Presenting patients with information on their oral health risk: the PREFER three-arm RCT and ethnography

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Disclaimer: This report contains transcripts of interviews conducted in the course of the research and contains language that may offend some readers.

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Scientific summary

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Background

In recent times, the notion of 'risk' has shifted from just being about the likelihood of an unfortunate event happening. Risk now also involves thinking about what actions are being taken to avoid the misfortune and who is to blame when things go wrong. Together with a rise in neoliberal thinking whereby citizens have responsibilities as well as rights, this means that health policies now increasingly emphasise that patients have a shared responsibility for maintaining their own health and are accountable for obeying recommendations to control their health risks.

The new model of NHS dental practice contract currently being tested reflects this. All patients receive an oral health risk assessment and are categorised into traffic light (TL) red (high risk), amber (medium risk) or green (low risk) groups at their check-up. TL categorisation is intended to restrict complex dental treatment for red patients, and prompt patients to adopt healthier lifestyle behaviours, such as better toothbrushing and reduced sugar consumption. However, we do not know whether patients value risk information presented as a TL or act on it. At the same time, new technology has expanded the way of presenting oral health information to patients. A Quantitative Light-Induced Fluorescence (QLF™) camera (Inspektor Research Systems BV, Amsterdam, the Netherlands) can show tooth demineralisation before cavities are visible with the naked eye. It also highlights mature plaque (> 48 hours), which fluoresces red.

Objectives

The overarching aim of the study was to investigate patients' preferences and responses to information about risk of poor oral health given at dental check-ups.

The primary objective was to compare, in a randomised controlled trial (RCT), patients' preferences for (1) verbal information only, (2) verbal information accompanied by TL information or (3) verbal information accompanied by a digital QLF photograph of the patient's mouth.

This study also had several secondary objectives. These included undertaking a systematic review of different forms of information on risk given in clinical settings and undertaking a qualitative investigation of how patients' oral health risk is communicated in routine dental practice. As part of the RCT we also set out to explore differences in preferences for the three different types of information by demographic, behavioural and psychographic groups, and to investigate any change in patients' behaviour using variables derived from the extended parallel process model (EPPM).

Methods

Systematic review

The systematic review involved an electronic search of nine databases, along with hand-searching eight specialist journals, and backwards and forwards citation-chasing. The search was limited to personalised information on risk given to patients as part of their health care. Cochrane's risk-of-bias methods were used to undertake a quality assessment of included RCTs.

Randomised controlled trial

The third part of the study involved recruitment of 412 'red/amber' patients to a RCT in four NHS dental practices. This involved 43 dental staff (excluding staff turnover). Forty-two per cent of patient participants came from the three most deprived areas, according to the Index of Multiple Deprivation. Participants were randomised to receive verbal, TL or QLF information from dentists after their check-up had been completed. After randomisation and before their check-up, patients were asked to rate their preference and willingness to pay (WTP) for the three forms of information. Patients revisited their WTP after receiving their information. At the baseline visit, a range of information on previous dental experience, dental anxiety, literacy and various socioeconomic indicators was collected. Data were collected on patients' oral health behaviours (smoking status, toothbrushing frequency and duration, use of fluoride and dietary sugar intake), as well as EPPM variables, as potential mediators of any behaviour change. Dental staff were trained to take QLF photographs of all patients at baseline and when they attended the following two dental visits (short-term follow-up) in order to measure any changes in percentage of dental plaque coverage and tooth demineralisation. Dentists also undertook a basic periodontal examination (BPE) score at baseline and at short-term follow-up visits. Participants were followed up at 6 and 12 months by telephone or e-mail to investigate reported behaviour change.

Qualitative work

Qualitative work involved an ethnography in five NHS dental practices, which included the observation of 368 routine appointments and the practice environment (between 4 and 12 weeks in each practice) plus formal interviews with 16 dental staff and 30 patients. One of these practices operated according to a prototype of the new NHS dental contract reimbursement arrangement.

Results

Systematic review

The systematic review identified 12 papers, nine of which had a RCT design. Eight studies involved the use of computerised health risk assessments in primary care. Beneficial effects were relatively modest, even in studies aiming only to enhance patient–clinician communication or to modify patients' risk perceptions. No previous work had considered how patients value different forms of risk information.

Randomised controlled trial

The trial found that 51% of patients identified verbal information as their most preferred form, with 35% identifying QLF as their first preference and only 14% preferring TL information. The dental practice attended was predictive of first preference for verbal and QLF, even after all sociodemographic variables were controlled for. Being a younger patient (aged between 18 and 35 years) also reduced the likelihood of preferring verbal information. Patients valued TL information according to WTP significantly less than either verbal or QLF information (even though we made it clear that TL was accompanied by a verbal explanation). Microcosting identified that verbal information costs £6.15 per patient, TL costs £5.89 per patient and QLF costs £12.62 per patient. We did not undertake a cost–benefit analysis because usual care (verbal) was the most preferred.

The study retained 185 (45%) participants at the 6-month follow-up and 153 (31%) participants at the 12-month follow-up. Although the attrition bias analysis did not show a significant bias in participants retained at 6 months, patients with low incomes and higher baseline sugar consumption were less likely to be retained at 12 months. Although at 6 and 12 months patients reported taking significantly less sugar in drinks and at 12 months reported a significantly longer toothbrushing duration, there was no difference according to information group allocation, and so this may have been a cohort effect.

This was the first time QLF technology had been used to gather clinical outcome data in a RCT undertaken in dental practices, and implementation proved to be challenging. Short-term follow-up data from QLF images were compromised by technical difficulties and some poor-quality images taken by the dental

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team. In addition, a significant proportion of patients failed to attend follow-up care, which was, to some extent, anticipated, given that participants were those with a high/medium risk of poor oral health and 34% came from households with < £16,000 per annum income. However, 83% (85) of good-quality short-term follow-up QLF images were obtained from one practice and showed a significant reduction in plaque coverage between participants in the QLF and the verbal information group ($p < 0.01$). There was no association between self-reported toothbrushing behaviour and percentage of plaque coverage in the data.

Qualitative work

The qualitative work found that, despite routine dental check-ups being a risk context, there was very little explicit risk talk between patients and the dental team, even in the new dental contract prototype practice. Risk and its derivatives were mentioned only 29 times in 19 out of 368 appointments observed. Risk discourse, therefore, appears to be more of a policy and professional concern than one that has meaning for patients in a clinical context. When risk was discussed, it was mainly in conjunction with outlining potential adverse outcomes relating to treatment, such as extractions. Only nine of the discussions observed concerned risks of poor oral health associated with smoking or inadequate toothbrushing behaviour. It was observed that lifestyle discussions were often cursory to avoid causing shame or embarrassment to patients. It was striking that TL categorisation did not prompt explicit risk talk or an expanded discussion on lifestyle risk. TL information was sometimes even seen to act as a short-hand for communicating oral health status to the patient and to close down discussions.

Interviews found that patients were mostly ambivalent about TL information. They felt that the information, although simple, was fairly meaningless without additional explanation from the dentist. Conversely, the study found that many patients had strong reactions to QLF photographs. Several patients described feeling uncomfortable looking at a photograph of their mouth, anticipating possible shame and guilt. However, despite initial reactions, patients reported an appreciation of the possible utility of QLF images. Both TL and QLF images were seen as being potentially useful in marking progress and encouraging patients who were making progress improving their oral health, but the study itself was limited to using these tools to convey information at one time point.

Conclusions

All three strands of the study point to the importance that patients place on verbal communication when receiving information on health risks. The study has particular importance in the NHS dental context, given that a dental contract model involving categorisation of patients by TL risk categories is due to be rolled out nationally in the next couple of years. The findings suggest that incorporating a TL risk categorisation into the delivery of NHS dental practice might reduce the extent to which patients are given detailed, personalised information on their oral health following check-ups.

Given that new technologies, such as scans and radiographs, can generate very vivid imagery to convey information on health risk for patients with a range of different conditions, this study indicates that, although some patients may feel initially uncomfortable, if this is accompanied by a detailed explanation of the image by a clinician, patients may find it useful.

The study undertook a very complex RCT in NHS dental practices, made more complex by using QLF photographs as a planimetric method of assessing dental plaque coverage and to measure early dental caries development. Although we experienced particular difficulty gathering QLF images to measure tooth demineralisation, in one of the four practices observed, sufficient QLF data were available to reveal that there was a significant reduction in the percentage of plaque coverage in patients receiving information using QLF photographs. Whether or not this represents a clinically significant difference for patients is debatable. However, it raises the question of whether or not QLF technology might be a useful tool to

measure clinical outcomes in trials for which calibrated follow-up clinical examinations are impracticable, and to what extent they correspond with self-reports of oral health behaviours.

Our study found, despite a growing emphasis on patients sharing responsibility for controlling risks to their health, that surprisingly little work has been conducted in this area. Further research is needed to assess whether or not explicit discussion of risk is missing in clinical interactions elsewhere in health care as much as it seems to be in dentistry. There is also a need for more research on how best to support clinicians in undertaking constructive conversations with patients that avoid making them feel shamed about improving health behaviours.

Trial registration

This trial is registered as ISRCTN71242343.

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