



Head injuries in children by accidents in domestic environments caused by certain products

- Abstract-

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Abstract

This **retrospective study** empirically investigated cases of head injuries in children up to the age of 14 years in **Germany and Austria**. The focus here lay on head injuries that were caused by accidents in a domestic environment and that had been treated in hospital. The aim was to **identify those products that caused the accidents** and to reveal the dangers of their presence in a household with children. In addition to that, suggestions are made to avoid these dangers.

The data being used originate from the **European Injury Data Base (IDB)** where cases of injuries from Germany and Austria were documented between 2006 and 2015. With the help of the features stored in the IDB the sample could be reduced down to the **study population: children up to the age of 14 years with head injuries** as a result of an accident that **occurred in the home environment** and that was **caused by certain products**. The relevant sample comprises **about 4,000 cases** with a record of the **circumstances of the accident (narrative)**.

By analysing these narratives, which were recorded as free text, **20 product groups** could be identified that were more frequently involved in accidents with head injuries.

Unless already coded, different kinds of injuries were given **ICD-10 codes**, which by the aid of medical professionals were assigned to **degrees of severity**. In this way, the injuries could be related to the degree of severity, the age of the child and the products associated with the accident.

For 9 conspicuous product groups suggestions are made to amend the DIN standards: for baby's changing units, loft and bunk beds, children's high chairs, children's cots, prams, carrycots, infant carriers, trampolines and staircase safety gates.

The results of the study support the long-standing appeal of paediatricians and child protection organisations for **taking baby walkers off the market entirely in the European Union**.

For another **10 product groups**, typical scenarios of injury are exemplarily depicted. Amendments of the DIN standards are not required here.

The study is also addressed to **associations, authorities and manufacturers**, who strive for more safety for children in the home. **Suggestions** are made **for campaigns** to raise awareness and to inform caregivers of potentially dangerous products. Also, in order to **achieve a change in the way of using a product**, the instructions of use should contain a corresponding note.

This applies to the following **10 product groups: parent's beds and sofas, staircases, wardrobes and dressers, hard edges of the bed, swings, bathtubs and showers, Bobby-Cars, swivel chairs, baby rockers and walking bikes.**

In addition to the verbal report, a **comprehensive volume of Excel-tables** was produced which upon request can be made available to interested readers.

The recommendations on **extending or changing of existing DIN standards** cover:

Baby's changing units (DIN EN 12221 „Changing units for domestic use“)

- Mandatory permanent affixing of a standardised **graphical symbol** „Never leave your child unattended“,
- Installing an **additional barrier** against falling located at that side of the unit, from which the nappies are changed,
- Recommendation for the instructions of use: Cover the floor below the changing unit additionally with a **soft rug or carpet**.

Loft and bunk beds (DIN EN 747 „Furniture - Bunk beds and high beds“)

- **Magnifying of the standardised graphical symbol** „For children of 6 years and above“ from now 15 x 15 mm to the size of 25 x 25 mm,
- **Access** through the opening in the fall protection to the upper or high bed **from the foot end** (recommendation for the instruction of use),
- **Elevation of the safety barrier** in the top bed (currently 160 mm only),
- Use of **non-slip surfaces** for ladder rungs or stairs.

Children's cots (DIN EN 716 " Children's cots and folding cots for domestic use")

- Renewed **technical verification** whether the **required minimum distance of 500 mm** between the upper side of the mattress base and the upper edge of the cot side is really sufficient to prevent falls,
- The instruction of use should **mandatorily** contain this note: Do not put **large objects** into the baby cot (e.g. large cuddly toys) which could serve **as a climbing aid**,
- An easy way to **remove some bars** for safe climbing in and out the bed for children aged 24 months and over,
- Recommendation of a **soft bedside rug** for additional safeguarding of children.

Children's high chairs (DIN EN 14988 "Children's high chairs - Safety requirements and Test methods")

- Equipment of the **rear chair legs with rollers** to prevent dangerous wobbling and tilting,
- Highchairs should be constructed so that autonomous climbing is made impossible for children up to 18 months.

Prams (DIN EN 1888:2012: „Wheeled child conveyances - Safety requirements and test methods“)

- Recommendation for the instruction of use: Do not use **prams in the home as a depository of the baby over prolonged periods**,
- All prams should be equipped with a child restraint system,
- Novel **proposal for examining the lateral stability**: Define a maximum allowable ratio between the height of the centre of gravity and track width of the pram,

- Proposal for a new locking mechanism, which brakes automatically if the childcare person releases the handle.

Carrycots (DIN EN 1466 "Carry cots and stands ")

- Flexible handles of a carrycot should be additionally held together by means of a **Velcro strap**,
- **All carrycots** should be equipped with a **child restraint system**,
- Permanent and clearly visible **affixing of standardised graphical symbols** „Always use the restraint system“, „Up to 4 month of age and maximum weight up to 9 kg“.

Infant carriers (ECE-R 44 and ECE-R 129 „Uniform provisions concerning the approval of enhanced Child Restraint Systems used on board of motor vehicles (ECRS)“)

- Children in infant carriers used **outside vehicles should be restrained anyway** (additional pictogram).
- Additional **warnings for the instruction of use**: It is dangerous to use the infant carrier on an elevated surface, e.g. a table. Always use the restraint system, also outside vehicles.

Trampolines (DIN EN 71-14:2015-03: „Safety of toys - Part 14: Trampolines for domestic use“)

- Trampolines (also mini-trampolines with a diameter under 1500 mm) should **not be used at all by children under 36 months** of age (permanent affixing of a corresponding pictogram),
- Mini-trampolines (without enclosures) should be validated, whether the frame and the suspension system are padded sufficiently, as required by the DIN standard,
- Recommendation: For smaller indoor-trampolines without enclosure a **padded robust floor mat around the trampoline** should be offered **optionally**.

Staircase safety gates (DIN EN 1930:2012 „Safety barriers- Safety requirements and test methods“)

- Staircase safety gates should **always** have an integrated **self-closing and self-locking** feature,
- It has to be made impossible for children **up to 36 months** of age to open the interlock,
- **Staircase safety gates** should be designed and constructed so that a safe use for children **up to 36 months** is possible and should be recommended in the standard (instead of the current 24 months),
- Should always open in the **opposite direction of the stairs** only.