

## ORIGINAL ARTICLE

**Medical profile of patients accessing hospital-based emergency dental care**N. Patel<sup>1</sup>, L.J. Broadfield<sup>2</sup> & A.C. Mellor<sup>3</sup><sup>1</sup>Oral Surgery, The University of Manchester, School of Dentistry, Manchester, UK<sup>2</sup>University Dental Hospital of Manchester, Manchester, UK<sup>3</sup>The University of Manchester, School of Dentistry, Manchester, UK**Key words:**

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**Clinical Relevance**

This article is the first to examine the medical profile of patients attending a UK hospital-based emergency dental care department. The article provides a review of common medications and medical conditions which oral surgeons may encounter.

Detailed knowledge of a patient's medical history is a form of risk management and could reduce the risk of an acute episode occurring in the dental setting. The findings of the article could further be used as a teaching aid.

**Introduction**

Advances in medical care, health policies and improvements in medical technology have contributed to an increase in life expectancy in the UK<sup>1</sup>.

Furthermore, there have been vast improvements in oral health care. This is reflected by the increase in number of patients retaining their natural teeth into old age. As individuals are living for longer, it is

**Abstract**

**Aim:** The aim of this study is to investigate the prevalence of medical conditions and medications used by patients accessing emergency dental care at Manchester Dental Hospital.

**Materials and methods:** The records of 400 randomly selected adult patients seeking emergency dental treatment at Manchester Dental Hospital from October 2011 to July 2012 were reviewed.

**Results:** From the 400 patients reviewed, 137 (34%) patients had a medically compromising condition. The most commonly presenting conditions were cardiovascular disorders, respiratory disorders, diabetes/endocrine disorders and psychiatric disorders. Twenty-nine per cent were taking prescribed medication.

**Conclusions:** Over a third of patients presenting to our emergency dental service had one or more medically compromising conditions. It is vital that dentists have an adequate knowledge about these conditions and how treatment may need to be modified in these patients. A detailed medical history is essential for all patients.

inevitable that dental professionals will encounter an increasing number of patients presenting with medically compromising conditions in addition to their dental problems<sup>2</sup>. At present, it is likely that many patients visiting the dentist have previously undergone and/or are currently under medical intervention<sup>3</sup>.

A detailed knowledge of a patient's medical history is a form of risk management. Some patients who present with a medically compromising condition could be at

an increased likelihood of undergoing an acute episode in the dental setting. It is vital that dentists are aware of the effect that medical conditions have on the provision of dental care. In addition, dentists should have an awareness of the effect that their treatment plans may have on particular medical conditions and their management. Furthermore, accurate medical history records can provide a valuable source of information for health service research as well as provide evidence in medico-legal situations<sup>4</sup>.

In the UK, since 1968, a national dental health survey is carried out every 10 years. The main purpose of these surveys is to get a picture of the dental health of the adult population and how this has changed over time. The 2009 Adult Dental Health Survey revealed that 27% of dentate adults reported they only attend a dentist when they are having trouble, and 2% said they never attend a dentist<sup>5</sup>. The 2009 survey also revealed a correlation between attendance and oral health-linked behaviours. Irregular attendance was shown to be associated with other negative oral health behaviours, such as decreased tooth brushing, higher plaque levels and increased level of anxiety. It is not unreasonable to consider the possibility that negative oral health behaviours could also occur alongside other poor general health behaviours. The survey revealed that the barriers that prevent regular dental attendance include dental anxiety, cost of treatment, lack of access and individuals perception of need for care.

In 2006, the way in which general dental practitioners working in the UK, under the National Health Service, were remunerated changed from a 'fee per item of service' to being paid per *course* of treatment. Following the introduction of the new contract, patients are no longer registered to treatment by a single general dental practitioner. The responsibility of providing emergency clinical care to these patients who are not accessing regular dental care now resides with the Primary Care Trust who is responsible for contracting local services. The Department of Health defines the following patients as requiring urgent care<sup>6</sup>:

- Severe dental and facial pain not controlled by over-the-counter preparations
- Dental and soft tissue acute infections
- Uncontrollable dental haemorrhage following extractions
- Dental trauma
- Rapidly increasing facial swelling

Manchester University Dental Hospital conforms to the guidance outlined by The Department of Health and provides a dental emergency service for patients over the age of 16 years. The service is available from

8:30 AM but does not operate during evenings or weekends. Every attending patient is initially triaged by a senior dental nurse to determine the level of care required. A separate trauma and emergency clinic is provided by the paediatric department for individuals under the age of 16 years.

Currently, there is a paucity of research regarding the prevalence of medically compromising conditions in patients attending the dental setting. This is especially true of patients who cannot access primary care services and are therefore managed in a secondary care environment<sup>7</sup>.

To the authors' knowledge, this is the first article examining the medical profile of patients attending a UK hospital-based emergency dental care department.

## Methods

Data collection was carried out retrospectively by two reviewers (LB, NP). Four hundred random patients were selected from the *Symphony*® database of patients who attended the dental emergency service at Manchester Dental Hospital between October 2011 and July 2012.

After the nurse led triage, medical histories were verbally obtained from patients via a consultation by the treating clinician who then entered the data as free text into the *Symphony*® database. Clinicians ranged from consultant to supervised fifth-year dental students. No medical history pro-formas or questionnaires were used during history taking. Exclusion criteria included patients under 16 who are treated by a paediatric emergency dental service.

Data were collected regarding patient gender, age, presence of allergies, medical conditions and medications taken. Medical conditions were divided into the following categories: cardiovascular disease, respiratory disease, nervous system disorder, haematological disorder, renal/hepatic disorder, gastrointestinal disease, endocrine, musculoskeletal, immune/infection, psychiatric and other conditions. Data were numerically coded and entered into Statistical Package for Social Sciences (SPSS) Version 15.0 (SPSS Inc., Chicago, IL, USA). Summary statistics were calculated to include frequencies, percentages and means where indicated.

## Results

Of the 400 patients, 61% (243) were male and 39% (157) female. The average age of attending patient was 39 years with a range of 17–88 years; 30% of the sample was aged between 26 and 35. (Fig. 1)

Thirty-four per cent (137) of the patients reported the presence of a medical condition, and 117 patients (29%) were taking prescribed medication when they attended. Eight per cent reported an allergy with the most common allergen being penicillin. Forty-four (11%) patients had more than one medically compromising condition, whereas 53(13%) were taking more than one medication. (Fig. 2)

Smoking status was recorded in 294 patients. In those patients where smoking status was recorded, 40% were smokers. (Tables 1 and 2)

## Discussion

### Prevalence

The prevalence of medically compromising conditions in patients presenting to the emergency dental department was 34%.

This result and our patient demographics are in line with other similar studies. Rhodus *et al.*<sup>8</sup> reported a

prevalence of medical conditions at 25% of their patients attending a dental school in the USA. A study by Smeets *et al.*<sup>9</sup> in the Netherlands reported a prevalence of 28% in a survey of almost 30 000 patients attending general dental practice. Additionally, a prospective Irish study suggested that 26% of patients attending the dental surgery have a current medical history<sup>4</sup>.

There are studies that vary above and below the reported prevalence of medically compromising conditions found in our sample. A study of Thai dental patients by Saengsiravin *et al.*<sup>10</sup> reported a much higher prevalence of 55%. In their study of elderly Japanese dental attendees, Umino *et al.*<sup>11</sup> reported a higher prevalence of 64% which may reflect their sample population. The lowest prevalence was cited by Dhanuthai *et al.*<sup>2</sup> at 12% in a retrospective study of 58 317 patients attending a University dental hospital in Thailand. Cottone *et al.*<sup>3</sup> conducted a survey of 4365 American dental patients. This study reported the highest prevalence, indicating that 69% had at least one significant medical problem. It must be noted, however, that the above articles were studying a population attending regular dental visits, not those seeking emergency treatment.

### Medically compromising conditions

The most commonly presenting conditions were cardiovascular disorders, respiratory disorders, diabetes/endocrine disorders and psychiatric disorders. This is in line with a number of comparable studies<sup>3,7,8,10,12</sup>.

Eight per cent of our sample reported medical conditions which did not fall under our category heading. These included cancer, pregnancy and relevant surgical history.

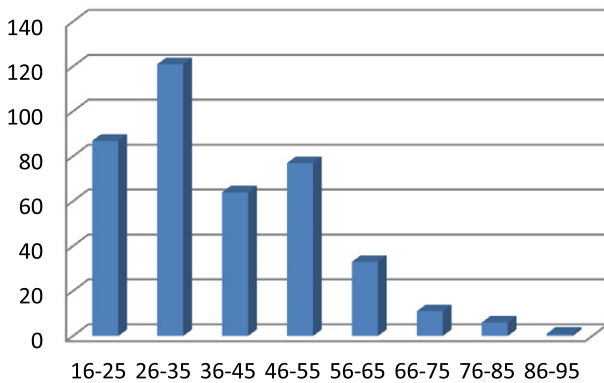


Figure 1 Chart to show age distribution of sample.

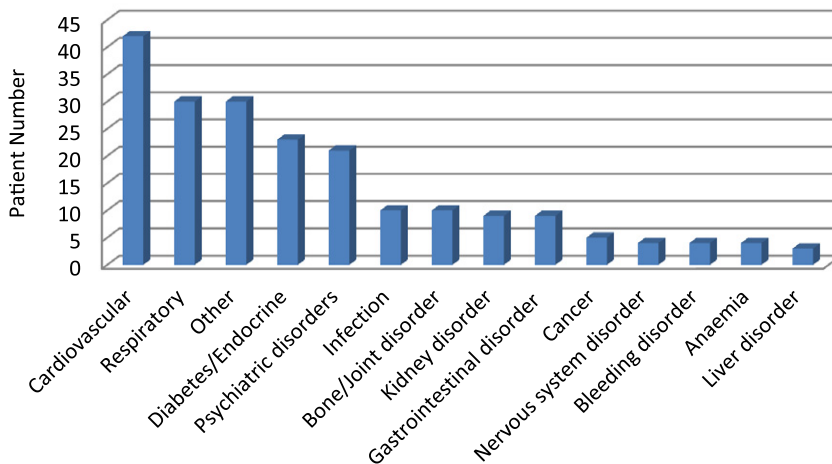


Figure 2 Chart to show frequency of medical conditions.

**Table 1** Outline of common medical conditions, their potential effect on dentistry and incidence of the condition in our sample

Medical factors	Oral problems related to specific conditions	Incidence in sample (%)
Cardiovascular disorders	<i>Angina</i> . Anxiety may precipitate an episode. Risk of myocardial infarction. <i>Myocardial infarction</i> . Risk of further episodes. Patient may be anticoagulated. Drug reactions can also occur between medications prescribed by a dentist and anticoagulants. <i>Arrhythmias</i> . Patients may be anticoagulated. Pace makers can be affected by some electronic dental equipment. <i>Congenital heart disease</i> . Patients may be anticoagulated. <i>Hypertension</i> . Postural hypotension risk.	11
Respiratory disorders	<i>Asthma</i> . Attack could be precipitated by dental anxiety. Ibuprofen should be avoided. Increased risk of oral thrush from inhaler use. <i>COPD/emphysema/bronchitis</i> . Anxiety may precipitate symptoms. General anaesthetic/intravenous sedation use may be problematic. <i>Obstructive sleep apnoea</i> . Can be improved with use of oral appliances. <i>Tuberculosis</i> . Risk of transmission.	8
Endocrine disorders	<i>Diabetes</i> . Increased risk of periodontal disease. In addition xerostomia, oral candidosis, salivary gland enlargement, lichenoid reactions and poor healing are all common findings. <i>Glucocorticoid excess</i> . Risk of adrenal crisis due to corticosteroid therapy. <i>Addisons</i> . Oral hyperpigmentation and risk of adrenal crisis. <i>Hyperthyroidism</i> . Risk of oropharyngeal ulceration. <i>Hypothyroidism</i> . Macroglossia and anaemia are common findings.	6
Psychiatric disorders	<i>Drug dependency</i> . Poor compliance, implications with general anaesthetic/intravenous sedation, risk of blood borne viruses. <i>Depression/anxiety</i> . Medications may cause xerostomia. Anxiety may manifest at the dental practice. <i>Schizophrenia</i> . Medications may cause xerostomia.	5
Liver and kidney disorders	<i>Liver disease</i> . Bleeding tendency, impaired drug and local anaesthetic metabolism, sialosis, erosion, poor wound healing and anaemia. <i>Renal failure</i> . Bleeding tendency, impaired drug excretion, oral ulceration, xerostomia, brown tumours and abnormal bone repair.	3
Musculoskeletal disorders	<i>Osteoporosis</i> . Risk of jaw fracture. <i>Osteoarthritis</i> . TMJ may be affected. <i>Rheumatoid arthritis</i> . TMJ may be affected.	3
Infective disorders	<i>HIV</i> . Enlargement of cervical lymph nodes, oral candidosis, hairy leukoplakia, Kaposi's sarcoma and bleeding tendencies. <i>Hepatitis A, B, and C</i> . Concerns surrounding infection control.	3
Haematological disorders	<i>Clotting disorders (thrombus/embolus/DVT)</i> . Patients may be anticoagulated. <i>Platelet disorders</i> . Liaise with haematologist. Platelet transfusions may be required. <i>Anaemia</i> . May affect patient's fitness for general anaesthetic. Oral presentations include sore/burning tongue, candidosis, ulcers and angular cheilitis. <i>Sickle cell anaemia</i> . Must be investigated for all patients of Afro-Caribbean origin prior to general anaesthetic. Risk of sickling crisis. <i>Thalassaemia</i> . Characteristically have an enlarged maxilla. Iron depositions can cause xerostomia and parotid swelling. <i>Haematological malignancies</i> . Antimicrobial cover maybe required for surgery. Risk of blood borne viruses, increased bleeding tendencies, gingival bleeding, increased infection risk, gingival swelling and candidal infection may be present.	2
Gastrointestinal disorders	<i>Gastric Oesopharyngeal reflux</i> . Can cause dental erosion. <i>Crohns</i> . Labial and oral swellings/ulceration. May have signs of steroid and immunosuppressive therapy.	2
Malignant disease	<i>Chemotherapy</i> . Increased risk of infection, oral purpura, mucositis, xerostomia and gingival bleeding. <i>Radiotherapy</i> . Mucositis, radiations caries, loss of taste, trismus are common. Osteoradionecrosis is a serious complication of dental infections/extractions.	1
Nervous system disorders	<i>Epilepsy</i> . Antiepileptic medications can cause gingival overgrowth. <i>Dementia</i> . Difficulties maintaining dental health and treatment maybe difficult under local anaesthetic. <i>Degenerative disorders (Parkinson's, multiple sclerosis, cerebral palsy)</i> . Medications may cause xerostomia, and cooperation with oral hygiene and dental treatment may be difficult.	1

COPD, chronic obstructive pulmonary disease; TMJ, temporomandibular joint; DVT, deep vein thrombosis.

**Table 2** List of the 10 most common medications taken by the sample and their relevance in dentistry

Drug	Incidence (%)	Side effects relevant to dentistry
Antihypertensives	8	Linked to lichenoid reactions.
Bronchodilators	7	Corticosteroid inhalers may cause oral thrush. Beta-2 agonists and ipratropium bromide can cause dry mouth.
Antidepressants/mood stabilisers	6	Tricyclics and MAOIs can cause postural hypotension. Benzodiazepines may be potentiated by SSRIs. Many antidepressants cause dry mouth.
Proton pump inhibitors/Antacids	4	May cause dry mouth. Erythema multiforme is linked to ranitidine use. Omeprazole may cause loss of taste.
Statins	4	Concurrent use with erythromycin or clarithromycin increases risk of muscle damage (rhabdomyolysis)
Oral hypoglycaemics agents	4	Hypoglycaemics can cause dry mouth and lichenoid reactions.
Analgesics	3	NSAIDs may cause gastric irritation and precipitate asthma attacks. NSAIDs may increase bleeding tendency.
Aspirin	2	Risk of increased bleeding.
Oral Steroids	2	Weight gain around the face. Increased susceptibility to infections. Oral candidosis. Impaired wound healing.

MAOI, monoamine oxidase inhibitor; SSRI, selective serotonin reuptake inhibitors; NSAIDs, non-steroidal anti-inflammatory drugs.

Cardiovascular disease ranked as the most common medical condition encountered in our study. It also ranked top in studies by Doyle and Smeets<sup>4,9</sup>. Additionally, 10% of medications taken by our sample population could be attributed to cardiovascular disease (angiotensin-converting-enzyme inhibitors, beta blockers, calcium channel blockers and aspirin). The prevalence of cardiovascular disease in the population could be higher than reported as it was evident when collecting the data that some patients were taking antihypertensives or other cardiovascular medications but were not aware that they had any medical condition or no medical condition was recorded. This could be attributed to an unawareness of self health or a lack of strong record keeping. It is important that as health professionals, we question a patient's medical status and record this accurately. Patients should be encouraged to be aware of their health and health conditions. This has a particular importance in those patients with a number of different conditions.

## Medications

Doyle and colleagues<sup>4</sup> further studied the medications taken by their sample of patients attending dental practice. Only 6% of their sample was taking medications of potential importance, whereas 29% of our sample revealed they were on prescribed medication. However, in the article by Doyle<sup>4</sup>, all medication

deemed not to be of interest to dentistry was excluded, which may offer an explanation of the differing results.

The three most common medications prescribed to our sample were antihypertensives, bronchodilators and antidepressants. These results are comparable with Doyle's study<sup>4</sup>.

Dentists must be particularly familiar with the trade names, mode of action and side effects of these drugs. Those effects that impinge upon the oral structures are of particular interest to dentistry. Oral side effects may compromise dental therapy. For example, many drugs decrease salivary flow rate which not only increases the caries risk for the patient but means that dentures may be less tolerated.

The results also highlight the need for care and vigilance when prescribing medications in this patient group. Dentists must be aware of the potential for drug interactions and unwanted effects of medications, especially with those patients on multiple medications.

## Smoking

In those patients where smoking status was recorded, 40% of patients were smokers. The 2009 Adult Dental Health survey reported that 22% of surveyed adults were currently smoking<sup>5</sup>. Our results may be biased due to smoking status not always being recorded or reflected in the health profiles of symptomatic attendees.

Smoking has a number of effects on the oral cavity including increasing oral cancer and chronic

periodontitis risk, causing halitosis, and increasing risk of dry socket and candidal infections. Dentists are ideally situated to advise patients on the risks of smoking and give assistance to patients wishing to quit. Smoking status was not recorded in 27% of medical histories. The 2009 Adult Dental Health Survey recommends that all health professions enquire the smoking status of their patients annually<sup>5</sup>. To rectify this incompleteness, the computerised data entry form is to be modified so that smoking status must be documented.

### Relevance to teaching and the dental setting

Medical compromise increases the risk of medical emergencies occurring in dental practice. With incidence of cardiovascular disease, respiratory disease, diabetes and psychiatric disease being most common, dentists must be rehearsed in medical emergencies which may present more frequently in these patients (e.g. angina attacks, asthma attack, myocardial infarction, hypoglycaemic attack and psychotic episodes).

Due to the study being conducted in a teaching hospital with students examining and treating some of the patients involved in the study, the results were passed to undergraduate teaching leads at Manchester Dental Hospital. Feedback through focus group discussion with final year dental students revealed that the majority was comfortable in understanding the dental relevance of cardiovascular and respiratory conditions. However, some felt less comfortable in managing patients with psychiatric conditions and were surprised these conditions featured highly in our population.

With an already full and busy undergraduate dental curriculum studies such as this could help focus teaching towards helping students understand medical conditions they are most likely to face in general practice.

Due to this being a retrospective study and the nature by which the data were collected our results are open to bias. Firstly, no questionnaire was used to illicit the medical history. Data collection solely relied on a verbal interview between patient and clinician. If the clinician failed to ask about a certain aspect of the medical history, then it would not have been recorded. On the other hand, questionnaires have inherent bias through excluding illiterate patients and those who do not understand the language the questionnaire is written in. Moreover, they must be tested for accuracy, reproducibility and readability.

Furthermore, some patients may not give accurate histories. Recall of medications and medical histories may be difficult for patients as described by Rahim and Ruprecht.<sup>12</sup> This may be more so the case in an emer-

gency setting where the patient is being distracted by pain for example. Kay found patients with infective diseases may be hesitant to disclose their condition as they may be worried that they will be refused treatment or treated differently, although this fear is unfounded<sup>13</sup>. In addition, patients do not always appreciate the relevance of the depth of information that a dentist requires and could be reluctant to volunteer this information. Brady *et al.*<sup>14</sup> found that 32% of patients attending a dental hospital clinic gave invalid answers to a health questionnaire, and patients who were ill considered themselves in good health from the point of view of the dentist.

Another difficulty faced was whether or not the 32 patients who reported they had an allergy had in fact a true hypersensitivity reaction.

### Conclusion

This is the first study looking at medical profiles of patients attending a hospital-based emergency dental service. Prevalence of medical conditions is relatively high in this population group. A thorough medical history is essential before commencing dental treatment.

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