

Prevention of Unintentional Childhood Injuries in India: An Indian Council of Medical Research (ICMR) Initiative

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Abstract

There is lack of data on childhood injuries from India. It has remained a neglected area of research. Available data on childhood injuries is mostly based on hospital-based studies that may underestimate the prevalence; very few community-based studies have been reported quoting different prevalence rates. The true magnitude and nature childhood injuries, the risk factors, its economic impact have not been adequately studied in India. We conducted a literature review that highlighted this gap in knowledge and initiated a strategy to promote research in the area.

Keywords: Injuries; Childhood; Accidents; Epidemiology; Mortality; Morbidity

Introduction

Injuries are a leading cause of death and disability accounting for 5 million deaths each year globally [1]. As per the report of the India State-level Disease Burden Initiative [2] 2016, injuries among adults constitute 11% of the total deaths in India. However, the study did not provide any data for childhood injuries. As per WHO's world report on child injury prevention "Childhood" is a social construction, whose boundaries shift with time and place and this has implication for vulnerability to injury [3]. Injuries are defined as the physical damage to the child's body, resulting from mechanical, thermal, and chemical or radiation energy, in amounts exceeding the threshold of physiologic tolerance or else the result of a lack of one or more vital elements, such as oxygen" [3]. By intent injuries are categorised as unintentional and intentional. Unintentional injuries can be road traffic injuries, poisoning, falls, fire and burn injuries and intentional injuries can be classified as child abuse, suicidal behaviour, self-harm, war injuries, community abuse and others.

WHO has estimated in 2011 that over 630 000 children under the age of 15 were killed by an injury. Moreover, for every death due to child injury, there are a few thousand children living with different degrees of disability [4]. In India, data on childhood injuries is mostly based on hospital-based studies that may underestimate the prevalence; very few community-based studies have been reported quoting different prevalence rates (7.1%, 16%) [5,6] leading to Loss of school attendance and financial burden due to Unintentional injuries. Hemlatha., *et al.* reported that even mild injuries result in economic loss and school attendance loss [7].

However, the true magnitude and nature childhood injuries the risk factors, its economic impact have not been adequately studied in India due to absence of a surveillance system.

Potential risk factors of childhood injuries

Rapid urbanization with increasing vehicular traffic on roads is a risk factor for street/homeless children, environmental hazards associated with climate changes such as cyclones, landslides, droughts, and floods cause displacement and migration of populations, increasing the risks and vulnerability of children to injuries. In India child labour is still in practice despite legislation against it and is likely to lead to greater number of injuries. Child injuries are strongly related to social determinants. The unemployed or underprivileged have less access to safety equipment's, and education to mention a few means of prevention whereas wealthy people have range of resources that makes prevention accessible [3]. When injury happens accessibility to high quality medical care can lead to inequalities, increasing the burden of injuries for the poor. More than 95% of child injury deaths occur in low income and middle-income countries and it is lower (approximately 40%) in high income countries.

Rationale

The pattern and aetiology of childhood injuries vary across countries. There is lack of data on childhood injuries from India. It has remained a neglected area of research so far. Sparse hospital-based data that are available may not have correct estimates of contribution of injuries to the overall morbidity/mortality pattern since majority of cases of injuries are never taken/or never reach hospitals. In addition to deaths, hospitalization and permanent disability are other outcomes of injuries that may cause a burden on the health system and the society. Therefore, it is important to address Childhood injuries, its risk factors and impact on child health through research. This would help integrate childhood injuries into child survival strategies leading to improvement in child health.

Objective of the Study

The objective of the present study is to evaluate the status of childhood injuries in the Indian context to highlight the research gaps.

Methodology

A review of literature was conducted, using the following search terms: "unintentional injuries" (including specific terms such as falls, burns, drowning, poisoning), "children", "accidents", "injuries". Intentional injuries such as suicide, violence and abuse, and war injuries and injuries among differently-abled children were excluded). Studies carried out and published between 2012 and 2019 were considered. The search for web-based articles was conducted using Google Scholar and e-resources such as JSTOR (Short for Journal Storage), Oxford Journals, The Lancet Journals, The Sage Journals Online, and PUBMED. Only full-text articles in English that described unintentional injuries among children according to the inclusion criteria were reviewed. 16 full text articles on prevention of unintentional injuries among children were retrieved for review by the authors.

Results and Discussion

Global data

The Alliance for safe children (TASC) and UNICEF reported in 2004 Bangkok that injuries lead to 20% of deaths among children less than 18 years [8]. Almost 60% of child deaths are due to road traffic injuries, drowning, burns, falls and poisoning and it was found that road traffic injuries and falls are the leading cause of DALY's loss among children 0 - 14 years [4].

The National Institute for Health and Clinical Excellence (NICE) in United Kingdom has published documents focussing on developing strategies, coordinating prevention activities through home safety assessment in order to prevent unintentional injuries among children aged under 15 years [9]. Researchers have conducted few qualitative studies that highlight preventing child injuries through focussing on timely delivery of key messages during pregnancy, use of child safety equipment's and home appliances and also approaching for parental

supervision, teaching children about safety and use of rules and routine [10]. The Social cognitive theory has guided in decreasing injury morbidity and mortality to an extent by improving parental perception of household injury risk, prioritizing risk behaviour counselling, and computer-based parental injury prevention assessment and also by cognitive development of children to distinguish dangerous household products leading to a decrease in injuries [11].

The Global literature provides evidence that childhood injury prevention has been accorded high priority in developed countries. These were the few studies that have put forward various strategies and approaches like active parental supervision, home safety assessment, use of child safety equipment's, knowledge of Cardio-pulmonary resuscitation (CPR) techniques, first aid courses etc. to prevent unintentional childhood injuries like RTIs, falls, burns, choking, suffocation etc.

The Canadian Standards Association (CSA) has made recommendations regarding anticipatory knowledge to the policy makers, the health care providers regarding playground injuries, active parental supervision to prevent childhood injuries [4]. Choking, strangulation, suffocation rank as a leading cause of unintentional injury deaths in infants and toddlers. The Canadian Pediatric Society thus encourages parents and caregivers to take CPR and choking first aid courses to prevent these unintentional deaths among children's [12].

Preventive interventions

There are proven interventions for child injury prevention in developed countries such as child car seats, cycling helmets, child-resistant packaging for medications, and fencing around swimming pools, hot water tap temperature regulations and window guards with limited evidence demonstrating success in child injury prevention program in developed countries. These could be locally adapted to save lives in developing countries.

Indian data

In India the police department collects data on injury related deaths as injuries are considered medico legal events. National Crime Record Bureau (NCRB) is the nodal agency that collects, analyses, interprets and disseminates injury data [10]. In 2010, children up to 14 y accounted for 7% of total unintentional injuries deaths. (NCRB) The Million Death Study (MDS) indicated that injuries were responsible for 3.2% and 16% of deaths in < 4 and 5 - 14y, respectively [13] (Registrar General of India. Report on causes of death in India, 2001 - 2003. Office of the Registrar General, New Delhi, India; 2009).

However, there is a clear lack of data on non-fatal injuries due to absence of a surveillance system in place, formal reporting systems and limited research. A few hospitals based studies from different parts of India indicate high rate of deaths due to injuries accounted by 16 - 20% of emergency room registration [14]. Bangalore Road Safety and Injury prevention Program showed injuries as a cause of 20% of emergency room registration, 10% of hospital admission and nearly a third of hospital deaths under the age group 15 - 44 years among males [12]. In 2014, government of India has launched a program called National Adolescents health program titled as 'Rastriya Kishor Swasthya Karyakram' and one of the components among others, of this program is to promote favourable attitude for preventing injuries and violence among adolescents aged 10 - 19 years. The road traffic injury needs enforcement of appropriate legislation as well as road infrastructure so that children and younger adolescents can travel safely.

Data from CAR on emergency paediatrics care 2019

Indian Studies under the flagship of ICMR

As a result of the above-mentioned literature review, it was realized that childhood injuries are a neglected area of research in India, there is a need to generate local data on disease epidemiology, risk factors, and preventive interventions and demand generation to fill the gaps in knowledge. With regard to the proven preventive interventions being used in developed counties (car seat belt, cycle helmets,

child secure locks etc) there is a need to create feasibility assessment data. In absence of local data, this important public health problem will remain neglected, it would not be possible to sensitise the community or to generate demands regarding preventive interventions, legislations from the policy makers. Data would be helpful in awareness generation in the community. Therefore, there is a need to generate local data on childhood injuries through research including local adaptation of known preventive interventions or generation of new locally suited ones.

With the objective to help integrate child injury prevention program with the child survival strategies focussed on improving lives of children, the Indian Council of Medical Research advertised for a call for proposals on childhood injuries in the following domain areas: disease epidemiology, risk factors and preventive interventions, advocacy and education (Appendix-1 List of areas).

A total 59 proposals were reviewed for their scientific content, novelty, applicability and competence of the investigator. Out of the total submitted projects, seven were found suitable for funding support by ICMR; detailed below:

1. Unintentional Childhood Injuries in Urban and Rural Ujjain, India: A Community-Based Survey. The objective is to identify the prevalence and risk factors of unintentional injuries and to design prevention strategies and awareness programs. This study was done in seven villages and ten contiguous urban slums in Ujjain, India. World Health Organization (WHO) tested tools and definitions were used for the survey. The result of the study is under publication.
2. A study on addressing occupational injuries was carried out involving 250 children and adolescent workers engaged in of four major informal sectors with an intervention approach to identify human and workplace factors leading to injuries as well as to undertake intervention through health education.
3. A randomized controlled trial on school-based interventions for prevention of childhood injuries in a district of coastal South India was completed.
4. Efficiency of Child-To-Child Approach in preventing unintentional childhood.
5. Injuries and their consequences were studied in Delhi.
6. In a novel initiative a Nanofibrous wound construct augmented with silver sulfadiazine for paediatric burn injury was developed by an investigator from CSIR-Central Leather Research Institute, Chennai.
7. An Assessment of Childhood Injury and Establishing Surveillance System among tribal population In Tamil Nadu is ongoing.

Data collected by the Centre for advanced research during 2018-19 on childhood emergency care established by ICMR showed that foreign body injuries accounted for 77% of emergency admissions, animal bites accounts for 15%, burns 0.60% and drowning 0.20%.

In addition to the above-mentioned investigator driven studies, a task force study on descriptive epidemiology of childhood injuries was also commissioned by ICMR under this initiative in eleven sites across eight Indian states. The results would provide a nationally representative data on prevalence and risk factors of unintentional Childhood injuries. Forming a surveillance network on childhood injuries through these eleven funded study sites is being considered. Results of the above studies supported by ICMR would be published in a special supplement of the journal Indian Paediatrics.

Conclusion

Childhood Injuries are a major public health problem. Tens of millions of children are non-fatally injured and many of these require hospital treatment. The impairment that injury can cause and the need for care and rehabilitation have an impact on child's prospects

for health, education and social inclusion and even on their parent's livelihood. Prevention of these injuries is important for the survival of the children and improvement of child health globally. Injuries need to be included as one of the indicators in overall child health programmes. Studies have recommended injury prevention to be included in school curriculum, home safety education, as well as establishment of an injury surveillance system. The health system can prevent injuries by awareness campaigns, establishment of a surveillance system for continued data generation to guide action. Involvement of policy makers can help in bringing out better legislations protecting the children. ICMR is planning a brainstorming meeting to disseminate and discuss the results of the studies supported and bring out a way forward for up scaling of interventions and policy uptake.

Supplementary material: Appendix-1

Epidemiology related:

- Epidemiology of common childhood injuries in the country,
- Reliable estimates of the level and pattern of child injury and death,
- Improved hospital surveillance system to create database on childhood injuries,
- Community based surveys, identification of high-risk groups for injuries.

Intervention related:

- Efficacy of intervention aimed at reducing injuries,
- Local environmental/context specific modification of known interventions or their adaptations to reduce injuries,
- Innovative/indigenous devices for prevention of child injuries and their efficacy in reducing injuries.

Advocacy related

- Education and counselling of peers/parents to improve skills of injury prevention;
- Cost effective, well-targeted responses helpful for policy formulation;
- Legislation and regulation related to child injury in the Indian context, and their enforcement; Promotion of safety devices;
- Availability, price and affordability of child-safety or family-safety devices.

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