

Urbanization, Urban Green Space and Public Health: A Case Study of Kolkata

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Abstract

Urban human life and green spaces are reciprocally associated. Urban Green Space is the burning concept which is the most effective for health as well as daily used essential commodity of the people in the urban area. Natural environment, or 'green spaces', have been associated with a wide range of health benefits. It is also considered as lungs of the city. Green Space is the rescue operation of chronicle disease of urban people. This paper attempts to analyse the impact of green space on human health. We selected health outcomes that were plausibly related to green space (cardiovascular disease, respiratory disease, high blood pressure, paralysis and self-reported limiting long-term illness) and another that was expected to be unrelated (lung cancer). It comes into existence that 80 percent of the green space users are disease affected persons and only 20 percent peoples take it as the entertainment places. It is found that health impact of green space is prominent in urban areas.

Keywords: Green Space, Natural Environment, Ecological city, Mental illness, life satisfaction and planning strategies.

Introduction

Urban settlements are grown by scratching the natural environment so greatly that people tend to see the city only as an employment site, and economic and cultural centre; urban area thereby transformed into most congested and polluted human habitat. This results tremendous increases of automobile commuter traffic, accompanied by traffic jams, accidents, stress, and ever more damage to the environment. In such environment hardly any person can breathe fresh air. Concepts of sustainable development or the ecological city represent strategies for changing these negative trends. The purpose for doing so is principally the well-being of a city's residents (Bertram et al., 2014). Thus a growing number of people prefer to reside in greener suburbs or rural areas (Wolch et al., 2014), because people generally believe that living in a green environment is good for one's health (De Vries et al. 2003). Urban green space can provide a wider range of ecosystem services and that could help for many urban ills specially the health of the urban dwellers (Wolch et al., 2014). Urban green space includes parks and reserves, sporting fields, riparian areas like stream and river banks, greenways and trails, community gardens, street trees, and nature conservation areas, as well as less conventional spaces such as green

walls, green alleyways, and cemeteries (Wolch et al., 2014). The significant relationships between self-reported stresses, diurnal patterns of cortisol secretion, and quantity of green space are evident in the living environment. Urban green spaces are resource in promoting public health (Stingsdotter et al., 2010). Hillsdon, et al. (2006) examined association between access and quality of urban green space with population physical activity over the middle aged people. In general, the older age groups were more active in the green space visit than the youngest age group. They also find no evidence to suggest that any public health value of urban green spaces is based on their impact on population levels of physical activity.

Barnett et al. opined 'Urban green space as connecting means of people and nature'. The connection between people and nature in the city, through a focus on identifying spatial patterns of urban green space, health outcomes for people, and knowledge of parks and biodiversity. A park is found to be worthy to reduce mental stress (Ulrich et al., 1991, Woo et al., 2009) and green space can afford urban residents opportunities to encounter plants and animals as well as opportunity to recuperate or experience solitude or loneliness (Fuller et al., 2007). Park visit can also rejuvenate and enhance residents' contemplation and provide a sense of peace and tranquillity (Kaplan et al., 2003, Song et al., 2007).

Bertram et al., (2014) found 'The role of urban green space for human well-being'. Private Green space such as gardens or other green infrastructure like street trees may also influence the life satisfaction of city inhabitants, as they can considerably alter the character of a neighbourhood. The effects of green space are non-linear with the marginal utility of green space as it first increasing and then decreasing. It conferred that living very close to urban green spaces may not only be associated with amenities but also with dis amenities arising e.g., from noise, congestion or fear of crime. Urban green space not only supports the ecological integrity of cities, but also protects public health of urban dwellers. Psychological well-being is empirically linked to urban parks and green space (Ernstson, 2012). To provide sufficient quality of life in high density cities, it is important to maintain and restore an urban green space system; Moreover, urban green space and a comfortable urban climate also produce social and economic benefits. De Vries et al., (2003) focused on human relation with an important aspect of environmental quality i.e. the 'greenness' of people's living environment. Green areas in one's living environment may lead people to spend a larger part of their spare time outdoors and/or be more physically active. Natural environments are more often used for recreational walking and cycling than urban environments, these activities have a direct health value. Therefore, people in a greener living environment may become more-healthier (De Vries et al., 2003). Often this entails bringing more of the natural environment back into the city, because urban green space fulfils several critical functions in an urban context that benefit people's quality of life (Stigsdotter et al., 2010).

Degree of urbanization adversely impacts the green and blue space coverage in the living environment. A significant effect was found for urbanity that people in highly urbanised areas tend to have more symptoms and a higher risk of mental illness. The amount of green space is related to the health indicators more strongly than the degree of urbanity. Now a day most research results converge, indicating a positive association between how often people visit or how long they stay in urban green spaces and recovery from stress and mental fatigue. The human body reacts involuntarily to natural elements, whereas built environments do not provoke the same quick and strong reactions. It is also said that the natural or green environments positively influence people's self-perceived health. It is suggested that the health of young people, the elderly, housewives and those with low socio-economic status benefited more from residential green space than other groups (Richardson et al., 2010). 'More green space is linked to less stress in deprived communities'. Salivary cortisol can act as a biomarker for variation in stress levels which may be associated with varying levels of exposure to green spaces (Thompson et al., 2012).

Steadily growing traffic and urban heat not only damage the environment, but also incur social and economic costs. As we explain further, we can save costs even by making small changes to existing situations. Furthermore, we maintain and show that an integrated approach is needed for designing and maintaining urban green space. There is a broad consensus about the importance, and therefore the value of urban green space in cities as currently constructed, in addition to its value in planning ecological cities (De Vries et al., 2003).

The present study is confined to analyse the impact of green space on the health of urban dwellers with special reference to Kolkata Municipal Corporation. The survey process is also designed to investigate the value of urban green spaces in environmental development and outdoor recreation pursuits in Kolkata city. The main objectives are a) to analyse the impacts of green space on the physical and psychological health on the urban dwellers. b) to reveal the responses and perceptions of urban dwellers towards the value of green space in the socio-psychological life and city's natural environmental improvements, and c) to analyse people's response towards the constraints and management of urban green space development strategies.

Database and Methodology

The work is based on primary and secondary sources of data. Municipal ward has been taken as a unit of analysis through the detail study of maps and reports. Primary data has been collected through a well-designed questionnaire and direct interview with the respondents. Total 125 green space users have been studied in 13 sample green spaces in Kolkata Municipal Corporation (KMC). In the processing of data some simple arithmetic techniques have been used like-

percentages, average etc. Map Info software has been used for mapping the locations and regional distribution of the different parameters.

Study Area

The study is confined to analyse the impact of green space on the urban peoples. Kolkata Municipal Corporation (KMC) being largest urban habitat in West Bengal has been selected for the study region which lies in the district of Kolkata, in West Bengal. Kolkata is a glaring example of highly urbanized unit with population density 24,306 persons per sq.km. (Census of India 2011). The urban population is increasing day by day. It has the long history of the urbanization. Several parks and gardens are available in this area. There have more than 600 parks and gardens in this city. Kolkata is the capital city of the Indian state of West Bengal. It is located on the east bank of Hooghly River and the hub of principal commercial, cultural, and educational centres of east India. As per 2011 census, the city had 4.5 million residents; the urban agglomeration which comprises the city and its suburbs was home to approximately 14.1 million, making the third most populous metropolitan unit in India. As a growing metropolitan city in a developing country, Kolkata confronts substantial urban pollution, traffic congestion, poverty, overpopulation and other logistic & socio-economic problems. The area falls between the latitudinal extension of 22°28'00" N to 22°37'00" N and the longitudinal extension of 88°17'30" to 88°25'00". The climate of the area is humid and tropical. The normal rainfall of this area is 1647 mm. The mean temperature in winter is 22.5°C which goes down to a minimum of 10°C in the months of December-January. The mean temperature in summer is 29.25°C and goes up to maximum of 40°C in the month of April. The area is covered with younger alluvial soil mainly of silty and clayey loams (Statistical Handbook of Kolkata, 2001). The study area is known for its literary, artistic and revolutionary heritage; as the former capital of India, it was the birth place of modern Indian literary and artistic thought. Kolkata had population of 4,496,694 persons accounting decadal growth of -1.67 percent during 2001-2011.

Green Space in KMC:The Kolkata Municipal Corporation (KMC) has been divided into 141 wards. The parks and gardens are not found in every ward. The green spaces are mostly found in the northern and southern portion of the KMC area. At the western and eastern portion of KMC contains very few green spaces.

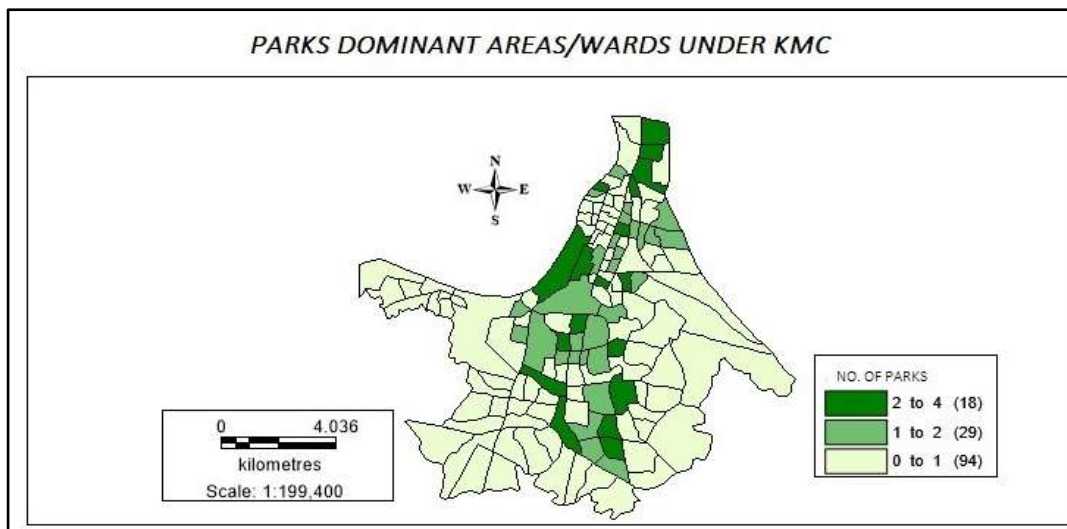


Figure: Dominancy of parks & gardens in KMC

Source: Prepared by the Author on the basis of KMC data

According to the World Health Organization (2001), at least 15 percent of a city's total area should be green space. Surprisingly most of the Indian metropolitans fall below the mark, including Kolkata. Mumbai has a public open space of only 14 sq. km, or 2.5 percent, of the city's total area. While it is worse than Kolkata, what has left environmentalists worried is the sharp rate at which open spaces have vanished in the city. "About 13 years ago, it would be slightly over 13 percent, which was not bad. Since then, we have seen a rapid decline. If you leave out Maidan, the city's open space would be just about 3 percent, which is marginally better than Mumbai," said AK Ghosh, president of the Society for Environment and Development, the NGO that has conducted the study. Simultaneously, the report point out that while Kolkata had just 290 parks a decade ago, the number has gone up to 600 by 2010. "Ten years ago, 50 out of the city's 141 wards had no parks. It is surprising that we now have 600 parks. Other than the Millenium Park and the MoharKunja, the rest have been carved out of existing parks or open spaces and are hardly big enough to make a difference," said Ghosh.

Health impact of urban green space

This field based study reveals that there have many interrelated issues on public health, disease and occupation. Among the employed persons most of them are suffering from multi diseases (40%) especially with High Blood Pressure and Diabetes. There is not dominancy of any particular disease among the people of self-employed because of having the sufficient time of exercise and mostly hard working. Non employed people are something different from others. They are mostly not affected by any diseases related with the green spaces. Retired persons and house wives are significantly suffered by different diseases. 68 percent of retired urban dwellers are suffering from Diabetes, Cardiovascular, Cholesterol, Neurological etc. and 41 percent of house wives are suffering with High blood pressure, Diabetes, Obesity, Arthritis and neurological problems. Regarding this survey it is revealed that self-employed and non-employed are less affected by such diseases than others.

Less than one year using urban dwellers are very new comers to the green space. 10 percent people are suffering from High Blood Pressure. They are suffering from few days ago by some little problems like, Diabetes, Obesity, neurological etc. Very few people (30%) are suffered by multi-diseases. In the green space, it is found that 63 percent people are suffering from multi-diseases since 3 to 5 years. They are found mostly the old age people. Very few people among them are not disease person using green space not because of illness. Green Space use has been so much concentrated by the users between the duration of 1 to 3 years. More than 5 years of green space users are very few, only 18 percent, many of them are disease free people (33%), just coming for the enjoyment of the beauty of Green Space.

Frequency of visit in the green space is the crude factor for improvement of health of people. More frequency visit of people in green space is maximum benefit for health. The 88 percent of the Green Space users are daily because of affected by different diseases. Rest of them are weekly and monthly users. Daily users are suffered by different types of diseases and 48 percent among them are suffered by multi-disease problem. Very few people have come for enjoyment purposes among them. The dominancy of disease free people are so much prominent among the weekly Green Space users (67%). The monthly users are fully engaged for the purpose of entertainment. It can clearly be underestimate that daily users are compelled to use the green spaces for the solution of different diseases whereas the weekly users partially diseases affected and monthly users are fully free from diseases.

Gender difference on health impact of green space is found in various rates. Both male and female are suffering by same diseases at the different rates. Females are generally more suffered by Diabetes and Obesity rather than males. There is 6 percent diabetes affected male people but,

10 percent female are affected by the diabetes. On the other hand, obesity is found more among the female than male people. Neurological problems are so much affects the male urban dwellers than females. 10 percent males and 6 percent females are affected by the neurological problems. (Table 1)

Table 1 Gender wise effect of health impact of Green Space user

Gender	HBP	Diabetes	Obesity	CVD	Cholesterol	Arthritis	Neurological	CBP	Multi-Diseases	Not Disease Affected	% (Total)
Male	4	6	1	4	4	1	10	4	44	22	100 (88)
Female	3	10	10	0	3	3	6	0	45	20	100 (37)
Total	4 (5)	4 (5)	4 (5)	3 (4)	4 (5)	3 (4)	10 (11)	4 (5)	44 (56)	20 (25)	100 (125)

Source: Field survey, 2016

Note: HBP: High Blood Pressure, CVD: Cardiovascular Disease, CVP: Chronic Back Pain.

Urban dwellers are using green space for their health improvement. They visit Green Space since long period of time. Less than 30 years of age among the Green Space users are very few affected by the diseases (04%). They mainly come to the Green Space for the entertainment purposes, not affected by diseases. The age group between 30-45 and more than 60 years are so much affected by multi- diseases securing 60 percent and 47 percent respectively. More than 60 years aged people are basically suffered by neurological problem as well as Diabetes, and Cardiovascular disease. The percentage of entertaining people among the age group of 45-60 are very few, only 7 percent. (Table 2)

Table 2 Effect of Green Space on different disease person by age group

Age Group	HBP	Diabetes	Obesity	CV D	Cholesterol	Arthritis	Neurological	CBP	Multi-Diseases	Not Disease Affected	% (Total)
<30 Years	0	0	0	0	0	0	0	0	04	96	100 (5)
30-45 Years	3	13	10	0	0	0	10	0	33	31	100 (38)
45-60 Years	7	4	0	4	7	4	7	0	60	7	100 (34)
>60 Years	3	5	3	5	5	3	10	5	47	15	100 (48)
Total	4 (5)	4 (5)	4 (5)	3 (4)	4 (5)	3 (4)	10 (11)	4 (5)	44 (56)	20 (25)	100 (125)

Source: Field survey, 2016

According to the field based study of health impact of green space, the daily, weekly and monthly Green Space users have so much benefited mentally and physically. They are benefited from various diseases. Some of the diseases are like High Blood Pressure, Diabetes, Neurologic have been controlled by using regular visit of green space. The psychological defects of people are benefited to relief the stress of the people. There have very few percentages of people who were only benefited from physically, at about 11 percent both of daily and weekly users. But, it is the perception of local people that green space is indispensable for them to sustain their daily livelihood smoothly. (Table 3)

Table 3 Frequency of Green Space visit of people advised by doctor or self

Advised By	Daily	Weekly	Monthly	% (Total)
Doctor	97	3	0	100 (84)
Self	71	21	8	100 (41)
Total	88 (111)	8 (11)	4 (3)	100 (125)

Source: Field survey, 2016

It is found that doctor prescribed people are generally more disease affected than self-prescribed people. All the people prescribed by doctor are diseased persons but among the self-advised people only 38 percentage are diseased and rest are free from disease affected. In this study, it is found that maximum people come to green space to reduce their stress and to reduce their health problems. They have a perception about green space that it is necessary as basic needs of life. (Table 4)

Table 4 Effect on health of Green Space user advised by doctor or self

Advised by	Disease Affected	Not Affected by Disease	% (Total)
Doctors Advised	100	0	100 (84)
Self-Advised	38	62	100 (41)
Total	80 (100)	20 (25)	100 (125)

Source: Field survey, 2016

Relationship between Green Space visit and distance covered by people

Distance is one of the important factors to describe the importance of green space visit. As already, mentioned that daily Green Space users are generally for the purpose of health problem. Weekly users are partially illness. 53 percent of daily users and 45 percent of weekly users among them have to travel more than 1 km. to use the green space. They come more frequently in green space for health improvement. It is essential for their daily health maintenance. On the

other hand 67 percent of the monthly users travel more than 1 km. for using the green space for the entertainment purposes. They are just coming to Green Space to enjoy the beauty of nature in the morning and early evening. Most of them are not the permanent resident of KMC.

Male urban dwellers have travelled more distance than female to avail the green space. 56 percent of the male people travel more than one km. to use the green space daily. On the other hand, female urban dwellers are unable to run long distance for green space visit. Although, 46 percent female covers more than 1 km distance. It is found that gender affects the visit of green space.

Level of education and use of green space

Education raises the awareness of the human population. It is found that more educated people have advance level of awareness. Here, the use of green space is also affected by the educated and uneducated persons. 66 percent of the responded people have been advised by their doctor to use the green space for the betterment of their health. There have very few people both among the doctor advised and self- advised are illiterate. That's why it can be said that literate person realized about the importance of the green space and public health, so that they regularly used it whether doctor prescribed or not.

Age of the people is the important factor for visiting Green Space. It is found that old age group people have to visit the green space. They are suffering from various diseases. Below 30 years of age, they come to green space not for the diseases but they come for entertainment. But above 30 years aged people (more than 90 percent) are coming daily by suffering different kind of problems. Green space users for entertainment are not coming daily; only 25 percentage uses daily, where diseased person uses more than 90 percent daily (Table 5).

Table 5: Frequency of Green Space visit by age group of people

Age Groups	Daily	Weekly	Monthly	% (Total)
<30 Years	25	50	25	100 (5)
30-45 Years	90	10	0	100 (38)
45-60 Years	89	11	0	100 (34)
>60 Years	95	0	5	100 (48)
Total	88 (111)	8 (11)	4 (3)	100 (125)

Source: Field survey, 2016

Regarding this field study we can confidently figure out that diseased persons are regularly using green space for the beneficial of their physical and mental illness whether doctor prescribed or

not. Among the doctor advised persons, 97 percent are daily users and among the self -advised people 71 percent people are daily users.

Problems in Green Space

Nothing is perfect in this world. There have lots of problems of the green spaces so that the people suffer from different barriers.

- There are many parks which charge entry fee. That is why, people of low income group face it trouble and see it as barrier.
- Very burning problem is lack of toilet facility. Toilet is very important inside the park. Most of the green spaces have the toilet facility. But, every park does not have toilet facility. It is must especially for the ladies park.
- The parks and gardens are also suffered from the inadequacy of exercise instrument and first aid facility.
- The Green Space users face the barrier problems. Like Dog Mess, Poor maintenance, parks far away from the resident of the people are important problems.

Conclusion and Recommendations

Conclusion and recommendation are based on the observation of field survey. Many characteristics, principles, and problems of green spaces and health condition of people are focused in the present work. Many significant conditions of parks & gardens and city dwellers can be concluded through the above analysed work.

- There have a misconception among the people that the green spaces are only for the enjoyment of the city dwellers. But, this is proved to be wrong. The green space becomes the integral part of the urban human life. It comes into existence that 80 percent of the green space users are found diseased persons and only 20 percent peoples take it as the entertainment places. So, Green Spaces are not only the beautification of the city, but also function as relieve to various human diseases including the mental, physical and psychological.
- According to the local people it comes under primary needs of them. It becomes as a mandatory in their daily schedule to spend a certain fixed time in the green space. 53 percent of the park-users cover more than one km. distance to avail the parks.
- Male population are so much dependent on the green space. About 44 percent male people are affected by the diseases. The old aged people are the users of green space at a greater level. 95 percent people are affected by diseases; they are over 60 years old. But there is an inequality between the male and female population. In the case of male people

56 percent of population cover more than 1 km. distance, where female is 46 percent. It is inferred that the male people cover long distance than female population.

- The people come to get relieve up to certain extent from the different diseases like, High Blood Pressure, Obesity, Diabetes, Cardio Vascular Disease, Cholesterol, Depression, Anxiety, Arthritis, Neurological problem and Chronic Back Pain. Most of the people come to the green space for multi disease problems.
- The diseaseaffected people who are the green space user 100 percent of them are suggested and advised by their consultant doctors. It was asked them that 'How long would you like to come in the parks?' Most of them responded that they will come long time to the Green Space. It is proved that green spaces are the integral part of the life of city dwellers.

On the basis of the above discussion, conclusion and problems the followings can be recommended.

- The government should provide facilities to the people to enter the green space with free of charge everywhere so that people wouldn't feel the charge as a barriers.
- Infrastructure facilities like exercise aids, exercise superintend, first aid facility, toilet facility, drinking water supply etc. are mandatory inside the green space.
- The government should increase more & more green space in urban centres that's beneficiary for the up gradation of the city and for the public health also and dog mess problem will be solved as people said as a barrier.
- The government should provide the maintenance service regularly so that green space as well as the city remains clean.
- There is lack of sufficient amount of Ladies Park. Women sometimes hesitate to use the common green space and deprived from using the green space. There is urgent need to increase some special Ladies Park.

If the above said problems have been solved, the urban people can use the green space spontaneously and be the owner of good health.

References

Ahmed, M.R.,(2003).People's perception towards value of urban green space in environmental development. Paper prepared for World Forestry Congress, Sept 2330, 2003, Quebec City, Canada.

- Balogh, P.I.,(2011).The significance of urban open spaces and green areas inurban property developments. First International Conference “Horticulture and Landscape Architecture in Transylvania” *Agriculture and Environment Supplement*,pp. 110-121
- Barnett, G., et al.Urban Green space: Connecting People and Nature. CSIRO Sustainable Ecosystems, Canberra.
- Bertram, C., (2014).The role of urban green space for human well-being. Working Paper No. 1911
- De vries S., et al. (2003).Natural environment- healthy environments?An exploratory analysis of the relationship between green space and health.*Environment and Planning*, Vol. 35,pp. 1717-1731
- De Vries, L., (2016). The revitalisation of parks and open spaces in downtown Johannesburg.*Urbaniizziv*, Vol. 27, No. 1
- Ernstson, H., (2012). The social production of ecosystem services: A framework for studying environmental justice and ecological complexity in urbanized landscape, *Landscape and Urban Planning*, Vol. 109, No. 1, pp. 7-17.
- Fuller, R. A., et al. (2007). Psychological benefits of green space increase with biodiversity, *Biology Letters*, Vol. 3, pp. 390-394.
- Grobelsek, L.J., (2012). Private space open to the public as an addition to the urban public space network. *Urbaniizziv*, Volume 23, No. 1
- Gupta, K., et al. (2012).Urban Neighbourhood Green Index – A measure of green spaces in urban areas.*Landscape and Urban Planning*, Vol. 105,pp. 325-335
- Hillsdon, M., et al. (2006).The relationship between access and quality of urban green space with population physical activity.*Public Health*, Vol. 120, pp. 1127-1132
- Kaplan, S., (2003). Health, supportive environments and the reasonable person model, *American Journal of public Health*, Vol. 93, No. 9, pp. 1484-1489.
- Khan, M., (2014). Study of open spaces in the context of Dhaka City for sustainable use: A syntactic approach. *IACSIT International Journal of Engineering and Technology*, Vol. 6. No. 3
- Lee, A.C.K., (2010). The health benefits of urban green spaces: a review of the evidence. *Journal of Public Health I*, Vol. 33, No. 2, pp. 212-222
- M’Ikiugu, M.M., et al. (2012).Urban Green Space Analysis and Identification of its Potential Expansion Areas.*Procedia - Social and Behavioral Sciences*, Vol. 35,pp. 449-458

- Madureira, H., (2015). Urban residents' beliefs concerning green space benefits in four cities in France and Portugal. *Urban Forestry and Urban Greenig*. Vol. 14, No. 1, 2015, pp. 56-64
- Rao, P.et al. (2014).Evaluating the Urban Green Space benefits and functions at macro, meso and micro level: case of Bhopal City. *International Journal of Engineering Research & Technology (IJERT)*, Vol. 3, No. 6, pp. 2278-0181
- Richardson, E.A., (2010).Gender differences in relationships between urban green space and health in the United Kingdom. *Social Science & Medicine*, Vol. 71, No. 3, pp. 568-575
- Ridder, K.De.,et al. (2004). An integrated methodology to assess the benefits of urban green space. *Science of the Total Environment* 334-335, pp.489-497
- Sa, J.D., (2013). *Green space in urban areas: a methodological approach based on ecosystem services*. Dissertation for the Master's degree in Urban Studies and Territorial Management, Department of Civil Engineering, Architecture and Georesources, Instituto Superior Tecnico, Universidade Tecnica de Lisboa.
- Sengupta, R., (2010). Strengthening urban green infrastructure. *e Traverse Geographical Institute*. Vol. 1, No. 2
- Song, Y., et al. (2007). Do physical neighbourhood characteristics matters in predicting traffic stress and health outcomes? *Transportation Research, Part A: Traffic psychology and behaviour*, Vol. 10, pp. 164-176.
- Stingsdotter, U.K., et al. (2010).Health promoting outdoor environments – Associations between green space, and health, health-related quality of life and stress based on a Danish national representative survey. *Scandinavian Journal of Public Health*, Vol. 10, pp. 1–7
- Thompson, C.W., et al. (2012).More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and Urban Planning*, Vol. 105, pp. 221–229
- Tzoulas, K., et al. (2007). Promoting Ecosystem and Human Health in Urban Areas using Green Infrastructure: A Literature Review. *Landscape and Urban Planning*, Vol. 81,pp. 167–178
- Ulrich, R. S., et al. (1991). Stress recovery during exposure to natural and urban environment, *Journal of Environmental Psychology*, Vol. 11, pp. 201-230.
- Ulrich, R.S., (1981). Natural versus urban scenes some psychophysiological effects: *Environment and Behavior*, Vol. 13, No. 5, pp. 523-556.

Ulrika, K.S., et al. (2010). Health promoting outdoor environments –Associations between green space, and health, health related quality of life and stress based on a Danish national representative survey. *Scandinavian Journal of Public Health*, 2010; 0: 1-7

Van den Berg A.E., (2015).Health Benefits of Plants and Green Space: Establishing the Evidence Base. *ActaHorticulturae*,Vol. 1093,pp. 9-30

Wolch, J.R., (2014).Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landscape and Urban Planning*, Vol. 125, pp. 234–244

World Health Organization (WHO, 2001) Report, Geneva

Zhou, X., (2011).Spatial–temporal dynamics of urban green space in response to rapid urbanization and greening policies.*Landscape and Urban Planning*,Vol. 100, No. 3, pp. 268–277