

ORIGINAL ARTICLE

Survey of domestic accidents in the elderly in the Province of Genoa (Northern Italy)

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Key words

Domestic accidents • Elderly • Prevention

Summary

Introduction. Accidents in the home are a major public health issue in most industrialised countries, as they are a frequent cause of injury and death. Moreover, since a considerable portion of such accidents involve elderly people, it is important to assess their social impact in this population. In Italy, the available data indicate that well over 3 million people per year suffer accidents in the home, and that this number is rising. The aim of the present study was to evaluate the number, characteristics and causes of domestic accidents among the elderly.

Materials and methods. The study population was made up of subjects of both sexes aged between 65 and 92 years admitted to first aid units and emergency departments of hospitals in Genoa. The investigation was conducted by means of an ad hoc questionnaire designed to record the circumstances of the accident, the functional capacity of the subject involved, any risky behaviour enacted and the safety profile of the subject's home.

Results. The study enrolled 111 voluntary participants: 62 women and 49 men. At the time of the accident, subjects were engaged in the following activities: housework (36.9%) "rest" (14.5%), ablutions (10%), gardening (9%), leisure activities (8.1%), eating and drinking (2.7%). The most common injuries were bruises (39.6%), followed by fractures (23.4%) and cuts

(23.4%); the frequency of other, some time more severe injuries (burns, poisoning, asphyxia, crush injuries, etc.) was, fortunately, very low. Anyway, taking into account their consequences, their surveillance and prevention is very important. Most subjects were deemed to be in good health and, in 76% of cases, the safety profile of their houses proved to be satisfactory.

Discussion and conclusions. The data collected during this survey are in line with those yielded by national and international studies. They show that the elderly are very vulnerable to domestic accidents and that, even in the event of only slight injury, the management of elderly victims requires a strong organisational commitment on the part of relatives and considerable financial resources for healthcare services. Falling proved to be the main cause of injury. Clearly, efforts to reduce the cost of accidents in the home should aim to implement preventive intervention among elderly people, since the elderly population is destined to grow as a result of increasing life expectancy. In particular, preventive action should focus on reducing the incidence of falls by eliminating risk-related structural features in domestic settings as far as possible and by raising public awareness of the problem through health education campaigns.

Introduction

Generally speaking, the home is the indoor environment in which the majority of people spend most of their time. Unlike other environments, such as the street, the workplace etc., the home should have connotations of safety, serenity and protection. Owing to this image of tranquillity, the growing dangers due to technological advances and numerous other factors in domestic settings have long been underestimated [1].

Accidents in the home are a serious public health issue in most industrialised countries, in that they are a major cause of injury and death. Moreover, other consequences, such as disability, suffering and diminished productivity, have a considerable impact on society. Finally, we should not underestimate the psychological effect of these accidents on the general public, which hope that the home is epitome of a safe environment [2].

World Health Organisation (WHO) data indicate that, in advanced countries, domestic accidents are the leading cause of death among children from 0 to 14 years

of age [3]. In Brussels in 2001, the European Consumer Safety Association (ECOSA) published data on domestic and leisure-time accidents in Europe in 2000. These revealed that 225 people die in domestic or leisure-time accidents in Europe every day. Each year, over 80,000 people die while working, or simply playing, at home; this is twice the number of road traffic deaths in the European Union and some 14 times higher than the number of fatal accidents in the workplace. In addition to these deaths, every year accidents in the home are responsible for 40 million injuries requiring medical attention. In Italy, about 30 deaths per 100,000 inhabitants are attributable to domestic accidents, a figure which roughly corresponds to the European average; Finland has the worst record, with almost 56 deaths per 100,000 inhabitants, followed by France and Luxembourg, while the United Kingdom (18 deaths) has the lowest rate [4].

A study conducted from 1990 to 1993 in Norway by Koppjar and Wickizer [5] revealed an incidence of domestic accidents of 22/1000, the highest values being recorded among children and persons over 65 years of age.

Hemenway et al. [6] carried out a study in Austria on a stratified, randomised sample of 55,000 subjects; they found that 2.6 per 1000 had suffered injuries caused by falling down stairs (resulting in limitation of activity for a least one day). In a study conducted in Hungary, Kazar et al. [7] showed that the most frequent accidents are those which happen in the home (50% of all accidents) and that their incidence is increasing, the 1994 value being 45 per 1000 inhabitants.

In the Italian ISTAT survey *La vita quotidiana nel 2006* ("Daily Life in 2006"), 797,000 people (13.7/1000) reported being involved in an accident in the home within the previous three months. On this basis, it can be estimated that over 3 million people per year are involved in domestic accidents. More than 60% of all such accidents involve women (17/1000), while among men, the figure is lower (10.1/1000). Among children and adolescents (up to 14 years), more males than females suffer accidents; in subsequent age-groups, however, more females are involved, since they tend to spend more time at home than males do and are more frequently in contact with objects, tools and electrical appliances that can cause injury (cuts, burns, etc.). The risk of injury increases among elderly subjects, particularly those over the age of 80 years (33.9/1000 had had an accident in the three months prior to the survey). Children under the age of 6 years are also at high risk. These data confirm the association between the risk of accident and the amount of time spent at home [8].

In Italy, the prevention of domestic accidents was addressed by Law N. 493 of 3rd December 1999, *Norme per la tutela della salute nelle abitazioni e istituzione dell'assicurazione contro gli infortuni domestici* ("Norms for the safeguard of health at home and institution of insurance against domestic injuries" (G.U. N. 303 of 28th December 1999)). This law not only had the merit of dignifying domestic work and instituting obligatory insurance for housewives, it also dealt with initiatives aimed at safeguarding health and safety through the prevention of accidents in domestic settings. In this regard, article 3 of the law obliges the National Health Service to promote health and safety in domestic environments and to undertake suitable action to inform and educate the public with regard to the prevention of risks and accidents in the home [9].

In Liguria, accidents in the home are particularly frequent on account of the large proportion of elderly residents in the Region. The Regional Authority has therefore made prevention a specific objective of its Regional Social Health Plan [10]. From January to September 2004, domestic accidents accounted for 17,420 admissions to First Aid Units (FAU)/Accident and Emergency Departments (AED) in Liguria, 9,993 of which involved women; in the same surveillance period in 2005, admissions were 15,514 (8,911 women) [10].

The Region's 2005-2007 Prevention Plan provided for the creation of a system of domestic accident prevention and of monitoring by FAUs and AEDs through the registration of supplementary information in addition to the data habitually recorded. In 2005, an experimental

phase (SINIACA, *Sistema Informativo Nazionale sugli Infortuni in Ambienti di Civile Abitazione* (System of National Information on Accidents in Domestic Environments) surveillance protocol) was initiated at the AED of Genoa's Galliera Hospital; in 2006-2007, this experimental phase was extended to include the AED of the city's Gaslini Children's Hospital, in order to monitor the situation of the paediatric population. In addition, in 2007 the system of surveillance was extended to FAUs and AEDs in other areas of the Region; the data gathered were integrated with those recorded by other information systems, such as Hospital Discharge Forms (HDF), the regional death registry and death records kept by the individual local health authorities [10].

Studies on domestic accidents are of considerable importance in the public health sphere, since they are the only means of acquiring the information needed in order to implement valid prevention strategies aimed at minimising risk factors. The aim of the present study was to evaluate the number, characteristics and causes of domestic accidents among the elderly and compare the unpublished data, collected in Liguria Region from December 2002 to August 2003 with the results of subsequent SINIACA surveillance.

Materials and methods

This study forms part of a multi-regional project co-ordinated by the Ministry of Health and the Health Department of the Lombardy Region. In Liguria, the regional authority appointed the Department of Health Sciences of the University of Genoa as its referent for the study.

QUESTIONNAIRE

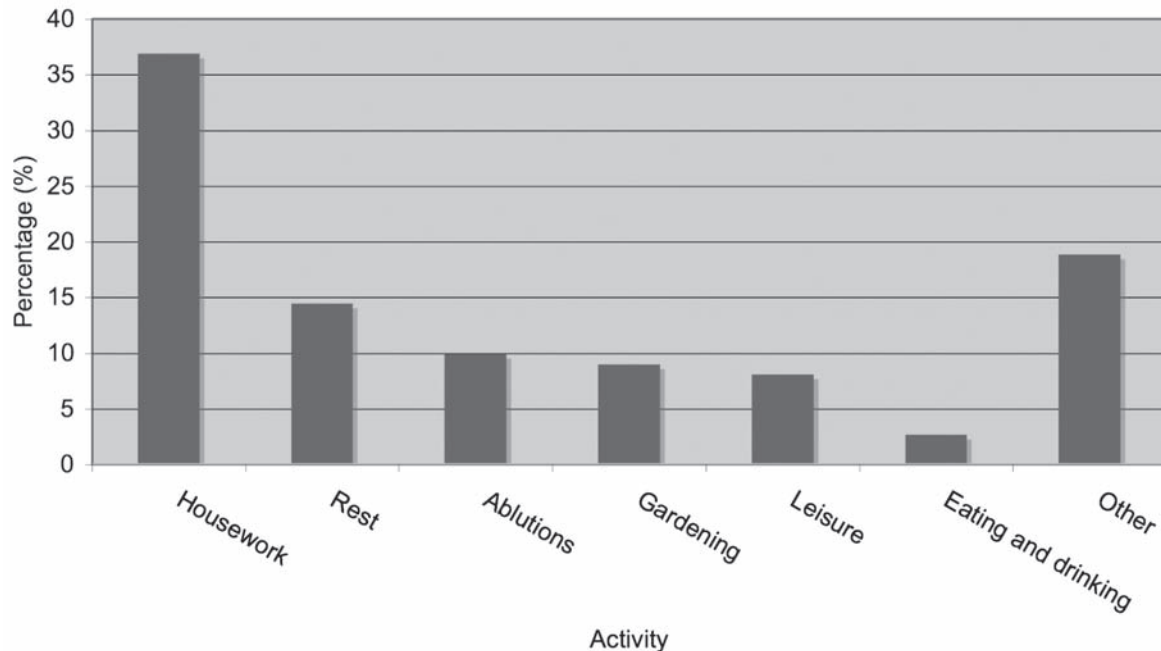
The investigation used an *ad hoc* questionnaire prepared by the Ministry of Health and the Health Department of the Lombardy Region. The questionnaire consisted of four sections: the first contained questions designed to establish the circumstances of the accident (where, how, when); the second aimed to determine the functional capacity of the subject at the time of the accident (Barthel scale [11]); the third was designed to discover whether the subject was engaged in any risky behaviour immediately prior to the accident, and the fourth consisted of a checklist to identify any features of the house that might engender a risk of falling. The questionnaire was administered by an interviewer.

STUDY POPULATION

In accordance with the regional programme, the study population was made up of subjects of both sexes aged between 65 and 92 years who attended the FAU and AED of Villa Scassi Hospital and San Martino Hospital in Genoa and the FAU of the 4th Local Health Facility in Chiavari.

In order to enrol an appropriate number of subjects, the above-mentioned facilities were asked to provide lists of patients admitted as a result of a domestic accidents during the period established by the study. Care was

Fig. 1. Activity in progress at the time of the accident.



taken to ensure that privacy laws were respected. From these lists, a random sample of 15% of the total number of cases was drawn up. Subsequently, the subjects involved, or their relatives, were contacted by telephone and invited to participate in the study. Once informed consent had been obtained, arrangements were made with the elderly person as to when and how the interview-inspection could be carried out by the appointed operator.

ASSESSMENT OF THE SUBJECT'S FUNCTIONAL CAPACITY

The Barthel index [11] was used to evaluate the functional capacity of the elderly person at the time of the accident. On the Barthel scale (0-100), scores from 100 to 91 indicate very good functional capacity; from 90 to 75 good; from 74 to 50 fair/sufficient; and < 49 poor/very poor functional capacity.

STATISTICAL ANALYSES

The data gathered were processed by means of a programme specifically designed for the study (SE-V-A 3/2004) run on the hardware of the Department of Health Sciences of the University of Genoa.

Results

Only 14.2% of the subjects contacted by telephone consented to take part in the study. The main reasons for refusal were: diffidence towards strangers who ask to come into their homes, even though the operators identified themselves as members of a workgroup coordinated by the Ministry of Health and the regional authority; reluctance on the part of those who feel that

their house is humble and unfit to receive a visit from operators charged with collecting information on the sanitary conditions of the premises; lack of trust in the National Health Service (NHS), and therefore unwillingness to co-operate.

A total of 786 subjects were contacted by telephone; of these, 111 (14.12%) participated in the study: 62 women (55.85%) and 49 men (44.15%). Most of the respondents interviewed were able to answer the questions personally; only 4 (3.6%) needed to be helped by relatives or other assistants, owing to their advanced age.

Most of the interviewees were at home alone when the accident happened (51: 45.9%); of these, 43 (84.3%) were reached by relatives or friends within an hour of the accident, while the remaining eight went to the emergency facility on their own. Thirty-eight subjects stated that they lived alone, and only one was equipped with an emergency alarm device.

Most of the accidents happened in the kitchen (36: 32.4%); 33 happened in the living room/dining room/bedroom area, 14 in the bathroom, 22 in areas adjacent to

Fig. 2. Main causes of accidents.

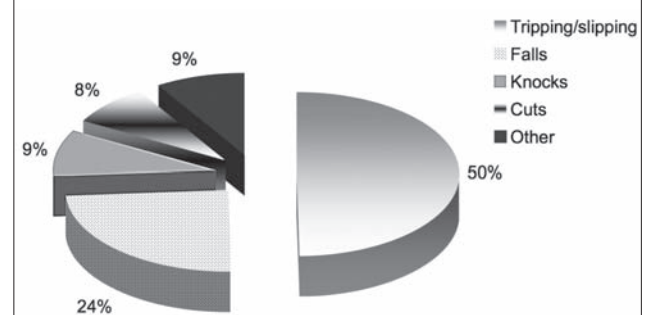
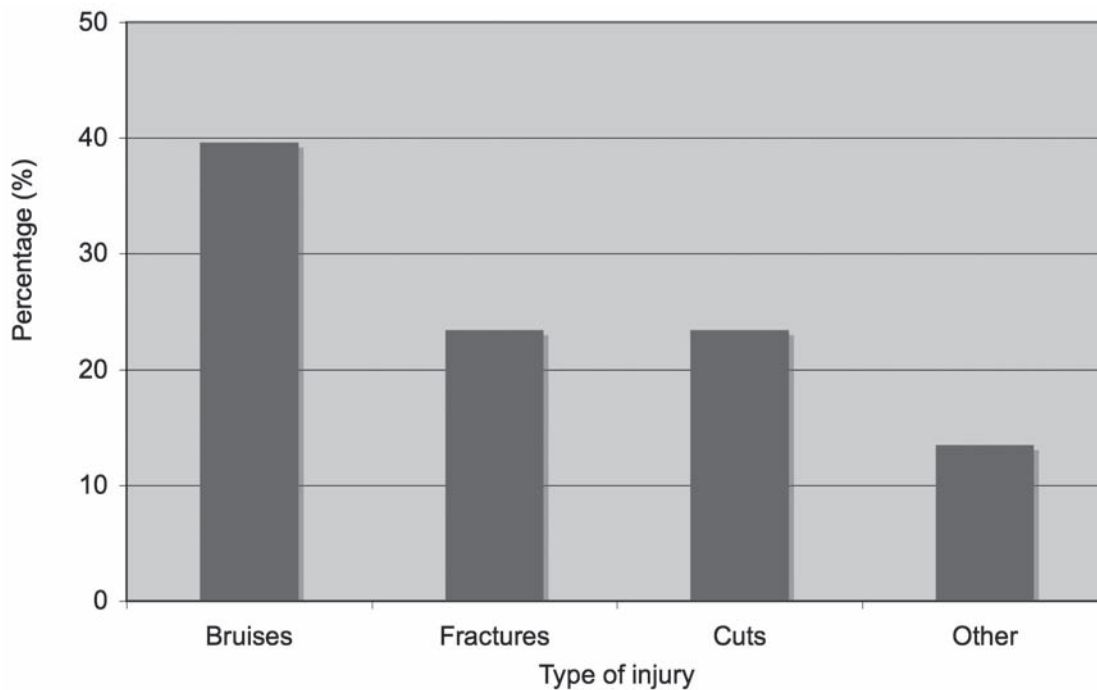


Fig. 3. Injuries sustained in domestic accidents.

the house (garden, orchard, external steps, garage, cellar, etc.), and 6 in other rooms (store-room, corridor, etc.).

With regard to the subject's activity at the moment of the accident, the item most frequently cited was "house-work" (41: 36.9%), followed by "rest" (16: 14.5%), "ablutions" (11: 10%), "gardening" (10: 9%), "leisure activity" (9: 8.1%), and "eating and drinking" (3: 2.7%); 21 subjects indicated other activities (Fig. 1).

With regard to how the accident happened, 55 subjects (49.5%) stated that they had tripped or slipped, 27 that they had fallen from a height, 9 that they had cut themselves, and 10 that they had bumped into objects; the other items in the questionnaire (crushing, stings, tripping over animals, poisoning, etc.) were negligible (Fig. 2).

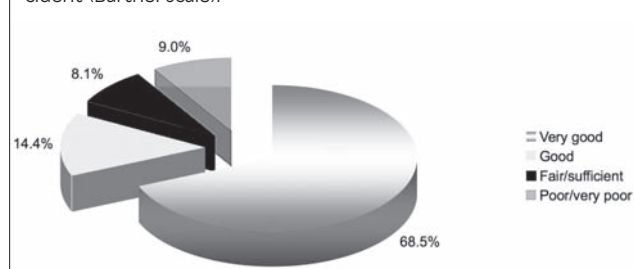
The most frequent injuries sustained were bruises (44: 39.6%), followed by fractures (26: 23.4%) and cuts (26: 23.4%); the frequency of other, some time more severe injuries (burns, poisoning, asphyxia, crush injuries, etc.) was, fortunately, very low (Fig. 3). The most common sites of injury were the limbs (arms 30 [27%], legs 24 [21.6%]), followed by the head (23: 20.7%) and the

chest/back (18: 16.2%); other sites (eye, nose, ear, teeth, etc.) were much less frequent.

The study also investigated any potentially risky behaviour on the part of the subject at the time of the accident. Few respondents reported that the accident had resulted from improper behaviour, though eight of the nine subjects who had suffered cuts admitted to having used sharp instruments improperly. Of the 55 subjects who had tripped or slipped, 5 reported that mats had been inappropriately positioned, 10 attributed their falls to inadequate lighting and 5 stated that they had left the floor wet after having a shower.

The functional capacity of the subjects at the time of the accident was assessed as being very good in 68.5% of cases (76), good in 14.4% (16), fair/sufficient in 8.1% (9) and poor in 9% (Fig. 4).

The fourth section of the questionnaire concerned the conditions of safety in the house, particularly with regard to identifying possible risks of falling. In 76.6% of the houses (85), the conditions were found to be good.

Fig. 4. Functional capacity of the subject at the time of the accident (Barthel scale).

Discussion and conclusions

In spite of the fact that accidents in the home have been steadily increasing for years, too little attention is paid to this issue in Italy. In contrast to the downward trends seen in accidents in the workplace and on the roads, the statistics reveal that accidents in the home are increasingly frequent and involve more than 3 million people per year [8].

The data collected during this investigation are in line with those yielded by national and international studies [4-7, 12].

It is well known that domestic accidents mostly involve people who spend a lot of time at home: women, children and the elderly. Elderly people in particular are highly vulnerable to accidents. Indeed, our study revealed that, even in the event of only slight injury, the management of elderly victims requires a strong organisational commitment on the part of relatives and considerable financial resources for healthcare services. These data are comparable with those of SINIACA surveillance.

We recorded a slightly higher number of injuries among women. This is probably due to the fact that they spend more time at home than men do, that they are more often engaged in housework, and that they are more frequently in contact with objects, tools and electrical appliances that may cause injury.

Falls were the most common type of accident, followed by cuts and knocks. In elderly subjects, falling is probably related to postural instability, functional status, impaired eyesight and pathological factors such as cardiovascular and neurological diseases and arthrosis. In any case, whatever the cause may be, falls can have serious physical and psychological consequences in the elderly and may accelerate the individual's physical and mental decline, leading to a precocious reduction in self-sufficiency. The collected data agree with those assessed by SINIACA surveillance.

With regard to the types of injury sustained, the most frequent were superficial injuries or bruises, particularly to the limbs. In most cases, the injury was slight and did not necessitate hospitalisation. Attendance at emergency facilities in cases in which treatment by the general practitioner would be sufficient raises healthcare costs and highlights the need to implement health education programmes to increase public awareness of the citizen's role in containing regional healthcare expenditure.

In order to assess the variables correlated with the risk of domestic accidents, we measured the functional capacity of our subjects and evaluated the potential risks present in their homes. In only 9% of cases did the functional capacity of the participants prove to be insuf-

ficient, and the safety profile of the houses examined was generally deemed to be good. These findings are confirmed by the fact that few respondents attributed their accidents to structural deficiencies of their homes or to health-related risky behaviour (e.g. falling out of bed following a sudden attack of illness).

Accidents in the home have a considerable impact both from the social and healthcare standpoint and in economic terms. Moreover, a large percentage of such accidents involve elderly persons. It is therefore very important to evaluate the economic impact of domestic accidents in the elderly. In Italy, the SINIACA study carried out a preliminary analysis of the costs linked to accidents in the home and found that the unit cost of hospitalisation increases with the age of the subject; indeed, the cost of hospitalising a patient aged between 70 and 74 years is 5 times higher than that of hospitalising a child under the age of 1 year. These higher costs are related to the different reaction of the organism to treatment. The most striking finding, however, is that patients over the age of 70 years account for 69% of total costs [12].

Clearly then, efforts to reduce the cost of accidents in the home should aim to implement preventive intervention among elderly people, since the elderly population is destined to grow as a result of increasing life expectancy. In particular, preventive action should focus on reducing the incidence of falls by eliminating risk-related structural features in domestic settings as far as possible and by raising public awareness of the problem through health education campaigns.

Inter- and intra-disciplinary programs and policies should be drawn up in order to identify risks and to seek to reduce them through safer housing design. In this regard, public health agencies have an important role to play, in that they should alert politicians, planners, specialists and the general population to the current risks. In order to achieve this objective, the results yielded by active epidemiological surveillance systems need to be made accessible and should be utilised to design prevention programmes and to work out an effective response to this problem.

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