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A STUDY ON THE PHYSICAL AND MENTAL HEALTH ISSUES TO THE NEIGHBOURING RESIDENCES DUE TO THE CONSTRUCTION PROJECTS IN SRI LANKA

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ABSTRACT

This study investigates the physical and mental health issues experienced by neighbouring residences as a result of construction projects in Sri Lanka. Specifically, it examines the impact of these projects on respiratory distress, hearing impairments, traffic congestion, lack of landscape, and flooding conditions. Additionally, the study explores the psychological effects on residents and emphasises the importance of health and safety measures in project management. Data collection involved conducting interviews with project managers, site safety officers, and a male nurse from three selected construction sites, followed by a questionnaire survey administered to 30 neighbouring residents. The study provides recommendations to mitigate adverse impacts, raise community awareness, and promote environmentally friendly practices in the construction industry. The findings enhance understanding of the health challenges faced by neighbouring residents and offer insights to policymakers and project managers to improve the well-being of affected communities.

Keywords: Construction Projects; Mental Health; Neighbouring Residences; Physical Health; Sri Lanka.

1. INTRODUCTION

The construction industry is one of the industries which provide a greater importance in the development of the world today (Fox & Skitmore, 2007). As a results, the construction industry is rapidly developing worldwide using a variety of technologies (Ofori, 2015). However, these construction activities are mainly built-in city centres and places where the masses hang out and these constructions have various effects on the daily life of the people (Wong et al., 2009). Neighbourhood has experienced significant changes in their everyday lives as they immediately experience both the success of the construction projects and the inevitable difficulties that come during the implementation of the construction operations (Budayan & Çelik, 2021).

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A growing body of literature indicates that contact with nature influence people's health and psychological well-being both directly and by moderating processes (Gidlöf-Gunnarsson & Öhrström, 2007). The activities related to construction projects have annoy the nearby inhabitants and companies, which can eventually result in economic loss, especially in urban regions where there is a high population density (Ferguson, 2012). Urban residents and those who live close to a construction site are subject to a wide range of negative impacts that are brought on by construction in terms of ecology, sociology, and economics (Balaban, 2012). Pollution coming from the construction sites, blockages by disposition of construction waste, traffic, dust and noises are several activities which cause diseases and negatively affect the physical and mental health of neighbouring residences (Ali et al., 2022). The World Health Organisation defined the terms physical and mental health as follows:

- **Physical health** – The condition of the body, with normal status being without disease or serious illness.
- **Mental health** – The condition, subject to fluctuations due to biological and social factors, which enables the individual to achieve a satisfactory synthesis of his own potentially conflicting, instinctive drives; to form and maintain harmonious relations with others; and to participate in constructive changes in his social and physical environment.

Nevertheless, it can commonly see that the consultants and contractors do not consider the difficulties faced by the local communities (Teo et al., 2009). Because of that contractors frequently prepare their bids without considering the expenditures necessary to make up for negative effects of construction operations on the community and indirect costs brought on by disputes and controversies (Liu et al., 2013). This leads to the community and non-government organisations frequently join forces and filing lawsuits against project teams (Missonier & Loufrani-Fedida, 2014). Since disputes have identified as one of the major causes for delay and disruption of construction projects (Edirisinghe et al., 2022) and securing the physical and mental health of the society is the social responsibility of the business organisations (Lantos, 2001).

Therefore, this study aims to examine the different situations and their magnitude effect on the physical and mental health of the neighbouring residents due to construction projects.

2. LITERATURE REVIEW

2.1 CONSTRUCTION PROJECTS AND IMPACT ON THE NEIGHBOURING

Majority of the larger constructions carried out near cities and the people around face various negative effect to their environment, social life and economic conditions (Shen et al., 2010). This situation become crucial because of the unprepared project teams and project management (Teo et al., 2009). One of the major reasons is behind that is project managers and the team only focus on completing the project at the lowest cost and with the highest profit margin (Bernheim & Reed, 1996). However, project delay or termination can be seen due to the external influence for the people which indirectly has a greater impact on the country's economy (Celik & Budayan, 2016).

A construction site has a high risk of accidents; thus, it is important to be made aware of the precautions that should be taken to prevent them (Dejus, 2007). There is a lot of

potential for these kinds of incidents to occur during the construction of high-rise buildings and thousands of individuals have experienced accidents and distressing circumstances because of this type of development (Wong et al., 2009). Most of the physical injuries are caused by many employees falling from the top of the building as well as various equipment (Murty et al., 2006). In 2011, there were 9057 accidents involving people who became trapped in objects that fell from Highrise structures, such as machinery, wall that were built badly, scaffoldings, etc. (Gürcanli, 2013). The psychological impact on third parties as well as the professional mental impact on the construction sector are both very significant (Bowen et al., 2014). Effects of physiological strain raise the risk of mental and physical weakness, including insomnia issues, headaches, gastrointestinal problems, increase poor health, and libido less (Blaug et al., 2007). In this way, interpersonal relationship between those working in the construction industry and those living in society at large are seriously affected because of psychological effects (Leung et al., 2008).

2.2 EFFECT ON PHYSICAL HEALTH DUE TO CONSTRUCTION PROJECTS

Due to the construction process, it is a very common situation for the workers in that field as well as the external parties to face various accidents and health issues (Abbe et al., 2011). These effects can range from the loss of human life to a decline in public trust in the services that organisations offer (Hemamalinie et al., 2014). In areas where construction work is ongoing, excessive toxic particles are mixed into the atmosphere almost constantly, due to which these toxic particles can be ingested for a long time and because of respiratory diseases related to allergies as well as immediate death (Apte et al., 2018). Construction dust exposure can cause illnesses such as silicosis, bronchitis, tracheal blockage, and occupational asthma in humans (Xing, 2018.).

Some other effects like gas leaking at a construction and improper use of the landscape during the renovation were discussed by Knegtering et al. (2009). When managing massive equipment like cranes, operators of such machinery must possess very specific training and expertise (Edwards & Holt, 2010). The practice of the project teams, however, is to ignore to consider the negative consequences of the building project on the nearby neighbours. Residents who experience these negative effects may decide to resist the construction project (Teo et al., 2009).

2.3 EFFECT ON MENTAL HEALTH DUE TO CONSTRUCTION PROJECTS

There is a significant direct and indirect cross-effect between people's physical and mental health (Ohrnberger et al., 2017). In a construction site, there are four different sorts of risks, namely, scaffolding collapse, falls from great heights, being struck by a falling object, and plant and mechanical damage (Wong et al., 2016). When the public get to know about the accidents happening in the construction sites have created emotional stress effecting to the mental health if the community (Leung et al., 2011). This has created conflicts among the neighbouring residences and the project parties. The complexity of the project is another factor that influences how people view it, and it will have a significant impact if the public makes a mistake because of such a project (Abdelhamid & Everett, 2002). 'Heat Stress' was discussed by another researcher related to mental comfort (Jackson & Rosenberg, 2010). Additionally, if significant site accidents occur, they may also put nearby residents under psychological stress (Okorie & Musonda, 2016).

2.4 CAUSES OF ADVERSE EFFECTS ON PHYSICAL AND MENTAL HEALTH

One of the main impediments to sustainable development in the construction industry is noise pollution brought on by the operation of construction activities (Casanovas-Rubio et al., 2020). Noise levels of more than 90 decibels (dB) are hazardous to human health, both physically and mentally (Birkner, 2010). Living close to a construction site and being subjected to loud noises puts you at risk for conditions like loss of voice, incomprehensible speech, hearing impairment, stress, loss of attention, hypertension-enhanced blood pressure, immunity effects, biochemical effects, cardiovascular disease, sleep disturbances, and vascular system diseases (Oliveira & Arenas, 2012).

Excavation, drilling, bulk material transportation, loading and unloading, open-air material storage, the production of concrete and mortar, cutting and filling, and equipment movement are just a few examples of the many sites activities that produce construction dust emission (CDE) (Shen et al., 2010). It will cause dealing with ailments like coughs, wheezing and shortness of breath, cardiovascular and respiratory disorders, lung cancer, strokes, and exacerbation of asthma due to chronic exposure to dust pollution created by building sites in this way. Necessary actions to lessen the harm caused by dust pollution in this way, it will considerably contribute to the development of a future worldwide environmental crisis (Wu et al., 2016).

According to the European Conference of Ministers of Transport (ECMT), there is no standard definition for traffic congestion, and there are various methods for determining it (Agyapong & Ojo, 2018). The major causes of traffic jams created by construction sites are the lack of space needed to stop vehicles surrounding the site and the obstruction between trucks delivering the site's essential supplies and raw materials and vehicles travelling on the highway (Chen & Du, 2009).

It is crucial to prioritise the identification of physical and mental health issues among neighbouring residents in relation to construction projects. Doing so will allow us to effectively address and minimise any adverse impact on the progress of these projects.

3. METHODOLOGY

The objective of this study was to examine the physical and mental health issues experienced by neighbouring residents as a result of construction projects. To gather relevant information, a comprehensive literature survey was conducted, incorporating primary findings from previous research studies (Hedges & Cooper, 1994). The literature survey enabled the identification of health-related concerns faced by neighbouring residents due to construction projects. Primary data for this research was obtained through three case studies involving multi-story construction projects in Sri Lanka.

To collect the data, interviews were conducted with project managers, a male nurse assigned to the construction site for labour healthcare, and safety officers. These interviews provided valuable insights into the standards that stakeholders should adhere to in order to ensure the health of neighbouring residents during construction projects. In order to understand the perspectives of neighbouring residents regarding their health issues, a questionnaire survey was conducted. A total of 30 households participated in this survey.

The collected data was subsequently analysed using Microsoft Excel, allowing for thorough examination and interpretation of the findings.

3.1 DEMOGRAPHICS DATA OF THE INTERVIEW PARTICIPANTS

Table 1 showcases the demographic information of the interview participants. The individuals included in the study consist of project managers, safety officers, and a male nurse, whose professional experiences amount to 14 years, 4-8 years, and 2 years, respectively.

Table 1: Experiences of the professionals working on the selected projects.

Organisations	No	Participants	Experiences
Case 1	2	Project Manager	14 years
		Safety Officer	6 Years
Case 2	2	Safety Officer	4 Years
		Safety Officer	8 Years
Case 3	2	Safety Officer	6 Years
		Male Nurse	2 Years

3.2 CASE STUDY ANALYSIS

The impact of the three selected construction projects on the physical and mental health of the residents living in the surrounding areas is depicted in the following representation: a square symbol (■) indicates the presence of observable physical and mental effects on the residents, while the absence of a square signifies a project-related effect that does not directly affect the residents' physical or mental state.

Table 2: Physical and mental health issues of neighbouring residencies

Issues	Case 1	Case 2	Case 3
Physical Health			
Effected respiratory distress	N	N	N
Effected Hearing impairments	N	N	N
Traffic jams caused	N	N	
Lack of Landscape	N		
Falling objects Cause			
Experienced flooding conditions and clogging of the drains system		N	N
Mental Health			
Effected respiratory distress	N	N	N
Effected Hearing impairments	N	N	N
Traffic jams caused	N	N	
Lack of Landscape	N	N	
Falling objects Cause	N	N	
Experienced flooding conditions and clogging of the drains system		N	N

Based on the data presented in Table 2, the construction projects have resulted in various physical health-related issues. Specifically, respiratory distress and hearing impairments have been commonly observed among the affected residents. Additionally, traffic jams have been reported in Case 1 and Case 2. This is primarily due to the fact that these two

projects are located in the Colombo city area, where nearby schools and a larger building footprint contribute to the challenge of parking vehicles. Case 1, in particular, also faces an issue of inadequate landscape due to its larger footprint and limited free land area. However, no incidents related to falling objects have been reported in any of the three projects. On the other hand, Cases 2 and 3 have encountered problems with flooding and drainage system clogging, whereas Case 1 has not experienced such issues.

Based on the analysis of mental health-related issues in Table 2, similar to the physical health-related issues such as respiratory distress and hearing impairments, these issues are commonly observed in all three cases. Although there were no reported physical health-related issues caused by falling objects in any of the cases, Case 1 and Case 2 experienced mental health-related issues. This suggests that false information has been spreading among the neighbouring residents of the construction projects, leading to unnecessary mental health problems, as noted in the study by Leung et al. (2008).

Furthermore, while there was no reported lack of landscape issues under the physical health category, Case 2 exhibited such issues in the context of mental health among the neighbouring residents. Additionally, flooding in Case 2 and Case 3 has caused both physical and mental health issues.

In terms of general practices, it was recommended to obtain certifications such as ISO 14001, ISO 14002, ISO 18001, and ISO 40001 for larger construction sites to ensure adherence to environmental and general safety practices. Case 1 and Case 2 have confirmed the availability of these certificates, which certify the implementation of such practices in their construction sites. Furthermore, it is commonly emphasised that a budget allocation of 1% to 2.5% of the total project budget should be made to prevent accidents and mitigate the impacts caused by construction activities. It is recommended that this percentage be increased to a minimum of 3% to 5% for each project.

Regarding noise control, it is specified that during the afternoon, noise levels exceeding 70dB should not extend beyond the construction site, while the limit is set at 50dB during the night. Special attention is given to managing excessive noise if there are frequent activities that generate high noise levels. In Case 1, special consideration is given to noise control due to the presence of nearby offices.

In situations where piling works may cause vibrations near old buildings, necessary barriers or precautions are implemented. It is advised to maintain the Hertz level between 90-100 within a 36-foot square area, and keeping it below 250 Hertz is considered satisfactory.

3.3 QUESTIONNAIRE SURVEY ANALYSIS

Table 3 presents the responses obtained from neighbouring residences regarding the physical and mental health issues they have encountered. It provides an overview of the experiences and feedback shared by residents in relation to their well-being.

Table 3: Physical and mental health related issues due to construction projects

Issues	Case 1	Case 2	Case 3
Physical Health			
Effected respiratory distress	7	7	6
Effected Hearing impairments	6	7	7
Traffic jams caused	6	6	5

Issues	Case 1	Case 2	Case 3
Lack of landscape	7	5	3
Falling objects cause	3	5	4
Experienced flooding conditions and clogging of the drains system	2	6	7
Total of Physical Cases (family)	31	36	32
Mental Health			
Effected respiratory distress	7	8	6
Effected hearing impairments	6	6	7
Traffic jams caused	7	7	5
Lack of landscape	7	6	3
Falling objects cause	6	7	4
Experienced flooding conditions and clogging of the drains system	4	6	7
Total of Mental Cases	37	40	32

The responses from neighbouring residencies reveal that they have experienced various physical and mental health-related issues. Falling objects were reported by all three cases, indicating contradictory information regarding physical health concerns. The majority of residents mentioned suffering from respiratory distress, hearing impairments, and the impact of flooding and clogging of the drainage system on their physical health. These issues are similarly reflected in their mental health.

According to the residents, the dust from the construction site has led to diseases such as wheezing, coughing, sore throat, colds, asthma, and pneumonia. Noise-related illnesses include earaches, ear discharge, and frequent headaches. Traffic jams are frequently mentioned and are seen as accidents that occur when crossing roads in the area, causing distress and inconvenience. Prolonged exposure to traffic congestion can even result in fainting due to dehydration. Additionally, the lack of open spaces in the vicinity has psychological effects, particularly for youth and children who have limited areas to play and engage in recreational activities.

3.4 COMPARISON BETWEEN THE CASE STUDY INTERVIEW AND QUESTIONNAIRE SURVEY

The data from both sources indicate that neighbouring residencies experience common physical and mental health issues, including respiratory distress and hearing impairments. Additionally, traffic jams, lack of landscape, and the presence of flooding and clogging significantly impact the well-being of these residents. While the project participants did not explicitly mention incidents related to falling objects in all three cases, it is noteworthy that such incidents have occurred on a few occasions.

Furthermore, when comparing the questionnaire responses, there are no significant differences observed between physical and mental health-related issues. This suggests that both aspects of health are equally affected and should be addressed with equal attention and consideration.

4. CONCLUSIONS AND RECOMMENDATION

In conclusion, the neighbouring residences have reported experiencing respiratory distress and hearing impairments, indicating the impact on both physical and mental

health. Additionally, the construction projects have resulted in issues such as traffic jams, lack of landscape, and problems with flooding and clogging in drainage systems. While the project participants did not specifically mention physical and mental health issues related to falling objects, the responses from the residences indicate that they have indeed experienced such incidents, both physically and mentally. These findings highlight the diverse range of challenges faced by the neighbouring residences as a result of the construction projects.

Based on the research findings, several recommendations can be made to address the adverse impacts of construction projects, particularly in partially urbanised areas:

1. **Project Management:** Allocate a higher percentage of the contract sum to ensure safety and health measures are prioritised. The project management team should be vigilant about health issues affecting the residents and take necessary measures to mitigate their impact.
2. **Community Awareness:** Inform and educate residents about health and safety measures, helping them understand the steps they can take to minimise the adverse effects caused by the construction project. Open communication and transparency with the community are crucial.
3. **Psychological Support:** Recognise and address the psychological impacts experienced by people in urban areas due to health issues arising from construction projects. Provide appropriate support and counselling services to help residents cope with the challenges.
4. **Environmental Considerations:** In areas located far from cities, where natural environmental conditions are more conducive, the impacts on health issues may be naturally resolved. However, it is still important to take necessary measures to ensure the well-being of the local residents. The project manager should actively contribute to maintaining the health of the community.
5. **Environmentally Friendly Equipment:** Encourage the use of environmentally friendly technical equipment in construction processes to minimise health and safety risks. Review the higher taxes imposed on the importation of such equipment to facilitate their adoption and incentivise sustainable practices.
6. **Government Policies:** Revise and update government policies related to the construction industry, taking into account the findings and recommendations of this research. Aim to create a regulatory framework that prioritises health, safety, and environmental sustainability in construction projects.

By implementing these recommendations, it is possible to mitigate the adverse impacts of construction projects on the health and well-being of residents in partially urbanised areas, fostering a safer and more sustainable construction industry.

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