Title

What influences the provision and reception of oral health education? A narrative review of the literature.

Authors

Emma Barnes

(Corresponding author)

School of Social Sciences

Cardiff University

BarnesEJ@cardiff.ac.uk

ORCID: 0000-0001-6447-6647

Prof Alison Bullock

School of Social Sciences

Cardiff University

BullockAD@cardiff.ac.uk

ORCID: 0000-0003-3800-2186

Prof Ivor Gordon Chestnutt

School of Dentistry

Cardiff University

ChestnuttIG@cardiff.ac.uk

ORCID: 0000-0002-9228-800X

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Abstract

Objectives

Most common diseases of the mouth are preventable through behavioural changes, oral hygiene routines and regular professional care. Research suggests dental professionals may prioritise clinical experience, personal values and preferences over evidence when delivering such interventions. Research also suggests variable rates of patient behaviour-change following oral health education (OHE) interactions. This review explores the literature to answer the question: what factors influence the provision and reception of OHE messages and the wider OHE process?

Methods

A structured search of literature was carried out with databases covering a range of academic disciplines (healthcare sciences, social sciences, education). Key words/terms were searched to elicit papers published since 1998. Citation mining (relevant citations within papers) and citation tracking (papers citing relevant papers) were also used. Recurring themes within the papers were identified and coded using NVivo12 and presented in a conceptual model.

Results

The studies analysed tended to employ small-scale surveys, larger-scale surveys (some with low response rates), or interview studies of varying sizes. There was also a limited number of review papers. However, several key messages were identified regarding dental professionals' and patients' views on OHE and the factors that influence its provision. Factors that were identified related to the wider social and policy context (macro),

community-level factors (meso), the individual practitioner and patient (micro), factors that influenced the nature of OHE interaction and any resulting behaviour change, and how the outcomes of the process influence future OHE interactions for both parties.

Conclusions

The literature highlighted how factors influence the OHE process before, during and after the educational interaction. The resultant conceptual model acknowledges the influence of wider "upstream" factors alongside interpersonal and individual influences which should be taken into consideration when developing OHE interventions.

Introduction

To enhance patient well-being and reduce treatment burden, prevention is an essential part of all general dental services (1, 2). Preventive care is defined as:

> *"behaviours that will prolong one's healthy life or practices that otherwise lessen the effects of infectious disease, chronic illness, or debilitating ailments"* (3).

Oral disease shares with other chronic diseases risk factors such as dietary behaviour, primarily inappropriate consumption of fermentable carbohydrates, tobacco use, and excessive alcohol consumption (4). Changing these lifestyle choices through increasing patient responsibility and self-management can improve health and wellbeing (5). Patient self-management has also been promoted as a way to improve the efficiency and quality of health services by reducing the strain currently faced by healthcare systems (6, 7).

Several systematic reviews explored the effectiveness of different approaches to oral health education (OHE) and concluded that various types of OHE interventions can lead to short-term changes in knowledge and oral health promoting oral hygiene behaviour (8-16). However, there was uncertainty over longer-term improvements and their wider public health impact. Methodological and reporting issues such as insufficient description of the interventions and the measures used to assess them, and short follow-up periods constrained the authors' ability to draw conclusions. Difficulty also arose from attempting cause-and-effect exploration of OHE interventions as it was impossible to separate the influence of OHE from that of other external factors. The inclusion of fluoride as part of the interventions and patients' exposure to other sources of fluoride also impeded drawing conclusions (8-10). Patient-related factors were also overlooked in the evaluations. Brown (8) noted that

traditional types of OHE did not take account of how the patient filtered the information according to their own understanding of health and oral health. The cost-effectiveness of OHE interactions for dental professionals were also uncertain (8, 15).

Dental practice is based on scientific knowledge and clinical skills but is also shaped by social, cultural, patient, and economic factors (17, 18). Research is needed on dental professionals' understanding of prevention (19), how the context of dental health care impacts on individual practitioners' perception of their role and motivation to provide oral health education (20), and how its delivery is influenced by personal and professional beliefs regarding patients' well-being (21). In particular, there is little evidence on dental professionals' motivation for providing preventive advice in traditional models of commissioning care which focus on interventions and clinical procedures. To improve population oral health, it is also important that the role of the patient is not lost (22). While there have been attempts to understand patient adherence to, and the clinical outcomes of OHE or other healthcare interventions, little is known about factors influencing its provision and reception. Mismatches between patients' and dentists' expectations of dental care, (23) and between dentists' and patients' expectations of each other's roles (24) reveal the importance of negotiation in healthcare delivery. Understanding what influences patients' experiences of dental care is vital.

This review explores the literature to answer the question: what factors influence the provision and reception of OHE messages and the wider OHE process?

Method

A comprehensive search of the literature was carried out to explore the evidence on factors influencing the provision of OHE within general dental practice and how it is perceived/received by patients. The narrative review method was chosen over a systematic review as it allowed analysis of a broader range of papers rather than the more narrowly defined set of eligibility criteria typical of systematic reviews. This review aimed to explore a range of influences on the OHE interaction, some of which have not been as exhaustively addressed as other areas. While comprehensive, the search strategy was not as clearly defined as in systematic reviews and was open to new avenues as they emerged from the literature. We acknowledge that this approach limits reproducibility and introduces a risk of bias from inadvertent omissions, and from no formal appraisal of the rigour of methods used in reported studies.

Databases (OVID SP, Scopus, Science Direct, Web of Science, CINAHL Plus, ASSIA, ERIC), and Google Scholar were searched using combinations of the following terms: dentist*OR dental; oral or dental health or oral hygiene instruction/education/intervention/promotion; smoking cessation or dietary advice or sugar or alcohol or lifestyle interventions or behaviour change; "general practice" or "primary care"; patient adherence or patient views/opinions.

Key words/terms were searched to elicit papers published in English, since 1998. This date was chosen as one reflecting contemporary contexts of general dentistry and covered a period during which measures had been taken to promote the use of prevention and OHE in general dental practice.

Results were exported to EndNote X9 (25). Duplicates were removed and the results were sifted by title and then by abstract. Full versions of all remaining papers were read to check relevance (Figure 1). Citation mining (relevant citations within papers) and citation tracking (papers citing relevant papers) were also used. All relevance checking was carried out by EB. As a narrative review, the focus was on a thematic analysis of content and a formal assessment of the quality of the reported methods was not undertaken. However, we did include commentary on the nature of the methods employed, and where appropriate, an indication of sample size.

The papers were coded using NVivo 12 (26) and recurring themes identified. The themes were used to generate a conceptual diagram, visually plotting the different factors influencing the provision and reception of OHE. The themes and diagram were developed by EB and refined through ongoing discussion with AB and IGC, and when writing the narrative summary of the literature.

["Figure 1: Literature search process" to be placed here]

Results

One hundred and forty-three papers were coded. Alongside systematic reviews (11, 27), the published studies included surveys (of various size and response rates) (28, 29), qualitative interview, focus groups, or mixed method studies of varying sizes (30-33), and two review papers/research summaries/commentary papers (19, 34). Small snapshots of literature were also found in papers which explore the topic, in varying degrees of depth, alongside other issues, such as specific conditions or health behaviours (35, 36), or evaluations of OHE interventions or methods of delivery (37). The coding process enabled individual papers to contribute understanding to more than one dimension or factor.

The conceptual model (Figure 2) organises the influencing factors identified from the literature into wider context factors at the macro level (social and structural factors that influence both dental professionals and patients); meso or community-level factors; individual or micro level factors (dental professional and patient-related); the individual factors that influence the OHE interaction itself from both dental professional and the patient perspectives, and the influence of the outcomes of the OHE interaction.

["Figure 2: Interaction of influencing factors in the OHE process" to be placed here]

Macro context factors

The macro context factors on oral health have been widely reported (38-41). Oral health is influenced by psychosocial, environmental, economic and political factors (42) and vary by age, gender, ethnicity, environment and lifestyle (43, 44). Levels of tooth decay show clear links to socio-economic deprivation, with those at the lower end of the socioeconomic scale experiencing significantly worse oral health (45). The interaction of different contributing factors mean that inequalities are graded within groups as well as between groups at different levels of the socio-economic ladder (44). These factors provide an outside influence on oral health and impact on any OHE efforts attempted within the dental practice.

In addition to biomedical knowledge and surgical ability, dental professionals are now expected to attempt to increase patients' knowledge, influence attitudes and beliefs, and change behaviours in order to improve patient oral health status (11). This ethos underlies fundamental reform of how dental services are delivered in England and Wales (e.g. 46, 47-49). The *"Delivering Better Oral Health: an evidence-based toolkit for prevention"*

guidelines outline evidence-based interventions for promoting preventive self-care (50). The importance of prevention has also been emphasised in the USA (51, 52), by the World Health Organisation in Europe (53), and internationally (54)

Alongside policy drivers, this paradigm shift from a positivistic biomedical model and reductionist view of health focused on treating acute afflictions (55) has been prompted by changes in the severity and prevalence of oral disease (chronic rather than acute) and increased understanding of its causes and increased treatment options (1, 2, 11, 56, 57). Also, patient demographics and demand have shifted. People are living longer and retaining their dentition into old age (58), resulting in elders having different care demands (59).

Both internationally, and in the UK, the impact of the remuneration system is possibly the most frequently reported barrier to providing OHE (4, 36, 60-63). In Wales, a pilot trialled the removal of traditional Unit of Dental Activity (UDA) payment method in favour of a prevention-promoting system based on widening access and allowing dental professionals to use risk-assessment and clinical judgement based on their patients' best interests (64). An amended contract reform programme (48) pilots ways of incentivising needs-led care, prevention, and enhancing teamwork via amended UDA management methods. The macro-level factors in Figure 2 shape the context within which general dental practices operate. They influence the type of care expected to be provided, and may either facilitate (e.g., guidelines) or constrain care provision (e.g., remuneration). A capitation model of payment could remove the financial barrier to OHE by eliminating the pressure to perform higher-remuneration activities at the expense of lower-funded ones.

Meso community factors

Community factors include the patients' particular physical, economic, social, and cultural environment (38). Cultural norms around health within communities or families influence health beliefs and behaviours (65). While OHE may improve oral health, it has also been found to increase inequalities (42) with behaviour change being most effective with affluent participants (66). Watt (42) explains how OHE interventions operate by attempting to provide new oral health information and tools to the individual but fail to consider the influence of their social environment (work, communities) on the lifestyle choices available.

The dental profession is characterised in the current review as a community, with its own set of norms, routines, language, and hierarchy. As Davis (18) noted, dental professionals have a

'professional culture' that shapes their professional routines and traditions. Peer group opinions and experiences in practice (their own or others' successes and failures with OHE) impact on practitioners' OHE practice (17, 61).

Extension and expansion of dental care professionals' remits have changed how dental teams operate. Adoption of a team approach has been recommended for all dental activities, including OHE (47, 50). Dental hygienists and dental therapists are two mid-level dental care providers with a wide scope of practice that reflects a preventive approach to patient oral care (67).

The way OHE is taught to undergraduates shapes student views both formally through new knowledge that changes how the student understands oral health (68), and informally through the transition from lay person into a dental professional identity (69). For example, coverage of the social determinants of healthcare and preventive dentistry may be minimal (70), leading to the perception that prevention education is not part of everyday practice (71-73). This may impact on the frequency and content of oral health messages (73). The culture of the individual's dental training also influences their approaches to dental practice. During dental training, the individual comes to identify with other dental health professionals and is shaped by their social norms, their attitudes, and behaviour, both clinically and personally (69).

In practice, practical barriers to the provision of OHE have been noted in several studies. These barriers include inadequate remuneration for the task (4, 60-62, 74), appointment time demands (4, 61, 62, 74), practice space and facilities (11, 61, 62), and patient factors (4, 11, 62). The presence of a prevention-focused leader, a prevention-supportive peer network, and the re-focussing of practice resources (spaces, appointment routines and financial schedules) to support preventive work were found to positively influence the preventive care provided in a sample of Australian dental practices (17). The picture is further complicated in the UK by increasing numbers of corporately-, or group-owned practices which introduce an additional tier of management to practices (75).

Individual Micro factors

Health literacy is more than the reception and retention of health knowledge; it includes self-efficacy and patient empowerment to effectively use this knowledge to improve their health (76). Increasing oral health literacy skills can reduce inequalities in promoting oral health

(76). Dentists and the dental team are key sources for patients' oral health literacy, but patient information is gathered from multiple sources (76) and influenced by education, culture and situational context (77).

Alongside health literacy, patients bring to their appointments personal expectations of health and care. Gholami (35) summarised international cultural beliefs and practices relating to periodontal health, for example the use of home remedies to treat periodontal diseases. Although exploring wider health issues and not specifically oral health, one interview study identified a number of patient expectations and understandings of health that may also relate to oral health (65). The majority saw health as a medical issue, with health defined as an absence of illness. The authors note that

> *"Viewing health as an absence of illness makes it difficult for people to think explicitly about how health might be created, as well as narrowing people's focus to clinical treatment and individual-level prevention."*

Good health was seen as resulting from lifestyle choices around diet, exercise, smoking, and alcohol consumption. Consequently, poor health was attributed to poor choices and good health to self-discipline and willpower. There was recognition that social and environmental factors may influence some health decisions, such as working long hours which may make exercise or eating well more difficult and that those with more money had increased access to healthy foods or increased exercise opportunities. Genetic exceptions or 'fate', outside individual responsibility, were also used to account for health status. Psychological factors (depression, anxiety, and attention deficit hyperactivity disorder) have also been associated with poorer oral health (78).

Fox (79) highlighted the nuances in attitudes towards preventive expectations and dental attendance. While some patients may see appointment attendance as an 'insurance policy' against poor oral health, others may view it as an active measure in promoting good oral health and/or out of concern about potential negative effects of unchecked oral health. Some patients may attend out of habit or because it is seen as the 'done thing', an attitude Finch et al (80) found was often associated with 'higher' or 'aspiring higher' classes. These findings reflect the variety of patient expectations of dental care and passive, active, or habitual actions in oral healthcare maintenance.

Few papers report dental professionals' views on their role in providing OHE. Dental professionals' subjective views on offering prevention advice leads to variation in provision (11, 63, 81). A systematic review by Kay et al (11)found moderate evidence that the

> *"beliefs, attitudes and values of oral health professionals influence the likelihood of them participating in and being positive about oral health promotion."*

One influencing belief is the extent to which dental professionals view dentistry as either 'disease' or 'health' focussed (60). 'Health-focussed' dentists were likely to adopt a preventive approach and provide interventions such as smoking cessation or dietary advice. 'Disease-focussed' dentists acknowledged a narrower approach to dental care and targeted only activities that directly impacted on the mouth. Jensen's (82) finding that OHE was only seen as needed when there is evidence of caries, rather than discussing oral health with everyone, reflects how this dichotomy can influence OHE provision.

Three studies (17, 60, 61) reported that views of the effectiveness of prevention and OHE were based on anecdotal information rather than evidence, with professionals valuing results observed in their own patients or in their practice over academic research. Other research also suggested that dentists use a more effective and positive approach to OHE when it allies with their personal attitudes and beliefs (74, 83) and their own oral healthcare behaviour (57).

The literature reported practitioners' concerns about their ability to manage behavioural change and about alienating patients owing to *'overstepping their mark'* or being intrusive (82) and uncertainty regarding the boundaries of the dental role (60, 62). Both dentists and dental nurses have reported concerns about delivering smoking cessation (62), and dentists with alcohol consumption advice (60) and diet counselling (21).

Although some dentists may hold positive views on OHE, they may view it as the responsibility of other members of the dental team such as hygienists or therapists (Dental Care Professionals (DCPs)) (60, 62). The underpinning reasons for preferring delegation ranged from a positive view of DCPs' abilities (60, 82), DCPs' better relationships with patients (62), or more pragmatic reasons such as longer appointment times or passing on unrewarding (personally or financially) tasks (60, 82).

While some dental professionals enjoyed working with challenging patients (82), others associated '*manageability'* and *'compliance'* with the '*ideal patient*' (24, 84, 85). However, perceptions of the personal responsibility of patients for their lifestyle and healthcare

behaviours has been little explored (86). A systematic review by Suga et al (27) identified three explanations that dentists held for patients' lack of adherence to preventive measures: capacity (e.g. ability factors from participant age, or time if have small children), lack of understanding of the benefits, or lack of motivation.

The OHE Interaction

OHE is an interaction between two individuals, each with their own experiences, understandings, and motivations, intended to instigate behaviour change. The experience of the dental professional-patient interaction has great influence over patient adherence and oral health outcomes (87, 88).

Horowitz and Kleinman (76) stated that:

> *"The transmission and receipt of [oral health] information depends on the capacity of both the sender and the receiver, and this capacity is affected by the setting […], context […], and format of the information delivered, among other factors."*

Whereas patients visiting a doctor or other healthcare professionals may expect to receive advice or a drug prescription, patients expect tangible clinical interventions from dental professionals (88). A Swedish study outlined how dental professionals thought that patients would not be willing to pay for advice (82). Dental professionals have also observed that patients are typically reluctant to spend any more time in the practice than necessary (62). Dentistry is also often associated with fear and pain from surgical activities (89). The issue of the dental practice environment and disrupting patient expectations and routine was suggested as a barrier for dental professionals offering OHE (4).

Oral health education and preventive dentistry are by nature interactive and several studies on dentists' communication with patients uncovered preferences for different patient "types" (24, 84). Despite reporting having the patients' best interest at heart, dental professionals also indicated that judgements and interaction with the patient during the appointment influenced their OHE activity (82). For example, an established relationship with the patient might make it difficult to comment on poor oral hygiene; the patient's level of interest in the appointment or poor chemistry between dental professional and patient also impact on OHE efforts. Some participants also reported that a patient's social status, cultural group, level of education, their perception of the patient's ability to make changes influence the interaction or affect the professionals' confidence to offer OHE (82). Studies report the importance of rapport

building and mutual communication, managing patient anxiety, attempts to understand the patient's context, avoiding blame or shame, and a sense of shared decision-making for patients (11, 23, 82, 87, 88, 90).

Öhrn et al (91) reported that participants recalled more positive responses towards dental hygienists than towards dentists during appointments, apart from in situations which may elicit feelings of shame or guilt such as discussing oral hygiene efforts, smoking, and other lifestyle factors. Fico (87) noted that dental hygienists were most frequently identified in descriptions of judgemental language or behaviour, and dentists associated with experiences where patients' expressed feeling were disregarded. Fico (87) also reported that patients' interactions with dentists had greater impact than with dental hygienists/therapists. They attributed this to the perceived higher status of dentists within the team leading to greater importance or more readily recalled interactions, or that their relationship with dentists was more established. However, Kay et al (11) found no studies comparing the effectiveness of OHE given by different dental roles. Shame and embarrassment about their smoking habits (92) and pain and anxiety from clinical treatment were suggested to influence the patients' ability to receive information (93). Being in an environment geared towards clinical activity with the patient being prone in a dental chair may make it more difficult to take in what is said, particularly if the patient is stressed or anxious (76, 93).

Impact of interaction outcome

The outcomes of oral health or lifestyle interventions influence both dental professionals and patients. For dental professionals, patient non-compliance and patient control were the main causes of frustration (94). Frustration arising from a lack of patient behaviour change following lifestyle interventions was also noted by others (60, 62). Conversely, dental professionals also reported gaining pleasure from positive outcomes (82). Jensen's (82) participants felt professional and personal motivation and pleasure from having made a difference to the patients' life. Kay et al (11) noted that a sense of self-efficacy about their oral health provision would encourage dental teams to engage with it more frequently.

Research from the medical field warns of unrealistic expectations of self-management activities, particularly for marginalised patients or those with less capital (31). Limited reflection by dental professionals on why patients do not follow advice may lead to disappointment and scepticism for future attempts (22). It may be difficult to measure behavioural change arising from interventions which ignore social health inequalities.

Richards (22) recommended dental professionals adopt a wider definition of success than one solely focused on individual cases. Training in working with patients from different backgrounds and helping them to appreciate the means and contexts which influence patients' behaviours was also recommended to help dental professionals have more realistic expectations of patients' scope for change (95).

The outcomes of dental treatment are also important for patients. As previously noted, judgemental comments blaming the patient for any oral conditions or devaluing attempts were negatively recalled (87). Sbaraini (88) reported how the practice characteristics and differing oral health outcomes influenced patients' views of self-care. Patients reflected on attending 'old school', 'drill-and-fill' practices with few preventive options which led to them feeling stuck in a pattern of continued poor oral health that required more care at each visit and corresponding de-motivation over their own oral hygiene attempts. In contrast, after engaging with preventive-focused practices, the positive reinforcement from small oral health improvements made them feel more in control of their oral health and motivated to continue self-care efforts.

Discussion

Figure 2 shows how the provision of OHE or self-care advice is situated within a broader context of influencing factors operating at different levels, both for the dental professional and the patient. The conceptual diagram broadly follows other models on the influences on oral health outcomes and disparities, for example Patrick (38), Peres (39), Watt (40), and Fisher-Owens (41). Like other models the conceptual diagram organises the factors into wider context factors (macro); community-level factors (meso); and individual (micro) level factors. The model was also informed by a schematic model posited by Brennan et al (96) accounting for the different influences at the personal, practice, and appointment-level on dental service provision. However, Figure 2 extends other models to include factors that influence the dental professional at all levels. It explores the individual factors that influence the OHE interaction itself from both dental professional and the patient perspectives, and the influence of the outcomes of the OHE interaction. It enables the identification of factors both up- and downstream that may facilitate change and improve both the provision and impact of OHE to improve public oral health. However, the order and separation of the factors as represented in Figure 2 are idealised and designed to represent the location of influences identified within the literature; in reality, the influences are not linear or discrete.

For dentistry, these influencing factors start with a national push towards patient self-care and a reorienting of the dental profession towards OHE. However, the practicalities of dental practice have not changed in line with these aims: concurrently dental education and remuneration for dentistry needs reform (36, 60-63). Mixed results from capitation model studies highlight how financial factors also interact with personal and practice influences on clinical activities (97), but without such reform a tension arises between intended and achievable work.

The literature highlighted the interactive nature of OHE. Rather than a provision of information to a listening patient, the interaction involves judgements and adjustments based on each party's action and reaction, perceived or real. Dental team members make judgements on patients' level of interest in the discussion or their likelihood of making changes (82). Patients adjust their interaction based on the dental professional's communication style and their own affective response, which may include shame from a sense of being blamed or anxiety about the appointment (17, 84, 87, 88). Patients need to feel valued and be treated compassionately. Negative feelings, arising from anxiety, shame, or simply the clinical nature of the dental practice may influence patient experience and the retention of OHE messages (98). Providers need to manage how they frame OHE and avoid apportioning blame or judgement. Such an approach concurs with conclusions that oral health messages should be positively framed, emphasising benefits rather than the risks of not changing behaviour (11), and avoiding blame (82).

The individualistic, behavioural approach to OHE does not address issues around social gradient in health and how to encourage preventative self-care in all patients, not just the more affluent (66). Different starting points for patients (social, economic, health literacy) and opportunities for change post-appointment all influence the patient experience and outcomes, regardless of the OHE interaction. While avoiding viewing the patient as powerless in the face of these influences, interventions must address upstream factors that limit the patient's ability to make improvements (42).

While this review has concentrated on the role of the dental team in OHE, patients may receive educational messages of relevance from other professionals such as psychologists, dieticians, pharmacists, and health visitors. However, constraints of space preclude a detailed discussion of the role of other non-dental professionals in OHE.

Conclusion

The provision of OHE is situated within a broader context of influencing and constraining factors operating at different levels, both for the dental professional and the patient. These factors feed into OHE, with each party's experiences, expectations, and interactions during the appointment and afterwards impacting on outcomes. Interventions need to take account of the wider determinants and influences on oral health as well as how individual factors influence the OHE interaction.

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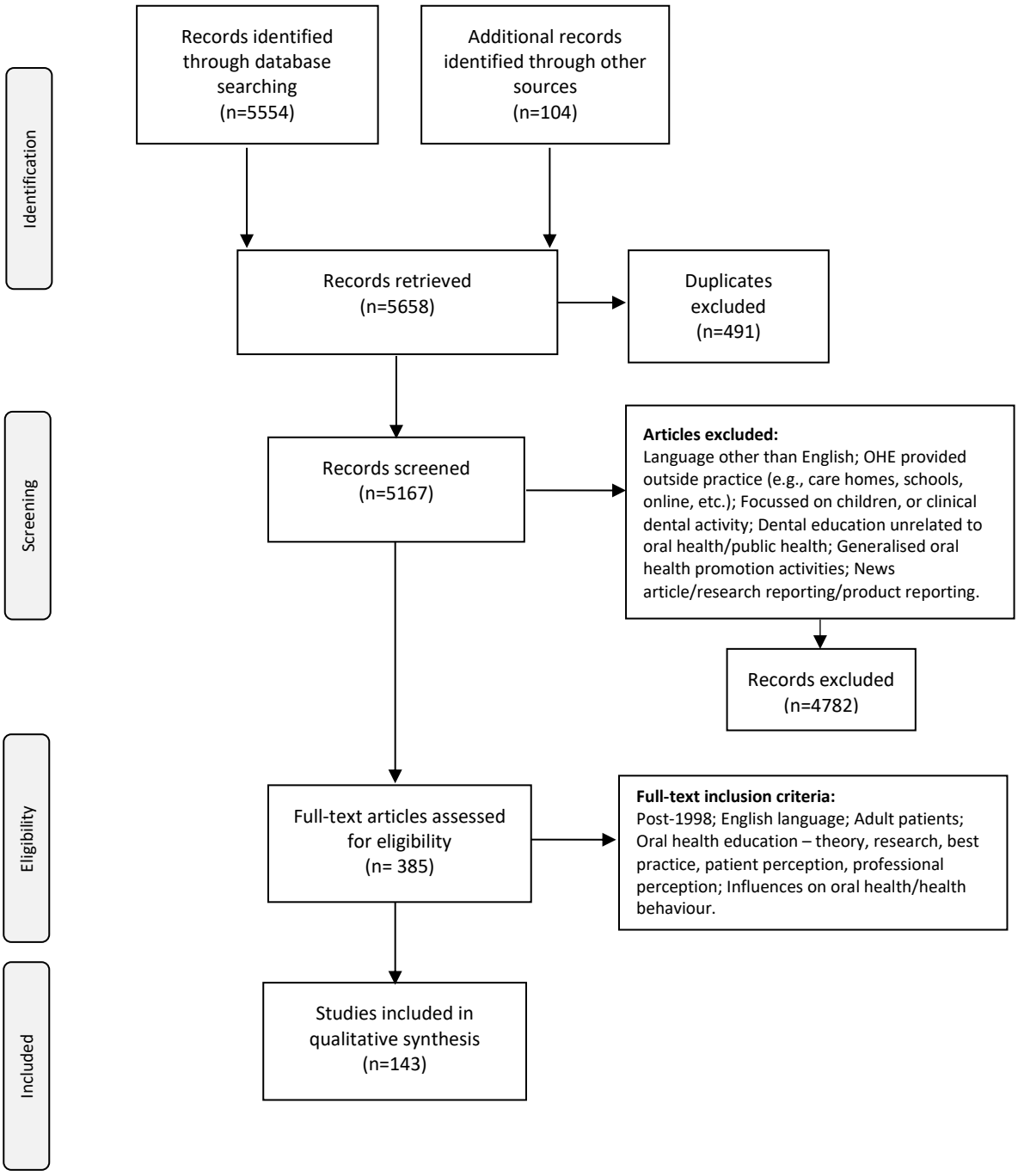

Figure 1: Literature search process

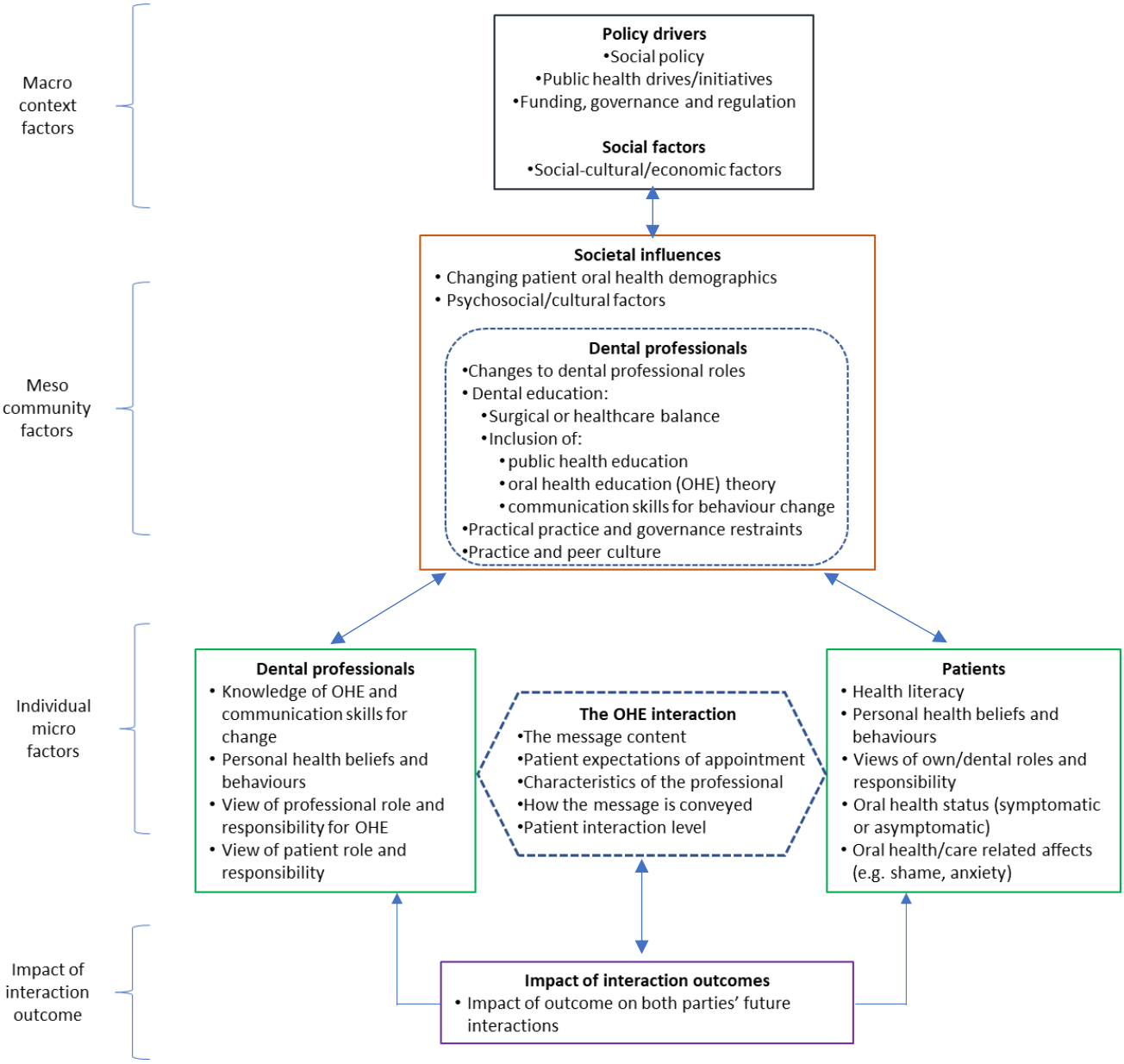

Figure 2: Interaction of influencing factors in the OHE process