005). The urban dwellers look for essential opportunities like seeing nature, playing in nature, interacting with others, and experiencing the natural life around them. These are often looked at as privileges of affluent neighborhoods because our cities have a huge gap in providing adequate and accessible green space to every urban dweller. Research on Green space planning by researcher Jain shows that many metro cities in India lack the essential minimum recommended per capita green open space of 9 sq.mt. Per person as per WHO (Prashanti Rao, 2014). Only the newer suburban areas and planned cities like Chandigarh and Mumbai sub-urban areas are seen to have adequate recommended percapita green areas.

TABLE I. PERCENTAGE OF GREEN OPEN SPACES IN INDIAN CITIES

Name of the City	% of green areas (Recreational area) to total city area	Name of the City	% of green areas (Recreational area) to total city area
Mumbai city	0.65%	Kolkata	0.20%
Chennai	4.17%	Chandigarh	13.16%
Ahmedabad	2.03%	Jaipur	4.42%
Hyderabad	5.08%	Pune	8.52%
Bhopal	11.26%	Mumbai Suburban	19.28%

Source: Jain. P, 2011. & Prashanti Rao, 2014.

TABLE II. ACCESSIBLE DISTANCE FROM HOME TO VARIOUS GREEN AREAS

Functional level	Maximum distance from home (meter)	Minimum surface area (ha.)
Residential green	150	-
Neighborhood green	400	1
Quarter green	800	10(Park: 5 ha.)
District green	1600	30(Park: 10 ha.)
City green	3200	60
Urban forest	5000	>200 (smaller towns) >300 (big cities)

Source: Herzale and Wiedemann, 2003.

Accessibility to green space is another major issue in Indian cities. Herzale and Wiedemann suggest a minimum standard for maximum distance to different functional levels, indicating an accessible minimum distance of 150m for residential green areas and 400 meters to neighborhood green areas (Wiedeman, 2003). WHO proposed a thumb rule that urban residents should be able to access a minimum of 0.5 to 1 hectare of urban green space within 300m distance, which is around 5 minutes walk (WHO, 2017). The distribution of green spaces does not always follow a decentralized spatial system. The public green areas are too far and not at walkable distance in many cities.

- **Need for Adequate sidewalks**

The daily habits of people are changing because of the current pandemic scenario. People are avoiding long-distance travel and staying in their locations. The pandemic restrictions lead many people to start walking and cycling more (Elliott, 2021) (Quiros, 2020). Walking and cycling are preferred not only to maintain physical distance by avoiding crowded public transportation but also to increase physical activity. Research shows that in neighborhoods where people walk less, people are more likely to be overweight (spaces, 2009). The increasing consciousness about physical activity is because it can reduce the risk factor for chronic diseases like diabetes, cardiovascular diseases, and some types of cancers (J Lennert Veerman, 2016). The studies conducted by AARP liveable communities reveal that the people who live in neighborhoods with good sidewalks are 49% more likely to be active for at least 39 minutes a day (Communities, 2014). Walking is the most accessible form of physical activity that helps in maintaining physical health and wellbeing. It is the most cost-effective and possible for all age and income groups (Moor, 2013).

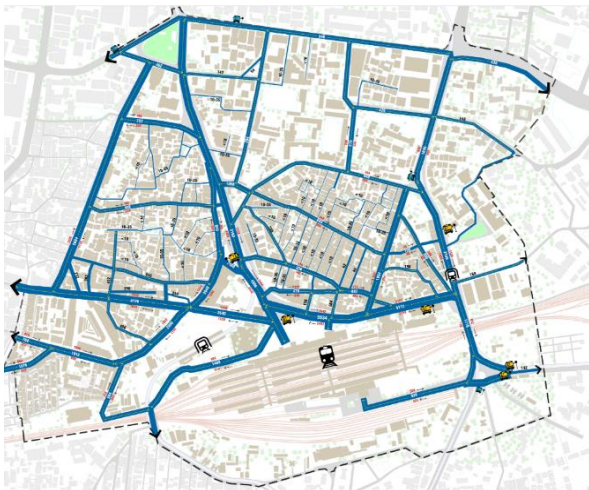STREET-LEVEL PEDESTRIAN FLOW MAPPING IN SECUNDERABAD RAILWAY STATION AREA.

Figure-1 Source: Author
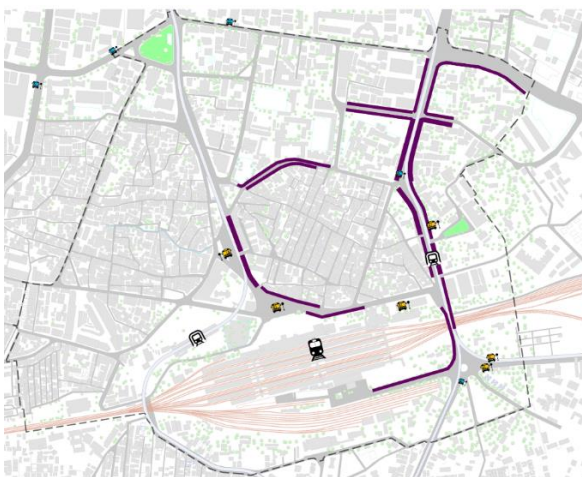
MAPPING OF AVAILABLE SIDEWALKS IN THE AREA

Figure-2 Source: Author

Observational survey mapping conducted in the Secunderabad railway station in Hyderabad city surrounding area in 2019 shows significantly fewer sidewalks available in the study area. Although the pedestrian count on each street is very high, pedestrians have to walk on the road carriageway because of the lack of sidewalks.

Studies reveal that India has about 28% of the population estimated to be walking, but the present percentage of sidewalks in Indian cities is meager. For example, Gangtok is one of the most pedestrian-friendly cities in India. Yet, only 20% of the city has footpaths on one side and witnesses a pedestrianization rate of 42.57%, higher than those using motorized trips (Shrivastava, 2020).

Many cities around the world see an increased demand for more sidewalks in their neighborhoods. For example, after the COVID-19 pandemic, motor traffic congestion has dropped by 30-70% in Milan (Laker, 2020). The city has started to transform almost 35 kilometers of streets to avoid congestion. Sufficiently wider sidewalks and expansion of cycling tracks are the primary interventions to prepare the post-pandemic city for a new normal. Indian cities have significantly less percentage of sidewalks, and providing adequate sidewalks is one of the easiest interventions for bringing public space close to the communities. Sidewalks are not only spaces for walking but also spaces for social interaction that promotes both physical and social wellbeing.

- **Need for Bicycle tracks**

Cycling is one of the efficient modes of transportation for shorter trips. A recent study by TERI in Delhi shows that if bicycles substitute two-and four-wheelers used for short-distance trips in India, it can result in an annual benefit of rupees. 1.8 trillion (Aggarwal, 2019). Cycling has many health and environmental benefits alongside economic benefits. Cycling is shown to have many positive effects on the physical and mental health of people. The Harvard Medical School says that cycling is an aerobic workout that can increase muscle building, improves bone health, and helps in overall activeness in everyday life (Letter, 2016). Cities worldwide are increasing bicycling through interventions like prioritizing the bicycle routes, restricting vehicular movement in some streets, constructing bicycle lanes, and making bicycles available for public usage. India is also experiencing a similar situation; bicycle sales surged significantly in many cities (Azad, 2020). With the unavailability of mass public transportation and ongoing restrictions on public transport usage, people are now shifting to private transport modes, including cycling. More people prefer cycling for shorter commutes because of the dual advantage the cycling offers. It reduces contact with others and also increases physical activity. Many fitness enthusiasts and health-conscious people are recently contacting cycling clubs to take memberships. This clearly shows that the share of bicycles on the road will increase significantly in the upcoming years in India. Studies in India show that bicycling is a preferred activity only under some known attributes like comfortable weather, availability of urban road infrastructure conducive for cycling, and some social and cultural aspects (Arindam Biswas, 2019)

India is now facing some challenges in meeting the requirements of increased cycling in cities. The lack of conducive urban road infrastructure for cycling is the primary challenge. Many cities in India still do not have bicycle tracks. The studies reveal that even though people want to use bicycles, the urban infrastructure is hazardous, that pedestrians and cyclists are at high risk of road accidents. A study conducted by the Times of India in Delhi shows that 70% of victims of road fatalities are cyclists and pedestrians (Sidharatha Roy, 2020). The situations with the cycling environment are different, ranging from lack of proper cycling tracks, discontinuous cycle tracks, insufficient width of cycle tracks, illegal parking on cycle tracks, potholes and improper maintenance, lack of signage, uneven surfaces, and usage of inappropriate material for constructing cycle tracks.

Another challenge is the accessibility of cycle tracks. Many ongoing smart city missions have constructed bicycle tracks and bicycle stands as part of the smart urban interventions. The ground reality of the accessibility of these cycle tracks is entirely different. The cycle tracks are often constructed as part of smart road infrastructure in locations that may not demand cycling. In contrast to this, activists and cyclists in cities like Bengaluru are demanding bicycle lanes. Innovative ideas like pop-up cycle lanes are coming up that are quick, need-based, and cost-effective to meet this challenge. Reclaiming the streets and designating dedicated cycling tracks are also being taken up in cities after noticing the increased demand for accessible cycle tracks. Delhi is constructing about 200kms of bicycle tracks as part of the Delhi cycle track project, Bengaluru is redesigning the ORR's Service lane to incorporate cycle track, and many cities in the country are following similar interventions (Sidharatha Roy, 2020) (Malagi, 2020).

- **Changing spatial dynamics of streets and market**

Because of the COVID-19 pandemic, the spatial arrangement of the streets and markets is changing. In many cities, shops in the narrow alleys are shifted to main roads and open grounds to maintain social distancing (Singh, 2021). At the same time, it becomes difficult to maintain physical distancing in traditional markets and bazaars because of their narrow streets and compact form. The street markets need a rethinking as they need more space and should make the users safe and secure, maintaining the physical distancing rules. The COVID-19 lockdown scenario in India has seen a change in the way people access the market spaces. Significant reduction in the number of people in markets, changes in operations, and physical distancing rules in front of shops are notable changes in market spaces. Markets are not just spaces for shopping; they are also spaces for recreation and social interaction that promote economic and social wellbeing in cities.

- **Importance of micro-scale public spaces**

The urban public spaces are not always necessary to be large. The small and micro-scale accessible public spaces like pocket parks, parklets, neighborhood streets, squares, plazas, or any incidental spaces are also public spaces that play a vital role in promoting wellbeing. In addition, social interactions among people at a community level are possible with micro-scale public spaces. The interactions in everyday life of people stimulate a sense of belonging to the place and result in individuals' psychological and social wellbeing. The micro-scale public spaces can decentralize the public space and create limited access to people in the post-pandemic scenario.

Pocket parks: These are also known as mini-parks or vest-pocket parks because they occupy significantly less space. These pocket parks are typically limited for usage among the residents of few buildings. They are the spaces for casual meetings, children playing, taking lunch breaks, and just relaxing. Pocket parks can be implemented in dense urban areas where large-scale public spaces are impossible (Faridi, 2020) (NRPA, 2014). The elements for designing pocket parks are limited to few trees, plants, seating spaces, and a few play equipment. For example, Philadelphia in Pennsylvania created more than 60 pocket parks by transforming vacant and abandoned spaces in low-income communities into play areas for children.

FREEDOM PARK AT GERMANTOWN AVE, PHILADELPHIA (LEFT)AND CARPENTERS PARK, PHILADELPHIA (RIGHT)

Figure-3 Source Mt. Airy bid (Left)
Figure-4 Source Mt. Airy bid (Right)

Parklets: Parklets transform street space into an enjoyable, vibrant, and healthy public realm. Parklets typically occupy 2 to 3 car parking spaces within a street or a parking lot (Shokry, 2019). The idea is to animate the streets and neighborhood parking lots by introducing activities for people in the neighborhoods (staff, 2020). Parklet design can be age-specific, like making parklets for children by introducing play equipment; they can be designed to make people come closer to interact and know each other. To quote some examples, in spring street parklet in Los Angles, a parklet is designed with space for simply sitting and relaxing, exercising, and playing. The design of the parklet is such because of nearby businesses and busy streets that needed a change in the nature of space.

Another best example of parklet design is Cyclehoop's parklet in Hammersmith and Fulham (Dexigner, 2017).

This parklet is designed in a busy commercial street with a simple design with few planter boxes, bicycle stands, and seating benches designed innovatively. This parklet project was shortlisted for the Best Innovation category in the Healthy Streets Awards.

SPRING ST. PARKLET IN DOWNTOWN L.A. (LEFT) & CYCLEHOOP'S PARKLET IN HAMMERSMITH AND FULHAM (RIGHT)

Figure-5 Source: Place and Page Group (Left)
Figure-6 Source: Dexigner (Right)

Squares and plazas: Traditionally, squares and plazas are active public spaces that welcome hundreds of people each day. They are common in commercial spaces, markets, and busy business districts. Because of the pandemic, most of the busiest squares and plazas worldwide are now experiencing the science of times (Khandelwal, 2020). There is a need to rethink the design and planning of squares and plazas post-pandemic.

BEFORE COVID-19 LOCKDOWN SCENARIO AT PIAZZA GIOTTO, ITALY (LEFT) AND POST LOCKDOWN INTERVENTIONS AT PIAZZA GIOTTO, ITALY(RIGHT)

Figure-7 Source: Benedetta Carcasci, 2019 (Left)
Figure-8 Source: Nicola Di Renzone(Right)

The situation in Indian squares is not quite the same; the public squares and plazas are not fully prepared for the post-pandemic scenario. Very few spatial design interventions like temporary marking can be seen without any permanent changes. In many Indian public squares, not even a physical distance marking is visible; for example, the spatial design of the post lockdown scenario at Charminar square is quite the same as before.

BEFORE COVID-19 LOCKDOWN SCENARIO AT CHARMINAR SQUARE, HYDERABAD (LEFT) AND POST LOCKDOWN SCENARIO AROUND CHARMINAR SQUARE, HYDERABAD (RIGHT)

Figure-9 Source: Sinjini Saha, 2019(Left)
Figure-10 Source: Sravan Vanaparthy, Times of India, 2020(Right)

It is only that the people are conscious of physical distancing. The design should induce a sense of safety, and it should make people follow the rules. Safety and public health are essential for crowded spaces. Decongesting and creating control over access by limiting the number of users, alternate timings, changing furniture spacing, adding physical distance marking, and regular sanitation is becoming necessary in these spaces (Sepe, 2021). It is interesting to see how public squares in Italy are functioning again by adapting to these pandemic rules with spatial design interventions.

III. FINDINGS

From the observations and analysis of various case examples, surveys, and facts, the public space typologies and respective design interventions can broadly be suggested as follows

TABLE III. FINDINGS

Public space	Functional level	Suggested locations and spatial design changes
Pocket parks	Block, Cluster, Street	• Transforming abandoned and vacant spaces of small size • Introducing in dense urban areas • Minimum design elements • Limiting public access • Design should create opportunities for play and social interactions
Parklets	Block, Cluster, Street	• Activating and Animating less active spaces • Tiny, minimal, and context-specific design elements • Open for diverse users • Interventions should focus on health and social interactions
Markets	Community, Neighborhood	• Introducing Permanent and temporary physical distancing measures • Limiting access and managing crowd • Ensuring safety and hygiene through design
Sidewalks & Bicycle tracks	Streets, Community, Neighborhood	• Introducing adequate sidewalks and bicycle tracks • Regular maintenance • Ensuring greenery for enhancing the visual experience • Design should promote social interactions and safety
Squares and Plazas	Cluster, Community,	• Introducing Permanent and temporary physical distancing

	Neighborhood, District, City	• measures • Limiting access and managing crowd • Ensuring safety and hygiene through design
Green open spaces	Block, Cluster, Community, Neighborhood, City	• Bringing green open spaces close to residential areas • Revitalizing abandoned and unused spaces • Introducing scope for physical activity for various user groups • Creating a network of green spaces wherever possible

IV. CONCLUSION

This study explored the role of public spaces in promoting health and wellbeing in the post-pandemic scenario concerning the Indian context. By taking examples, recommendations, and facts from various practices from cities worldwide, the study has critically commented on implementable design changes and spatial transformations needed for different public spaces from a built environment perspective. Although the concept and interpretation of the term urban wellbeing are different in different contexts, the study has explored a dimension through the physiological qualities of public spaces. Access to public space is one of the prime challenges in Indian cities because of their overpopulated and dense urban form that threatens urban residents' health and wellbeing. Public space will play a major role in health and wellbeing in the future of cities because more people are becoming conscious about the need for physical activity for keeping themselves physically healthy. This study categorically recommended introducing micro-scale public spaces with minor design interventions for dense urban spaces and design transformations for large public spaces. The study shows that it is essential to focus on readjusting the existing public spaces and adapting the learning from the pandemic scenario. It has always been a case that cities change themselves to overcome the challenges posed by epidemics and pandemics. The governments and authorities can regulate and implement necessary rules to deal with the health emergency scenario. Still, the built environment experts like urban planners, designers, and Architects should focus on innovation and opportunities to make public spaces of cities more resilient through context-specific design changes. Thus the recommendations of this study is more focused on suggesting opportunities to enhance health and wellbeing through public spaces.

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