



Accidents in the context of study among university students—A multicentre cross-sectional study in North Rhine-Westphalia, Germany

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ABSTRACT

Knowledge about prevalence and patterns of accidents among university students is scarce. The aims of the present health survey were to assess the general prevalence of accidents among university students, to describe the specific kinds of accidents, and to analyse associated factors. A multicentre cross-sectional health survey was conducted at 12 universities and 4 universities of applied sciences in North Rhine-Westphalia (NRW), Germany. The response rate was 88%. The self-administered questionnaire covered multiple areas of health, behaviours and a specific module for accidents. In total, 252 (8.8%) out of 2855 students (aged 17–26 years) had experienced an accident in the context of their studies. Contusions, compressions and strains constituted more than 50% of all kinds of injuries, while fractures, irritations, burns or acid burns were reported less frequently. The cumulative risk of experiencing an accident was increasing linearly with the study duration, indicating an absence of a specific vulnerable period. Nearly 60% of all accidents took place during study-related sports activities, and about a quarter of all accidents occurred on the way to or from university. Only few accidents occurred on university floors, in lecture rooms or on stairways. Further studies are needed to assess more in depth the causes of accidents and the situation immediately preceding the event before making specific recommendations for prevention.

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1. Introduction

There is a growing number of analyses regarding children health and safety in Germany (Kahl et al., 2007; Kelm et al., 2004, 2001; Schneiders et al., 2005), but the knowledge about accidents among students in the context of their studies is still limited. Accidents experienced by university students in Germany are classified as occupational, if they happen in the context of their studies—including accidents on the way to and from university. The German Social Accident Insurance (DGUV) is collecting information about these occupational student accidents. According to official data, 0.64% of university students in Germany have experienced occupational accidents in 2005 (calculated on the basis of the German Social Accident Insurance (DGUV), 2008;

Federal Statistical Office, 2008). However, the data is incomplete because of several problems. First, not all accidents are reported by students, because many do not know that these accidents are classified as occupational. Especially accidents occurring on the way to university or from university back home are likely not to be considered occupational. Second, only accidents are recorded, which are subject to registration. Therefore, bagatelle injuries are excluded from registration, although they can indicate serious dangers, which under less lucky circumstances could have led to severe injuries. Third, additional information like socio-demographic variables is not collected in the official registration. In Germany, previous analyses related to accidents among students have been performed by single insurance companies and are limited to descriptive purposes or they just focus on selected types of accidents (Social Accident Insurance Berlin, n.d.). Other published inquiries about student accidents either come from Anglo-American (Callan et al., 2006; Sumilo and Stewart-Brown, 2006) or Scandinavian countries (Sane et al., 1997), and their results might not apply to Germany. Furthermore, the studies display a substantial variation in reported accidents rates. In the UK, a postal questionnaire survey of 1208 students at three institutions showed an overall annual incidence of accidents among students of 8%, while 4% of the students reported an injury in the last year, which was related to their studies (Sumilo and Stewart-Brown, 2006). Sane et al. (1997) report a 3-year incidence of 28.7% for a

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Finnish student population. However, only 0.5% reported accidents on the campus or in the context of their studies. At the same time, current knowledge about stress factors and accident promoting causes in the working world are not easily transferable to student populations because of the different structure of risks (BIBB/BAuA, 2007; Federal Institute for Occupational Safety and Health, 2007).

The aims of the current study are to provide an estimate of yearly incidence of accidents among university student in Germany using self-reported data, and assess the effects of study year, gender, university type and subject of study on the risk of accident. Furthermore, we aimed at obtaining additional information about circumstances of the accidents in order to identify specific risk situations.

2. Materials and methods

2.1. Sample

A multicentre cross-sectional study was conducted in 12 universities and 4 universities of applied sciences in North Rhine-Westphalia (NRW), Germany in 2006 and 2007. From 14 universities in NRW, one is based on distant learning only and one linked to a specific insurance company, the remaining 12 took part in the study. There are 25 universities of applied science in NRW and four of them were selected randomly. The 12 to 4 ratio was chosen to reflect the proportion of 3:1 among all students from public universities in NRW. In total, 466,302 students were registered in winter semester 2004/2005 in NRW, 73.4% of them studied in public universities and 23.4% in public universities of applied sciences. Only a small fraction of students (3.2%) studied in private universities. The sample was planned to include at least 200 students at each participating site, two different groups of approximately 50 students from the first 2 years and the same number of more advanced students, in total 3200. Because variation in the size of the surveyed courses was expected, the study was planned to include between 200 and 400 students in each site, resulting in a total up to 5000 respondents. In each case, one group should be recruited from students of natural sciences and the other from social sciences. Due to organizational difficulties and variation in response rates (which ranged from 69% to 100% in different universities and was on average 88%) the samples provided by different universities displayed more variation than originally planned. The institutions which participated in the study were RWTH Aachen University, Bielefeld University of Applied Sciences, University of Bielefeld, Bochum University of Applied Sciences, Ruhr University of Bochum, University of Bonn, University of Dortmund, University of Duisburg-Essen, University of Düsseldorf, German Sport University Cologne, Cologne University of Applied Sciences, Muenster University of Applied Sciences, University of Muenster, University of Paderborn, University of Siegen, and University of Wuppertal. In further description we use randomly applied letters to maintain the anonymity of the named institutions. The final sample included 3306 respondents. Self-administered questionnaires were distributed to the students in lectures and seminars. Permission to conduct the study was obtained from the participating institutions. Participation was voluntary and anonymous. Students were informed that by filling out the questionnaire they simultaneously provided their informed consent for the participation in the study.

2.2. Questionnaire

The questionnaire used in this study was a general health survey, similar to the questionnaire used in the Cross-National Student Health Survey (CNSHS), conducted since 1994 by the University of Bielefeld, Germany (El Ansari et al., 2007). The questionnaire cov-

ers multiple areas of health and behaviour among students; for the purpose of this study a specific module related to accidents was included. The module was derived from the questionnaire used by insurance companies for the reporting of study-related accidents. Questions about accidents were: *Did you have an accident in the context of your study (including accidents between university and home)? And: In which context did the accident happen?* Further questions aimed at the description of the accident and circumstances were also asked (for instance: at which day of the week, at what time of the day or at which location at the university the accident happened).

2.3. Statistical analysis

Since the cumulative risk of having experienced a study-related accident increases with the number of years at university, Cox-proportional hazard regression was applied for the analysis. We restricted our sample to students enrolling to the university at the age between 17 and 26 years. We also selected only students who completed at most 10 semesters at the universities or eight at universities of applied science, since these are the regular times of studies. The first restriction was made to avoid the effects of a few large outliers; the second because only a small fraction of students at universities of applied sciences continue their studies for more than 8 semesters and for universities the regular study time is 10 semesters. This resulted in a total sample size of 2929 students. Kaplan–Meier life table analysis was applied to estimate the cumulative risk of an accident stratified by gender, faculty and university versus applied university. To estimate the hazard ratio the Cox-proportional hazard model was used. The cumulative hazard for 1 year of studying in different strata was used to calculate the total number of accidents occurring in the studied federal state North Rhine-Westphalia per year. The analysis was conducted by SPSS® 13.

3. Results

3.1. Characteristics of the sample

Fifty-six percent of the sample were female students, the mean age of the students was 23 years (SD=2.2) and 12.3% of the students were foreign born. There were substantial differences in the samples from different universities in terms of the proportion of female students, first year students, and foreign born students, students with private health insurance and students of parents with a university degree (Table 1). In the samples from applied universities the proportion of foreign born students was higher and the proportion of students with private health insurance and parents with university degree was lower.

3.2. Description of accidents

In total, 252 out of 2855 students stated, that they experienced an accident in the context of their studies. The distribution of the accidents was similar across the weekdays, most frequently accidents occurred on Thursdays (22.3%) followed by Tuesdays (19.5%) and Wednesdays (19.2%). Twenty-four percent of accidents happened between 8 and 11 am, 22.5% between 5 and 8 pm, 22.1% between 2 and 5 pm and less in the other times.

Most of the accidents involved contusions, compressions and strains (52.6%). Other types of injuries were reported less frequently, for example fractures (7.6%), irritations and acid burns (7.3%), burns and scalds (7.0%) and infections (in most cases following a local trauma) (4.3%) (multiple responses were possible). A small proportion of students reported concussions (2.0%). With regard to the injured parts of the body, arms and hands were most

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