

Prevalence and Impact of Falls as Domestic Injury among Rural Housewives of Raipur District, Chhattisgarh

Mondal J^{1,2}, Singh M³

¹ Research Scholar, NIMS College of Nursing, NIMS University Rajasthan, Jaipur, India.

² Professor & Principal, Sri Sri College of Nursing, FHW, Sri Sri University, Cuttack, Odisha.

³ Professor & Research Head, NIMS Nursing College, NIMS University Rajasthan, Jaipur, India.

ABSTRACT

Corresponding author:

Jaita Mondal,
Research Scholar, NIMS College
of Nursing, NIMS University
Rajasthan, Jaipur, India.
Professor & Principal, Sri Sri
College of Nursing, FHW, Sri Sri
University, Cuttack, Odisha.
Tel.: +91 6394523995,
E-mail: jaidolsmon@gmail.com
ORCID ID: <https://orcid.org/0000-0003-2999-6983>

Date of submission: 01.11.2022

Date of acceptance: 21.08.2023

Date of publication: 10.10.2023

Conflicts of interest: None

Supporting agencies: None

DOI: <https://doi.org/10.3126/ijosh.v13i4.49182>



Copyright: This work is licensed
under a [Creative Commons
Attribution-NonCommercial 4.0
International License](https://creativecommons.org/licenses/by-nc/4.0/)

Introduction: The most common domestic injury among housewives is falling from stairs and ramps or on the floor. The present study aimed to find and associate the prevalence of falls with various agents, risk factors causing falls and the impact of falls among rural housewives.

Methods: A cross-sectional survey was carried out among 500 randomly selected housewives from a rural area of Raipur district, Chhattisgarh from March to June 2019. Demographic data and information regarding the occurrence of falls, various agents & factors associated with falls were collected by questionnaires, lux meter, anemometer and sound level meter through interviews, and observation techniques. Nordic questionnaire was used to assess the impact of falls. Collected data were analyzed by using the SPSS 20 statistical package.

Results: 295 out of 500 housewives had domestic injuries which included 12.8 % of fall injuries. Fall had a significant association with various physical agents like illumination in the living room ($\chi^2=11.004$, $df=1$), relative humidity of the kitchen ($\chi^2=18.03$, $df=2$) and presence of adequate natural light ($\chi^2=11.232$, $df=1$). Even various personal risk factors were significant causes of falls like wearing slippers on a wet floor ($\chi^2=11.845$, $df=1$), presence of open electric wires ($\chi^2=4.84$, $df=1$), self-cleaning of toilet & floor ($\chi^2=11.371$, $df=1$) and self-cooking ($\chi^2=10.959$, $df=1$). Heavy work like carrying water in a big container ($\chi^2=6.025$, $df=1$), working under direct sunlight ($\chi^2=4.195$, $df=1$), prolonged standing while cooking or on an agriculture field ($\chi^2=32.073$, $df=1$) and using of hand pump per day to draw water ($\chi^2=42.329$, $df=1$) were highly significant causes of domestic fall.

Conclusion: Findings of the study concluded that fall was very prevalent among housewives, and being at home housewives are still exposed to various agents and personal risk factors causing fall.

Keywords: Domestic injury, Fall, Housewives, Mechanical agents, Physical agents

Introduction

Fall is defined as an event that results in a person coming to rest inadvertently on the ground floor or other lower level. Globally, falls are a major public health problem. An estimated 6,84,000 fatal falls occur each year, making it the second leading cause of unintentional injury and death. Fall-related injuries mostly are non-fatal but approximately 37.3 million falls per year are

severe enough to require medical attention. Globally, falls are responsible for over 38 million DALYs (disability-adjusted life years) each year.¹

The Royal Society for Prevention of Accidents has specified that every year there are approximately 6000 deaths as the result of a home accident. Falls are the most common accidents, which cause serious injury at any time

of life. The risk increases with age and more women than men over the age of 65 die as a result of an accident in the home.²

It was observed that domestic kitchen also has various risk factors and hazards like the other working sector. Slips and falls were found as major hazards out of other threats.³ Most common domestic accidents were found cuts and lacerations (57.1%) followed by falls (18.5%).^{4,5}

A survey to find the top 10 injuries found the most common domestic injuries among housewives are falling from stairs and ramps or on the floor, slamming doors on hands and heads, falling from beds, falling from chairs or stools, slipping, falling and hitting heads and back on bathroom structures and fixtures, falling over and falling from ladders.⁶

While analyzing the causes of fall injuries, it was found that they resulted primarily from falling to the floor due to slippery floors; slipping or loss of balance due to floor surface contamination; overexertion in lifting heavy things; climbing and twisting. These injuries mostly affected the back followed by the ankles and knee.⁷

A prospective study found that out of 307 samples, 155 women (50.5%) fell one or more times. One hundred and fifty-six (51%) falls resulted in a fall-related injury, 74 (24%) in a serious fall-related injury, and 40 falls (13%) resulted in fractures.⁸

Based on the review, the present study aimed to assess and associate the prevalence of falls with various agents, risk factors causing falls and the impact of falls among rural housewives.

Methods

A descriptive cross-sectional study was performed among 500 housewives aged more than 18 years from villages of Raipur, Chhattisgarh, India. Samples were selected through a simple random sampling technique based on the inclusion criteria like women who were housewives and gave written consent to participate in the study, as well as who could understand Hindi. Housewives who came from

another district rather than Raipur were excluded. Data on demographic information, the prevalence of falls as a domestic injury, agents & risk factors associated with falls were collected by questionnaires through interview and observation techniques. Physical parameters were measured by instruments like measuring tape, weighing machine to calculate BMI, Lux meter to measure illumination, sound level meter to measure noise level and anemometer to measure relative humidity and room temperature.⁹ The content validity index (CVI \geq 0.7) of the tools was ensured by giving them to seven experts. The reliability of the instruments was checked by split half method for the questionnaire and intraclass method for the weighing machine, measuring tape, anemometer, sound level meter and lux meter by administering to 20 samples ($r \geq$ 0.8). Data were analyzed based on the study objectives and hypothesis using descriptive and inferential statistics (SPSS 20).

Results

Results showed that the majority of the housewives were from the 22-35 years of age group with a mean age of 39.27 (\pm 12.07) years. Maximum women had a mean BMI of 20.71 (\pm 3.2) which denotes that 60.6% had normal weight, 7% of them fall under pre-obesity and 32.4 % were underweight. Out of 500 housewives, 295 had domestic injuries which include 12.8% of fall injuries and 20.5% of them were hospitalized due to falls.

Table 1 denotes that, illumination in the living room ($p=0.001$), relative humidity in the kitchen ($p=0.001$), presence of adequate light ($p=0.001$), ventilation of rooms ($p=0.028$), and a smokey kitchen ($p=0.003$) were significant factors of fall at home. Falls were also significantly associated with wearing slippers on wet floors ($p=0.001$), watching TV while chopping vegetables ($p=0.001$), the presence of open electric wires at home ($p=0.028$), and the presence of slippery floors ($p=0.001$).

Table 1: Association between Falls and Various agents causing Domestic Injury (n = 295)

Agents	Fall		p-value
	Yes f (%)	No f (%)	
Illumination Casual reading (living room)	Low Illumination	30 (78.9)	0.001*
	Normal Illumination	8 (21.1)	
Kitchen relative humidity (%)	Normal humidity	20 (52.6)	0.001*
	Dry weather	18 (47.4)	
	More humid	0 (0)	
Presence of adequate light	Yes	20 (52.6)	0.001*
	No	18 (47.4)	
Ventilation of rooms	Yes	0 (0)	0.028*
	No	38 (100)	
Smokey kitchen/rooms	Yes	38 (100)	0.003*
	No	0 (0)	
Wearing slippers on the wet floor	Yes	0 (0)	0.001*
	No	38 (100)	
Watching TV while chopping vegetables	Yes	0(0)	0.001*
	No	38(100)	
Presence of open electric wires at home	Yes	0 (0)	0.028*
	No	38 (100)	
Presence of a slippery floor	Yes	0 (0)	< 0.001*
	No	38 (100)	

Table 2: Association between Fall and Various personal risk factors causing Domestic Injury (n = 295)

Personal Risk Factors	Fall		p-value
	Yes f (%)	No f (%)	
Self-cleaning of toilet & latrine	Yes	38 (100)	0.001*
	No	0 (0)	
Self-mopping of the floor of house	Yes	38 (100)	0.001*
	No	0 (0)	
Self-cooking	Sitting position	38 (100)	0.001*
	Standing position	0 (0)	
Carrying water in a big bucket/ container	Yes	38 (100)	0.014*
	No	0 (0)	
Working under direct sunlight	Yes	30 (78.9)	0.041*
	No	8 (21.1)	
Working in a standing position for long	Yes	38 (100)	0.001*
	No	0 (0)	
Comfortable shelf height	Yes	28 (73.7)	0.001*
	No	10 (26.3)	
Using a hand pump to draw water	Yes	20 (52.6)	0.001*
	No	18 (47.4)	

Table 2 denotes that, some personal risk factors like self-cleaning of toilet & latrine(p=0.001), self-mopping of the floor(p=0.001) and self-cooking (p=0.001) are the significant causes of fall. Carrying water in a big container (p=0.014), working long under direct sunlight (p=0.041), prolonged standing (p=0.001) and using a hand

pump to draw water (p=0.001) are also significant risk factors for falls.

Table 3 showed that a significant association was found with fall and age (p<0.001), type of family (p=0.002), number of toddlers (p<0.001), house condition (p=0.001), and monthly income (p<0.001).

Table 3: Association between Fall and selected demographic factors n = 295

Demographic Variables	Fall		p-value
	Yes f (%)	No f (%)	
Age	22-35	1 (2.6)	0.001*
	36-50	29 (76.3)	
	51-69	8 (21.1)	
Type of family	Nuclear	36 (94.7)	0.002*
	Joint	2 (5.3)	
No. of toddler	No toddler	38 (100)	0.001*
	One	0 (0)	
	Two	0 (0)	
	More than two	0 (0)	
House condition	Kacha	17 (44.7)	0.001*
	Pakka	2 (5.3)	
	Semi pakka	19 (50.0)	
Monthly income	> 6254/-	0 (0)	0.001*
	3127 - 6253/-	37 (97.4)	
	1876-3126/-	1 (2.6)	
	938-1875/-	0 (0)	
	< 938/-	0 (0)	

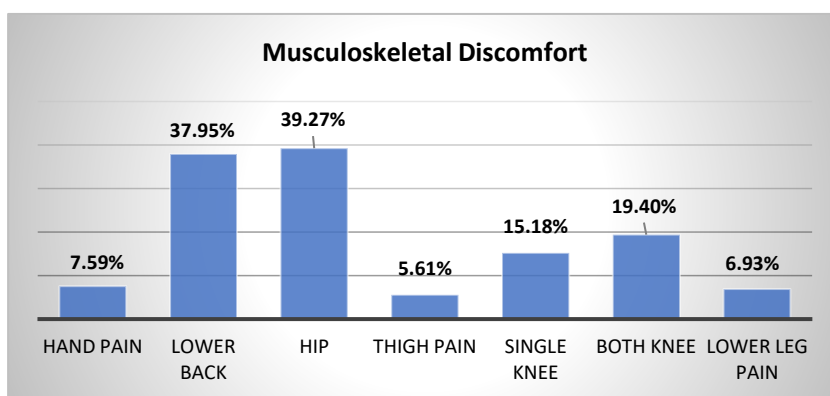


Figure 1: Bar diagram showing the impact of falls on MSDs

Figure 1 denotes that women used to suffer from hip pain (39.27%), lower back pain (37.95%), Both or single knee pain (19.4% & 15.18%), etc. However, it was a limitation of the study that can not show these MSDs happened directly due to

falls only. Table 4 denotes that there is a significant impact of falls on MSDs.

As found through the Nordic questionnaire 13.53% of housewives reported that they were not even able to do daily work when the pain started and

79.87% of pain slightly interfered with their daily ability to work. 69.64% of them had persistent pain during data collection time, especially in the

hip, knee, lower back, and upper arm area. The study found that 20.5% of housewives even got hospitalized due to falls.

Table 4: Association between Fall & MSDs

Demographic Variables	MSDs		p-value
	Yes f (%)	No f (%)	
Fall	Yes	34 (2.6)	0.001*
	No	269 (76.3)	
		5 (44.7)	
		192 (30.0)	

*Significance at 0.05 level of significance

Discussion

The result of the present study denoted a significant association between falls and various agents causing falls, hence., there is a statistically significant association between falls & various agents causing falls when $p < 0.05$.

A significant association was found between falls and various personal risk factors causing falls, hence, there was a statistically significant association between various factors and domestic injuries at a 5% level of significance. There was a statistically significant association between fall and demographic variables. The present study was limited to housewives only but males and children of the family are also prone to falls and the study was also limited to the housewives of Raipur Chhattisgarh only so findings cannot be generalized.

A longitudinal study was conducted to describe the occurrence of domestic accidents in the health training center area of the Community Medicine Department, RIMS, Imphal having a total household of 712 with a population of 4241. Cuts and lacerations (57.1%) were the most common accident encountered followed by falls (18.5%), burn, and scald (13.6%).³ Though the present study differed in research design i.e. cross-sectional, it too encountered falls (12.8%) as one of the common injuries at home.

Various studies stated that traumatic and repetitive injuries related to kitchen tasks include lacerations, cuts, wrist fractures from slips and

falls due to spills.^{4,12} These studies supported the present study as housewives had cuts, lacerations, falls and thermal strains from poor work practices. Maximum falls happened due to wearing slippers on wet floors, thermal strain while working a long time in a smoky kitchen, or working in a field under direct sunlight.

As per a report in Victoria, adult injuries are more likely to occur in the home. Falls cause over two-thirds (68.7%) of home injuries leading to hospital admissions. The major causes of home injury were falls (37.5%).¹³ This study supports the present study regarding a select sample of housewives.

A cross-sectional study conducted among 300 associates of an urban area found that cut was the most common domestic accident (114, 38%), followed by falls and slips (96, 32%) and scalds (51, 17%).⁵ Both studies supported the present study as falls (12.8%) were found as one of the most common domestic injuries.

The prevalence of domestic accidents/injuries and various factors associated with it in a rural community of Kerala. The prevalence of domestic accidents in the community was found to be 10.5%. The majority (66%) of them were females. Fall (33.5%) was found as the most prevalent type of domestic accident which was significantly associated with age, educational status, place of occurrence and activity during an accident.¹⁴ Significant association was found in the present

study too with fall and age ($p<0.001$), type of family ($p=0.002$), number of toddlers ($p<0.001$), house condition ($p=0.001$) and monthly income ($p<0.001$).

Fall injuries result primarily from falls to the floor; overexertion in lifting; slips or loss of balance, climbing and twisting. These injuries mostly affected the back, followed by the ankles and knees. Slippery floors are the root of fall injury. Floor surface contamination is frequently reported when slips occur.⁵ The present study was supported by this study in terms of the occurrence of falls on slippery floors, the presence of back pain (37.95%) and knee pain among housewives (34.65%).

The present study was supported by another study with respect to the incidence of falls as the most common domestic injury and females as most prone to get it. A cross-sectional study was conducted to find out the prevalence of domestic accidents and the factors influencing them in a rural community in Salem district. 960 subjects were selected by using a simple random sampling technique. A total of 125 domestic accidents were found in this study, with a prevalence of 13%. About 50.4% of domestic accidents were due to falls, and 82% of accidents were seen among females. The result showed that about 49.7% of accidents took place around the house, 56.8% of accidents took place while playing or doing household work, and 39.2% of accidents happened in the afternoon. The most frequent type of accident was a fall and the study recommended proper designing of the house and adequate illumination which may help in reducing these occurrences.¹⁵

The following studies also supported the present study in various aspects. An article mentioned that the author of "Kitchen Smarts: Food Safety and Kitchen Equipment" Frances E. Ruffin cites that since all kinds of liquids and foods can be used in a kitchen, spills are inevitable. If the spill is a slippery food or liquid, this can result in someone slipping and possibly falling, which can cause fractures, broken bones, concussions, or sprains. Climbing up on step stools to reach

items up high can result in a fall and injuries. Freshly mopped floors can cause slipping and falling too.¹⁶ A community-based cross-sectional study was done in a rural area of Kanchipuram district, Tamil Nadu. It was found that around 12% ($n=184$) of the total study subjects had a history of some form of domestic accident/injury during the past 3 months. Out of these 184 subjects, 56.5 % ($f=104$) had faced domestic accidents/injuries and 51 % ($f=53$) of the domestic accidents have occurred due to 'falls'.¹⁷

A population-based cross-sectional analytical study was conducted in the service area of Jawaharlal Institute of Postgraduate Medical Education and Research Urban Health Centre, Puducherry to find the prevalence of domestic accidents, household safety practices and their association with socio-demographic factors in selected urban wards. Among the 578 randomly selected households 22 (37%) were due to falls, 27 (45%) had upper limb injuries and 25 (43%) occurred in the kitchen.¹⁸ The study supported the present study as fall was found as most common domestic injury.

A community-based cross-sectional study was carried out in Panemangaluru, Dakshina Kannada. Complete enumeration was done and all the women above 18 years of age were interviewed to assess the prevalence of domestic accidents among women and to study the epidemiological factors associated with domestic accidents. The prevalence of domestic accidents in rural women was 35.9%.¹⁹ Present study was also conducted among rural women above 18 years and data was collected by interview technique.

Another study supported the present study which was based on a group of community-dwelling, independent women aged over 50 years. The frequency of falls was calculated based on a retrospective analysis of 1326 cases. 100 women were chosen for a telephone questionnaire to identify the causes and consequences of falls. Approximately 31% of 1326 women reported at least one fall a year. In the year preceding the questionnaire, 62% of the

participants reported one fall, 26% two falls, 8% three falls and 5% four and more falls. In the surveyed group of 100 women, 72% of falls occurred outdoors, which is 2.5 times more often than at home (28%). 68% of falls occurred between 12 pm and 6 pm. Summer is the season with the highest occurrence of falls (37%). In winter, the frequency of outdoor falls increases, whereas during summer the frequency of falls happening in and outdoors does not differ. The most frequent cause of falls, both in and outdoors, was slipping.²⁰

References

1. World Health Organization. Falls. [Internet] updated 26th April 2021. [cited on 20.7.2021]. Available on: <https://www.who.int/news-room/fact-sheets/detail/falls>.
2. The Royal Society for the Prevention of Accidents. Facts and Figures. [Internet]. 2019 [Cited 2019 Aug 10]. Available from: <https://www.rospa.com/home-safety/advice/general/facts-and-figures/>
3. Osborne A, Blake C, McNamara J, Meredith D, Phelan J. Musculoskeletal disorders among Irish farmers. *Occup Med (Lond)*. 2010 Dec; 60 (8): 598-603. Available from: <https://doi.org/10.1093/occmed/kqq146>
4. Hmingthanzuala, Devi HS, Singh TG. Domestic Accidents in an Urban Health Training Centre. *Indian Medical Gazette*. 2011 Dec; CXLV (12): 476-80.
5. Sirohi S, Pandey D, Dixit S, Jain C, Deshmankar B, Raja RS. Domestic accidents: an emerging threat to community. *International Journal of Medical Science and Public Health*. 2015; 4 (9): 1202-5. Available from: <https://www.ejmanager.com/mnstemps/67/67-1421224790.pdf?t=1675451071>
6. Most Common Domestic Injuries. Top 10 Injuries [Internet] 2014 [Cited on 2016 Aug 25]. Available from: <http://top10injuries.com/most-common-injuries-at-home/>
7. Filiaggi AJ, Courtney TK. Restaurant hazards-practice based approaches to disabling occupational injuries in restaurants. *Prof Saf*. 2003; 48: 18-23. Available from: https://www.researchgate.net/publication/284065338_Responding_to_disabling_occupational_injuries_in_restaurants_Practice-based_approaches
8. Bergland A, Wyller TB. Risk factors for serious fall related injury in elderly women living at home. *Injury Prevention*. 2004 Oct;10(5):308-13. Available from: <https://injuryprevention.bmj.com/content/10/5/308>
9. Oxford Dictionary Thesaurus and Wordpower Guide: Oxford University Press; 2005.
10. Park K. Preventive and social medicine. 20th ed. Jabalpur: M/s BanarasidasBhanot; 2009.
11. Keyserling W M, Stetson D S, Silverstein B A, Brouwer M L. A checklist for evaluating ergonomic risk factors associated with upper extremity cumulative trauma disorder. *Ergonomics*. 1993 Jul; 36 (7): 807-31. Available from: <https://www.tandfonline.com/doi/abs/10.1080/00140139308967945>
12. Hajic M. Ergonomics in the Kitchen - Cooking Tips. *BellaOnline The Voice of Woman* [Internet]. 2018 [Cited on 2019 Jan 10]. Available from: <http://www.bellaonline.com/articles/art18237.asp>
13. Cassell E, Smith JO. Women's injury in the home. Monash University Accident Research Centre - Report #158 – 1999 [Internet]. 2019 [Cited on 2019

Conclusions

Findings of the study concluded that housewives were exposed to low illumination, high noise levels, and working in hot and humid environments for prolonged time which led to fall injuries. Fall was very much prevalent among housewives, and they were exposed to various agents and personal risk factors causing falls which are to be taken care of. Researchers recommend that similar studies be conducted in different geographical areas which may yield similar results to generalize the findings and recommend safety measures to all housewives.

- Aug 12]. Available from: <https://www.monash.edu/muarc/archive/our-publications/reports/muarc158>. <https://www.iiste.org/Journals/index.php/RHSS/article/view/38497>
14. George S, Paul N, Francis PT, Leelamoni K. Prevalence of domestic accidents in a rural area of Kerala: a cross sectional study. *Int J Community Med Public Health*. 2017 April; 4(4): 949-53. Available from: <https://doi.org/10.18203/2394-6040.ijcmph20170949>.
15. Radhakrishnan S, Nayeem A. Prevalence and factors influencing domestic accidents in a rural area in Salem district. *Int J Med Sci Public Health*. 2016; 5(8): 1688-92. Available from: <https://doi.org/10.5455/ijmsph.2016.09122015287>
16. Measom C. Accidents that happen in the kitchen [Internet]. 2017. [Updated 2017 July 21; Cited on 2019 Aug 12]. Available from: <https://homeguides.sfgate.com/accidents-that-happen-in-the-kitchen-12518227.html>
17. Vincent A, Dhamotharan K, Singh Z. Prevalence and Determinants of Domestic Accidents in a Rural Area of Kanchipuram District, Tamil Nadu. *Research on Humanities and Social Sciences*. 2017; 7 (17): 21-4. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7001614/>
18. Rehman T, Sulgante S, Sekhar SK. Prevalence and pattern of domestic accidents in the field practice area of Jawaharlal Institute of Urban Health Centre, Puducherry: a cross-sectional analytical study. [Internet]. 2020. [cited on 30.10.2022]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7001614/>
19. Adhikari S, Ismail IM. A Study on Domestic Accidents Among Women in a Coastal Area of Mangaluru, Karnataka. [Internet] 2022 [cited on 30.10.22]. Available from: <https://www.cureus.com/articles/119579-a-study-on-domestic-accidents-among-women-in-a-coastal-area-of-mangaluru-karnataka>. Available from: <https://doi.org/10.7759/cureus.30605>
20. Kumorek A et al. The causes of falls and injuries after falls in women over the age of 50 living alone in Krakow. *National library of Medicine* 2014; 71 (10): 516-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/25826972/>