

QUALITATIVE ANALYSIS OF EMERGENCY DEPARTMENT REPORTS APPLIED TO A PILOT PROJECT FOR THE PREVENTION OF PEDIATRIC BURNS

ANALYSE QUALITATIVE DES DOSSIERS DES SERVICES D'URGENCE DANS LE BUT DE DÉVELOPPER UN PROJET PILOTE DE PRÉVENTION DES BRÛLURES DE L'ENFANT

Longo E.,¹ Masellis M.,² Fondi G.,¹ Cedri C.,¹ Debbia C.,³ Pitidis A.¹

¹ Italian National Institute of Health, Department of Environment and Health, Rome, Italy

² Euro-Mediterranean Council for Burns and Fire Disasters, Palermo, Italy

³ G. Gaslini Children's Hospital, Genova, Italy

SUMMARY. Accidents and burns are a major problem in Italy and in industrialized countries, due to the consequences they have on health, especially in children aged 0-4 years. In Italy, about 400 people die each year from burns, with over 70% of these occurring in the home. In the European Union, burns are one of the top five causes of death from accidents, accounting for 3% of all deaths from accidents and violence in those age groups. One percent of all deaths in children are due to burns. In this paper, we illustrate the results of qualitative analysis, conducted according to the methodology of content analysis, on narratives included in the anamnesis of clinical papers at the ED in 738 cases of burns in children (0-14 years) observed in a sample of Emergency Departments in the years 2005-2009. The results of content analysis show that the most frequent mechanism that leads to burns is contact with hot liquids and heating surfaces. Much of preventive action should be directed at controlling the child. The accidental event descriptions for the younger age group (0-4 years) reveal an unequivocal responsibility of the parents. The qualitative analysis of narratives was carried out to produce scientific evidence to identify the more frequent and severe burn accidents for specific target/age groups and to establish specific preventive measures. The study of qualitative analysis of burns observed at the ED was introductory to the pilot project PRIUS (Preventing burns among school-aged children). The objective of PRIUS is to increase awareness of the risks of burns in children and adults through a learning path tailored towards their prevention, and the promotion of appropriate standards of personal safe behaviour and first aid actions.

Keywords: burns, accident prevention, qualitative analysis, child injury, vulnerable people

RÉSUMÉ. Les accidents et les brûlures représentent en Italie et dans les pays industrialisés, un problème majeur de santé publique, en particulier chez les enfants entre 0 et 4 ans. En Italie, environ 400 personnes meurent chaque année de brûlures, dont 70% sont survenues au domicile. Dans l'Union Européenne, les brûlures (3% des causes de mort violente ou accidentelle), entrent dans le groupe des cinq causes les plus fréquentes de décès dans cette tranche d'âge. Dans cet article, nous présentons les résultats de l'analyse qualitative, réalisée selon la méthodologie de l'analyse de contenu, des dossiers d'entrée aux urgences de 738 cas de brûlures chez les enfants (0-14 ans) survenues entre 2005 et 2009, dans un échantillon représentatif de la population italienne. L'analyse de contenu montre que les causes les plus fréquentes qui conduisent aux brûlures dans les groupes d'âge étudiés sont représentées par le contact avec des liquides chauds et les surfaces de chauffage. Donc, une grande partie des actions préventives doit être élaborée en direction de la surveillance de l'enfant. L'étude de l'événement accidentel, pour ce groupe d'âge (0-4 ans), révèle une responsabilité sans équivoque des parents. L'analyse qualitative des récits a aidé à produire les preuves scientifiques des circonstances de survenue des brûlures graves et étendues chez des enfants petits, afin préconiser des mesures spécifiques de prévention. Notre étude est une étude d'analyse qualitative réalisée avant de proposer le projet pilote Prius (Prévention des accidents et des brûlures chez les enfants d'âge scolaire). L'objectif de Prius est d'accroître la sensibilisation aux risques de brûlures chez les enfants et les adultes à travers un parcours d'apprentissage adapté à leur prévention et la promotion de protocoles appropriés de comportement et de premiers secours.

Mots-clés: brûlures, prévention des accidents, analyse qualitative, blessures des enfants, personnes vulnérables

^{Corresponding author:} Eloise Longo, Environment and Trauma Unit, Italian National Institute of Health, Viale Regina Elena, 299, 00161 Rome, Italy. Tel.: +39-06-49902181; fax: +39-06-49902383; email: eloise.longo@iss.it
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Introduction

Accidents in the home, especially those involving young people and children, constitute a public health problem. Burns are a type of injury that is particularly serious because they are a major cause of mortality and morbidity at home in the pediatric age (0-14 years), especially in younger children (0-4 years).^{1,2} The physical and psychological implications of burns are noteworthy, and involve both children and parents.

In Italy, the prevention of domestic accidents in childhood is still not fully developed. The development of effective ad hoc programs requires in-depth analysis and epidemiological surveillance.

In European countries, morbidity and mortality for childhood accidents in the home has decreased thanks to the development of targeted prevention interventions based on the analysis of the specific circumstances that led to the injury and aimed at reducing the consequences of the accident.³ There are many factors leading to childhood accidents, and they vary depending on the circumstances, place of occurrence and age. In the case of burns in children, one of the main factors is low perception of risk, especially by those who are entrusted with the care, custody and education of children: first the parents, but also other figures who in substitution of parents provide child care, caregivers included (grandparents, baby-sitters etc.).

As for the perception of risk in the social sciences, there is a prevailing psychological approach. A variety of psychological constructs and theories have been developed to explain how attitudes relate to an individual's decisions about health behaviours, and these are called social cognitive models. The main social cognitive models are: the theories of Planned Behavior;⁴ the Social Learning Theory describing how the individual takes his/her decisions in light of the social context in which it is inserted;⁵ the Health Belief model⁶ and finally the Protection Motivation theory of Maddux⁷ describing both the effect and operation of the messages highlighting the aspects of loss, cost or danger of unhealthy behaviours. None of these theories is fully explanatory. However, they point to a number of variables and processes that must be taken into account in order to predict specific behaviour, and choose the most appropriate preventive action.

The socio-anthropological literature, however, highlights the close interdependence between environment-individual-society. In the relationship between the individual and the home environment, in our case it becomes important to understand the meanings and functions of sense that the individual puts in place to cope with the dangers inherent in a space that is generally considered safe: the home. Parents very often acknowledge injury risks at home.⁸ However, they are unaware of the scope of the child injury problem⁹ and do not routinely think about in-

jury risk in the course of their day-to-day interactions with their child.⁸ Very often, an underestimation of the risk or a small distraction from adults can cause severe burns. There are many examples, and they differ according to the different rooms of the house: in the kitchen, pots on the stove, the oven or stove left turned on, switched on appliances, detergents placed under the sink; in the living room, the presence of stoves, fireplaces and a lit iron; in the bathroom, use of electrical appliances in wet conditions, medicines left unattended; hazards from toxic substances, alcohol, petrol, etc. Most of the accidents happen, therefore, due to superficiality, disregard of elementary rules of safety and lack of a culture of prevention. The correct perception of risk and consequent appropriate behaviour affects culture in a general sense as a set of knowledge, beliefs, habits, behaviours and socially-elaborated values, which are shared and transmitted by a given society.^{10,11,12} In this respect, it is important to note that perception is the meeting point of one's own cultural system of reference and expertise, direct or indirect, in the light of acquired knowledge. A very close link is established between perception and conception of reality, between what we "feel" and what we "know", and choices that we make are based on this relevant behavioural relationship. There is a diversity of protective behaviours based on different risk assessments for the home environment. The denial or minimization of these risks is counterproductive.

Among the methodologies that can be used for the analysis of the circumstantial risk of accident, there is one used in social research, both qualitative and quantitative, where "text" means any integrated set of signs related to one or more codes (protocols, open interviews, life stories, documents etc.) and any act of communication relevant to researchers according to the interests and objectives of the survey.¹³ Qualitative analysis can be used to produce scientific evidence and identify the mechanism of injury for specific target groups.

Materials and methods

In this study we have chosen to apply a particular type of qualitative analysis of the narratives that are in use at the Emergency Department (ED) for describing home accidents that caused burns: content analysis.¹⁴ In this research, the content is the information gained from the narratives (open text anamnesis), taken from the register of hospital surveillance of home accidents called SINIACA-IDB. These narratives can be classified into four main variables: mechanism of injury; place of occurrence; activity at the time of the accident and products involved. Furthermore, the data are broken down by gender and age group for a total sample of 738 cases of burns in children found in the Italian sample of the SINIACA-IDB surveillance for the years 2005-2010. The identified circumstan-

tial situations of burns which are more frequent and / or serious were subsequently used for the design and the implementation of teaching materials in the training pilot project PRIUS.

The cases of ED attendances observed in the SINIACA-IDB surveillance system (National Information System on Home Accidents-Injury DataBase) have been taken into account; an ED register held by the Italian National Institute of Health (ISS). The years taken into consideration are 2005-2009. During this period, more than 25 Italian hospital centres (wide sample of the Italian population) participated in the surveillance system. On the overall sample of 738 cases of burns in children, individual descriptions of the ED's clinical papers were analyzed. These pediatric patients are 26.3% of burn patients of all ages observed in the SINIACA-IDB sample for the aforesaid period. Burns represent 2.50% (CI 99%: 2.42-2.67) of the overall sample of home accidents observed at the ED (110,064 years 2005-2009) and pediatric burns are equal to 0.70% of the general sample (CI 99%: 0.61-0.73).

A detailed age/gender specific analysis was lead on the basis of these data. The cases seen in the ED were divided by gender (males or females) and age into four classes: 1) <1 yr; 2) 1-4 yrs; 3) 5-9 yrs; 4) 10-14 yrs. Since the accidents differ according to age and gender, place of occurrence and thermal agent, these factors were first considered relevant to content analysis methodology in order to identify the main information contained in the narratives. This methodology uses the breakdown of texts to encode them in a data array to be subsequently analyzed.¹⁵ Qualitative content analysis is one of the several qualitative methods currently available for analyzing data and interpreting its meaning.¹⁶ As a research method, it represents a systematic and objective means of describing and quantifying phenomena.^{17,16} A prerequisite for a successful content analysis is that data can be reduced to concepts that describe the research phenomenon^{18,19,20} by creating categories, concepts, a model, conceptual system, or conceptual map.¹⁹ The contents of the narratives were completely analyzed using an ad hoc analysis consisting of a series of ordered items divided into thematic areas, each intended to detect a particular narrative feature we examined.²¹ The summary form has been designed respecting the criteria of: univocality of the classification, exhaustiveness of the collection of categories and mutual exclusiveness of the same type of cases.²² Each form, separated by sex and age class, was divided into five areas: the mechanism of the accident, the environment where the accident happened, the affected body part, the product involved, the situations which characterize the type of accident. Four places were considered: kitchen, bathroom, living room and outdoor spaces. The body parts affected by burns were: face, trunk, upper limbs and lower limbs. Burns were also divided according to the products that caused

them. The products included: thermal surfaces, hot liquids, hot solid foods, caustic substances, flames and electricity. On the other hand, as regards situation-type for each age class and gender, descriptions of the most significant events have been reported depending on the thematic areas identified above.

Results

The results are summarized below for the four pediatric age groups. Regarding the narratives, please refer to *Table 1* summarizing the most emblematic ones.

In children of the age group < 1 year, burns were caused in most cases by accidental contact with hot drinks and hot substances, liquids and semi-solid (in absolute values 35 cases out of 86, equal to 41%) or with heating surfaces (in absolute 21 cases out of a total of 86 or 24%). In 21% of the cases, burns were caused by other agents (e.g. bleach, liquid or solid, caustic soda, alcohol, perfume, etc.) (*Fig. 1*). There were no significant differences between males and females as regards the mechanism of injury or the product involved. As for the liquid products involved, these were hot drinks (water, tea, chamomile tea, milk, coffee, etc.) and the semi-solids were hot foods such as soup, sauce, baby food, etc. These products and the description of the mechanism of injury were related to the activity of domestic food preparation. It is, in fact, the mother and / or father who prepares the meal for the children, and the burn occurs due to lack of vigilance and / or distraction of the parent, or a careless gesture by the child. Regarding hot surfaces, the most commonly used in the domestic environment were e.g. iron, coffee machine, glass of the stove and / or door of the fireplace, oven, pot cover, pot, cup, etc. Hot surfaces must be kept away from

Table I - Narratives

<i>0-14 years - Examples of narratives of burns cases from the Emergency Department - SINIACA-IDB (2005-2009)</i>	
Male < 1 year:	at 18.45 today he placed both hands on a hot stove
Male < 1 year:	the child accidentally burned himself with hot tea
Female < 1 year:	this evening, at home, she burned herself with coffee
Female 1-4 years:	she burned her right arm with soup
Male 1-4 years:	today he reported burns to the thorax with a cup of coffee
Male 1-4 years:	burn to the body with a hot plate
Female 5-9 years:	she accidentally got lime paint in her left eye
Female 5-9 years:	reported accidental contact with an iron on the abdomen
Male 5-9 years:	he was burned by placing his hand on the oven
Male 10-14 years:	contact of carnival foam in the left eye
Female 10-14 years:	she accidentally burned herself with tea

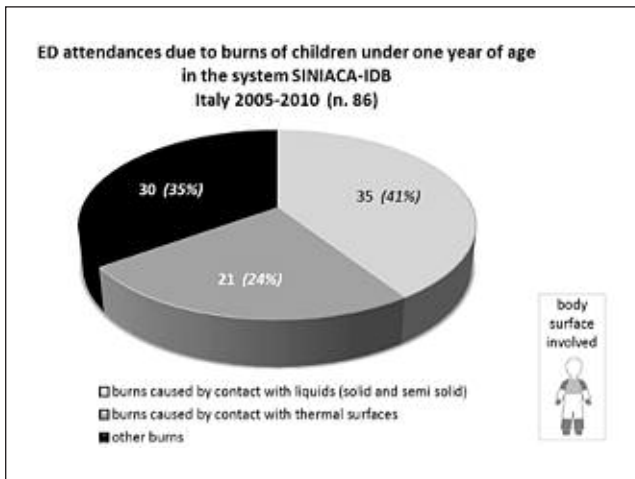


Fig. 1

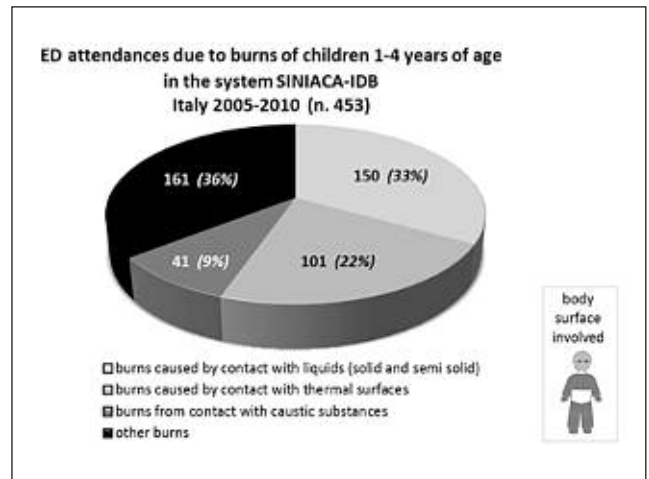


Fig. 2

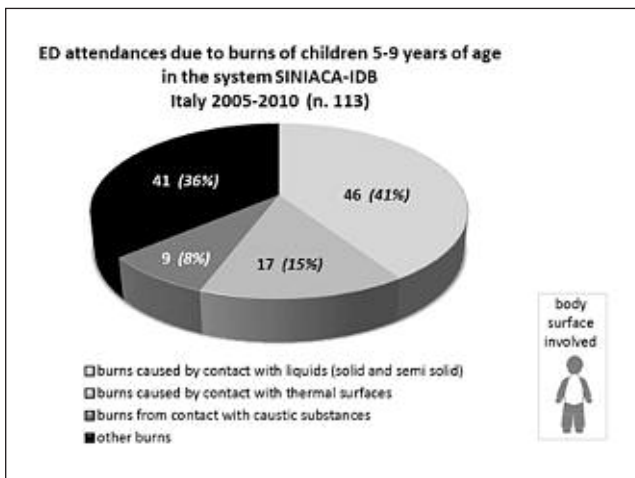


Fig. 3

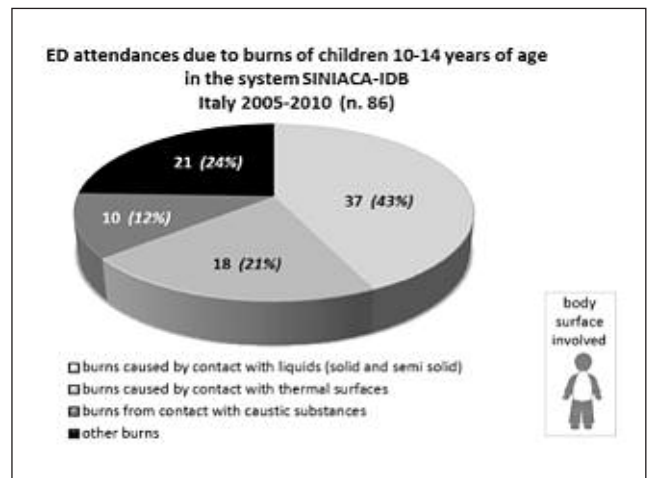


Fig. 4

children. These children have not yet reached one year of age and their mobility is fairly static: from the description, it is clear that the parents and / or an unexpected attitude of the child is at fault. The body surfaces affected were generally the upper limbs (hand, arm) and lower ones (leg, foot) and, rarely, the chest.

The sample for the age group 1-4 years, however, is much wider than the other age groups and comprises the majority of cases, in absolute values 453 out of the total sample of 738 burned children: 61.4% of the cases (IC 99%: 56.8-66.0). In this age group burns were mostly caused by liquid substances (solid, semi-solid) in 33% of cases, followed by contact with heating surfaces (22%). With regard to surfaces, the products mostly involved in absolute values were the iron (28 cases), the heater (20 cases) and oven / stove (13 cases). The other 40 cases involved contact with plates, grill, pots and pans, glass (of

the oven, fireplace, stove) and hot tools for the kitchen or barbecue such as blades or pliers. Compared to the previous age group, there was an increase for caustic products, which alone recorded 41 cases, 9%. The caustic products involved were: potassium permanganate, nail polish, detergents used for cleaning the oven and glass, generic degreasers, lemongrass and gasoline (Fig. 2). For the liquid substances, the cases concern once again burns caused by boiling water, either by direct or indirect contact, in the classic example where the mother drains the pasta and boiling water spills on the child. Many cases in this area involved burns caused by coffee. For the semi-solid liquids, burns were usually caused by food (sauce, soup, broth, rice, etc.). The body surfaces concerned were the lower and upper limbs and in some cases also the chest. Severe cases (two in all) concerned the ingestion of hot milk or oil spilling on the face. In these cases, the body surfaces

involved were the face and the organs of the digestive system.

For the age group 5-9 years, the sample is lower: 113 cases in all. Looking at the prevalence of products, more cases involved liquid and semi-solid substances (46 cases, 70%), with a prevalence for liquid beverages (29 cases) over semi-solid liquids (17 cases). Hot surfaces were involved in a total of only 17 cases, accounting for 15%. As for the caustic substances, there were only 9 cases, 8% of the total. There were also new products: firecrackers (*Fig. 3*). The body surfaces mainly affected, like the other age groups, were the upper and lower limbs. It is worth reporting two emblematic cases from the ED reports: "This evening, at home, she accidentally leaned her lips on an oven" (female); "Burns from exposure to the sun" (female).

The sample includes 86 subjects in the age group 10-14 years. Even here, most cases involved liquid and semi-solid substances (37 cases, 43%). For thermal surfaces, there were total of 18 cases (21%). Finally there were 10 cases (12%) of burns caused by caustic substances (*Fig. 4*).

Discussion and conclusions

The analysis of narratives made it possible to identify the mechanism of the accidental event and to distinguish the products involved. The age group mostly affected is undoubtedly the 1-4 years group, to which the majority of burns in the observed sample of pediatric burns (61%) belonged, and also the more serious ones. Body surfaces mainly affected are the upper (hand, arm) and lower limbs (leg, foot). The products involved are both hot liquids (water, tea, coffee, etc.) and semi-solids including hot food (soup, etc.). Among the thermal surfaces are: oven, cooker, iron, plate, covered saucepan etc. Since these are very young children whose correct perception of risks is reduced, from the description of the mechanism of injury it emerges that underestimation of risk and lack of child surveillance by the parent or the care-giver is often the cause of the accidental event. This means that it is essential to invest in education and prevention campaigns to prevent the incident from happening, by informing parents and care-givers and making them aware of the real risks in the home environment in day-to-day behavior. More in general, greater awareness and dissemination of the culture of safety is desirable to make all health personnel, parents and caregivers aware of both risks in the home environment and those tied to specific behaviors (e.g. food preparation).

Furthermore, factual knowledge in the ED reports regarding the circumstances of the accidents allows us to explore how to educate and build up in small children a correct perception of the risk of accidents in the home environment through communication means appropriate for their stage of mental and physical development.

The study on the narratives (open text anamnesis) of the ED reports highlights how the risk perception of adults involves both cognitive and socio-behavioural aspects. The process of building a correct perception and risk assessment becomes a priority commitment. This task requires awareness of the more frequent type of "accidents", the analysis of responsibilities and the identification of specific training and preventive interventions.

It is important to keep in mind that children are by their very nature more likely to find themselves in dangerous situations, due to their personality traits (impulsiveness, a need to move and explore, lack of experience and knowledge of risks and dangers) and their developmental process, sensory-neural maturation included (limited field of vision, difficulty of lateralization in sound perception, inability to comprehend symbols and abstract concepts).

It is therefore important that the adult has awareness of and is informed about risky situations in the domestic environment in order to be able to predict and prevent them. It is also important that the concepts regarding risk of accidents are transmitted to even small children, with practical examples and visual communication means which are more appropriate and specifically targeted to their developmental stage. We also have to remember that every age has its specific hazards. The issue of risk management regards a sensibility to risk that intersects both the objective and the subjective dimension.

The objective dimension concerns the observational likelihood of injury related to models of behaviour that can lead to the accidental event. The subjective one, on the other hand, refers to the degree of risk perception by the subject. Depending on the type of perception, the subject processes behaviours ranging from the highest degree of prudence to unconsciousness, giving this term a cultural orientation to systematically underestimate the possible dangers.

In this regard, the example of a young child who was burned by irons while learning to walk is emblematic.

The analysis of open descriptions of anamnesis reported at the ED provided useful information to orient the actions of prevention according to the description of the main risks of burns for children in the home environment differentiated by gender/age, highest risk places of occurrence (kitchen, bathroom, living room, appliances outside the home), activities and products.

The aim is to build a prevention model centred on building parents' or caregivers' awareness of the observed risks, develop appropriate behaviours and orient them towards a safety culture. And to do so together with their children, whose awareness of risks and safety culture could be built up through educational and communication means that are most appropriate for their stage of cognitive and physical development.

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- Alessandro Masellis. Euro-Mediterranean Council for Burns and Fire Disasters, Palermo.
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- Roberto D'Alessio. Dario d'Angelo, Burns Center – General Hospital of Naples "A. Cardarelli"
- Maurizio Governa. Burns Center – General Hospital of Verona, "Borgo Trento"
- Luigi Marasco. Burns Center – General Hospital of Brindisi, "Di Summa Perrino"
- Riccardo Pietrantoni, Paolo Palombo. Burns Center – General Hospital of Rome, "S. Eugenio"
- Vincenzo Rapisarda, Antonella Citterio. Burns Center – General Hospital of Milan, "Niguarda Ca' Granda"
- Maurizio Stella. Burns Center – Trauma Center of Torino "Maria Adelaide"