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Prospective cohort study into post-disaster benzodiazepine use demonstrated only short-term increase

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Abstract

Objectives: Benzodiazepines are typically prescribed for anxiety and insomnia, two complaints often reported after disasters. Benzodiazepines can cause mental or physical dependence, especially when taken for a long time. This study aims at evaluating benzodiazepine use in a disaster-stricken community with the help of computer-based records.

Study Design and Setting: This prospective cohort study covers a period of 4 years. For every patient, predisaster baseline data are available. Multilevel regression is applied to study differences in benzodiazepine use in 496 patients whose children were involved in the Volendam café fire on January 1, 2001 compared with 1,709 community controls, and 4,530 patients from an unaffected cohort.

Results: In community controls and patients from the unaffected cohort, benzodiazepine use remained stable in the course of the years. In the first year postfire, parents of disaster victims were more likely to use benzodiazepines than community controls (OR 1.58; 95% confidence interval 1.13–2.23). With regard to long-term use, differences between community controls and parents were statistically nonsignificant.

Conclusions: In the studied community, benzodiazepines were predominantly prescribed as a short-term intervention. Clinical guidelines that advocate a conservative prescription policy were well adhered to.

Keywords: Benzodiazepines; Stress; Psychological; Life change events; Cohort studies; Disasters; Family; Medical records systems; Computerized

1. Background

The data in computer-based patient records are increasingly used to evaluate the provision of care [1,2]. In pharmacoepidemiological research, the source of data, whether it be pharmacy, physician, or billing records, will affect the quality and content of data [3]. Although pharmacy records provide detailed and well-structured information on the drugs themselves, data on the consumers often are very limited. The latter is not the case when patients purchase prescription drugs at only one designated pharmacy, as is the case in the Netherlands [4]. In addition, at times, the pharmacies are electronically linked to the registration systems of general practitioners—a favorable situation in drug research [5].

The current study provides an example of how longitudinal data captured in computerized registries can be used to evaluate the provision of care. It aims at quantifying benzodiazepine use in a disaster-stricken community and is centered around the question whether clinical guidelines for benzodiazepines prescribing have been adhered to.

Benzodiazepines are effective antianxiety and sleep-inducing medications [6]. Because anxiety and insomnia are problems which are often presented to health care practitioners after disasters [7–10], it is possible that in times of crisis a proportion of the patients is exposed to benzodiazepines for the first time [11]. Although benzodiazepines have several favorable aspects, they are also known to cause physical and psychological dependence when taken for longer periods of time [12,13]. Clinical guidelines, therefore, recommend benzodiazepines only for short-time relief [14,15].

The disaster described here is considered to be one of the worst mass burn incidents that has happened in the Netherlands in recent years [16–18]. The fire broke out in an overcrowded café where about 350 adolescents were celebrating New Year's Eve. Fourteen adolescents lost their lives and a large number suffered burn injuries. The youngest victim was 13 years old, with the others all aged under 25.

Our study concentrates on the parents of these victims. The parents of fire victims were exposed to high levels of postdisaster stress [19–22]. Previous research has

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demonstrated that these parents were more at risk for developing hypertension after the fire than controls from the same community whose children had not been directly affected [23]. Moreover, the parents of the affected children contacted their general practitioners more often for mental health issues when compared to community controls [24].

It is therefore hypothesized that the parents of fire victims are more likely to receive prescriptions for benzodiazepines. We also investigate whether those who lost a child and those whose children suffered burns are more likely to use benzodiazepines than parents of children who have survived the fire without suffering burns [25,26]. Finally, we expect affected mothers to use benzodiazepines more often than affected fathers [27–29].

2. Method

2.1. Setting

The Dutch health care system is organized on an insurance basis. When the study was carried out, two types of health insurance existed, public and private insurance. Patients with an annual income below a specific level were insured through public insurance; above this level, patients were privately insured. Insurance type can thus be used as an indicator for the socioeconomic status of the patient. In the Netherlands, general practitioners (GPs) act as gatekeepers to specialist services. Dutch GPs have fixed patient lists and patients are enrolled with one GP only, which is ideal for population-based research. Usually, complete families are registered with the same practice [30]. Volendam, a former fishing town located 20 miles north of Amsterdam with about 20,000 inhabitants, is served by four general practices. In Volendam, the GP registrations can be linked to the registrations of the local pharmacies due to shared patient identification numbers. These pharmacy records contain virtually complete information on all drugs dispensed to outpatients (either prescribed by the GPs or, on an extramural basis, by specialists). If a prescribed drug is not picked up by a patient (less than 1% of all prescriptions), the prescription is removed from the record. It is thus assumed that the number of prescribed drugs very closely approximates the number of dispensed drugs. The terms ‘‘prescribed’’ and ‘‘dispensed’’ are therefore used interchangeably in this article.

2.2. Data collection

Three population-based cohorts were tracked throughout 1 year before and 3 years after the fire: (1) parents of the fire victims, (2) community controls, and (3) patients from 14 unaffected Dutch communities. The last sample consisted of a cohort of patients who are monitored within the Netherlands Information Network of General Practice (LINH), a representative network of computerized general practitioners [31]. For this cohort, only GP-based registrations of benzodiazepine prescriptions were available. These registrations are less comprehensive than pharmacy registrations for three reasons. First, they do not contain prescriptions issued by specialists (as it is the case in pharmacy records). Second, repeat prescriptions are not fully captured in these records. Third, because they are not used for billing (as pharmacy records), they are generally more prone to underregistration. As a consequence, estimates based on GP records are generally lower than estimates based on pharmacy records [32]. Nevertheless, the LINH data were used here because they were available at the patient level and therefore allow for in-depth statistical comparisons of patients who belong to the Volendam community (parents of fire victims and community controls) with patients who do not belong to this community (LINH). Although the LINH data provide an underestimation of true rates, there is no reason to assume that these data were systematically distorted by other factors. On the one hand, the LINH data allow for an assessment of time trends in benzodiazepine use in a population outside Volendam. On the other hand, they are not suitable for the assessment of absolute differences between groups. To compensate for this, we also report estimates of the percentage of benzodiazepine users in the same age group on the national level. These figures were provided by the Dutch Foundation for Pharmaceutical Statistics (Stichting Farmaceutische Kerngetallen, SFK). Because these data were not available at the patient level, the number of patients with more than 90 daily-defined doses (DDDs) per year or 3 year or more months of use cannot be provided in this case. Nevertheless, the figures give a general idea of the level of benzodiazepine use in Volendam in relation to the national level (Table 2).

2.3. Sampling of cohorts

2.3.1. Parents of fire victims and community controls

As a first step, it was necessary to identify the fire victims. According to official estimates, about 300–350 people were in the building at the time of the fire. The four GP practices were able to identify a total of 335 in their registrations (14 deceased adolescents and 321 survivors, with and without physical injuries). Thirty-five of the surviving victims were excluded from the study because they belonged to a practice that was not yet fully computerized. None of the deceased adolescents belonged to this practice. The characteristics of victims enrolled in the nonparticipating practice ($n = 35$) were compared with those of victims enrolled with the participating practices ($n = 286$). Victims included in the final study sample did not significantly differ from nonparticipants with respect to burn size, number of days in hospital, gender, age, or insurance status. Victims with burn injuries had a mean total burned surface area of 14.9% (SD = 17.1) and spent, on average, 34.2 days in hospital during the first 12 months after the disaster (SD = 59.3). As a second step, we identified all parents of deceased and/or surviving victims with the help of the