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Accidents among housewives while operating electrical and non-electrical appliances at domestic level: An empirical research

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Abstract
The present study was conducted to know the accident level among housewives in operating electrical and non-electrical appliances at the domestic level. The study was conducted in the Kurnool district of Andhra Pradesh. An empirical research design was adopted for the study. Women were chosen as a sample for the study. The purposive sampling method was adopted for sample selection. Self-structured questionnaire was used to collect the information on independent and dependent variables. The study revealed the women are facing injuries due to falls, burns, electric shocks at the domestic level while operating electric and non-electric appliances which are leading to harm to the physical and mental health of women. Respondents expressed that most injuries were occurred in Kitchen and on stairs. Keeping in view the injuries expressed by women necessary suggestions were provided to reduce the accidents at the domestic level.

Keywords: Housewives, electric appliances, non-electric appliances, accidents, domestic level

1. Introduction

Accidents can occur in a wide range of environments, and they are possible in all aspects of human life, such as at home and at work. Domestic accidents are those that occur in the home or its immediate surroundings (Park, 2015 and Ramesh,2012) [7, 9]. Home injuries are the leading cause of death and disability worldwide, and they are widely recognised as a major public health concern (Mannocci *et al*. 2013) [6]. It is one of the leading five causes of deaths in both developed and developing countries. Every domestic accident has a negative impact on the injured person's mental and physical well-being (Galal, 2011) [3]. Domestic accidents were found to be more common in women, particularly in the kitchen.

According to the World Health Organisation (WHO), domestic accidents such as burns and falls are significant causes of morbidity and mortality all over the world in advanced countries. They are among the leading causes of death in children aged 0 to 15 years. With each new technological or cultural change, new patterns of injury attributed to domestic accidents emerge. Accidents can occur in a variety of settings, but the home is the most likely location for accidents involving people of all ages, from children to the elderly.

Accidents in the home are a major cause of death and injury, and they are strongly related to the years of life that may be lost (Dowswell,1999) [2]. Slips, trips, and falls are among the most commonly reported household accidents for a variety of reasons. According to the National Safety Council, falls account for nearly one-third of all nonfatal injuries. The current study was carried out to investigate the accident rate among housewives when operating electrical and non-electrical appliances at home.

Objectives of the study

1. To study the demographic profile of housewives
2. List/Type of electrical and non-electrical appliances used by housewives
3. Frequency the use of electrical and non-electrical appliances and description of the workstation where operations are performed

4. Other infrastructure facilities available at the place of work
5. Accidents, Injuries, Slips, Strips, Falls while in operation
6. Satisfaction level among workers and suggestions for improvement to reduce accident, injuries, slips, trips and falls etc.

2. Review of Literature

The literature related to the accident level at the domestic level was surveyed and examined to get an in-depth understanding of the selected topic. The comprehensive summary of previous research related to the present study is presented below

Soumya Shree *et al*. (2018) [12] conducted a study to determine the prevalence of domestic accidents among housewives in the kitchen and to evaluate the preventive measures used by housewives in the kitchen. A questionnaire was used to collect information about socio-demographic factors, the kitchen environment, domestic accidents that occurred in the kitchen in the previous six months, and safety measures practised by housewives. According to the study, more than half (51.7%) of housewives experienced one or more types of domestic accidents in the previous six months. The majority of participants (74.2%) followed safety precautions such as turning off the gas cylinder after cooking and using kitchen machinery after reading the instruction manual (54.5%). Housewives had little experience with kitchen safety precautions.

Rehman *et al*. 2020 [10] sought to determine the prevalence of domestic accidents, household safety practises, and their relationship with socio-demographic factors in Puducherry, Tamil Nadu. Data on self-reported domestic accidents in the previous year were collected using a structured questionnaire, and after inspecting the houses, an assessment of household hazards was performed. It was mostly reported in adults and in the kitchen, with falls being the most common cause and upper limb injuries being the most common. The majority of the houses had objects scattered on the floor, impeding movement, and stoppers and grab bars were missing from the doors and bathrooms. Overcrowding was found to be significantly associated with domestic accidents.

Bindari *et al*. (2008) conducted a study to determine the prevalence of domestic accidents in a semi-urban community and their relationship to various epidemiological factors. A semi-structured questionnaire was used to collect data. Domestic accidents were found to occur at a rate of 1.7%. A fall was the most common type of accident reported. The occurrence of falls was discovered to be related to age and overcrowding. Burns, scalds, electrocution, injuries, and accidental poisoning were also reported. Accidents were reported at a significantly higher rate in extreme age groups and among women. In 82.6% of cases, full recovery was observed, whereas permanent disability was found in only 2.9% of subjects, and 14.5% reported chronic pain after the accident. In the current study, no deaths were reported as a result of a domestic accident. Domestic violence is more common in older people and women.

Sirohi *et al*. (2015) [11] investigated the prevalence of domestic accidents and public awareness of their prevention in an urban community. A semi-structured questionnaire was used to collect data. According to the findings of this study, respondents were injured as a result of a lack of knowledge about the proper use of equipment. Cuts were the most commonly reported accident. The residents' level of awareness about domestic accidents was low, and the study concluded that there is an urgent need to address the issue through public health education.

Lafta *et al*. (2013) [5] conducted a study to assess women's knowledge of domestic accidents involving children and to determine its relationship with some demographic factors. Women attending primary healthcare centres (PHCCs) were chosen as a study sample. A well-structured questionnaire was created, which included questions about four major types of accidents involving children: chemical and detergent poisoning, electric shock, injuries from sharp kitchen instruments, and burns. According to the findings, only 9.2% of the mothers had a good level of knowledge in the prevention of chemical and detergent injuries, while more than 90% had poor knowledge. The same was discovered when it came to knowledge about preventing electrical accidents caused by power sockets and electrical appliances, with only 10.2% of mothers having a good level of knowledge. Only 6.3% of mothers had a good level of knowledge about accidents caused by sharp kitchen tools. Statistics show that older mothers have a higher level of knowledge than younger mothers. This study concludes that women are poorly educated about how to protect their children from domestic accidents.

Radhakrishnan *et al*. (2016) [8] conducted a study in a rural community to assess the prevalence of domestic accidents and the factors that influence them. For one year, the study was carried out in a rural field practise area of a medical college. Domestic accident information was gathered through structured questionnaire interviews. In our study, we discovered 125 domestic accidents, with a 13% prevalence. Falls caused approximately 50.4% of domestic accidents, 82 accidents in female subjects, 41% of accidents in children under the age of five, and 41% of accidents in adults over the age of sixty. Approximately 49.7% of accidents occurred in the courtyard, 56.8% occurred while playing or doing household chores, and 39.2% occurred in the afternoon. Domestic violence is more common in older people and among women. The reasons could be increased home time and participation in daily home activities. Falls are the most common type of accident; proper house design and adequate lighting can help to reduce their occurrence. The study concludes that, in order to prevent and control domestic accidents, community awareness must be raised through the promotion of household safety measures and the use of information, education, and communication (IEC) interventions.

3. Methodology

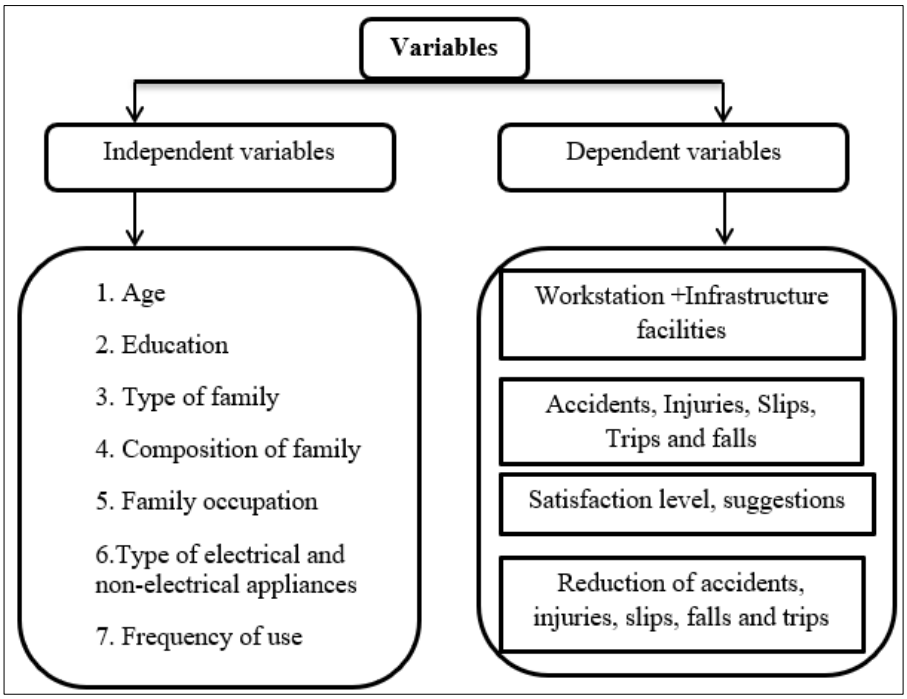
The methodology adopted to reach the objectives of the study is discussed under the following heads.

Research design Empirical research/Case study Research

Empirical Research is an evidence-based approach to the study and interpretation of information. The empirical approach relies on real-world data, metrics and results rather than theories and concepts. It is the idea that knowledge is primarily received through experience.

Sampling procedure: Purposive sampling procedure; **Sample:** Housewives **Study Location**: Koilkuntla, Kurnool district, Andhra Pradesh.

Variables and their measurement



Data collection tool: A self-structured questionnaire to elicit information on accident level among housewives in operating electrical and non-electrical appliances at the domestic level. The scheduled was developed in a way to collect information on both independent and dependent variables.

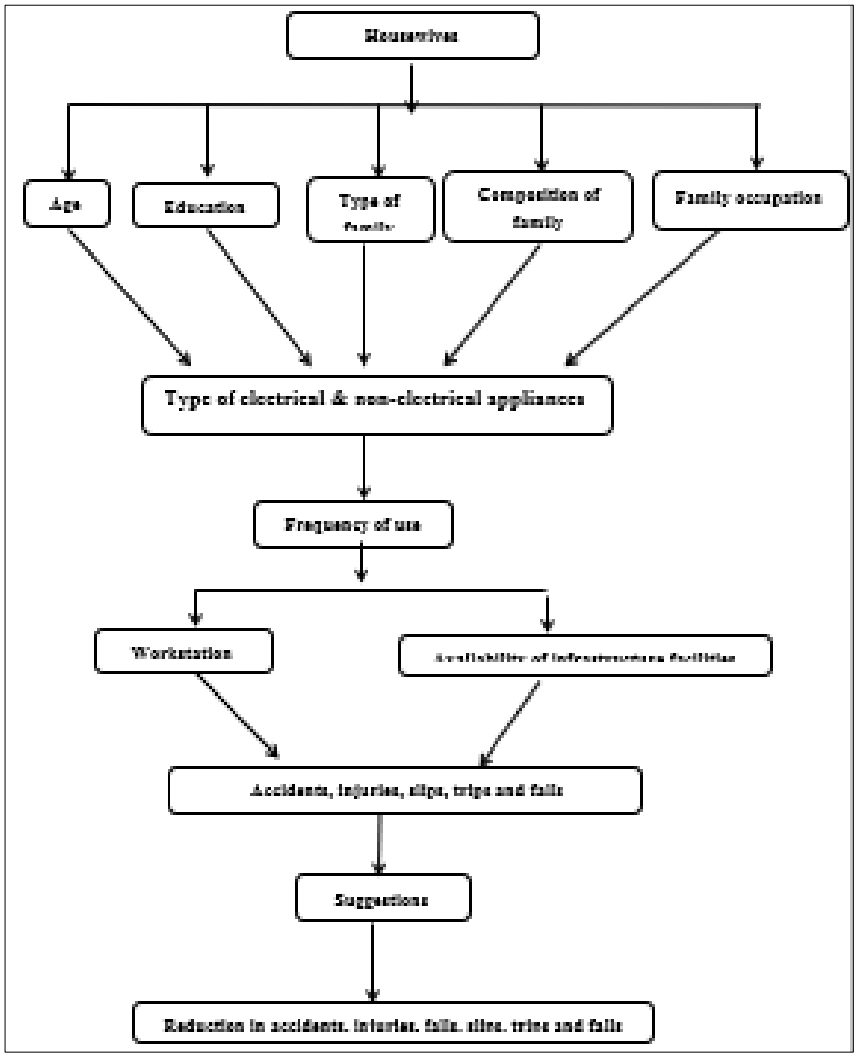


Fig 2: Conceptual framework of the study

Table 1: Conceptual framework of the study

S. No	Independent variables	Scoring/measuring variables			
		1	2	3	4
1	Age	20-30	30-40	40-50	50 and above
2	Education	Primary education	Secondary education	Intermediate	Graduation
3	Type of family	Nuclear family	Joint family	Single parent family	Any other
4	Composition of family	Living with children and spouse	Living with a spouse	Living alone	Living with children
5	Family occupation	Private job	Government job	Business	Any other
6	Type and availability of electrical and non-electrical devices	Not present	Present		
7	Frequency of use	Less frequently	Most frequently		
S. No	**Dependent variables**	**Scoring/measuring variables**			
		1	**2**	**3**	
1	Workstation	Not at all	Partially provided	Fully provided	
2	Infrastructure facilities	Not present	Present		
3	Type of accidents	No	Yes		
4	The perceived sense of safety	No	Yes		
5	Suggestions to reduce accidents	Disagree	Agree		

4. Results and Discussion

The results that emerged out of the study on accident level among housewives in operating electrical and non-electrical appliances at the domestic level are presented below.

Case studies of the selected respondents

Case study -1: Respondent A

Respondent A aged 45 years completed graduation and living with a spouse (nuclear family). The income for the family is earned by the family head (private job).

Various electric appliances available in the house include an electric rice cooker, mixer, refrigerator, electric fan, television, electric water kettle which are used most frequently and washing machine, cooler, grinder, electric iron box, air conditioner, electric water pump and tape recorder are used less frequently. Non-electric appliances in the house include Gas stove, Pressure cooker, Mortar and pestle, knives, Gas water heater and manual sewing machine which are most frequently used.

Most of the appliances were used in the kitchen and the workstation of the kitchen in the house was fully provided with sufficient space for food preparation and cooking area, proper storage shelves at the proper height, a work triangle, adequate lighting and proper ventilation. Some of the infrastructure facilities available near to workplace are dining area, washing area, most used equipment's were kept in reach, multipurpose space to perform other activities.

Types of injuries encountered while performing activities expressed by the respondents were Slips due to wet slippery flooring in which the respondent has injured and was medicated for 3 months for recovery. Minor cuts/scratches/burns while cutting vegetables and cooking and also. Minor injuries occurred because of the sharp edges of furniture while having movement.

The perceived sense of safety expressed by the respondent include slips/ falls due to wet slippery floor in kitchen and bathroom and climbing chair/stool to reach utensils in the kitchen and other areas and also at staircase when there is no railing on both sides with improper riser and treads and also in absence of light.

Case study -2: Respondent B

Respondent B aged 49 years is the head of the family living with children (Single Parent family) completed graduation and working in the government sector.

Electric appliances available in the house include electric rice cooker, mixer, refrigerator, electric fan, mobile phones used most frequently and cooler, electric iron box are used less frequently. Non-electric appliances available in the house include Gas stove, pressure cooker, mortar and pestle, knives which are used most frequently in the house.

The workstation of the kitchen has the partial provision of space for food preparation and cooking area. Storage shelves were fully provided at the proper height. Non-slippery flooring was present in the house, Poor work triangle in the kitchen exists with inadequate ventilation and artificial lighting. Dining area used as a food preparation area and multipurpose space to perform activities.

Minor cuts occurred while cutting vegetables. The electrical injury occurred due to the high voltage level in the stabilizer of the refrigerator that leads to a short circuit and leads to an accident. Respondent also experienced falls while climbing the staircase because of higher risers and lower treads with a minor injury in the leg region. Respondent expressed a perceived sense of safety in climbing staircases while preparing food using electrical appliances in the kitchen.

Case study 3: Respondent C

Respondent C aged 43 years completed graduation and living with children (Single parent family). The type of electric appliances available in the house includes electric rice cooker, mixer, Refrigerator, electric fan, Washing machine, electric iron box and mobile phones which are used most frequently the house except cooler and grinder.

Non-electric appliances in the house include Gas stove, pressure cooker, mortar and pestle, knives used most frequently in the house.

The kitchen was provided with ample space for food preparation and a cooking area representing a proper work triangle, Proper storage facilities and easy reach were provided with no sharp edges but there was no proper ventilation and artificial lighting was provided in the kitchen. Dining area and washing area can be directly accessible from the kitchen.

Type of accidents encountered by the respondent using appliances include burns due to pressure cooker opening at the wrong time which lead to burning in the face and hands and also expressed electrical injury while using washing machine because of short circuit happened due to electric socket contacted with water which leads to the electric shock with a minor injury. Perceived sense of safety while

performing activities was expressed in the kitchen while cutting vegetables, cooking food and using electric appliance s and also at the staircase while climbing.

Case study 4: Respondent D

Respondent D aged 32 years living with her spouse and children (nuclear family) completed graduation. The income was earned by the head of the family who is working in the private sector. Types of electric appliances available in the house include electric rice cooker, mixer, refrigerator,

Electric fan, Television, washing machine, mobile phones which are used most frequently than cooler and iron box. Non-electric appliances available in the house include a gas stove, pressure cooker, mortar and pestle, knives, manual sewing machine and are used most frequently.

A proper work triangle was not found in the kitchen. Non-slippery flooring was present. Storage shelves are provided at the proper height in easy reach. Infrastructure facilities available to the kitchen include a dining area, multipurpose space where a sewing machine is used and also has direct access to the washing area.

Respondent expressed that minor electric shock has occurred while using the iron box, cuts/scratches while cutting vegetables and also experienced cuts and injuries while peddling foot of sewing machines. Perceived sense of safety expressed by respondent includes a kitchen where slips/falls and shocks due to appliances can occur.

Case study 5: Respondent E

Respondent E aged 52 years completed graduation and also working as a teacher in the government sector living with her spouse (nuclear family). The electrical appliances available in the house include an electric rice cooker, mixer, refrigerator, kitchen hood, air conditioner, electric fan, television, water purifier, mobile phones using more frequently and grinder, washing machine, cooler, electric iron box, water heater using less frequently. Non-electric appliances include a gas stove, Pressure cooker, Mortar and pestle, knives.

The kitchen workstation in the house includes sufficient space for food preparation and cooking area, with all storage shelves at the proper height and properly arranged electric appliances at the countertop. The kitchen has ample ventilation. Infrastructure facilities available near to workplace include a dining area, washing area, direct access to the storage room for groceries etc.

Type of accidents expressed by the respondent include slips due to oil spills in the kitchen which also has slippery flooring and lead to serious injury, minor cuts/burns happened which has a minor injury. Respondent expressed a perceived sense of safety while in the kitchen while using various electrical appliances and also cooking food. cautious, while using electrical appliances in the bathroom.

Suggestions to reduce the accidents/injuries at the domestic level

All the respondents have given positive response(agreed) to the suggestions to reduce the accidents/injuries at the domestic level by following the given precautions in various places of the house.

The suggestions provided include:

- Clean up spills immediately to avoid falls
- Do not store oil on the floor which sometimes may lead to falls
- Use non-slip floor surfaces in the kitchen and bathroom
- Place desks close to power supplies, or route cables along walls or under raised floors to prevent trip hazards.
- Plan storage within your workplace to minimize the risk of slips
- Good lighting helps to reduce the risks of slips, trips and falls
- Obstacles in walkways such as boxes, cables, materials and other trip or slip hazards should be removed.
- Arrange furniture in an organized manner to reduce any harm
- Clear clutter from the floor, including electric cords, throw rugs or other trip hazards.
- Make sure walkways and steps are smooth and puddle-free.
- Never use a damaged extension cord
- Pull-on the plug and not on the cable to unplug an electrical device
- Be careful when using multi-outlet bars. Connecting too many devices that consume a lot of electricity could lead to overheating
- In the bathroom, never use electrical devices if you are wet or the humidity level is high
- Never throw water on an outlet that's on fire
- Use all electrical devices(radios, phones, tablets etc.) as far as away from any water
- Do not use electric gadgets while they are in charging mode
- Read the instructions provided in the manual carefully while operating appliances.

5. Summary and Conclusion

All the respondent's houses were provided with electric appliances that are most used in the current generation and are using most frequently tom perform activities. The respondents had experienced one or other type of injuries (slips/falls/cuts/trips/electric shock) at the domestic level by using various electric and non-electric appliances. Most injuries expressed by women in the house were occurred in the kitchen and also at stairs. The injuries experienced by the respondents include slips due to wet flooring, electric shock while operating washing machine, iron box and burns using the refrigerator for food preparation and hot oil spill while cooking. Some injuries experienced using non-electric appliances include cuts/scratches using knives and while operating a sewing machine and also burns while operating pressure coker All the respondents expressed perceived sense of safety has to exist while using in the kitchen using various appliances, climbing staircase and also while operating electric appliances for any purpose. The study concludes that women are most frequently experiencing the various type of injury which may cause harm to physical health and mental health. To reduce accidents at the domestic level necessary precautions and awareness have to be created and implemented in a way to improve the way of operating appliances that create no harm to users.

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Appendix

Questionnaire Schedule to elicit information on accident level among housewives at the domestic level

Table 1: Age

1.20-30	2.30-40
3.40-50	4.50 and above

Table 2: Education

1. Primary school	2. Secondary school
3. Intermediate	4. Graduate

Table 3: Type of Family

1. Nuclear family	2. Joint family
3. Single parent family	4. Any other

Table 4: Composition of family

1. Living with children and spouse	2. Living with a spouse
3. Living alone	4. Living with children

Table 5: Family occupation

1. Private job	2. Government job
3. Business	4. Any other

Table 6: Most prone to accidents in homes (Rank 1-4)

Kitchen	Bathroom
Bedroom	Staircase

Table 7: Types of electrical appliances available in the house and frequency of use

S.no	Name of electric appliances	Availability		Frequency of use	
		Present	Not present	Always	Sometimes
1	Electric Rice cooker				
2	mixer				
3	Grinder				
4	Refrigerator				
5	Kitchen hood/exhaust fan				
6	Air conditioner				
7	Electric fan				
8	Television				
9	Washing machine				
10	Water Purifier				
11	Cooler				
12	Electric Iron box				
13	Electric heater				
14	Electric water kettle				
15	Tape recorder				
16	Mobile Phones				

Table 8: Types of non-electrical appliances available in the house and frequency of use

S. No	Name of non-electric appliances	Availability		Frequency of use	
		Present	Not present	Most frequently	Less frequently
1	Gas Stove				
2	Pressure cooker				
3	Mortar and pestle				
4	Knives				
5	Gas water heater				
6	Manual sewing Machine				

Table 9: Type of workstation where operations are performed

S. No	Kitchen	Fully provided	Partially provided	Not at all
1	Sufficient space for Food preparation and **coo**king			
2	proper storage of utensils etc used in the kitchen			
3	Non-slippery flooring in kitchen			
4	Avoided Sharp edges			
5	Proper work triangle			
6	Storage shelves at the proper height			
7	Adequate lighting			
8	Proper ventilation			
9	Provision of exhaust fan/chimney			

Table 10: Any other infrastructure facilities available at the place of work

S. No	Infrastructure facilities	Present	Not present
1	Dining area		
2	Washing area		
3	Most used equipment		
4	Multi-purpose space to perform activities		

Table 11: Type of accidents/injuries happened while in operation using appliances

Type of Injury	Occurrence		If yes, reason
	Yes	No	
Slips/ Falls			
Cuts/Scratch			
Burns			
Electrical injury			
Trips			
Any other			

Table 12: A Perceived sense of safety while performing activities

Injury type		Yes	No
Slips/falls	While walking on a greasy or wet floor		
	Climbing using chair/stool to reach utensils		
	While walking on wet floors/slippery floors		
	Bathing stools unstable		
	No railing on both sides		
	Uneven riser and tread		
	Walking on the spiral staircase		
	The door at the landing space		
	Walking in absence of light		
Cuts	While cutting vegetables		
	Sharp-edged objects/furniture		
Fires /burns	Gas burner near the cylinder		
	While pouring hot items to another vessel		
	While cooking food		
	While using electric appliances		
	Switches near taps		
	While using a geyser/electric heater		

Table 13: Suggestions to reduce accident, injuries, slips, trips and falls etc. at the domestic level among housewives

S. No	Suggestions to reduce accidents at the domestic level	Acceptance level	
		Agree	Disagree
1	Clean up spills immediately to avoid falls		
3	Do not store oil on the floor which sometimes may lead to falls		
4	Use non-slip floor surfaces in the kitchen and bathroom		
5	Place desks close to power supplies, or route cables along walls or under raised floors to prevent trip hazards.		
6	Plan storage within your workplace to minimize the risk of slips		
8	Good lighting helps to reduce the risks of slips, trips and falls.		
9	Obstacles in walkways such as boxes, cables, materials and other trip or slip hazards should be removed.		
10	Arrange furniture in an organized manner to reduce any harm		
11	Clear clutter from the floor, including electric cords, throw rugs or other trip hazards.		
12	Make sure walkways and steps are smooth and puddle-free.		
13	Never use a damaged extension cord		
14	Pull-on the plug and not on the cable to unplug an electrical device		
15	Be careful when using multi-outlet bars. Connecting too many devices that consume a lot of electricity could lead to overheating.		

16	In the bathroom, never use electrical devices if you are wet or the humidity level is high		
17	Never throw water on an outlet that's on fire		
18	Use all electrical devices (radios, phones, tablets etc.) as far as away from any water		
19.	Do not use electric gadgets while they are in charging mode		
	Read the instructions provided in the manual carefully while operating appliances		