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RAPID APPRAISAL OF ROAD-SAFETY ENVIRONMENT AROUND EDUCATIONAL INSTITUTIONS OF MANGALURU CITY, SOUTH INDIA

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ABSTRACT

INTRODUCTION: Road traffic accidents (RTA) are the biggest killers according to the Global Status Report on Road Safety.

OBJECTIVE: The objective of the present study was to assess the road safety in the vicinity of the educational institutions in the city of Mangaluru in South India.

MATERIAL AND METHODS: Considering the proportion of educational institutions having road safety standards in place as 50%, absolute error as 5%, and z as 1.96 (95% confidence level), the required sample size was about 100 institutions. It was decided to sample approximately 100 each of government and private education institutions from a total of about 964 schools and colleges in the city limits of Mangaluru and survey them using a comprehensive checklist prepared based on some previous studies.

RESULTS: Of the 200 schools observed for road safety features using a preformed checklist, 124 (62%) were located on the main road, 76 (38%) had an approach road from the main road to reach the school. Of these only 23 (11.5%) of institutions had road sign showing school/college, 14 (7%) had a signage showing children crossing, 37 (18.5) had a speed breaker for slowing of traffic and only 2 (1%) had zebra crossing. Sixty four (32%) institutions had parking space and 12 (6%) had sidewalk/pavement for safety.

CONCLUSION: It was found that the road safety features and the safe environment around the schools were inadequate putting children, young adults and the employees of these institutions at risk.

Key words: *Road traffic accidents, Road safety, Schools, Colleges*

INTRODUCTION

Road traffic accidents (RTA) have been recognized as the 'biggest killers' in the age group 15-19 by the Global Status Report on Road Safety (1). While it affects all the age-groups, the children and young adults are especially vulnerable. More than 2,60,000 children die each year due to road traffic accidents according to the World report on childhood injuries (2). Recognizing the scale of the problem, the decade of 2011 to 2020 has been declared as a 'decade of action for road safety' by UN general assembly (3). In India, like many developing countries, there is a huge burden of road traffic accidents. There were almost 53 cases of road accidents every one hour during the year 2015, wherein 17 persons were killed (4). This huge burden reflects the huge pedestrian population, rapid motorization, and poor road safety features

and infrastructure. According to this report RTA accounted for 34.8% of all accidental deaths in India. Maximum RTAs were in the state of Tamil Nadu followed by Karnataka which contributed to 14.9% and 9.5% respectively of total such accidents (4). RTAs are second leading cause of death in children and adolescents of 5-19 years of age (5). The World Bank estimates that about 1% of the Gross National Product in high income countries and 1.5-2% of it in the middle and low income countries respectively is being spent on road injuries (6). It is one of the most important modifiable risk factor that needs to be addressed. Moreover, there is huge underreporting of injuries, poor enforcement of maximum speed laws and seatbelt usage in the country (7) which probably underestimates the true burden of the problem in the country.

OBJECTIVE

The present study was conducted with an objective to assess the road safety factors in the vicinity of the educational institutions, both schools and colleges of the city.

MATERIAL AND METHODS

This was an observational cross sectional study done during July 2016 to December 2016 in Mangaluru city of South India. Considering the proportion of educational institutions having road safety standards in place as 50% (as no baseline information is available), absolute error as 5%, and z as 1.96 (95% confidence level), using the formula $Z^2 pq/L^2$ (p is the prevalence of the factor, q is $1-p$ and L is the absolute error) the required sample size was about 100 institutions. It was decided to sample approximately 100 each of government and private education institutions from a total of about 964 schools and colleges in the city limits of Mangaluru. After creating a sampling frame of all these educational institutions, 200 educational institutions were selected by simple random sampling technique. A structured observational checklist was prepared based on previous studies (5,8) and the local government road safety guidelines for the schools to assess the road safety features in and around of these educational institutions (9). Permission to conduct the study was obtained from the Ethics Committee of the institution. Data were entered and analyzed using Microsoft Excel 2010 and SPSS version 23.

RESULTS

Road safety measures were surveyed for 200 educational institutions of Mangaluru city. Out of 200 schools and colleges studied, 93 (46.5%) were private institutions and 107 (53.5%) were government institutions. The baseline characteristics of these institutions are described in Table 1.

Table I. Characteristics of educational institutes included in the study

School Characteristics		Number	Percent
Type of institution	Private	93	46.5
	Government	107	53.5
Location of school with respect of the main road	Main road	124	62.0
	Approach road	76	38.0
Type of institutions	Primary	40	20.0
	Secondary	27	13.5
	High schools	59	29.5
	Colleges	74	37.0
Schools on the main road (124)	Single lane	46	23.0
	Double lane	78	39.0

Table II. Road safety characteristics of educational institutes included in the study

Presence of road safety characteristic	Number	Percent
Road sign shows school/college	23	11.5
Road sign showing children crossing	14	7.0
Speed breaker	37	18.5
Zebra crossing	2	1.0
Parking space within institution	64	32.0
Sidewalk/pavement	12	6.0
Pot holes within 50 meters of the institution	1	0.5
Repair work or dug-up road within 50 meters of the institution	1	0.5

There were 40 (20%) primary schools, 27 (13.5%) secondary schools, 59 (29.5%) high schools and 74 (37%) institutions for higher education named as colleges in this study. Of 200 institutions, 124 (62%) were located on the main road and 76 (38%) were located on an approach road leading from a main road. For the 124 schools (62%) on the main road 46 (23%) were located near a single lane and 78 (39%) located near to double lane type of road.

Regarding the road safety measures, road signage indicating presence of a school/college was installed only in 23 (11.5%) educational institutions. Moreover, only 14 (7%) institutions had a traffic signage showing children crossing, 37 (18.5) had a speed breaker and only two (1%) had zebra crossing for safe crossing of the road. Sidewalk for walking to the school was present in 12 (6%) educational institutions. Of the 200 schools/colleges surveyed, 64 (32%) institutions had parking space within their premises. There were large pot holes and major repair work around two of these institutions.

A comparison was done between the road safety situation between government and private institutions. There was no statistically significant difference between both these categories when tested for individual safety characteristics (Table 3).

Table III. Comparison between government and private educational institutional with respect to safety measures.

Road safety characteristic*	Government (n = 107)	Private (n = 93)
Road sign shows school/college	13 (6.5%)	10 (5%)
Road sign showing children crossing	7 (3.5%)	7 (3.5%)
Road bump	23 (11.5%)	14 (7%)
Zebra crossing	1 (0.5%)	1 (0.5%)
Parking space within institution	38 (19%)	26 (13 %)
Presence of sidewalk/pavement	4 (2%)	8 (4%)

* Chi-square test not significant (>0.05)

DISCUSSION

The study found that most of the educational institutions were unsafe with regard to road safety. This exposes the students, their parents and the employees of these institutions to the possible hazard of traffic accidents. Of total 200 educational institutions surveyed, only 23 (11.5%) had a road sign indicating a school/college nearby. This proportion is much smaller than that found in the city of Dharwad, a city in South India where it was 27% (8). Department of women and child development of the Government of Karnataka state has laid down specific guidelines and a child safety checklist for schools (9). In this document the presence of a speed breaker along with necessary traffic signs has been mentioned as mandatory. It also mandates all the schools to appoint responsible person/security to oversee the movement of vehicles in front of the school, including those coming to drop/pick up the children and to avoid accidents. Presence of a speed breaker was found in only 18.5% of the institutions. Such speed breakers are important for checking the speeding vehicles which can jeopardize the safety of the children crossing roads in the vicinity of the educational institution. This was also found to be as low as 3 on the scale of 0-10 in India in detailed review of the status of road safety in Asia (7).

Absence of a sidewalk was very stark with only 4 (2%) institutions having them. This absence can hamper the safety of children and young adults walking to their destination. According to a technical report on road safety in India from Transportation Research Institute of University of Michigan, six areas for reducing road traffic fatalities have been identified of which pedestrian safety in urban areas and highway is one of them in this report (10). A study from Vellore used a different methodology to study road safety features and awareness in school students (5). In this study, 146 students were interviewed in the age group of 5 to 19 years of age and it was found that none of schools had any speed breakers or pedestrian/zebra crossing. Moreover, 25% students reported having either collided or being a part of two-wheeler crash in the month before the study. While these findings are not only worrisome, duration of 4-5 years has elapsed since this study was done with minimal progress that seems to have been achieved since then. In a similar large study in Hyderabad, a school travel questionnaire administered to a sample of 5842 school going children revealed that almost 17% of children had some event that led to either missing of school or treatment by a doctor or nurse (11).

Another study in Tamil Nadu studied knowledge of high school students for road safety (12). There was lack of knowledge in 50% of the 485 students for even

a basic understanding of traffic lights in this study. Moreover, only 33 of the 158 students, who had driven motorized vehicles, had ever used a helmet and only four had a valid license for it.

According to National Highway Authority of India project, there were 497 reported accidents in and around Mangaluru during nine months of systematic data collection on the highways connecting the city to neighboring borders (13).

The situation is not very different in other developing countries such as Thailand (14), Uganda (15) and Nigeria (16). In Peru, a unique community based cross sectional study with two nested case control studies to explore personal and environmental factors was done (17). Here the evidence generated is clearly in favor of reducing traffic volumes and limiting the speed of the vehicles apart from problems due to street vendors. Speed breakers are effective in limiting the speed of the speeding vehicles.

Unfortunately, like the most developing countries, the research in the field of RTA in India is limited compared to other countries. There are only 0.7% papers on RTA being contributed by India and less than one article on road traffic injury per 1,000 road traffic accident deaths (18). The positive aspect is the number of documents for national data on RTA; 'Road Accidents in India', an annual publication of the Transport Research Wing of Ministry of Road Transport and Highways, Government of India (6); 'Accidental Deaths and Suicides in India' by the National Crime Records Bureau of the Ministry of Home Affairs', Government of India (4) and Road Transport Year Book', again an annual publication of the Transport and Research Wing of the Ministry of Road Transport and Highways, Government of India. These are valuable resources for social workers, road safety researchers, policy makers, and police departments, non-governmental organizations for baseline information, trend analysis, geographical distribution, and research and resource allocation for advocacy.

Strength of the present study is the sample size, with almost 200 educational institutions being covered in the survey by random sampling. But at the same time, there are numerous safety factors within the premises of the educational institutions that were not included. These being, the presence of a responsible person to oversee the movement of vehicles in front of the institution, types of institutional buses and co-ordination with the State Transport Authority as mentioned in the document of Karnataka Government (9), to assess the safety measures in these vehicles, etc. Being a checklist based rapid appraisal with no person to person interviews, the institutional authorities were not included for assessing these factors. But a detailed

qualitative study which can explore the facilitating factors and bottle necks in achieving required safety features around educational institutions can give valuable insights into the problem.

CONCLUSION

The study found that road safety around schools/colleges of Mangaluru city are disconcertingly lacking. Students and their parents dropping them to school and colleges, as well as employees attending these institutions face a constant danger of RTA. The younger among them are especially at risk due to inadequate capacity to react and take decision while being on a heavily trafficked road. Educational institutions, road transport authority and civil society need to be proactive in taking up this matter on priority basis so as to control the rising incidence of RTA in our cities in the country.

REFERENCES

1. WHO, Global status report on road safety: time for action. Geneva, World Health Organization; 2009.
2. WHO. World report on child injury prevention. Geneva, Switzerland, 2008.
3. WHO, Global Plan for the Decade of Action for Road Safety, 2011–2020. Geneva, World Health Organization, 2011. Available at: (www.who.int/roadsafety/decade_of_action/plan/plan_english.pdf).
4. National Crime Records Bureau, Ministry of Home Affairs New Delhi, India. 2012. Accidental deaths & suicides in India. 2011. p. 317. Available from: <http://ncrb.nic.in/StatPublications/ADSI/ADSI2015/adsi-2015-full-report.pdf> [Accessed on 07/04/2017].
5. John O, John SM, Bose A. A study on road safety features and awareness in selected schools in Vellore. *Injury prevention*. 2012 Oct 1;18 (Suppl 1):A102-103.
6. Transport Research Wing, Ministry of Road Transport and Highways. Road Accidents in India 2011. New Delhi: Ministry of Road Transport and Highways, Government of India; 2012.
7. Wismans J, Ingrid S, Anna NE, et al. Implications of Road Safety in National Productivity and Human Development in Asia. Background paper for the Eighth Regional EST Forum in Asia, 19 to 21 November 2014, Colombo, Sri Lanka, 2014. Available at: http://www.uncrd.or.jp/content/22698EST-P4_Wismans.pdf.
8. Shettar CM, Patil PS. Road safety environment around urban schools of Dharwad, India: a cross-sectional study. *Int J Community Med Public Health*. 2016;3(3):607-9.
9. Department of women and child development, Government of Karnataka. Available at http://www.schooleducation.kar.nic.in/pdf/files/Trans1415/fwd-docfordeptwebsite/SCHOOL%20%20SAFETY%20CHECKLIST%20-%20Revised%20Nov%204th_15_11_14.docx [Accessed on 07/04/2017].
10. Mohan D, Tsimhoni O, Sivak M, Flannagan MJ. Road safety in India: challenges and opportunities, Ann Arbor: University of Michigan Transportation Research Institute, 2009.
11. Tetali S, Edwards P, Murthy GV, Roberts I. Road traffic injuries to children during the school commute in Hyderabad, India: cross-sectional survey. *Inj Prev*, 2016 Jun 1;22(3):171-5.
12. Raj CKP, Datta SS, Jayanthi V, Sing Z, Senthilvel V. Study of knowledge and behavioral pattern with regard to road safety among high school children in a rural community in Tamil Nadu, India. *Indian Jour of Medical Specialties*. 2011;2(2):110-113.
13. National Highway Authority of India, Ministry of Road Transport and Highways. Project: Kundapur-Surathkal & Mangalore- KNT/Kerala Border. Available at <http://nhai.org.in/mangalore-ksknt/AccidentData.aspx>. [Accessed on 07/04/2017].
14. Shbeeb L, Mujahed J. Walk ability of school surrounding environment and its impact on pedestrian behaviour. Proceedings of the 14th international conference on road safety on four continents. 14-16 November 2007; Bangkok, Thailand.
15. Nakitto MT, Mutto M, Howard A, Lett R. Pedestrian traffic injuries among school children in Kawempe, Uganda. *Afr Health Sci*. 2008;8:156-9.
16. Sangowawa AO, Adebisi AO, Faseru B, et al. An observational study of road safety around selected primary schools in Ibadan municipality, Oyo State, Southwestern Nigeria. *Ann Afr Med*. 2012;11(1).
17. Donroe J, Tincopa M, Gilman RH, et al. Pedestrian road traffic injuries in urban Peruvian children and adolescents: case control analyses of personal and environmental risk factors. *PLoS One*. 2008;3(9):e3166.
18. Ruikar M. National statistics of road traffic accidents in India. *J Orthop Traumatol Rehabil*. 2013;6:1-6.

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