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ORIGINAL RESEARCH


# Pain, Dental Fear, and Oral Health-related Quality of Life—Patients Seeking Care in an Emergency Dental Service in Germany

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## ABSTRACT

**Aim:** The aim of this study was to identify the influence of dental fear, pain, and impaired oral health-related quality of life (OHRQoL) on patients seeking care in a German emergency dental service.

**Materials and methods:** Patients attending the emergency dental service at the University of Leipzig (Germany) were consecutively recruited and completed three questionnaires, including a visual analog scale for pain, the dental fear survey (DFS), and the oral health impact profile (OHIP–49).

**Results:** A total of 307 patients attended the emergency dental service and 286 agreed to take part in the study. The mean age was 41.7 years (50.4% males). The pain was reported by 87.2 % of the subjects, and their main reason for seeking care was a toothache (52.6 %). Regarding psychosocial characteristics, the mean OHIP and DFS scores were 40.0 and 47.6, respectively. For dentally fearful patients, a significantly higher impairment of OHRQoL was identified than for subjects with less or no fear. 33.2% of the participants irregularly consulted a dentist, and 58.4% of these patients were categorized as dentally fearful.

**Conclusion:** The current investigation identified a high pain intensity as well as a high prevalence of dental fear, and a high impairment of OHRQoL in patients seeking care in an emergency dental service.

**Clinical significance:** The results of the current study might help to develop specific services for patients with dental fear, which can successively reduce the number of emergency dental treatments.

**Keywords:** Cohort study, Dental anxiety, Oral health, Orofacial pain, Out-of-hours.

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## INTRODUCTION

Emergency dental services are regularly consulted as a result of biologically mediated emergencies such as odontogenic pain or peri-implant infections as well as mechanically mediated emergencies such as loosening or fracture of restoration or cracking of a tooth.[1,2] Therefore, many countries have established emergency dental services meeting those acute treatment demands on weekends, during national holidays,xx and at nights.

Most of the patients who consult emergency dental services are in the age between 31–50,[3,4] and more than half of the patients are male.[3,5,6] Approximately, 70% of the emergency dental patients suffer from pain, such as a toothache.[4,5,7,8] The urgent care seekers hope for pain relief as well as for advice and reassurance that the problem was not serious.[9] However, it has been reported that in several countries patients are not aware of the existence of emergency dental service,[5,10] while in Australia and Brazil, financial or logistic considerations make patients consult emergency units rather than regular dental services.[6,11,12]

While previous investigations addressed the physical characteristics, only a few studies have focused on the psychosocial features of these patients. About 41.9% of the emergency dental patients in Great Britain[13] and Brazil suffer from dental fear,[6] whereas the prevalence of dental fear in the general population is 24.3%.[14] Moreover, Currie et al.[3] identified that the general quality of life of this clientele is impaired.

In contrast to other countries, the national health care system in Germany covers a large variety of dental treatments, and patients can easily obtain an appointment

within a couple of days. Nonetheless, in major cities such as Berlin, approximately 26,500 emergency dental patients visit out-of-hours services annually.[15] As an affordable statutory insurance system and solid primary dental care are available and compulsory in Germany, this phenomenon leads to the question of why patients seek emergency dental care rather than consulting a dentist regularly. About this aspect, psychosocial characteristics such as the prevalence of pain or dental fear within this population are unknown. Moreover, it is not clear how strong the impairment of perceived oral health conditions is in these patients.

Thus, the aim of this study was to identify the prevalence of pain and dental fear as well as the impairment of OHRQoL in patients consulting a German emergency dental service. The working hypothesis is based on the assumption that the psychosocial characteristics within this patient clientele are similar to the general population.

## MATERIALS AND METHODS

Within five weekends (defined as Friday 6 PM–Monday 8 AM) and two national holidays between April and May 2011, a total of 307 patients who consulted the emergency dental service at the University of Leipzig (Germany) were consecutively recruited. Only German-speaking patients aged 18, or older were included. The exclusion criteria were children or adolescent (<18 years) as well as patients who had only rudimentary German-language knowledge. All patients gave their signed informed consent to take part in the study and completed three questionnaires.

The first questionnaire included the following items:

- The reason(s) for the visit to the emergency dental service,
- The number of regular dental appointments within the last year,
- A visual analog scale (VAS) for pain intensity (0–100), the duration of pain,
- An overall rating of perceived general health,
- An overall rating of perceived oral health.

The second questionnaire measured dental fear using the DFS, which consisted of 20 items with a 5-point scale.[16] A general cutoff value for dental fear was set at ≥ 53,[17] allotting the subjects to either a group labeled "no or little fear" or a group labeled "high or extreme fear".

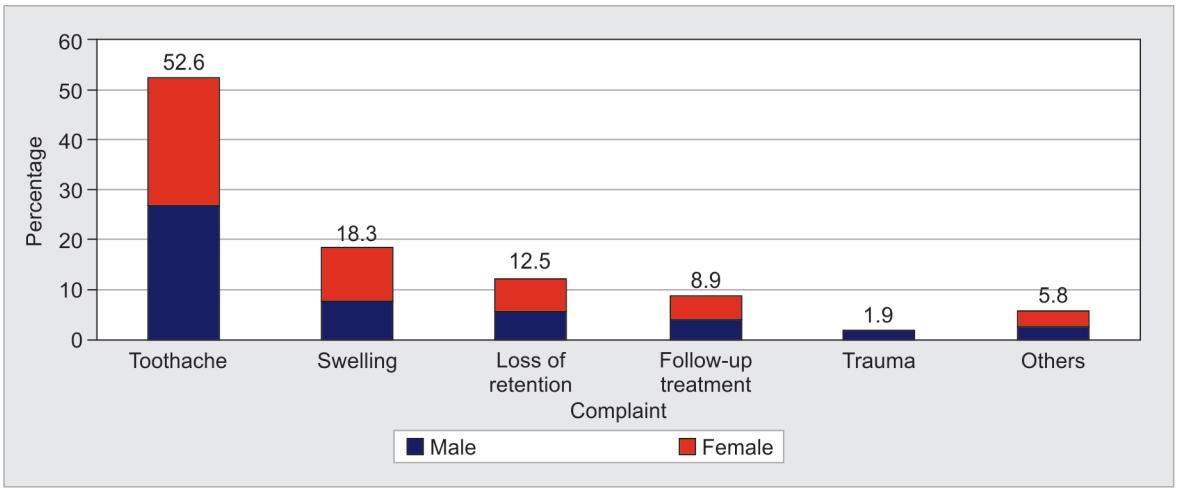
The third questionnaire measured the perceived oral health conditions' impairment (OHIP), represented as OHRQoL, and contained 49 items (OHIP–49).[18] The OHIP questionnaire assessed the perceived functional, painful, psychosocial and, to a limited extent, esthetical impairmentsduring the last month using a 5-point scale.[19] The resulting individual scores were summed up to seven domain scores as well as a total score; low total sum scores correlated with little impact on the subject.

The data analyses were conducted with STATA[13] (StataCorp LLC, USA) using descriptive statistics, unpaired t-tests, and Chi-square tests. The level of significance was set to $p < 0.05$.

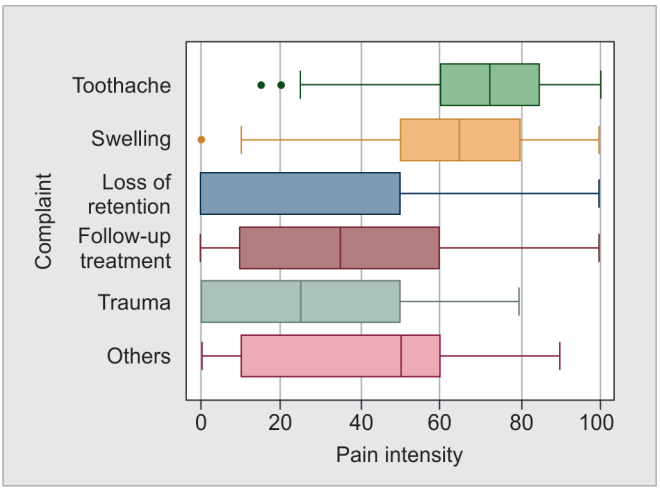
## RESULTS

A total of 307 patients attended the emergency dental service and 286 agreed to take part in this study (93.2%). The mean age of these respondents was 41.7 (± 15.9) years within a range from 19 to 84 years, including 50.4 % males. The main reason for consulting the emergency dental service was a toothache (52.6%; Graph 1).

The pain was reported by 87.2% of the participants. Patients suffering from a toothache perceived the highest pain intensity (Graph 2), with a mean VAS score of 72.2 (± 18.3) points, followed by swelling (61.8 (± 26.7) points), and follow-up treatments (such as the application of drainages or intracanal medicaments) with a VAS score of 36.9 (± 28.6). 58.8 % of the patients with pain reported persisting pain for a couple of hours up to one day; 33.4% declared that the pain had been lasting for more than a




**Graph 1:** Frequency of complaints reported by emergency dental patients




**Graph 2:** Complaints of emergency dental patients and self-reported pain intensity

day up to one week, and 7.8 % had been feeling pain for more than one week.

*Dental Fear:* The evaluation of the DFS indicated that 34.9% of the patients suffered from dental fear. The mean value for the DFS was 47.6 (± 20.7) points, and higher DFS sum scores were identified for females (52.2/43.0 points; unpaired t-test; $p < 0.001$).

*Health and OHRQoL:* About 73.7 % of the patients evaluated their global general health as 'excellent' or 'good', and 42.2 % rated their oral health status as 'excellent' or 'good' (Table 1). Regarding OHRQoL, the mean total sum score for the OHIP was 40.0 (± 31.2) points; domain sum scores are indicated in Table 2. Patients with dental fear had higher OHIP sum scores than patients with no or little dental fear (OHIP 51.9 and 34.7 points) (unpaired t-test; $p < 0.001$).

*Regular Dental Care:* About 33.2 % of the patients irregularly attended dental care (less than once a year) or only in the event of emergencies. Patients who had irregularly visited a dentist featured statistically significant higher OHIP and DFS sum scores (unpaired t-test; both $p \leq 0.001$) and were more dentally fearful (Chi-square test; $p < 0.001$) (Table 3).

In both groups and irrespective of the regularity of dental care, the main reasons for attending the emergency dental service were a toothache and swelling. Moreover, approximately one-third of the patients had consulted emergency dental services within the previous 5 years.

**Table 1:** Self-reported global rating of general and oral health in emergency dental patients.

| *Evaluation* | *General health in %* | *Oral health in %* |
|---|---|---|
| Excellent | 5.0 | 1.2 |
| Very good | 20.2 | 6.7 |
| Good | 48.5 | 35.3 |
| Acceptable | 22.5 | 37.3 |
| Bad | 3.8 | 19.6 |

## DISCUSSION

To the knowledge of the authors, this investigation is the first study that analyzed the prevalence of pain and dental fear as well as the impairment of perceived oral health conditions in emergency dental patients. Within the patient population, high pain intensities, a high percentage of dentally fearful patients as well as an impaired oral health-related quality of life (OHRQoL) were observed. With regard to the working hypothesis of the current study, it was identified that the values for perceived pain intensity and dental fear as well as for impairment of OHRQoL in emergency dental patients differ to those within the general population; this observation was particularly truefor patients who had irregularly attended dental care.

The demographic distribution of the patients in this study was similar to investigations on emergency dental patients in other countries, featuring a dominant age group between 30 years and 50 years and a slightly higher proportion of male patients.[3-6] The pain frequency (87.2 %) identified in this study was even higher than in other studies, where values between 70–80% were reported.[4,6,20] All studies identified a toothache as the main reason for consulting emergency dental care services. Austin et al.[7] reported that swelling and loss of retention are other main reasons for consulting emergency dental care services, which is supported by the results of the current study. Contrary to investigations in other countries,[3,6,20]

**Table 2:** Total score and domain scores including standard deviation (SD) of the OHIP-49 of emergency dental patients

| *Domain* | *Mean (SD)* |
|---|---|
| Total score | 40.0 (31.2) |
| Functional limitation | 8.6 (6.2) |
| Physical pain | 9.8 (7.4) |
| Psychological discomfort | 5.2 (4.7) |
| Physical disability | 5.4 (6.0) |
| Psychological disability | 4.8 (4.7) |
| Social disability | 2.5 (3.3) |
| Handicap | 4.2 (4.0) |

**Table 3:** Comparison of patients attending the emergency dental service, depending on irregular (less than once a year) or regular (at least once a year) dental care (standard is indicated within parentheses)

| *Criterion* | *Regular dental treatment n = 191* | *Irregular dental treatment n = 95* |
|---|---|---|
| Female | 49.2% | 50.0% |
| Age in years | 36.4 (± 28.3) | 43.0 (± 18.4) |
| Utilization of emergency dental care within 5 years | 22.1% | 34.8% |
| Existing pain | 85.1% | 89.9% |
| Pain intensity | 52.8 (± 31.0) | 63.4 (± 30.1) |
| OHIP–49 | 35.5 (± 29.3) | 49.4 (± 33.1) |
| Dentally fearful | 26.3% | 51.8% |
| DFS | 42.2 (± 17.3) | 58.4 (± 22.8) |

the patients in the recent study consulted the emergency dental service rather promptly. This difference might be due to the German health insurance system, which makes it easy to obtain a dental appointment within a narrow time frame and covers basic dental treatments. All in all, patients might let time pass by from first occurring complaints to care to seek, since most of them have used a variety of pain medication before which can be bought over-the-counter worldwide.[3,21]

Previous studies have highlighted that numerous patients repeatedly consult dental emergency services,[3,6] similar observations have been made in the current study, identifying that one-third of the patients consult emergency dental services regularly. A possible explanation for this observation might be dental fear since most fearful patients seek dental care only when suffering from severe pain.[20] In comparison to the general population, dental fear was decisively more pronounced within the study group (34.9%) of the current investigation. This observation is corroborated by a study from Britain that reported a prevalence of dental fear of 41.9% in patients attending emergency dental services.[13]

Fear describes a particular set of states based on an extremely complicated overall emotional structure. Thus, fear is no single effect or force that might be measured with a single number. The most common approach is to ask patients for their general or specific fear using structured questionnaires. An alternate approach is to confront people visually or physically with fearful situations. The latter is mostly used in therapeutic assessmentsof specific fears,and therefore less useful in a broad and more unspecific assessment as applied within this study. Fear can be triggered by certain events or experiences like loss of control, pain, embarrassment or bad experiences in the past. As in all exaggerated fears, the fundament of improvement is the patient's self-recognition and self-acceptanceas excessively fearful, as well as the will to change. In less severe cases a trained dentist alone might be helpful; in more severe cases a psychologist should be consulted.[22]

Currie et al. suggested that emergency dental patients self-evaluate their health status differently than other parts of the population, prioritizing other activities over regular dental care.[3] The results of the current study underline this assumption since it was surprising that three-quarters of the participants rated their general health as good or better although only two thirds regularly attended dental care. Regarding oral health, the participants' self-evaluation was more differentiated; 56.9% had an acceptable or even worse individual perception of oral health. Furthermore, their OHRQoL was strongly impaired (OHIP: 40.0 points), which might be related to the high number of dentally fearful patients within this clientele. With regard to this aspect, it has been reported that the degree of OHRQoL impairment is closely related to the extent of dental fear.[15] Nonetheless, even subjects who did not suffer from dental fear showed a high impairment of OHRQoL (OHIP: 34.7 points), which was more pronounced than in the general population (15.8 points).[23] This observation is not surprising, as emergency dental patients suffering from acute and challenging restrictions such as limited function (chewing), limited esthetics (swelling) as well as high pain intensity. For measurements of OHRQoL two strategies are available. On the one hand, objective parameters can be measured like the chewing efficiency or the number of teeth. Nonetheless, it is well known that these objective parameters do not coincide with the individual'sgeneral perception. Therefore, on the other hand, measuring the patient´s subjective experience utilizing unspecific questions is the method of choice. The OHIP is the most established and scientifically investigated available questionnaire for OHRQoL.[24]

One-third of the emergency dental care seekers had irregularly attended general dental care, although an affordable statutory insurance system and solid primary dental care were available. This observation might be particularly important for health care systems, as it suggests that the establishment of dental clinics specialized in treating patients with dental fear should be supported. Besides, a strict follow-up of dentally fearful patients, e.g., utilizing a recall system in a dental practice might help to decrease the number of emergency cases. Furthermore, it is wishful that dental students and dentists are continuously trained in handling patients with dental fear. These measures might be an important step to guide patients with dental fear into regular dental service.

The strengths of the current study include the high number of continuously recruited emergency dental patients as well as their psychosocial examination in accordance with valid questionnaires in German. However, only German-speaking patients were included, yet the proportion of non-German-speaking migrants in Leipzig was 5.2% in 2011,[25] which indicates a negligible risk of bias. Although no control group could be recruited in an emergency dental service setting, the results of the current study can be compared to investigations assessing emergency dental services in other nations. With regard to OHRQoL, normative values for the general population were available in the literature and were employed for comparison.

## CONCLUSION

The current investigation identified a high pain intensity as well as a high prevalence of dental fear in patients

seeking care in emergency dental services. Moreover, impairment of OHRQoL was observed. Values for perceived pain intensity and dental fear as well as for impairment of OHRQoL in emergency dental patients highly differed to those within the general population. In particular, this observation was true for patients who had irregularly attended dental care.

## CLINICAL SIGNIFICANCE

The results of this investigation highlight that patients consulting emergency dental services feature a severely impaired oral health-related quality of life. Thus, the establishment of specific dental services offering a treatment environment optimized for patients with dental fear should be supported by health care systems to improve the compliance of these patients, which might successively result in a higher oral health-related quality of life and decrease the number of emergency dental treatments.

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