



Nabina Bhujel

Sadna Rajan

# Motivational Interviewing in Managing Dental Caries in Children

**Abstract:** Motivational Interviewing (MI) is a person-centred behavioural management technique that is valuable in prevention in healthcare including dentistry. This useful tool increases the motivation of patients and their carers and has been incorporated in the professional guidelines for the prevention of dental disease and also behavioural management. This review explores the relevance to the whole dental team in the promotion of oral health behaviour and discusses the relevant evidence related to dentistry.

**CPD/Clinical Relevance:** All dental professionals who deliver prevention should understand the clinical relevance of using MI so that dental disease can be minimized with positive behaviour change in patients and their care-givers.

**Dent Update 2019; 46: 686–692**

*'A collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal eliciting and exploring the person's own reason for change within an atmosphere of acceptance and compassion.'* Miller & Rollnick 2013.<sup>1</sup>

Motivational Interviewing (MI) is a person-centred, goal-directed, therapeutic communication approach that supports the person's readiness to change by intrinsic

motivation. This term was coined by a psychologist, Millner, in the early 1980s from his experience of helping people with alcohol addiction problems. It was further developed by Rollnick and Millner in the early 90s and later described and developed in more detail.<sup>1</sup>

Since its conception, MI has been applied to many clinical settings to prompt a change in health-threatening behaviour, including managing obesity, diabetes, eating disorders, hypertension, smoking, drug and addiction and oral healthcare. It is based on the fact that behaviour change is not easy and the person has to be ready, willing and able to make the behaviour change. MI resolves the ambivalence, which is a psychological state. Among the common styles to help implement behaviour change, MI is the guiding type rather than directing or following. MI is a collaborative process with a purposeful conversation directed towards a specific goal.<sup>1</sup> The aim of this review is to explore the relevance of MI in the practice of dentistry.

## Relevant professional guidelines

In the UK, there are several guidelines that are relevant to healthcare professionals treating children in the management of their oral healthcare.<sup>2-4</sup> The Royal College of Surgeons of England produced a guidance document in 2011 on non-pharmacological techniques relevant to Paediatric Dentistry and has endorsed MI as one of the alternative therapies.<sup>3</sup> The guideline also recognizes that additional training is required to use MI in clinical practice.

Similarly, the Scottish Intercollegiate Guidelines Network (SIGN) guideline 138,<sup>4</sup> *Dental Interventions to Prevent Caries in Children*, published in 2014, also recommends MI and has been utilized in Scottish national projects like Childsmile. However, the SIGN guideline specifies that training is needed to support the delivery of MI.

More recently, the Department of Health document, *Delivering Better Oral Health*:

**Nabina Bhujel**, BDS(Aus), MPAedDent RCPS(Glasg), DCLinDent(Leeds), FDS RCS(Eng) (email: nabinabhujel@hotmail.com), Consultant in Paediatric Dentistry, Guy's and St Thomas' NHS Trust and **Sadna Rajan**, BDS(Mal), MDSc(Mal), MDentSci(Leeds), MPAedDent RCS(Eng), Lecturer in Paediatric Dentistry, Melbourne Dental School, The University of Melbourne, Melbourne, Australia.

an Evidence-based Toolkit for Prevention, in its third edition published in 2017, has a section on behaviour change.<sup>2</sup> This is a new section discussing the importance of the dental team to influence behaviour change positively. The ways of achieving desired behaviour change have been described using the themes of MI.

The guideline recommended very brief intervention lasting from 30 seconds to a minute, and brief intervention lasting between 5 to 10 minutes. Very brief intervention can be given by dentists and also by other dental health professionals, including signposting to local services such as smoking cessation. The guideline also acknowledges the need for training the dental team that is available from the NHS Stop Smoking and Alcohol Learning Centre. Such online learning tools based on health psychology and oral health behaviour may benefit the dental team in the future. A simple way to help patients achieve their goal would be by the SMART acronym (Simple, Measurable, Achievable, Relevant and Timely). However, it is also important to understand that, if they are resistant towards behaviour change, then this has to be picked up at their next routine appointment.<sup>2</sup>

## Spirit of motivational interviewing

The four aspects of the spirit of MI are based on:

1. Partnership;
2. Acceptance;
3. Compassion; and
4. Evocation.

The partnership has been described by Miller and Rollnick<sup>1</sup> like a dancing partnership that is smooth and collaborative with one (therapist) leading the dance without coercion. Patients often exhibit ambivalence and some resistance to change, hence discussing the status quo and their confidence to self-efficacy.<sup>5</sup> Therapists help patients initiate their desire or capability to achieve the change. Thus, co-operation between patient and therapist is important, therapist not dominating but guiding the behaviour change.<sup>1</sup>

Acceptance of patients and their perspectives by therapists in the spirit of partnership is important. The therapist's expert opinions (approval or disapproval) are irrelevant. There are four elements of acceptance:

1. Absolute worth;

2. Autonomy;
3. Accurate empathy; and
4. Affirmation.

Absolute worth is the caring attitude and unconditional positive regard for the person receiving therapy. Next, is accurate empathy, where therapists show genuine and active interest in understanding people's thoughts and insights without being judgemental about their circumstances. Empathy is not to be confused with sympathy. Thirdly, autonomy is an important element of acceptance when the decision-making power is left with the patient who has to believe that the change is in his/her own interest. And, lastly, affirmation by the therapist, to acknowledge the person's value, effort and desire during the therapy.<sup>1</sup>

Compassion brings all the spirit of MI in place by putting the patient's needs first and to give it a priority. This helps set the scene for behaviour change. Unlike a conventional authoritarian approach, MI attempts to evoke patients' own intrinsic motivations and desires to change by tapping into patients' hidden resources. This helps to strengthen patients' motivations for change, which is self-driven and ultimately much more successful.

## Phases of motivational interviewing

MI is based on four basic phases and these include:

1. Engaging;
2. Focusing;
3. Evoking; and
4. Planning.<sup>1</sup>

These overlapping phases form the basis to make MI flow in helping patients to reach the ultimate goal of desired behaviour change. These phases can also be visualized as a series of ascending steps and each step can be built on and can be reached further.<sup>1</sup>

Engaging is the first process in MI whereby both parties establish a helpful connection and a working relationship, which is considered as a prerequisite that can build further steps. Focusing is the second process of clarification by which an MI practitioner develops and maintains a specific desired direction to converse about behaviour change. Evoking is the third process to elicit involvement of the client's own motivations for desired change. This process has always

been regarded as the heart of MI. Planning is the fourth and last process of MI when people's motivation reaches readiness to change and thus 'change talk' starts.<sup>1</sup>

## How to apply MI into clinical practice

Interestingly, information on the MI protocol used is lacking in the dental literature. The application of MI in children can be challenging as children may not understand the effect of not looking after their oral health and are generally unable to associate the future significance, especially if they need operative care.<sup>6</sup> Hence, the responsibility lies with parents or care-givers and their own oral health has a significant influence on a child's oral health status and behaviour. Behaviour change in parents and care-givers will affect the oral healthcare of the whole family unit.

The basic skill of MI is to use:

- Open-ended questions;
- Affirmations;
- Reflective listening; and
- Summaries.

This is also well known by the acronym OARS.<sup>1</sup> Kakudate and colleagues<sup>7</sup> published a six-step method to assist with modification of patient oral healthcare and education:

1. Identifying the problem;
2. Creating confidence and commitment;
3. Increasing awareness of behavior;
4. Developing and implementing the action plan;
5. Evaluating the plan;
6. Maintaining change and preventing relapse.

Another example of MI protocol starts with establishing rapport. After building rapport, the agenda is set, asking the importance of dental health and targeting a specific behaviour change, such as parent-assisted brushing teeth twice daily, drinking less juice or healthy snacking habits. Then readiness is determined along with the assessment of importance and confidence using a Likert scale and deciding focus of the specific behaviour change(s). Subsequently, the importance of behaviour change is explored building confidence and developing the strategic plan. Rolling with resistance is one of the key principles of MI which is only possible by having an open policy to enter further discussion if there is

an obstacle in any of the phases of MI.

Asimakopoulou and colleagues<sup>5</sup> published an MI technique inspired by Goal Setting, Planning and Self-Monitoring (GPS) to yield positive oral health outcomes. Their method consisted of:

- Expressing empathy;
- Developing discrepancy with the view of supporting Change Talk;
- Rolling with resistance; and
- Supporting self-efficacy

In summary, the principle of MI is universal, however, the methods can be modified based on the training received, the clinician undertaking the therapy and the specific needs of the patient. Regardless of MI method used, during the strategic development planning stage, therapists can incorporate a review plan as a short MI session during their regular 3–4 monthly visits (for high caries risk children) to revisit the plan and assess the family's progress with the set plan. Or this can be done through short phone calls or postcard reminders to suit the family and therapist. Variations in MI intervention are highlighted in Table 1.

If the MI method is successful, a family could be in 'maintenance phase' when able to understand the importance of regular dental check-ups and able to maintain healthy oral health practices, as discussed. Face-to-face meetings is an opportunity for the dentist to record dmft/DMFT, use plaque scores as a visual toothbrushing effectiveness tool to help motivate child and parent, apply fluoride varnish (as per recommendations) in children with high caries risk, and reinforce positive, established dietary habits. If this is not achieved, further MI sessions will be needed to understand a family's challenges and the factors contributing to resistance.

### Relevance to dental professionals

Motivational interviewing is relevant for healthcare professionals as many medical and dental-related health problems would require behaviour/lifestyle changes to modify contributory risk factors. A meta-analysis of randomized controlled clinical trials in both medical and dental fields suggested that MI had a moderate advantage over other comparative interventions.<sup>8</sup> The use of MI in dentistry is not a new concept and has

been successfully used for the prevention of childhood dental caries,<sup>9,10</sup> improving plaque control,<sup>11</sup> oral hygiene,<sup>7,12</sup> periodontal health,<sup>13</sup> to control early childhood caries, periodontal disease, keeping dental appointments and avoidance of alcohol and illicit drugs to prevent facial injuries.<sup>8</sup>

Werner and colleagues<sup>14</sup> conducted a systematic review and meta-analysis on MI and other psychological interventions in adults and adolescents, with a clear set of primary (dental caries, periodontitis, gingivitis and peri-implantitis) and secondary outcomes (dental plaque, oral health-related behaviour, health-related quality of life, health beliefs and attitudes, self-perceived oral health and complications) and showed that psychological interventions did not result in a statistically significant difference concerning gingivitis and presence of plaque.

Behavioural risk factors are common in several oral diseases, such as oral cancer, dental caries, gingivitis and periodontitis, therefore, it is important for dental clinicians to have the clinical competencies to deal with these behavioural risk factors and be able to contribute to positive behaviour change to benefit their patients' overall health, including their oral status. MI is effective in the primary dental care setting.<sup>7,13</sup> The 'therapeutic alliance' between patients and the dental team is the key and, for this to be achieved, the dental team should be prepared to investigate dental health behaviour from the patient's perspective.<sup>15</sup> The patient's perspective would provide an insight into the patient's motivation and self-efficacy to behaviour change.

Management of dental caries in children, through the application of MI, is targeted at parents and care-givers as they are responsible for their children's health. Family-related factors will need to be looked into for any dental intervention to be successful in a child with high-risk caries.<sup>16</sup> The best method for intervention for parent-child dyads is possibly a combination of school, family and community-based interventions for maximum benefit.

For successful outcomes in children, interventions have targeted mothers/carers of babies and pre-school children. A summary of interventions in children and parents/carers, type of MI models used and outcomes has been provided in Table 1.

MI models used ranged from 30–45 min counselling sessions conducted by trained MI counsellors, which could be any staff member. Some researchers had supplemented MI sessions with pamphlets, videos and DVDs.<sup>17,18</sup> MI follow-up also varied with researchers, in duration from 2 weeks to 6 months, in the form of multiple phone calls and reminder postcards. The outcome measures used to assess the effectiveness of MI included carious teeth surfaces,<sup>10</sup> pre-cavities,<sup>19</sup> new caries lesions,<sup>9,19–21</sup> dmfs,<sup>17,18</sup> ICDAS score (intensity of caries),<sup>20</sup> plaque score,<sup>20</sup> attendance to dental clinic.<sup>17,19</sup> Edelstein and co-workers analysed cost benefits of MI interventions and found 67% reduction in cavities when administered in conjunction with reduction in cariogenic flora transmission in preschoolers.<sup>22</sup>

### Challenges and barriers

One of the challenges faced is the time spent on MI. This would depend on how quickly the patient and clinician are able to move through the developing discrepancy, and roll with resistance stages which allow the patient to identify specific behaviour change, and to develop a suitable strategic plan. Unsurprisingly, there is a great variation in the amount of time spent by the healthcare providers, this being between 18 to 40 hours, with an average of four hours.<sup>8</sup> Not all studies reporting on MI specified the time taken for MI. Harrison and colleagues<sup>17</sup> reported that 45 minutes MI with telephone follow-up was the most effective, while Wagner and colleagues<sup>18</sup> found that 30 minutes MI was effective in reducing dental caries. Hence, MI is a time-consuming process for healthcare professionals and raises the discussion on cost-effectiveness and remunerations for preventing dental disease. Two published protocols, when completed, will be able to provide valuable insight into the cost-effectiveness of MI to prevent dental disease.<sup>23,24</sup> Results of these protocol studies may add value to the prevention of dental disease rather than treatment of dental disease.

The other challenge is the appropriate training of healthcare professionals in delivering MI. There is wide variation in the application of MI.<sup>25</sup> In addition to the significant increase in self-reported MI skills of healthcare professionals after MI training, patient satisfaction also increased.<sup>25</sup> Oral health promotion based on MI is effective

Researcher	Type of study Duration	Sample size	Intervention	MI by	Outcomes
Weinstein <i>et al</i> (2004) <sup>10</sup>	RCT Duration = 1 yr	240 mothers of 6-18 mth-old infants	Baseline: caries assessment MI: 45 min and phone follow-up Control: traditional health education (pamphlet + 11 min video) 12 mths assessment: caries assessment	MI counsellor or health education group	MI=cariou surface 0.71±2.8 vs Control=1.91±4.8 (p=0.01)
Weinstein <i>et al</i> (2006) <sup>9</sup>	RCT Duration = 6 mths	205 mothers of 6-18 mth-old infants	Baseline: caries assessment MI: 45min and phone follow-up Control: traditional health education (pamphlet + 11min video) 12 mths assessment: caries assessment and children referred to dentist if needed	MI counsellor or health education group	MI=new carious lesions 35.2% vs Control=52% (p< 0.02) Protective effect of MI after 2y (OR = 37, CI = 0.76 to 1.76)
Harrison <i>et al</i> (2007) <sup>17</sup>	RCT Duration = 2 yrs	205 mothers of 6-18 mth-old infants	MI vs traditional health education MI: pamphlet and video, 45 min MI session and phone follow-up Control: pamphlet and video, advised to have F varnish	Trained staff	MI group had 46% lower dmfs after 2 years Poisson regression supported protective effects of MI (hazard ratio=0.54; 95%CI=0.35-0.84)
Ismail <i>et al</i> (2011) <sup>19</sup>	RCT Duration = 2 yrs	1021 0-5 yr-old children and carers	Baseline: dental exam MI: MI and DVD Control: DVD only	Trained staff	MI and DVD group OR=2.7
Gonzalez-Del-Castillo-McGrath <i>et al</i> (2014) <sup>20</sup>	RCT Duration = 1 yr	96 children and carers Mean age MI: 7.38 ± 1.3 yrs Control: 7.32 ± 1.28 yrs	Baseline: dental cries and plaque score MI: 6 periodic MI sessions Control: prevention information only	Trained staff	New caries lower in MI group (2.12 vs 3.51, p<0.0001) Decreased plaque score in MI group (34.3 vs 20.6, p=0.002) ICDAS criteria lower in MI group (2 vs 3, p<0.0001)

Researcher	Type of study Duration	Sample size	Intervention	MI by	Outcomes
Wagner <i>et al</i> (2014) <sup>18</sup>	Retrospective cohort study Duration = 5 yrs	332 children and mothers (age 5.2 ± 0.5 yrs) child and mother	Baseline: parents' survey MI: MI (30 mins) and prevention information (diet, OH, fluoride and dental visits) Annual kindergarten dental visits: Toothbrushing + dental exam	Trained dental assistants	MI group: 1.5 ± 2.5 d3-4mft/3.2 ± 7.4 d3-4mfs vs control group: 2.4 ± 4.1 d3-4mft/ 5.2 ± 6.4 d3-4mfs (p < 0.05)
Edelstein <i>et al</i> (2015) <sup>22</sup>	Cost-benefit analysis	6 mths to pre-schoolers (Medicaid birth - 2 yrs, ie high-risk pre-schoolers)	Assuming 40-63% cavity reduction in children MI and reduced cariogenic flora transmission administered (assuming 63% cavity reduction) MI and preventive visits (assuming 47% cavity reduction) MI and preventive visits and 50% increase in toothbrushing (assuming 47% cavity reduction)	N/A	Percentage reduction in cavities ranged from 5-45%  67% reduction in cavities  7% percentage in reduction in cavities  10% percentage in reduction in cavities
Gauba <i>et al</i> (2016) <sup>21</sup>	Clinical trial Duration = 1 yr	100 parents of children with dmft/DMFT ≥ 5 (age 5.43 ± 1.34 yrs)	Caries risk assessment, MI, altering plaque ecology, F-therapy, FS, restorations, follow-up and maintenance	Paediatric dentistry postgrads	3/100 children developed new caries 97% success at 12 mths Clinical improvements observed in 2.72 ± 4.9 mths

RCT = randomized controlled trial; yr = year; mths = months; CRA = caries risk assessment; OH = oral hygiene; wks = weeks; HE = health education; mins = minutes; OR = odds ratio; FS = fissure sealant; N/A = not applicable.

**Table 1.** Study characteristics of studies employing motivational interviewing (MI) to children and parents.

and the dental team should have knowledge of health psychology as this is linked with oral health behaviours. The use of patient information leaflets alone may not be effective in changing oral health behaviours. SIGN 138 highlighted that studies incorporating MI may be at high risk of positive bias as the

effect of MI may have been possible with any other behavioural change approaches.<sup>14</sup> There is also a need for standardized definitions of behaviour change techniques so that reporting of such approaches can be quantified and reported for research purposes. While communications skills have been a

major focus of medical and dental training globally, specific training in MI has not been incorporated into many dental institutions where the future workforce, the dental and other allied staff are trained. Starting the training for MI in the undergraduate qualification for both dentists and allied

health (oral health therapy and hygienist) would be prudent so that they would have the knowledge and skills to use the MI techniques upon graduation. MI could be used in conjunction with minimal intervention dentistry during the early stages of caries progression or caries stabilization phase in children with advanced caries disease. Families with high-risk caries children would particularly benefit from MI.

## Conclusion

Motivational interviewing is a useful intrinsic motivational tool, which can be used as a patient-centred approach to prevent or improve dental conditions. The whole dental team should be familiar with MI. It would be useful to explore the usefulness of MI in Paediatric Dentistry, as a clinician and patient interaction is dependent on the involvement of parents and caregivers, as children and adolescents need their parents' help and support to maintain good oral habits. MI may be a useful tool in preventing dental caries in high-risk children as these children are likely to come from low socio-economic groups and also have low functional oral health literacy. Targeting high-risk patients will ultimately reduce the risk of sepsis, pain and the number of GAs related to dental treatment, and this group should ideally have as good oral health as people with the higher socio-economic background.

### Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest.

## References

- Miller W, Rollnick S, eds. *Motivational Interviewing: Helping People Change* 3rd edn. New York City: Guilford Press, 2013.
- Public Health England. *Delivering Better Oral Health: an Evidence-based Toolkit for Prevention* 3rd edn. UK: Department of Health, 2017.
- Royal College of Surgeons of England and the British Society of Paediatric Dentistry. Clinical Guidelines in Paediatric Dentistry: Update of non-pharmacological behaviour management guideline 2011 (Available from: <http://udps-srb.org/wp-content/uploads/2015/10/Non-pharmacological-behaviour-management.pdf>)
- Scottish Intercollegiate Guidelines Network (SIGN). *Dental Interventions to Prevent Caries in Children*. Edinburgh: SIGN, 2014.
- Asimakopoulou K, Newton T. Success with motivational interviewing techniques in the dental clinic: a case for the use of iMI-GPS. *Dent Update* 2018; **45**: 462–467.
- Innes NP, Manton DJ. Minimum intervention children's dentistry - the starting point for a lifetime of oral health. *Br Dent J* 2017; **223**: 205–213.
- Kakudate N, Morita M, Sugai M, Kawanami M. Systematic cognitive behavioral approach for oral hygiene instruction: a short-term study. *Patient Educ Couns* 2009; **74**: 191–196.
- Lundahl B, Moleni T, Burke BL, Butters R, Tollefson D, Butler C *et al*. Motivational interviewing in medical care settings: a systematic review and meta-analysis of randomized controlled trials. *Patient Educ Couns* 2013; **93**: 157–168.
- Weinstein P, Harrison R, Benton T. Motivating mothers to prevent caries: confirming the beneficial effect of counseling. *J Am Dent Assoc* 2006; **137**: 789–793.
- Weinstein P, Harrison R, Benton T. Motivating parents to prevent caries in their young children: one-year findings. *J Am Dent Assoc* 2004; **135**: 731–738.
- Mohammadi TM, Hajizamani A, Bozorgmehr E. Improving oral health status of preschool children using motivational interviewing method. *Dent Res J* 2015; **12**: 476–481.
- Clarkson JE, Young L, Ramsay CR, Bonner BC, Bonetti D. How to influence patient oral hygiene behavior effectively. *J Dent Res* 2009; **88**: 933–937.
- Jonsson B, Ohrn K, Lindberg P, Oscarson N. Evaluation of an individually tailored oral health educational programme on periodontal health. *J Clin Periodontol* 2010; **37**: 912–919.
- Werner H, Hakeberg M, Dahlstrom L, Eriksson M, Sjogren P, Strandell A *et al*. Psychological interventions for poor oral health: a systematic review. *J Dent Res* 2016; **95**: 506–514.
- Kay EJ, Vascott D, Hocking A, Nield H. Motivational interviewing in general dental practice: a review of the evidence. *Br Dent J* 2016; **221**: 785–791.
- Borrelli B, Tooley EM, Scott-Sheldon LA. Motivational interviewing for parent-child health interventions: a systematic review and meta-analysis. *Pediatr Dent* 2015; **37**: 254–265.
- Harrison R, Benton T, Everson-Stewart S, Weinstein P. Effect of motivational interviewing on rates of early childhood caries: a randomized trial. *Pediatr Dent* 2007; **29**: 16–22.
- Wagner Y, Greiner S, Heinrich-Weltzien R. Evaluation of an oral health promotion program at the time of birth on dental caries in 5-year-old children in Vorarlberg, Austria. *Community Dent Oral Epidemiol* 2014; **42**: 160–169.
- Ismail AI, Ondersma S, Jeede JMW, Little RJ, Lepkowski JM. Evaluation of a brief tailored motivational intervention to prevent early childhood caries. *Community Dent Oral Epidemiol* 2011; **39**: 433–448.
- Gonzalez-Del-Castillo-McGrath M, Guizar-Mendoza JM, Madrigal-Orozco C, Anguiano-Flores L, Amador-Licona N. A parent motivational interviewing program for dental care in children of a rural population. *J Clin Exp Dent* 2014; **6**: e524–529.
- Gaubha K, Goyal A, Mittal N. A CAMBRA model for high caries risk Indian children: a pragmatic comprehensive tailored intervention. *J Clin Pediatr Dent* 2016; **40**: 36–43.
- Edelstein BL, Hirsch G, Frosh M, Kumar J. Reducing early childhood caries in a Medicaid population: a systems model analysis. *J Am Dent Assoc* 2015; **146**: 224–232.
- Gao X, Lo EC-M, McGrath C, Ho SM-Y. Face-to-face individual counseling and online group motivational interviewing in improving oral health: study protocol for a randomized controlled trial. *Trials* 2015; **16**: 416.
- Batliner T, Fehring KA, Tiwari T, Henderson WG, Wilson A, Brega AG *et al*. Motivational interviewing with American Indian mothers to prevent early childhood caries: study design and methodology of a randomized control trial. *Trials* 2014; **15**: 125.
- Pollak KI, Nagy P, Bigger J, Bilheimer A, Lyna P, Gao X *et al*. Effect of teaching motivational interviewing via communication coaching on clinician and patient satisfaction in primary care and pediatric obesity focused offices. *Patient Educ Couns* 2016; **99**: 300–303