

Role of the Neighborhood Planning in Containing the Future Epidemics, in the Wake of COVID-19

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Abstract - The Coronavirus disease (COVID-19), is a pandemic (WHO), has spread across the globe [1], [2]. The purpose of this paper is to extend the recent work through the literature review from varied fields to assess neighborhood-level intervention methods, and the advantages of planned neighborhoods, in the containment of the epidemic, as compared to traditional developments, and future preparedness, in the wake of COVID-19, and other epidemics. Various measures such as social distancing, lockdown, and home quarantine, (the suspected individuals are kept on home in isolation [2], are taken up to contain the virus, as the existing health care provisions are insufficient to cater to the surge [3], giving a breathing time to health care personnel and facilities. Addressing the facilities of neighborhoods such as health care, encouraging online shopping modes in reducing footfalls, transforming public open spaces to facilitate emergencies, schools with fewer students, are some of the important measures for the future preparedness of future epidemics.

Key Words: COVID-19, Indian neighborhoods, Proximity, Neighborhood characteristics, Quarantine.

1. INTRODUCTION

The novel Coronavirus outbreak, termed as COVID-19 is threatening the world, which has been declared by WHO (World Health Organization), as pandemic (R. Singh & Adhikari, 2020), which doesn't have preventive or curative medicine or a vaccine presently. Since the vaccines are under trials the health care requirement will be under tremendous stress. The COVID-19 is unique, as there is a difficulty in asymptomatic people spreading the virus to others. The measures such as lockdown (entire city go on closure) [6], social distancing measures and the restrictions on social interactions, geographic quarantine, (movement restriction of residents), home quarantine, along with minimizing social contacts by the closure of schools, supermarkets, cinema halls, restricting, mass gatherings, and adopting work from home, etc, used for containment the surge of COVID-19 [7]. These measures affect the social interactions of the area as the neighborhoods are a bundle of social interactions. This paper identifies the advantages of planned neighborhoods over traditional developments and highlights future preparedness for the epidemics through the study of available literature.

2.0 LITERATURE REVIEW:

The COVID-19 situation being unique and the pandemic has brought new thoughts into planning which have not been given a thought earlier. There is thin research on this as far as neighborhood planning concerned. Relevant most important papers are discussed here which helped write this paper.

The paper by Allam, Z., & Jones, D. S. (2020), has discussed the role of modern methods such as smart city technology and related methods, data sharing by electronic means in the COVID-19 control measures by providing transparency of data sharing. This paper highlighted the modern methods useful in disaster controls) [6].

Dhingra, M., & Chattopadhyay, S. (2016) discusses the smart neighborhood interventions and what methods the traditional neighborhoods were following in their sustainable smartness. This paper discusses the public participation level of these traditional ones. This paper is useful in understanding the traditional setting of neighborhoods [8].

This paper by Meenakshi (2011), has been very useful in understanding the basics of neighborhood concepts its evolution, and present-day status of the concept. This is a good paper in understanding the concept [9].

Ebrahim et al. (2020) has discussed the community mitigation strategies adapted in the containment of epidemics such as restrictions on public gatherings etc along with the quarantine methods in gaining time for the healthcare professional's preparedness [7].

Ramachandran, K. K., & Karthick, K. K (2019) highlights the importance of on-line methods of shopping, etc, and their role in reducing foot-falls, and options left for small retailers in online modes. This paper is a guideline for understanding the Indian situation of Online methods [10].

Zhang et.al, (2020) have discussed the future measures such as control on social interactions use of masks, other aspects while restart of economic activities following control measures at the individual level to recoup the economy [11].

The literature available on the health front is abundant but when it comes to urban planning interventions especially at the neighborhood level there is a huge gap and need to do more research, which this paper tries to find out.

3.0 NEIGHBORHOOD PLANNING

The neighborhood planning has been a widely accepted tool of Urban planning, ever since Perry advocated the

Neighborhood concept in 1929 [9], [12]. The neighborhoods are self-contained places rather than just houses with related facilities [13], sharing their entities with improved mental and physical abilities, with specific boundaries. The neighborhood planning concept's social and physical spheres foster neighborly interactions, constituting good housing, ('since man is a social animal'), and social interactions are necessary for his existence [14], provide opportunities for face-to-face contacts, and enhance the sense of community among the residents [12]). In urban development, neighborhoods act as a barrier to infections, because the facilities located for the designated area, encouraging orderly growth of the unit [13], thus the infections may be restricted to a particular neighborhood, rather than spreading to other areas by well-planned neighborhoods rather than the organically grown areas.

3.1 COVID-19 CONTROL MEASURES:

During the H1N1 Influenza pandemic in 2009, it is noticed that areas with high density have more impact of spread as compared to the areas where the densities are low [15], and the planned neighborhoods have more advantages in tracking the movement of people within the locality. The physical design and social interaction can best be balanced primarily at the neighborhood level [16]. COVID-19's virus containment measures posed a challenge to the interpersonal social and community interactions with the measures of social distancing and isolation [14]. There is a probability of social unrest due to isolation measures which may affect the social cohesion [17] since man's social interactions are key to his existence and his neighborhood as individual's social interactions contribute from their daily activities to the economy [18], which has been put to test in this COVID-19 situation. The way out is needed to continue social isolation as well as interpersonal relationships. The virtual communities are places where people communicate electronically, on similar interests [19] in the context of good controls, the virtual communities have added advantage during the restrictions of social distancing and lockdown in getting essential services with maintaining social isolation. The online approaches and virtual services enhance social cohesion through free access to educational and cultural resources through online modes. People can be kept in interaction by way of social media. The civil services organizations are using virtual services during this lockdown period, maintaining social cohesion during the mandated social distancing periods. These are engaging classes and counseling sessions in overcoming social isolation issues [20]. Lifting the social isolation measures with the opening of transport links and other activities, a gradual increase in social contacts is a priority of policymakers to set to the original position of cities in recouping the economy, in the post-social isolation point [11]. As rightly pointed out by the Chief Minister of Andhra Pradesh, Mr. Jagan Mohan Reddy, and other Chief Ministers of Indian states in line, that it's an accepted fact that the COVID-19 is going to stay until a

vaccine or medicine is invented and one has to live with the virus, meaning the social distancing has to continue in the future. These measures will guide us to work on the long-term measures at the neighborhood level one should attempt to adopt, to get prepared for the future.

3.2 TRADITIONAL AREAS VS PLANNED NEIGHBORHOODS:

The traditional spaces are organic, compact with high density, developing into a wide range of shapes responding to site constraints, economic status of the locality [8]. These spaces are not easily approachable due to their organic pattern, where the control of epidemics becomes difficult to handle, including the sanitization measures. Since these have unplanned growth, the areas are difficult to attain social distancing, etc. The neighborhoods designed with the neighborhood concept where the facilities are well located and open spaces are planned and are a planned development. These planned neighborhoods have scope to restrict and control the area during the relaxations and monitor individual movements when they move out to get essential commodities and vegetables. As these are equipped with planned facilities such as local shopping within its boundaries, it will be beneficial in tracking individual movements and getting data on his/her movements in case of the suspected virus, also benefiting the police personal to define boundaries. Whereas in the organic developments this is not possible as the specific facility provisions are not made and the aspect of the travel not defined, allowing it to spread throughout a larger area as people commute to get their daily needs and their trips are not easily traceable. Higher densities and insufficient social distancing, unplanned growth make them more prone to infectious diseases, and containing the epidemic becomes harder. The use of technology in person to person socio-economic contacts like online activities will be effective in containing the epidemics [7]. The virtual communities play an important role in the neighborhoods of post Lockdown and social distancing measures. The concept of virtual cyberspace is a recent idea that extends that a community can exist without a local place, existing in cyberspace. The virtual city doesn't have the physical constraints of the real-world and can overcome the complexities of city design [21], which will in-turn give less of social personal contacts and could be useful tools in reducing the crowding of facilities especially when we need to restrict social movements and continue social cohesion. The interpersonal connectivity can be preserved with the use of technology to succeed against a fast-emerging epidemic like COVID-19 while stopping disease transmission [22]. The social distancing measures and isolation measures can be imposed effectively since people can continue to operate with the help of IoT (Internet of Things) by the continuation of social contacts, online shopping to avoid unnecessary trips. The app-based approach for the suspected in quarantine with the mobile app system of google maps will facilitate better quarantine measures. As per Krishnan (2019), the suspicious

person needs to download the app when he comes for screening and the IMEI number will facilitate his movement and other members nearby.

3.3 FUTURE EPIDEMICS- NEIGHBORHOOD PLANNING

The planned approaches can provide some protection from the Virus, such as social distancing, masks, and PPEs, etc., including the use of technology such as the 'Arogya Sethu' app' created by the Government of India, to track the movement of individuals which is an easier way to identify the pattern of movements in a given neighborhood. The existing CCTV data can also be useful in tracking the movement of individuals in case the data is to be monitored. The confirmed person movements can be traced in the period by Google traffic API and Google Map timeline API and other measures of recording the pattern of trips of individuals [3]. The footfall reduction will be noticed in conventional shopping by the online shopping mode in this COVID-19 situation. Ramachandran in his study [10], found out that in the Indian context the local shopping is affected by online shopping and made these shopkeepers also to join online and more delivery models which are a measure to avoid the unnecessary footfall in shopping areas. Post COVID-19 neighborhoods should adopt door delivery options for all commodities in the future, to push ease of social distancing measures. The convenience store in a neighborhood can transform itself with door delivery mode in future shopping needs of neighborhoods. Matt (2018) finds out by study that Higher-income households are using online purchases for grocery but others prefer local stores for the same.

The other factors that need to be addressed are health centers. Social isolation and lockdown provided for more opportunities for the medical staff to intervene with the limited resources at their disposal, and buy significant time to procure additional resources, for controlled management of the epidemic. The health care can reach the needy as the spread of epidemic as the COVID-19 has the possibility of community transmission in case of the affected is not isolated. The Indian health care system has inadequate resources or medical staff to deal with this emergency [3]. The equipment such as PPE kits masks and ventilators need time to procure as our neighborhoods are not prepared for the same since it's an epidemic. The local clinics, with the location and proximity to health care facilities, is an important factor affecting their optimum usage [23]. The GOI Ministry of housing and urban affairs (URDPFI Guidelines, M o U D, 2015) recommends a health center over an area of 0.8-1.2 Ha for a population of 15000. National Urban Health Mission (NUHM) covers cities with a population of more than 50,000, NUHM encourages innovation and provides flexibility to design, services concerning the target population's needs. Public health is the key to developing infrastructure,[24], and analysis,

planning, and innovation are essential in designing an effective urban health system.

Vasisht et al., (2015), pointed out that the use of Spatio-temporal mapping, remote monitoring and management, and enhanced cloud computing capabilities, can be useful in the sophistication of public healthcare which will lead to better urban management potential [6]. Mr. Surender Bagga in the webinar on 18 Apr 2020, pointed out isolation rooms in large apartments in the neighborhoods with and special isolation room may become a practice in the future. The neighborhoods have to be equipped with the latest technology, with the availability of technologies such as Big Data, AI, IoT, machine learning and deep learning, blockchain technologies, and crowd computing is now easier to monitor and attain advanced neighborhoods, and the data derived by the usage of a myriad of connected devices, sensors, camera and systems to be integrated to the infrastructure of these neighborhoods [25]. Where the entire neighborhood can be under control in the course of pandemic challenges. The use of thermal cameras or Internet of Things (IoT) sensors can deliver better results in containing the epidemics [6]. The data-driven neighborhoods have an edge over the others. The role of open spaces is also one of the main themes of the neighborhood concept Perry (whose concept was adopted as a tool of neighborhood planning throughout the globe in one form or the other [9], advocated a 10% of open spaces as a neighborhood requirement, with no thorough traffic in the internal areas with assigned parks and other open spaces that are walkable. The neighborhood planning will benefit a healthy environment with its designated open spaces parks etc. The Outdoor spaces provide the prospect to encounters and potential interactions, of all age groups [26]. In the neighborhood planning, proximity to public open spaces is quoted as a key to encourage physical, mental, and social outcomes such as improved air quality, quality of life, and social cohesion [27]. The open spaces which are centrally located well equipped, serving all age groups and with safety are preferred by the neighborhood population.

The open spaces in the wake of epidemics give breathing spaces and are offering green spaces with more natural air and sustainable environments, as compared to compact spaces of organic developments [28]. These open spaces can be converted into health care facilities, temporary quarantine centers with temporary shelters, and meeting points to address the individuals since space availability becomes advantageous. Well-designed is designed for all age groups with the required equipment, open spaces can influence better health of the inhabitants by way get more immunity and better health to fight the epidemics. The neighborhood up tech-friendly neighborhoods to monitor the movements of people, and provide better facilities easily, as compared to traditional developments planning has more advantages of having a more organized setup, as the planned developments will be useful in monitoring the area, set.

4.0 DISCUSSION

In the wake of the COVID-19 situation, where the future preparedness is inevitable. With the lessons learned by the outbreak of the Pandemic. By adopting neighborhood planning measures that will benefit in the control of sudden epidemics, allowing required social distancing, and yet continues to function with the Tech-savvy approaches one can easily contain these sudden surges of viruses.

The planning of neighborhoods is an accepted element of social and physical organization, enhancing socio-cultural bonds. Creating better livable spaces. The conventional high dense organic developments are difficult to handle in the wake of controlling the epidemics. The neighborhood planning, since being more organized is more adoptive to IoT enabled technological advances such as apps, cc TV monitoring, and Neighborhood mapping provides a tool for understanding the workability of the community-based public health programs [29]. In addition to the usual way of summarizing the demographic characteristics of communities, and the neighborhood physical characteristics, using maps, Map Info, ArcGIS and EpiMap, can be useful tools for better identification sections of a target area. The increased risk can be controlled for the safety and management of the population residing within it. The virtual neighborhood concepts can be easily applied for the facilities such as convenience stores, health centers, and open spaces where the footfall can be managed by a better understanding of the area by IoT enabled technologies.

The conventional organic layouts are difficult to control these situations, as these are less organized as compared to the planned neighborhoods, though these also can be IoT enabled, the ease with which we can control planned neighborhoods is not easy in the organic ones. The facilities of health care need a new outlook by, strengthening the existing health center with more technological advances and availability of more isolation ward in the health centers and better equipment such as PPEs, etc in the neighborhood level, benefit in easy control of the sudden outbreak of viruses [30]. The conventional health centers to be reworked out for new measures of social distancing and isolation areas, more movement spaces around the facilities. The convenient shopping also to be encouraged for reducing footfall by encouraging app-based home delivery of the daily needs grocery etc., and payments which will also benefit in tracking the movement of people, as well as the control of the neighborhood, is easier. Adequate social distancing and sanitation measures to be added at open spaces. The conventional areas where organic growth is evident have to be dealt with in easing the compactness and adding the benefits of neighborhood planning wherever possible, by use of more monitoring of the area by data-driven technologies.

5.0 CONCLUSIONS

The need for the hour is to extend the benefits of the neighborhood planning such as better planned facilities, better organized open spaces, well-monitored, safe places, and allowing fewer footfalls on the facilities, to the conventional organic areas. The density aspect has to be re-looked into, to allow social distancing and other measures, in case of the control of future communicable diseases and present state of continuing the social distancing and other hygienic measures. The use of better technology in reducing human interventions, in the usage of smart city facilities better mapping of residential areas with monitoring and other measures, will benefit further, the COVID-19 is going to stay with humanity quite some time, before its eradicated or some vaccine or medicine is invented. The pattern of some of the existing settlements, slums triggers alarm bells as these are areas with (UN-Habitat, n.d.), low interventions of proper planning, which are vulnerable to these outbreaks of epidemics. Scholars need to identify the planning guidelines to the existing areas by observing the Neighborhood planning, to apply them judiciously in the future planning of new areas and redevelopment of existing pockets. Future research needs to address these emergencies incorporated into neighborhood planning and implementation.

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To the best of my knowledge, this paper has significantly extended such idea of advantages of planned neighborhoods

The paper does not pretend to provide an exhaustive review of the literature on neighborhoods, which extends to thousands of publications and may have missed out on important mentions. The Author is also aware that, the paper is based on a recognition that it would not be possible to review all relevant documentation.

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REFERENCES

- [1] G. Lippi and M. Plebani, "Laboratory abnormalities in patients with COVID-2019 infection," *Clin. Chem. Lab. Med.*, 2020, doi: 10.1515/cclm-2020-0198.
- [2] S. S. Nadim, I. Ghosh, and J. Chattopadhyay, "Short-term predictions and prevention strategies for COVID-2019: A model based study," 2020, [Online]. Available: <http://arxiv.org/abs/2003.08150>.
- [3] A. Krishnan and I. G. et all Narayanan, "Simple Method of Improving Quarantine for CoronaVirus

- (COVID-2019) Through Location-Based Web-Services," 2019.
- [4] C. Telles, *Covid-19, an overview of virus reproductive emergent social transmission behavior*. 2020.
- [5] R. Singh and R. Adhikari, "Age-structured impact of social distancing on the COVID-19 epidemic in India," no. March, 2020, [Online]. Available: <http://arxiv.org/abs/2003.12055>.
- [6] Z. Allam and D. S. Jones, "On the Coronavirus (COVID-19) Outbreak and the Smart City Network: Universal Data Sharing Standards Coupled with Artificial Intelligence (AI) to Benefit Urban Health Monitoring and Management," *Healthcare*, vol. 8, no. 1, p. 46, 2020, doi: 10.3390/healthcare8010046.
- [7] S. H. Ebrahim, Q. A. Ahmed, E. Gozzer, P. Schlagenhauf, and Z. A. Memish, "Covid-19 and community mitigation strategies in a pandemic," *The BMJ*, vol. 368, no. March. pp. 1–2, 2020, doi: 10.1136/bmj.m1066.
- [8] M. Dhingra and S. Chattopadhyay, "Advancing smartness of traditional settlements-case analysis of Indian and Arab old cities," *Int. J. Sustain. Built Environ.*, vol. 5, no. 2, pp. 549–563, 2016, doi: 10.1016/j.ijsbe.2016.08.004.
- [9] Meenakshi, "Neighborhood Unit and its Conceptualization in the Contemporary Urban Context," *J. Inst. Urban Planners*, vol. 8 no3, no. September, pp. 81–87, 2011.
- [10] K. K. Ramachandran and K. K. Karthick, "Effect of Online Shopping in Local Market of India," no. 6, pp. 817–819, 2019, doi: 10.35940/ijeat.F1155.0886S19.
- [11] L. Zhang *et al.*, "What is required to prevent a second major outbreak of the novel coronavirus SARS-CoV-2 upon lifting the metropolitan-wide quarantine of Wuhan city, China," *medRxiv*, p. 2020.03.24.20042374, 2020, doi: 10.1101/2020.03.24.20042374.
- [12] L. L. Lawhon, "The neighborhood unit: Physical design or physical determinism?," *J. Plan. Hist.*, vol. 8, no. 2, pp. 111–132, 2009, doi: 10.1177/1538513208327072.
- [13] T. Kamble, "Minimum Interventions to Raise Existing Neighborhood Sustainability: Solution for Urban development," no. September, 2017.
- [14] J. Singh and G. Singh, "COVID-19 and Its Impact on Society," vol. 2, no. I, pp. 168–172, 2020.
- [15] M. K. Arti, "Modeling and Predictions for COVID 19 Spread in India," *Res. Gate*, no. April, 2020, doi: 10.13140/RG.2.2.11427.81444.
- [16] N. N. Patricios, "The Neighborhood Concept: A Retrospective Of Physical Design And Social Interaction," vol. 12, no. 3, pp. 240–258, 2015.
- [17] G. J. Rubin and S. Wessely, "The psychological effects of quarantining a city," *BMJ*, vol. 368, no. January, pp. 1–2, 2020, doi: 10.1136/bmj.m313.
- [18] T. C. Reluga, "Game theory of social distancing in response to an epidemic," *PLoS Comput. Biol.*, vol. 6, no. 5, pp. 1–9, 2010, doi: 10.1371/journal.pcbi.1000793.
- [19] S. Gupta and H. Kim, "Virtual Community : Concepts, Implications , and Future Research Directions," *Tenth Am. Conf. Inf. Syatem*, no. August, pp. 2679–2687, 2004.
- [20] UN, "Shared Responsibility, Global Solidarity: Responding to the socio-economic impacts of COVID-19," no. March, 2020.
- [21] A. Tungare, "Le Corbusier's Principles of City Planning and Their Application in Virtual Environments," p. 176, 2001.
- [22] A. J. Stier, M. G. Berman, and L. M. A. Bettencourt, "COVID-19 attack rate increases with city size," pp. 1–23, 2020, [Online]. Available: <http://arxiv.org/abs/2003.10376>.
- [23] R. Hiscock, J. Pearce, T. Blakely, and K. Witten, "Access and Utilization Is Neighborhood Access to Health Care Provision Associated with Individual-Level Utilization and Satisfaction ?," *Heal. Res. Educ. Trust*, no. 2183, pp. 2183–2200, 2008, doi: 10.1111/j.1475-6773.2008.00877.x.
- [24] M. Das Gupta, "Public Health in India : An Overview WPS3787," no. June, 2014.
- [25] Z. Allam, *Cities and the Digital Revolution*. 2020.
- [26] N. Farida, "Social Interaction in Communal Outdoor Spaces of Residential Housing Estates in Biskra-Algeria," *Int. J. Environ. Ecol. Fam. Urban Stud.*, vol. 3, no. 1, pp. 45–58, 2013.
- [27] M. J. Koohsari, J. A. Karakiewicz, and A. T. Kaczynski, "Public Open Space and Walking: The Role of Proximity, Perceptual Qualities of the Surrounding Built Environment, and Street Configuration," *Environ. Behav.*, vol. 45, no. 6, pp. 706–736, 2013, doi: 10.1177/0013916512440876.
- [28] R. K. V. Veluru and D. N. Veluru, "Neighborhood

Safety Measures in the wake of COVID-19 for home quarantine waste generation in India," *Int. J. Sci. Eng. Res. Vol.*, vol. 11, no. 5, pp. 899–906, 2020, [Online]. Available:

<https://www.ijser.org/onlineResearchPaperViewer.aspx?Neighborhood-Safety-Measures-in-the-wake-of-COVID-19-for-home-quarantine-waste-generation-in-India.pdf>.

- [29] R. E. Aronson, A. B. Wallis, P. J. O'Campo, and P. Schafer, "Neighborhood mapping and evaluation: A methodology for participatory community health initiatives," *Matern. Child Health J.*, vol. 11, no. 4, pp. 373–383, 2007, doi: 10.1007/s10995-007-0184-5.
- [30] Y. Ji, Z. Ma, M. P. Peppelenbosch, and Q. Pan, "Potential association between COVID-19 mortality and health-care resource availability," *Lancet Glob. Heal.*, vol. 8, no. 4, p. e480, 2020, doi: 10.1016/S2214-109X(20)30068-1.
- [31] UN Habitat, "UN-Habitat Covid-19 Key messages."