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A Cross-Sectional Study on Prevalence and Pattern of Childhood Injuries in Rural and Urban Communities of Telangana State, South India: Burden of Childhood Injuries

Varalakshmi Manchana*, B. R. Shamanna

Abstract

Background: Injuries are leading cause of disability and premature mortality in children below 18 years of age and are a growing public health concern globally. There is an urgent need to understand injury epidemiology and its prevention. **Aim:** The study aims to identify the prevalence and pattern of injuries and its associated factors among children (≤18 years) in peri-urban communities. **Methods:** The present cross-sectional community-based survey undertaken in peri-urban communities of Telangana, South India. Two areas each from urban and peri-urban communities were randomly selected from the total clusters of villages under the purview of urban and rural health centers. House-to-house survey was conducted by trained field assistant and data were collected on sociodemographic details, injury history, causes, and consequences, community practices with the help of a structured questionnaire administered to parent/guardian of the children. **Results:** Study findings identify 53.6% children encountered at least one injury during 1 year period, which was 52.45% among children below 5 years of age, which was documented higher (66.3%) in children between 16 and 18 years age. Overall prevalence shows that 54% were unintentional injuries, 34% intentional injuries, and 12% uninjured. Injury prevalence was higher among rural children than urban children and was slightly higher in boys (53.8%) than girls (51.99%). **Conclusions:** Multi-faceted approach to document injury burden, strengthening primary health care through for appropriate mechanisms for injury registry and capacity building among gross root health workers, and primary health providers and school safety education is an urgent need in countries like India.

Keywords: Childhood injuries, Disability, Pattern, Peri-urban communities and community practices, Prevalence

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Introduction

Injuries are significant area of concern in children below the age of 18 years. Childhood injuries in are complex with multiple predisposing factors, which are a growing public health challenge worldwide, both in the developing and developed world counting about six million deaths per year,[1] requiring immediate attention. Children from the 1st year of life until the age of 18 years encounter injuries of various natures every year. Unintentional injuries account the major proportion (90%) and leading cause of disability and mortality among children aged between 10 and 19 years of age.[2] Injuries in children are the leading cause for disability, crippled adulthood, subsequently affecting their families, and societies. Significant number of children experiences premature mortality each year from injuries or violence, and millions of them suffer the consequences of injuries of various sorts.[3] Globally, around 950,000 children (ar years of age) experience injuries, violence, and related mortality every year.[4] Injury pattern, causes, and treatment practices adopted by the people vary in populations, with in and across the countries.

A child until the age of 18 years is potential to the implications of vulnerability to injury and violence. Injuries are threat to safety and welfare of children, which impact their quality of life and adulthood. Most of the injuries in children go unreported or under reported and among which intentional injuries are least reported. Children spent most of their time in schools and play grounds during their school age, and during the period, they may encounter injuries of various sorts and severities. However, many a times schools and primary health centers which may be sources of first aid and treating minor injuries are not equipped with necessary resources or may be not prepared to identify and address the injuries and timely referral of necessary cases to secondary and tertiary care health care. Promoting on injury risk awareness, prevention, and appropriate management at schools and community level may prevent majority of injury-related disability in children. Socioeconomic conditions, gender, education, living arrangements, and social and family environment are some of the factors closely linked with growing number childhood injuries. Injury consequences not only affect the quality of life in children but also connected to further socioeconomic implications. India, being one of the Nations in the world with huge population with ¼ of its population is younger, requires understanding and addressing the child health and safety at community and primary care level. There is limited evidence on child injury burden in India and the available evidence also mostly from hospital based. Since most of the injuries are at community level and go unreported, are not documented in the primary and secondary care facilities and even majority of schools do not have mechanism to document injury

School of Medical Sciences, University of Hyderabad, Gachibowli, Hyderabad, Telangana, India

Corresponding Author: Varalakshmi Manchana, School of Medical Sciences, University of Hyderabad, Gachibowli, Hyderabad, Telangana, India. Tel.: 91(40)-2313 5475/85. E-mail: varamanchana@gmail.com

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history and consequences; thus, the real facts and injury burden in children are not clearly known. In this connection, the present community-based study was undertaken with an aim to study the prevalence, pattern, risk factors, associated sociodemographic factors, and community practices in injury management in urban and rural communities of Telangana. The findings contribute in understanding the epidemiology of injuries, determinants, consequences, and practices for injury management.

Methods

The present cross-sectional population-based study was to estimate the prevalence and pattern of injuries in children below 18 years of age. Investigator was closely working with the urban and rural communities included in the study since more than a decade for different community surveillance studies. Thus being familiar with the communities, two urban areas under the purview of urban health center and two peri-urban areas under the purview of rural health center were selected for the study. The peri-urban communities in the study fall in the purview of rural health center, the peri-urban areas were under the purview of rural health center, hence were here after referred as rural areas more appropriately.

Urban PHC in the purview of serilingampally covers eight sub centers with population of about 30,000. Rural RHC covers eight sub-centers with 12 villages with approximate population of 22,000. Urban and rural health centers were purposively selected and two areas each from a sub-center in urban and rural communities were selected randomly. Injury data were collected from children (n = 5336) through house-to-house survey over a period from June 2018 to July 2019. The study population included the household living in the study areas for at least 6 months and above, with children under the age of 18 years. The study documented injury epidemiology, consequence of injuries, and common community practices in rural and urban households.

A recall period of 1 year was considered in the study. "Injury" was any bodily injury from any external source or self-caused with any sort of objects such as sharp, blunt or hit or hurt by any source, fall, road traffic injuries and any other sort of hurt, place of injury, nature, and consequence of injury and gender differences in injuries were estimated. Minor or major injures, any recallable type and source of injury, injury consequence, interventions such as home remedies, local help, primary health care or any specialized professional help, history of hospitalization, and associated disability were included in the study. The consequences affecting the child from regular activities for a minimum of 1 day and above that required any sort of treatment to any major injuries and hospitalizations were also included in the study. The respondent in the study was parent or guardian, who was the primary contact of the child; however, interview included child who is above seven year old, able to recollect, comprehend, and willing to communicate. Assent was secured from the children above 7 years old along with parent informed consent. Children those who were not attending to school or those who were at home during non-working days of the school and available during the interview have participated in responding to the questions such as if they had any injuries at school or playground, or injuries occurred outside home. Meaning of various sorts of injuries was developed based on the injury prevention user manual.[5]

Sample Size Estimation: In reference to worldwide population proportions, India has largest proportions of the younger age groups with 41% of the population account for <18 years of age.[6] Assuming the prevalence, 1.5% relative precision and 10% non-responsive, sample size was calculated to 4,513. However, every house in the selected area was covered by house-to-house survey to identify children below 18 years of age.

Data were collected after obtaining their feasibility and consent. There were about 5,955 households in the urban and 4,100 household in the rural study areas. Total 5,336 children were included, n = 3097 from urban and n = 2239 from rural households. The study assessment included prevalence, pattern of injuries, source, place and nature of injury, injury consequence, and treatment practices among the community. Data on the selected variables were collected with the help of the pre-tested, structured interview schedule written in English, translated in Telugu, and interviewed in simple local language. Ethical clearance from the Institutional Ethics Committee was obtained before initiating the study (UH/IEC/2014/16(R-1). After briefing the purpose of the study and possible time taken, written informed consent was obtained from the parent/guardian. Assent from children along with parent/guardian consent was obtained as necessary.

Statistical Analysis: After completion, data were verified, organized, and entered into excel sheets, assessed for descriptive analysis (frequency, percentages) and then analyzed using SPSS 20 version, "P" value <0.05 was considered as statistically significant.

Results

A total of 5,336 households have participated in providing injury data from urban (n = 3097) and rural (n = 2239) children below 18 years of age. The non-response rate in the study was 3.2%. Among 5,336 children, 2,749 (51.5%) were boys and 2,587 (48.5%) were girls. The sociodemographic information [Table 1] was shown across different age groups in children and other characteristics were gender, type of family, parent education, and occupation. Injuries in children from urban communities were much lower in comparison to rural areas (85.11) during one year recall period in the study. The mean age of the children with injuries was 7.8 ± 5.6 years. Majority were nuclear families in both urban (78%) and rural (82%) areas, 51.5% were boys and 48.5% were girls. During 1 year recall period, 53.6% children (≤18 years) experienced at least one type of injury. Age-wise prevalence among different age groups was reflected from ≤5 years to 18 years was 52.45%, 48.52%, 50.66%, and 66.3%, respectively [Table 2]. Injury profile was documented in three types as unintentional, intentional, and uninjured. Injuries in boys (53.8) and girls (51.99) were recorded almost similar, with slightly higher rate in boys. Injury pattern in children was distributed as 53.6% un-intentional injuries, 34.3% intentional, and 12.1% children were uninjured. Children with about 20,763 injury rate, total pattern shows 4.4 injuries per child in an average. Injuries in children less than 5 years aged were significantly high with 52.45%; however, among all ages, injury prevalence was higher (66.3%) in the children between 16 and 18 years aged. Injury among boys was 53.8% and 51.99% in girls; however, the difference was not statistically significant (P = 0.181). Children with various sorts of injuries were recovered and no disability or death was recorded due to injuries during the recall period in the study.

Injury prevalence identified in the study indicates 53.6% were unintentional injuries and 34.3% reported some sort of intentional injuries and 12.1% reported of not encountering any injuries [Table 3]. Injury Pattern shows that 91.73% of injuries were accidental, which were slightly higher in the age group of 16-18

years children. About 0.31% of injuries were self-inflicted and 0.465 of them were with reasons unknown [Table 4]. Childhood injuries were categorized under eight varieties as road traffic injuries, work area related, accidental falls, hit/cut, etc., burns, drowning, animal bites, and any other (miscellaneous) injuries. Major cause of injuries were byhit/cut/stab (28%), 20% were falls, 17% burns, 5% drowning, and 2% each were by road traffic injuries and animal bites [Figure 1]. Locality wise injury distribution of major injuries by hit/cut was 23.5% in rural and 51% in urban, next common was falls (rural 22%; urban 10%) and burn 19% and 6% in rural and urban children, respectively. Among the total, 4.5% were drowning, 2.3% animal bites, and 25.8% injuries miscellaneous/unknown origin. Of all, 40.8% injuries occurred at home, followed by 31.2% school injuries, 12% occurred at playground, and 11.6% were road traffic injures. Injuries at home were slightly higher among girls (41.9%) than boys (39.8%). Major site of injuries was upper/lower extremity (61.52%), followed by head/face/neck injuries (34.93%) and abdominal injuries (2.49%) [Figure 2].

Upper/lower extremity injuries were high in 6 to 15 age group children (57.48%). Head/face/neck injuries were 32.63% high in 16–18 age group children, abdominal injuries were 2.32%. Injury nature was categorized in to six varieties, of all abrasion/bruises were major (38.02%), which was high in 6–10 years age group children (40.64%), followed by sprain/strain injury (33.5%), 17.56% were by cut, and 5.45% were fractures/dislocations. Abrasion/bruise injury was ranked first among 0–15 years old, sprain ranked first in 16–18 years old and ranked 2nd among 0–15 years age children, and abrasion ranked 2nd for aged 16–18 children, followed by cut/open wound/laceration were ranked 3rd for all age groups (0–18 years). Fracture/dislocation ranked as 4th among different age group children [Figure 3]. Home remedy was the major (36.24%) source of treatment practiced in the study population, 30.82% used primary health care, and 17.25% injuries were not reported and not treated. Six percent children used OTC medicines, 48.53%

Table 1: Distribution of sociodemographic characteristics of rural and urban children

Variable	*Rural*	*Urban*	*Total*	*P value*
1.1. Age in years				
≤5	913 (29.5)	656 (29.3)	1569 (29.4)	
6–10	901 (29.1)	752 (33.6)	1653 (31.0)	0.000
11–15	718 (23.2)	577 (25.8)	1295 (24.3)	
16–18	565 (18.2)	254 (11.3)	819 (15.3)	
1.2. Gender				
Boys	1614 (52.1)	1135 (50.7)	2749 (51.5)	
Girls	1483 (47.9)	1104 (49.3)	2587 (48.5)	0.305
1.3. Type of family				
Nuclear family	2545 (82.2)	1751 (78.2)	4296 (80.5)	
Joint family	529 (17.1)	395 (17.6)	924 (17.3)	0.000
Extended family	23 (0.7)	93 (4.2)	116 (2.2)	
1.4. Mother education				
Illiterate	1267 (40.9)	652 (29.1)	1919 (36.0)	
Primary education	679 (21.9)	472 (21.1)	1151 (21.6)	0.000
Graduate and above	216 (7.0)	247 (11.0)	463 (8.7)	
1.5. Father education				
Illiterate	1126 (36.4)	604 (27.0)	1730 (32.4)	
Primary education	670 (21.6)	345 (15.4)	1015 (19.0)	0.000
Secondary/higher secondary	1056 (34.1)	952 (42.5)	2008 (37.6)	
Graduate and above	245 (7.9)	338 (15.1)	583 (10.9)	
1.6. Mother occupation				
Laborer/daily wages	659 (21.3)	378 (16.9)	1037 (19.4)	
Self-employed/business	115 (3.7)	106 (4.7)	221 (4.1)	0.000
Private employed	210 (6.8)	266 (11.9)	476 (8.9)	
Government employed	30 (1)	14 (0.6)	44 (0.8)	
Not working	2083 (67.3)	1475 (65.9)	3558 (66.7)	
1.7. Father occupation				
Laborer/daily wages	1358 (43.8)	710 (31.7)	2068 (38.8)	
Self-employed/business	559 (18.0)	501 (22.4)	1060 (19.9)	
Private employed	917 (29.6)	847 (37.8)	1768 (33.1)	0.000
Government employed	75 (2.4)	49 (2.2)	124 (2.3)	
Not working	188 (6.1)	132 (5.9)	320 (6.0)	

Table 2: Age-, Gender-, and location-wise prevalence of injuries among children

Variables	*n (5336)*	*n (2824)*	*%*
Age group			
≤5	1569	823	52.45
6–10	1653	802	48.52
11–15	1295	656	50.66
16–18	819	543	66.30
Gender			
Boys	2749	1479	53.8
Girls	2587	1345	51.99
Location			
Urban	2239	188	8.39
Rural	3097	2636	85.11

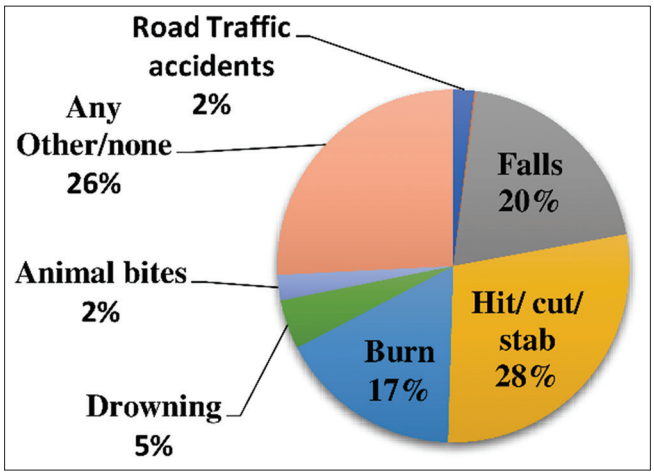

Figure 1: Causes of injuries in children

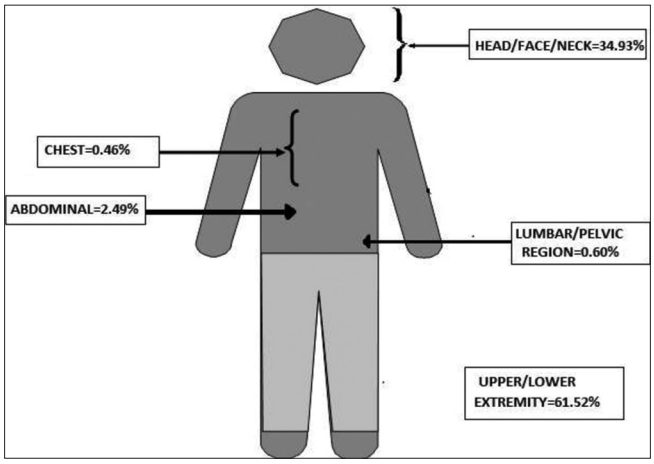

Figure 2: Child hood injury prevalence by site of injuries

Table 3: Injury pattern by locality and gender

Injury Pattern	Rural		Urban		Boys		Girls		Total	
	n	%	n	%	n	%	n	%	n	%
Un-intentional	9251	65.6	1869	28.1	5759	53.7	5361	53.4	11120	53.6
Intentional	4388	31.1	2743	41.2	3693	34.4	3438	34.2	7131	34.3
Not injured	461	3.3	2051	30.8	1270	11.8	1242	12.4	2512	12.1

Table 4: Age-wise pattern of child injury

Pattern of Injury	Age group				
	≤g	6–10	11–15	16–18	Total
Accidental	1375 (87.63)	1548 (93.52)	1196 (91.92)	775 (94.63)	4894 (91.72)
Self-inflicted	3 (0.19)	6 (0.36)	8 (0.61)	0 (0)	17 (0.31)
Any other	9 (0.57)	9 (0.54)	5 (0.38)	2 (0.24)	25 (0.46)
None	182 (11.58)	90 (5.43)	86 (6.61)	42 (5.13)	400 (7.47)
Total	1569 (100)	1653 (100)	1301 (100)	819 (100)	5336 (100)

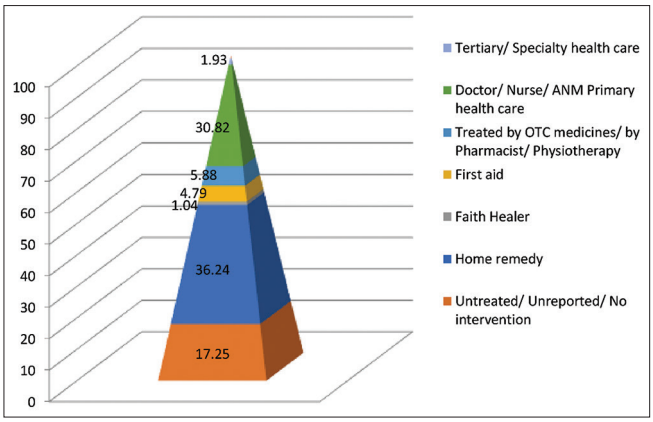

Figure 3: Type of intervention taken when injured

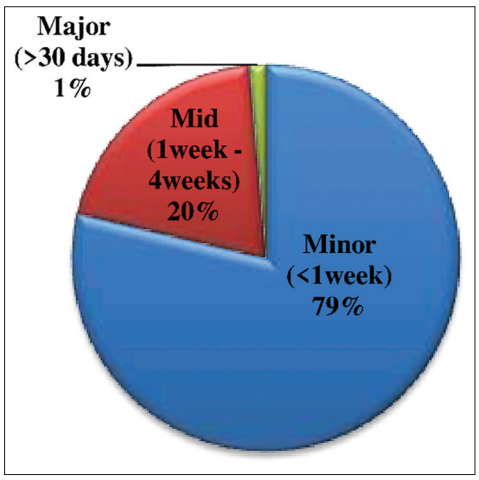

Figure 4: Injury-related disability in children

recovered with no intervention or with some first aid at home, and 45.23% recovered after primary health care. Home remedy was the ranked first among 0–15 years age group children. Primary care by a doctor/nurse/ANM was ranked first among 16–18 years age group. Untreated was ranked 3rd in all age groups (0–18 years). Of all, 79% injuries caused minor disability (<1week), 20% were mild (1–4 weeks) and 1% major disability, 55.48% girls and 48.5% boys were hospitalized at least 1 day to 1 week, and 1.10% of girls hospitalized for more than 30 days [Figure 4].

Discussion

The present study report 53.6% injury prevalence in children below 18 years aged children, among them 91.72% were accidental injuries. The prevalence was higher among rural communities compared to urban children, which was slightly higher in boys. However, a study conducted in an urban slum, injury prevalence was reported as 43.2% and road accidents were most common injury,[7] but hit/cut were the most common injury (28.4%) as per the present study, followed by falls (20%). A community-based study reported 62.7% injury prevalence[8] and in consistent with the present findings, home was the most common place for injures. The present findings document injuries among children below 5 years (52.45%) and 66.3% in 16–18 years age group which is higher than other age groups. In a recent study from an urban India,[9] injuries in children under 5 years of age was 33.6%, similar finding reported in an epidemiological survey,[10] with an annual incidence rate of 91/1,000 injuries in children (≤5 years). A study.[11] from rural India reported 23% injuries among children below 14 years and which was 11% in a population-based study.[12] Child injury of varied prevalence such as 6.3%, 12.9%, and 22.2% was reported in the previous studies.[13-15] In both boys and girls, major injuries were un-intentional (54%), 34% of injuries were intentional and 12% were not injured. In the present study, boys suffered 52.4% and girls 47.6%, similar findings were reported in the previous research studies.[16-18] Whereas a recent study from north India[19] reported 70% injures in boys while 30% in girls, similarly injuries in boys were reported higher in boys than girls in other community-based studies.[12-19]

Among unintentional injuries, accidental hit/cut was the major, followed by falls while playing at home, school, and other playground. The findings from the present study identified that 40.8% injuries occurred at home, which was 43.1% in Parmeswaran *et al.*[9] and similar findings were reported in Gururaj,[12] Shriyan *et al.*,[19] and Bhuvaneswari *et al.*[20] Second common place of injury identified after home was school (31.2%), other studies on child injuries from Singapore,[16] rural north India[13] which reported similar findings. Strength of the study is a community-based survey, studied injury epidemiology from both urban and rural communities with adequate sample size and precision with a response rate of 96.8%. Furthermore, the study included peri-urban communities, with below poverty line groups, lower middle income, and middle income groups. Self-reporting and recall bias may be limitation to the present study. There was hardly any child injury registry, no mechanism identified for injury record keeping

and referral services information in both urban and rural health care, which is an immediate need for implementation.

Conclusions

Childhood injuries are serious public health concern globally that requires immediate attention. Injuries are major cause for disability and mortality in children which are largely preventable. There is urgent need to promote awareness, educating community, and all other stakeholders on injury risk and prevention. Measures to revise injury prevention policies, capacity building among school teachers, and primary health care personnel on injury registry, community surveillance is a dire need.

Limitations and Future Research Recommendations

The study being cross-sectional and descriptive in nature addressed the challenge of conducting data collection to understand epidemiology of child injuries in both urban and rural communities. One year, recall period and self-reported data in the presence of children and family have potential to have bias. Causes, sociocultural, and economic impact involved in injury prevalence need to be further investigated. The study findings recommend strategies and policies to strengthen injury registry and education and capacity building among different stake holders on child injury risk, prevention for safe environment for children.

Further, epidemiological research is needed to replicate these findings and explore the mechanisms underlying the causes to find associations with variables such as health behaviors, family pattern, education, living arrangements, and occupation with injury pattern in children.

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Authors' Note

Primary author (M.V.L) contributed from the conception, design, conduct, analysis, interpretation of the data, and drafting the paper. B.R.S. contributed while conception and revision of the proposal. Authors agreed to be accountable for the integrity of the research work.

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