ORIGINAL ARTICLE

Children At Construction sites-Overcome the neglected Challenges, Play safe and reduce morbidity

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Introduction

In India with modernization of the civic infrastructure, it is imperative that huge numbers of construction activities are continuously happening in both urban and rural area. Construction activities include building of residential houses, commercial unistoreyed or multistoreyed buildings, construction of roads, bridges, towers, installation of cellphone towers, solar panels, electricity poles and many other activities. The construction activity requires deployment of large number of skilled and unskilled workforce/human labour. The human workforce includes men or women coming to work alone and in most instances spouses employed together at the construction site. In both cases, children mostly in the toddler age group accompany their parents to work place because mostly both parents are working either at the same place of at different places. It is usually the mother, whom children accompany to the work place.

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Review of the construction sector by many experts have clearly stressed on the fact that construction sites are very hazardous to the manpower working there[1]. Exact data are not available regarding the number of accidents which can happen at the construction sites but it is estimated that the figure ranges from 2-10 non-fatal accidents per month and 1-2 fatal accidents per 6 month at construction sites employing more than 100 individuals every day. In most countries, there is an absence of standard recording and notifications system for construction accidents while in countries such as India, the systems exist but their implementation is an important issue. In both cases, statistics on construction accidents are either unavailable or highly underreported and this leads to a situation where due attention to safety is not paid.

In a previous study performed by Dara et al[2] it was observed that in India, apart from road traffic accidents (RTA), children are very vulnerable to accidents at home, farms, playground, school, etc. due to the lack of safety measures and effective legal regulations at all these places. There is, in general, non-availability of on the spot resuscitation facility, poorly organized, equipped transport of patient and emergency services; lack of team approach the developing world like India. Dara et al and other researchers[3,4] also reported that in children admitted to a tertiary care hospital due to Traumatic brain injury, two peaks were seen, first in the age group of 1–3 years and second between 6 and 14 years. This was

interesting to note because the younger age group (1–3 years) mostly had TBI because of a fall either from their home terrace, balcony or a construction site. They raised this issue as a very critical point related to child (especially toddlers) safety in India stressing the fact that there are poor safety measures at both home and unfortunately construction sites. They mentioned that Infants and Toddlers in developing world are taken to the construction sites by parents because there is no one left at home to look after them in a typical lower socioeconomic urban family where only one generation migrated to the city. Dara et al[2] felt that studies specifically looking into the health issues of children at construction sites are required to further elaborate on many of these issues. A review of literature revealed that there were no other studies specifically focusing on the health problems of children at construction sites.

With this background, we felt that there is a very urgent need to address the various safety related issues of children at construction sites in India and also measures to prevent the same.

The objectives of this project were:

1. Find out the status of safety related issues in children at construction sites
2. Determine the profile of various types of injuries in these children
3. Find out the impact of counselling of Architects, Supervisors, parents and owners of the construction site regarding safety measures at these sites

METHODOLOGY and OBSERVATIONS

For the current project a total of 120 ongoing construction sites in Jodhpur, Udaipur and Chittorgarh municipal Corporation were visited. These included 86 residential house construction sites, 22 uni/two storey commercial building projects, 10 multistoreyed commercial building projects, 2 school building projects, 4 Road construction sites and 1 overbridge construction sites. A meeting was organized with the chief architect or contactor or the house owner who was explained the objectives of the project and consent was requested for conducting the study.

The chief architect or contractor or the house owner of only 22 construction sites in all the 3 districts agreed for the project. Out of these 13 were residential house construction sites, 5 were uni/two storey commercial building projects, 2 were multistoreyed commercial building projects, 1 Road construction sites and 1 overbridge construction site. An initial survey of the safety issues related to children at the construction site was done after the consent and recorded in a predesigned proforma for the study purpose. The presence or absence of facilities enlisted in Tablet I for children accompanying the parent/ parents/ family members working in the construction site were assessed at the start of the project. Wherever these facilities were not available, the chief architect and/or contractor and/or the owner were requested to create/develop the facilities for the same. All these construction sites were then visited every 2 weeks for a minimum of 6 months by one of the participants or volunteers to assess the development of the aforementioned facilities. Also during the initial visit and also in all subsequent visits, children were assessed for:

1. Number of minor or major (fractures, traumatic brain injury, chest injury, burns or any other accident requiring hospitalisation) accidents in the past 2 weeks
2. Any other morbidity requiring OPD or indoor treatment
3. Vaccination visits

4. School days lost in children > 5 years of age	We also recorded number of accidents, morbidity and hospitalizations of parents or family members of these children.

Tablet I: Status of facilities available before the start of the project and Creation/ Development of facilities after Counselling of Architect/ Contractor/ Owner:

	Residential houses (n=13)	Uni/two storeyed commercial building (n=5)	Multistoreyed Commercial building (n=2)	Road Construction site (n=1)	Overbridge Construction site (n=1)
1. Average number of Children in a month in six month period	**8**	**9**	**15**	**14**	**12**
2. Separate dedicated cordoned playing or housing area	4 (30.7% (Initially 0)	4 (80%) (Initially 0)	2 (100%) Temporary shades (Initially 1 had temporary shade)	1 (100%)Temporary shades (Initially 1 had temporary shade)	1 Temporary shades (100%) (Initially 1 had temporary shade)
3. A designated supervisor/caretaker for children	6 (46%) (Initially 0)	3 (60%) (Initially 0)	2 (100%) (Initially 0)	1 (100%) (Initially 0)	1 (100%) (Initially 0)
4. Access to safe drinking water	10 (77%) (Initially 0)	4(80%) (Initially 0)	2 (100%) (Initially 0)	0 (Initially 0)	0 (Initially 0)
5. Designated safe and accessible toilet	10 (77%) (Initially 0)	3 (60%) (Initially 0)	2 (100%) (Initially 0)	0 (Initially 0)	0 (Initially 0)
6. Trained personnel in providing basic life support or a minimum of First aid	6 (46%) sites developed first aid facilities (Initially 0)	2 (40%) sites developed first aid facilities (Initially 0)	2 (100%) site developed first aid facilities (Initially 0)	1 (100%) developed first aid facilities (Initially 0)	0 (Initially 0)
7. Recreation facilities/equipment	3 (23%) (Initially 0)	0 (Initially 0)	1 (50%) (Initially 0)	0 (Initially 0)	0 (Initially 0)
8. Breast feeding room/ area	0 (Initially 0)	0 (Initially 0)	1 (50%) (Initially 0)	0 (Initially 0)	0 (Initially 0)
In the case of multistoreyed commercial building projects, school building projects, Road construction sites and overbridge construction sites, presence or absence of following added facilities for children accompanying the parent/ parents/ family members working in the construction site					
9. Separate residential house/facility	-	-	0 (Initially 1 had temporary shade)	0 (Initially 1 had temporary shade)	0 (Initially 1 had temporary shade)
10. 24 hour availability of a trained emergency medical personnel with resuscitation equipments	-	-	1 (50%)for morning shift (Initially 0)	0 (Initially 0)	0 (Initially 0)

Tablet II: Status of health and schooling of children in a 6 month follow up after Counselling of Architect/ Contractor/ Owner:

	Residential houses (n=13)	Uni/two storeyed commercial building (n=5)	Multistoreyed Commercial building (n=2)	Road Construction site (n=1)	Overbridge Construction site (n=1)
1. Number of minor injuries	2.1/child (2.9/child)	2.0/child (4/child)	1.3/child (2.8/child)	1.5/child (3.0/child)	2.0/child (3.1/child)
2. Number of major injuries (fractures, traumatic brain injury, chest injury, drowning, burns or any other accident requiring hospitalisation) accidents	0.5/child (0.9/child)	0.3/child (0.8/child)	0.2/child (0.7/child)	0.2/child (0.3/child)	0.1/child (0.2/child)
3. Any other morbidity requiring OPD or indoor treatment	0.0/child (0.2/child)	0.0/child (0.3/child)	0.2/child (0.2/child)	0.1/child (0.3/child)	0.6/child (0.2/child)
4. % of children getting Vaccination visits as per National Immunisation Schedule for children <5 years	100% (40%)	95% (25%)	80% (38%)	75% (20%)	90% (45%)
5. Average School days lost every month in children >5 years of age	10 (20)	18 (18)	20 (20)	12 (21)	8 (10)

(Value in bracket are the average in 3 months preceding the start of the project)

DISCUSSION

Construction safety in India is dismal and unfortunately safety laws are not strictly enforced. Architects and contractors ignore basic safety rules and regulations because of cost issues related to developing and installing safety devices and areas. The Minimum Wages Act, the Workmen's Compensation Act of 1923 (modified in 1962), and the Contract Labour(Regulation and abolition) Act of 1970 and National Building Code of India 2005 provide guidelines for regulating construction activities including safety measures for construction workers. Unfortunately, despite these legislations, the safety of the construction workers is often not a priority and the condition of the families accompanying the construction workers is more pathetic. The current project was conducted with an objective to find out the status of safety issues of the children of construction workers who accompany their parents at the site. It was very difficult to convince the contractors, architects and building owners for data collection and also for counselling them to improve the safety standards and facilities for the children accompanying their parents. In the current project, we were targeting equal number of smaller (residential houses/ uni or two storeyed commercial complexes) and bigger projects (multistoreyed building projects, road and bridge construction sites, school construction sites etc), but it was very difficult to convince architects and well established contractors into bigger projects. Most of the sites surveyed could be done because of only personal relations with either the house owner, architect or the contractor.

It was unfortunate that almost 8-12 children (of age ranging from neonate to 15 years) every month on an average

lived on site with their parents. In both the smaller and bigger construction sites, there were almost no existent separate dedicated cordoned playing or housing area. No dedicated supervisor or caretaker was available to take care of the children when their parents were working. It was also very pathetic to note that there was almost no access to safe drinking water or safe toilets for children and their parents. Adolescent girls were the most troubled and had to urinate or defecate in very shabby makeshift toilet areas/corners. Mothers had to feed their neonates and infants in open spaces. There was no provision for basic life support or first aid for the construction workers or their families. Even in the bigger construction projects, where the project continued for at least 1.5 to 2 years, there were no provision for a designated residential space for workers or 24 hour availability of a trained emergency medical personnel with resuscitation equipments.

At all the included construction sites, a personal meeting was organized with the architects/contractors or the owners to appraise them of the safety and health issues of the children at construction sites. They were also counselled to make provision for a separate and safe designated residential space with recreation facilities, covered private breast feeding corner, safe drinking water and toilet in the premises. Workers and their families were also counselled regarding the dangers related to living at a construction site and also the safety and health issues involved. An impact assessment of this counselling was done every 15 days for 6 weeks by one of the volunteers.

During the 6 month impact assessment only 4 out of 13 (31%) residential house, 4/5 (80%) Uni/two storeyed commercial building construction sites developed a separate dedicated cordoned playing area along with temporary housing facility for the children. Initially one multistoreyed commercial building complex, 1 road construction site and overbridge construction site had a temporary shade for the families staying at the construction site; despite best persuasion, a safe permanent playing/housing facility for children was not created at any of these sites. None of the construction sites had a designated supervisor/caretaker for children at the start of the project. However, 46% of the residential house, 60% of Uni/two storeyed commercial projects, 100% of the bigger construction sites designated are supervisor/caretaker for the children. However this caretaker was only for the day time. Initially none of the construction sites had provision for safe drinking water which was developed in almost 10/13 (77%), 4/5 (80%) and 2/2 (100%) of the residential house, Uni/two storeyed commercial projects and multistoreyed projects. The provision for 7 drinking water was not created and the road construction site and the overbridge construction site. Similarly, none of the construction sites had provision for safe and accessible toilet which was developed in almost 10/13 (77%), 3/5 (60%) and 2/2 (100%) of the residential house, Uni/two storeyed commercial projects and multistoreyed projects. The provision for 7 drinking water was not created and the road construction site and the overbridge construction site. A trained personnel in providing basic life support for a minimum of first aid was not available at any of the construction sites initially, however 6/13 (46%), 2/5 (40%) and 2/2 (100%) of the residential house, Uni/two storeyed commercial projects and multistoreyed projects developed facilities for first aid in first 2 months of the project. Only 3/13 (23%) of the residential house projects and 1/1 (100%) of the Multistoreyed project created some recreation facilities for the

children after counseling. A separate breastfeeding room/area could not be designated/created at any of the sites, except 1 multistoreyed building project despite best persuasion/ counseling of the architects/contractors/owners.

An impact assessment regarding minor and major injuries, morbidities, vaccination and schooling of these children was also done in the 6 month period (Table II). It was interesting to note that after the counseling and also development of some facilities the number of both minor and major injuries had a significant reduction along with morbidities requiring OPD in no treatment. The vaccination visits of these children also improved significantly. The improvement in school presence did not improve significantly because of the fact that schools of most of these children were far of from the construction site and parents had difficulty dropping them or picking them up from school.

Even on an extensive review of the literature we did not find another similar study/project looking into the safety and health issues of children at construction sites. In the study by Dara et al, it is very clearly reported that severe traumatic brain injury or other major injuries occurring in children at construction sites can leave them severely disabled and crippled[2]. In the developing countries, parents have their own limitations regarding employment and often are forced to take children to their employment sites. Mostly, this is because most of the labourers at construction site are actually migrated population who live in nuclear families and do not have a permanent address. Even if they have a permanent address in the vicinity, they feel that children are unsafe if left behind because there is no caretaker at home.

With the observations in this study it is prudent that policy makers in this country and most of the developing world appreciate the urgent need for ensuring safety and health of children accompanying their parents at construction sites or other employment sites which entail a risk to people on that site. Especially in developing countries like India, efforts should be made to raise the level of awareness among all the stake holders regarding the importance of health and safety-related issues of both the workers and there families at construction sites[1,5].

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