# Why don't general dental practitioners test for diabetes in periodontitis patients? How infrastructure, role identity and self-efficacy can prevent effective shared care

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## Key points

- NHS-practising GDPs perceived the current infrastructure of the health service to be their biggest barrier to implementation of such testing.
- All GDPs, whether NHS or private, had varied perspectives on their social and professional role and identity in relation to such testing.
- Self-efficacy in the realm of testing was generally low due to a lack of perceived knowledge, training and competence.

## Abstract

**Aim** To explore the attitudes of general dental practitioners (GDPs) towards testing for diabetes in periodontitis patients amid recommendations from professional organisations that dentists and oral health professionals are well-positioned to support the diagnosis of diabetes in primary dental care.

**Method** GDPs were selected based on purposeful sampling. The number of GDPs recruited was dependent on thematic saturation. Semi-structured telephone interviews were conducted with all recruited GDPs. Interviews were audio recorded and transcribed verbatim. Thematic analysis was utilised to generate initial codes and subsequent themes.

**Results** Fifteen GDPs participated in this qualitative study. Three main interrelated themes emerged: 1) there is an inadequate infrastructure within the current NHS; 2) the difference in the definition and threshold of the social and professional roles and identities of GDPs; and 3) there is a low self-efficacy to testing due to a perceived lack of knowledge.

**Conclusions** This qualitative study has identified the barriers to and enablers for testing for diabetes in patients with periodontitis attending general dental practices in England. The findings have the potential to influence interventions and policies going forward to improve the co-management of diabetes and periodontitis within primary healthcare.

## Introduction

Periodontitis, a major public concern, affects 45% of the adult population, with 10.8% of the population displaying signs of severe periodontal breakdown.[1,2] Traditionally, biofilm control has been the therapeutic focus of periodontitis management. Yet such an approach has failed to impact as a single form of periodontal therapy.[2]

The pathophysiology of periodontitis involves a paradigm comprising a dysbiotic biofilm leading to an aberrant host immune-inflammatory response, causing the substantive tissue damage seen in periodontitis.[3] As a result, there has been a shift in contemporary research towards therapies modulating an individual's host response to the bacterial challenge, with risk assessment playing a pivotal role in the management of periodontitis.[2,4]

Diabetes, another major public health concern, has been diagnosed in 3.7 million people in the UK, with undiagnosed type II diabetes estimated in a further 1 million people.[5] The economic burden of both type I and type II diabetes accounts for 10% of the UK's NHS budget and is estimated to rise to 17% by 2035.[6]

The co-morbid relationship between periodontitis and type II diabetes has been discussed at length.[7] Glycaemic control is related to periodontitis in a dose-response manner.[8] Uncontrolled glycaemic levels increases the risk of periodontitis by two- to three-fold.[9] Those suffering with periodontitis but who do not have diabetes have shown higher levels of glycated haemoglobin (HbA1c), fasting blood glucose and increased risk of developing prediabetes. A significant, higher risk of developing diabetes has been identified in those with severe periodontitis compared to periodontally healthy individuals.[7] The current understanding linking the two conditions involves the upregulated inflammatory response arising from each disease process adversely affecting the other.[9] Therefore, uncontrolled diabetes has become a known risk factor of periodontitis as it can adversely affect the host response.

Multiple organisations, including the National Institute for Health and Care Excellence and the Royal College of Surgeons of England Faculty of Dental Surgery, have suggested dental professionals are well-positioned to play a broader role in supporting patients' general health, particularly in the detection of diabetes.[5,10] In addition, recent treatment guidelines have listed improved

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metabolic control in those with diabetes as a first step in periodontal therapy.[11]

We are unaware of research exploring the attitudes of general dental practitioners (GDPs) to testing for diabetes in primary dental care. The aim of this research was, therefore, to explore the perceived barriers and facilitators to such testing which may influence interventions and policies going forward.

## Method

Ethical approval (reference QMREC2377a) was granted by the Research Ethics Committee of Queen Mary University of London (QMUL) before commencing the research study. It was deemed this research did not require NHS Research Ethics Committee approval.

Purposive sampling was undertaken seeking variation in relation to the key criteria of the interview guide (Appendix 1) and demographic characteristics of GDPs. Participants were recruited through personal contacts. Criterion sampling was utilised initially to construct a comprehensive understanding surrounding the study question from participants who fulfiled the predetermined criteria set in Table 1. After the initial eight interviews were conducted, snowball sampling was used to ascertain participants who met the predetermined criteria.[12] The criteria were very inclusive to gain a broader diversity of opinion.

Participant information sheets and consent forms were emailed to GDPs who were willing to participate in the study. They were subsequently contacted by the principal investigator to arrange an interview. Participants could withdraw consent at any time without reasoning.

Due to the restrictions placed on face-to-face contact during the coronavirus pandemic, telephone interviews were conducted. All interviews were conducted by one investigator between April 2020 and June 2021. A semi-structured interview guide (Appendix 1) was designed and utilised as a reference to ensure all key topics were included. A conversational style of interviewing was adopted to encourage a dialogue rich in detail. Interviews were audio recorded, transcribed verbatim and were checked by the interviewer before analysis. Audio recordings were stored on a password-protected laptop and deleted from the device after transcription and content checking.

Data were analysed following an inductive thematic analysis.[13] Interview transcripts were read repetitively to aid familiarity and iteratively develop a coding scheme representing the relevant concepts voiced in the interviews. Existing codes were used in later transcripts where similar data were identified. Any data that did not fit under existing codes were given new codes to ensure the analysis was open to emerging issues not previously anticipated or identified during earlier analysis. Upon completion of transcript analysis, codes were grouped into initial themes and sub-themes by both authors until a consensus thematic framework was produced.

## Results

A total of 15 GDPs participated in the study and reflected diversity across key characteristics (Table 2). The barriers to testing for diabetes in periodontitis patients, in primary care, identified in this research can be categorised into four domains of the Theoretical Domains Framework:[14]

- Environmental context and resources
- Social/professional role and identity
- Knowledge
- Beliefs about consequences.

**Table 1 Inclusion and exclusion criteria for GDPs to be accepted on to the research study**

| Inclusion criteria | Exclusion criteria |
|---|---|
| Work actively in a primary care dental setting as a general dental practitioner, whether it is in an independent or corporate-owned practice, as part of the NHS or privately | Post-graduate periodontal training |
| Be willing to be audio recorded | |

**Table 2 Demographic characteristics of GDP study participants**

| Participant | Sex | | Primary field of practice | | | Type of dental practice | | Post-graduation experience (years) | | | Practice location (county) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | NHS | Private | Mixed | Independent | Corporate | 0–5 | 5–10 | >10 | |
| 1 | X | | | X | | X | | X | | | Somerset |
| 2 | | X | X | | | X | | X | | | Shropshire |
| 3 | X | | | X | | X | | | X | | Merseyside |
| 4 | X | | | | X | | X | | X | | Shropshire |
| 5 | X | | | | X | X | | | | X | West Midlands |
| 6 | X | | | | X | X | | X | | | City of London |
| 7 | X | | | | X | X | | | X | | Greater London |
| 8 | X | | X | | | | | | | X | West Midlands |
| 9 | | X | X | | | | X | X | | | Staffordshire |
| 10 | | X | X | | | X | | X | | | Essex |
| 11 | | X | | | X | X | | | X | | West Midlands |
| 12 | | X | | X | | X | | | | X | West Midlands |
| 13 | | X | | | X | X | | | X | | West Midlands |
| 14 | | X | X | | | X | | | | X | West Midlands |
| 15 | X | | | | X | | X | X | | | Leicestershire |

## Environmental context and resources

'Environmental context and resources' was the most frequently discussed domain among NHS-practising GDPs when they discussed their perceived barriers to testing for diabetes in periodontitis patients. Whether working within the service partly or wholly, they believed they would have insufficient time to devote to the task due to their limited appointment times and increasing patient and contract demands:

- '*If I had longer appointment times or I wasn't rushed or under any sort of time pressures, I would quite happily implement it [diabetes testing]*' (Participant 14).

Furthermore, they discussed the lack of remuneration for managing periodontitis patients at present and felt such testing could only be implemented if adequately funded:

- '*I don't know how it [diabetes testing] would be funded or would they [NHS] expect us to do it for no extra funding [...] my principal always has a go saying I spend too much time on periodontitis for NHS patients and it's not currently paid very well*' (Participant 11).

In contrast, private GDPs had no qualms regarding time and financial implications of testing and felt it would not be a significant factor in their decision to undertake such testing.

The lack of educational resources and public campaigns to raise public awareness on the bidirectional link between periodontitis and diabetes was discussed by all interviewees. Enhancing public knowledge was thought to improve patient acceptance to GDPs becoming involved in their patients' diabetes management:

- '*There needs to be more public awareness between diabetes and periodontitis. People don't think about these things unless there is some sort of public campaign about it*' (Participant 8).

Environmental restructuring was believed to have the ability to modify the physical and social opportunities to allow such testing to work effectively. GDPs could envision technical solutions to encourage shared care for patients. For example, most GDPs discussed a central shared database with other healthcare professions who could monitor diabetic markers in patients:

- '*I think if there was a central database, where dentists, opticians, pharmacists, GPs [general practitioners] could see the general health of the patient, access all of the medical records, I think that would be something that is quite useful because we can build a picture of someone a lot easier and tailor their treatment plans accordingly*' (Participant 3).

This would not only improve inter-professional collaborations but better facilitate the management of diabetes. Failure to adopt technology in healthcare is a regular occurrence.[15] There are numerous reasons why this is thought to be so.[15] Others conveyed a lack of trust when referring to other professions and commented on the need of electronic referral systems to allow for ease of communication between professions. Lack of efficient inter-professional communication between GDPs and general practitioners (GPs) has been identified in alternative research.[16] Such poor communication has been described as a barrier to successful organisational change towards effective multi-disciplinary practice.[17]

Though GDPs voiced a number of barriers to testing for diabetes in periodontitis patients at present, they understood how it could improve access to diabetes diagnosis and management. This could help reduce global health inequalities.

## Social/professional role and identity

A small number of GDPs were against extending their professional responsibility to test for diabetes in periodontitis patients:

- '*I can see its use for specialist periodontists but otherwise I just don't see how it [diabetes testing] would change the management of periodontitis, especially as we are a general dental practice so we don't really focus just on gum disease. I feel like I have told them the link and that should be all […] I think with diabetes that is up to them to control or discuss with their GP*' (Participant 2).

They expressed that as a generalist their central role was to provide an overview of their patients' dental status and they would be unable to focus on periodontitis alone. They felt their contribution should be limited to informing and educating of the association between the two conditions only.

Another GDP expressed a concern that testing could not only obscure the division between the activities of medical and dental professionals but also encourage the NHS to put more onus on GDPs:

- '*It might blur the lines between us and the GP if we start doing their blood tests for them [...] the NHS might get us to take on more of the GP duties if we start with this*' (Participant 6).

Other GDPs felt patients and other healthcare providers underestimated their professional role in the patients' overall health. Health reforms fostering increased cooperation were discussed by most participants, including all participants with five or more years of post-qualification experience. Alternative research involving primary health care GPs has found GPs' years of experience shaped their willingness in tackling health inequalities.[18] Their willingness could be the result of their increased experiences resulting in developed relationships of trust and positive interactions with other healthcare professionals.

Most GDPs felt a system-wide whole team approach should be incorporated into the system, with appropriate redirection of resources, to improve access to diabetes testing:

- '*I think this would be a good, integrated, bottoms-up approach to strengthen health inequalities within our health system, because if these patients see us more regularly then resources should be redirected to professions who are best positioned to help such patient groups and I think dentists play a big role in that*' (Participant 5).

From their perspectives, GDPs have a professional duty to increase their contribution in their patients' overall health but did not see their current role including diagnosing diabetes. They believed GDPs were well-positioned to provide such testing due to the more frequent visits by patients to GDPs than to GPs.

Intra-professional collaborations were discussed frequently by most GDPs. They believed dental professionals, as an entirety, could be better positioned to provide such holistic care by delegating the task of testing for diabetes to dental hygienists during periodontal treatments. This echoed the findings from other research that all healthcare professionals should be giving the same consistent advice and testing is attractive and acceptable in the GDP setting.[19,20] The difficulty with this idealism is that GDPs, within this study, worked alongside dental hygienists who treated private patients only. Therefore, this would discriminate against NHS patients.

Although all GDPs could understand the benefits to such testing on improved patient health outcomes, all GDPs felt such an increase in professional responsibility should not be undertaken until there were improved integrated systems with primary care GPs. They feared a lack of patient follow-up with their

medical colleagues meant there would be more onus on the GDP to provide subsequent follow up and management of a systemic condition:

- '*I just want to know that I could then refer to the GP or press a button and I have done my bit and that won't come back on me*' (Participant 12).

GDPs could envisage their role changing but only under external pressures. To these GDPs, their role was not defined by them but by national public policies, professional or societal campaigns and organisations and the public. Improved social support from GPs was an interventional function anticipated by the interviewees to improve their confidence in extending their professional roles. Distinct training with subsequent socialisation into professional groups has been deemed a barrier to different healthcare professionals working together.[17]

### Knowledge

Self-efficacy in the realm of testing and counselling patients about their risk of diabetes was generally low due to a lack of perceived competence at present. All GDPs, to varying extents, discussed their perceived lack of knowledge and scientific rationale of the conditions as a barrier to implementing testing into dental practice. As years since graduation increased, GDPs felt they knew less in comparison to their junior colleagues. Most GDPs had not continued professional development on the topic since graduation and felt their dental degrees did not provide them with sufficient detail. They voiced the little emphasis on periodontal diseases in relation to systemic diseases within their dental curriculums.

Perhaps not surprisingly, some GDPs preferred someone else to look after aspects of care they did not feel confident about and used this as rationale to support their beliefs about why diabetes testing should be solely GP-led:

- '*I wouldn't want to contradict anything that their GP is saying and I think their physician is probably more qualified to discuss their diabetic condition*' (Participant 3).

The majority of GDPs acknowledged their insufficient training as a serious impediment to engaging in a more active role in testing for diabetes in general dental practice and felt that if adequate training was provided, then they would be happier to commence such a service.

### Beliefs about consequences

Patient acceptance was a barrier envisaged by some NHS-practising GDPs. They felt their patients would not expect investigations outside of the mouth to be carried by their dental professional and would be more comfortable with their GP undertaking such testing:

- '*They [patients] would think "why is the dentist doing this to me, it's got nothing to do with you, it's between me and my GP*' (Participant 14).

However, other GDPs, whether NHS or private, felt the uptake to such testing would be positively received as patients would appreciate the efforts to provide more holistic care and improve their access to diabetes testing if they were at risk of the condition. A recent study demonstrated that 48% of a sample of periodontitis patients were at a significantly increased risk of developing type II diabetes after an initial diabetes screening was undertaken in a primary dental care setting.[16] GDPs expressed how such testing would allow for tailored and personalised management and subsequently, improve patient outcomes:

- '*[Diabetes testing] is another caveat that allows you to have something more in your armoury that allows you to target your advice*' (Participant 1).

One GDP was concerned about the legal accountability by doing in-house diabetes testing. They felt a false-negative result could become the subject of a lawsuit:

- '*I'd also wonder if there are any potential litigation issues, for example, false-negative results […] I wonder if the patient could sue me? Would current dental indemnity include this testing and diagnosis, or would dentists need increased cover?*' (Participant 6).

This decisional conflict and uncertainty could result in stasis and therefore, a lack of willingness to change practice routines. Concerns regarding fear and risk of medical litigation have also been identified among GPs. The fear of litigation influenced how medicine was being practised, defining their role as a healthcare professional.[21]

Most GDPs felt such testing would only work in their favour regarding litigation. During a period where periodontal-related litigation claims are high, objective measurements demonstrating glucose control, particularly in poorly controlled patients, would aid explanation of poor periodontal treatment outcomes:

- '*Litigation is a bigger risk from misdiagnosis of perio and not treating it well enough. So if you have more idea of it [diabetes control], I think that is only a good thing […] and you're covering yourself for when something doesn't work*' (Participant 11).

In addition, extending professional responsibility to diabetes testing demonstrated holistic care which GDPs felt could aid their counterargument should there be any cases of litigation.

## Discussion

GDPs recognise the benefits of testing for diabetes in periodontitis patients. Yet, embedding this in the individual primary care practices is hindered by several phenomena recognised in the quality improvement literature. Several policy categories and personal dispositions identified in the Behaviour Change Wheel (BCW) are evident in this analysis.[22] This research was conducted before major attempts to integrate diabetes testing in general dental practice and we believe that some of the intervention functions from the BCW can help those seeking to encourage this practice.

The responses from GDPs identified several personal and organisational elements influencing their periodontal practices:

- Inadequate NHS structure which has created distinct professional identities as opposed to a team-based primary care approach to support collaborative care
- Poor identification of the role of a GDP which has been defined by external pressures
- Insufficient training at both undergraduate and postgraduate levels.

If GDPs are to play a larger part in supporting the diagnosis of patients who may have diabetes, then interventions to change behaviour may need to address the issue of how GDPs see themselves.

### Inadequate service structure

Professor Steele felt public investments in oral health were required, with a priority on 'strong, coordinated public health systems, recognising the common risks to oral health and health overall.'[23]

GDPs felt the co-management of periodontitis and diabetes could be implemented successfully in the health service if, after substantial service redesign, an electronic and cross-disciplinary index was easily accessible for all professions. A similar system has been utilised in an observational cross-sectional study of referral centres in the USA and UK. Full-mouth periodontal assessments were performed to screen for periodontitis in diabetic patients. This integrated practice was recorded in a novel diabetes cross-disciplinary index, which included: glycaemic control, blood pressure, kidney health, retinal health, foot health and periodontal health status.[24] Such a system would allow dentistry to fit in the wider health service and be better aligned with the NHS constitution's principles and values.[25] While the advantages of such a system can be seen, GDPs felt that a well-designed integrated care pathway would be required before a successful interprofessional collaboration could occur.

A crucial component in collaborative care is to share organisational power which is believed to be the balance of leadership and ownership sharing.[17] Therefore, interprofessional collaborations would require the involvement of all healthcare professionals, rather than a delegation of duty which could be evident in the responses by some GDPs in this research. Multiple research studies found a lack of trust and respect among healthcare professionals acting as a barrier to the development of efficient cooperative care.[17,26] Eliminating such barriers would help shift the present solitary care to a team-based approach supporting collaborative care. A health reform fostering collaborative work could be achieved should there be development of adequate local and national organisational structures.

An example of such an integrated clinical pathway to support the NHS Long Term Plan is the commissioning standard proposing the local implementation of a clinical care pathway for patients diagnosed with diabetes to be signposted to their GDP for periodontal assessments and subsequent management.[27,28] An economic analysis has proposed savings of £124 million in NHS medical care if such an integrated pathway between GPs and GDPs existed.[28]

### Poor identification of social and professional role and identity

We identified, as a major barrier, a limited perception of the GDPs' role in diabetes care. Role is one of the key components of the Non-adoption, Abandonment, Scale-up, Spread and Sustainability framework theorising non-adoption of healthcare technologies and of the Theoretical Domains Framework, where the 'social/professional role and identity' domain is defined as 'a coherent set of behaviours and displayed personal qualities of an individual in a social or work setting.'[29,30]

This study explored how GDPs perceived their role in delivering such holistic care, which could aid in the management of periodontitis and the factors which encouraged or hindered them from participating. The participants had differing views on their role as a GDP and their part in the patients' overall health.

Shared care is a model of collaborative care. The General Medical Council states the following regarding shared care: 'decisions about who should take responsibility for continuing care or treatment after initial diagnosis or assessment should be based on the patient's best interests, rather than on your convenience or the cost of the medicine and associated monitoring or follow-up.'[31] The NHS aspires to incorporate shared care via integrated care systems.[27] Some GDPs within this study engaged in more fragmented care regarding testing for diabetes. This was either because they did not see it as their role, or they did not believe it was relevant to their work. Fragmentation is defined as 'focusing and acting on the parts without adequately appreciating their relation to the evolving whole.'[32] Focusing narrowly on a part of the person rather than looking at the person holistically, as a whole, the healthcare professional is thought to have unfulfilled their responsibility to the profession and society.[32]

### Insufficient training

Many GDPs felt their training, or lack of it, acted as an impediment to extending their role to aid in the detection of systemic conditions. Some felt their undergraduate teaching of systemic conditions, particularly when enquiring about their knowledge base associated to diabetes, was sparse. Others, however, did not see it as a crucial aspect of their career and so did not participate in any relevant continued professional development. Nevertheless, it has been recommended by professional bodies that dentists and oral health professionals should engage in general health improvement strategies, particularly in the detection of diabetes, as part of a system-wide, whole team approach to preventative and treatment strategies.[5,33]

Current projects looking at redesigning education and training to advance dental care has recognised the devastating impact diabetes can have on general and oral health. Early management could limit the impact and be delivered by a range of primary care healthcare service professionals to meet the needs of our population. However, delivery of such clinical services would require significant service development. To enhance the scope of practice of dental professionals, Health Education England have acknowledged the need for inter- and intra-professional education and training. They aim to achieve this via core competencies being delivered across professional groups and encouraging the professions to learn together from each other.[33] Such strategies could work to shift the focus away from such distinctly bounded professional identities to a team-based identity supporting collaborative care.

There is an urgent need to better understand the enthusiasm and hindrances behind the attitudes of GDPs to testing for diabetes to inform any interventions and policies aimed at redesigning their role in primary dental care.

One of the authors has an interest in periodontology and this may have led to bias in the interpretation of data, particularly in support of holistic care to improve risk profiling of patients with periodontitis.

## Conclusions

This research suggests that encouraging shared care, at present, around diabetes and periodontal co-management may be hindered by a fragmented wider health service, GDPs' perceptions of their professional and social roles and an insufficient knowledge base. Interventions that seek to encourage GDPs to adjust their perspectives of their roles and re-orient their interactions with other healthcare professionals could help to improve the care of patients with periodontitis and diabetes.

*Ethics declaration*

*The authors declare no conflicts of interest.*

*Author contributions*

*Varkha Rattu designed the study, collected the data, analysed the data, wrote the first draft of the manuscript and edited subsequent draft manuscripts until the final version was agreed. Dominic Hurst advised on the design of the study, contributed to data analysis, edited the manuscript and agreed its final version.*

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## Appendix 1 Topic guide used for telephone interviews with GDPs

1. Demographic questions
- Sex
- Year of qualification
- Location of practice
- Type of practice
- Practice size

2. Managing patients with periodontitis and diabetes in practice
- Thinking about a patient you have seen with periodontitis:
  - How did you explain the aetiology of the disease and what might help improve it?
  - Generally, how do you manage periodontitis patients?
- Can you tell me a bit about how you manage patients with periodontitis and diabetes?
- How do you feel about discussing diabetes with **your** patients who have periodontitis?
  - What do you tend to say to these patients?
  - Did you feel comfortable and confident speaking about their diabetes with them?
  - What do you feel confident discussing with a patient about diabetes and periodontitis?
- Is there anything about managing periodontitis and diabetes that concerns you?
- Do you do anything else for these patients – eg refer to GP?
  - If not, why not? Do you find there are any barriers to referring to a GP?
  - If yes, how do you tend to refer the GP?

3. Exploratory questions about attitudes towards tests:
- Are you aware of any tests to assess blood glucose? How is blood glucose assessed for diabetic patients?
- Some organisations have advocated that GDPs run tests to check patients' blood sugar level, particularly those with periodontitis – how would you feel about this in your practice?
- Are there aspects of **your** practice that do / would prevent or encourage diabetes testing?

4. Is there anything more you would like to say about managing patients with periodontitis who might have diabetes in your practice?

5. Emerging themes included in the topic guide as the research progressed:
- What are your thoughts on integrated care pathways between GPs and GDPs to facilitate the co-management of diabetes and periodontitis?
- Do you think litigation would be a barrier to increasing your professional role in the form of diabetes testing? Why?