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Design guidelines for an effective workspace during the pandemic

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ABSTRACT

The coronavirus (COVID-19) pandemic has made employees nervous about returning to office spaces, as working situations in offices incorporates multiple shared surfaces, minimal scope for maintaining social distancing thereby increasing the risk of virus transmission. During the pandemic, both the government and the private sector witnessed significant modifications in their working methods. Although many adopted remote working, certain sectors such as banks, courts and health-care administrative offices have probably experienced more changes as most of them were open and operational throughout the pandemic. Considering the current pandemic situation and with all the Government and health mandates that has come into effect in an office workspace, new guidelines and design interventions needs to be identified to secure employee's health and well-being within a shared workspace. This study is aimed at exploring the various organizational approaches in making an office space more welcoming during the pandemic and understanding the importance of designing a healthy interior environment. The nature of this research is intended in the direction to explore the potential ideas where remote working option is not feasible or where the nature of the work demands physical presence. Besides following the general measures, if certain changes or alterations can be done to an existing office space without having to completely change the interiors, could add an extra layer to the defensive measures.

Keywords— Workspace, Office, Open plan, Shared workspace, Guidelines, Pandemic, Re-designing.

1. OBJECTIVES

Infectious diseases such as the novel coronavirus and many other seasonal colds and flus are more likely to spread in poorly designed workspaces where people are grouped close together. By adhering to certain design guidelines, organizations could help reduce viral transmission risks within an interior work environment. The main objective here is to understand and identify potential design solutions that could be incorporated as adaptive measures by various organizations in order to provide a safe and healthy working environment in an office during and after the pandemic.

2. INTRODUCTION

According to World Economic Forum (2020), there is a need of global cooperation within various organizations to control the spread of virus transmission across different working environments. Particles containing the Covid-19 virus can travel more than 6 feet, especially within an enclosed space (OSHA, 2021). Every organization has a unique and different culture of working, as are the circumstances of each individual employee. Many people have embraced this new way of working remotely, while others have grown tired of it and waiting eagerly to return back to their usual office routines. The Covid-19 virus affects different people in different ways and this makes people working in a workspace more prone to health risks. The ongoing epidemic has pushed us to reconsider the design and planning of office spaces, indicating that these places need to be redesigned in order to provide the employees with a safer and healthier working environment. (McKinsey, 2020; World Economic Forum, 2020). In order to bring about significant changes in a workspace, the various aspects of modern workplaces will have to change if employees are to safely return to their desks (BBC, 2020).

The workplace is more than simply a structural building; it's a place where people form bonds, collaborate, and develop (Smith, 2020). The office environment can have a significant impact on the employees. The desk areas, collaborative meeting rooms, break

out areas or cafes in office areas are critical components of employees working environment. They can have an impact on the culture, productivity, and efficiency of organizations team, as well as their overall well-being at work. It thus becomes essential to design spaces that foster a positive work environment, keeping health and safety as the utmost priority (Hirehive, 2020).

3. AN INSIGHT INTO SOME OF THE OFFICES RUNNING DURING THE PANDEMIC

Banks: Bank employees have been one of the most vulnerable segments to the COVID infections due to the nature of their work. There has been a sense of fear among bank employees over the increase of covid-positive cases in the recent times across various public sector banks in the country. Employees showed their displeasure of working for long hours even in containment zones and that the footfall in the branches were on the rise, with customers walking in to update pass book and other menial jobs (The Hindu Business Line, 2020). While banking was an essential service, bank employees were not treated as frontline workers. In an interview article the president of Andhra Bank Award Employees Union (ABAEU) State, M. Kishore Babu said, “There are no thermal scanners at the branches. Most of the branches have no security guard to control the visitors. Due to lack of space, it is very difficult to maintain physical distance” (The Hindu, 2021). As per data compiled by the All-India Bank Employee Association (AIBE), a total of 1.5 lakh cases were reported and 1200 deaths across various banks around.

3.1 Healthcare Administrative Offices in Hospitals

Healthcare administrative jobs are undoubtedly one of the most essential as these front and back-end office employees are responsible in organizing and managing healthcare facility’s operational efficiency (CCCK, 2020). Due to the increasing cases in the number of covid-patients, there has been quite a rush in the hospitals treating covid-patients. With long queues, back-to-back registrations and the required hospital formalities that these employees have to manage; makes them more vulnerable to the spread of the coronavirus infection. To work under such an environment, necessary measures need to be taken both at design level as well as following the basic safety protocols laid down by health organizations.

3.2 Learnings from the past

There has been considerable amount of research that has already been done and the world has witnessed how earlier pandemics have impacted the built environment (Budds, 2020). Infectious disease has already altered the architecture, design, and urban planning of our cities. Many of the current architectural, design and planning trends may be traced back to comparable steps taken in the past to maintain the health, hygiene, and comfort of people working under different environments. Our constructed environment has always demonstrated the ability to adapt in the face of adversity. (Chang, 2020). Drewnowski et al. (2018) proposed the moving to health (M2H) paradigm shift, which aimed to build more links between health and the built environment. Architectural modernism is typically reduced to a set of ideas advocating purity of form, rigorous geometry, modern materials, and a rejection of embellishment, which was the dominant mode of design from the 1920s until the 1970s. These concepts were developed in response to the aftermath of war and the diseases that followed that characterized the first half of the twentieth century (Chang, 2020). Humans have always looked to physical space to heal and cure illness, as can be seen in Philip Lovell’s house designed by Richard Neutra. A modernist house designed for a healthy lifestyle, inspired by buildings designed to cure tuberculosis. Cities, infrastructure, architecture, and interiors have all been redesigned in the name of reducing the risk of infectious disease. Enough research and evidences have been witnessed of how humans have responded to infectious disease by redesigning physical spaces. (Budds, 2020).

3.3 Possibilities of virus transmission in workplace

The way people behave and interact in the workplace contribute to the spread of different viruses via direct or indirect contact that can result from shaking hands, touching contaminated surfaces and sneezing and coughing (Reynolds, Kelly A et al, 2016). Surfaces (desks, tables and platforms of pantries, cafeterias) and objects (desktops, keyboards, telephones, printers) have the most potential for contamination as employees regularly keep using them or touches them, which is considered one of the main ways of virus spread (WHO,2020). Figure 1 depicts how the latest Covid-19 virus transmits. Figure 2 depicts the survival time of the coronavirus on different surfaces. Usually offices exhibit products, furnitures and surfaces made in different materials, thereby having an impact of contamination for different durations.

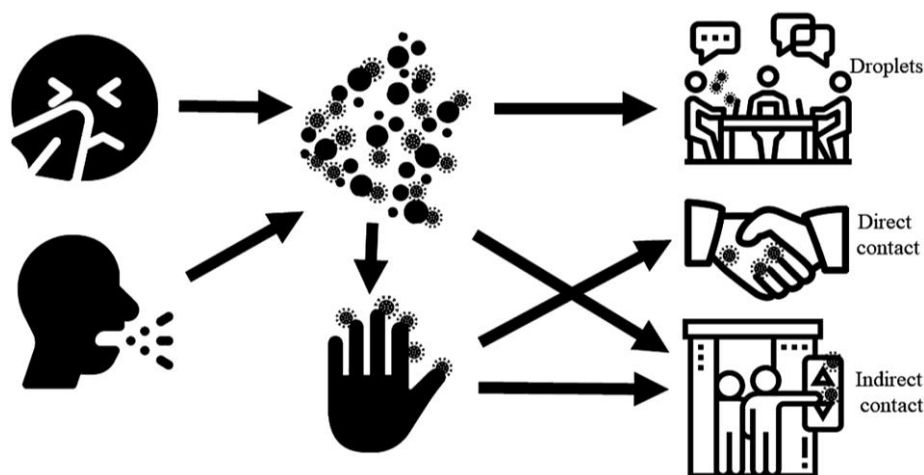


Figure 1: The COVID-19 virus transmission routes

(Source: <https://acsjournals.onlinelibrary.wiley.com/doi/abs/10.1002/ency.22280>)

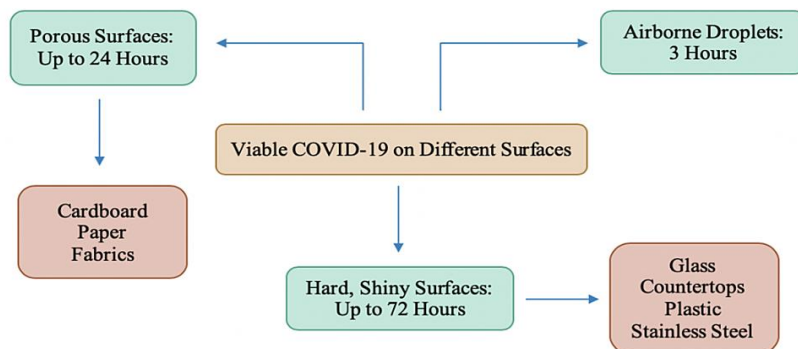


Figure 2: The survival time of coronavirus on different surfaces
(Source: <https://www.cbc.ca/news/health/covid-19-surfaces-1.5509619>.)

3.4 General measures at present

Organizations like WHO, World Economic Forum, Centres for Disease Control and Prevention, State ministry health departments and many other global giants have already laid down some basic guidelines.

- Opting for remote working option.
- Allowing only 50% attendance of employees to the office.
- Maintaining social distancing via changing work shifts or by following the 6-foot distance seating.
- Temperature check at the entry.
- Wearing face masks at all times.
- Hand washing and sanitizing at frequent intervals.

4. METHODOLOGY

The study of this paper is based on mixed method research. First, an exploratory research was carried out in order to determine the nature of the problem. The data collected for the exploratory research was not intended to provide conclusive evidence, but to have a better understanding of the problem and to be able to provide better insights to the current pandemic situation in the context of office spaces.

The data and information collected was to analyze potential aspects of the research study, where Grounded Theory approach was applied. As explained best by Strauss and Corbin (1998) that... 'Data collection, analysis, and eventual theory stand in close relationship to one another...the researcher begins with an area of study and allows the theory to emerge from the data...grounded theories, because they are drawn from data, are likely to offer insight, enhance understanding, and provide a meaningful guide to action'. Grounded theory (GT) is a method that is both structured and yet provides flexibility to the researcher. One of the defining elements of GT is that it strives to build theory that is grounded in data, with the aim of constructing an explanatory theory around the subject of inquiry (Glaser & Strauss, 1969; Byrant & Charmaz, 2007; Chun & Birks, 2019). Glaser and Holton define GT as 'a set of integrated conceptual hypotheses systematically generated to produce an inductive theory about a substantive area' (Glaser, Holton, 2004).

Qualitative research is the most effective way for exploring research (Creswell, 2007). As identified by Creswell (2007), there could be four approaches for gathering qualitative data that researchers might use. Fieldwork, observation, interviews (individual or focus groups), and document analysis are examples of these methods (Creswell, 2007). The qualitative and comparative component of the methodology encourages the development of responses to social factors in terms of what happens and why. It further allows a more in- depth and thorough analysis of the already researched theories based on the concepts extracted from the data (Strauss & Corbin, 2012).

4.1 Data collection sources

Both primary and secondary sources of data were collected over the period of last six months. The data and information collected was derived from various trusted sources which included well established global firms' articles and journals, case study reports, blogs, interviews, survey reports; covering both national and international data sources through online mode of communication. Publications and reports issued by global industry giants like McKinsey, Delloite, KPMG, Forbes, PwC, EY and insights from research institutes like Gensler on the current pandemic situations of workspaces and future predictability of what these spaces might look like, were reviewed and compared. Time to time guidelines issued by globally recognized organizations like WHO (World Health Organization) and World Economic Forum since March 2020 were considered majorly. Also, regular updates and guidelines from MoHFW (Ministry of Health and Family Welfare. Government of India) were taken into consideration.

A primary research was carried out in between Nov'2020 to March'2021 by interviewing people and through observation (capturing photographs of the same) in some of the Government sector offices like banks (SBI), post-offices, District courts, back-end hospital administrative offices in the city of Jorhat, Assam (India). These offices were active and were running with either full or 70% employee capacity during the above-mentioned time period.

4.2 Data Analysis

According to Neuman (2011), all the data, case study reports or parts of social life that are considered for analysis are the key to developing the basic concepts. Neuman (2011) further indicated that the units of analysis could possibly include individuals, peoples, groups, organizations, movements, institutions and countries as well.

Constant comparative analysis used in GT is an analytical process for coding and category development (Birks, Mills 2015). All the data collected through various sources online were then sorted out and categorized under different headings to make a comparative analysis. This procedure entails the researcher comparing episodes in one category to incidents in other categories, both similar and dissimilar. Future codes are compared to each other, and categories are compared to each other. The new data is then compared to the information gathered earlier in the analytical processes. The primary data collected gave an in-depth understanding of how physical office spaces have responded to the pandemic and gave an insight on the various safety measures adopted by them. Constant comparison and refining analysis at different stages of data collection helped in critically evaluating the findings.

Table 1: Summary of common issues faced by Government sector offices (Compilation from the primary research conducted). Own collaboration.

Banks/Post office/District courts/Healthcare administrative offices	
Issues	Implications
Poor ventilation	Leads to contaminated air circulation with the enclosed space. Inhale and exhale of virus-laden air, thus lowering the overall concentration and causing minor discomforts.
Congested circulation spacing between worktables	More chances of contracting the virus due to closed proximity between two persons while seating or walking.
Shared devices and equipments like printers, fax machines, note counting machines, water filters	Indirect transmission of the virus due to multiple people sharing the same devices.
Lack of technology driven smart devices	Not using smart technology options like sensed biometric systems for login in (still using traditional methods of signing in the register book), or sensed door openings, sensed water/coffee vending machines.
Very few or no indoor plants at all.	Lack of biophilia within sterile and enclosed environments leads to fatigue and effects the efficiency of the employees while working for long hours.

Table 2: Different categories identified for insight-driven action. Own collaboration.

Category	Suggested plan of action
Indoor air quality	Improving the inside pollutant air
Natural light and ventilation	Maximum excess to natural light and allowing cross-ventilation within the space. Good ventilated spaces protect the occupants against airborne transmission.
Furniture/space layout	Change in the layout or modifications to the existing furniture's
Technology	Using touch-free systems
Visual graphics	The use of visual graphics to convey or educate do's and don'ts
Materials	Minimizing the use of toxic materials

Table 3: Summary of common factors contributing to poor indoor air quality and its implications. Own collaboration.

Poor Indoor Air Quality	
Biological contamination	Implications
Spread of viruses through respiratory diseases such as coughs, colds, influenza viruses, and coronaviruses especially in closed and air-conditioned spaces.	Some might be asymptomatic, relatively mild. But people having reduced immunity to infection, can have severe health consequences. Low level of concentration, feeling lethargic reducing work efficiency. Severe health conditions could lead to taking long leaves from office.
Spread of viruses through common space like touching elevator buttons, door knobs and shared surfaces such as worktop platforms, printers, and pantry cooking equipments like coffee machines, induction, stove and microwave.	
Chemical contamination	Minor discomfort or irritation in nose, eyes, throat, headaches, nausea resulting in loss of concentration
Chemical pollutants from surface paints, cleaning products, insect/mosquito repellents, office equipment materials like printers, markers, and adhesives.	

5. RESULTS

Based on the comparative analysis of the acquired data from both primary and secondary research, researchers were able to identify and develop the core concepts which led to formulate the required adaptive guidelines for the intended subject of inquiry. In most of the government offices like post office, bar council office, banks and many other administrative offices have more open plan workspace where tables are adjoined and they hardly have enough space for maintaining social distancing if working in full attendance. Most of the offices have been using the same office layouts during the ongoing pandemic period. Even if there is partition between two individuals, it is more often low heighted semi- enclosed barriers. They use shared tables and other equipment like shared printer machines, or coffee machines. Hence, the major points of consideration that could be brought out from the above findings were:

5.1 Minimizing the shared space usage

In order to reduce exposure and minimize the transmission of the virus between fellow workers, the best way is to limit the access to the shared spaces. As per social distancing norms indicated by CDC (Centers for Disease Control and Prevention, 2021), people require to maintain a six-foot separation at all times (CDC, 2021).

- Minimizing access to shared workspaces is the simplest way to comply.
- However, this isn't always possible, and if certain areas of the workplace need to be shared then adjustments should be made to accommodate distance in such situations.

5.2 Rearranging the office layout configuration

Considering the remote working option adopted by many offices, if half of an office's workers are going to work remotely on any given day, individual office spaces can be reduced as a consequence of this, prompting businesses to rethink their office configurations and layouts throughout the long run and move away from assigning individual spaces.

5.3 Use of Dividers and Partitions

Existing offices with open plan layout or shared table workspace where maintaining the required six-foot distance is not possible, could install screen dividers or partition shields between two people to block the transmission of air borne viruses (e.g., plexiglass, flexible strip curtains). Preferably with a material that allows transparency so as to allow visibility and eye contact depending on the nature of work and workplace. The barriers should restrict face-to face direct interactions between individuals in order to prevent direct transmission of respiratory droplets. If an opening is required in the partition then minimal size of opening should be considered. While designing and installing these barriers, one should also consider the posture of users (whether it will be used sitting or standing).

5.4 Maintaining hygiene all throughout the space

Touch-free technology could be implemented in elevators, security access, and other areas in the offices. This may take the form of a greater use of sensors and voice recognition. Multiple touch-free sanitizing machines could be installed throughout the office at entry and exit points of different rooms.

5.5 Improving indoor air quality and ventilation

Strategies to improve health such as allowing more natural sunlight indoors, improved ventilation, eliminating or having fewer toxic substances, and incorporating indoor plants can help enhance better air quality. The ability to improve or increase the ventilation rates as needed (such as during the COVID-19 epidemic) may vary, and may be restricted due to their original design requirements and implementation. Air filters or purifiers could be installed in places which are enclosed with less provision of cross ventilation or has minimal window openings. Devices such as portable consumer air cleaning devices may be beneficial in smaller rooms, provided it is appropriately sized for the space. In case of existing spaces, where there is less provision of improving ventilation, the addition of local air cleaning or disinfection devices, such as GUV(Germicidal ultraviolet) or UVGI (Ultraviolet germicidal irradiation) can also be beneficial. Biophilic design elements such as adding indoor plants or green covers within the space can also help in mental recovery and stress relief, other than purifying the inside air. The above analysis suggest that improving the quality of the indoor environment is an important aspect for organizations seeking to improve employee performance and well-being.

5.6 Use of Graphical representations

Displaying posters or using digitized medium within the different workspaces encouraging frequent hand-washing or sanitizing, to keep one's desk or individual work area clean, could act as a reminder to the employees.

6. DISCUSSIONS AND INFERENCES

This research study has also brought to notice that the current pandemic situation and some of the different interventions that came along as a means of precautionary measures can be seen as an opportunity to maintain a healthier and satisfying work environment in the future as well. Whether the idea of maintaining hygiene in shared spaces or improving indoor air quality and ventilation, they have long been a subject of utmost importance when it comes to designing healthy workspaces.

As identified by Shain and Kramer (2004), in order to support and promote healthy individuals and healthy workplaces, it is important to recognize that health, as we experience and observe it in the workplace, is largely influenced by two fundamental forces: "what employees bring with them to the workplace in terms of personal resources, health practices, beliefs, attitudes, values, and hereditary endowment" (healthy individuals) and "what the workplace does to employees once they are there in terms of organization of work in both the physical and psychosocial sense" (a healthy environment). The combined impact that comes from the interaction between the physical environment (the safety of places and things) and the psychosocial environment (culture and climate) on health is quite significant (Shain and Kramer, 2004).

Thus, adhering to certain practices at workplace can foster a healthy work environment. The pandemic acted as a reminder that it is very essential to have healthy and safer work environments. And therefore, whether pandemic or not, organizations can continue to follow the above derived guidelines for a healthier and more efficient workplace.

7. CONCLUSIONS

The above concepts derived from analysis of all the data and information shows the need and advantage of certain strategic measures that are important for organisations to provide a safe environment while working during the pandemic. Whereas work from home will still be continued and adopted by many, office life will continue to exist in some way too. The challenge lies in adapting healthy workspace practices.

Apart from the pandemic's current and potentially expanding effects and following the basic safety guidelines laid down by various established organizations, an additional set of design measures adopted by offices can help in smooth functioning of

workflow during the pandemic. In such unprecedented times, even slight development changes may have a long-term impact on an organizations long term goals. Some of these changes may lead to new practices, or empowered rules that lead to new rules and guidelines, while others may simply lead to adaptive measures. These additional measures are intended to assist employees in abating the health hazards in maintaining a healthy environment and are informational in content, and advisory in nature.

However, it is to be noted that, this global pandemic is a bigger issue that requires collaborative efforts from various angles in terms of implementation which is multidisciplinary in nature. There can be other redesign options for different types of offices in the long term, depending on the place and nature of the work. This study caters to only one aspect of workspace measures which is design oriented and could be adapted by offices while working during the pandemic.

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