*RESEARCH ARTICLE*

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# Determinants of Domestic Accidents in the Urban Field Practice Area of a Medical College in South India: A Cross-Sectional Study

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## Abstract

**Background:** Domestic accident is one of the five leading causes of death due to injuries in industrialized and developing countries. It is often determined by various factors like human, environmental and psychosocial factors. The resulting injury can largely be reduced by prompt identification and elimination of the risk factors. Not many studies are available regarding domestic accidents, their determinants and awareness. With this background the present study was carried out. **Objectives:** To assess the factors contributing to domestic accidents, to describe the immediate care given to manage domestic accidents, to find out the health seeking pattern and treatment outcomes among subjects with domestic accidents, to determine the association between domestic accidents and various socio-demographic characteristics. **Methods:** A cross-sectional study was done in the urban field practice area of a medical college in South India. Probability Proportional to Population Size (PPPS) was the sampling technique used. All individuals residing in the area for a minimum period of 6 months were included in the study. A total of 5282 study subjects were interviewed using a pre-tested semi-structured questionnaire. Data was entered into Microsoft excel and analyzed using descriptive and inferential statistics. **Results:** In the present study the prevalence of domestic accidents was 9.6%. Falls accounted for 47.7% of the domestic accidents. The most common human factor contributing to domestic accidents was visual impairment followed by illiteracy which was the most common psycho-social factor noted. Most of the study subjects, i.e., 82%, were treated at home and majority of them i.e., 91.1% recovered completely. A statistically significant association was found between domestic accidents and various socio-demographic characteristics. **Conclusion:** The prevalence of domestic accidents was 9.6%. The major determinants (human, environmental and psychosocial factors) of domestic accidents were visual impairment, Diabetes, Arthritis, Slippery floors, Kitchen clutter and Illiteracy.

**Keywords:** Domestic Accidents, Determinants, Urban

## 1. Introduction

Domestic accident is an accident which takes place in the home or in its immediate surroundings, and, more generally, all accidents not connected with traffic, vehicles or sport. The most common causes are drowning, burns, falls, poisoning, injuries from sharp or pointed objects[1].

Injuries are an important public health concern in many countries of the world, especially the middle- and low-income countries. They result in more than 5 million

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deaths every year. Nearly 70% of the injuries occurring globally are unintentional of which 30% is contributed by fall, drowning, fire related burns and poisoning[2].

The burden of childhood unintentional injury is highest in Southeast Asia and Africa, the cause specific mortality being 64 and 55 children per 1,00,000 population respectively[3]. Majority of the unintentional injuries among children occurred in the home and they pose a major threat to the health of the children especially in the Middle and Low-income countries[4].

As per the NCRB report for the year 2018, drowning accounted for 7.5% of the total deaths due to unnatural causes followed by falls (5%), accidental fires (3.1%), and electrocution (3%) in India[5].

There are multiple complex factors determining domestic accidents (environmental, human, socio-cultural factors), majority of which, if identified promptly, can reduce the physical, mental and economic burden caused by domestic accidents[6]. Majority of the data which is available is on unintentional injuries as a whole as a result of which very little information exists regarding home injuries. The accidents occurring at home are not reported as a result of which the global and country-wise estimates are not available. The burden and determinants of domestic accidents in the urban poor locality is unaccounted as well as not reported and also awareness regarding its occurrence, management and prevention is limited. In this background, the present study was undertaken to assess the determinants of domestic accidents in urban poor locality.

## 2. Objectives

a) To assess the factors contributing to domestic accidents. b) To describe the immediate care given to manage domestic accidents. c) To find out the health-seeking pattern and treatment outcomes among subjects with domestic accidents.

## 3. Materials and Methods

A cross-sectional study was conducted in an urban field practice area of a medical college of South India, from December 2016 to February 2018. The study was initiated after approval was obtained from the institutional ethics committee and informed written consent was obtained from all the study subjects. All individuals residing in the locality (minimum duration of stay of 6 months) were included in the study whereas seriously ill patients with cognitive impairment and individuals who gave a history of injury due to domestic violence were excluded from the study. Based on domestic accident prevalence of 12.7% from a previous study, with a relative precision of 10% and design effect of 2, Sample size calculated was 5282. Using Probability Proportional to Population Size (PPPS), study subjects were surveyed in eight localities under Urban Health Training Centre with a total population of 43059.

## 4. Data Collection and Analysis

Data was collected regarding the socio-demographic profile of the study subjects, domestic accidents in the household in the past 6 months, various factors (human, environmental and psychosocial) contributing to domestic accidents, immediate care given to manage domestic accidents, health care seeking pattern for management of domestic accidents and its outcome. The data was entered in Microsoft excel and analysis was done sing SPSS version 21.0. The data was analyzed by using descriptive statistics like mean, standard deviation, and percentages.

## 5. Results

The total number of study subjects were 5282. The mean age of the study subjects was 32.98 years ± 20.032 years. The study population comprised of 2645 (50.1%) females and 2637 (49.9%) males. It was observed that the majority of the males (22.1%) and females (20.3%) belonged to the age group of 10-19 years.

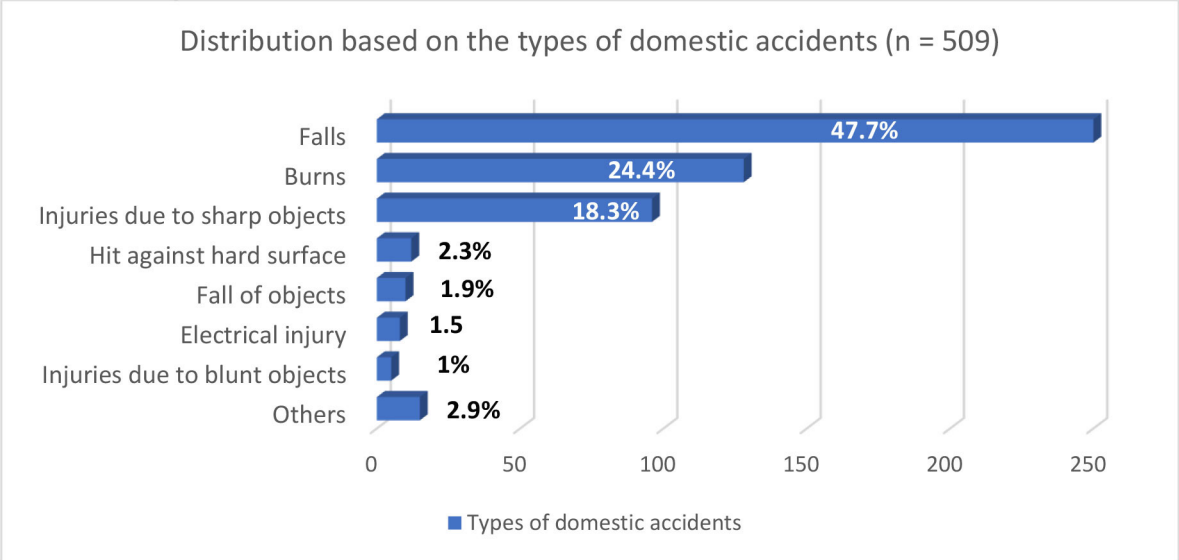
In the current study, 509 study subjects reported experiencing a domestic accident, resulting in a prevalence of 9.6%. Domestic accidents were seen most commonly in the extremes of age group i.e. among 139 (27.3%) subjects aged ≥ 60 years and 91 (17.9%) subjects aged ≤ 9 years. Domestic accidents were reported by 183 (35.95%) of male study subjects and 326 (64.05%) of female subjects.

In this study, falls emerged as the most prevalent type of domestic accident, observed among 250 (49.1%) of the study subjects. Following falls, burns affected 128 (25.14%) subjects, while injuries caused by sharp objects were reported among 96 (18.86%) subjects (Graph 1).

Majority of the falls i.e. 76 (30.4%) were reported by study subjects aged  60 years whereas burns were

noted predominantly among those aged between 30–39 years (25%) and injuries due to sharp objects among 40–49 years (31.2%) subjects. Falls remained the leading domestic accident for both genders, affecting 124 (49.6%) of males and 126 (50.4%) of females.

In the present study, visual impairment emerged as the most prevalent human factor associated with falls, burns, and injuries due to sharp objects affecting 40 (16%), 21 (16.4%) and 17 (17.7%) subjects respectively. This was followed by chronic diseases such as diabetes




*Others include animal bites, foreign body ingestion, foreign body insertion into the nose and ear and poisoning

**Graph 1.** Distribution of domestic accidents based on the types.

**Table 1.** Distribution of the subjects based on determinants responsible for falls

| | **Determinants** | **Frequency (n = 250)** |
|---|---|---|
| **Human factors** | Visual impairment | **40 (16.0)** |
| | Chronic disease (Diabetes Mellitus, Hypertension) | 34 (13.6) |
| | Degenerative bone disorders | 23 (09.2) |
| | Drug intake | 22 (08.8) |
| | Lack of supervision | 15 (06.0) |
| | Fatigue | 15 (06.0) |
| | Alcoholism | 13 (05.2) |
| | Others | 12 (04.8) |
| **Environmental factors** | Slippery floors | **46 (18.4)** |
| | Unstable furniture | 11 (04.4) |
| | Household clutter | 11 (04.4) |
| | Poor lighting | 9 (03.6) |
| | Unsafe stairs | 7 (02.8) |
| **Psychosocial factors** | Illiteracy | **70 (28.0)** |
| | Overcrowding | 62 (24.8) |
| | Stress | 05 (02.0) |
| | Family disturbance | 04 (01.6) |

*Figures in parenthesis indicate percentages

**Multiple response

**Table 2.** Distribution of the subjects based on determinants responsible for burns

| | Determinants | Frequency (n = 128) |
|---|---|---|
| **Human factors** | Visual Impairment | **21 (16.4)** |
| | Diabetes Mellitus | 16 (12.5) |
| | Arthritis | 8 (6.3) |
| | Fatigue | 5 (4.0) |
| | Others | 7 (5.5) |
| **Environmental factors** | Kitchen clutter | **23 (17.9)** |
| | Poor lighting | 11 (8.6) |
| | Absent safety measures | 5 (4.0) |
| | Absent/Low-level kitchen slab | 4 (3.1) |
| **Psychosocial factors** | Illiteracy | **38 (29.7)** |
| | Overcrowding | 30 (23.4) |
| | Stress | 7 (5.5) |
| | Family disturbance | 7 (5.5) |

*Figures in parenthesis indicate percentages
**Multiple response

**Table 3.** Distribution of the subjects based on determinants responsible for injuries due to sharp objects

| | Determinants | Frequency (n = 96) |
|---|---|---|
| **Human factors** | Visual Impairment | **17 (17.7)** |
| | Arthritis | 05 (5.2) |
| | Fatigue | 04 (4.2) |
| | Lack of concentration | 02 (2.1) |
| **Environmental factors** | Broken or blunt knife, broken glass, kitchen equipment | **17 (17.7)** |
| | Household clutter | 06 (6.3) |
| | Poor lighting | 02 (2.1) |
| **Psychosocial factors** | Illiteracy | **29 (30.2)** |
| | Overcrowding | 15 (15.6) |
| | Stress | 03 (3.1) |
| | Family disturbance | 02 (2.1) |
| | Sleep disturbance | 01 (1.1) |

*Figures in parenthesis indicate percentages
**Multiple response

and hypertension and bone diseases like arthritis and osteoporosis (Table 1, 2, 3).

Slippery floors were found to be the leading environmental factor contributing to falls, impacting 46 (18.4%) subjects. Subsequently, unstable furniture and household clutter were each observed in 11 (4.4%) cases (Table 1). Regarding burns, kitchen clutter emerged as the most common environmental factor, affecting 23 (17.9%) subjects, followed by poor lighting in 11 (8.6%) cases (Table 2). Injuries from sharp objects were primarily attributed to broken or blunt knives, broken glass, and equipment, impacting 17 (17.7%) subjects. Household clutter followed closely, contributing to 6 (6.3%) cases (Table 3).

Illiteracy and Overcrowding were the common psychosocial factors noted among study subjects who suffered falls, burns and injuries due to sharp objects.

The first aid measure commonly administered following falls was found to be rubbing the affected area (27.2%) and washing the affected area with water (17.6%).

**Table 4.** Distribution of the domestic accidents based on the immediate first aid measure taken

| | | |
|---|---|---|
| **Falls** | **Immediate first aid measure**** | **Frequency (n= 250)** |
| | Rubbing affected area | **68 (27.2)** |
| | Wash affected area with water | 44 (17.6) |
| | Apply pressure to stop bleeding | 14 (05.6) |
| | Application of antiseptic | 12 (04.8) |
| | Application of ice/hot fomentation | 11 (04.4) |
| | Application of turmeric/coffee powder/Lime | 05 (02.0) |
| | | |
| **Burns** | **Immediate first aid measure** | **Frequency (n=128)** |
| | Placing affected area under running tap water | **101 (78.9)** |
| | Application of cold cream/oil/ lime | 20 (15.5) |
| | Application of ice | 16 (12.5) |
| | Application of antiseptic | 02 (01.5) |
| | | |
| **Injuries from sharp objects** | **Immediate first aid measure** | **Frequency (n=96)** |
| | Wash with water | **44 (45.8)** |
| | Application of pressure | 29 (30.2) |
| | Application of turmeric/coffee powder/mud | 21 (21.8) |
| | Tying a piece of cloth | 12 (12.5) |
| | Application of antiseptics/sterile bandage | 09 (09.4) |
| | | |
| **Fall of external objects** | **Immediate first aid measure** | **Frequency (n= 10)** |
| | Rubbing affected area | **08 (80.0)** |
| | Application of ice | 06 (60.0) |
| | | |
| **Hit against a hard surface** | **Immediate first aid measure** | **Frequency (n=12)** |
| | Rubbing affected area | **06 (50.0)** |
| | Application of tight bandage | 05 (41.6) |
| | Application of pressure | 04 (33.3) |
| | | |
| **Animal bites** | **Immediate first aid measure** | **Frequency (n=4)** |
| | Wash the wound with water | 04 (100) |
| | Apply tight bandage over the wound | 01 (25.0) |
| | Application of turmeric | 01 (25.0) |

*Figures in the parenthesis indicate percentages
**Multiple response

The most common first aid measure adopted following burn injury was placing the affected area under running tap water (78.9%). Following injuries from sharp and pointed objects, in majority of the cases, the immediate first aid measure taken was application of turmeric/coffee powder/mud (45.8%). All the animal bite victims washed the wound with water (Table 4).

Majority of the domestic accidents i.e. 430 (84.47%) were treated at home, 70 (13.75%) were treated on an out-patient basis and 12 (2.35%) underwent in-patient treatment.

**Table 5.** Association between domestic accidents and various socio-demographic characteristics of the study population

| Socio-demographic variable | | Domestic Accident (+) | Domestic Accident (-) | $X^2$ value, p value |
|---|---|---|---|---|
| **Age groups** | Children (< 18 years) | 163 | 1570 | **88.1, < 0.001** |
| | Adults (18 – 59 years) | 207 | 2594 | |
| | Elderly (≥ 60 years) | 139 | 599 | |
| **Gender** | Male | 183 | 2454 | **43.98, < 0.001** |
| | Female | 326 | 2311 | |
| **Standard of Living Index** | High | 284 | 3497 | **78.86, < 0.001** |
| | Medium | 182 | 927 | |
| | Low | 43 | 349 | |
| **Type of family** | Nuclear | 191 | 2148 | **10.43, < 0.001** |
| | 3 generation/Joint family | 318 | 2625 | |

Complete recovery was seen in majority i.e. 478 (93.9%) domestic accident events, 33 (6.5%) events were such that the subjects had recovered with impairment or disability and following 13 (2.55%) events, subjects were in the recovery phase.

Table 5 shows that domestic accidents was found to be more prevalent among elderly age group, Female gender, those belonging to medium SLI families and 3 generation/ joint families. A statistically significant association was also found between these socio-demographic variables and domestic accidents.

## 6. Discussion

- Out of 5282 study subjects, 509 individuals had a history of domestic accidents in the past 6 months. The prevalence of domestic accidents was 9.6%. A study done in a semi-urban community by P. Stalin *et al.* noted a slightly higher prevalence of 12.7% which may be due to an extended recall period of 1 year[7].
- Majority of the subjects with domestic accidents belonged to the extremes of age group i.e. 27.3% subjects ≥ 60 years of age and 17.9% subjects ≤ 9 years of age and most of them were females, i.e. 64.05%. A similar finding was seen in a study done by Ramesh Masthi *et al.* in a rural community wherein females and children aged 5–14 years were more commonly affected[8]. In contrast to this, Hmingthanzuala *et al.* study reported domestic accidents to be higher among males i.e. 52.6% and least among the elderly (≥ 60 years)[9].
- The most common domestic accident noted in the present study was falls (49.1%), followed by burns (25.14%) and injury due to sharp objects (18.86%).
- Majority of the falls were seen in age groups  years whereas in the age group of 30-39 years burns was the commonest domestic accident. Most of the domestic accident victims in the age group of 40–49 years suffered from injuries due to sharp objects. Falls were the commonest domestic accidents noted both among males and females. The results were in accordance with a study done by Dinesh J Bhanderi *et al.* and Sudhir *et al.* which also reported falls to be the most common domestic accident followed by burns and scalds[10,11]. However, Vani Madhavi Kommula *et al.* study observed injuries from sharp and pointed objects to be the most common domestic accident followed by falls[12].

### 6.1 Determinants of Domestic Accidents

In the present study, with respect to the occurrence of falls, the common human factors noted were visual impairment (16%), chronic diseases like diabetes and hypertension (13.6%) and degenerative bone disorders (9.2%). Environmental factors noted were slippery floors (18.4%), unstable furniture (4.4%) and household clutter (4.4%). Among those who had a fall, illiteracy and overcrowding was present in 28% and 24.8% subjects respectively. However, a study by Aniket Sirohi *et al.* found out that the commonest clinical conditions present in elderly who had a fall were osteoarthritis, functional disability and visual impairment[13]. A meta-analysis of 12 studies by Laurence Z Rubenstein on falls in elderly found

out that the most likely cause in majority of the falls i.e. 31% were environment related, 17% were due to balance disorders or weakness and 13% were due to dizziness or vertigo. The other most likely causes included drop attack, confusion, postural hypotension and visual disorders[14]. A prospective cohort study by Bueno Cavanillas *et al*. showed that the intrinsic precipitating factors for falls among elderly were age, diabetes, dementia, balance disorders, previous history of falls and treatment with neuroleptics or anti-depressants which suggested that these can be identified easily and can largely be controlled[15]. The human factors which were commonly noted in cases of burns in this study were visual impairment (16.4%), diabetes mellitus (12.5%) and arthritis (6.3%) whereas the common environmental factors were kitchen clutter (17.9%), poor lighting (8.6%) and absence of safety measures (4%). A study done by Roksana Mirkazemi showed that the household behavior influencing the risk of burn injuries included, cooking in the living area (27.8%), use of kerosene pressure stove in addition to gas stove (27.5%) cooking at ground level (27.5%) and using open fire for warming (12%)[16].

### 6.2 Immediate First Aid Measure Taken, Health Seeking Pattern and Outcome of Domestic Accidents

In the present study, rubbing the affected area was the immediate first aid measure taken following a fall in 27.2% subjects followed by washing the affected area with water (17.6%). Turmeric, lime or coffee powder was applied to the affected area in 2% subjects. Following an injury due to burns, 78.9% subjects placed the affected area under running tap water and 15.5% subjects applied cold cream/oil/lime. Similarly in a study done by Hmingthanzuala *et al*. the local practices adopted to manage domestic accidents were found to be application of lime, toothpaste and turmeric paste to open wounds. People were aware of few basic first aid measures like application of pressure to stop bleeding and immobilization in case of bone injuries[9]. Most of the domestic accidents i.e. 82% were treated at home, 14% were treated on an out-patient basis and 2% as an in-patient while 2% subjects did not avail any treatment. More than 90% subjects with domestic accidents recovered completely whereas 6.5% subjects recovered with impairment/disability in the form of chronic pain and limited range of limb movements. A study done by Nethra G. *et al*. showed a varying result wherein nearly 50% of the domestic accidents sought treatment at a healthcare facility and 22% resorted to home-based treatment and also, majority of the domestic accident cases recovered completely, and permanent disability was seen in 1.9% subjects[17].

A statistically significant association was found between the age, gender, standard of living index of the families and the type of family with regard to domestic accident occurrence.

## 7. Conclusion and Recommendation

Community-based studies need to be done in different settings so as to determine the pattern and prevalence of domestic accidents which can form a basis for initiating corrective measures. Since the cause of domestic accidents is multi-factorial, it needs a multi-pronged approach which can be achieved by creating awareness regarding its occurrence, management and prevention.

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