



Cardiff University

**Medical History Complexity of Patients Attending
Student Restorative Dental Education Clinics
Compared With Patients Attending the Emergency Dental Clinic:
A Service Review**

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Abstract

Introduction: Published data illustrates that the UK has an increasingly ageing and medically complex population. The UK's changing demographics emphasises the necessity for General Dental Practitioners (GDPs) to have a thorough understanding of the medical conditions and medications affecting the population, in order to provide sufficient care.

Aims: This service review aims to determine whether dental undergraduate students at Cardiff Dental School have greater learning opportunities relating to Human Diseases/Clinical Medical Sciences in Dentistry (HD/CMSD) on one University Dental Hospital clinic (Examination and Emergency clinic/E&E), compared to another (restorative Dental Education Clinic/DEC).

Materials and Methods: The medical histories of 200 patients attending DEC in January and February 2022 were recorded (matching the time period of the comparator review). The data was then input onto an Excel spreadsheet for further analysis.

Results: Our results revealed 83% of patients to be medically compromised, with the most prevalent medical condition being cardiovascular disease. Over 75% of patients required at least one medication, with antihypertensives being the most frequently utilised drug.

Discussion: Our results correspond to the comparator review and related literature, illustrating that students gain a similar learning experience of HD/CMSD on E&E and DEC. In addition, students gain a realistic expectation of the types of patients they will be expected to treat as a foundation dentist. Notably, the GDC's HD/CMSD curriculum guidance has weakened over time despite the UK's changing demographics. We believe that the current curriculum must be reformed in order to encourage dental schools to provide graduating dentists with the comprehensive knowledge required to manage all patients, safely and competently.

Conclusion: GDPs will become increasingly incapable of managing medically complex patients if a reformation to GDC's curriculum guidance fails to occur.

Introduction

As of 2030, it is expected that just over 20% of the UK's population will be aged over 65 (Age UK 2019). With greater education and awareness on health accompanying the countless medical advancements made in the last half-century, it comes as no

surprise that once fatal comorbidities are now treatable. The dental implications of this are that dentists are seeing a greater proportion of older patients who are retaining more teeth, and more patients with more complex medical histories. To be specific, the National Institute for Health Care and Research (Kingston et al. 2018) estimates that by 2035, two-thirds of those aged over 65 will have multi-morbidities, with the most prevalent medical conditions expected to be arthritis (62.6%), hypertension (55.9%) and respiratory disease (24.4%). Naturally, safe and successful dental treatment requires careful planning centred around the avoidance of medical complications. The UK population's increasing longevity emphasises the necessity for current and future General Dental Practitioners (GDPs) to have a firm understanding of the key medical conditions and medications affecting the population, in order to provide suitable and sufficient care. For dentists and other dental care providers, the learning about diseases and drugs begins during the dental undergraduate teaching of Human Diseases/Clinical Medical Sciences in Dentistry (HD/CMSD) which tends to be delivered in the early part of a typical 5-year dental programme. It can be assumed, therefore, that it is the quality of undergraduate HD/CMSD teaching, and its subsequent reinforcement in training, that determines the adequacy of GDPs to suitably treat patients with complex medical histories (MHs). With the UK's increasingly medically complex and ageing population, it is paramount that the GDC's HD/CMSD curriculum guidance provides dental students with the foundation of knowledge required to treat all patients.

A previously completed service review in Cardiff Dental Hospital (Ref. No. 6848) evaluated the MH complexity of adult patients attending a dental emergency clinic (Examination and Emergency clinic/E&E). The aim of that service review was to determine whether treating patients on that department might enhance and support the learning of HD for dental undergraduate students due to the medical complexity of patients attending, and the opportunity to see numerous 'new patients' for urgent dental care. The thought process behind conducting this comparative review looking at the MH complexity of adult patients attending a student dental restorative clinic (Dental Education Clinic/DEC), was to discern whether undergraduate students might be exposed to patients with similar, greater or lesser medical complexity than on the dental emergency clinic, but in the context of delivering more comprehensive dental care over longer courses of treatment.

Unlike E&E, adult patients are screened prior to being allocated for treatment by students. The screening process is conducted by the dental practitioners and/or the dental consultants working at University Dental Hospital (UDH); it involves a brief medical history followed by determination of the dental treatment need. If the patient is deemed suitable for undergraduate treatment, they are placed on a treatment waiting list. Upon completion of the waiting period, the patient is assigned to a student who conducts a new patient history and examination, determines the dental treatment needs and formulates a treatment plan. The student then completes the patient's treatment under the supervision of dental practitioners and/or dental consultants, with the option of shared care with dental hygiene and/or therapy students. Undergraduate students begin treating patients on DEC at the end of year 2; by years 4 and 5, the students attend DEC on a weekly basis, simultaneously treating approximately 8 patients.

Undoubtedly, DEC provides a suitable learning experience of dentistry through mirroring a scaled-down version of general dental practice. We questioned, however, whether the screening process for DEC resulted in more complex medical history patients being excluded on the basis that they are 'too complex' for treatment by undergraduate students. If this were to be true, then undergraduate dental students might be given a skewed view on MH complexity for patients allocated for longer-term courses of dental care, and not representative of their expected experiences in foundation dental training (FD) and future dental practice with the changing patient demographics mentioned previously. This service review therefore aims to determine the MH complexity of patients on DEC in comparison to the MH complexity of patients attending E&E and ultimately, how this relates to the consolidation of dental undergraduate learning of HD and its application to future general dental practice and the safe dental care of all patients.

Literature Review

With the UK's changing demographics, it is essential that dental practitioners can effectively treat patients with complex medical histories. At present, there are just under 12 million people aged over 65 in the UK – during the next half-century, this figure is expected to rise by 8.6 million. With multi-morbidities affecting 46% of 64–75-year-olds (Age UK 2019), it is needless to say that dentists will encounter increasingly

complex MH cases as the ageing population grows. This is especially true due to improvements in oral hygiene and health, which has decreased the incidence of edentulism and increased the proportion of older patients visiting GDPs. To be precise, the 2019 Oral Health Surveillance Report revealed that, out of those aged 65 and over, only 17% were edentulous compared to 27% in 1999-2004. Likewise, dentate older adults had retained an average of 21 teeth in 2019 compared to only 19 in 1999-2004 (Centres for Disease Control and Prevention 2019).

Evidently, GDPs are being faced with increasing numbers of older patients with fuller dentitions and more challenging medical histories. A study by Bhatega (2012) found that, amongst those dental patients who were medically compromised, cardiovascular disease (CVD) accounted for the highest prevalence (57.87%), followed by endocrine disorders (35.73%). Similar findings were also noticed by Patel et al. (2014), who investigated the medical profiles of 400 patients attending a hospital-based dental emergency service. The study revealed that, out of those who were medically compromised (34%), the most prevalent condition was CVD, followed by respiratory and endocrine disorders, respectively. Importantly, the latter study revealed that the mean age of the presenting patient was 39, highlighting that it is not only the older population's MH that is growing increasingly complex. It should be noted that, with recent medical advancements, younger people with chronic diseases are also living longer and thus presenting to general dental practice. For example, when cystic fibrosis (CF) was first described in 1938, over 70% of children died within the first year of diagnosis (Simmonds 2013). Today, extensive new-born screening coupled with numerous medical progressions, such as nutritional and pulmonary therapy, has resulted in the median predicted survival of those with CF, to be aged 40 (MacKenzie 2014).

Though dental practitioners are being faced with increasingly complex MH cases, studies conducted in Japan and the UK suggest that clinicians lack confidence treating medically complex patients. A Japanese survey of 408 dentists revealed that 74% felt as though they experienced day-to-day difficulties due to a lack of medical knowledge (Miyatake 2004). The possible struggles encountered by dental clinicians are subjective and widespread, however examples may include treating patients with a history of myocardial infarction (MI) or managing medical emergencies. Patients who have previously suffered an MI often present on oral anticoagulant medication which,

amongst many other medical applications, is extensively used for the secondary prevention of MI. The challenge of treating patients on oral anticoagulants lies with the increased risk of post-operative bleeding which the clinician must manage accordingly. Safe and effective management strategies may include implementing additional haemostatic measures and/or crucially asking the patient to delay a dose of their medication where appropriate, as is typically carried out for Direct Oral Anticoagulants (DOACs). Similarly, yet objectively more importantly, clinicians lacking medical knowledge may find difficulty managing medical emergencies. A study conducted from 1980-1984 in Japan revealed that 19-44% of dentists were required to manage a patient with a medical emergency in any single year (Hass 2006). Furthermore, a questionnaire of 302 UK GPs revealed that vasovagal syncope accounted for the most common medical emergency (1.9 cases per dentist, per year), followed by hypoglycaemia and angina pectoris. Startlingly, only 20.8% of GPs felt capable of diagnosing the reason for their patients' collapse and over 50% felt incompetent to manage an MI or anaphylaxis (Girdler and Smith 1999). This literature indicates that the majority of dental practitioners have insufficient medical knowledge when it comes to managing patients with complex medical histories. With the UK's changing demographics, the General Dental Council (GDC) may have to consider improving their recommendations regarding HD/CMSD in their curriculum; this would ensure that graduating dentists have the in-depth knowledge required to safely and effectively treat the increasingly complex MH cases presenting to general dental practice.

Furthermore, it is paramount that dental practitioners have a thorough understanding of medical conditions and medications in order to prevent potentially life-threatening medical disasters. Multi-morbidities are often accompanied by polypharmacy – in 2005, it was reported that over 65s consumed approximately a third of all prescription drugs (Jacobsen and Chávez 2005). Unsurprisingly, polypharmacy increases the scope for adverse drug reactions (ADRs); the risk of an ADR rises from 6% to 50% and 100% with a patient on 2, 5 and 8+ medications, respectively (Jacobsen and Chávez 2005). Due to the extensive use of drugs in dentistry, dental practitioners have a responsibility to undertake a thorough medical history and be aware of potential ADRs which may occur due to drug interactions.

The most common dental drugs include local anaesthetics (LAs), analgesics (eg. paracetamol, non-steroidal anti-inflammatory drugs), central nervous system depressants (eg. nitrous oxide, benzodiazepines) and antibiotics (eg. penicillin,

metronidazole) (Ouanounou et al. 2020). The most frequently used LA is 1.8ml of 2% lidocaine with a concentration of adrenaline, which varies from 1:200,000 to 1:50,000 (Kothari and Abbas 2015). While LAs are generally considered to be safe, clinicians must be aware of the maximum dosage calculation. This is of particular concern for paediatric patients who are of a lower weight – if LA is given in high enough doses, it can lead to seizures, coma and death (Kothari and Abbas 2015). A systematic review investigating deaths related to dental treatment revealed that, out of 148 fatalities, eight were related to the administration of LA – the associated paediatric deaths unfortunately occurred due to a drug overdose (Reuter et al. 2017). Similarly, dental clinicians must follow the recommended guidelines surrounding the administration of vasoconstrictor-containing LAs in high-risk cardiovascular (CV) patients – higher doses of LA may lead to systemic vasoconstriction and myocardial ischaemia. The maximum recommended dose of LA for CV patients is therefore 4ml of 2% lidocaine with 1:100,000 adrenaline (Kothari and Abbas 2015). The importance of following the necessary precautions surrounding CV patients is highlighted by the same systematic review, which revealed that 20.9% of dental-related death occurred due to cardiovascular events, with both age and the setting in which the adverse reaction started, being significant risk factors (Reuter et al. 2017).

As mentioned previously, dental practitioners must be aware of potential drug-interactions to prevent potentially fatal ADRs. For example, clinicians must be aware of the interaction between clarithromycin, erythromycin and azithromycin with digoxin, which causes inhibition of digoxin's elimination from the bloodstream and subsequently digoxin toxicity (Ouanounou et al. 2020). Significantly, the systematic review highlighted that, out of the total dental-related deaths, six were caused by ADRs, two were due to accidental drug administrations and one was the result of a CV event which occurred due to cessation of warfarin four days prior to an extraction (Reuter et al. 2017). Importantly, the evidence above illustrates that dental practitioners with insufficient medical knowledge run the risk of precipitating potentially life-threatening medical catastrophes. While it is the clinician's responsibility to familiarise themselves with patients' medical histories and appropriate guidelines, an improved HD/CMSD curriculum along with consolidation of this learning in foundation training, would likely increase practitioners' confidence in managing complex MH cases and prevent future fatalities. This is of particular importance due to the UK's progressively ageing and medically complex population, who will require more advanced management strategies.

Methodology:

Audit Criteria:

Adult patients attending restorative Dental Education Clinic (DEC) at Cardiff University Dental Hospital in January and February 2020. Patients who are already registered with a GDP cannot seek treatment at DEC, therefore they are excluded from this service review. This service review was approved by the relevant audit and clinical governance group (Ref: 6892).

Audit Standard:

To compare against a previously completed service review in Cardiff Dental Hospital (Ref. No. 6848) which evaluated the MH complexity of 200 adult patients attending a dental emergency clinic in January/February 2020.

Methods:

Data collection was carried out in January and February 2022. A list of the first 200 patients attending DEC in January/February 2020 (to match the time period of the comparator review) was collated. These patients' hospital numbers were input onto SALUD, a dental software utilised on DEC to keep an electronic record of patients' information on MH, appointment history, treatment plans etc. The required information for each anonymised patient was input onto an Excel spreadsheet for future statistical analysis.

Inclusion Criteria:

- Patients aged 18 and over attending DEC for an appointment in January/February 2020

Exclusion Criteria:

- Patients registered with a GDP
- Patients under the age of 18

Data Collection:

The collected data was input onto an Excel spreadsheet similar to that utilised in the previously completed service review (Ref. No. 6848), to allow direct comparison of both data sets. Each patient was assigned a number from 1 to 200 and information was recorded on their age, gender, post-code, MH condition and associated

medication(s) if applicable, smoking and alcohol consumption status. The MH conditions were organised into 13 categories including cardiovascular, respiratory, endocrine, psychiatric, musculoskeletal, renal, gastrointestinal, nervous system, blood, skin, allergy, infection and 'other'. Likewise, the medications were categorised into antihypertensive, analgesic, supplement, hypoglycaemic, PPI, statin, steroid, bronchodilator, antiplatelet, NSAID, anticonvulsant, hypnotic, antibiotic, laxative, antipsychotic, insulin and neuropathic. Completion of simple statistical analysis enabled graphs and tables to be produced, highlighting the salient findings.

It should be noted that certain medications did not fit into the chosen categories, hence they were allocated to an 'other' category and excluded from the results. For example, hormonal drugs such as levothyroxine, tamoxifen and the oral contraceptive pill, all of which are each required for varying patients/disorders. Likewise, anticoagulants e.g., apixaban; nitrates e.g., isosorbide mononitrate; bisphosphonates e.g., alendronic acid; triptans e.g., sumatriptan; antispasmodics e.g., mebeverine; anti-anginal drugs e.g., glyceryl trinitrate; antimuscarinics e.g., tamsulosin; aminosalicylates e.g., mesalazine; xanthine oxidase inhibitors e.g., allopurinol; fibrates e.g., fenofibrate; dopamine precursors e.g., levodopa; dopamine receptor agonists e.g., ropinirole; antipropulsives e.g., loperamide hydrochloride; cardiac glycosides e.g., digoxin; 5-alpha reductase inhibitors e.g., finasteride; serotonin receptor agonists e.g., ondansetron; antimalarials e.g., quinine; phosphodiesterase type-5 inhibitors e.g., sildenafil; antacids e.g., sodium alginate; prostamides e.g., bimatoprost and NMDA receptor agonists e.g., memantine hydrochloride.

Similarly, a few medications were challenging to categorise due to their uses in differing disorders. For example, although calcium channel blockers would typically be placed in the 'antihypertensive' category, they may in fact be required to treat Raynaud's syndrome. Likewise, anticonvulsants such as gabapentin, carbamazepine and pregabalin which are typically used in the treatment of epilepsy, are also widely utilised in the management of neuropathic pain. Similarly, amitriptyline may be required in the management of chronic neuropathic pain, albeit its common use as an antidepressant. Lastly, the categorisation of aspirin is dependent on the dose – 75mg is characteristically required for its antiplatelet action in the prophylaxis of myocardial infarction and cerebrovascular accident, whereas 300mg is commonly used as an

analgesic. The examples provided illustrate the difficulty in categorising a drug with multiple uses.

Results

Statistical analysis revealed that the most commonly presenting age group was 56-65, with 28.5% of patients being of this age range (Figure 1). Additionally, 60.5% of presenting patients were male and only 39.5% were female (Table 1). Of those that were male, 84% were medically compromised and of those that were female, 81% were medically compromised (Table 2); in this context, a patient is defined as 'medically compromised' if they have at least one of the medical conditions from the 13 categories listed above. The most prevalent medical conditions were those categorised into 'cardiovascular' and 'musculoskeletal' (Figure 2). Just under a quarter of patients suffered with six or more co-morbidities (Figure 3); the age groups with the highest and lowest average number of co-morbidities were 76-85 and 18-25, respectively (Figure 4). Furthermore, just over three-quarters of patients required one or more medications (Table 3) – the most frequently used medications were those categorised into antihypertensives, analgesics and supplements (Figure 5). Lastly, 32% of patients were smokers and 39% of patients consumed alcohol.

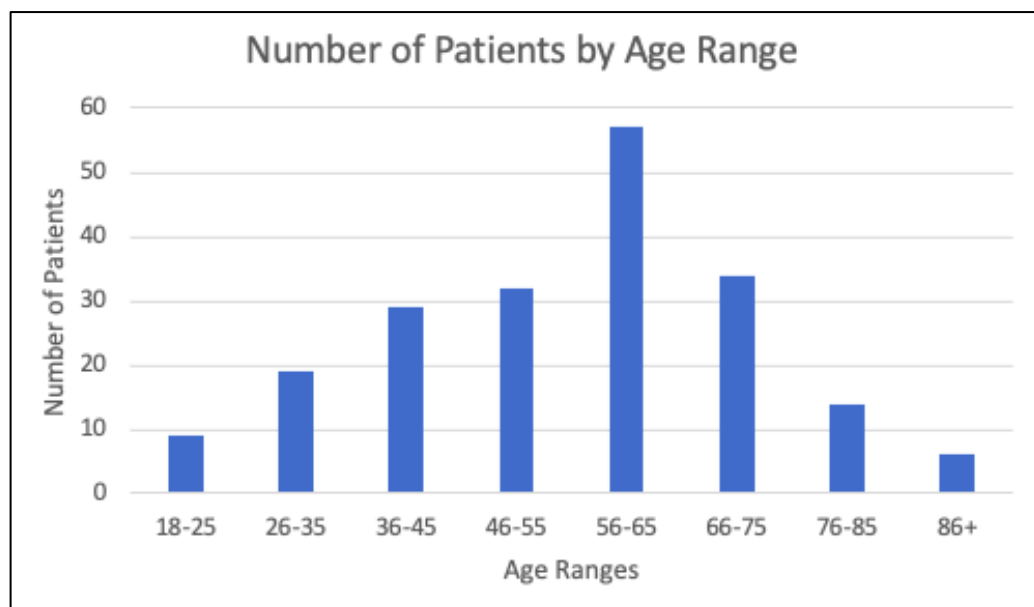


Figure 1. A bar graph showing the number of patients presenting to DEC, categorised into different age ranges.

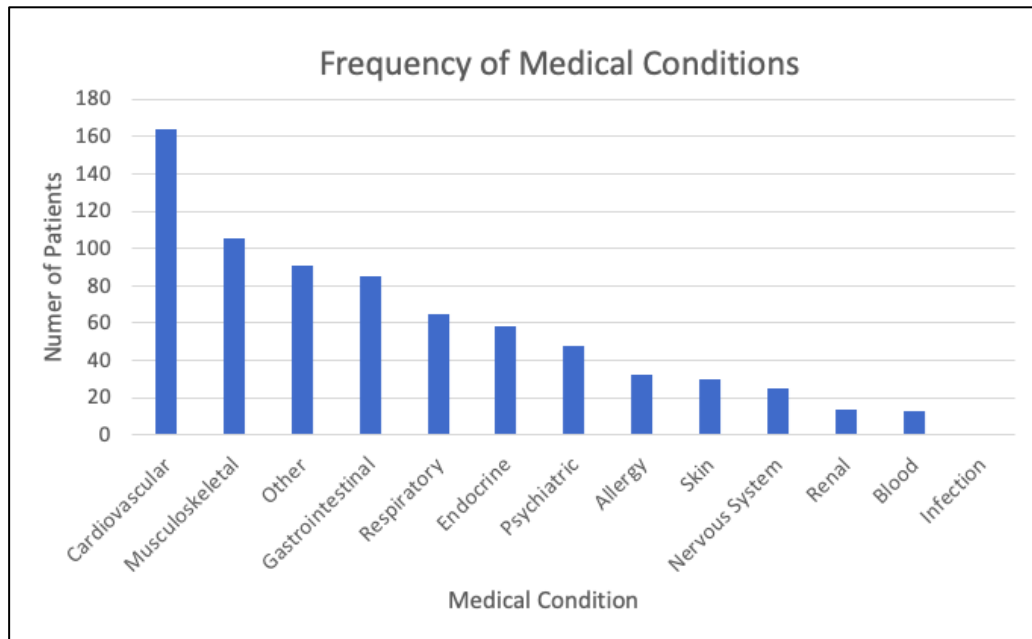


Figure 2. A bar graph showing the frequency of medical conditions in patients presenting to DEC.

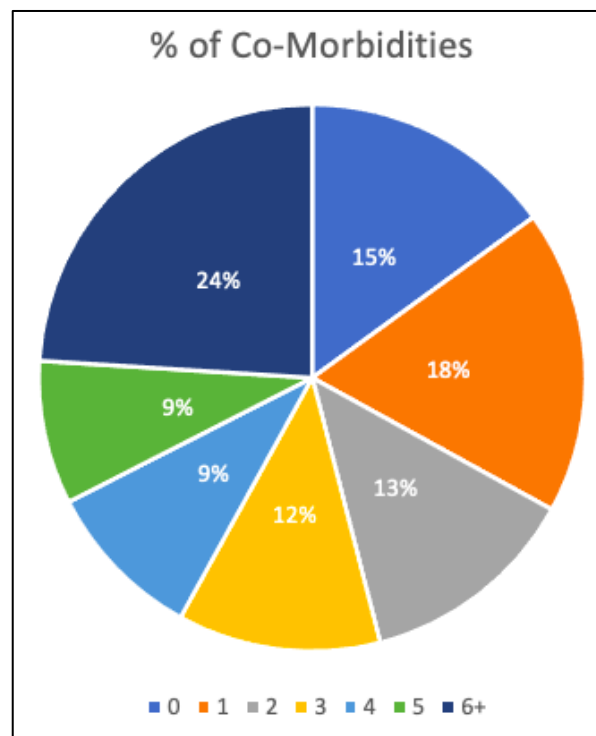


Figure 3. A pie chart showing the differing number of co-morbidities and their frequency, amongst patients presenting to DEC.

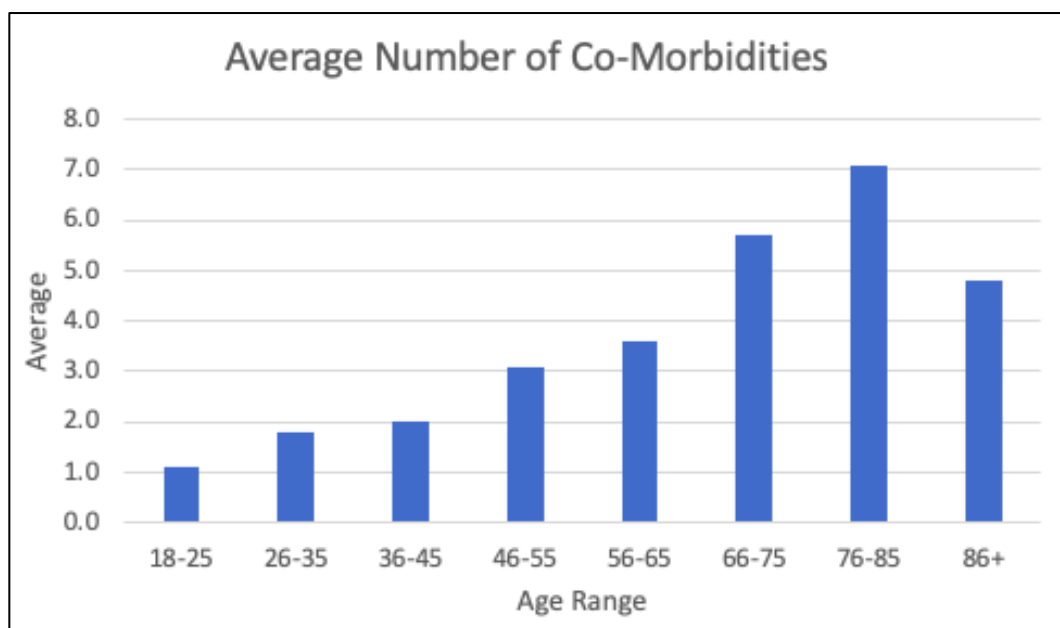


Figure 4. A bar graph showing the average number of co-morbidities across different age ranges, in patients presenting to DEC.

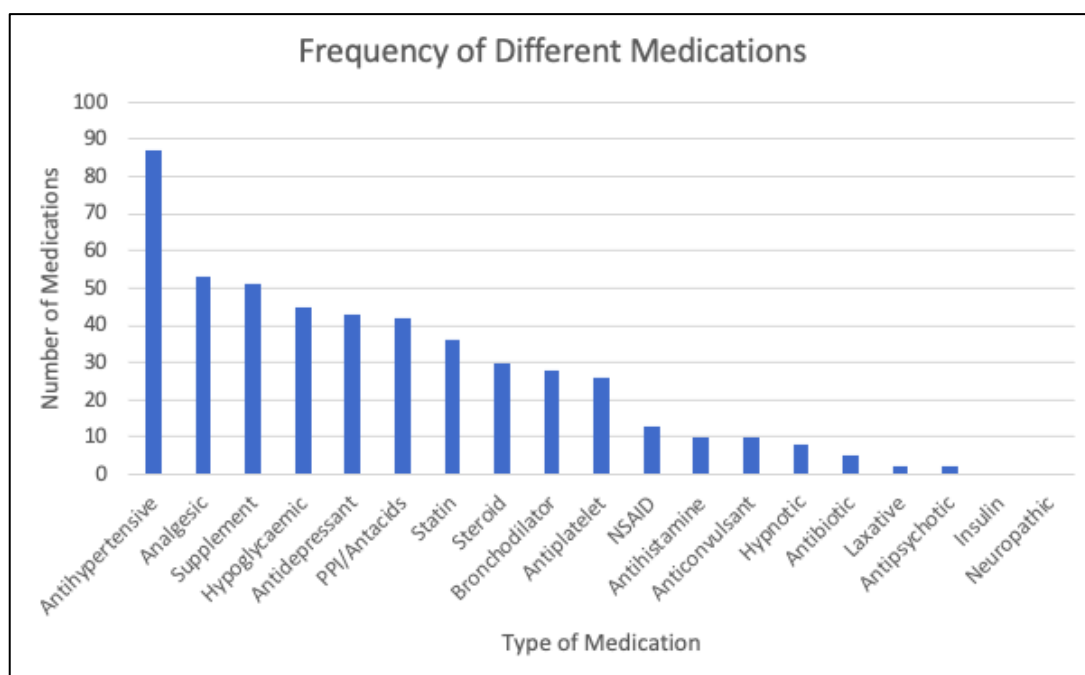


Figure 5. A bar graph showing the frequency of different medications required by patients presenting to DEC.

Gender	%
M	60.5
F	39.5

Table 1. The percentage of male and female patients presenting to DEC.

Gender	Total	Medically Compromised	%Compromised
M	121	102	84.0
F	79	64	81.0

Table 2. The percentage of male and female patients that are medically compromised.

Patients who do or do not require medication(s)	%
Do not require medication	23.0
Require medication(s)	77.0

Table 3. The percentage of patients requiring or not requiring medication(s).

Discussion

Our results illustrate that DEC patients have a similar MH complexity to those discussed in the comparator review and related literature. Firstly, our data shows that the predominant medical condition amongst DEC patients is CVD. Significantly, this parallels findings of not only the comparator review (Atkin et al. 2022), but also a Spanish study exploring the prevalence of systematic diseases amongst dental patients in public and private systems (Fernández-Feijoo et al. 2012) which, likewise, revealed CVD to be the most common medical condition. Notably, these findings are comparable to the previously discussed literature by Bhatega (2012) and Patel et al. (2014), which found CVD to be the most frequent medical condition amongst dental patients. Albeit concerning, the prevalence of CVD is unsurprising considering this group of morbidities affects 7.6 million people in the UK alone (British Heart Foundation 20220) and, globally, is the leading cause of death (Centres for Disease Control and Prevention 2022).

Additionally, our results revealed 83% of patients to be medically compromised – this is 17% greater than the comparator review (Atkin et al. 2022). The dissimilarity may be due to the differing mean ages of the presenting patient on E&E and DEC – 36 years versus 55 years, respectively. A reason for the relatively young mean age of

those presenting to E&E may be due to three universities being in proximity to Cardiff Dental School, as mentioned in the comparator review (Atkin et al. 2022). With many students not registering with a local GDP, it is unsurprising that a significant proportion of patients presenting for emergency dental treatment were below the age of 35 (Atkin et al. 2022). DEC, on the other hand, more accurately reflects the ages of patients presenting to GDPs – according to England's 2018 Oral Health Survey of 16,572 adults attending general dental practice, the approximate mean age of the presenting patient was 52 (Public Health England 2020). Likewise, an Australian study assessing the MH complexity of 873 patients presenting for a general dental examination, revealed the estimated mean age of the patient to be 57 (Agnieszka et al. 2020). Importantly, the results showed that 80% of patients required at least one medication, which is only 3% less than percentage of DEC patients requiring at least one medication. This consolidates the idea that a greater proportion of older patients are presenting to GDPs with alike MHs, which tend to be more complex and hence more challenging to manage.

The findings discussed illustrate that patients on DEC appear to have a similar or greater MH complexity to patients on E&E. This signifies that, while a screening process exists on DEC to filter out unsuitable patients, those with complex MHs are not excluded on the basis they are 'too complex'. Though we can agree that DEC gives undergraduate students the opportunity to treat medically complex patients, there is no requirement to retake the MH as patients are seen repeatedly for longer courses of treatment, which diminishes any new learning of HD/CMSD. In this context, E&E may provide a more thorough learning experience of HD/CMSD due to the increased turnover of patients and the immediate importance of MH for treating the presenting emergency. The similarities between the MH complexity of DEC patients to those discussed in related literature, however, indicates that DEC is an accurate microcosm of general dental practice, which gives undergraduate students a realistic expectation of the older and more medically complex patients they will be required to treat as a foundation dentist.

Although our results largely follow the anticipated trends, certain limitations of the methodology may have reduced the accuracy and reliability of the results. Our data illustrates that the average number of co-morbidities increases from the ages of 18-85. This coincides with the previously discussed and well-recognised concept that medical complexity grows with age. However, our data also shows that those over

the age of 85 have fewer co-morbidities than both the 66-75 and 76–85 age groups (average of 4.8 co-morbidities compared to 5.7 and 7.1, respectively), which differs from the apparent trend. This irregularity may be due to only six of the 200 patients (3%) being over the age of 85; it is unlikely that a sample of this size would be able to accurately represent the MH complexity of this entire age group's population. Likewise, though the data generally coincides with the expected trends, the overall sample size of 200 is still relatively small – this will have resulted in difficulty identifying anomalies, increasing the risk of skewed data and unreliable results. A larger sample size would likely have given more accurate results, particularly due to utilisation of data collection methods which have an increased margin of human error – accidental inclusion or exclusion of certain medications or medical conditions would have rendered inaccurate results. That being said, a study of 1.7 million patients in Scotland and the UK revealed that over 85-year-olds comprised merely 2.1% of the sample – of those included, just over 80% suffered with at least two co-morbidities (Barnett et al. 2012). This agrees with our own results which show that over 85-year-olds account for only 3% of the sample – of those included, 83% suffered with at least two co-morbidities. Importantly, the consistency between our results and related literature favours the accuracy of our data. Moreover, it leads us to believe that the small proportion of over 85s in our sample may be due to less of the population being of this age range – according to Age UK (2019), those aged over 85 constitute only 13% of the over 65s population.

Startlingly, the GDC's guidance on medical teaching has diminished over the last 40 years, despite the UK's changing demographics. Undoubtedly, the UK's increasingly ageing and more medically complex population is forcing GPs to treat patients with challenging medical histories. As discussed previously, a large proportion of GPs lack the knowledge to effectively manage medical emergencies and complex MH cases – it is evident, therefore, that a more robust HD/CMSD curriculum, along with reinforcement in foundation training, is essential to instil greater confidence amongst all dental practitioners. Over the years, the GDC's undergraduate curriculum on medical teaching has changed from what was once known as “medicine and surgery” to what is now known as “HD/CMSD”. Unfortunately, accompanying this name change is a watered-down curriculum which fails to give specific instruction on the medical teaching that should be given to dental undergraduate students.

For example, in the 1980 'Recommendations Concerning the Dental Curriculum', three paragraphs were dedicated to guidance on medical teaching. The curriculum stated that dental undergraduate students were expected to attend "the medical and surgical departments of a general hospital" (General Dental Council 1980) – the GDC's 1997 guidance, 'The First Five Years', gave further instruction regarding this teaching, stating that undergraduate students should have teaching at "in-patient and out-patient medical and surgical departments or in specialist clinics situated in teaching or district general hospitals" (General Dental Council 1997). It also specified that students were expected to attend the accident and emergency departments of a general hospital. Unarguably, the GDC placed great emphasis on the teaching of HD/CMSD in the latter part of the 20th century – in fact the authors of the 1997 guidance even wrote that "the course in human disease (medicine and surgery) and in allied subjects, including general pathology and microbiology has been held in high regard by those designing dental curricula" (General Dental Council 1997).

In the 2002 edition of 'The First Five Years' however, less detailed instruction on medicine and surgery was given. For example, unlike the 1997 curriculum which stated that dental students were to be given teaching on medicine and surgery by physicians and surgeons (General Dental Council 1997), the 2002 curriculum did not specify who should deliver teaching to students (General Dental Council 2002). Similarly, the 2002 guidance stated that clinical teaching of medicine and surgery could be delivered in a primary care trust (General Dental Council 2002), unlike the 1997 guidance which specified that it should be delivered in a hospital-environment, only (General Dental Council 1997). That being said, the 2002 guidance did dedicate a small section to gerontology – the authors stated that this addition to the curriculum was due to the UK's "profound demographic changes" and the subsequent increasing "numbers of adults with teeth" (General Dental Council 2002). Evidently, the GDC recognised the demographic changes affecting the population – we would assume, therefore, that their curriculum would remain as thorough as the 1980 and 1997 editions and that any modifications, would result in an even more comprehensive curriculum. Yet the somewhat less specific 2002 guidance, illustrates that in fact the opposite occurred – the deteriorating instruction on the teaching of 'medicine and surgery' is further evident by the changes made to the curricula which followed.

The 2008 guidance was an interim curriculum which was shortly replaced in 2010 (General Dental Council 2008) – it was significantly less detailed than the previous editions of ‘The First Five Years’. Surprisingly, the guidance no longer included specific instruction on how the curriculum should be assessed and there was no mention of co-ordination between the medical and dental schools (Atkin et al. 2018). Likewise, the 2011 guidance which replaced ‘The First Five Years’ was named ‘Preparing for Practice’ – this document was even less detailed than the last, consisting only of a series of broad outcomes which dental students were expected to meet (General Dental Council 2011). Astonishingly, the HD/CMSD curriculum was diminished into merely a few sentences, for example to “identify general and systemic disease and explain their relevance to oral health and their impact on clinical treatment” (General Dental Council 2011). Unfortunately, the next edition of ‘Preparing for Practice’ which was released in 2015, failed to include further instruction on HD/CMSD – the outcomes remained entirely unchanged (General Dental Council 2015).

Evidently, the GDC’s curriculum guidance on HD/CMSD teaching has faded over the years into a set of vague outcomes. This gives scope for each dental school to teach and assess HD/CMSD as they see fit, resulting in a very different learning experience for students. This is apparent from the findings of a 1-day symposium held in Cardiff in 2017, comparing the teaching of HD/CMSD across different dental schools (Atkin et al. 2018). It was discovered that Aberdeen, for example, taught students HD/CMSD in years 2,3,4,5 whereas in Dublin and Belfast, students were taught this portion of the curriculum in year 3, only. Likewise, due to no specific instruction on the assessment of HD/CMSD, Cardiff, Cork and Peninsula dental schools did not have an Objective Structured Clinical Exam (OSCE) to assess the HD/CMSD, unlike the rest. Similarly, Aberdeen was the sole dental school with an equal proportion of medical and dental staff teaching HD/CMSD; in every other school, HD/CMSD was predominantly delivered by dental staff. Undoubtedly, the current teaching of HD/CMSD differs greatly to the methods utilised in the latter part of the 20th century – with the release of the original ‘First Five Years’, most dental students were taught HD/CMSD by medically qualified staff, under more detailed guidance from the GDC – as communicated by the dental school – resulting in an entirely different learning experience (Atkin et al. 2018).

Conclusion and Further Research

To conclude, our results coincide with the idea that the UK's population is becoming increasingly medically complex. The HD/CMSD learning experience that students gain on DEC and E&E varies only in the fact that on E&E, students are required to take several medical histories due to the greater number of presenting patients. Since the MH complexity of patients on DEC are equal, if not greater in complexity than E&E patients, students gain a realistic expectation of the types of patients they will be expected to treat as a graduating dentist. While we have assumed that students gain a different, yet similarly challenging learning experience of HD/CMSD on E&E and DEC, future research should be targeted towards students' perceptions of HD/CMSD teaching reinforcement on different clinics. In doing so, dental schools can utilise teaching methods which are well-received by students, improving the learning experience of HD/CMSD further. Moreover, although the varying approaches of teaching and assessing HD/CMSD were divulged at the 1-day symposium mentioned previously, further research is required to determine which of these means are most effective – this may guide the GDC towards introducing a specific standardised HD/CMSD curriculum which will ensure the proficiency of all graduating dentists. Importantly, a publication from the UK and Ireland Teachers of Human Disease attempted to rectify this lack of central GDC guidance in order to allow dental schools to adopt some common themes for HD/CMSD teaching (Mighell et al. 2011). Failing a reformation to the guidance, GPDs will become progressively incapable of managing medically complex patients as the UK's demographics evolve. This will result in greater anxiety treating patients, more medical catastrophes and, ultimately, diminished confidence in the dental profession.

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