Audit: Explaining and investigating periodontitis as a risk factor of diabetes within the diabetes department at a district general hospital

PROJECT DETAILS

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- Location: Diabetes Department, New Cross Hospital, The Royal Wolverhampton NHS Trust, Wolverhampton, WV10 0QP

PROJECT BACKGROUND

Periodontitis, often described as the sixth complication of diabetes, is increased by two to three-fold in individuals with diabetes compared to those without.[1] Glycaemic control is the key determining factor.[1] Successful periodontal therapy in a patient with periodontitis can have clinically significant effects on general health, including improvements in glycaemic control where diabetes co-exists.[1]

Although the above is well recognised amongst the dental profession, awareness amongst medical professions is minimal.[2] The European Federation of Periodontology (EFP), jointly with the International Diabetes Federation (IDF), proposed guidelines for medical professionals. They include informing patients of the bidirectional link between diabetes and periodontitis, asking patients about a prior diagnosis and any signs and symptoms of periodontitis, and referring to a dentist accordingly.[3] These guidelines highlight the importance of multi-disciplinary care to aid improvements in patient health outcomes.

The impact of poorly controlled diabetes on periodontitis is due to an exaggerated host immune-inflammatory response which upregulates the systemic response resulting in substantive tissue attachment loss and alveolar bone resorption.[1] Traditionally, the therapeutic focus in treating periodontitis focused on biofilm management resulting in partially effective treatment.[4] For treatment to be more effective, approaches which embrace the recent advances in our understanding of host modulation are required.[4]

It is of significance that diabetes patients in specialist diabetes care are more likely to have significant diabetes related complications including periodontitis. Therefore, colleagues from diabetes departments in secondary and tertiary care centres are well positioned to ensure susceptible patients (for example, poorly controlled and/ or systemically complicated diabetic patients) are identified and given evidence-based and consistent messages to emphasise the significance of ensuring periodontal, as well as general health, and diabetes care. Early diagnosis with subsequent preventative care and treatment via collaboration between general dental practitioners (GDPs) and diabetes physicians is of utmost importance.

Recognising that the co-management of periodontitis and diabetes could be improved with multi-disciplinary care, we launched a quality improvement project within the diabetes department at New Cross Hospital. This quality improvement project involved educating the diabetes team and patients about the impact of periodontitis on diabetes and vice versa; and introducing a periodontal review within

the diabetes consultation. The periodontal review involves informing patients of the bidirectional link between periodontitis and diabetes, enquiring about a prior diagnosis and signs and symptoms of periodontitis, and signposting the patient onwards to a GDP for a thorough periodontal assessment. This subsequent audit project aims to evaluate the compliance with incorporating a periodontal review into the diabetes consultation.

Incorporating this new service initiative within the diabetes consultation not only encourages healthcare equity, by aiming to reduce health inequalities, but also promotes the benefits of integrated care pathways as discussed within the NHS England's '*Commissioning Standard: Dental Care for People with Diabetes.*'[5]

QUALITY IMPROVEMENT PROJECT AIMS

This project will aim to improve the quality of healthcare provision in a specialist diabetes care setting. It demonstrates a commitment to the quality of care by encouraging health care professionals to make every contact count and integrates the care of diabetes patients whilst promoting preventative strategies.

The objectives of the quality improvement project were to:

- Increase awareness of the bidirectional link between periodontitis and diabetes amongst diabetic patients.
- Assess how diabetic healthcare professionals view diabetes as a risk factor and if they are aware of the bidirectional link with periodontitis.
- Implement the 2017 EFP-IDF guidelines as part of the diabetes consultation.
- Identify methods to increase the delivery of periodontal and diabetes advice to diabetic patients.

QUALITY IMPROVEMENT PROJECT PROCESS

The quality improvement project began in December 2019 and followed a 6-stage process:

- Stage 1 – Project initiation
    - Identify the service to be improved – The diabetes consultation did not include a periodontal investigation.
    - Identify key stakeholders –Individuals whose interests may be affected as a result of project execution or completion were sought after to help instigate the project start.
    - Gather ideas from staff – An initial meeting with the Clinical Director for Diabetes Endocrinology was carried out before discussing the project potential with other team members.
    - Aims of improvement work are to be aligned with organizational aims – The EFP-IDF guidelines *'Guidelines for physicians and other medical health professions for use in Diabetes Practice'* were used as a standard to align our organizational aims against.
    - Obtain agreement for our project to progress – Agreement was gained from the Diabetes directorate. The project was registered at the trust.

- Stage 2 – Define and scope
    - Root cause analysis– When undertaking this process, it was thought that the lack of periodontal investigation within the diabetes consultation was due to the absence of

interprofessional collaborations between medical and dental teams resulting in minimal awareness, with no systems in place to bridge the gap in healthcare.
    - Gathering patient experiences and staff satisfaction – Patient surveys were distributed to assess the awareness amongst patients of the bidirectional link between diabetes and periodontitis. A question-and-answer session with staff was carried out where potential barriers to implementing this project plan were identified.
    - SMART objectives were created which were based around:
        - Increasing the awareness of the bidirectional link amongst patients and staff.
        - Investigating periodontitis as a part of the diabetes consultation.
    - Identify key individuals critical to achieving aims and those who may challenge change. This step was continuous throughout the project.

- Stage 3 – Measure and understand
    - Baseline data was gathered and analysed to assess the:
        - Current level of awareness of the bidirectional link amongst diabetes healthcare professionals at New Cross Hospital (15.6%)
        - Current level of awareness of the bidirectional link amongst diabetic patients attending the diabetic department (17%)
        - The number of diabetes consultations which include a periodontal investigation (0%).

- Stage 4 – Design and plan
    - An action plan was created with target dates. The target dates had to be amended due to the impact of the covid-19 pandemic.
    - The action plan involved two main points:
        - Delivering education to the diabetes team and patients accordingly. This would include departmental teaching to the diabetes team educating them on the bidirectional link between periodontitis and diabetes and informing them of the EFP-IDF guidance. Educational resources would be made available to the diabetic patients.
        - Implementing a periodontal investigation within the diabetes consultation. A proforma would be created to aid the diabetes healthcare professionals when participating in a discussion with their patients regarding their periodontal and diabetes health.

- **Stage 5 – Pilot + Implement (The Audit)**
    - The action points were implemented, and their robustness was assessed against our standards. Barriers to the project were identified and changes were implemented to improve the response. This stage of the quality improvement project forms our audit project which is detailed below.

- Stage 6 – Sustain and share

AUDIT AIM, OBJECTIVES AND STANDARDS

Aim:

- To improve the quality of healthcare provision regarding periodontal and diabetes care to diabetic patients at New Cross Hospital.

Objectives:

- To ensure all diabetic patients attending for a diabetic consultation receive advice in line with the EFP-IDF guidance (detailed in the audit criteria below).
- Assess how diabetes healthcare professionals view diabetes as a risk factor for periodontitis and vice versa and how discussions surrounding the topic can be implemented into the consultation.
- Identify methods in which we can ensure this new service initiative is sustainable in the long-term.

Standards:

Audit Criteria	Target	Source of Evidence
Diabetic patients will be: • Informed of the bidirectional link between periodontitis and diabetes. • Investigated for a prior diagnosis of periodontitis. • Investigated for current signs and symptoms of periodontitis. • Signposted to a GDP for a periodontal assessment/ NB: This has been amended from the sub-section *'Guidelines for physicians and other medical health professions for use in Diabetes Practice'* from the source of evidence. The evidence suggests referral to a dental professional for periodontal assessment. However, due to the lack of integrated care pathways this was not feasible at present and so the audit standards were amended accordingly.	50%	Sanz M, Ceriello A, Buysschaert M, et al. Scientific evidence on the links between periodontal diseases and diabetes: Consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International Diabetes Federation and the European Federation of Periodontology. *J Clin Periodontol*. 2018;45(2):138-149. doi:10.1111/jcpe.12808

AUDIT METHOD

A retrospective pilot study was carried out to assess whether the inclusion criteria provided a large enough sample size for the main audit. This pilot study would have helped to define the time-period required to audit a sufficient sample size. However, due to the covid-19 pandemic, outpatient clinical appointments were reduced significantly, and workforces redeployed. Therefore, the time-period to audit was extended to ensure a sufficient patient sample size was met.

It was anticipated that a periodontal and diabetes proforma would be disseminated to patients to complete upon their arrival for their consultation. However, due to the transition to telephone consultations in the wake of the covid-19 pandemic this was not feasible. Therefore, a topic guide was created and e-mailed to the diabetes physicians within the department in November 2020. It briefly summarised the key components of the 'periodontitis and diabetes' discussion and acted as an aide memoire for diabetes physicians. Diabetes physicians were then expected to record their periodontal and diabetes discussion in the clinical records. The clinical record should have a statement that the following aspects of the EFP-IDF guidance have been met:

- The patient has been informed of the bidirectional link between periodontitis and diabetes.
- An enquiry into a prior diagnosis of periodontitis has been completed.
- Current signs and symptoms of periodontitis have been reviewed with the patient.
- The patient has been signposted to a GDP for a periodontal assessment.

The first audit cycle was carried out over a 16-week period (1st December 2020 to 23rd March 2021). A randomly selected sample size of 100 patients (n = 100) were chosen from extracted clinic lists for this time-period. The extracted clinic lists were then modified to include those patients who satisfied the selection criteria in figure 1.

Figure 1: Selection criteria for a patient to be included within the audit

Inclusion criteria:	**Exclusion criteria:**
• Patient has been diagnosed with diabetes	• Patient stated they were edentulous during their consultation
• Patient has attended their diabetes consultation, either as a face-to-face or telephone appointment, with a diabetes physician	

The collected data was input into a data collection form (appendix 1) and included the following information:

- Date of the diabetes consultation
- Patient hospital number
- Whether the digital clinical record (clinical letter or clinical file note) includes the following details:
    - The patient has been informed of the bidirectional link between periodontitis and diabetes.
    - An enquiry about a prior diagnosis of periodontitis.
    - A review of current signs and symptoms of periodontitis.
    - The patient has been signposted to see a dentist.
- Has any supplemental advice been provided to the patient in the form of a leaflet?

In addition, semi-structured interviews were undertaken with different groups of diabetes healthcare professionals to provide insight into the barriers to discussing periodontal and diabetes health during a diabetes consultation.

Following data collection from the first cycle, the following interventions were implemented to improve the delivery of the periodontal and diabetes discussion amongst the diabetes team:

- **Regional teaching** delivered by senior colleagues and academics within periodontology - Professor Iain Chapple and Miss Zehra Yonel. This 1-hour webinar was delivered on 30th March 2021 over Microsoft Teams (MST) due to the restrictions on face-to-face contact due to the covid-19 pandemic. The teaching was combined with the regional teaching planned for general practitioners (GPs) as part of a Wolverhampton Diabetes Network event. GPs were sent a digital flyer (appendix 2) and MST link via e-mail bulletins from the Wolverhampton Diabetes Network, Black Country and West Birmingham Clinical Commissioning Group (CCG), and Sustainability and Transformation Partnership (STP) primary care distribution lists. A recording of this webinar was available to all members of the diabetes department at New Cross Hospital if they were unable to make the live webinar.
- **Tailored small group teaching** for healthcare assistants (HCA) and clinical nurse specialists (CNS).
- **A 'Periodontitis and Diabetes Proforma'** (appendix 3) was designed and a new protocol was established within the department to include this assessment into the diabetes consultation. The proforma is completed by the HCA or CNS, prior to the patient seeing their diabetes physician, and is attached to the patients' consultation form(s). This is done at the same time as the HCA/CNS collecting other clinical parameters such as height and weight. Question 4 of the proforma provides the diabetes physician with the information they require which minimizes the time they need to discuss periodontitis and diabetes. Questions 1-3 and 5-6 are being utilized for the larger quality improvement project. This protocol could only be followed for face-to-face consultations.
- **Increased promotional material** on display in the department to raise awareness regarding the bidirectional link. The EFP infographics on diabetes and periodontitis were printed on to roller banners and placed throughout the department. British Society of Periodontology (BSP) leaflets were available at the reception desk and often posted with clinical letters to patients. BSP posters were printed and displayed throughout the department. Permission to utilize resources was gained from both the EFP and BSP.
- **An exhibition ('Perio Pop-Up Stand')** was held over 2 separate days (Monday 24th May 2021 and Friday 18th June 2021) providing diabetes staff and patients with oral health information and educating them further regarding the bidirectional link between periodontitis and diabetes. An array of resources, designed by the EFP and BSP, were available to improve delivery of information. Staff and patients were provided with a bag which included educational resources and oral health samples to improve gum health. The contents of the bag was kindly sponsored by Oral-B, Colgate and TePe. Photographs of the event can be seen in appendix 4.

A second audit cycle was carried out assessing a randomly selected sample of 100 patients (n = 100) seen within a 16-week period (8th June 2021 – 30th September 2021) and the results were analysed. Patients were randomly selected from extracted clinic lists for this time-period. The extracted clinic lists were then modified to include those patients who satisfied the selection criteria in figure 1.

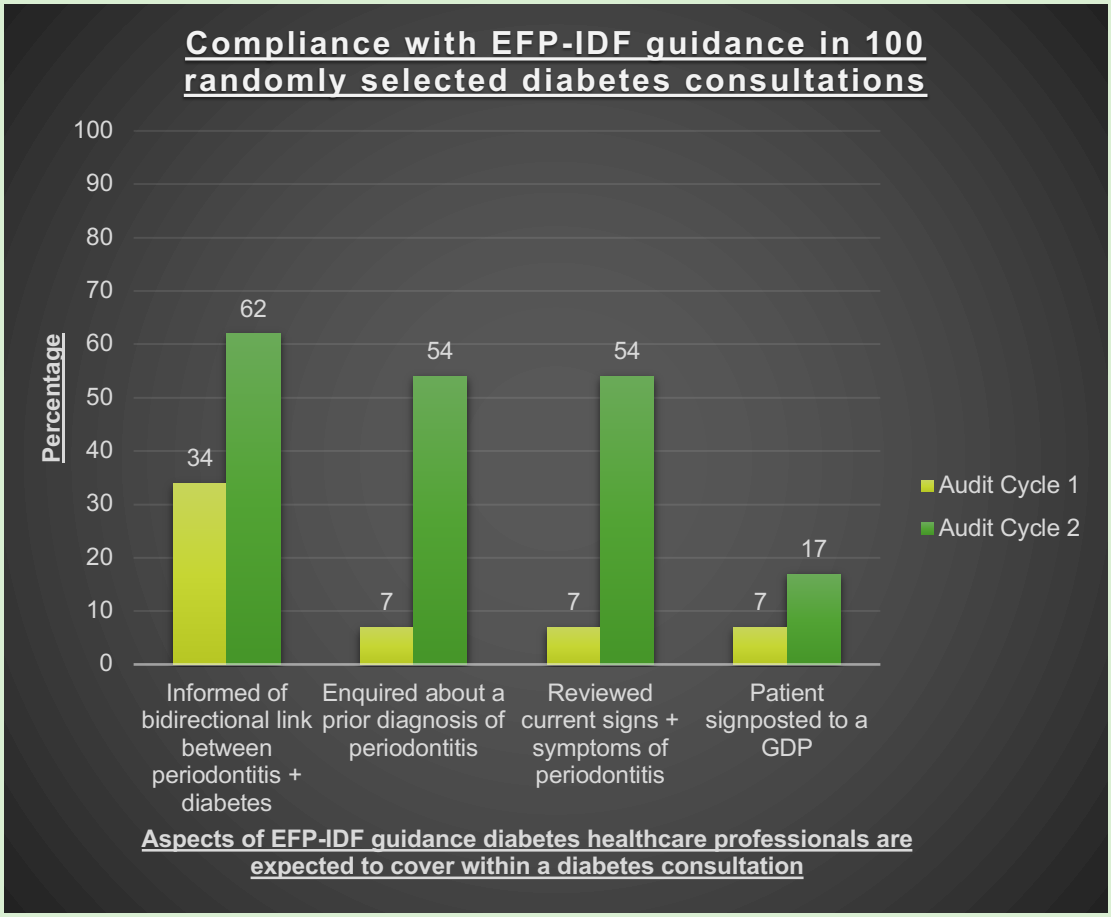
AUDIT RESULTS

- **Pilot**

The purpose of the pilot study was to identify the selection criteria for patients to be included within the audit and to define the time-period required to audit a sufficient sample size. However, due to the covid-19 pandemic, outpatient clinical appointments were reduced significantly, and workforces redeployed. Therefore, the time-period to audit was extended to ensure a sufficient patient sample size was being met.

The pilot was carried out retrospectively from December 2019 to January 2020. The data collected showed that a discussion regarding periodontal and diabetes health was not being considered in the diabetes consultations. Carrying out a first cycle without informing the diabetes healthcare professionals of the requirement to abide by EFP-IDF guidance would inevitably produce the same results. Therefore, departmental teaching was organized in February 2020 for all members of the diabetes team (consultants, registrars, clinical fellows, junior doctors, CNS and HCAs). They were educated on the bidirectional link of periodontitis and diabetes and informed about the guidance produced by EFP-IDF.

- **Cycle 1 + Cycle 2:**



The clinical records would also include any instructions to enclose a copy of the BSP leaflet *'Periodontal health for a better life'* with the patients' clinical letters. Within cycle 1,

85% (n = 29) of patients informed of the bidirectional link (n = 34) were sent a BSP leaflet *'Periodontal health for a better life'* with a copy of their clinical letter. In cycle 2, 22.6% (n = 14) of the patients informed of the bidirectional link (n = 62) were sent a BSP leaflet.

- **Semi-structured interview prompts + summary of responses (Undertaken after Cycle 1)**

Are you comfortable explaining the bidirectional link between periodontitis and diabetes? If not, why not?
◆ There was variation amongst healthcare professionals in the knowledge of the bidirectional link between periodontitis and diabetes. Not all clinicians who were aware were applying it during their clinical consultations.
What are the barriers, if any, preventing you from incorporating this into your consultations?
◆ Time constraints were the biggest barrier amongst diabetes physicians to implementing this practically. ◆ Information overload was another frequent concern amongst all healthcare professionals as they felt like patients were already being given masses of information to do with other diabetic complications which were, for some patients, more important than delivering periodontal advice. Therefore, the healthcare professionals felt they had to prioritise the diabetes complications and so it may not be wise to deliver periodontal related advice at the same time as the other complications. ◆ A lot of patients have stated to the diabetes team that they cannot find a GDP as their local GDPs have told them they are not accepting new NHS patients. When a discussion is then brought up about periodontitis and diabetes, some patients then expect the physician to refer them to a GDP. This then prolongs the time of the appointment and means the physician is having to explain why this is not feasible. This discouraged some diabetes physicians from having a conversation about periodontitis and diabetes as they felt they could not act on the advice they were giving to patients. ◆ A minority of diabetes physicians found that many of the patients they see were from a low socio-economic background. They believed that if they told such patients to see a GDP or improve their oral hygiene it would require funds the patient did not have access to, as dental visits are generally not free under the NHS.
How do you feel we can improve the delivery of such advice?
◆ Provide written information to supplement the verbal advice provided by the diabetes team say so that patients can read this in their own time. ◆ Utilise the entire diabetes team to provide such information to the patients. Diabetes physicians frequently commented on using the HCAs/ CNS to undertake the periodontal proforma with the patients when they assess the patients' clinical parameters, prior to the patients seeing their diabetes physicians. This information can then be given to the diabetes physicians with the other clinical data.
Additional comments?

- Several diabetes healthcare professionals believed a dental professional should be included within the diabetes team to assess for periodontitis. They described this initiative as one that could be similar to the retinal screening programme for diabetic patients.

AUDIT DISCUSSION

The results of this audit show promise for the delivery of periodontal and diabetes advice during a diabetes consultation by the diabetes team.

Though the target of 50%, which was defined following the pilot, was not met in any of the 4 aspects of the periodontal and diabetes discussion in cycle 1 of the audit, it was met in 3 of the 4 areas in cycle 2:

- Awareness of bidirectional link (28% increase from cycle 1)
- Enquired about a prior diagnosis of periodontitis (47% increase from cycle 1)
- Review of current signs and symptoms of periodontitis (47% increase from cycle 1)

There was a 10% increase, from cycle 1 to cycle 2, in signposting patients to a GDP. However, this did not meet the 50% target. This could have been due to the difficulties the diabetes physicians faced when explaining this to patients, as discussed in the semi-structured interviews, as patients expected the physician to then be able to help find or refer to a GDP. Therefore, diabetes physicians may have then found it easier to omit this part of the guidance due to poor integrated care pathways at present. It could be considered that local dental committees and/ or managed clinical networks work with secondary and tertiary diabetes health services to produce integrated care pathways for those with diabetes to access dental care.

Most of the diabetes consultations undertaken in cycle 1 were telephone consultations as a result of the covid-19 pandemic. In cycle 2, many more patients were being seen face-to-face. The proforma (appendix 3) benefits those who attend for face-to-face appointments as it is then attached to the consultation notes. Patients with telephone appointments do not have a consultation pack created as diabetes physicians dictate the findings of their telephone appointment straight to a clinical letter. Therefore, physicians may have been more likely to forget to discuss periodontitis and diabetes without a prompt.

With more face-to-face consultations occurring in cycle 2, diabetes patients were given BSP leaflets during their clinical visit. Therefore, fewer patients were required to have them posted out to them with their clinical letter. The instruction to enclose a leaflet was seen on the clinical records when telephone consultations had been undertaken. Although, the results show a reduction in the number of leaflets being supplemented in cycle 2, this is not an accurate reflection as it was not documented when leaflets were given during the clinical visit.

Furthermore, the limitations of this audit must be considered. The data collected was based on clinical notes. While it is pragmatic to record the discussion in the notes, diabetes physicians have an array of topics to discuss and so recording all discussions in the clinical notes may not be an efficient use of time. Discussions around other well-established diabetes related complications would be of greater importance in the clinical records, particularly when a project such as this is in its infancy, and this was highlighted during the semi-structured interviews. Though diabetes healthcare professionals could understand the benefit of such advice, they felt

they had to consider the priority of the different diabetes complications. They acknowledged there is a place for periodontal advice within a diabetes visit but it may not be within the initial visit.

As this audit was part of a larger quality improvement project, diabetes healthcare professionals were aware they were being audited. Therefore, the data may be skewed because of the Hawthorne effect. To eliminate this, future audit cycles may have to be carried out retrospectively.

To assess the effectiveness of the new service initiative, it would be beneficial to investigate whether the periodontal related discussion has improved the patients' health behaviours. This did not fall within the remit of this audit but is being carried out as part of the overall quality improvement project.

Provisions have been made to repeat the audit cycle within the next 12 months. Within this time, it has been anticipated that we will create additional resources, more tailored towards diabetes and periodontitis, to improve the delivery of periodontal related information to the diabetes patients. The aim is for further resources to be delivered sustainably to ensure the longevity of such an initiative.

USE OF FUNDS

The BSP's audit award has contributed to several initiatives to improve practice in the diabetes department at New Cross Hospital.

- Promotional material for the department, patients, and teaching events.
- Periodontal exhibition stand- BSP funding was utilised for graphic design and printing, printing of educational resources, and the provision of bags gifted to patients and staff containing educational resources and oral health samples. The oral health samples were kindly sponsored by Oral-B, Colgate and TePe.

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Appendix 1: Data collection form

Consultation date:	Patient hospital number:	Informed of bidirectional link between periodontitis + diabetes	Enquired about a prior diagnosis of periodontitis	Reviewed current signs + symptoms of periodontitis	Signposted to a GDP	Has this information been supplemented with a leaflet?

Appendix 2: Digital flyer promoting the regional teaching

Appendix 3: 'Periodontitis + Diabetes Proforma' which is completed by a HCA/ CNS, prior to the patient seeing their diabetes physician, and attached to the consultation form(s).

Diabetes Department
New Cross Hospital

Periodontitis + Diabetes Proforma

Clinic Details

Date:
Clinic Name/ Code:

Patient Details (Place patient sticker here)

Name:
Date of Birth:
Hospital Unit Number:
NHS Number:
Address:
Contact Number:

Question 1

Does the patient have teeth?

☐ Yes (Please answer the below questions)
☐ No (You do not need to continue with this proforma)

Question 2

What type of diabetes does the patient have?

☐ Type 1 ☐ Type 2 ☐ Gestational ☐ Prediabetes ☐ Other ☐ Not sure

Question 3

a. Does the patient have a registered dentist? ☐ Yes ☐ No

b. When did the patient last see the dentist for a dental check-up?
☐ < 1 year ago ☐ 1-2 years ago ☐ >2 years ago

Question 4

a. Has the patient ever been informed by their dentist that they have gum disease? ☐ Yes ☐ No

b. Does the patient have any of the below signs and symptoms of gum disease? (Please tick all that apply)
☐ Red or swollen gums ☐ Gums bleed after brushing teeth ☐ Bad taste ☐ Bad breath
☐ Gum recession (margin of the gum shrinks which exposes more of the tooth making the tooth look longer)
☐ Loose teeth ☐ Increasing spaces between your teeth ☐ Calculus (tartar) on your teeth ☐ None

Question 5

a. Prior to today's appointment, has the patient ever been given information about gum disease by their dentist or GP?
☐ Yes ☐ No

b. Prior to today's appointment, was the patient aware of the link between diabetes and gum disease?
☐ Yes ☐ No

Question 6

Is the patient happy to be contacted in the future for a follow-up call? ☐ Yes ☐ No

Appendix 4: Photographs from the exhibition - 'Perio Pop-Up Stand'