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General dental practitioners' perceptions of, and attitudes towards, improving patient safety through a multidisciplinary approach to the prevention of medication-related osteonecrosis of the jaw (MRONJ): a qualitative study in the North East of England

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ABSTRACT

Objective To explore general dental practitioners' (GDPs') perceptions of, and attitudes towards, the risks of medication-related osteonecrosis of the jaw (MRONJ) and the current/potential multidisciplinary approach(es) to prevention of the condition.

Design Interpretivist methodology using a grounded theory approach and constant comparative analysis to undertake an iterative series of semistructured interviews. Ritchie and Spencer's framework analysis facilitated the identification and prioritisation of salient themes.

Setting Primary care general dental practices in the North East of England.

Participants 15 GDPs.

Results GDPs are aware of the risk of MRONJ with commonly implicated medicines; however, they report limited collaboration between professional groups in person-centred avoidance of complications, which is a key requirement of the preventive advice recommended in extant literature. Four salient and inter-related themes emerged: (1) perception of knowledge; indicating the awareness of the risk, limited knowledge of implicated medications and experience of managing the condition; (2) risk; indicating the importance of accurate medication histories, the treatment of low risk patients in primary dental care, counselling of poorly informed patients, the fear of litigation and perceived low priority of oral health in the context of general health and well-being; (3) access and isolation; referring to access to general medical records, professional isolation and somewhat limited and challenging professional collaborative relationships; (4) interprofessional working; indicating oral health education of other professional groups, collaboration and communication, and a focus on preventive care.

Conclusions Patients continue to be at risk of developing MRONJ due to limited preventive interventions and relatively disparate contexts of multidisciplinary team healthcare. Effective collaboration, education and access to shared medical records could potentially improve patient safety and reduce the potential risk of developing MRONJ.

Strengths and limitations of this study

- ► Although medication-related osteonecrosis of the jaw (MRONJ) is not a common finding, affected patients experience significant morbidity and management of this condition warrants further study to improve patient care.
- ► This is the first qualitative study that has explored the attitudes and perceptions of general dental practitioners (GDPs) towards the multidisciplinary approach to preventing MRONJ.
- ► A qualitative method yielded rich data through in-depth semistructured interviews with GDPs; constant comparative analysis allowed further exploration and refining of emergent themes.
- ► The study was based around an *a priori* assumption of limited knowledge among GDPs in relation to MRONJ; participants were provided a patient information leaflet in advance, therefore exposing participants to the concepts before the interview.

INTRODUCTION

Bisphosphonates were first implicated in the pathogenesis of medication-related osteonecrosis of the jaw (MRONJ) in 2003[1]; however, other medications such as the antiangiogenic drugs, bevacizumab, sunitinib and aflibercept, and the receptor activator of nuclear factor kappa-beta ligand inhibitor denosumab have subsequently also been associated

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with the condition.[2] MRONJ is defined as exposed bone, or bone that can be probed through an intraoral or extraoral fistula, in the maxillofacial region that has persisted for >8 weeks in patients with a history of treatment with antiresorptive or antiangiogenic drugs, and where there has been no history of radiation therapy to the jaw or no obvious metastatic disease to the jaw.[3]

MRONJ is a rare complication; the estimated incidence in cancer patients treated with antiresorptive or antiangiogenic drugs is 1% and, in osteoporosis patients treated with antiresorptive drugs, is 0.01%–0.1%.[2] However, MRONJ is difficult to treat and can cause significant morbidity to patients; our previous qualitative study of patients diagnosed with MRONJ highlighted the significant quality of life implications, particularly the physical, psychological and social impacts associated with the condition.[4]

Prescribing rates of drugs associated with MRONJ have risen significantly in recent years and are expected to rise further. Prescribing of denosumab has increased in the UK with an estimated 24.4% rise in National Health Service (NHS)expenditure on the drug between 2015/2016 and 2016/2017.[5] The introduction of intravenous bisphosphonates in the treatment of early breast cancer also approximates to a further 20 000 patients being prescribed bisphosphonates annually in the UK.[6]

Current clinical guidelines recommend that patients are to be in a state of optimal dental fitness, relative to their condition, specifically with the elimination or stabilisation of oral disease before commencement of MRONJ-implicated medications, or as soon as possible thereafter. A particular focus should be directed towards high-risk oncology patients, including a thorough dental assessment and the prioritisation of care that reduces mucosal trauma or prophylactically reduces the risk of subsequent dental extractions.[2]

A number of studies have described reductions in the incidence rates of MRONJ with the execution of appropriate screening and preventive dental care.[7 8] However, a 2015 survey (n=129) identified that >90% of general dental practitioners (GDPs) were unaware of medications which are associated with MRONJ other than bisphosphonates and that 58% of participants were not confident in performing an extraction in primary care on a patient prescribed oral bisphosphonates.[9] The prevention of MRONJ should be promoted by the multidisciplinary healthcare team with a collaborative approach to the education of patients and promotion of high standards of oral hygiene and preventive measures.[2 10–12]

Our previous studies have identified limited awareness of MRONJ among patients, with little promotion of appropriate preventive strategies from general medical practitioners and pharmacists.[4 13] Both of these professional groups often overlooked the advice related to the risk and prevention of MRONJ; the reasons for this were multifactorial; however, a lack of awareness of the condition, complexity of patient medical histories and prioritisation of other information, were all potential barriers to optimal patient care.[4 13] In this study, we have investigated the attitudes and perceptions of GDPs on the risks of MRONJ and approaches to its prevention.

Aims

1. To explore the attitudes towards, and perceptions of, GDPs on the risks of MRONJ.
2. To explore the attitudes towards, and perceptions of, GDPs on the multidisciplinary approach to the prevention of MRONJ.
3. To explore any perceived barriers or enablers to optimising the management of this patient group.

METHOD

Design

The study adopted a grounded theory approach,[14] whereby constant comparative analysis was utilised to enrich data through iterative cycles of data collection and analysis.[15] Individual semistructured interviews were undertaken at the participants' places of work and up to 1 hour was designated for each interview conducted. An initial topic guide (online supplementary document 1) was developed by the principal investigator based on the extant published literature to date and the findings of our previous qualitative study.[4 13] The topic guide was reviewed and refined by the multidisciplinary research team and served as a benchmark for the establishment of initial questions. However, flexibility in this process and the emergence of particular new themes facilitated further exploration during the interview and in subsequent data collection with other participants. The interviews were audio recorded and transcribed verbatim as an integral part of the qualitative analysis methods adopted.

Participants

An invitation letter (online supplementary document 2) and participant information sheet (online supplementary document 3) were posted to GDPs and disseminated with the assistance of the local dental professional network. A convenience sample of participants who responded to the invitation was implemented initially, with snowball sampling adopted to successfully ensure further recruitment to the study.

Analysis

Constant comparative analysis facilitated the enrichment of data and further exploration of emerging theoretical concepts in subsequent interviews. Ritchie and Spencer's framework analysis[16] provided a systematic approach to data analysis and allowed the identification and prioritisation of salient themes from the data[16]; themes were reviewed by the principal investigator (AS) and the research team until definitive concepts became evident.

Patient and public involvement

A patient representative from the University of Sunderland Patient, Carer and Public Involvement Group was involved in coconstructed discussions around the

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Table 1 Participant characteristics

Participant	Identifier	No of years' since graduation	Gender
1	D1	5–9	Female
2	D2	<5	Male
3	D3	5–9	Female
4	D4	<5	Male
5	D5	>20	Male
6	D6	<5	Female
7	D7	>20	Male
8	D8	>20	Male
9	D9	<5	Male
10	D10	5–9	Male
11	D11	5–9	Female
12	D12	<5	Female
13	D13	>20	Female
14	D14	5–9	Female
15	D15	<5	Male

practical implications of the design and ethical issues associated with this study.

RESULTS

A total of 15 GDPs participated in this study (table 1). In-depth semistructured interviews were carried out between May 2018 and September 2018 until theoretical emergence of the data was exhausted.

Four salient inter-related themes emerged from the data: (1) perceived knowledge; (2) risk; (3) access and isolation; (4) interprofessional working.

Perceived knowledge

The concept of MRONJ was introduced in the participant information sheet provided in advance of the interview; however, all participants reported prior awareness of the risk of osteonecrosis of the jaw posed by certain medications.

> Even though it's a low risk, as a dentist, maybe just I know that it—it's such a difficult condition to manage and can't really be managed that well. (D1)

All participants were able to identify bisphosphonates as being associated with MRONJ; there was limited knowledge of other implicated medications.

> That's the only one (bisphosphonates) that I am really aware of. There's probably, maybe, other ones, but I really wouldn't know what they are. (D4)

All participants had at least some (though minimal) experience of managing patients with MRONJ; this was mostly gained during their undergraduate studies and participants had very limited or no exposure to patients with MRONJ in their subsequent general practice.

> I've seen it as an undergraduate, but I have never seen it in practice. I think this particular patient that I saw was quite disfigured by it and had been attending the dental hospital for a long time. (D1)

Most of the participants were aware of guidelines for the prevention and management of MRONJ. Although all participants practiced in England, the Scottish Dental Clinical Effectiveness Programme (SDCEP) Guideline was cited as a good source of information[2]; those participants who had qualified most recently described being directed to these guidelines during their undergraduate study.

> The guideline I usually tend to use for everything is the Scottish ones, SDCEP . (D3)

Risk

Participants described the importance of taking accurate medication histories for each patient; a particular focus was directed towards certain medications such as anticoagulants and bisphosphonates.

> I'm looking out for any bisphosphonate really, and warfarin, any anticoagulants, they are the main ones. (D2)

Participants were aware that the risk of MRONJ is small for patients who are taking oral bisphosphonates and that intravenous formulations carry a higher risk. The risk of MRONJ developing following a dental extraction in patients prescribed oral medications was deemed to be small and this procedure was considered typically suitable for general practice. Patients receiving intravenous medications associated with a cancer diagnosis were perceived to be at higher risk and participants reported that they would typically refer these patients to secondary care.

> The way I view it—if—if they are on IV or if they have had IV bisphosphonates recently, then I would see it as high risk and I would probably refer to oral surgery. If they are on long-term oral then I am not concerned and would do the extraction. (D10)

All participants reported that they discuss the risk with patients prior to carrying out treatment; however, participants described the limited awareness of patients on the oral risks associated with medications implicated in MRONJ. Typically, information regarding this was introduced to the patient by the dentist prior to invasive procedures and had not been introduced at the point of prescribing or dispensing the medication.

> The patients don't really have a clue to be honest, I think dentists are aware but I am not sure anyone else even knows about it. (D10)

> It should come from the person prescribing I suppose, it's not me that is putting the patient on these drugs, but it would be up to me to guide them through what's appropriate for them once they are prescribed them. (D6)

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Although there are guidelines that inform prevention, treatment planning and the management of MRONJ, the fear of litigation following an extraction and subsequent development of osteonecrosis was an emergent theme from the data.

> I don't think it's a big risk, at least not with orals [oral bisphosphonates], but I think it's a litigation thing really, protecting yourself and making sure the patient is informed, rather than it being a massive risk. (D9)

Oral health was perceived to be low down the list of priorities for other healthcare professionals, particularly among medical colleagues.

> I feel like whenever I have spoken to a GP about anything related to dentistry, they are kind of very much of the opinion, 'that's your job and not mine, you know better so sort it out'. (D14)

> A lot of the time they don't think of oral health as—as being high up on that—on that priority list. You know, they think about everything else, but the teeth and gums are an afterthought. (D10)

Access and isolation

Participants described challenges in obtaining accurate medication histories from some patients; the relative degree of time it takes when dentists are required to contact general medical practitioners was seen as a significant barrier to improving patient care.

> I make sure I take medication histories for patients, but they don't always know exactly what they take. It's sometimes hard to be sure the list they give you is accurate. (D15)

> I think it's sometimes very difficult to make contact, and like, if we try and phone them and they phone us, obviously we're all busy, we never have gaps at the same time, it can be really time consuming. (D11)

Access to summary care records (SCRs) was described as a key opportunity to save clinical time and ensure that dentists were fully aware of the patient's current medical conditions and medication history.

> It would be brilliant, if we could just see, even just an element of their records, even just what drugs they were taking. That's the main thing for us, it takes so long to get the drug history out of a patient. (D13)

Participants described the professional isolation that occurs in general dental practice. This indicated isolation from other healthcare professionals and potentially from other dental colleagues.

> I think with a lot of things with dentists really, that we are out of the loop, I just don't seem to have had much interaction with any other healthcare professionals. (D6)

Participants described limited interprofessional relationships and communication with other healthcare professionals in the existing organisational infrastructure. Typically, communication with general medical practitioners would be one way, difficult to initiate, and only take place when needing to confirm complex medication histories.

> It's really just the difficulty getting in touch with them and the time that it takes, it's quite hard to speak to the GP. (D3)

> I've never had a referral from the GP for anything. (D2)

Participants reported little collaboration with pharmacists, and some described a lack of understanding of the pharmacist's role. Communication with pharmacists would typically be to discuss issues around prescribing errors or with potential drug interactions; some participants reported communication with pharmacists who run anticoagulant therapy monitoring services.

> I personally don't really feel that I've got a good enough understanding of what an actual pharmacist's job entails. (D2)

> The only patients that I have really had any dialogue about with pharmacists are those on warfarin. The pharmacist runs the anticoagulant monitoring service. (D5)

Interprofessional working

A greater focus on oral health education in other healthcare professionals' training could potentially develop a better collaboration between the professions of dentistry and general medical practice and facilitate a greater understanding of the importance of oral health in relation to the adverse effects of medication and the links between oral health and systemic disease.

> I think the importance of oral health could be stressed more by other professions and we could probably work better together really. You know, sometimes there are medications that have side effects like with osteonecrosis and sometimes, there are, there are benefits on other condition like diabetes with oral health. (D15)

Participants described a willingness to engage with other healthcare professionals in order to improve patient care. Greater collaboration, clear referral pathways and communication with general medical practitioners and pharmacists would be well received.

> If there was a better multidisciplinary relationship, better communication, it would be much better for us in terms of delivery of better patient care. (D2)

> Yeah definitely. Yeah, I'm more than happy if pharmacists could refer appropriate patients, it's just about making sure that the patients know and getting them to see me as soon as possible really. (D2)

A greater focus on preventive care and the discussion of the oral health implications of medications associated

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with MRONJ at the point of prescribing would improve care for this patient group. This would allow dentists to implement preventive strategies before the potential risk of MRONJ develops.

> If a patient is going to go on to alendronic acid or any of the bisphosphonates they should be referred to be dentally screened first, because I don't think that happens at all. It could really help to reduce the risk if we can do any work and explain things properly to the patient first. (D8)

DISCUSSION

In this research, we undertook semistructured interviews to investigate the attitudes and perceptions of GDPs on risks of MRONJ and approaches to its prevention. Although rare, MRONJ is associated with significant morbidity and can develop following common dental procedures such as tooth extractions. We therefore selected GDPs as a key group of healthcare professionals who can play an important role in prevention strategies for MRONJ, to explore their knowledge in this area and learn from their prior experiences of multidisciplinary working. All participants reported being aware of the risk of MRONJ; however, it should be noted that this was introduced through the patient information leaflet given to participants as part of the consent process, therefore exposing participants to the concept before the interview. Although participants had minimal experience of managing patients with MRONJ, it was apparent that GDPs are aware of the risks associated with bisphosphonate therapy and the importance of prioritising preventive care in this patient group. Our previous qualitative studies of general medical professionals, pharmacists and patients found that patients have poor awareness of the risk of MRONJ and that preventive strategies are rarely implemented at the point of prescribing implicated medicines.[4 13] Participants in the current study have also reported similar experiences, as they often treat patients who are poorly informed about the associated risks of bisphosphonate use. All three studies suggest that patients are being poorly informed about the need for high standards of oral health and that preventive dental care is not being recommended. The multidisciplinary team appear to be working in relative isolation from one another, when prescribing and managing patients who have already been prescribed medications that are linked with the potential development of MRONJ.

Further education of dentists on specific medications, other than bisphosphonates, implicated in the pathogenesis of MRONJ is also required. The participants interviewed in our study had limited knowledge of other implicated medicines, with most participants only aware of the association with bisphosphonate therapy. These findings correspond with those of Tanna[9] who identified that more than 90% of GDPs were unaware of medications other than bisphosphonates which are associated with MRONJ.[9]

Participants were clear in the need to obtain accurate medical and medication histories from patients as part of routine care. Participants described their current practices and confidence in treating many patients prescribed the implicated medications in the context of primary care; however, they would typically find that patients would be unaware of the risks associated with them. It is clear that the recommendations in current guidelines are not always followed and that education of prescribers and pharmacists on the risks of MRONJ is required to ensure that patients are fully informed at the point of initiating pharmacological therapy.

The importance of counselling patients fully on the risks before treatment was highlighted by participants who also referred to the potential risk of litigation from a poorly informed patient or from patients who develop MRONJ following a dental procedure. Although not reported by all, a fear of litigation was clearly a consideration for some participants. A survey by Tanna[9] of 129 GDPs found that 21% identified a fear of litigation as a reason for not performing an extraction in primary care.[9] Participants in our study were, however, willing to perform extractions on lower risk patients prescribed oral bisphosphonates in primary care; this follows recommendations in current clinical guidelines, of which most participants were aware. A 2014 paper highlighted that the legal implications of MRONJ are complex; however, legal liability and malpractice claims have been made.[17] The authors identified the need for dentists and other healthcare professionals to have an understanding in relation to knowledge of MRONJ, provision of information to patients, prevention, diagnosis and treatment.[17]

Participants reported that GDPs are often isolated contextually, situationally and geographically from peers and other healthcare professionals; this was identified by participants as a potential barrier to optimal care of this patient group. This is similar to the findings of a previous qualitative study which explored the collaborative management of patients with diabetes; the researchers identified an isolated knowledge base and a perceived division between the medical and dental professions to negatively impact patient care.[18] Professional isolation among dentists has also been reported in other studies; recent research into the mental health and well-being of UK dentists by the British Dental Association identified professional isolation as a contributing factor in mental illness and burnout among dentists.[19]

SCRs are an electronic summary of key clinical information, such as medicines, allergies and adverse drug reactions that are created from GP medical records. More than 96% of the population in England currently have an SCR, which is accessible from a variety of NHS service providers, including hospitals and community pharmacies; however, GDPs do not currently have access to SCRs.[20] Participants reported challenges in taking accurate medication histories posed by the existing healthcare infrastructure in which they operate, with access to patient's SCRs described as a potentially useful opportunity to improve care and safeguard

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patient safety. Sharing medical records with dental practices could save clinical time for dentists and reduce the risk to patients by ensuring that GDPs have the required information to make informed decisions about proposed dental health interventions. This could potentially benefit patients at risk of MRONJ and directly contribute to the improvement of oral health-related outcomes and potentially increase the opportunity for the safe(r) management of other patient groups.

Mechanisms of reducing both perceived and actual professional isolation, improving collaborative care and mechanisms of communication between professions should also be reviewed. The house of care model provides a framework for patient centred co-ordinated care in the context of diabetes management,[21 22] this model relies onfour key components: (1) engaged and informed individuals, (2) professionals committed to partnerships, (3) organisational and supporting processes and (4) system wide approaches to commissioning. The integration of oral healthcare into the wider healthcare system following this model could potentially address the issues identified in our research, optimise prevention of MRONJ and also address other areas in which oral health impacts the overall health and well-being of patients. Further research into how this model could be implemented, the development of coordinated services and the integration of oral health into primary care settings could potentially have significant benefits to patients.

Participants perceived that oral health is low down the priority list of other (non-dental) healthcare professionals. It is apparent that relationships between GDPs and other professional groups are limited and that effective collaboration and communication could significantly improve care of this patient group. A focus on the collective education of the multidisciplinary team, highlighting the importance of preventive dental care and taking opportunities to actively reinforce the need for good oral health to patients, could be a key mechanism of facilitating and potentially reducing patients' risk of developing MRONJ.

CONCLUSION

Participants identified awareness of the risk of MRONJ, but had limited knowledge of implicated medicines other than bisphosphonates. GDPs place importance on the establishment of accurate medication histories from patients and ensure that patients are informed about the risk of developing MRONJ if invasive dental treatment is required.

Barriers to optimal patient care include a perception that oral health is a low-priority area for other healthcare professionals, a feeling of professional isolation, limited interprofessional collaboration and a lack of access to medical records.

An increased focus on preventive dental care with education of other healthcare professionals on the importance of oral health, integration of oral health into collaborative care models and access to medical records could potentially improve patient safety and reduce the risk of the development of MRONJ in practice.

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