INCIDENCE, ECONOMIC IMPACT, MEDICAL CONSEQUENCES AND PERCEPTION OF UNINTENTIONAL CHILDHOOD INJURIES IN A RURAL BLOCK IN SOUTH INDIA

A dissertation submitted in partial fulfillment of the requirement of The Tamil Nadu Dr.M.G.R Medical University for the M.D Branch XV (Community Medicine) examination to be held in April 2014

CERTIFICATE

This is to certify that "INCIDENCE, ECONOMIC IMPACT, MEDICAL CONSEQUENCES AND PERCEPTION OF UNINTENTIONAL CHILDHOOD INJURIES IN A RURAL BLOCK IN SOUTH INDIA" is a bona fide work of Dr. Leeberk Raja I in partial fulfillment of the requirements for the M. D Community Medicine examination (Branch-XV) of the Tamilnadu Dr. M.G.R. Medical University, Chennai, to be held in April, 2013.

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ACRONYMS

NFHS	:	National Family Health Survey
ER	:	Emergency Room
DALY	:	Disability Adjusted Life Years
LMIC	:	Low and Middle income countries
PYLL	:	Potential years of life Lost
WHO	:	World Health Organization
UNICEF	:	United Nations Children's Fund
TASC	:	The Alliance for Safe Children
BSA	:	Body Surface Area
LOS	:	Length of Hosptial Stay
CHAD	:	Community Health and Development
PHN	:	Public Health Nurse
PTCHW	:	Part Time Community Health Worker
RTI	:	Road Traffic Incident
PR	:	Perception of Risk
PH	:	Perception of Hazard

1. INTRODUCTION & JUSTIFICATION

Unintentional childhood injuries are a major cause of mortality and morbidity among children across the globe and contributes to over 875,000 deaths annually worldwide among children and adolescents (aged up to 18 years), that is equivalent to the number of deaths caused by measles, diphtheria and polio added together [1-2]. While infectious diseases are the major cause of death among under-5 children in developing countries, unintentional childhood injuries are the major cause of mortality in the developed world [3]. Millions of children all over the world require hospital admission for nonfatal injuries and are often left with lifelong disabilities. Global Childhood Unintentional Injury Surveillance estimates that nearly 50% of under 12 children who suffered an unintentional injury severe enough to warrant presentation to an emergency department were left with some form of disability [1]. In India, under-5 mortality was 85.8 per 1000 live births [4] and child mortality (1-4 years) was 18 per 1000 live births (NFHS-3). Pneumonia and Diarrheal diseases contributed to 50% of all mortality among children aged 1-59 months. The mortality rate due to injuries was 2.9 per 1000 live births and contributed to 5.9% of the total deaths in the same age group [4]. In a nationwide survey based on verbal autopsy, the mortality rate related to injuries among under-5 children was 302 per 100,000 live births [4]. A Community based study done in Puducherry revealed the mortality rate was more in rural areas than in urban areas (339 as compared to 173 per 100,000) [5].

Childhood injury has severe physical, emotional and financial consequences for children and their families. For instance, children may require days of painful medical procedures and be scarred for life. The child can even be left with permanent brain damage or loss of vital organs.

In the USA, children seen in the ER were more likely to stay two or more days in bed and miss two or more days of school than being children treated in the clinic. 55.9 percent of patients had some limitation in activity for two days or more due to the injury. The impact of the injury also varied with age and etiology. Older children (10-14 years) were more likely to spend two or more days in bed, miss two or more days of school, and have more limitations of activity than being younger children (0-4 years) [6]. A study from Jerusalem showed limitations after six months after an injury ranged from 8.3% (daily activities) to 19.4% (sport activities). Burns and traffic crashes were associated with higher proportions of disabilities than other causes and with more frequent work absenteeism by their parent [7].

Within the injury prevention community, it is accepted that up to 90% of childhood injuries are both predictable and preventable [8, 9]. However, the general public believes that injuries are “accidents” or “acts of fate” and are an inevitable part of life. Changing people’s perceptions and beliefs about the nature of childhood injuries is challenging. A recent Safe Kids Canada survey in 2006 revealed that the majority of parents do not know that the leading health risk to children is unintentional injury [10, 11].

Parents’ perceptions and behavior especially what parents think and do in with regard to safety can be critical for the prevention of injury for the young child. Parental perceptions determine whether certain situations are viewed as risky or risk-free. Accurate perception

of risks of hazards, risky actions or situations could help the parent in organizing the safe environment for the child. In addition, such perceptions could increase or decrease parental supervision of a child. Thus, perceptions of risk may have significant association between social environment and injury outcomes`.

A survey conducted by European child safety Alliance about the obstacles to achieving child safety showed that , "Lack of awareness" or knowledge about the causes of accidents was the second most frequently given response after difficulty in providing continuous supervision [12].

A study in North America on perceived risks of childhood injuries among parents of preschoolers showed that parents underestimated the risks of some hazards and injuries and overestimated the risks of others. Parents of children who had sustained a recent injury had a higher risk perception of the risk of hazards and injuries. Further, socio demographic variables and parental safety behaviors were not found to be significant predictors of childhood injuries [13].

It is evident from increasing incidence of childhood injuries that education and preventive strategies have failed to sensitize the parents on this issue in western countries. This may be because of inadequate perception of these injuries. Therefore, knowledge of parental perception on childhood injuries in rural Indian context will help us to develop an education module and help plan preventive strategies to tackle this problem.

3. OBJECTIVES

1. To estimate the incidence of unintentional injuries among children aged 0-14 years in Kaniyambadi block of Vellore district.

2. To assess the economic impact and medical consequences of unintentional childhood injuries.

3. To assess the perception of mothers regarding the risks and hazards of unintentional childhood injuries.

2.0 REVIEW OF LITERATURE

2.1 INTRODUCTION

Definition

An injury is the physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physical tolerance, or a lack of one or more vital element (Ex., oxygen). This energy could be mechanical, thermal, chemical or radiant. Injuries are normally defined by intention. The terms intentional and unintentional denote whether or not an injury was meant to harm the victim. While there are many causes of unintentional injuries, intentional injuries result from violence and can be directed to others (interpersonal violence), to self (self directed violence) or at groups (Collective violence). Violence is the intentional threat or physical force inflicted on oneself, another person or a group that results in injury, death, psychological harm, mal-development or deprivation [14-17].

Children are exposed to many hazards and risks as they go through various milestones of development Unintentional injuries are the leading cause of death and disability for children and teenagers all over the world. Rate and risk of injuries significantly depend on physical, social, cultural, political and economic environments in which they live. Centers for Disease control and Prevention has classified unintentional childhood injuries according to their causes. They are as follows,

1. Motor vehicle
2. Suffocation

3. Drowning

4. Poisoning

5. Fire/Burns

6. Falls

7. Sports and recreation

Unintentional injuries are a major public health problem. However, it is difficult to measure its magnitude primarily due to definitional inconsistencies. While defining the magnitude of injuries, the focus is very often on the severity rather than the incidence of injury. This leads to an under-estimate of minor injuries. In the event of death, defining the severity of the injury is simple and clear. But when an injury does not result in death, defining the injury is quite a challenge. Some rely on length of hospital stay using admission records, others use severity ratings based on the type and location of injury, some others use risk of survival as a guide and yet others create Disability Adjusted Life Years or DALYs (where one DALY is equivalent to one year of life lost to premature death or injury related disability) [18]. Self report surveys often categorize injuries as those which require a visit to hospital or a doctor. These different operational difficulties make it difficult to perform comparisons with data sources.

2.2 BURDEN OF THE PROBLEM

2.2.1 GLOBAL BURDEN

In 1990, 10% of the 51 million deaths worldwide were due to injuries among all age groups [19]. It is estimated that by 2020, the deaths will rise to 8.4 million annually, making injury the single largest cause of loss of healthy years of human life, especially among children and young adults [20, 21]. According to the WHO's 2008 World Report on Child Injury Prevention, approximately there were 950,000 deaths due to injury among children less than 17 years of age in 2004, and 87% of these were due to unintentional and potentially preventable causes [22]. Injury has been described as the "neglected disease of modern society" [23] and an "invisible epidemic". In addition to the deaths, tens of millions of children require hospital care for non-fatal injuries. Many are left with some form of disability, often with lifelong consequences. Road Traffic injuries and falls are among the top 15 Leading causes worldwide of disability-adjusted life years (DALYs) lost for children aged 0–14 years [4]. In the year 2001, unintentional injuries were also responsible for more than 113 million DALYs, or about 8% of all DALYs and some 70% of all injury DALYs. The economic burden of unintentional injuries among children is considerable all over the world, ranging from US $516,938 to US $9,550,704 per year US $4 to US $1,856 per case and 7.88 to 17.2 days of LOS (Length of stay) per case. [24-28]

2.2.2 LOW & MIDDLE INCOME COUNTRIES (LMIC)

The burden of injuries worldwide is disproportionately more in low- and middle-income countries (LMIC). According to WHO, 91% of unintentional injury deaths and 94% of disability-adjusted life-years were lost in LMIC in 2004. In LMIC unintentional injuries accounted for over 7% of total mortalities and over 9% of total disability-adjusted life-

years [29]. When standardized per 100,000 population and compared with high-income countries, the death rate is nearly double in LMIC (65 vs. 35 per 100,000), and the rate for disability-adjusted life-years is more than triple in LMIC (2,398 vs. 774 per 100,000) [29]. The LMIC in the Southeast Asian region contribute over 34% of the global unintentional injury deaths. LMIC in the Western Pacific region (with over 1.5 billion people) contribute a much smaller proportion or only 20% of the global unintentional injury deaths comparing South East Asia's LMIC which has 1.6 billion people. A study on the injury burden in children less than 5 years of age in South Asia showed a mortality rate of 33.9–850.7 deaths per 100,000 children. From community based studies from this region the overall incidence was 8,870 cases per 100,000 children per year. [30]. A recent study from China which included about 6,000 children less than 15 years of age hospitalized for unintentional injuries showed a mean institutional cost of US $166 and a mean length of stay of over 17 days per injury case [24]. A community-level analysis in Vietnam showed that the total annual cost of unintentional injuries was over US $235,000 (equivalent to the income of ~1, 800 people), of which over 90% fell on individuals [31].

2.2.3 HIGH INCOME COUNTRIES

Unintentional injuries are the leading cause of PYLL (Potential years of life lost) in Canada and a major cause of hospitalization. In Canada, approximately 390 children age 14 years and under died from unintentional injuries annually from 1994 to 2003, and 25,500 were hospitalized. In 2004, injuries cost Canadians $19.8 billion in health care costs, of which $16.0 billion resulted from unintentional causes [32-34]. In England 2.5 children and young per 100,000 die due to unintentional injury per year [35]. In the WHO European region, injuries cause 21% of the deaths but 44% of the DALYs lost in people

aged 0-29 years [36]. Among Children under 19 years of age, Injuries are the leading causes of death in the USA. Every year, nearly 9 million children aged 0 to 19 years present to Emergency Departments for injury out of which almost 9000 die due to injury. The estimated annual cost of unintentional child injuries in the United States is nearly $11.5 billion. [37]

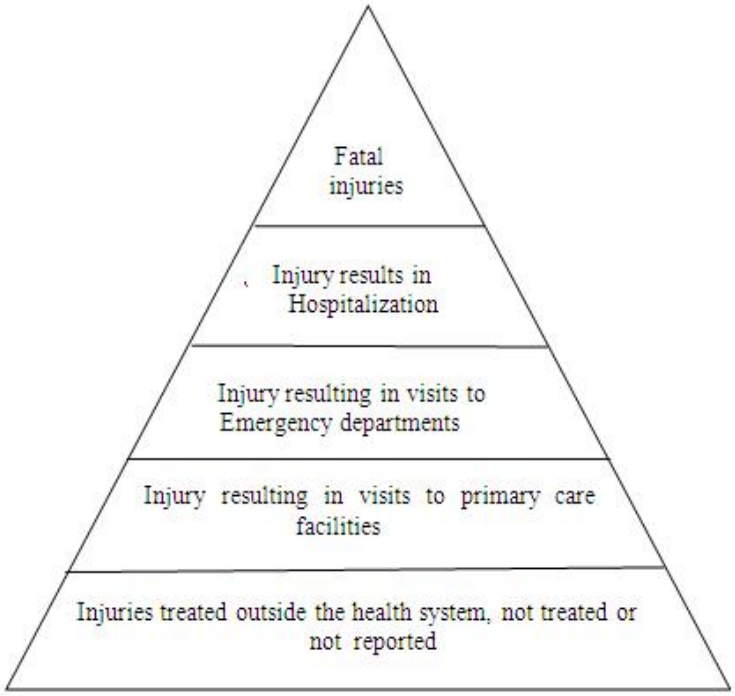
2.2.4 INDIA

The surveillance system monitoring the occurrence of childhood injuries is poor in India and it limits the accurate estimate of injury related statistics. According to a study done among primary school children in West Bengal, the prevalence of unintentional injury among the study population was 58.9%. It was higher in boys (68%) than in girls (53%). The highest prevalence of injury was observed in 11-12 yrs age group. More than 41% of the students experienced injuries at home, followed by 31.6% on road [38]. In Andhra Pradesh, the rate of childhood injuries was found to be 307 per 1000 child years. Falls contributed to 75% of the injuries followed by the Road Traffic crashes [39]. A survey done in rural north India which looked at the occurrence of childhood injury showed that most of the injuries occur at home (42%), followed by road (35%), farms (8%) and playgrounds (6%) [40]. In south India a study done in Kaniyambadi block of Vellore district revealed morbidity of 341.8/1000 child-years and mortality 39.16/100,000 child-years among children between 0-14 yrs with 2 weeks recall period [41]. A study done in Puducherry to assess the prevalence of childhood injuries amongst children between 1-4 years of age estimated the prevalence at 15.2% [5].

2.3 THE 'INJURY PYRAMID'

The injury pyramid refers to the incidence and severity rate of injuries by referring to a general relationship between injury deaths, admissions to hospital and visits to the emergency department. The millions of deaths that result from injuries represent only a small fraction of those injured. Millions of people suffer injuries and most of them do not involve formal medical care, few of them report to general practitioners and few present to Emergency departments while very few of them are hospitalized. The relative numbers of fatal and non-fatal injuries are often graphically depicted in the form of a pyramid. Besides the severity of an injury, there are a number of factors that vary by country and that determine the "shape" of the pyramid, such as access to health care services, or the quality of the data available [42]

Figure 2.1 Injury Pyramid



2.4 RISKFACTORS FOR UNINTENTIONAL CHILDHOOD INJURIES

2.4.1 CHILDREN'S DEMOGRAPHIC CHARACTRESTICS

2.4.1.1 AGE

The death rate due to unintentional injuries is highest in children between 1-5 years of age. But they are also relatively high among adolescents between 15-19 years of age. Evidence has shown that Road traffic crashes, the commonest cause of unintentional injury increase with age from the age of fifteen. Deaths due to thermal injuries are most commonly seen in young children [43]

2.4.1.2 GENDER

Much of the evidence suggests that boys are at a greater risk of being injured than girls. This is seen across all injury type and severity including serious injuries and fatalities. The sex difference is apparent from a young age. Researchers have identified several gender related factor to explain the sex difference in the rate of injuries as listed,

- Physical, cognitive and intellectual development may occur at different time and rate for males and females.
- Behavioral differences and societal expectations such as increased risk taking and influence of peer pressure on the behavior of males
- Young males may have less parental supervision and enjoy greater independence
- Males also experience greater exposure to particular environment where hazards are present [43]

2.4.1.3 INCOME AND SOCIO-ECONOMIC STATUS

Children belonging to the families of low socioeconomic status are more likely to suffer serious unintentional injuries than those who belong to the families of high socioeconomic status and high income. Edward and Kendrick have observed a significant association between level of deprivation and seriousness of injury requiring medical attention in two large studies. [44, 45]. Difference of rates of unintentional injuries may be attributed to the following factors

- Children from poor families may be exposed to hazardous environment especially when the parents are engaged in a hazardous occupation and children exposed to the same when there is no alternate caregiver available.

- Poverty may influence parent's mental health , stress and parental behaviors which in turn have an effect on childhood injuries

- Inability to buy safety equipment and lack of access to health care facility

- Floor level cooking and unavailability of appropriate storage place, forcing low income families to store hazardous materials such as kerosene in a reachable place for children.

- Supervision of young children by their older siblings, lack of safety play areas and appropriate safety measures in and around the home [46].

2.4.2. PARENTING CHARACTERISTICS

2.4.2.1 PARENTAL BEHAVIOR

It has been shown that greater supervision of childhood injuries is linked to a reduction in the rate and likelihood of injuries. A study from the USA study has reported that when maternal supervision is low, there is a variation in the behavior of the child leading to increase in the rate of injuries [47]. A similar American study has shown that consumption of alcohol by mothers while caring for children increases the likelihood of injury children [48]. Children of mothers with higher level of anxiety, impulsive or stressed behaviors most likely experience minor injuries but that maternal conscientiousness show reduction in moderate injuries [49]. Parental supervision is an ideal strategy for primary prevention of childhood injuries, but it's not always possible. Over-reliance on supervision is not a successful approach to prevent childhood injuries for falls can occur even with complete supervision and what the primary caregivers think as a complete supervision may not be consistent with guidelines. A systematic review that compared fall injuries in a day care with those in home care found that the risk of a fall injury among infants and young children in the home was twice the comparable risk in day-care settings [1]. So it's essential that children enjoy the safe surroundings. It is the responsibility of the system which is in place to provide hazard free environment.

2.4.2.2 MATERNAL HEALTH AND SOCIAL SUPPORT

Maternal health and social support are the important predictors of home safety and injury rates. A systematic review has concluded that there is a weak to moderate link between maternal depression and injury rates [50]. Similarly Western studies have also reported a

link between social support and unsafe environment at home leading to high injury rates [45].

2.4.3 CHILDREN'S BEHAVIOURAL CHARACTERISTICS

2.4.3.1 MENTAL AND PHYSICAL HEALTH AND BEHAVIOR PROBLEMS

Children's mental health problems usually evident in the form of externalizing behavior problems were associated with increased risk of childhood injury .Evidence from one large US study reported that children diagnosed with autism, hyperactivity and more serious mental illness were more than twice as likely to have suffered an injury compared with children who had not been diagnosed with one of these conditions [51]. Research on children's physical health conditions and disability and injury is more mixed. The systematic review reported no consistent links between children's medical problems and injuries [52].

2.4.3.2 RISK-TAKING BEHAVIOUR

A systematic review of qualitative research evidence suggests that taking minor risks including not using pedestrian crossings or crossing the road between parked cars were a natural part of children and young people's lives. Children actively sought out situations with serious risks or become involved in activities where the risk of experiencing an injury was high [53]. Children who did not recognize the dangers or vulnerable situations through appropriate cognition also were more likely to take risks than other children [44]. Risk taking behavior shown to be different in the age groups. Older children are more optimistic than younger children about the chances of injury with certain hazards. Risk taking behavior has been shown to rise between the ages of 9-14 years and peaks in early

adulthood and declining with age thereafter. Children, who perceive danger as low, judge their personal vulnerability for an injury to be low, also believe that the potential severity of injury is not great and hence they are more likely to take risks [53]. Cognitive processes are more developed in children aged 11 years and they are able to recognize the situation and take appropriate decisions. Children over the age of 12 years have the capacity to modify their behavior when faced with a situation involving two tasks [1].

2.5 EPIDEMIOLOGY OF SPECIFIC CAUSES OF INJURY

2.5.1 ROAD TRAFFIC INJURIES

According to the WHO Global Burden of Disease project, nearly 1.3 million people of all ages were killed in road traffic crashes around the world and up to 50 million more were injured or disabled in 2004. The South-East Asia and the Western Pacific Regions of WHO together accounted for two thirds of all road traffic deaths. By the year 2030, road traffic injuries are predicted to be the fifth leading cause of death worldwide [54] and the seventh leading cause of disability adjusted life years lost [55]. In 2004, road traffic injuries accounted for approximately 2, 62000 child deaths among children and youth aged 0–19 years – almost 30% of all injury deaths among children and accounting for 2% of all causes related to mortality in Children. Children suffer injuries while in a variety of roles related to different types of transport. They may be pedestrians, bicyclists, car occupants, motorcycle riders or motorcycle passengers, or passengers on public transport. In countries like India, children work on the streets, usually selling merchandise, where they weave in and out of moving traffic. Depending on the type of Road user, the severity and the likelihood of injuries vary [1].

a. PEDESTRIAN INJURIES

Globally, pedestrians form the single largest category of children involved in road traffic crashes. In high-income countries between 5% and 10% of children suffering road traffic injuries are pedestrians, while in low-income and middle-income countries the proportion ranges from 30% to 40% [56].

b. OCCUPANT

Children injured or killed while traveling in cars as occupants are a serious concern in high-income countries, where such cases can account for up to 50% of childhood traffic deaths [57]. As motorization increases, child occupant deaths are also an emerging problem in many middle-income countries.

c. BICYCLIST

Children are taught to ride bicycles as a form of recreation. In many parts of Asia, bicycles are also a common means of transportation. Bicyclists constitute 3%–15% of children injured in traffic collisions and 2%–8% of child traffic-related fatalities around the world [58]. In some Asian countries, though, fatalities are as high as 33% [58]. While there is a decline in bicycle-related injuries in High income [57] countries, there is an increasing trend found in many low-income and middle-income countries, particularly in South-East Asia and the Western Pacific [59].

d. MOTORCYCLIST

Motorcycles are the most common mode of transport in rural as well as urban areas in most developing countries including India. This is probably due to the rapid urbanization

occurring in these countries coupled with the fact that motorcycles are the cheapest mode of quick transport available. Children may begin to travel on motorcycles at an early age, either sitting in the fuel tank or behind the driver. In some Asian countries including India, where they are legally permitted to drive small-engine motorcycles (without gear) from their 16th year, motorcycle crashes are the leading cause of mortality and morbidity among teenagers [1].

2.5.2 DROWNING

According to the WHO Global Burden of Disease estimates, 388000 people died in 2004 as a result of drowning around the world, of which 45% were under the age of 20. Fatal drowning ranked 13th as the overall cause of death among children under 15 years, with the 1–4 age group appearing at greatest risk. The drowning rate in low-income and middle-income countries is six times higher than in high-income countries (with rates of 7.8 per 100 000 and 1.2 per 100 000, respectively). The low-income and middle-income countries of the WHO Western Pacific Region have the highest rate of drowning deaths (13.9 per100 000 population), followed by the African Region (7.2 per 100 000), the low-income and middle-income countries of the Eastern Mediterranean Region (6.8 per 100 000) and the South-East Asia Region (6.2 per 100 000) [1]. Nearly one and half of all childhood drowning in Asia is among those aged 1-4. Toddlers are more likely to wander off while their mothers are busy with household work. Mothers may not be used to their children being able to walk, or think others are watching them. Another key risk factor is that toddlers can drown in a bucket or any other small amount of unattended water. Drowning is largely a silent epidemic because drowning deaths are rarely reported to hospitals, the source of data for most national health statistics. In a community survey in Thailand, which went from house to house interviewing family members, nearly three out

of four of all drowning cases were never reported to a hospital — this accounts for 2000 deaths that were missed in hospital data [60].

A population based study done in Kaniyambadi block showed the overall-drowning rate of 25.9 per 100,000 person years [61]. Wells were the commonest (80%) site for children in the 10-12 year age group. These wells are large open irrigation wells, with no protective wall and are not only used for domestic purposes, but also for swimming. This poses a risk for children who have access to these wells .It was also evident from the study that the risk of drowning was greater where there is a well near the place of dwelling. In children under the age 5, the commonest site was collection of water (buckets, pots, etc.) at home [61].

2.5.3 FALLS

WHO Global Burden of Disease project for 2004, has estimated that 424000 people of all ages died from falls worldwide. Falls ranked as the twelfth leading cause of death among 5 to 9-year-olds and 15 to 19-year-olds .In under -5 age group, non-fatal falls were the 13th leading cause of disability-adjusted life years (DALYs) lost [1]. It is the most common type of childhood injury seen in emergency departments, accounting for between 25% and 52% of cases [62, 63]. A systematic review done in low income and middle income countries showed incidence of falls among children and youth aged less than 22 years was 41 per 100 000 population in Africa [64], whereas the rate varied from 1378 to 2700 per 100 000 population aged less than 20 years in central and South America, while in Asia the median incidence was 170 per 100 000 population aged less than 18 years (43% of all injuries) [65,66].The highest rate on the Asian continent was recorded in the United Arab Emirates with an incidence of some 1923 per 100 000

population. High-income countries had average mortality rates of between 0.2 and 1.0 per 100 000 children aged less than 20 years. However, low-income and middle-income countries in the same regions reported rates up to three times higher ranging from – about 2.7 per 100 000 and 2.9 per 100 000, respectively [1]. According to UNICEF-TASC Survey mortality due to falls was as high as 4.7/100,000 in Vietnam [67].

2.5.4. BURNS

Fire-related burns are the 11th leading cause of death for children between the ages of 1 and 9 years. Overall, children are at high risk for death from burns, with a global rate of 3.9 deaths per 1, 00,000 populations [1]. Globally, infants have the highest death rates from burns. The rate then slowly declines with age, but increases again in elderly adults. Worldwide, nearly 96000 children under the age of 20 years were estimated to have been fatally injured by burns in the year 2004. The death rate in low-income and middle-income countries was eleven times higher than that in high-income countries, with the figures standing at 4.3 per 100 000 as against 0.4 per 100 000.Burn-related deaths show great regional variability. Most of the deaths occur in the poorer regions of the world .The death rates in the Americas and the high income countries of Europe and the Western Pacific are among the lowest in the world. Analysis of data by WHO from the reports submitted by member states show that fire-related burns made up 93.0% of all burn deaths in 2002, scalds contributed 5.4% and the rest, 1.6%, were as a result of contact, chemical or electrical burns [68]. Studies from high-income countries suggest that smoke inhalation is the strongest determinant of mortality from burns, mostly from house fires or other conflagrations. For children over three years of age, smoke inhalation is strongly associated with mortality [69]. A hospital based study in Manipal, India showed that most of the children received burn injuries in the range of 0 to 20% BSA (63.1%). Scald

(72.5%) followed by flame (22.7%) and electrical burns (3.2%) were the most common cause of burn injuries. Most of the children (90.6%) received burn injuries at home especially in the kitchen according to this study. Overall pediatric burn mortality was 7.4% [70].

2.5.5 ACCIDENTAL POISONING

Acute poisoning accounted for an estimated 45 000 deaths annually in children and young people under the age of 20 years. Global death rates in children younger than 20 years due to poisoning was 1.8 per 100 000 population in 2004. As in the case with other injuries, high-income countries rank lower with a rate of 0.5 per 100 000 while in low-income and middle income countries this is four times higher, at 2.0per100000 [1]. A hospital based retrospective study in India showed Childhood poisoning was responsible for 2.1 % of the pediatric admissions and 1.2% of total deaths. Non-medicinal compounds were the largest contributors (69.2%), of which kerosene alone was responsible for 47% of the cases [71]. Another similar retrospective study has concluded that pediatric poisonings constituted 0.23–3.3% of the total poisoning. The mortality ranged from 0.64–11.6% in India with the highest being Shimla [72].

2.5.6 ANIMAL BITES

Children are exposed to various kinds of animal and insect bites such as dog, *scorpion* etc. Dog bite is one of the most common childhood accidents causing significant morbidity and mortality in pediatric age group. Rabies, an almost invariably fatal disease continues to be the most serious, most dreaded and frequent disease associated with a dog bite; children do not realize that their playful behavior may elicit an angry or defensive reaction from an otherwise friendly well known pet dog [73]. Roughly 36% of the

world's rabies deaths occur in India each year, most of which are caused by children being bitten by infected dogs [74]. A WHO sponsored multicentre rabies survey in India has concluded that the annual incidence of dog bite was 1.7 % and more in rural areas (1.8%) and among children (2.6 %). The main biting animal was a dog (91.5%) followed by cat (4.7%) [75].

2.6 ECONOMIC IMPACT OF CHILDHOOD INJURIES

Unintentional childhood injuries do not only cause significant mortality and morbidity. They have a huge impact on the economy of the country as well as the immediate family of injured. According to a study from China which looked into the cost of treating unintentional injuries for 2 years has estimated that the total hospitalization cost for unintentional childhood injuries was US $ 1,033,876.0, and the mean cost was US $166.3 per case. The total length of stay (LOS) in hospital was 106,915.2 days; with a mean of LOS of 17.2 days per case. Cost of treatment for fractures (US $306,572.0) was the highest, followed by internal organ and encephalic injuries (US $279,725.6). The mean LOS relating to blood vessel and nerve injuries was the highest, at 30.1 days per case [24]. A study in rural Bangladesh focusing on *Out-of-pocket payments for unintentional injuries* demonstrated that, most rural Bangladeshi people paid from their own pocket for the treatment of unintentional injuries, rather than depending on the available governmental or public health care facilities. The mean of out of pocket expenditure was US $4 [76].

The global losses due to road traffic injuries are estimated to be US$518 billion per annum [77]. In Low and middle income countries it costs from US$65 billion to US$100 billion. This means those road traffic collisions and their consequences cost governments

up to 3% of their gross national product [78]. The direct and indirect costs for Unintentional injuries may include permanent disabilities, loss of schooling, medical care, legal costs, vehicle repair cost and loss of income to parents resulting from absence from work to care for the child. In addition, there are long-term economic costs arising from premature death, rehabilitation, the loss of healthy years in children, and the inability of those with serious disabilities to work to the full extent. Studies from Bangladesh and India have showed that there is a incline in poverty when poor are injured because of additional resources that are need to care for the injured by taking on extra work, selling assets or taking out loans[79] .

Specific studies into the costs of hospitalizations for non-fatal drowning in US has estimated that, the mean direct costs associated with hospitalization have been reported at $US 13 000 to $US 14 000 per case. Among children with severe long-term consequences, such as brain damage, treatment costs alone can exceed $US 100 000 [80, 81].

In Canada it is estimated that annual injuries due to falls among children in 1995 cost 630 million Canadian dollars .By implementing strategies it is expected there would be a 20% reduction in the incidence of falls among children aged 0–9 years, 1500 fewer hospitalizations,

13000 fewer non-hospitalized injuries, 54 fewer injuries leading to permanent disability and net savings of over C$ 126 million (US$ 120 million) every year [34].

2.7 CONSEQUENCES OF CHILDHOOD INJURIES

The impact of injury on these children is often lifelong. Head injuries can lead to substantial changes in learning ability, developmental delays, and behavioral challenges. Spinal cord injuries may have limitations in play and pose challenges to children's future employment opportunities. Among all the causes of injuries, road traffic injuries are the leading cause of disability for children. A survey in Asia shows that road traffic injuries are one of the five leading causes of disability in children. According to these surveys, the rate of permanent disability among children aged 1 to 17 years injured as a result of a road traffic crash was 20 per 100 000 children [59]. A study done in Bangalore, India found that 14% of children who sustained a traumatic brain injury from a road traffic crash still required assistance with day-to-day activities six months after the crash [82]. Several studies have reported high levels of distress in children during and immediately after a road traffic injury .Findings from a study has reported that that within five days of a traumatic event, such as a road traffic crash, 98% of the children suffered post-traumatic stress disorder, depression or anxiety. One month after injury, 82% still had symptoms. Twelve months after injury, 44% were still having flashbacks, feared being injured again, or suffered mood disorders, body-image changes, sleep disturbances [83]

A study from Australia on drowning has concluded that among all admitted cases with drowning an average that 22.3% of cases were left with severe or persistent respiratory or neurological consequences [84]. The study also indicated that at least 5% of child survivors of drowning admitted to a hospital were discharged with severe neurological deficits, meaning they will spend their rest of the life in a vegetative state. A descriptive study from Thailand done in a pediatric intensive care unit has shown a mortality rate of 26% and 36% with long-term consequences [85].

Studies from Low income countries have concluded that 49% of affected children from burns suffered some form of disability after a burn, with 8% being left with a permanent physical disability .A community based survey from Bangladesh has revealed an annual disability rate of 5.7 per 100000 children as a result of burns [86]. Hypertrophic scarring, extensive contractures, formation of keloids and the need to amputate an extremity are the most common consequences after burns. Hypertrophic scarring in particular has been found to be one of the most significant long-term consequences of childhood burns occurring in almost half of severe cases. Burns to the face resulting in gross disfiguration can lead to poor self-esteem in children and adolescents. Studies have concluded that young children adapt to disfigurement with ease than adolescents [1]. A study from India showed that only adolescents in the study required psychosocial rehabilitation [87].

According to the UNICEF– TASC Survey in China, falls were the leading cause of permanent disability in young people aged 0–17 years, primarily due to the long-term consequences of brain and cervical spine injuries [88].Similar findings have also been revealed from a study in Nicaragua which state that falls were the leading cause of permanent disability in young people less than 15 years of age [1]. In Thailand [89] and Viet Nam [59], falls accounted for 1% and 4% of the total burden of permanent disability, respectively. Permanent disability in these surveys referred to the loss of a physical sense – such as sight or hearing, loss of mobility or loss of the ability to speak. However, emotional, psychological and cognitive long-term consequences were not included because of the difficulty in measuring them [88]. As a result, the overall amount of permanent disability is likely to be considerably greater than the survey estimates suggest.

2.8 PRINCIPLES OF PREVENTION

Researchers estimate that over 90 % of unintentional injuries could be prevented. Certainly, a lot of comprehensive injury analysis is required. Nevertheless, if appropriate strategies are implemented, it is estimated that as much as 40 % of injuries can be prevented. Prevention programmes that use a multidisciplinary approach have been shown to be the most effective for reducing child mortality as a result of injury. A number of countries have achieved remarkable reductions in their child injury death rates, in some cases by more than 50%. Though there are no definitive strategies to for the prevention of injuries, there are six basic principles that have been enforced in most of the successful child injury prevention programmes around the world. These are:

– legislation and regulations, and their enforcement;

– product modification;

– environmental modification;

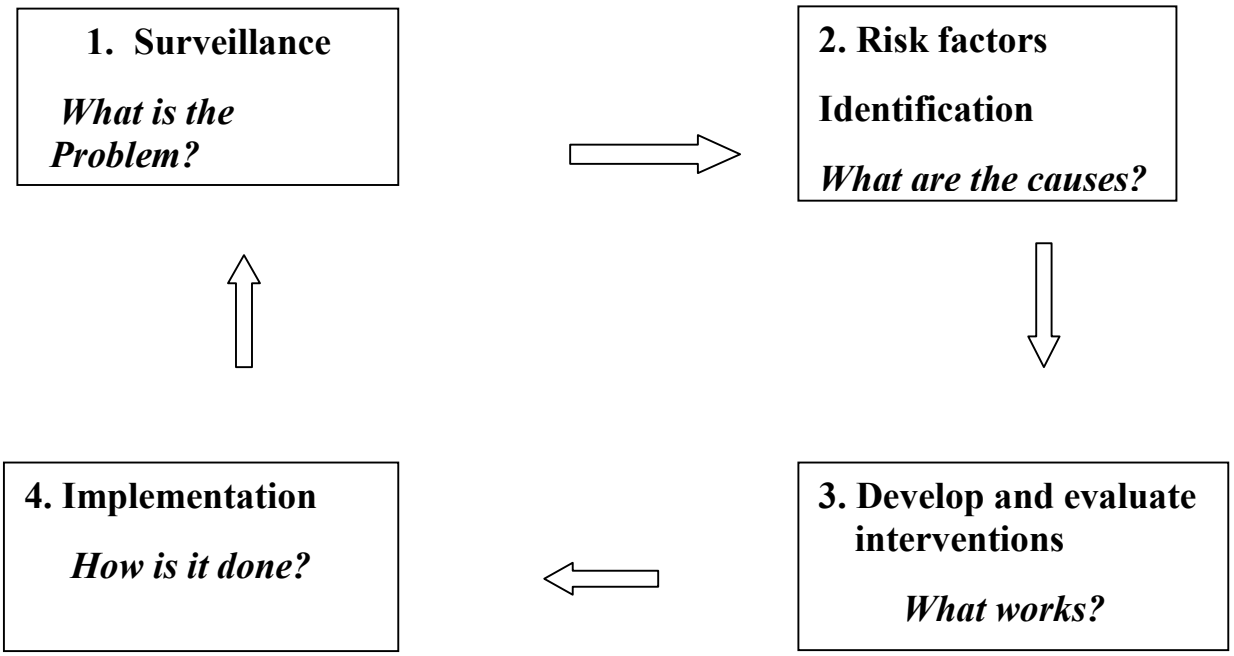
– supportive home visits;

– promotion of safety devices;

– education and the teaching of skills.

Child injury prevention strategies should be based on available evidence. Interventions should be prioritized after considering the scale of the problem, and the known effectiveness of the intervention, cost-effectiveness and the cost of each intervention. The principles of Public health approach for the prevention of unintentional childhood injuries is given in the following figure.

Figure 2.2 Public health approach to injury prevention



Source: *Unintentional childhood injures, Children's health & Environment, WHO package for Health sector*

2.8.1 HADDON'S PHASE MATRIX

The Haddon matrix has been used in injury prevention research and intervention for the past two decades. The Haddon matrix is a grid with four columns and three rows. The columns represent different influencing factors (host, agent/vehicle, physical environment, social environment), The rows represent different phases of an injury (pre-event, event, and post-event). The host column represents the person or persons at risk of injury. The agent of injury impacts the host through a vehicle (inanimate object) or vector (person or other animal/organism). Physical environment refers to the actual setting where the injury occurs. Socio-cultural and legal norms of a community constitute the

social environment. The phases of an event are depicted in the matrix as a continuum beginning before the event (pre-event), the event itself (event phase), and sequelae of the event (post-event phase). Through its phase-factor approach, the Haddon matrix integrates the concepts of primary, secondary, and tertiary prevention with the concept of the host/agent/environmental interface as a target for delivering public health interventions. [90].

Table 2.1: Haddon's Matrix

	FACTORS			
PHASES	**Host (Person)**	**Agent (Vehicle or Product)**	**Physical Environment**	**Socio economic Environment**
Pre-event	Is the person pre-disposed or over exposed to risk?	Is the agent Hazardous?	Is the environment Hazardous? Possibility to reduce risks?	Does the environment encourage or discourage risk taking and Hazard?
Event	Is the person able to tolerate force or energy transfer?	Does the agent provide protection?	Does the environment contribute to injury during the event?	Does the environment Contribute to injury during the event?
Post-event	How severe is the trauma or harm?	Does the agent contribute to trauma?	Does the environment add to the trauma after the event?	Does the environment contribute to recovery?

Source: *Unintentional childhood injures, Children's health & Environment, WHO package for Health sector*

HADDON'S BASIC STRATEGIES

1. Prevent creation of hazard

2. Reduce amount of hazard

3. Prevent release of hazard

4. Modify the rate or distribution of hazard

5. Separate (in space or time) hazard from that to be protected

6. Separate hazard from that to be protected with barrier

7. Modify relevant basic qualities of hazard

8. Make that to be protected more resistant to damage

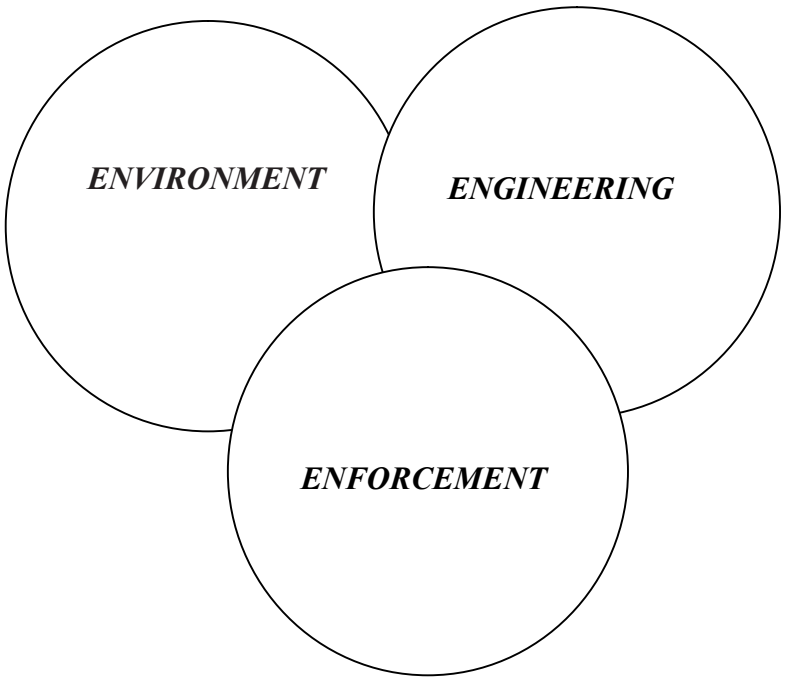
9. Counter damage already done by hazard

10. Stabilize, repair and rehabilitate the object of the damage.

2.8.2 STRATEGIES FOR INJURY PREVENTION

Injury prevention theory dictates a multi-tiered public health approach that concurrently and comprehensively targets **E**ducation, **E**nforcement/legislation and **E**ngineering offers the most effective strategy for prevention

Figure 2.3 Strategies for Injury Prevention



2.8.2.1ENVIRONMENTAL APPROACH

The environmental approach refers to making changes in our environment to reduce injury risks. The environment refers physical surroundings (ex. roadways), products (ex. vehicles), and the social environment (ex. societal attitudes towards drinking and driving). The environmental approach is the one strategy that involves injury reduction measures that are not dependent on action by those being protected; they are passive, automatic, and constant in their protective effects. As a result, the environmental approach is considered the most effective strategy [91].

2.8.2.2 EDUCATIONAL APPROACH

A community education approach aims to reach groups of people with information and resources for improving health. Community education is broadly targeted at groups or the population at large. Mass media campaigns have been shown to increase awareness, change attitudes, and provide a context in which other strategies can succeed, such as public policy change. Effective community education not only alerts individuals to new information, but also builds a critical mass of support for healthier behavior, norms, and policy change [91].

2.8.2.3 ENFORCEMENT APPROACH

Changes in local, state, and national laws, as well as the adoption of formal policies by boards and commissions, fall under the umbrella of policy and legislation. Influencing policy usually presents the opportunity for the broadest improvement in health outcomes. Requiring safe practices, implementing safety standards, and encouraging the use of safety equipment can Key prevent unintentional injuries [92].

2.8.3 ROLE OF PARENTAL PERCEPTION ON PREVENTION OF CHILDHOOD INJURIES

Though the literature has identified behaviors of both children and their parents as risk factors for childhood injury, there is a lack of research on behavioral components of injury risk [93]. A research which studied patterns of injury among 1 to 3-year-old children whose mothers were more stressed and less educated, and whose homes

were noisier and had more safety hazards concluded that these children were perceived by their mothers to be hard to manage and aggressive and thus suffered higher rates of injury that required medical attention [94]. Various studies have reported a significant association between perceptions of risk and safety behaviors [95]. Unpublished data from Vellore has revealed that 84.5 % (255/302) caregivers had a good perception of injuries that could have occurred in the situations, 81.7 % (247/302) had adequate knowledge of the type of injury type that could occur in each situation, 73.5 % (222/302) believed that the injuries were preventable, 60.9 % (184/302) of the caregivers were aware of the correct prevention methods that could be used in those situations. Less than 10 years of education, illiteracy and Low socioeconomic score were significantly associated with poor perception of injury and poor perception of injury prevention.

A study done in 14 countries of Europe on Parents' perception has concluded that three-quarters of parents of children aged 0 to 5 agree that most injuries involving children can be avoided (77%, including 32% who strongly agree). Only one in ten disagreed, and a further one in ten parents was neutral. The European country in which parents were most positive about the scope for avoiding child injury is Portugal, where nine out of ten people agreed that most injuries involving children can be avoided. Other countries in which parents were particularly positive about the potential for improving child safety were Spain, France, Finland and Italy, where at least four out of five agreed that most child injuries can be avoided. There were no significant differences in opinion by age or gender of the parent. However, parents of young children on a low income were slightly more likely than those with a higher income to agree that most injuries involving children can be avoided (82% vs. 75% agree) [11]. A study from Sweden showed 14-23% of the variance in mothers' risk perception with socio demographic profiles, casual attributions and behavior related variables. Causal

attribution to the child was found to be the most important predictor of maternal risk perception [96]. Safety education often targets parental risk perception. Predictors of risk perception, however, are not well known and it limits the feasibility of effective safety education. When parental perception is well understood, it will lead to a better understanding of health education on safety thus resulting in hazard free environments for children with lesser incidence of childhood injuries.

4. METHODOLOGY

4.1 STUDY DESIGN

The first phase of the study was a non-concurrent cohort study to measure the incidence of unintentional injuries and to assess the impact and consequences of injuries among the children those who had injuries. The objective of the second phase was to assess the perception of injuries among the mothers. This was done by using both qualitative (Focus Group discussions) and quantitative study design (Cross sectional study).

4.2 STUDY PERIOD

This study was undertaken from March 2013 to August 2013

4.7 STUDY SETTING

The study was conducted in Kaniyambadi Block, a rural block in southern India which has a population of 1,10,646. Health care in the block is provided by three primary health centers and a Government Medical College. The Community Health Department of the Christian Medical College has been working in Kaniyambadi block for more than 50 years and provides comprehensive health care through health workers at different levels. The peripheral workers of Community Health and Development (CHAD) health care program are the Part Time Community Health Worker (PTCHW), who are traditional midwives living in the village and have been trained by the program. There is one part Time Community Health Worker (PTCHW) for every 1000 to 1500 population. A Health aide who serves a population of 3000 to 5000 supervises the PTCHW. A Public Health Nurse (PHN) is responsible for a population of 15000 to 20000 and she is assisted by area

Health aides. The PHN is supervised by a Postgraduate Trainee in Community Medicine who looks after a population of 30000 to 40000. The PHN reports to the resident on health related events and it's verified by home visits by the resident if required. The resident also monitors patients with chronic illness and infectious diseases on compliance and complications and conducts review meetings with the team. A resident along with a medical intern visits the villages once a month and conduct mobile clinics. The resident takes care of maternal and child care while the intern runs morbidity clinic.

The PHN visits the homes of the patients in order to follow up with the villagers, updates her records, make note of health complications (if any) and if required, refer them to CHAD. She is assisted by the health aide and/or PTCHW in these visits. Patients with Health problems requiring hospital based care from the periphery are referred to the CHAD hospital through PTCHWs, Health aides and PHNs during their home visits and also from nurse run clinics and through a doctor from doctor run mobile clinics. The CHAD (Community Health and Development) Hospital serves both as a referral centre for field programs and a point of primary care. The facilities at CHAD include pharmacy, laboratory, labor room, operation theatre and emergency care. Patients with complications requiring specialized care are referred to Christian Medical College and Hospital which is a tertiary care center.

The Health aide reports pregnancies, births, deaths, morbidity, marriages, immunization and couples eligible for contraception in the village. She is assisted by the PTCHW and collects information through home visits and records it in appropriate registers and passes it on to the Public Health Nurse. The data obtained through this surveillance system is maintained as an electronic database in the Health Information System (HIS) of the department. The data is collated for the entire block and reviewed monthly by the entire

team involved in the care. In order to determine the accuracy of the information, validation is carried out by independent trained personals. Every five year census of the block is updated.

4.4 STUDY ON INCIDENCE OF INJURY:

For estimating incidence of injury a non concurrent cohort study was conducted.

4.4.1 INCLUSION CRITERIA

a. Children between ages 0-14 years

b. Permanent resident of Kaniyambadi block

4.4.2 EXCLUSION CRITERIA

Children with birth injuries, iatrogenic injuries were excluded.

4.4.3 SAMPLE SIZE CALCULATION

Injuries follow a Poisson distribution.

Using $4pq/d^2$

From a previous study in Kaniyambadi block mean No.of events = 0.3/year

With precision of 0.06, n = 333,

Since 3 months recall period is used n =333 x4 =1332

By adding design effect of 1.2, the sample size = 1598

4.4.4 SAMPLING METHOD

Mortality data of the Kaniyambadi block for the period January 2008 to December 2012 was obtained from the CHAD Health Information System (HIS) and deaths due to unintentional injuries from 0-14 years of age were analyzed. There were a total of 38 deaths and a list of villages with 2 or more deaths due to unintentional injuries was prepared and arranged in an alphabetical order. The number of children under 14 for the same villages was listed against the villages. 13 villages were finally chosen to be included in the study. In each village a house-to-house survey was done. In each household the youngest child was included in the study. Information was sought from the primary caregiver of the child after obtaining informed consent using the recall periods of 2 weeks and 3 months. For those who had suffered an injury, a detailed questionnaire was administered. Vacant houses were revisited once.

4.4.5 STUDY TOOL

a. Injury screening form:

A Proforma with questions on general demographic information and questions to screen if the child had an injury. (Annexure 4)

b. Impact of Injury Questionnaire:

A pilot tested, translated and back translated interviewer-administered questionnaire which had questions to collect information on the details of injury and events that followed the injury. (Annexure -5)

4.5 STUDY ON PERCEPTION OF INJURIES:

Mothers' perception regarding unintentional injuries was carried out by a cross sectional study design and by a qualitative method through focus group discussions

4.5.1 INCLUSION CRITERIA

1. Mothers with at least one child between the age group of 1-5 years

2. Permanent resident of Kaniyambadi block

4.5.2 SAMPLE SIZE CALCULATION

A European study [12] has revealed 75 % of the mothers had a good perception on unintentional childhood injuries. Assuming 50% of Indian mothers have good perception and 20% of relative precision , Sample size was calculated using the formula

$$N= 4pq /d^2$$

$$= 4 x50 x 50 / 100 = 100$$

Sample size =100

4.5.3 SAMPLING METHOD

A list of mothers who have children between 1-5 years of age was obtained from the 13 villages where injury screening was done. Hundred mothers were chosen by simple random sampling method. It was ensured that in each village the sample size was proportionate to the population of mothers with 1-5 year old children.

4.5.4 STUDY TOOL: (Annexure 5)

Perception of risk and Perception of Hazard were measured with an instrument developed by Glik and Kronenfeld (1990). The tool contains four Likert scaled questions measuring the following perceptions

1. The likelihood of injury occurring to a child
2. The degree of seriousness of the injury
3. The likelihood of Hazard occurring
4. The dangerousness of the hazard

17 items scale on the likelihood of an injury asks the mother, "What do you think the chances are that a typical child from 1- 5 will be injured in the following ways at least once (falls, burns, choking, etc)?" Nineteen items on the Likelihood of Hazard asks "What do you think the chances are a child from 1-5 will be injured from following Hazard or things (automobiles, furniture, stairs etc)?" The seriousness of an injury was measured by 17 item scale asking "How serious do you think the following type of injury to a typical child from 1-5 (falls, burns, choking, etc.)". The danger of hazard was measured by 19 item scale asking "How dangerous do you believe the following types of hazards are (automobiles, furniture, stairs, etc).The perception of risk (PR) scale was developed by multiplying each item in the Likelihood of injury scale by its counterpart on the Seriousness of injury. The 17 item perception of risk scale had Alpha cronbach reliability co-efficient of 0.85. The Perception of Hazard (PH) scale was developed by multiplying each item in the Likelihood of hazard scale by its counterpart on the Danger

of hazard of scale. The perception of Hazard scale 19 items and Alpha cronbach reliability coefficient of 0.86. This questionnaire was translated into Tamil and back translated and pilot tested.

4.5.5 QUALITATIVE DATA COLLECTION

1. FOCUS GROUP DISCUSSION -I

Venue: Veppempet

Date: 28.8.2013

Time: 10.30 am

Participants; Mothers with children 1-5 years of age

Number of participants: 8

Moderator: Principal Investigator

Observer: Mrs.Manimegalai – Health Auxiliary

Method of Recording: Voice Recording after a verbal consent from participants

2. FOCUS GROUP DISCUSSION- II

Venue: Kammasamudram

Date: 28.8.2013

Participants: Mothers with children 1-5 years of age

Number of Participants: 6

Moderator: Principal Investigator

Observer: Mrs. Kavitha – Health Auxillary

Mode of Recording: Voice recording after verbal consent from participants

4.6 DEFINITIONS FOR THE PURPOSE OF THE STUDY

4.6.1 Injury:

The physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance – or else the result of a lack of one or more vital elements, such as oxygen. Injury cases were categorized into the following types:

1. Road Traffic Incidents (RTIs)
2. Injury caused by sharp objects
3. Drowning - submersion leading to water inhalation or unconsciousness

Poisoning (including food poisoning) - inadvertent ingestion of
substance that can cause internal organ damage.

4. Falls
5. Animal bites
6. Electric shock
7. Burn/Fire - a minimum of superficial first degree burns
8. Suffocation
9. Injury caused by falling objects
10. Injury caused by machines.

4.6.2 Severity

Trivial injuries have been excluded from the study and injuries were classified further as given below [15],

A. Fatal injury (death): Injury resulting in death, whether immediately or later, but as a direct result of the injury.

B. Severe injury (permanent disability): injury resulting in permanent disability from blindness, deafness, loss of an extremity (arm or leg) or loss of the ability to use the hands or walk, or the loss of mental abilities. Emotional and psychiatric causes were not included because of the difficulty of diagnosis and classification.

C. Serious injury (10+ hospital days): injury requiring hospitalization for 10 days or more. This is designed to capture injuries requiring a major surgical procedure

D. Major injury (1–9 hospital days): injury requiring hospitalization for nine days or less. This definition is designed to capture injuries requiring significant medical care and hospitalization, but not major surgical intervention.

E. Moderate injury (missing school or work, seeking care from health practitioner but not being hospitalized): injury requiring medical care, or missing either one or three days of school or work, or being unable to carry out activities of daily living for the same time period, but without hospitalization

4.6.3. Temporary Disability

A child has a temporary disability if he/she has a physical or mental impairment and the impairment hampers her ability to perform normal day-to-day activities lasting for at least a day.

4.6.4 Permanent Disability

Permanent disability an injury which impairs the physical and/or mental ability of a child to the extent that he or she is never again able to resume his/her normal day to day activities. Permanent disability is that disability or impairment that remains after the child has reached the point of maximum healing.

4.6.5 Sick Absenteeism:

A child who is unable to attend balwadi, preschool or school because of an injury.

4.6.6 Nuclear Family*

Composed of husband, wife and unmarried children. Has one or two generations.

4.6.7 Extended Family*

Composed of husband, wife, unmarried children and direct dependents. (Eg. Father /Mother)

4.6.8 Joint Family*

Composed of two or more couples of same generation and their children belonging to the same Household.

(Source: Definitions for General survey- Community Orientation Programme, Christian Medical College, Vellore.)

4.6.9 Risk:

It is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It is the likelihood of an injury from an unwanted event

4.6.10 Hazard:

A hazard is any source of potential damage, harm or adverse health effects on something or someone under certain conditions at work. Anything or any condition that causes or has the potential to cause injury.

5. RESULTS & ANALYSIS

A total of 1600 children were screened for injuries using 2 weeks and 3 months re-call method from 13 village clusters. The study had covered more than 80% of the eligible children in all the clusters except in the last village. Table 5.1 shows cluster wise distribution of the screened children.

Table 5.1 Cluster wise distribution of children in the survey

Cluster Number	Name of the cluster	Number of eligible children	Number of children screened	Percentage of children screened in the eligible population
1	Allivaram	156	136	87.1
2	Chinnakolavimedu	75	72	96
3	Chinnaplampakkam	242	221	91.3
4	Edigaithoppu	30	28	93.3
5	Edyansathu	333	278	83.4
6	Kanikaniyan	64	53	82.8
7	Kammasamudram	180	164	91.1
8	Killpallipet	187	194	96.3
9	Killvallam	160	137	85.6
10	Kattupadi.A	105	87	82.8
11	Kannadipalayam	78	71	91
12	Mottupalyam	77	67	87.0
13	Naaganadhi	162	92	56.7
	Total	**1849**	**1600**	**86.5**

5.1 INJURY ANALYSIS

5.1.1. DEMOGRAPHIC CHARACTERISTICS:

Table 5.2 shows grouped age and gender distribution of the study population. The population had almost equal proportion of males and females and highest proportion of children was from 0-4 years of age.

Table 5.2 Age- Gender distribution of study population

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
0-4	329	50.9	318	49.1	647	40.4
5-9	236	53.0	209	47	445	27.8
10-14	273	53.6	235	46.3	508	31.8
Total	**838**	**52.4**	**762**	**47.6**	**1600**	**100.0**

Table 5.3 shows cluster-wise distribution of injuries included in the survey. Among the 1600 children 58 of them reported have an injury as per the case definition

Table 5.3 Cluster-wise rate of Injuries

Cluster Number	Name of the cluster	Number screened	Children with injury	Percentage of children with injury in each cluster
1	Allivaram	136	10	7.3
2	Chinnakolavimedu	72	2	2.7
3	Chinnaplampakkam	221	6	2.7
4	Edigaithoppu	28	0	0
5	Edyansathu	278	12	4.3
6	Kanikaniyan	53	4	7.5
7	Kammasamudram	164	5	3
8	Killpallipet	194	4	2
9	Killvallam	137	0	0
10	Kattupadi.A	87	7	8
11	Kannadipalayam	71	3	4.2
12	Mottupalyam	67	4	5.9
13	Naaganadhi	92	1	1
	Total	**1600**	**58**	**3.6**

By 2 weeks recall period:

Total number of injuries in 2 weeks = 18

Total number screened =1600

Injury related morbidity for 1 year/1000 = 18/1600 X 26 X 1000

= 292.5/1000/year in 0-14 years

Injury related morbidity rate in 0-14 year population in the study area is 292.5/1000/year in 0-14 years.

By 3 months recall method

Total number of injuries in 3 months =58

Total number of children seen =1600

Injury related morbidity rate for one year /1000 = 58/1600 X 4 X1000

= 145/1000/year in 0-14 years

Table 5.4 shows the distribution of injuries by age and gender. The injury rates in 0-4, 5-9 and 10-14 years were 117/1000, 153/1000 and 173/1000/year respectively. The injury rates among males and females were 181/1000, 104/1000/year respectively. The proportion of males with injuries were higher than the proportion of females with injuries and difference in injuries between males and females was found to be significant (test of significance between two proportions, p=0. 04). The age group between 0-4 and 10-14 had a higher proportion of injuries than the age group of 5-9. However, the difference in proportion of injuries among the three age groups (χ^2=9. 58, df=2, p=0. 619) was not statistically significant.

Table 5.4 Age –Gender distribution of injuries

Age in years	Male			Female			Total
	Number of children screened	Number of children with injury	Percentage of injured children in each age category	Number of children screened	Number of children with injury	Percentage of injured children in each age category	Percentage Of children in each category
0-4	329	12	3.6	318	7	2.2	2.9
5-9	236	10	4.2	209	7	3.3	3.8
10-14	273	16	5.8	205	6	2.9	4.6
Total	**838**	**38**	**4.5**	**762**	**20**	**2.6**	**3.6**

5.2. DESCRIPTION OF INJURIES

Table 5.5 shows the various types of injuries. Falls were the commonest cause of injury contributing to 43 % of total injuries followed by Road traffic injuries (27.6%)

Table 5.5 Types of injuries

Types of Injury	Number	Percentage
Road traffic injuries	16	27.6
Burns	8	13.8
Falls	25	43.1
Animal bite	3	5.2
Others	6	10.3
Total	**58**	**100.0**

Place where injury occurred:

Table 5.6 shows the place of injury, the most common place of injury was home and this was followed by street. In children under 0-4 years 63% of the injuries had happened at home.

Table 5.6 Place where injury occurred

Place of injury	Number	Percentage
Home	26	44.8
School	5	8.6
Playground	2	3.4
Farm	2	3.4
Highway	5	8.6
Street	16	27.6
Others	2	3.4
Total	**58**	**100.0**

Anatomical Sites of Injury:

Table 5.7 shows the anatomical sites of injuries. More than half of them sustained injury to the Lower limb and the next commonest site was the head.

Table 5.7 Anatomical sites of injury

Anatomical site	Number	Percentage
Head	16	27.6
Eye	3	5.2
Upper Limb	7	12.1
Lower Limb	30	51.7
Trunk	2	3.4
Total	**58**	**100.0**

Classification of severity of injury:

Injuries were classified according to the case definition as shown in Table 5.8. Since trivial injuries were not included the study. Most of them had moderate injuries and about 7% of the children had severe injuries which lead to disability.

Table 5.8 Classification of severity of injury

Classification of injury	Number	Percentage
Moderate	53	91.4
Major	1	1.7
Severe	4	6.9
Total	58	100.0

Was the child alone?

60.3 % of the children were found to be alone at the time of injury. There was no significant association between mother being a housewife or a working woman and leaving the child alone which would have increased the risk of getting injured ($\chi 2=0.028$, $p=0.867$)

Description of Various types of Injury:

Table 5.9 shows detailed description various causes of various types of injury.

Table 5.9 Causes of Injuries

Types of injury	Causes	Number	Percentage
RTIs (N=16)	Bicycle related	14	87.5
	Motorcycle related	2	12.5
Falls (N=25)	On ground level	17	68.0
	Furniture	1	4.0
	Stairs	4	16.0
	Trees	1	4.0
	Others	2	8.0
Burns (N=8)	Hot water/milk	2	25.0
	Flame	1	12.5
	Hot objects	2	25.07
	Silencer of the bike	3	37.5

Among those who had Road traffic injuries 87.5% (14/16) of them were bicycle related and 71.4 % (10/14) of the children were the drivers of the bicycle .31% (5/16) of the children were pillion riders on either motorcycle or bicycle.

5.1.3. TREATMENT:

Type of treatment

Out of 58 children who suffered injuries 2 of them did not receive any treatment. One child did not reveal the injury to the primary caregiver and for another child the primary caregiver didn't think that it was severe enough to seek medical attention. However, both children missed school due to injury. Table 5.10 shows the treatment details after the injury

Table 5.10 Type of treatment

Type of treatment	Number	Percentage
Home remedy	1	1.8
Native treatment	2	3.6
Emergency room	9	16.1
Outpatient care	43	76.8
In-patient care	1	1.8
Total	**56**	**100.0**

Place where treatment was given:

Table 5.11 shows the place of treatment after the injury. 60% of the injuries were treated by a private practitioner and one third of them were treated in a Government hospital.

Table 5.11 Place where treatment was given

Place	Number	Percentage
Government services	16	28.5
Private practitioner	32	57.1
CMCH	3	5.3
CHAD	2	3.5
Native treatment	2	3.5
Home remedy	1	1.7
Total	56	100

Time for treatment and Distance to Hospital:

The time taken for the treatment after an injury ranged from 30 minutes to 7 days with a mean of 18 minutes. The mean distance from home to the place of treatment was 0.9 Km with a minimum of 0.5 km. The maximum distance was to a Native bone setting center in Andhra Pradesh which is around 103 km from Vellore.

Cost of Treatment:

The minimum direct medical and non medical cost of treatment after an injury was approximately 10 INR and the maximum was approximately 50,000 INR which was a prolonged hospital stay for an operation after a Road traffic injury. The mean was 1854 INR. More than half of primary caregiver spent 101-500 INR for the treatment. Those who were treated in a state run Government hospital were offered free treatment and others were out of pocket spending and no one had Health insurance except for one child who availed the medical facility in a tertiary care hospital since his father was entitled for medical benefits as an employee of the hospital. The cost of treatment with frequency is shown in Table 2.19

Table 5.12 Cost of treatment

Rupees (INR)	Frequency	Percentage
<100	13	23.2
101 -500	29	51.8
501-1000	8	14.3
1001-5000	3	5.4
<5000	3	5.4
Total	**56**	**100**

INDIRECT MEDICAL COST:

Loss of wages and productivity to the Primary caregiver:

The minimum wages lost by the primary caregiver in the process of caring for the injured child was 100 INR and the maximum approximately 6000 INR. The mean wage loss was 1000.4 INR. Among the 29 primary caregivers involved in an occupation, 41.7 % of them lost less than 100 INR whereas 41.4 % of them lost 100-500 INR and 17.2 % of them lost more than 1000 INR in caring for the injured children. The mean number of days missed at work for the primary caregiver was 7.34 and this ranged from a minimum of 1 day to 2 months.

Loss of Productivity of the Child and Sick Absenteeism:

Few children continued to attend school even after an injury. The number of days with sick absenteeism varied from 0 to 45 days. Mean number of days of missing school after an injury was 5.17 days. The minimum number of days spent with temporary disability was 1 day and the maximum 60 days with a mean of 4.08 days. The mean duration of days of illness was 8.58 days the minimum 1 day and the maximum 60 days. Some children were ill during the time of the survey and were on treatment. So the exact duration of illness could not be quantified for those children. Table 5.13, 5.14 and 5.15 show the number of days spent in sick absenteeism temporary disability and total duration of illness respectively.

Table.5.13 Days spent in sick absenteeism

Number of days	Frequency	Percentage
1-3 days	14	50
4-5 days	3	10.7
6-10 days	7	25
>10 days	4	14.3
Total	**28**	**100**

Table 5.14 Days with Temporary disability

Number of days	Number of children	Percentage
1-5 days	9	47.4
6-10 days	5	26.3
>10 days	9	26.3
Total	19	100

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Table.5.15 Total duration of illness

Number of days	Number of children	Percentage
<3 days	21	37.5
4-5 days	7	12.5
6-10 days	19	33.9
>10 days	9	16.1
Total	56	100

Permanent disability:

4 out of 58 (7.73%) children who had injuries had permanent disability. One child had blindness of an eye, 2 of them had difficulty in walking and another child had loco motor disability of the upper limb

5.2. PERCEPTION ON UNITENTIONAL CHILDHOOD INJURIES

5.2.1 QUANTITATIVE STUDY

100 mothers were included from villages chosen by Simple Random Sampling to assess the perception on unintentional childhood injuries.

5.2.1.1. Demographic characteristics

Table 5.15 shows the demographic profile of mothers included in the study. 83 % of the study population was less than 30 years of age. 39% of them had education beyond high school. Three quarters of the population was literate and 60 % of the mothers belonged to the low SES category. 82% of them were housewives. Almost half of them had a family with 2 children. More than half of them belonged to nuclear family. There were no widows or Divorcees in the sample population. Only one mother had a child who suffered an injury in the last 3 months and none of them had a history of losing a child due to an injury.

Table 5.16 Demographic Profile (N=100)

CHARACTERISTICS	CATEGORIES	NUMBER
1. Age	20-25 yrs	41
	26-30 yrs	42
	31-35 yrs	14
	26-40 yrs	3
2.Education in years	0-5	15
	6-8	23
	9-10	33
	11-12	16
	>13 yrs	13
3. Literacy	Read only	2
	Write only	5
	Read & Write	76
	Illiterate	17
4. Socio Economic status	Low SES	60
	Middle SES	39
	High SES	1
5. Occupation	Housewife	82
	Agricultural laborer	7
	Manual laborer	8
	Others	3
6.No.of Children	1	34
	2	49
	3	13
	4	4
7. Type of Family	Nuclear	53
	Joint/Extended	47

5.2.1.2 PERCEPTION CHANCES OF INJURY FROM A HAZARD

While mothers were asked about chances of injury to a typical 1-5 year old child on specific hazards, perception on injury by household door, drawers small toys, plastic bags and cribs was poor as shown in the Table 5.17.

Table 5.17 Perception on chances of injury from a Hazard (Number of respondents)

Scale: 1- least likely, 5-most likely, x- Didn't know (N=100)

Items	1	2	3	4	5	x
1.Automobiles	18	12	14	15	41	
2.Furnitures	24	38	18	14	6	
3.Stairs	19	28	23	15	13	2
4.Household doors and drawers	**37**	**29**	**17**	**8**	**9**	
5. Hot water	18	19	19	21	23	
6. Electrical appliances	41	10	8	17	23	1
7. Electrical outlets	42	10	11	14	21	2
8. Wood stoves and fire places	18	17	21	19	23	2
9.Small objects	**51**	**22**	**9**	**4**	**13**	1
10. Small toys	**72**	**11**	**8**	**6**	**3**	
11. Plastic bags	**77**	**8**	**8**	**3**	**1**	3
12. Cribs	**40**	**20**	**28**	**8**	**3**	1
13. Bathtubs	38	16	12	16	17	1
14.cords and ropes	62	8	11	9	8	2
15. Swimming pools and lakes	30	9	16	9	34	2
16.Knives and other objects	19	11	27	23	19	1
17. Dogs	24	18	26	11	21	
18. Riding toys and playground equipments	41	17	17	15	9	1
19. Insect stings	23	24	20	20	11	2
20. Bites from other children	32	18	19	19	11	1

5.2.1.3 PERCEPTION CHANCES OF INJURY BY SPECIFIC CAUSES

Mothers had a poor perception of injury by entrapment, choking and strangulation by a rope or a Cord. The percentage of responses in each category is given in Table 5.18.

Table 5.18 Perception on chances of injury from specific causes (Number of respondents)

Scale: 1- least likely, 5-most likely, x- didn't know (N=100)

Items	1	2	3	4	5	X
1. Falls	12	17	15	23	33	
2.Burns	30	20	14	16	20	
3.Entrapment (In refrigerators, Closets)	**44**	**15**	**16**	**14**	**9**	**2**
4.Electrical shocks	47	11	10	15	17	
5. Poisoning	36	14	10	14	24	2
6. Drowning	37	9	13	16	24	1
7. Choking	**24**	**28**	**19**	**18**	**9**	**2**
8. Strangulation (like getting a cord around the neck)	**49**	**13**	**14**	**7**	**15**	**2**
9. Suffocation	46	15	6	11	18	4
10.Puntcure wound	43	17	15	13	11	1
11. Bruises	20	20	18	17	23	2
12.Grashes and cuts	35	18	18	15	14	
13.Animal bites	28	16	27	9	19	1
14. Head injuries	28	13	19	18	20	2
15. Broken bones	35	14	14	17	19	1
16. Insect stings	29	16	29	16	10	0
17. Bites from other children	31	16	25	11	16	1

5.2.1.4 PERCEPTION ON SERIOUSNESS OF INJURY

While the mothers were asked about the perception on seriousness of injury due to various causes in a Likert scale. Choking, bruises, puncture wound was perceived as less serious events as shown in the Table 5.19.

Table 5.19 Perception on seriousness of injury (Number of respondents)

Scale: 1- least serious, 5-most serious, x- didn't know (N=100)

Items	1	2	3	4	5	X
1. Falls	19	21	21	18	21	
2.Burns	9	14	18	24	35	
3.Entrapment (In refrigerators, Closets)	26	13	15	22	23	1
4.Electrical shocks	14	6	12	32	36	
5. Poisoning	11	5	10	28	44	2
6. Drowning	8	8	5	28	51	
7. Choking	**29**	**25**	**23**	**14**	**7**	2
8. Strangulation (like getting a cord around the neck)	22	11	11	26	28	2
9. Suffocation	21	6	17	21	29	
10.Puncture wound	**23**	**25**	**20**	**21**	**8**	3
11. Bruises	**44**	**25**	**17**	**8**	**5**	1
12.Gashes and cuts	25	18	26	18	11	2
13.Animal bites	15	16	14	32	22	1
14. Head injuries	13	7	18	29	31	2
15. Broken bones	19	12	14	32	23	
16. Insect stings	18	21	23	23	15	
17. Bites from other children	31	13	24	14	17	1

5.2.1.5 PERCEPTION ON DANGEROUSNESS OF HAZARD

On responding to questions to assess dangerousness of Hazard, household door and drawers,small objects & toys, plastic bags were perceived as less dangerous hazards.

Table 5.20 Perception on seriousness of injury (Number of respondents)

Scale: 1- least dangerous 5-most dangerous, x- didn't know (N=100)

Items	1	2	3	4	5	X
1. Automobiles	8	6	8	20	58	
2. Furnitures	32	27	18	15	8	
3. Stairs	22	23	21	17	17	
4. Household doors and drawers	**38**	**27**	**20**	**10**	**5**	
5. Hot water	12	13	17	35	23	
6. Electrical appliances	18	6	11	32	33	
7. Electrical outlets	18	7	18	24	33	
8. Wood stoves and fireplaces	20	16	11	25	28	
9. Small objects	**64**	**19**	**8**	**7**	**1**	**1**
10. Small toys	**73**	**13**	**7**	**6**	**0**	**1**
11. Plastic bags	**65**	**11**	**8**	**10**	**4**	**2**
12. Cribs	**45**	**21**	**13**	**10**	**10**	**1**
13. Bathtubs	33	9	14	22	22	
14.cords and ropes	49	10	15	13	12	1
15. Swimming pools and lakes	9	4	15	25	46	1
16.Knives and other objects	16	10	20	23	31	
17. Dogs	24	8	24	21	22	1
18. Riding toys and playground equipments	32	20	17	24	6	1
19. Insect stings	22	15	27	23	13	
20. Bites from other children	23	18	30	16	13	

5.2.1.6 PERCEPTION OF RISK

Each item in likelihood of injury scale (n=17) was multiplied by its counterpart in seriousness (n=17) of injury. These seventeen items were added up together to a raw scale which gives Perception of risk Score. The maximum score one can obtain from the tool is 425. Sample population had a mean score of 160.97, median of 208.5 and scores ranging from 23 to 415. Exposure variables were grouped and the t- test for independent samples was used to test the statistical significance.

5.2.1.6.1 Predictors of Perception risk (PR) of Mothers:

Mother's age was grouped into less than 30 years and more than 30 years category. Those who were less than 30 years of age had higher (Mean=172.03, SE=11.64) perception of risk than more than 30 years of age (Mean 125.9, SE=11.02).This difference was statistically significant with t-statistics of -2.87, and p value of 0.05. Mothers who had education for less than 8 years of education had Lower (Mean= 115.38, SE=9.32) Perception of risk than those who had education for more than 8 years (Mean=170.9, SE = 89.30). This difference was statistically significant with t statistics of 2.42 and a p value of <0.05.

The mean score for injury perception score for those who were Literate was 172.7 (SE=10.52) while the same for those who were illiterate was 123.66 (SE=15.35), and this difference was statistically significant (t-statistics -2.37, p <0.05). While comparing the mean injury perception score of the mothers from nuclear family and Joint or extended family, the former group had mean score of 158.24 (SE=12.73) and the later group had mean score of 164.58 (SE=12.60). The difference was not statistically significant (t statistics -0.34, p= 0.738). Mothers who belonged to low socio economic strata had low

mean score (Mean =158.62, SE =9.92) than those who come from high socio economic strata (Mean =170.35, SE=21.83). However this difference was not statistically significant (t statistics – (-0.518, p=0.606)

Mothers who were housewives had higher mean (Mean= 165.48, SE=10.03) injury perception score than working mothers (Mean = 140.38, SE=86.55). But the difference was statistically not significant (t-statistics 1.07, p = 0.287. Mothers who had less than or equal to 2 children had higher (Mean =169.74, SE=10.05) mean score than those who had more than 2 children (Mean =118.11, SE=1713).This difference was statistically significant (t statistics-2.190, p =0.031).

Table 5.21 Univariate analysis of factors associated with Perception of Risk (PR)

Exposure Variable	Categories	N	Mean Perception of risk score	SD	Standard Error	t statistics	p value
Age	>=30 yrs	24	125.91	57.063	11.64	-2.87	**0.005***
	<30 yrs	76	172.03	96.07	11.02		
Education	>=8 years	82	170.97	89.30	9.86	2.42	**0.017***
	<8 years	18	115.38	82.00	19.32		
Literacy	Illiterate	24	123.66	75.21	15.35	-2.37	**0.019***
	Literate	76	172.75	91.78	10.52		
Type of family	Nuclear	53	158.24	96.18	12.73	-0.34	0.730
	Extended/Joint	47	164.58	82.64	12.60		
SES	Low SES	80	158.62	88.77	9.92	-0.518	0.606
	High SES	20	170.35	97.64	21.83		
Occupation	Housewives	82	165.48	90.89	10.03	1.07	0.287
	Working Women	18	140.38	86.55	20.40		
Number of Children	<=2 Children	83	169.74	91.62	10.05	-2.190	**0.031***
	>Children	17	118.11	70.64	17.13		

* Significant p value

5.2.1.6.2 Logistic regression model for predictors of Perception of risk (PR)

The Median score was taken as cut off and Injury perception score was dichotomized into good and poor perception. A multiple logistic regression model was derived to predict the poor perception and it was entered as dependent variable. Predictors entered in the model were age more than 30 years, having completed less than 8 years of education, illiteracy, being a working woman, belonging to nuclear family, low SES background and having two or less number of children. Though age more than 30 years, illiteracy and having less than 8 years of education were significantly associated with poor perception in the univariate analysis, the logistic regression model did not show any significant associated factors for Perception of risk (PR) The final model is shown below,

Table 5.22 Logistic regression model for predictors of perception risk

Variables	B	Sig	Exp (B)	CI
Age more than 30 years	0.70	0.25	2.02	0.61-6.70
Education less than 8 years	-1.518	0.10	0.29	0.6-6.9
Illiteracy	0.19	0.78	1.21	0.30-4.7
Low SES	1.99	0.72	1.2	0.40 -3.6
Nuclear family	0.53	0.90	0.94	0.39 -2.25
Working woman	-0.64	0.33	0.52	0.14 – 1.92
Having less than 2 children	-0.830	0.17	0.52	0.69- 7.6

5.2.1.6.3 PERCEPTION OF HAZARD

Each item in likelihood of hazard scale (n=20) was multiplied by its counterpart in the dangerousness of hazard (n=20) of injury. These twenty items were added up together with a raw scale which gives Perception of hazard Score. The maximum score one can obtain is 500. Sample population had a mean score of 167.1 and a minimum of 22 to maximum of 399.Exposure variables were grouped and the t- test for independent samples was used to test the statistical significance.

5.2.1.6.3.1 Predictors of Hazard (PH) of Mothers:

Mothers who were less than 30 years of age had higher (Mean=176.42, SE=9.94) perception of hazard than more than 30 years of age (Mean 137.83, SE=11.52).This difference was statistically significant with t-statistics of -2.04, and p value of 0.04.Mothers who had education for more than 8 years had higher (Mean=179.89, SE=8.97).Perception of hazard than those who had education for less than 8 years (Mean=109.16, SE = 13.36). This difference was statistically significant with t statistics of 3.501 and p value of 0.001.

The mean score for Hazard perception score for those who were Literate was 181.09(SE=9.41) while the same for those who were illiterate was 123.04 (SE=13.26), and this difference was statistically significant (t-statistics -3.162, p value-0.002).Mothers who belonged high socio economic status had high mean score (Mean =168.30, SE =18.84) than those who belonged to low socio economic status(Mean =166.87, SE=9.14.However this difference was not statistically significant (t statistics – (-0.069, p=0.945).Mothers from nuclear family had mean score of 161.61 (SE=11.41) and those

belonged to joint or extended family had mean score of 174.51 (SE=11.62). The difference was not statistically significant (t statistics -0.778, p= 0.438)

Mothers who were house wives had higher (Mean= 170.80, SE=8.98) injury perception mean Score than working mothers who are involved in an occupation (Mean = 150.55, SE=84.74). But the difference was statistically significant (t-statistics 0.949, p = 0.345). Mothers who had less than or equal to 2 children had higher (Mean =158.81, SE=10.40) mean score than those who had more than 2 children (Mean =183.35, SE=12.87) and this difference was statistically significant (t statistics-1.42, p =0.157).

Table 5.23 Univariate analysis of factors associated with Perception of Hazard (PH)

Variables	Categories	N		SD	Standard Error	t statistics	p value
Age	>=30 yrs	24	137.83	56.43	11.5	-2.044	**0.04***
	<30 yrs	76	176.42	86.6	9.9		
Education	>= 8yrs	82	179.89	81.3	8.97	3.501	**0.001***
	< 8yrs	18	109.16	56.70	13.3		
Literacy	Illiterate	24	123.04	64.96	13.26	-3.162	**0.002***
	Literate	76	181.09	82.09	9.41		
SES	Low SES	80	166.87	81.83	9.14	-0.069	0.945
	High SES	20	168.30	84.2	18.8		
Type of family	Nuclear	57	161.61	861.8	11.4	-0.778	0.438
	Joint/Extended	43	174.511	76.22	11.6		
Occupation	House wives	82	170.80	81.33	8.98	0.949	0.345
	Working women	18	150.55	84.74	19.97		
Number of Children	>=2	66	158.81	84.54	10.40	-1.42	0.157
	<2	34	183.35	75.05	12.87		

*Significant p value

5.2.1.6.3.2 Logistic regression model on predictors of Perception of Hazard

The Median Hazard perception score was taken as cut off and hazard perception score dichotomized into good and poor perception. A multiple logistic regression model was derived to predict the poor perception which was entered as dependent variable. Predictors entered in the model were variable age more than 30 years, having completed less than 8 years of education, illiteracy, being a working woman, belonging to nuclear family, low SES background and having two or less number of children. In the final model ,having completed less than 8 years of education was of borderline significance as a predictor of poor perception (odds ratio of 4.35 (CI : 0.96- 19.7)).

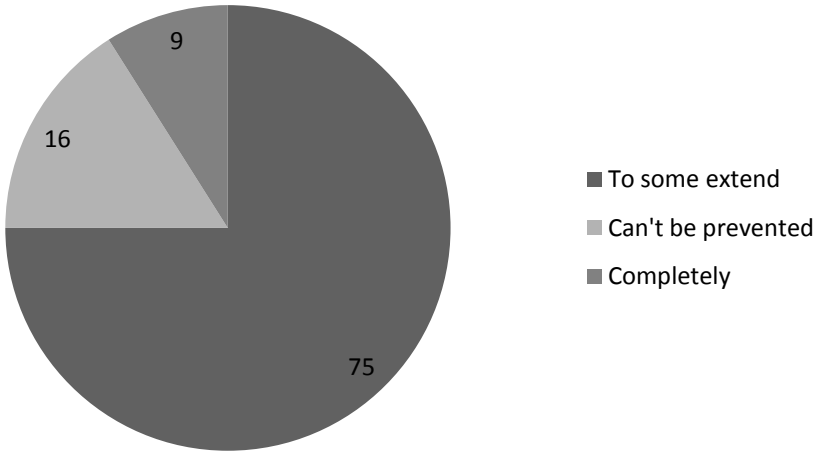
Table 5.24 Logistic regression model for predictors of hazard perception

Variables	**B**	**Sig**	**Exp (B)**	**CI**
Age more than 30 years	0.52	0.41	1.59	0.16-2.07
Education less than 8 years	0.68	0.22	1.98	0.79 -15.05
Illiteracy	1.47	**0.05**	**4.35**	**0.96 -19.7**
Low SES	-0.16	0.77	0.84	0.27 -2.6
Nuclear family	0.37	0.39	1.45	0.61- 3.40
Working woman	1.24	0.98	3.45	0.79 -15.05
Having less than 2 children	-0.80	0.19	0.44	0.13 – 1.51

5.2.1.7 PERCEPTION ON PREVENTION:

15 % of the mothers believed that childhood Unintentional injuries cannot be prevented and it's a fate whereas 75% of them think that it can be prevented to some extent. Only 9% of them believed it is a completely preventable event.

Figure 5.1 Perception on prevention of injury



When perception on prevention of injury was dichotomized there was no statistical significant association except for literacy as shown in the table 5.26.

Table 5.25 Factors associated with perception on Injury prevention

Variables	Categories	Injury preventable			Chi square p value	Odds ratio (95% CI)
		No (%)	Yes (%)	Total (100%)		
Age	<30 yrs	13 (15.7)	70 (84.3)	83	1.0	0.86(0.21-3.44)
	>=30 yrs	3 (15)	14 (85)	17		
Education	<= 8yrs	9 (23.7)	29 (67.3)	38	0.101	2.43 (0.82- .219)
	> 8yrs	7 (11.3	55 (88.7)	62		
Literacy	Illiterate	7(29.2)	17(70.8)	24	**0.044***	3.065 (0.99 -9.44)
	Literate	9 (11.8)	67 (88.2)	74		
SES	Low SES	13(16.2)	67 (83.8)	80	1.0	1.100 (0.28 – 4.2)
	High SES	3 (15)	17 (85)	20		
Type of family	Nuclear	9 (15.8)	48 (84.2)	57	0.947	0.96 (0.32 – 2.8)
	Joint/Extended	7 (16.3)	36 (83.7)	43		
Occupation	Housewives	11 (13.4)	71(86.6)	82	0.132	0.4 (0.12 -1.35)
	Working women	5 (27.8)	13(72.2)	18		
Number of Children	<2	13(15.7)	70 (84.3)	83	1.0	0.86 (0.21- 3.44)
	>=2	3 (17.6)	14 (82.4)	17		

*significant p value

5.2.2 QUALITATIVE ANALYSIS ON INJURY PERCEPTION

5.2.2.1 Causes of unintentional injuries

Initially the discussion was on the types of unintentional injuries that can occur in a typical 0-14 year old child. Mothers listed Road traffic injuries, fall, drowning and burns as the commonest type of injuries in a rural setting. They said that because of the recent increase in the number of vehicles on the road, injuries related to vehicles are increasing over the years. Participants listed that cut injuries by knives, fall from a crib or staircase, electrical shock due to electrical appliances or sockets, thermal injury due to hot objects such as milk, Sambar, hot water and wood stoves and were the commonest injuries that can happen inside the house. Children can face threat by animals such as dogs and snakes and insects such as bees and scorpion. The mothers said that the chances of child accidentally consuming kerosene or pesticides are less as they are usually kept in a place where children cannot reach easily. They have discussed the possibility that collection of water in a pot or bucket could be dangerous to toddlers since it can lead to fatal drowning. They did not discuss injuries due to plastic bags, ropes or furniture as a possible hazard. Probably they did not perceive them as hazardous objects.

5.2.2.2 SERIOUS INJURIES:

While the mothers were asked to discuss about the most dangerous type of injuries, they have listed Road traffic injuries, burns and drowning. They said in consensus that the chances of surviving after drowning are very less.

5.2.2.3. PREVENTION OF UNINTENTIONAL INJURIES

The discussion was intended to elicit to preventive measures for unintentional injuries. Most of them said that constant supervision is the only effective method to prevent injuries. Covering water collection and hot objects, not allowing children in the kitchen areas were the some of the measures to prevent injuries. Some of them have said that sending the children to balwadi can prevent injuries as there is constant supervision available in those centers. Participants did not discuss any specific measures to prevent the commonest type of injuries such as spokes injury, RTIs or fall from a staircase etc. Though many of them have said unintentional injuries are preventable, few of them said that it cannot be prevented because it is natural (***iyarkai or Vidhi)*** for the children to sustain injury as they grow.

6. DISCUSSION

There are about 500 million young people as defined in India [97]. The estimate of the burden of injury is inaccurate in India as there is a significant under- reporting. The National Crime bureau of investigations reported that 15-10% of injury deaths occur among children every year [98]. This non-concurrent cohort study which aimed to measure the incidence of unintentional childhood injuries showed that injury morbidity rates in 0-14 years was 292.5/1000/year. This was lower than the previous study done 10 years ago in the same block which showed an injury rate of 341.8/1000/year [41]. The significant difference in injury rates may be due to recall bias or decreasing trend in the injury rates over the years. This was more evident from this study when 3 months recall period was used, the injury rate was much lower (145 /1000 / year) than 2 weeks recall period. It is clear from this study that 2 weeks recall period is the best method to measure injury related morbidity which is a hyper- acute event.

Our study has shown a lower injury rate than a study from Andhra Pradesh by Nirgude et al which showed the injury rate at 307/1000/year [39]. The possible reason could be the wider age group (0-18 years) chosen for the Andhra Pradesh study. Furthermore and there may be a difference in the definition of injury. Gordon showed in Punjab (1962), morbidity of 126.6/1000/year in the age group of 0-14 years [99]. The vast difference may be due to definition of injury. While the Kaniyambadi study included injury resulting in a treatment of Health care worker or 1-3 days of sick absenteeism, the Punjab studied included only injuries that caused disability for a day or more. Another possible reason could be increasing trend towards the injury rate comparing 1962 due to various environmental hazards including heavy road traffic. Report to UNICEF on the Vietnam multi-center injury survey from which definitions and classification of injury was

adopted for this current study, showed over all non fatal injury rate of 48.18/1000/year which was much lower than the this study.

The current study showed a significantly increased risk among the boys {4.5% (38/838} as compared to girls {2.6% (20/762)} in sustaining injuries. This finding is in concordance with many other studies in the industrialized countries as well as developing countries including India [1, 10, 39, 41, and 66]. This may be due to risk taking behavior among males and greater independence enjoyed by boys than girls in a rural setting. These may expose boys to various environmental hazards than girls [43].

As the age increases, there is an increasing trend in the injury rate. Children between 10-14 years of age years of age had a higher injury rate {4.6 %,(22/478)} than children who belong to other age groups. This finding is in concordance with an Hospital based retrospective study from the USA by Rivara et al [6] which showed highest injury rate among children between 10-14 years of age. However, few studies have also reported a bimodal distribution in the rate of injuries in which higher rate of injury was seen in younger (1-5 years) and older children (10-14 years [1, 43]. Children under less than 4 years of age may need constant parental supervision which might be difficult especially with a working mother. On the other hand older children are highly exposed to hazards due to impulsiveness, their mode of reaction and lack of experience in calculating risk. It has been observed that younger children are at higher risk for thermal injuries whereas older children are more prone to Road traffic injuries [44].

The most common site where injury occurred was home (44.8%). Further 63.1% injuries in less than 4 years of age had occurred at home and most common cause of injuries in this age group was falls followed by burns. It is possible that there could be many more

potential hazards for toddlers in the house than outside. The hazards may be furniture, wood stoves, uncovered lamps, and staircase and other household fixtures. Similar findings have been observed in studies from developing countries in which child's residence was the commonest site of injury. A study from the neighboring country Pakistan showed that 85% injuries occurred at home [100].

The commonest anatomical site of the injury in the study was Lower limb (51.7%). This is in concordance with previous Kaniyambadi study [41].This is also corroborated with a study from Texas done by A.Arif et al in which it is stated that the most common anatomical site of the injury was Lower extremity followed by Head, face and neck. It has also observed that younger children sustain more head injuries while older children suffer from injuries to the Lower limb. This is probably because of frequent falls among younger children [101]. A study from Aligarh also revealed similar findings [102].

The falls is the commonest cause (43.1%) of injury among the injured children. Similar finding has been observed in a recent population based study done by Zaidi et al [102] in a rural area of Aligarh. This finding is also in concordance with the earlier study done in Kaniyambadi block [41]. However research from the western world has concluded falls as a second commonest cause after Road traffic injuries [1]. Among the children who sustained injuries due to falls, 68 % of them had fallen down on ground level and 16 % of them had fallen from staircases. This explains in a rural setting children are exposed few particular hazards such as trees, staircases without sidewalls and terrace parapets. They may also be involved in unsafe recreational and sports activities which could make them prone to fall related injuries than children in the western world.

The second commonest injury observed in the study was vehicle related. The injuries could be among pedestrians, drivers and occupants. While studies from the industrialized world [1] showed that pedestrian injuries are most common in younger children and driver injuries more common in adolescents, our study has revealed majority of them were driver injuries (62.5%) followed by occupant injuries (31.3%). 87.5% of the injuries were cycle related in which the child was either a driver or an occupant. Two bicycle related injuries resulted in fracture of the bones. One child was operated in a tertiary care hospital and continues to have disability while the other child was treated in a native bone setting center as parents could not afford allopathic treatment and he too is disabled currently. Since children drive bicycles without leg guard, the leg of the child who is sitting in the rear gets caught in the back wheel of the moving cycle. Children's head, chest, abdomen and limbs are all in a state of growth. Their relative softness makes a child physically more vulnerable to the impact of injury than an adult. The smaller physical stature of the children limits their ability to see or to be seen by the drivers of the vehicle. Evidence suggests that, although the visual processes needed for a child to cross a road are fully developed as infants, the full integration of visual signals into a meaningful context is not fully developed until children are around 10–12 years old. These cognitive processes are more developed in children aged 11 years and older who appear to be able to recognize a given road location as dangerous and show judgment that allows them to be safe on the roads [1].

Among the children with burn related injuries, a significant proportion of them are due to the silencer of parked bikes, mostly at home and all of them had happened when the parents were at home. This implies the poor parental perception on silencer as a potential hazard to the children. Motorcycles have become increasingly available in the rural areas

and have become the commonest mode of transport in the villages. Other causes of burn injury include, flame and hot objects.

Few injuries were classified as 'others'. They included injuries caused by cutting instruments, piercing objects, animal bites, falling objects etc. Two children had rat bites while sleeping while another 2 of them had dog bites. Few children sustained injury from knives which were kept at a reachable place at home.

Since our inclusion criteria included the children who sought medical attention, most of the injured children received treatment from the allopathic medical facility where as two of them received treatment from native bone setting centers. These two children had sustained fractures by bicycle injuries. While three quarters of them was seen in an out-patient facility, only 16 % of them reported to the emergency room and only one child required hospital admission. This finding is in contrast with western studies where one third of the children with injuries present to the emergency room and significant proportion of them require hospitalization [101]. This could be because of the much better access to health care available in high income countries with emergency rooms open round the clock. Most western studies are hospital based studies and accurate follow up is possible after an injury. This is limited in our country due to poor surveillance and underreporting. In spite of free services that are offered in the state run hospital, most of our injured children received treatment from a private practitioner (60.4%). The source of primary contact for health care in these villages is a practitioner in the nearest village or town. So it is essential that these clinics are equipped in managing injury related emergencies and these doctors are trained in treated pediatric injuries to bring down injury related mortality.

Half of the children missed school after an injury. Among those missed school half of them did not attend school for less than 3 days and the rest missed school for more than 3 days and one child missed school for a month and a half due to injury requiring surgery and post operative care. This finding is similar to an American study done by Rivara et al which showed 55.9 % of the injured children missed school for two or less than two days [6]. Among children who had temporary disability, nearly half of them (47.4%) had disability for less than 5 days. Overall, 32.7% of the children reported to have a temporary disability. Correspondingly the above said American study reported that 43% of the children had a disability for seven or more days [6]. In contrast to our findings, Zaida et al reported only 10.2% of the children had some form of disability. This is may be because of case definition as this study included trivial injuries as inclusion criteria [102].

37.5% of the injured children were ill for less than 3 days and 16.1% of them for more than 10 days. More than half of the children spent 100-500 INR for the treatment and 41.4 % of the primary caregivers lost 100-500 INR of wages while caring for their injured children. Almost all the expenditure is met out of pocket. There are no data available on the cost of treatment for childhood injuries in India. Hence, it is difficult to compare these findings. However, we can draw a few conclusions from these findings. Firstly, most of our study population belonged to Low socio economic background, health care spending for an unintentional injury may push their economic status even worse as shown studies done in South Asia including India in which they have concluded that the injury pushes many houses into poverty [80]. It is reported in Ghana that 28% of the families were found to have declined in food consumption after an injury [1]. Secondly, most of the primary caregivers are the sole breadwinner of the family. If his/her wages are lost because of an injury, it will have a huge impact on the entire family.

Though a majority (91%) of the injuries was classified as moderate injuries, 4 out of 58 children (6.9%) were disabled at the time of the survey and likely to have a permanent disability. One child had blindness in one eye. He sustained injury by a stone which hit him unintentionally while playing on the road. He was operated for corneal injury and unless he goes for corneal transplantation, his vision is not likely to improve. The current study shows higher rates of disability as compared to few other studies done in South Asia [82-86]. In a survey in Asia the rate of permanent disability among children aged 1 to 17 years injured as a result of a road traffic crash was 20 per 100 000 children [59].

6.2 PERCEPTION OF CHILDHOOD INJURIES

Mothers in the study population had a reasonably good perception of the common causes of injury such as Road traffic injuries, burns and drowning. However, they had a poor perception on injuries caused by small objects, toys, plastic bags and ropes. Same finding was also observed during focus group discussions.

Perception of risk scores (PR) measures perception of mothers on the likelihood of injury and seriousness of injury whereas Perception of Hazard (PH) measures perception of the likelihood of the hazard and dangerousness of hazard. Age was a significant predictor for both perception of risk of injury as well as perception of Hazard. It is possible that the younger mothers less than 30 years of age have had more opportunities for health education and consequently they may be better informed. This could also be attributed to the greater opportunity for the women in the recent generation to go to school for formal education and continue schooling. Various social welfare measures have been implemented enabling women to finish middle school education.

Education and Literacy were significantly associated with Perception of injury and Hazard. An educated and literate mother can perceive hazards much more quickly than an uneducated and an illiterate mother and she could supervise the child. Having 2 or more children was also a significant predictor of the perception of risk (PR). However, the final logistic regression model showed significant association between illiteracy and poor perception of hazard and there were no significant predictors for perception of risk. This study is corroborated with a research from North America on perceived risks of childhood injuries among the parents with preschoolers showed that When risk perceptions were viewed as summed scales, socio demographic variables was not significant predictor [13].But our findings are in contrast with a previous study done in the same block which is yet to be published showed that Pre-matric education, illiteracy, Low socio-economic score were significantly associated with poor perception of injury, inadequate knowledge on type of injury, poor perception on prevention and inadequate awareness on prevention methods.

Out of 100 mothers 84 of them believed that injury could be prevented and 9 out of 84 believed injury could be prevented completely. Further analysis showed there was no statistical significant association between socio demographic variables expect for literacy. This was in concordance with a European study by European child safety Alliance revealed three-quarters of parents of children aged 0 to 5 agree that most injuries involving children can be avoided (77%, including 32% who strongly agree). There were no significant differences in opinion by age or gender of parent. However, parents of young children on a low income were slightly more likely than those on a higher income to agree that most injuries involving children can be avoided (82% vs. 75% agree) [12].

7. SUMMARY AND CONCLUSIONS

1. The overall injury related morbidity in the study population was 292.5/1000/year among children between 0-14 years

2. Boys (4.5%) had a higher rate of injury than girls (2.6 %).

3. Age group between 10-14 years had a higher number of injuries (4.6%) in comparison other age groups.

4. The commonest place of injury was home (44.8%).

5. The most common anatomical site of injury was lower extremity (51.7%).

6. Falls (43.1%) was the most common cause of injury followed by Road traffic injuries (27.6%) and burns (13.8%). Most of the Road traffic injuries were bicycle related.

7. The direct medical and non medical cost of treatment after an injury was from approximately 10 INR to approximately 50,000 INR and the mean was 1854 INR. More than half of the children treated spent 100- 500 INR towards the treatment.

8. Among injured children, 37.5% of them were ill for less than 3 days and only 16.1% of them were ill for more than 10 days. Half of the children missed school after an injury. Among those missed school half of them did not attend school for less than 3 days.

9. Literacy was found to be the significant predictor for perception of hazard and there were no significant predictors for perception of risk.

8. RECOMMENDATIONS

1. Education

a) Education on hazards should be taught from primary schools. The curriculum should include lessons on Road safety and safety measures that have to be followed during sports and recreational activities

b) Mothers and primary caregivers should be sensitized towards childhood injuries and providing a hazard free environment for children. This can be done through anganwadi workers, CHAD health care team and mass media.

c) The younger generation has more access to internet and mobile phones. Education through short texts and attractive e-mails may have effective impact.

2. Environment

a) All hazardous items such as knives, cutting instruments, ropes, drugs, pesticides, kerosene should be kept in a place where children cannot reach.

b) As far as possible, cooking at the floor level should be avoided and household with poor resources can be given financial assistance by the Government to build appropriate cooking areas.

c) Local Government or Panchayat should allocate funds to cover the walls and construct walls around the wells in the villages.

d) Containers and buckets with water should be emptied periodically or water should be stored in a narrow-mouthed vessels. Buckets with lids can be used for all the domestic uses and Government can make it a mandate to sell only bucket with lids.

e) A separate pavement the roads would be helpful in preventing pedestrian related injuries.

f) The staircase should have side walls and all terraced houses should have parapets.

3. ENFORCEMENT

a) Helmets should be made compulsory for all two-wheelers including bicyclists.

b) Legislation should be enacted to instruct all cycle manufacturers to produce cycles only with leg guards.

c) All the motorized vehicles should have a cover for the silencer.

d) Measures should be taken to control the stray dogs and rabies vaccination should be available in all health care facilities free of cost.

9. LIMITATIONS

1. This study used both 3 months as well as 2 weeks recall period to collect information. The three months recall bias could have resulted in bias.

2. When parents were not available at home, other primary caregivers were interviewed about the details of a child's injury. This may have resulted in obtaining erroneous information.

3. The exact cost of the treatment could not be calculated due to recall bias as few respondents could not remember the exact amount that they had spent for the treatment.

4. Since the survey was done during summer vacation, exact days with sick absenteeism could not be quantified.

5. Questionnaire on perception had used the Likert scale and it was very difficult to explain and administer among rural women and collect data. This might have resulted in information bias.

10. BIBLIOGRAPHY

1. PedenM,OyegbiteK,Ozanne-SmithJ, et al. World Report on Child Injury prevention World Health Organization; 2008. Accessed on October 2013. http://whqlibdoc.who.int/publications/2008/9789241563574_eng.pdf

2. Patton GC, Coffey C, Sawyer SM, et al. Global patterns of mortality in young people: a systematic analysis of population health data. The Lancet. 2009; 374(9693):881–892.

3. Murray CJL, Lopez AD. Alternative projections of mortality and disability by cause 1990–2020: global Burden of Disease study. The Lancet. 1997; 349(9064):1498–1504.

4. The Million Death Study Collaborators; Causes of neonatal and child mortality in India: a nationally representative mortality survey Lancet 2010; 376: 1853–60

5. MahalakshmyT, Dongre AR, KalaiselvanG; Epidemiology of childhood injuries in Rural Puduchery.Indian J Pediatr. 2011 Jul; 78 (7): 821-5. Epub 2011 Jan 4.

6. Rivara FP,Calonge N,Thompson RS. Population based study of unintentional injury and impact on childhood. Am J Public Health. 1989 Aug; 79 (8): 990-4.

7. Gofin R et al. Incidence and impact of childhood and adolescent injuries: a population- based study. J Trauma. 1999 Jul; 47 (1): 15-21

8. MacKay, M., Reid, D.C., Moher, D., Klassen, T. (1999). Systematic review of the relationship between childhood injury and socioeconomic status. Accessed from http://publications.gc.ca/pub?id=83124&sl=0

9. Joffe, A. R., & Lalani, A. (2006). Injury admissions to pediatric intensive care are predictable and preventable: A call to action. Journal of Intensive Care Medicine. 21, (4), 227-234.

10. Safe Kids Canada. (2006). Child & Youth Unintentional Injury: 10 Years in Review 1994-2003.

11. Safe Kids Canada. National Survey of Health Risks to Children, 2006.

12. Jonah A et al Parents' perception attitude and behavior towards child safety; a study in 14 European countries , International Journal of Injury control and safety promotion 2005 12 (3), 183-89

13. Glik D et al. Predictors of Risk Perceptions of Childhood Injury among Parents of Preschoolers: *Health Educ Behav* October 1991 18:285-301.

14. Baker SP, et al. *The injury fact book.* Second edition. New York, Oxford University Press, 1992

15. Peden M, McGee K, Krug E. Injury: a leading cause of the global burden of Disease 2000. Geneva, World Health Organization, 2002.

16. Krug EG, et al. World report on violence and health. Geneva, World Health Organization, 2002.

17. Christoffel KK, Scheidt PC, Agran PF, Kraus JF, McLoughlin E, Paulson JA. Standard definitions for childhood injury research: Excerpts of a conference report. Pediatrics, 1992;89(1):1033

18. Alexandrescu et al. A review of injury epidemiology in the UK and Europe : Some methodological consideration and constructing rates. BMC Public Heath ; 2009-9: 226-47

19. Murray CJ, Lopez AD. Mortality by cause for eight regions of the world: Global Burden of Disease Study. Lancet 1997; 349(9061):1269-76.

20. Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease. Lancet 1997; 349 (9064): 1498-504.

21. Murray CJ, Lopez AD (Eds.) The Global Burden of Disease. Geneva: WHO, Harvard School of Public Health, World Bank, 1996

22. World Health Organization. World Report on child injury prevention. December 2008:http://www.who.int/violence_injury_prevention/child/injury/world_report/report/en/index.html (Accessed May 25, 2012).

23. National Academy of Sciences. Accidental Death and Disability: The Neglected Disease of Modern Society. Washington DC: National Academy Press, 1996.

24. Jiang X, Zhang Y, Wang Y, Wang B, Xu Y, Shang L. An analysis of 6215 hospitalized unintentional injuries among children aged 0-14 in northwest China. Accid Anal Prev.2010; 42:320–6

25. Dalal K, Rahman A. Out-of-pocket payments for unintentional injuries: A study in rural Bangladesh. Int J Injury Contr Saf Promot. 2009;16:41–7.

26. Kopjar B, Wickizer TM. Population-based study of unintentional injuries in the home. Am J Epidemiol. 1996;144:456–62

27. Cohen RH, Matter KC, Sinclair SA, Smith GA, Xiang H. Unintentional pediatric submersion-injury-related hospitalizations in the United States, 2003. Inj Prev.2008;14:131

28. Zavoski RW, Lapidus GD, Lerer TJ, Banco LI. A population-based study of severe firearm injury among children and youth. Pediatrics. 1995;96:278–82.

29. Aruna C, Global burden of Unintentional injuries and an agenda for progress, Epidemol Rev .2010 April; 32 (1): 110-20

30. Hyder AA, Wali S, Fishman S, et al. The burden of unintentional injuries among the under-five population in South Asia. Acta Paediatr. 2008;97(3):267–275.

31. Thanh NX, Hang HM, Chuc NT, et al. The economic burden of unintentional injuries: a community-based cost analysis in Bavi, Vietnam. Scand J Public Health. 2003;31 (62 Suppl): 45–33

32. Safe Kids Canada. Child & Youth Unintentional Injury: 1994-2003; 10 Years in Review. National Report 2006:http://www.mhp.gov.on.ca/en/prevention/injury-prevention/skc_injuries.pdf (Accessed October, 2013)

33. Statistics Canada, Canadian Vital Statistics, Death Database, and Demography Division (population estimates). Potential years of life lost, population aged 0 to 74, by selected causes of death and sex, Canada, provinces and territories.

http://www.communityaccounts.ca/SALandscape/1_8_pyll.htm#RANGE!TFtn (Accessed October 2, 2013).

34. Smartrisk, 2009. The Economic Burden of Injury in Canada http://www.parachutecanada.org/downloads/research/reports/EBI2009-Eng-Final.pdf (Accessed October 2, 2012

35. Statistics from NHS clinical and Health Outcomes data base http://www.nchod.nhs.uk

36. APOLLO Policy briefing: The role of public health in injury prevention- A report by WHO European region.

37. A report from Centres for Disease Control – http://www.cdc.gov/safechild/

(Accessed October 23,2013)

38. Ray K et al.Physical injury: A profile among the municipal primary school children of Siliguri, Darjeeling District. Indian J Public Health 2012;56:49-52

39. Nirgude Abhay S, Naik Poonam , Sheikh Nishat; Pattern of childhood injuries in a rural area of South India; Indian Journal of Forensic Medicine & Toxicology: 2012, 6(1) 48- 50

40. Dinesh Mohana, Adarsh Kumarb, Mathew Varghese; Childhood injuries in rural north India; International Journal of Injury Control and Safety Promotion 2010 17(1),; 45 -52

41. M Sivamani, V Balraj, and JP Muliyil. Validity of a Surveillance System for Childhood Injuries in a Rural Block of Tamilnadu. Indian J Community MED. 2009 Jan;34(1):43-7.

42. Injury and Violence the facts 2010- World Health Organization (whqlibdoc. who. int/publications/2010/9789241599375_eng. pd) Accessed October 25, 2013

43. Rebecca F Antony F Reducing unintentional injuries in childhood: A Research review, NCB Research Centre,September 2010.

44. Edwards et al,Serious injury in Children: Variation by area deprivation and settlement type.Archives of disease in Childhood 2008;93: 485-89

45. Kendrick et al, Relationship between child,family and neighborhood characteristics and childhood injury: A co-heart study Social Science and Medicine 61, 1905-15

46. Bhuvaneshwari B, Lakshmi L,Unintentional injuries among poor resource settings: Where do the fingers point? Arch Dis Child 2012; 97:35–38.

47. Morrongellio et al, Young children's risk of unintentional injury: A comparison of Mothers' and fathers 'supervision beliefs and reported practices, Journal of Pediatric Psychology ,2009;34,1063-68.

48. Damashek et al, Relation of caregiver's alcohol use to unintentional injury, Journal of Pediatric Psychology,34; 334-53

49. Morrongellio et al Understanding unintentional risk in young children: The contribution of Caregiver supervision, Child's attributes, Parent attributes, Journal or Pediatric psychology ,2006 31, 540-551

50. Pearson,m., Hewson, p.,Moxham, t. & Taylor, r. (2009b) Review 2: a systematic review of risk factors for unintentional injuries among children and young people aged under 15 years. Exeter, Peninsula Technology Assessment Group (PenTAG), Peninsula Medical School. Report commissioned by NICE Centre for Public Health excellence.

51. Lee, LC., Harrington, R. A., Chang, J. J. & Connors, S. L. (2008)Increased risk of injury in children with developmental disabilities.Research in Developmental Disabilities, 29, 247-255.

52. Garside, R., Ashton, K., Moxham, T. & Anderson, R. (2009) Interventions to prevent unintentional injury in children on the road. Exeter, Peninsula Technology Assessment Group (PenTAG), Peninsula Medical School, Universities of Exeter and Plymouth. Report commissioned by NICE Centre for Public Health Excellence.

53. Morrongiello, B. A. &Lasenby-Lessard, J. (2007) Psychological determinants of risk taking by children: An integrative model and implications for interventions. Injury Prevention, 13, 20-25.

54. World Health Stati stics 2008. Geneva, World Health Organization, 2008 http://www.who.int/gho/publications/world_health_statistics/EN_WHS08_Full.pdf (Accessed October 20,2013)

55. Mathers C, Loncar D. Updated projections of global mortality and burden of disease, 2002–2030: data sources, methods and results. Geneva, World Health Organization, 2005. http://www.who.int/healthinfo/statistics/bodprojectionspaper.pdf (Accessed October 20,2013)

56. Toroyan T, Peden M, eds. Youth and road safety. Geneva,World Health Organization, 2007 http://apps.who.int/iris/bitstream/10665/85396/1/9789241505109_eng.pdf (Accessed October 20,2013)

57. Keeping children safe in traffic. Paris, Organization for Economic Co-operation and Development, 2004. http://www.internationaltransportforum.org/Pub/pdf/04ChildrenSafeE.pdf (Accessed October25,2013)

58. Li G, Baker SP. Injuries to bicyclists in Wuhan, People's Republic of China. American Journal of Public Health,1997, 87:1049–1052.

59. Linnan M et al. Child mortality and injury in Asia: survey results and evidence. Florence, UNICEF Innocenti Research Centre, 2007 (http://www.unicef-irc.org/publication/pdf)

60. Drowning: a public heath Emergency – A fact sheet by TASC (http://www.tasc-gcipf.org/downloads/drowning.pdf) Acessed October 24,2013)

61. Anuradha Bose, Kuryan George, Abraham Joseph, Drowning in Childhood: A population based study.Indian Pediatrics 2000;37: 80-83

62. Khambalia A et al. Risk factors for unintentional injuries due to falls in children aged 0–6 years: a systematic review. Injury Prevention, 2006, 12:378–385.

63. Bartlett SN. The problem of children's injuries in low income countries: a review. Health Policy and Planning, 2002, 17:1–13.

64. Hyder AA et al. Falls among children in the developing world: a gap in child health burden estimations? Acta Paediatrica, 2007, 96:1394–1398.

65. Bangdiwala SI et al. Th e incidence of injuries in young people: I. Methodology and results of a collaborative study in Brazil, Chile, Cuba and Venezuela. International Journal of Epidemiology, 1990, 19:115–124

66. Del Ciampo LA et al. Incidence of childhood accidents determined in a study of home surveys. Annals of Tropical Paediatrics, 2001, 21:239–243.

67. Report to UNICEF on Vietnam Multicentre injury survey - http://www.tasc-gcipf.org/downloads/Vietnam%20-%20UNICEFfinalVMISreportfinal.pdf (Accessed on 31 October 2013)

68. WHO mortality database: tables. Geneva, World Health Organization (http://www.who.int/healthinfo/ morttables/en/index.htm) Accessed October 25,2013

69. Barrow RE et al . Influence of demographics and inhalation injury on burn mortality in children. Burns, 2004, 30:72– 77.

70. Pramod Kumar et al, Ten years epidemiological study of pediatric burns in Manipal, India Burns. 2000 May;26(3):261-4.

71. S Gupta et al Trends in poisoning in children: Experience at a large referral teaching hospital. The National Medical Journal Of India Vol. Ii, No.4, 1998

72. AK Dutta et al . Poisoning in children: Indian scenario The Indian Journal of PediatricsMay–June 1998, 65 (30); 365-370

73. Kale KM et al. Dog bites in Children. Indian J Community Medicine 2006;31:24-5

74. Bulletin of the World Health Organization 87(12)December 2009, 885-964

(http://www.who.int/bulletin/volumes/87/12/09-021209/en/ (Accessed October 20,2013)

75. MS Sudharshan et al , An epidemiological study on Animal bites in India : Results from WHO sponsored multi-centric Rabies survey . J comm. Disease 38(1) 2006 : 32-39

76. Dalal K, Rahman A. Out-of-pocket payments for unintentional injuries: A study in rural Bangladesh. Int J Injury Contr Saf Promot. 2009;16:41–7.

77. Peden M et al., eds. World report on road traffic injury prevention. Geneva, World Health Organization, 2004 (http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/index.html (Accessed 22 October 2013)

78. Jacobs G, Thomas AA, Astrop A. Estimating global road fatalities. Crowthorne, Transport Research Laboratory, 2000 (TRL Report 445) (http://www.transport-links.org/transport_links/fi learea/publications/1_329_TRL445.pdf)

79. Aeron-Thomas AA et al. The involvement and impactof road crashes on the poor: Bangladesh and India case studies. Crowthorne, Transport Research Laboratory Limited, 2004 (http://www.grsproadsafety.org/themes/default/pdfs/Th e%20Poor_fi nal%20fi nal%20report.pdf, accessed 22 January 2008).

80. Ellis AA, Trent RB. Hospitalizations for near drowning in California: incidence and costs. American Journal of Public Health, 1995, 85:1115–1118.

81. Joseph MM, King WD. Epidemiology of hospitalization for near-drowning. Southern Medical Journal, 1998, 91:253–255.

82. Gururaj G et al. Traumatic brain injury. Bangalore,National Institute of Mental Health and Neurosciences, 2005 (Publication no. 61).

83. Bryant B et al. Psychological consequences of road traffic accidents for children and their mothers. Psychological Medicine, 2004, 4:335–346

84. Kreisfeld R, Henley G. Deaths and hospitalizations due to drowning, Australia 1999–2000 to 2003–2004. Adelaide,Australian Institute for Health and Welfare, 2008 (Deaths and Hospitalisations Injury Research and Statistics Series,No. 39)

85. Susiva C, Boonrong T. Near-drowning in Pediatric Respiratory Intensive Care Unit, Siriraj Hospital. Journal of the Medical Association of Th ailand, 2005, 88(Suppl. 8):S44–S47.

86. Mashreky SR et al. Epidemiology of childhood burn: yield of largest community based injury survey in Bangladesh. Burns, 2008 34: 856–862.

87. Mathangi Ramakrishnan K et al. Pediatric rehabilitation in a developing country, India, in relation to etiology, consequences and outcome in a group of 459 burnt children. Pediatric Rehabilitation, 2004, 7:145–149.

88. Jiangxi injury survey: child injury report. Jiangxi, Jiangxi Center for Disease Control, The Alliance for Safe Children, UNICEF–China, Jiangxi Provincial Health Bureau, Chinese Field Epidemiology Training Program, 2006.

89. Thailand injury survey: Child injury report. Bangkok, Institute for Health Research, Chulalongkorn University, The Alliance for Safe Children, UNICEF–Thailand, 2004. http://www.unicef.org/eapro/Child_injury_issue_paper.pdf (Acessed 25,October 2013)

90. Daniel J. Barnett, Ran D. Balicer, and Jonathan M. Links The Application of the Haddon Matrix to Public Health Readiness and Response planning Environ Health Perspect. 2005 May; 113(5): 561–566.

91. The three Es- Accessed 23,October 2013

http://www.npaihb.org/images/epicenter_docs/injuryprevention/ThreeEs.pdf

92. Larry cohen et al The spectrum of prevention: developing a comprehensive approach to injury prevention , *Inj Prev* 1999;5:203-207 doi:10.1136/ip.5.3.203

93. Peterson, L., & Stern, B. (1997). Family processes and child risk for injury. Behavior Research and Therapy, 35(3), 179–190.

94. Matheny, A. P. (1986). Injuries among toddlers: Contributions from child, mother, and family.Journal of Pediatric Psychology, 11, 163–176

95. Janet Abboud Dal Santo, at al Childhood Unintentional Injuries: Factors Predicting Injury Risk Among Preschoolers J. Pediatr. Psychol. (2004) 29 (4):273-283

96. Eva et al,Risk of childhood injury: predictors of mothers' perceptions, Scand J Public Health July 2000 vol. 28 no. 3 188-193

97. The Government of India- Census- 2001 (Accessed October 29, 2013)

http://censusindia.gov.in/Census_And_You/age_structure_and_marital_status.aspx

98. National Crime Records Bureau, Accidents, deaths & Suicides in India, Ministry of Home affairs, New Delhi -2007

99. Gordon JE, Gulati PV, Wyon JB. Traumatic accidents in rural tropical regions: an epidemiological field study in Punjab, India. Am J Med Sci. 1962 Mar;243:382-402

100. Fatmi Z, Kazi A, Hadden WC et al. Incidence and pattern of unintentional injuries and resulting disability among children under 5 years of age: results of the National Health Survey of Pakistan. Paediatr Perinat Epidemiol. 2009; 23(3): 229–238

101. Ahmed A. Arif, et al. The Epidemiology of Unintentional Nonfatal Injuries among Children in the South Plains/Panhandle Region of Texas. Texas Journal of Rural Health. 2003; 21(2): 31-41.

102. Zaidi et al. Injury pattern in children: A population based study, Indian Journal of Community Health 2013; 25(1): 45-

ANNEXURES

1. Approval Letter from the Institutional Review Board

2. Information Sheet and Consent form (Tamil & English)

3. Injury Screening form (Tamil & English)

4. Injury Impact Questionnaire (Tamil & English)

5. Perception of Childhood injuries (Tamil & English)

6. Originality Report

ANNEXURE -1

INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE
BAGAYAM, VELLORE 632 002, INDIA

Dr. George Thomas, D Ortho, PhD
Chairperson, Ethics Committee

Dr. B. Antonisamy, M. Sc, PhD, FSMS, FRSS
Secretary, Research Committee

Prof. Keith Gomez, B.Sc, MA (S.W), MPhil
Deputy Chairperson, Ethics Committee

Dr. Alfred Job Daniel, D (Ortho), MS (Ortho), DNB (Ortho)
Chairperson, Research Committee & Principal

Dr. Nihal Thomas
MD, MNAMS, DNB (Endo), FRACP (Endo), FRCP (EDIN)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

June 10, 2013

Dr. Leeberk R Inbaraj
PG Registrar
Department of Community Health
Christian Medical College
Vellore 632 002

Sub: **Fluid Research Grant Project NEW PROPOSAL**
Prevalence of Musculoskeletal disorders among Brick Kiln workers in Rural Southern India.
Dr. Leeberk R Inbaraj, Dr. Obed Heber, Dr. Fenn Saj, Dr. Samantha D, Dr. Peter Paul, Dr. Abhilash KPP, Dr. Venkata Raghava Mohan, Dr. Reginald Alex.

Ref: IRB Min No: 8329 dated 10.06.2013

Dear Dr. Leeberk R Inbaraj,

The Institutional Review Board (Research and Ethics Committee) of the Christian Medical College, Vellore, reviewed and discussed your project titled "Prevalence of Musculoskeletal disorders among Brick Kiln workers in Rural Southern India." on June 10, 2013.

The following Institutional Review Board (Research & Ethics Committee) members reviewed the study proposal.

Name	Qualification	Designation	Other Affiliations
Dr. B. Poonkuzhali	MSC, PhD	Professor, Haematology, CMC	Internal, Basic Medical Scientist

TEL : 0416 - 2284294, 2284202 FAX : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE
BAGAYAM, VELLORE 632 002, INDIA

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Dr. Alfred Job Daniel, D (Ortho), MS (Ortho), DNB (Ortho)
Chairperson, Research Committee & Principal

Dr. Nihal Thomas
MD, MNAMS, DNB (Endo), FRACP (Endo), FRCP (EDIN)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

Dr. George Thomas	MBBS, D Ortho, PhD	Chairperson (IRB) & Orthopaedic Surgeon, St. Isabel Hospital, Chennai	External, Clinician
Dr. Vinod Joseph Abraham	MBBS, MD, MPH	Professor, Community Medicine, CMC	Internal, Clinician
Dr. Thambu David	MBBS, MD, DNB	Professor, Medicine, CMC	Internal, Clinician
Dr. Anuradha Bose	MBBS, DCH, MD, MRCP, FRCPCH	Professor, Pediatrics, CMC	Internal, Clinician
Dr. Binu Susan Mathew	MBBS, MD	Associate Professor, Dept. of Clinical Pharmacology	Internal, Pharmacologist
Dr. Suresh Devasahayam	BE, MS, PhD	Professor, Bioengineering, CMC	Internal
Dr. L. Jeyaseelan	M Sc, PhD, FRSS	Professor Dept. of Biostatistics, CMC	Internal, Statistician
Dr. DJ Christopher	B Sc, MBBS, DTCD, DNB, FCCP	Professor, Pulmonary Medicine, CMC	Clinician
Mrs. Pattabiraman	B Sc, DSSA	Social Worker, Vellore	External, Lay person
Mr. Sampath	B Sc, BL	Advocate, Vellore	External, Legal Expert
Mrs. Mary Johnson	M Sc	Professor, Child Health Nursing, CMC.	Internal, Nurse
Dr. Asha Mary Abraham	MBBS, MD, PhD	Professor, Virology, CMC	Internal, Clinician
Dr. Jayaprakash Muliyil	BSC, MBBS, MD, MPH, DrPH (Epid), DMHC	Retired Professor, Vellore	External
Dr. Deepak Abraham	MBBS, MS	Professor, Endocrine Surgery, CMC	Internal, Clinician
Mrs. Selva Titus Chacko	M Sc	Professor, Medical Surgical Nursing, CMC	Internal, Nurse

TEL : 0416 - 2284294, 2284202 FAX : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

INSTITUTIONAL REVIEW BOARD (IRB)
CHRISTIAN MEDICAL COLLEGE
BAGAYAM, VELLORE 632 002, INDIA

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Chairperson, Research Committee & Principal

Dr. Nihal Thomas
MD, MNAMS, DNB (Endo), FRACP (Endo), FRCP (EDIN)
Deputy Chairperson
Secretary, Ethics Committee, IRB
Additional Vice Principal (Research)

Prof. Keith Gomez	BSc, MA (S.W), M. Phil (Psychiatry Social Work)	Deputy Chairperson (IRB) Students' Counsellor, Loyola College, Chennai	External, Social Scientist
Dr. Prathap Tharyan	MD, MRCPsych.	Professor of Psychiatry, CMC	Internal, Clinician
Dr. B. Antonisamy	MSc PhD FSMS, FRSS	Professor & Head Dept. of Biostatistics & Secretary IRB (EC), CMC	Internal, Statistician
Dr. Nihal Thomas	MD MNAMS DNB(Endo) FRACP(Endo) FRCP(Edin)	Secretary IRB (EC)& Dy. Chairperson (IRB), Professor of Endocrinology & Addl. Vice Principal (Research), CMC.	Internal, Clinician

We approve the project to be conducted as presented.

However, the project proposal has to be presented and ratified in the next full Institutional Review Board meeting.

With best wishes

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

Dr Nihal Thomas
MBBS MD MNAMS DNB (Endo) FRACP(Endo) FRCP(Edin)
Secretary (Ethics Committee)
Institutional Review Board

CC: Dr. Reginald Alex, Department of Medicine Unit IV, CMC.

TEL : 0416 - 2284294, 2284202 FAX : 0416 - 2262788, 2284481 E-mail : research@cmcvellore.ac.in

OFFICE OF RESEARCH
CHRISTIAN MEDICAL COLLEGE, BAGAYAM
VELLORE 632002, TAMIL NADU, INDIA

Ref: FG/8235/03/2013

May 03, 2013

OFFICE OF THE TREASURER
04 MAY 2013
543867
CMC, VELLORE - 632 004

The Treasurer
Christian Medical College,
Vellore.

Dear Mr. Denzil,

Sub: **FLUID Research grant project NEW PROPOSAL:**
Incidence of unintentional childhood injuries and risk Perception of unintentional childhood injuries among primary caregivers of children between 0-14 yrs of age in a rural block of South India.
Dr. Leeberk Raja. I. (Emp. No. 29009), PG Registrar, Community Health,
Dr. Kurien George (Emp.No – 08947), Dr. Anuradha Bose, Dr. Anuradha Rose, Community Health.

Ref: IRB Min. No. 8235 dated 19.03.2013

The Institutional Review Board at its meeting held on March 19, 2013 vide IRB Min. No. ***8235*** accepted the project from 6 months for *a total sanction Rs. 13,000/- (Rupees Twenty Thirteen Hundred only)). If overspent the excess should be debited form the respective departmental or Special funds*. Kindly arrange to transfer the sanctioned amount to a separate account to be operated by Dr. Leeberk Raja. I and Dr. Kurien George.

Thank you.

Yours sincerely,

Dr. Nihal Thomas
Secretary (Ethics Committee)
Institutional Review Board

Dr Nihal Thomas
MBBS MD MRAMS DNB (Endo) FRACP(Endo) FRCP(Edin)
Secretary (Ethics Committee)
Institutional Review Board

CC: Dr. Leeberk Raja. I, Department of Community Health, CMC
Dr. Kurien George, Department of Community Health, CMC
File

22y08b. RF. Dr. Leeberk Raja - chad (8235)

ANNEXURE -2

STUDY ON UNINTENTIONAL CHILDHOOD INJURIES IN KANYIAMBADI BLOCK

Participant Names:

Child:

ID No.:

PARTICIPANT INFORMATION AND CONSENT FORM

Information Document

Description of the information

Hello. I am Dr.Leeberk Raja I .I am doing my Post graduation in Community Medicine in Christian Medical college, Vellore. I am involved in a community based research to gain information on unintentional childhood injuries in your community.

When I say unintentional childhood injures I mean the injuries which are sustained by the children between 0-14 yrs of age without deliberate intent of harming the child such as fall, drowning, accidental poisoning etc. In India , children dying due to unintentional injuries are increasing number for the past few years and this number will soon overtake the number of children who die due to other infectious causes such as chest infection, diarrhea. Since I work in CHAD I have also been noticing that many children are brought from your community with unintentional injuries.

So we have decided to do this research to find out how many children are sustained injuries every year and what happens after the injury and so on.

To carry out this study we would need your help in the ways detailed below.

1. Our primary investigator will be visiting your home and asking you a set of questions to obtain general information about your child, and his/her caregivers, your family income and so on.'
2. If your child had sustained injury in the past questions will be asked about, place of treatment, days spent in the hospital and disability and days missed at school etc. ,
3. You may be also chosen to participate in another part of the study to gain information about your beliefs on unintentional childhood injuries.
4. This information will give us better understanding of this problem and help us to plan preventive strategies in your community.

5. To do this we will need approximately 20 minutes of your time for the initial survey and additional time if a need for re-visitation arises due to doubts or necessary clarifications.
6. It is possible that you may face emotional trauma from recalling the injuries your child has had in the past few months and talking about them to us. When such an event arise we can offer you referral services to trained counselors and therapists working for our institution.

7. We will ensure that the information you give us remains confidential and that your privacy is maintained unless disclosure is essential for the safety for child.

8. You are free to access the data pertaining to your child on demand. The results of this study shall be disclosed to you on completion, and we shall seek to publish the same in a relevant medical journal. Should we find that there are specific indicators of higher risk that your child faces, we will inform you individually.

9. You are free to refuse to participate in this study or to withdraw at any point in time. Your refusal or withdrawal will not affect the standard of care you would receive at our institution's health services.

10. The study is funded by the institutional review board of our institution.

11. The Institutional Review Board of Christian Medical College, Vellore has approved this study protocol.

Please feel free to ask us any doubts you may have regarding this study.

Contact Names and Numbers

If you have any questions about this study, you should talk to Dr. Leeberk Raja I (Mob-9789573402), Department Of Community Medicine, Christian Medical College, Vellore 632 002.

If you have any questions regarding research participants' rights, please contact Dr. Alfred Job Daniel, Chairman, Institutional Review Board, Christian Medical College, Vellore 632 002, Tamil Nadu, India. (Tel.No - 0091-0416-2284294 Email - research@cmcvellore.ac.in)

Consent form

I have read or read to me, the above information before signing this form. I have been informed that participation in this is voluntary; I have been offered an opportunity to ask questions and have clarified my queries.

SIGNATURE	PRINT	DATE

*** I CONFIRM BY SIGNING THIS FORM THAT I HAVE THE LEGAL AUTHORITY TO SIGN FOR THIS MINOR.**

PERSON OBTAINING SIGNATURE	PERSON OBTAIING PRINT	DATE

WITNESS NAME SIGNATURE	'WITNEES NAME PRINT	DATE

(In the case of illiterate persons, the consent form will be read to him/her in the presence of a witness (not associated with the study) and a digital impression (thumbprint) will be obtained in place of a signature. The witness also will be signing this form)

0-14 வயதுள்ள குழந்தைகளுக்கு எதிர்பாராத விதமாக நிகழும் காயங்களை பற்றி தென்னிந்தியாவின் ஒரு வட்டத்தில் நடத்தப்படும் ஆய்வு

ஒப்புதல் படிவம்

தேதி : அடையாள எண் :

கருத்தாய்வில் பங்கேற்பவர் பெயர்: தொகுதி எண்:

தந்தை / கணவர் / பெயர்: கிராமம்:

இந்த ஆய்வானது குழந்தைகளுக்கு எதிர்பாராத விதமாக நிகழும் காயங்களை பற்றி நடத்தப்படுகிறது என அறிந்து கொண்டேன் இதன் கண்காணிப்பாளரிடம் கொடுக்கப்பட்ட தகவல்களை நான் படித்து அறிந்து கொண்டேன் / அவர் சொல்ல கேட்டேன். இந்த ஆய்வு குழந்தைகளுக்கு எதிர்பாராத விதமாக நிகழும் இப்பிரச்சனைகளை செயல்பாட்டின் முலம் குறைக்க உதவும் என்று அறிந்து கொண்டேன்.

இந்த ஆய்வில் கலந்து கொள்வது எனது சுய விருப்பத்தை சார்ந்தது . எனக்கு விருப்பமில்லை என்றாலும் அல்லது இந்த ஆய்விலிருந்து விலகினாலும் இந்த நிறுவனத்தின் வாயிலாக கிடைக்கும் சிகிச்சைப் தற்போதைய அல்லது எதிர்காலத்தில் எந்த பாதிப்பும் இராது என்பதை அறிந்து கொண்டேன்.

எனது தனித்துவம் சார்ந்த எந்த ஒரு செய்திகளையும் இந்த கருத்தாயவிர்க்கு மட்டும் பயன்படுத்தவும் அதற்க்கான எந்த தகவல்களும் பாதுகாக்கப்படும் என்பதையும் நான் அறிவேன். கருத்தாய்வு சார்ந்த முடிவுகள் வெளியுடுவற்காக பகிர்ந்து அளிக்கப்படும்.

ஆய்வாளர் மற்றும் ஆராய்ச்சியாளர் இந்த ஆய்வின் தற்போதைய தகவல்களை மற்றும் எந்த ஆய்வு தொடர்பாகவும் பயன்படுத்துவதற்கு என் அனுமதி தேவையில்லை.

இந்த தகவல் படிவதில்லுள்ளவைகளை நான் படித்தும்(கண்காணிப்பாளரால் படித்து காண்பிக்கப்பட்டது) புரிந்தும் கொண்டேன். இதற்கான என் சந்தேகங்களை/ கேள்விகளை கேட்கவும் வாய்புள்ளது என்பதையும் அறிந்து கொண்டேன்.

இந்த ஆய்வில் பங்கேற்க இதன் மூலம் முழுச்சம்மதம் தெரிவிக்கிறேன்.

கையெப்பம்/ பங்கேற்பவரின் இடது கை பெருவிரல் ரேகை:

சாட்சி கையெப்பம்: 1

2

ஆய்வாளர் கையெப்பம்:

இந்த ஆய்வு சார்ந்த தங்கள் சந்தேகங்களுக்கு மருத்துவர்.வீபர்க் ராஜா-0978957340 அல்லது எனது ஆலோசகர் மருத்துவர் குரியன் ஜார்ஜ் (01462282207)அவர்களை தொடர்பு கொள்ளவும்.

ANNEXURE -3

Injury screening form

1. Name of the Village :
2. Cluster Number
3. Street Name :
4. Residential status : Permanent /Temporary
5. Name of the child :
6. Age of the child:
7. Primary care giver name:
8. Relation to the child:
9. Did the child sustain any injury in the last 2 weeks: Yes/No
10. If yes , type of injury (code according the types mentioned below)__
11. Did the child sustain any injury in the last 3 months? Yes/No
12. If yes , type of injury (code according the types mentioned below) __

1. Fatal injury (death): Injury resulting in death, whether immediately or later, but as a direct result of the injury.

2.Severe injury (permanent disability): injury resulting in permanent disability from blindness, deafness, loss of an extremity (arm or leg) or loss of the ability to use the hands or walk, or the loss of mental abilities. Emotional and psychiatric causes were not included because of the difficulty of diagnosis and classification.

3.Serious injury (10+ hospital days): injury requiring hospitalization for 10 days or more. This is designed to capture injuries requiring a major surgical procedure

4. Major injury (1–9 hospital days): injury requiring hospitalization for nine days or less. This definition is designed to capture injuries requiring significant medical care and hospitalization, but not major surgical intervention.

5. Moderate injury (missing school or work, seeking care from health practitioner but not being hospitalized): injury requiring medical care, or missing either one or three days of school or work, or being unable to carry out activities of daily living for the same time period, but without hospitalization

(If the answer to No 10 or 12 questions is YES, then include the child in the study. Mild injuries are not included in the study)

காயட கைைடாு பட

1. கிராமட ஊபபட :

2. ஊணாதது :

3. ஊ ட ஊபபட :

4. ஸபடு ! : துறகாஸ ட / றாறநத ட

5. குழுறஸாத :

6. குழுறஸாத :

7. முதணஸ ரியாரிபபஸ ஊணாடுபபஸ :

8. குபு ஊ! :

9. குபு டைடாற 2 ஸயாரிா ஸாஸப ஸ காயட ரிறபட ?:
ஆ / இல

10. ஆய , வகை (குறு) __

11. குபு டைடாற 3 யாதுவகஸாஸ காயட ரிறபட ?:
ஆ / இலப

12. ஆய , வ

கை (குறு) __

ANNEXURE 4

Childhood injuries – Impact

1. ID Number : 2. Name of the child :

3. Age in months: 4.Sex : Male /Female

5. Type of family :

   1. Nuclear 2. Joint 3. Others_____

6. Child's occupation :

   1. Infant or Toddler
   2. Preschooler
   3. Student
   4. If working specify_____
   5. Not working

7. Education of the care taker:

   1. None
   2. Primary school
   3. Middle school
   4. High school
   5. Higher secondary school
   6. Graduate /Diploma
   7. Professional /Master degree

8. Literacy of the primary care giver :
   1. Illiterate
   2. Able to read
   3. Able to read& write

9. Occupation of the primary caregiver :

10. Socio- economic score – (Sheet attached) :

11. Place of injury:
   1. Home
   2. School
   3. Balwadi
   4. Playground
   5. Work place
   6. Field
   7. Highway
   8. Street
   9. Others_____

12. What was the anatomical site of injury:

1. Head
2. Eyes
3. Upper limb
4. Lower limb
5. Trunk

13. Was the child alone at the time of injury: 1. Yes 2. No 3.Don't know

14. If accompanied by a carer, relationship to the child: _____

15. Was the injury or accident intentionally inflicted by someone else?

1. Yes 2. No 3. Don't know

16. Type of injuries:

1. Road traffic injury
2. Drowning
3. Fire /burns
4. Falls
5. Poison
6. Other_____

17. Outcome of injury:

1. Moderate
2. Severe injury
3. Serious injury
4. Major injury
5. Fatal

18. A. Vehicle related injury
1. Bicycle
2. Motor vehicle (Two wheeler)
3. Auto
4. Car
5. Bus
6. Lorry
7. Others

B. Injured child was

1. Driver
2. Pedestrian
3. Occupant

19. Drowning or near drowning in a
1. Open well
2. Well
3. Lake
4. Pool or pond
5. Sea
6. Indoor water collection
7. Others_____

20. Burns
1. Flame
2. Hot water
5. Chemical
6. Electrical

3. Stream
4. Hot Objects
7. Others_____

21. Falls

1. Ground level
2. Table/chair
3. Staircase
4. Balcony
5. Trees
6.Others_____

22. Poisoning

1. Kerosine
2. Medicines
3. Insecticides/Pesticides
4.Others_____

23. Did the child receive any treatment after injury? 1. Yes 2. No

24. If yes where?

1. Home remedy
2. Health personnel (Excluding doctors)
3. Native treatment
4. Emergency room
5. Out patient
6. In-patient

25. After how many hours was the child taken to the medical facility_____

26. How far is that Hospital/clinic from your home _____Kms

27. If not given any treatment, why?_____

28. If treated in a medical facility, How many days was the child admitted?_____

29. How many days did the child remain ill at home?_____

30. How many days did the child was ill in total? _____

31. If had temporary disability, how many days did the child spend in disability _____

32. How many days did the child miss school/work/Balwadi?_____

33. How many days did you miss your work? _____

34. How much did you spend in total for the treatment(Drugs+Transport+Hospital Bill)Rs. _____

35. How much of your wages lost in caring for the child Rs. _____

36. Does the child have permanent disability now? 1. Yes 2.No

37. If yes, type of physical disability

1. Blindness
2. Deafness
3. Loss of Extremity
4. Loss of ability to walk
5. Loss of ability to use hand
6. Loss of mental abilities

குழ பருவ ஏற காயா – தாக

1. அடையாள எ : 2. குழுந மபய :

3. யாதுங வய : 4.ஜுே : மட / ஆ

5. ரு வகை:

1.துணாககுப 2. ச கடு 3.யழுா ___________

6. குழுந வேலை:

1. தூ குழுநல 4. வேலையயல ________
2. முனைபள . 5. மவனைலப வெ
3. யாணை

7. பரா யரா பபல கூ தத

1. எதுவுய 5. மயமபா பம
2. ஆரு பம 6. பட்டது / டிப்ள
3. ா நாலைல பம 7. ெதாழில / முதுந
4. உயர்நில பம

8. முத பரயரா பபாம எழுத

1. எழுததா 3.வாசக & எட மு

3. வாசக மு

9. முகல பராயரா பபாள வேலை:

10. வேலைமப (:

11. காய ஏறபட ஜுட :

1.வடு 2.பளா 3. அங்க 4. ம ளைய மைதான
5.வேலை செய்யுமி 6. மகாம்ல 7. மாநடுங்கு
8.மட 9. மறா ________

12. காய ஏறபட உ பு

1. தலை 4. காலப

2. கை 5. உ

3. கைபட

13. காய ஏறபத குபு தைய இ நூ ணா/ளா?

1. அ . 2. இல 3.தெரிய

14. குபு யறறபெருடன ,குழூநைதககு

____

15. அததைகய காய யறெறாபெரால ஏ ஏறபடுதத ?

1. 2 அ . 3 இல . 3.தெரிய

16. காயதத வகை:

1. சாலை விபத 4. வ
2. நா ே குதி . 5. விு
3. ?் 6. மறறு __________

17. காயதது வை :

1. மிதமான. 4.பெரு காய
2. கடுமைப காய 5. இறப
3. திவி காய

18. அ. வாகன வகை

1.மைசக 2. மோட்டட வாகன (இ சகக வாக) 3. ஆ ேடோ 4.கார் 5.பஸ் 6. லாி 7. மற்று ________

ஆ. காயமயை த கு

1. ஓடடுநர 3. பய

2. பாதசா

19. புூ அ ஒ ட கா யாகு

1. தாுநத க 2. கா௦௦௦ா 3. ஏரா 4. கு அ குட

5 . கட 6. ஒ டிுகுள ஶசகரா 7. மறு

20. தககாய

1. சா 5. ரசாயனப ஶப

2. சா 6. யா சாரு

3. ஆவோ 7. மற்று ___________

4. தூட ஶபா(

21. ஒ

1. தரை யடட 4. பாஶ

2. மேசை/ நாுகா 5. யாங

3. படி 6.மற்று ____________

22. ந

1. ய௦௦௦ஶா 3. பூசசாகஶகா

2. யமு 4.மறு ___________

23. குபு (காய ஏுபடட பாுகு சாகாச௦௦ச கு ?

1. அ . 2. ஜு

24. அ ௦ ,எா ?

1. ஒவடடு புூ௦௦ 4. அவசர அறை

2. சுகாத ஊழிய (மருதத தஒ) 5.ஶஒ ஶநாயா

3. நாடடு மருததுவய 6. உ ஶநாயா

ஆ. மருததுவய

1. அரசு மருத்துவமனை 2. சாட

3. CMCH 4.தனி .

25. காயம ஏ! எவவ மக மறு, கழுத்து (, மருச மனைக்கு மகாணடு ' . __________

26. அய துவமனை உஙகள வடடில உக ? _________ கி.மீ.

27. ஏ! சகாசனை அளாகச ஏன , ஏ ? ____________________

28. மருத்துவமனையால சகாசனச ஏதச நாட ' குபு அனுமதி ' ' பட்டி _________________

29. மருத்துவமன நது வரு ஏ ஏதச நாட சுகமானமயினா ' ? __________

30. மமா ஏதச நாட சுகமானமயமான ? __________

31. தறகா இயலாமை ஏறபட ஜுரு , குபு ஜுயலான ' ஏவ நாட் கழுந் __________

34. குபு பக / வேலை / அஙகன ஏதச நாட வாடுபபு ஏடுக ' ? ___________

35. நிங ' வேனல ஏதச நாட மசவ ' வ ? _________________

36. சகச்சைசகக மமா மசவ ஏல வு {மரு + மபாகு ' + மருத்து க்கு மசலுத் ')(. ___________

35. குபு யை பரா தததுனால உஙகள உ ஜுழுநத ' . __________

36. குபு (ஜுபமட நாநத ஊ உள ? 1 அ 2. ஜுவ

37. ஆய , வகை

1. பாரனவம 4. நடச தறு ஜுழு
2. காழ கேளாமை 5. கை பயன தீறு ஜுழு
3. கை,கால ஜு 6 மன திறனச ஜுழு

ANNEXURE -5

PERCEPTION OF CHILDHOOD INJURIES

1. Name of the Mother :
2. Age :
3. Education in years :
4. Literacy: 1. Read 2. Write 3. Read & write
5. Occupation :
6. SES (Modified kuppuswamy scale) :
7. No. of children at home :
8. History of unintentional injury in 2 weeks : Yes/No
9. History of unintentional injury in 3 weeks : Yes /No
10. History of infant death due to unintentional injury in the past : Yes /No
11. Living with the husband : Yes /No

12. What do you think the CHANCES of typical child from 1 to 5 will be injured from following things or Hazards? Please rate your answers in the scale from 1 to 5, where 1 is least likely and 5 is most likely. Circle x if no response

Items	1	2	3	4	5	x
1.Automobiles						
2.Furnitures						
3.Stairs						
4.Household doors and drawers						
5. Hot water						
6. Electrical appliances						
7. Electrical outlets						
8. Wood stoves and fire places						
9.Small objects						
10. Small toys and other						
11. Plastic bags						
12. Cribs						
13. Bathtubs						
14.cords and ropes						
15. Swimming pools and lakes						
16.Knives and other objects						
17. Dogs						
18. Riding toys and playground equipments						
19. Insect stings						
20. Bites from other children						

13. What do you think the CHANCES are that of a typical child from 1 to 5 years will be injured in the following ways at least once? Please rate your answers in the scale from 1 to 5, where 1 is least likely and 5 is most likely. Circle x if no response

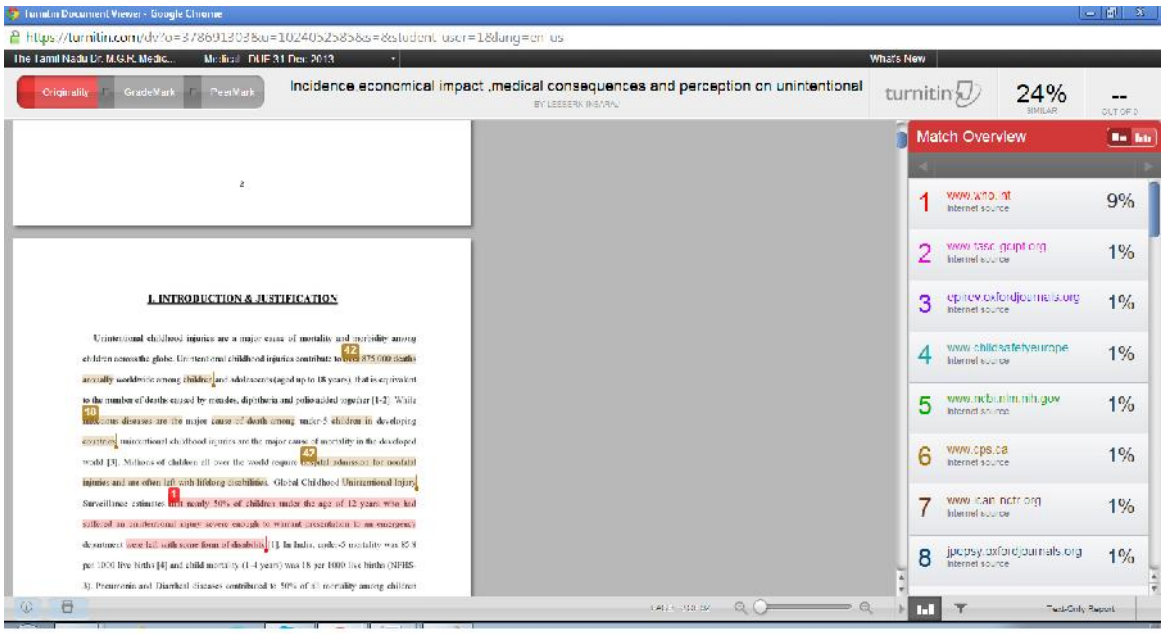
Items	1	2	3	4	5	
1.Falls						
2.Burns						
3.Entrapment (In refrigerators, Closets)						
4.Electrical shocks						
5. Poisoning						
6. Drowning						
7. Choking						
8. Strangulation (like getting a cord around the neck)						
9. Suffocation						
10.Puntcure wound						
11. Bruises						
12.Grashes and cuts						
13.Animal bites						
14. Head injuries						
15. Broken bones						
16. Insect stings						
17. Bites from other children						

14. How SERIOUS do you think the following types of injuries to a typical child from 1 to 5.? Please rate your answers in the scale from 1 to 5, where 1 is least serious and 5 is most serious. Circle x if no response.

Items	1	2	3	4	5	
1.Falls						
2.Burns						
3.Entrapment (In refrigerators, Closets)						
4.Electrical shocks						
5. Poisoning						
6. Drowning						
7. Choking						
8. Strangulation (like getting a cord around the neck)						
9. Suffocation						
10.Puntcure wound						
11. Bruises						
12.Grashes and cuts						
13.Animal bites						
14. Head injuries						
15. Broken bones						
16. Insect stings						
17. Bites from other children						

15. Again thinking about a typical child from 1 to 5, how DANGEROUS do you believe the following types of hazards are. Please rate your answers in the scale from 1 to 5, where 1 is least dangerous and 5 is most dangerous. Circle x if no response.

Items	1	2	3	4	5	x
1.Automobiles						
2.Furnitures						
3.Stairs						
4.Household doors and drawers						
5. Hot water						
6. Electrical appliances						
7. Electrical outlets						
8. Wood stoves and fire places						
9.Small objects						
10. Small toys and other						
11. Plastic bags						
12. Cribs						
13. Bathtubs						
14.cords and ropes						
15. Swimming pools and lakes						
16.Knives and other objects						
17. Dogs						
18. Riding toys and playground equipments						
19. Insect stings						
20. Bites from other children						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I. INTRODUCTION & JUSTIFICATION