

Motivational interviewing in promoting oral health: A literature review

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Abstract

Behavioral sciences are a group of disciplines that involve the study of human actions. Various behavioral models have been used in the past 50 years in behavior modification. One behavioral model currently being studied for its application in oral healthcare is motivational interviewing (MI). Motivational interviewing is a patient-centered psycho-behavioral method used in various fields of medicine and psychology to help patients change their health-affecting behaviors. Effective health promotion is important, since in developed countries, the majority of deaths and diseases are caused by chronic conditions. Controlling and treating chronic diseases require sustained commitment. This literature review aimed to describe the current methods of health promotion for oral health, based on various disease models, with a thorough discussion of the psycho-behavioral method known as MI, and its applications in dentistry and oral health. There is evidence that MI is applied in various health and dental areas, such as oral health promotion, early childhood caries (ECC), periodontal disease, smoking cessation, and improving the quality of life during and after cancer treatment. The clinical and research limitations of this method were also addressed. Comparing the general ideas and ethos of MI to the definition of health promotion by the World Health Organization (WHO), it can be stated that they represent a common approach to promoting health.

Keywords: oral health, health promotion, motivational interviewing

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Introduction

Behavioral sciences are a group of disciplines that involve the study of human actions. In dentistry, behavioral sciences focus on the clinical diagnosis and promotion of oral health, using specific disease models. Owing to behavioral sciences, our understanding of oral health has expanded from a narrow view as a 'disease-only' problem to a broader approach, where oral health is understood through the biopsychosocial model, including the physical, social, and psychological aspects of oral health.^{1,2} Various behavioral models have been used in the past 50 years for behavior modification, although only since the mid-1990s have they been applied in dental research.²

One behavioral model currently being studied for its application in oral health is motivational interviewing (MI). Motivational interviewing is a patient-centered psycho-behavioral method used in various fields of medicine and psychology to help patients change their health-affecting behaviors. It has been applied in such areas as promoting oral health,^{3–5} smoking cessation,^{6,7} periodontal disease,⁸ and improving the quality of life during and after cancer treatment.⁹

Effective health promotion is important, since in developed countries, the majority of deaths and diseases are caused by chronic conditions or non-communicable diseases, like lung cancer and cardiovascular diseases.¹⁰ The World Health Organization (WHO) defines health promotion as "the process of enabling people to increase control over, and to improve, their health."¹¹

Controlling and treating chronic diseases require sustained commitment and the modification of the established behaviors on the part of the patient.^{12,13} Oral health-related behaviors are strongly linked to other behaviors that patients use to deal with challenges in their lives. Social and cultural factors that influence these behaviors can be difficult to consider in the context of a regular dental visit. Therefore, there is a need to develop a strategy for effective oral health promotion by dentists and general healthcare professionals.⁴

Oral diseases such as caries, periodontal disease and cancers are the most common chronic diseases found among people. These conditions have a significant impact on a person's quality of life and overall health. The frequent occurrence of some of the abovementioned diseases (caries and periodontal disease) makes the oral cavity one of the most expensive parts of the body to treat.¹⁴ Annual expenditure on oral diseases in the European Union (EU) in the years 2008–2012 amounted to approx. 79 billion euros.¹⁵

The key problem in controlling the patient's health is not their lack of knowledge, but incorrect compliance with the physician's or dentist's recommendations. This key issue is complex and will be discussed in the present article. Compliance with treatment recommendations

is of significant value, since according to some studies, as many as 50% of patients do not take their prescribed medications, and a similar percentage of patients who take their medications do so incorrectly.¹⁶

This literature review aimed to describe the current methods of health promotion for oral health, based on various disease models, with a thorough discussion of the psycho-behavioral method known as MI, and its applications in dentistry and oral health. The clinical and research limitations of this method will also be addressed.³

For this literature review, the MEDLINE database was searched through PubMed. The keywords included were: motivational interviewing/motivational interview; oral health; oral health promotion; caries; early childhood caries (ECC); periodontitis; and cancer. Only review articles were included.

Health promotion and various disease models – biomedical and biopsychosocial

The most commonly used disease model during the 20th century is the biomedical model, where a specific pathology is the cause of the disease and the removal of the cause leads to recovery. This model assumes that every disease has a causative or pathological factor in some system or organ, and the patient is a passive recipient of treatment. Mental and emotional states are separated from other disorders of the body's function.¹⁷ The biomedical model has brought great advances in medicine, for example, through the work of Louis Pasteur and Robert Koch,¹⁸ or due to the efficacy of vaccines, which prevent about 6 million deaths per year.¹⁹ Based on this model, the patient simply needs the right information or instruction to make a change in their behavior.¹⁷ Unfortunately, in terms of oral health, simply giving advice and providing information is not sufficiently effective for patients to make long-term behavior changes.^{4,17,20} Often, simple advice-giving overlooks the social, economic, political, and environmental aspects of the patient's life.⁴

Another approach used to try to change the patient's behavior is to intimidate them with potential consequences that may arise if they fail to follow the recommendations, e.g. the loss of teeth or cancer. However, fear is not an effective motivator for a behavior change.²¹ Scaring or stressing the patient could lead to, or contribute to, chronic stress, which has a significant influence on performing routine activities. People who are stressed repeat the same behavior despite the fact that it ceased to provide a valuable effect. The awareness of the consequences of the behavior becomes impaired. This is the effect of glucocorticoids, like cortisol, which negatively affect the part of the brain responsible for making the right decisions (the prefrontal cortex).²²

When considering human behaviors and the ability to change them, it is impossible to view a problem purely from a biological or psychological perspective. The two cannot be separated and are absolutely interconnected.²³ A more comprehensive disease model, currently recommended by the WHO, is the biopsychosocial model.^{24,25}

Proposed by the psychiatrist George Engel in 1977, the biopsychosocial model was supposed to fill the social and psychological deficiencies of the biomedical model.²⁶ The model has been studied and developed since the 1970s, and since 2018, about 500 articles concerning the biopsychosocial model are published annually.²⁷ Despite the criticism of the biomedical model, the biopsychosocial model does not intend to replace it, but rather to supplement it.²⁷ One of the important features of the biopsychosocial model is the recognition of the many factors that can influence behaviors, of which the disease (pathology), is just one. The biopsychosocial model includes psychological or mental factors, such as expectations, emotional states, beliefs, goals, etc. All these personal factors influence the patient's behaviors.

In addition, this model recognizes that psychological and social factors have an impact on how the patient perceives the disease and what it means to be sick.¹⁷ This model also has the potential to explain and predict various observations, such as functional disorders, e.g., irritable bowel syndrome.²⁸ Non-linear and complex relationships between various factors are crucial.²⁸ According to this model, all activities are focused on the patient (patient/client-centered), where the patient plays a central role in their disease and treatment process. A client-centered consultation is characterized by sensitivity to the patient's social and environmental conditions. This allows the healthcare provider to include social health determinants in the consultation, which helps to motivate the patient to change their behaviors more effectively. Attempts to remove the causes of oral diseases in isolation from the social situation of the patient are ineffective in both the short and long term.⁴ Motivational interviewing shares many aspects with the abovementioned biopsychosocial model. Motivational interviewing is a way of helping the patient change from a psycho-behavioral perspective, based on a specific dialog and the cooperation established with the patient, to discover and engage their reasons for making a change in their behavior.²¹

Definition and strategy of motivational interviewing

Founded by Miller in 1983 for the treatment of people with alcohol use disorder,²⁹ MI is currently used in various fields, like dietary consultations, physical education, diabetes prevention, and oral health promotion.³⁰

Motivational intervention is defined as a collaboration-based conversation, with special attention given to 'change talk'. In MI, dialog is used as a way to strengthen personal motivation and oblige the patient to achieve a specific goal by evoking and examining their reasons for a change in the presence of acceptance and compassion.²¹ The MI process can be understood through 4 themes:

- engaging – engaging a person in cooperation, for example through open questions;
- focusing – developing and maintaining a specific direction in the dialog about change;
- evoking – finding reasons important for the patient to make a change; and
- planning – discussing a plan that can be applied and that best suits the patient.²¹

Ambivalence is a common attitude that patients hold in relation to harmful behaviors, with 2 opinions – one for and one against a particular behavior. For example, "I know that I have to brush my teeth two times per day, but I don't really eat a lot of candies". Ambivalence often accompanies us in everyday life and is normal. However, in the dental office, when the dentist argues for one side of an ambivalent statement, e.g., to stop smoking, the patient naturally supports the other side, and therefore justifies their behavior ("It's only half a pack").²¹

One of the goals of MI is to help the patient engage in 'change talk' and support the part of the ambivalent attitude which leads to a healthy change.²¹ People believe in what they hear themselves say^{21,31}; therefore, in resolving ambivalence, it is very helpful to refrain from the 'righting reflex' and arguing for one part of the ambivalent statement. Autonomy is an important and significant aspect of MI, and when we engage in the 'righting reflex', the patient's autonomy is not honored. Medical personnel should avoid straightening up the patient or repairing what is not correct in their behavior. Respecting the patient's autonomy means for example asking whether one can raise a particular topic to discuss, whereas speaking in a patronizing way or tone should be avoided. This also includes advising without permission or forcibly saying what the patient must or must not do.²¹

Often, when people feel that their freedom to make a choice is threatened, their reaction is to justify their freedom, which brings them to an internal balance, where this freedom of decision-making is not affected. This is known as reactance. Even if the decision is harmful to the person, the freedom of choice is more important.³² Another way of looking at autonomy is accepting that people can decide and make choices about the course of their lives. Doctors can inform, advise, and even warn, but ultimately the patient decides what to do. Recognizing this is a key element in facilitating a behavior change. Human nature resists being forced. Accepting the rights and freedom of others without undue interference enables change.³¹

When attempting to elicit a dialog with the patient, open questions are one of the main elements in MI. Open questions allow the patient to think about the subject before answering, leaving them the choice of the direction in which the conversation could go. And it will probably be a direction that is important for the patient.³¹ Examples of such open questions are those that touch upon desire, ability, reason, and need for change:

- desire – Why do you want to make this change?
- ability – How can you do it to succeed?
- reason – What are the 3 best reasons to do this?
- need – How important is this change for you and why?³¹

Summing up the abovementioned principles, the patient changes their behavior because it is their reasons that lead to a change and not someone else's. Applying an MI-based approach leads to an understanding of the patient's perspective, supporting the correct side of ambivalence and abstaining from solving the patient's problems for them. By using open questions, one can create a specific vision for change, and when the patient is ready for it, planning a way how this change can be achieved.²¹

Motivational interviewing and oral health

There is evidence that MI is applied in various health and dental areas, such as oral health promotion,^{4,33} ECC,^{5,34} periodontal disease,⁸ smoking cessation,^{6,7} and improving the quality of life during and after cancer treatment.⁹

Researchers from Australia evaluated various health promotion models and their effectiveness, including clinical prevention and health education, psychological counseling and MI.⁴ Clinical prevention and health sciences are based on providing information and advice to a passive patient. The results of the review showed that giving advice had poor efficiency. A review of the research on psychological counseling indicated that this approach had little impact on oral health and eating habits, and only increased the use of xylitol and fluoride pills. The authors also analyzed 9 studies related to MI, which showed that the behavior changes caused by MI did not disappear with time.⁴ Motivational interviewing not only brings positive results when dealing with specific problems, but also seems to positively affect the patient in a wider and socially significant manner. In addition, MI takes less time than the other methods tested, which makes it more profitable. The authors of the abovementioned study comment that the reviewed research confirms the complex nature of behavioral change, which supports the need for effective ways to promote health. The authors suggest that studying oral diseases in isolation from the patient's life and social circumstances is not effective. There is a need to create and apply oral health

promotion that focuses more on the causes of diseases and on respecting the patient's expertise regarding their life. Recognizing a broader context that triggers certain behaviors can make healthcare professionals more effective in working with patients to help them change their harmful behaviors and habits.⁴

A systematic review from 2016 examined the use of MI in dentistry.³³ The review analyzed 8 studies that met the search criteria. One study examined the effect of MI on the parents of children at increased risk of caries. The intervention consisted of 1 session and 6 telephone conversations. Children in the MI group had more than half the number of new carious lesions as compared to the control group. The remaining studies varied in terms of quality and did not show long-term changes in oral behavior. The authors concluded that understanding and accepting patients in the context of oral health, without judging, helps create a therapeutic environment that supports oral health promotion. Teaching medical staff about health psychology would enable more effective promotion of oral health. Although the review was based mainly on MI, out of the 8 studies included, only one was related directly to MI.³³

Two recent systematic reviews and meta-analyses looked at the applications of MI in the treatment and prevention of ECC.^{5,34} Applying behavioral techniques in the management of ECC is a challenge, as they are used indirectly – the behavior change must first go through the parent, and then be passed on to the child. One of the reviews found 8 studies from the years 2004–2018, where 6 showed positive results.³⁴ In the meta-analysis of 3 studies, the results were found to be inconclusive and had high/significant heterogeneity. In the majority of the studies, only one MI session was used and an appropriate dose of MI could not be established. The authors noted that a limitation of their work was that few of the reviewed studies had proper quality or a standardized methodology, along with high heterogeneity noted.³⁴

Another review and meta-analysis on MI in the prevention of ECC, conducted by Colvara et al. in 2021, involved a broader search (i.e., with no language restriction), using different search criteria.⁵ The authors included 14 studies in the systematic review and 8 in the meta-analysis. Four studies in the systematic review found MI had a protective effect against caries. In the meta-analysis, a subgroup effect was found, where patients with high caries experience benefited more from the intervention, as in their case, MI prevented caries to a greater extent than in patients who had lower caries experience. In comparison with the previous meta-analysis, the studies assessed in this meta-analysis had low heterogeneity. The authors concluded that there was significant methodological variety in the reviewed studies, e.g., in terms of design and implementation of the intervention, which posed problems. The authors also noted that only 3 studies (out of 14) had an oral professional as the counselor administering MI.

There were also some differences in what constituted a control group, with various definitions of “conventional oral health education”. The authors concluded that MI could be recommended as part of a preventive strategy, especially in groups of patients with a high disease burden.⁵

A systematic review conducted by Kopp et al. in 2017 looked at the effectiveness of MI as an adjunctive therapy in the treatment of periodontal disease (oral hygiene instruction with scaling and root planing (SRP)) and whether the duration of MI treatment had any impact.⁸ The review found 5 studies, with 3 showing positive results (1 with MI alone and 2 with MI mixed with the theory of self-efficacy). The authors made a number of important observations. In the study where the therapy was conducted by a counselor specializing in MI, the intervention did not produce positive results, whereas studies with hygienists and dental students trained in MI showed better results. According to the authors, this might be due to the fact that patients have more confidence in medical staff. The authors suggest that more long-term studies should be conducted and that subsequent studies should have a standardized method of applying MI, e.g., with a textbook, and should not be combined with other types of therapy. Despite these observations, the authors concluded that MI might have a positive effect on the treatment of periodontal disease, yet more long-term studies should be conducted.⁸

Since 2008, the Cochrane Library has been publishing reviews on the effect of MI on smoking cessation.³⁵ The most recent review from 2019 looked at 37 studies with a total of over 15,000 participants.⁶ Participants in the studies varied significantly (young people, homeless people, incarcerated individuals, etc.). The compared studies also greatly varied in terms of treatment applied, with MI being conducted in 1–12 sessions and lasting from 5 min to more than 5 h. According to the authors, there was not enough evidence that MI helps people with smoking cessation, yet the treatment effect might be low due to bias, imprecision and inconsistency among the trials.⁶

In 2015, the Cochrane Database of Systematic Reviews also published a review on the effectiveness of MI in smoking cessation.⁷ The authors examined 28 studies with a total of over 16,000 participants. In this systematic review, MI was compared with short advice or normal care.⁷ The intervention was performed by family doctors, nurses or psychologists. The training of the counselors in MI ranged from 2 h to 40 h. The conversations lasting less than 20 min had a better effect than those lasting longer, and the number of interventions had no statistical significance. The review confirms the results of other studies stating that the therapy gives better results when it is provided by the attending physician than by a nurse or a counselor. The interventions carried out by phone or in person in the office had comparable results. The review

confirmed that MI had a statistically significant advantage over the usual advice to quit smoking. However, care should be taken in interpreting the results, as the evidence was of medium quality. The authors concluded that there was a need for greater consistency and clarity of methods in the conducted trials.⁷

Spencer and Wheeler analyzed the use of MI for cancer patients.⁹ Their review included 15 studies that concerned 2 groups of patients – one during cancer treatment and the other after treatment.⁹ The authors also divided the studies into 3 main categories: lifestyle improvement; psychosocial support; and the self-management of cancer-related symptoms. The types of cancer studied mainly concerned breast cancer, but also head and neck cancer, colorectal cancer, or any type of cancer. In the studies, the intervention was carried out by MI-trained nurses, dietitians, MI counselors, and former cancer survivors. Lifestyle improvement included improving diet and increasing physical activity. In this category, healthier eating habits (more vegetables and fruits) and increased physical activity were observed in groups where MI was used. The authors also noted that the dropout rate was high, but this was possibly due to the great intensity of physical exercise required. According to the authors, the best results were found in the lifestyle improvement category, but in the other 2 categories, the results were promising as well.⁹ Regarding smoking cessation, in one study on patients undergoing cancer treatment, MI led to a short-term cessation of smoking. Another study showed an increased number of attempts to quit smoking. A third head and neck cancer study showed positive results, with the majority of participants (68%) quitting smoking, and this result persisted for a year; however, this study did not have a control group. In the category of psychosocial support, the authors found that according to the surveys completed by participants, MI reduced the effect of the emotional stress associated with cancer. Respondents reported a positive impact of MI – increased optimism and the acceptance of the diagnosis and disease.⁹ In the category of the self-management of cancer-related symptoms, MI was proven effective in reducing the impact of pain on daily functioning. According to the authors, MI was easily adapted to situations where resources and time were limited.⁹ Individual studies showed good results, but there were many concerns regarding, for example, the way MI was used (in person, by phone and attendance), quality control and the evaluation of the results. In most studies, the intervention was done over the phone, not in person. The authors conclude that MI focuses on letting the patient develop solutions for changing their behaviors in everyday life. And so, empowering patients and generating motivation is important for those who have been overwhelmed by cancer or its treatment.⁹

The summaries and details of the abovementioned articles are presented in Table 1.

Table 1. Impact of motivational interviewing (MI) on oral health

Study	Type of study	Number of studies reviewed	Problem reviewed	Interventions analyzed	Conclusions
Yevlahova and Satur ⁴ 2009	systematic review	32	oral health promotion	clinical prevention and health education, psychological counseling and MI behavior change models	there is a need to shift away from the biomedical model and focus on the social determinants of oral health; MI is most effective in altering the patients' behaviors
Kay et al. ³³ 2016	systematic review	8	oral health promotion	MI or based on MI	MI may be useful in the dental setting and should be further researched
Colvara et al. ⁵ 2021	systematic review and meta-analysis	systematic review: 14 meta-analysis: 8	ECC	MI or based on MI	the interventions based on MI are effective in the prevention of ECC (especially in populations with high caries experience); the studies present a wide methodological variety
Faghihian et al. ³⁴ 2020	systematic review and meta-analysis	systematic review: 8 meta-analysis: 3	ECC	MI	MI is as effective as dental health education (meta-analysis); more evidence is needed to assess the impact of MI on ECC
Kopp et al. ⁸ 2017	systematic review	5	periodontal disease	MI as an adjunct to periodontal therapy	MI as an adjunct to periodontal therapy might have a positive influence, but further long-term studies are needed
Lindson et al. ³⁵ 2019	systematic review	37	smoking cessation	MI	there is not enough information available to conclude if MI helps with smoking cessation; more research is needed
Lindson-Hawley et al. ⁷ 2015	systematic review	28	smoking cessation	MI	MI has a statistically significant advantage over simple advice-giving for smoking cessation, but the evidence is of medium quality
Spencer and Wheeler ⁹ 2016	systematic review	15	lifestyle behaviors, psychosocial outcomes and cancer-related symptom management	MI	MI is a promising intervention for promoting behavior changes in a variety of cancer types and treatment stages; it is difficult to assess the application of MI in cancer populations due to a poor study design

ECC – early childhood caries.

Need for the standardization of motivational interviewing

Frost et al. analyzed over 100 articles on the effectiveness of MI in the fields of health and social care.³ Motivational interviewing was most effective in stopping unhealthy behaviors, such as binge drinking, reducing the amount and frequency of alcohol consumption, and quitting smoking and substance abuse. Based on the authors' review of the literature, the evidence is inconclusive or of poor quality in the field of health promotion. For example, there are low-quality results showing that MI is effective for weight loss, but there is moderate evidence that MI is effective in increasing physical activity in people with chronic diseases. The authors point out that MI is covered in the National Institute for Health Care and Excellence (NICE) guidelines as a potentially effective intervention for behavior modification, though not in every situation. The reason may be the lack of requirements in official MI training. In addition, MI is applied without monitoring for competency, and this lack of competence can affect results. Often, studies do not describe what

training in MI has been given. Therefore, there exists the Motivational Interviewing Treatment Integrity (MITI) code, whose purpose is to establish standard guidelines for the application of MI in practice.³

There is an international organization, Motivational Interviewing Network of Trainers (MINT), which operates in 26 languages and in 35 countries, including Poland. The organization aims to promote good MI practice, and MI research and training. It supports the development of the knowledge and skills of its members through meetings, as well as the open sharing of sources and publications. Owing to this organization, there is support for the experienced and non-experienced users of MI, and for researchers.³⁶

More information on MI is available from various sources. Some textbooks for dental students recommend using MI.³⁷ On the British Medical Journal (BMJ) website there is a scientific module that covers MI.³⁸ In Poland there is the Polish Society for Motivating Dialog (PTDM), where one can find more information.³⁹ The Center for Addiction and Mental Health (CAMH) in Toronto, Canada, shares films showing sample conversations between the dentist and the patient with the use of the MI approach.⁴⁰

Conclusions

Many psychological approaches are currently being investigated as potential methods to help patients make effective changes in their behaviors to improve their health. This is important, because psychological and biological aspects are inseparable from one another. Motivational interviewing is one of such psychological approaches. Currently researched and used in many areas of medicine, it has potential application in the promotion of oral health. However, research results have not always been positive. Despite this, MI is recommended and warrants more research. The MI studies likely have substantial flaws; there are also studies that do not prove the efficacy of MI. Thus, more research with higher standards is needed. Comparing the general ideas and ethos of MI to the definition of health promotion by WHO, it can be stated that they represent a common approach to promoting health. Motivational interviewing has many positive clinical aspects that make it attractive in the dental setting when the patient's behavior should be modified.

Ethics approval and consent to participate

Not applicable.

Data availability


All data generated and/or analyzed during this study is included in this published article.

Consent for publication

Not applicable.

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