



Appraisal of Behaviour-change Models and Application of Transtheoretical Model-based Motivational Interviewing for Bottle Feeding Cessation- A Qualitative Study

Priyanka R. Acharya^{a#} and Ashwin M. Jawdekar^{b°}

^a *Department of Pediatric and Preventive Dentistry, YMT Dental College and Hospital, Navi Mumbai, India.*

^b *Department of Pediatric and Preventive Dentistry, Bharati Vidyapeeth (Deemed-to-be University) Dental College and Hospital, Navi Mumbai, India.*

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i55B33845

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/77956>

Original Research Article

Received 05 October 2021

Accepted 07 December 2021

Published 13 December 2021

ABSTRACT

Behaviour change is the key to prevention of diseases; oral diseases being no exception. Behaviours such as frequent consumption of sugar sweetened beverages (SSBs), feeding milk using a bottle and lack of oral hygiene maintenance are a few examples of behaviours that can cause early childhood caries. Dentists must adopt skills to counsel patients in a manner that will elicit behaviour change. Motivational Interviewing (MI) based on the transtheoretical model of behaviour-change has been effective in tobacco cessation and also has been shown effective in oral health behaviours. This qualitative study demonstrates effectiveness of MI practiced by a paediatric dentist for bottle-feeding cessation. Sixteen mothers were counselled by a single trained MI counsellor in one-to-one counselling sessions and followed up telephonically. Fifteen mothers could stop the practice of bottle feeding. Mothers reported positive feedback on the counselling sessions and satisfaction with the result.

[#] *Ex Post-graduate Student and Ex-Senior Lecturer;*

[°] *Professor and Head;*

^{*}*Corresponding author: E-mail: priyankaacharya007@gmail.com;*

Keywords: Behaviour change; health behaviours; Motivational Interviewing (MI); transtheoretical model; early childhood caries; bottle feeding; counselling.

1. BACKGROUND RATIONALE

Breast feeding is the most ideal way to feed babies, and has many benefits to mother and child. In spite of the worldwide increase in governmental, institutional and professional support for breast feeding, majority of babies still receive at least some amount of bottle milk in the first year of life [1]. The World Health Organization (WHO) recommends exclusive breast feeding until six months of age and continued breast feeding for at least two years [2]. Mother's milk (Human Breast Milk, HBM) is exclusively designed for the infant and even science and technology cannot provide a better substitute [3].

A systematic review published in 2003, identified five studies that reported a high frequency of errors in the composition of formula-feed preparation [4]. Additionally, these inaccuracies in the measurement and over-concentration of bottle-feeds may contribute to overfeeding, leading to obesity later. It has also been proposed that bottle-feeding gives more control to the parent and the infant less self-regulation, thereby misleading the satiation clues [5]. Moreover, shorter duration of breast feeding and early bottle-feeding with cow's milk may play a role in the development of constipation and anal fissures in infants and young children [6], severe Iron Deficiency Anaemia (IDA) [7], affect orofacial development, and cause respiratory diseases such as otitis media and wheezing [8] and delayed developmental milestones in infants after the first year of age [9]. There is an increasing body of literature co-relating bottle feeding with respiratory conditions including nocturnal cough, otitis media, sinusitis, chronic cough, etc. along with certain Gastrointestinal (GI) symptoms like regurgitation and vomiting, etc. as a result of prolonged bottle-feeding practices in infants [10]. Another recent cross-sectional study on Indian infant population has shown association of bottle-feeding with Severe-Early childhood caries (S-ECC) and gastrointestinal infections. The study also concludes that exclusive breast feeding had protective benefits against caries, anaemia, GI infections, constipation and delayed milestones [11].

Infant-feeding practices are a key component of child caring practices and have been principally

influenced by environmental, socio-cultural, economic and demographic factors [12]. As rightly stated by Sheiham (2000), "Health behaviours of people depend on the environment people live in and the choices people make" [13]. Until the last decade, medicine has always explained that "disease" can be defined only in terms of somatic parameters, and physicians need not be concerned with psychosocial issues which lie outside medicine's responsibility and authority. However, only medicine is actually responsible for the treatment and cure of disease and it involves treatment of psychosocial aspects which are concerned with the re-education of people with the "environmental factors" or "problems of living [14]."

One of the four strategic directions for promoting health as stated by The World Oral Health Report 2003 was, "Promoting healthy lifestyles and reducing risk factors to oral health that arise from environmental, economic, social and behavioural causes" Apart from the biological factors influencing a particular disease, there are other problems resulting from social and community networks and from living and working conditions [15]. However, in late 90's, there has been a paradigm shift in treatment of illness i.e. from "lesions" to "disease" and to "the whole person" and thus "Biomedical model" to cure illnesses has changed to "bio-psychosocial model" focusing on over all well-being of an individual [13]. To summarize, the main determinants of health can be very well understood by the model given by Dalhgreen and Winterhead (1991) [15].

This helps us to focus on the common risk factor approach in curing the sickness, and considering the social, cultural and environmental determinants of health. Hence, modifying behaviours and habits becomes an integral part of medicine and management of illness. Over the past 20 years, social psychology theories have gained popularity, and use of their applications to predict and understand social behaviours in different domain has been increased. Hence, there is a need for a Behaviour Change Technique (BCT) which can alter or modify the habits that regulate unhealthy behaviour/s. Various authors have tried to understand the dynamicity of human behaviours and have proposed various models of health behaviours to explain the interactions between individuals, their

behaviours and environment. Following are a few models that have been proposed:

1. Health Belief Model was proposed by Rosenstock et al (1966) and Becker (1974) did the addition of “cues to action” to the model. It states that the health behaviour is determined by perceived seriousness, perceived susceptibility, the benefits outweighing the costs and the perceived threats of the condition, and cues to action (the situation). Various researchers have used this model to explain the dental health behaviours. Kunher and Raetzke (1989) demonstrated moderate effectiveness of this model in explaining variance (around one third) in oral hygiene behaviours in periodontal patients. Baker (1994) studied the patient compliance with preventive dental advice and reduction in plaque score and found a significant correlation with factors such as the “perceived benefits” and “susceptibility” and “benefits” combined together. Rayant and Sheiham, (1980), however, reported that none of the factors of the model was significantly associated with the Gingival Index and Plaque Index in patients with periodontal disease. Overall, Pine (1987) reports that dental behaviours are thought to be more complex than those explained by this model [16].
2. Protection-Motivation Theory: A behaviour such as consumption of sweets can be explained on the basis of this model as the one that involves intrinsic reward (satisfaction from eating sweets), extrinsic rewards (approval by others), factors decreasing the behaviour (beliefs that tooth decay can result and it is possible to avoid consuming sweets), and factors increasing the behaviour (temptation). The two sources of information- education and personal (coping) initiate threat and coping appraisals that lead to adaptive or maladaptive behaviours. This model has not been studied in dentistry [17].
3. Health Locus of Control (HLOC) by Rotter (1966): This model states that the behaviour is multidimensional; and could be due to the ‘internal LOC’ (when depends on the person’s ability) or the ‘powerful others LOC’ (when depends on other person’s ability) or the ‘chance LOC’ (when is determined by chance and can be minimally influenced as reported Daly et al, 2002). This model has been applied in the dental literature with mixed results. Regis et al (1994) found low correlation between the LOC and tooth-brushing frequencies. Knecht et al (1999) reported a significant relationship between the LOC and plaque index in diabetics. Wolf et al (1996) found an association between only the external LOC and oral hygiene behaviours. Borkowska (1998), however, found no association between the LOC and oral hygiene behaviours [18].
4. Theory of Reasoned Action by Fishbein and Ajzen (1975): According to this theory, ‘attitudes’ and ‘subjective norms’ that originate from beliefs, determine the intentions of the behaviour. This model has been applied in dentistry. Tedesco et al (1992) reported that this theory could moderately predict the oral hygiene behaviours [19].
5. Theory of Planned Action by Ajzen (1991) was proposed to include an additional variable ‘perceived behaviour control’ in the gap between intention and behaviour as mentioned in the Theory of Reasoned Action. In a study by Beale and Manstead (1991), the ‘perceived behaviour control’ was found to be an important predictor in the mothers’ behaviour of restricting sugar for the babies [20].
6. The Transtheoretical Model/ Stages of Control Model: This model was developed by Prochaska and DiClemente (1982). According to this model, the behaviour has five stages: Pre-contemplation, Contemplation, Preparation, Action and Maintenance or Relapse-Prevention. The transitions between the stages are effected by 10 “processors of change” that can be grouped as experimental and behavioural. Based on this model of behaviour change, a contemporary counselling technique, Motivational Interviewing (MI) has been widely used in the process of de-addiction to evoke behaviour change [21].

Table 1. Stages of behaviour change and the objectives to be achieved by the health care giver

Stage	Practitioner tasks
Pre-contemplation	<ul style="list-style-type: none"> • Raise doubt – Increase the client’s perception of risks and problems with current behaviour
Contemplation	<ul style="list-style-type: none"> • Tip the decisional balance - Evoke reasons for change, risks of not changing; • Strengthen client’s self-efficacy for behaviour change
Preparation	<ul style="list-style-type: none"> • Help the client to determine the best course of action to take in seeking change; • Develop a plan
Action	<ul style="list-style-type: none"> • Help the client implement the plan; Use skills; • Problem solve; • Support self-efficacy
Maintenance/ relapse prevention	<ul style="list-style-type: none"> • Help the client identify and use strategies to prevent relapse; • Resolve associated problems

“Motivational Interviewing (MI)” is one such novel behaviour modification technique which aims to activate patients own motivation for change and adherence to treatment [22]. MI can contribute in constructing new knowledge and to reducing the individual’s resistance to change, thus, helping to overcome difficult situations by evoking their motivation to make change in the health behaviours. According to Miller and Rollnick (2003), MI can be defined as “a collaborative conversation to strengthen a person’s own motivation for and commitment to change [23].” Newer definition given by Miller and Rollnick (2013) is “a person-centered counselling style for addressing the common problem of ambivalence about change” [24]. MI can contribute to constructing new knowledge and to reducing the individual’s resistance to change, thus, helping to overcome difficult situations by evoking their motivation to make change in the health behaviours. In the 21st century, health care is focusing on long-term condition management and thus about health behaviour change— those things that people can do to improve their health. Miller and Rollnick explain, “When a patient seems unmotivated to change or to take the sound advice of practitioners, it is often assumed that there is something the matter with a patient and that there is not much one can do about it. These assumptions are usually false. No person is completely unmotivated.” The way in which you talk with patients about their health can substantially influence their personal motivation for behaviour change.

MI in healthcare is considered to be an advanced form involving three styles of communication: direct, guide, and follow; plus three skills: ask, inform, and listen [25]. MI can be considered as a

counselling technique for the behaviour-change related to bottle-feeding since it has proved to be highly effective in addiction disorders, and has recently been adapted to achieve various health goals including oral health [26]. A systematic review published in 2014 reveals that MI could be a promising approach for changing individual behaviour in many health outcomes [27]. Behaviour-change occurs in phases as outlined by the Transtheoretical Model (TTM) proposed by Prochaska and DiClemente (1982), which may be regarded as the foundation of MI. The effectiveness of the MI approach for more lasting behaviour-change with consequent improvements in health outcomes has been documented in several studies related to alcohol use, smoking, eating disorders, as well as the promotion of physical activity and healthy eating habits [25].

1.1 Evidence in Relation to the Use of MI in Dental Health Settings

Various studies have demonstrated effectiveness of MI in dental health settings. A systematic review that studies the effectiveness of MI approach on adolescents and adults and observed that MI outperformed conventional education, especially in preventing [28]. Weinstein et al (2006) compared MI with traditional health education in infants aged 6 to 18 months and their mothers. Post two years, significantly less new caries in MI group was observed. This showed that MI had a protective effect w. r. t. ECC [29]. Naidu et al (2015) reported the results of a randomized controlled trial comparing MI with the conventional health education to mothers in relation to ECC. The study concluded that, MI exhibited positive effect

on parent/ caregiver oral health knowledge, attitudes and behaviours compared to the conventional methods [22]. When MI was compared with the conventional health education to mothers in reducing new caries and plaque levels, Gonzalez et al (2014) found out that MI is better than traditional educational programs [30].

1.2 Potential to Recommend MI in Dental Settings

There is a potential to recommend MI for achieving a behaviour change in following dental health conditions:

- Management of ECC parental counselling for the comprehensive care
- Stopping of bottle feeding behaviours of mothers
- Smoking cessation
- Improving compliance of the patient during an appliance therapy
- Improving dental attendance behaviour
- Altering dietary behaviours

Advantages of MI

- MI enhances patients' participation by self motivation and helps them to achieve their goals
- Unlike other behaviour modification techniques MI does not have a 'victim blaming' or 'paternalistic' approach. It has a rational approach allowing the patient to perceive costs and benefits of behaviour change.
- It is an evidence based approach.

Limitations

- It may not be a quick-fix and requires patience on the part of the interviewer as well as the interviewee.
- It requires training in the field of counselling. Additional help from a psychologist may be needed.
- It may not be effective where health literacy is poor.

MI is a behaviour change technique that elicits health behaviour change based on the Transtheoretical model, and can be used to achieve health related goals. However, research is necessary to substantiate the claims of its effectiveness dental health related behaviours and interventions.

1.3 Aim

To assess the effectiveness of Motivational Interviewing (MI) on bottle feeding behaviour in an urban population.

2. METHODOLOGY

It was a preliminary qualitative study which was the Part 2 of a cross-sectional study. The primary study assessed Severe Early Childhood Caries (S-ECC) and General Health Status (GHS) in One to Two Year-Old Children Related to Bottle-Feeding, in Urban Indian Population. In the main study, 824 infants were examined for dental and general health status and their mothers were interviewed for the same [11]. This sample was drawn from 3 different set-ups (2 government general hospitals and 1 private Paediatric set up) across the urban area.

From the 824 infants that were selected for the Part 1 [11], 60 parents were screened for the qualitative analysis. 26 parents reported bottle feeding behaviour and 21 parents showed readiness to participate in the study. However, only 16 mothers expressed willingness to continue interaction for the stoppage of bottle feeding habit, meeting the inclusion and exclusion criteria (refer to Table 2) for our current qualitative study.

Piloting of Motivational Interviewing (MI) was done with the help of a psychologist prior to the commencement of the same in the parents who had reported. The technique of MI is based on TTM of behaviour change developed by Prochaska and DiClemente (1982). It is framework for understanding the process of change. This model has been extensively used in the studies on the effectiveness of stage-matched interventions for smoking cessation as reported by Riemsma et al (2003). This model categorizes patients into 5 stages of behaviour change by assessing the status quo of the individual. The stages are: 1) Pre-contemplation, 2) Contemplation, 3) Preparation, 4) Action, 5) Maintenance/ Relapse prevention (Refer to Table 1 and Fig. 1). The assessment of these statuses is based on "the change talk" of the patient which may express their desire, ability, reasons and need to change. Patients may also demonstrate their commitment and actively start taking steps to change their unhealthy practices.

After piloting, the questions to be included in the interview were standardized (Annexure I

describes a conversation with mother). As per the recommendation of MI, more emphasis were given on open ended questions and mothers reflections were received to assess the 'change talk' and thus change in the stage of behaviour. Mothers were provided enough time to reflect upon. After the 1st session of counselling, mothers were followed up with telephonic counselling session for the period of one month.

The process of MI is thus explained in the Table 3.

2.1 Statistical Analysis

The results of MI in terms of habit discontinuation or persistence over the scale of TTM were statistically assessed on MS Excel (version 2012) and reported using descriptive statistics.

Table 2. The inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
1. Mothers having children between 6-24 months of age	1. Mothers practicing exclusive breast feeding for their child
2. Mothers with history on-going bottle feeding practice	2. Children with any known systemic disorders, physical or mental illness; thus impacting the parameters of the study (dental conditions and dietary practices)
3. Mothers willing to participate and follow up for the counselling sessions	



Fig. 1. Stages of behaviour change based on the transtheoretical model

Table 3. The process of MI describing initial counselling phase and follow-up phases

Activity	Time	Goals
Initial counseling	Start of study	1. Preparatory- Initial rapport 2. Participatory- Open ended Questions to evoke response <ul style="list-style-type: none"> • What your view regarding feeding practices? • What are perceived costs and benefits of bottle use? • When and how are you planning to stop? 3. Reflection- reflective listening of their needs, reasons and difficulties
Follow-up with telephonic conversation	1 week after initial counseling 1 month after initial counseling	Assessment

3. RESULTS

The behaviour change in mothers was assessed at one week and one month follow-up through a telephonic communication. Out of the 16 mothers who went through the initial counselling, all 16 mothers were followed up post 1 week; however, at the end of 1 month only 15 mothers were followed up (Refer to Fig. 2 and Table 4). Behaviour change was found in 87.5% of mothers by the end of 1 month follow-up. At the end of 1 week, 18.75% mothers were in the stage of Pre-contemplation, 6.25% mothers were in the stage of Contemplation, 12.5% mothers in the stage of Preparation and 62.5% mothers were in the stage of Action. At the end of 1 month, 6.25% mothers were in the stage of Pre-contemplation, 6.25% mothers were in the stage of Contemplation, 6.25% mothers were in the stage of Preparation, 18.75% mothers were in the stage of Action and 56.25% mothers in the stage of maintenance.

4. DISCUSSION

We had assessed the behaviour change in mothers who bottle-fed their children after counselling them using a BCT, MI. This being a study of its kind, only a preliminary investigation was possible and hence a small non-probabilistic sample was obtained. The use of MI for behaviour change in the bottle feeding practice of mothers as the intervention is unique in itself and the study thus provides a model for aspects of MI implementation, such as desirable characteristics of intervention providers,

individual adaptation of the approach, and reliability. The results of MI in terms of habit discontinuation or persistence over the scale of TTM were reported quantitatively. Behaviour change was found in 87.5% of mothers by the end of 1 month follow-up. We could not assess the intervention qualitatively; however, the conversation were recorded and the 'change talks' were noted during the telephonic follow up sessions which helped us understand the stage of behaviour. Participants (mothers) with continues practice of bottle feeding after unsuccessful attempts to quit in past exhibited following reflections suggestive of changed behaviours. A few examples of 'change talks' are cited here. A mother in the stage of contemplation stated, *"I definitely want to leave this habit of bottle, the only reason I give him is that it gives me my ME time."* This statement indicated her willingness to stop the habit but inability to do so. Another statement made by one of the mothers, *"...his grandparents, particularly my in-laws, do not agree; but, I have started taking a stand, I do not want to rely on something like this to feed my child"* indicating that the mother has started taking steps for the stoppage of habit i.e stage of preparation. We also came across certain confident statements boldly stated by mothers who had already reached the stage of action; like, *"No, that is not going to happen now, I have thrown away the bottle and he saw it, he feels that it cannot come back"* or another statement like, *".. So I keep the bottle empty, he takes, feels disappointed and then leaves it. He engages himself into playing. I think he will manage"*.

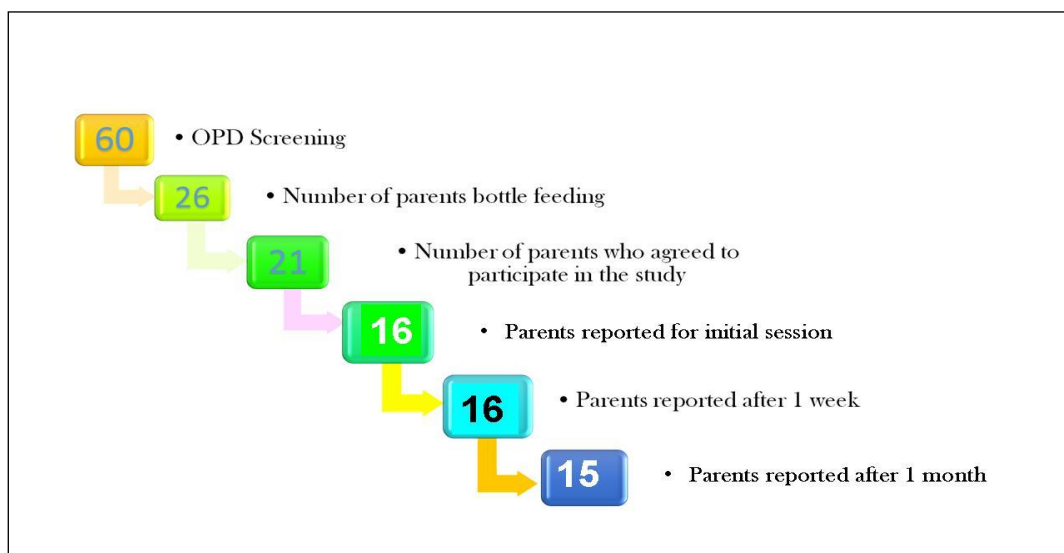


Fig. 2. Flow diagram showing number of patients enrolled for the study

Table 4. Stage of behaviour change at 1 week and 1 month follow-up

Stage of behaviour change	1 week follow-up	1 month follow-up
Pre-Contemplation	3	1
Contemplation	1	1
Preparation	2	1
Action	10	3
Maintenance	-	9

The technique had evoked a positive response by the end of each follow-up session and mothers came up with the reasons and barriers that they felt must have stopped them from quitting the practice. Mothers felt that the long working hours in office and inability to give time to the child made them bottle feed the child even if not required thereby getting addicted to it. At times mothers wanted to buy some time away from their crying child and hence giving bottle in the hands of the child was a good escape. Also, infants were bottle fed in the absence of mother and they felt that there was 'no option' other than bottle feeding. Similar reasons and barriers and reported in studies by Naidu et al (2015) and Freeman (2008) [31]. Mothers had dealt with difficulties in breaking the habit easily and hence had come up with their own solutions and ideas to de-addict themselves. A few mothers suggested the use of sipper or cup instead of bottles or hiding the bottle. Mothers would hide or would go away from child's vision if child cries for bottle or demands milk. A few other mothers preferred replacing the milk in the bottle with water or not filling the bottle at all.

It was further observed that mothers were comfortable in communicating with the examiner. Open discussion of oral health goals and barriers along with sharing of experiences was done at both the follow-up sessions with the examiner. At the same time, opinions offered did not feel intrusive and seemed helpful and no participants indicated discomfort with the same. One of the statements in regards to the helpfulness of the MI technique is quoted as follows, "Yes, it was really good (the MI talk), because I was aware about the general aspects of bottle feeding and I did enquire from my dentist. So now whenever she demands for bottle I am handing her a sipper, she resists but I am sure she will be used to it." Also, from the views expressed by the mothers it could be inferred that after the intervention, participants felt more confident in their ability to use the information that was provided. Exploring practical ways to overcome barriers to oral and general Healthcare for their

child/children may also have helped participants to persist with introducing new oral healthcare and dietary regimes about which they had learned during the follow-up sessions. Nevertheless, it has been suggested in literature that MI provides an opportunity to address 'felt needs' [32], which supports a view that primary healthcare professionals should address the needs of families in the context of their environment and experience as the choices that people make are because of the conditions in which they live [33]. It has also been suggested that health practitioners are likely to gain a greater sense of achievement from recognizing progress in an individual's 'readiness for change' as an important outcome rather than using behaviour change as the only goal since behaviour change is a dynamic process and it may not be possible to measure behaviours in the short term [34].

5. LIMITATIONS

Out of the 64 mothers informed about the intervention (MI), only 15 reported and could be followed up for 1 month. MI was carried out in different settings and not where the parents were accessed for the observational study. Hence, direct and indirect costs involved (due to time and travel) could have altered their decision and attendance. Moreover, the technique of MI although very effective may be expensive as it requires time commitment from both the sides (the patient and counsellor). No precise sample size calculation was made for MI as this was the first study in this population without any previous data to enable the same.

Our study has limited generalizability despite its observational nature. The study is unique and first of its kind linking several general health conditions and dental caries to the feeding practices in the age group of 1-2 year olds. This study generates a few new hypotheses to be tested through prospective observational and interventional studies, such as:

- Effectiveness of MI in relation to the behaviour change of feeding practices as against educational approaches.
- Effectiveness of MI as a group behavioural intervention.

This study identifies bottle feeding as common risk and establishes an opportunity for a paediatric dentist to become a counsellor for the behaviour change. However, a larger sample and multi-centric investigation may substantiate our claims.

6. CONCLUSION

MI was effective in stoppage of bottle feeding in 87.5% of the participants.

Recommendations: It is in the domain of paediatric dentists to inform and counsel parents on feeding practices for which dentist must imbibe skills of BCTs such as MI.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Ethics Committee. Permissions from the concerned hospital authorities (where the study sample was available) were taken for conducting the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Bolling, K. Infant Feeding Survey. The Information Centre; 2005. Available from Available:<http://www.ic.nhs.uk/webfiles/publications/ifs06/2005%20Infant%20Feeding%20Survey%20%28Chapter%201%29%20%20Introduction.pdf>. Accessed on Accessed on September 15, 2016.
2. WHO recommendations on postnatal care of the mother and newborn. 1. Postnatal care – standards. 2. Maternal welfare. 3. Infant, Newborn. 4. Guideline. I. World Health Organization. ISBN 978 92 4 150664 9 (NLM classification: WQ 500); 2013
3. Ministry of human resource development, Department of women and child development (Food and nutrition board), Govt. of India. National guidelines on infant and young child feeding; 2004.
4. Renfrew MJ, Ansell P, Macleod KL. Formula feed preparation: helping reduce the risks; a systematic review. *Archives of Disease in Childhood*. 2003;88(10):855-8.
5. Lakshman R, Ogilvie D, Ong KK. Mothers' experiences of bottle-feeding: A systematic review of qualitative and quantitative studies. *Archives of Disease in Childhood*. 2009;94(8):596-601.
6. Andiran F, Dayı S, Mete E. Cows milk consumption in constipation and anal fissure in infants and young children. *Journal of Paediatrics and Child Health*. 2003;39(5):329-31.
7. Parkin PC, DeGroot J, Maguire JL, Birken CS, Zlotkin S. Severe iron-deficiency anaemia and feeding practices in young children. *Public Health Nutrition*. 2016; 19(4):716-22.
8. Gaffney KF, Farrar-Simpson MA, Claire D, Davilla G. Prolonged baby bottle feeding: A health risk factor. *Pediatric Nursing*. 2004; 30(3):242-6.
9. Bennett WE, HendrixKS, Thompson-Fleming RT, Downs SM, Carroll AE. Early cow's milk introduction is associated with failed personal–social milestones after 1 year of age. *European Journal of Pediatrics*. 2014;173(7):887-92.
10. Kim HY, Han Y, Pyun Y. Prolonged bedtime bottle-feeding and respiratory symptoms in infants. *Asia Pac Allergy*. 2011;1(1):30-5.
11. Acharya PR. Severe Early Childhood Caries (S-ECC) and General Health Status (GHS) in One to Two Year-Old Children Related to Bottle-Feeding, in Urban Indian Population-A Cross-Sectional Study. *EC Paediatrics*. 2021;10:52-66.
12. Lumeng J. What Can We Do to Prevent Childhood Obesity? *Zero to Three (J)*. 2005;25(3):13-9.
13. Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. *Community dentistry and oral epidemiology*. 2000;28(6):399-406.
14. Engel GL. The need for a new medical model: A challenge for biomedicine. *Holistic Medicine*. 1989;4(1):37-53.

15. Whitehead M, Dahlgren G, Gilson L. Developing the policy response to inequities in Health: A global perspective. *ill;- Challenging inequities in health care: From ethics to action*. New York: Oxford University Press. 2001;309-322.
16. Janz NK, Becker MH. The health belief model: A decade later. *Health education quarterly*. 1984;11(1):1-47.
17. Floyd DL, Prentice-Dunn S, Rogers RW. A meta-analysis of research on protection motivation theory. *Journal of Applied Social Psychology*. 2000;30(2):407-29.
18. Norman P, Bennett P, Smith C, Murphy S. Health locus of control and health behaviour. *Journal of Health Psychology*. 1998;3(2):171-80.
19. Albarracín D, Johnson BT, Fishbein M, Muellerleile PA. Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin*. 2001;127(1):142.
20. Madden TJ, Ellen PS, Ajzen I. A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and Social Psychology Bulletin*. 1992;18(1):3-9.
21. Prochaska JO, DiClemente CC. Toward a comprehensive model of change. In *Treating Addictive Behaviors*. 1986;3-27. Springer US.
22. Naidu R, Nunn J, Irwin JD. The effect of motivational interviewing on oral healthcare knowledge, attitudes and behaviour of parents and caregivers of preschool children: an exploratory cluster randomised controlled study. *BMC Oral Health*. 2015;15(1):101.
23. Miller W, Rollnick S. *Motivational interviewing: Preparing people for change*. *Journal for Healthcare Quality*. 2003; 25(3):46.
24. Miller WR, Rollnick S. *Motivational interviewing: Helping people change*. Guilford Press; 2012.
25. Rollnick S, Miller WR, Butler CC, Aloia MS. *Motivational interviewing in health care: helping patients change behavior*.
26. Weinstein P, Milgrom P, Riedy CA, Mancl LA, Garson G, Huebner CE, Smolen D, Sutherland M, Nykamp A. Treatment fidelity of brief motivational interviewing and health education in a randomized clinical trial to promote dental attendance of low-income mothers and children: Community-Based Intergenerational Oral Health Study "Baby Smiles". *BMC Oral Health*. 2014;14(1):15.
27. Cascaes AM, Bielemann RM, Clark VL, Barros AJ. Effectiveness of motivational interviewing at improving oral health: a systematic review. *Revista de saude Publica*. 2014;48(1):142-53.
28. Gao X, Lo EC, Kot SC, Chan KC. Motivational interviewing in improving oral health: A systematic review of randomized controlled trials. *Journal of Periodontology*. 2014;85(3):426-37.
29. Weinstein P, Milgrom P, Riedy CA, Mancl LA, Garson G, Huebner CE, Smolen D, Sutherland M, Nykamp A. Treatment fidelity of brief motivational interviewing and health education in a randomized clinical trial to promote dental attendance of low-income mothers and children: Community-Based Intergenerational Oral Health Study "Baby Smiles". *BMC Oral Health*. 2014;14(1):15.
30. González-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. *Journal of clinical and experimental dentistry*. 2014;6(5):e524.
31. Freeman R, Stevens A. Nursing caries and buying time: An emerging theory of prolonged bottle feeding. *Community Dent Oral Epidemiol*. 2008;63:425–33.
32. Freeman R, Stevens A. Nursing caries and buying time: an emerging theory of prolonged bottle feeding. *Community Dentistry and Oral Epidemiology*. 2008; 36(5):425-33.
33. Williams DM, Sheiham A, Watt RG. Oral health professionals and social determinants. *Br Dent J*. 2013;214:427.
34. Britt E, Hudson SM, Blampied NM. Motivational interviewing in health settings: A review. *Patient Education and Counseling*. 2004;53(2):147-55.

ANNEXURE 1

Interviewer: I just wanted to talk to you after going through the questionnaire you have answered. I am a little bit concerned (about his health) that _____ is repeatedly getting GI infections and noticing his dental condition I feel he is being bottle fed. So if you can tell me a little bit more about that.

Mother: Yes, we bottle feed him these days. He is so habituated to the bottle that he just doesn't sleep or just keeps crying. Also, we have tried to quit, we could do it for 1 day but now it is not happening because it is difficult to be after him; giving bottle in his hand is much easier with full time job and workload at home.

Interviewer: OK, so it gives you a sense of security when you give him the bottle, you are sure he is at least having something or at least will sleep without crying.

Mother: Yes, it is much easy and comfortable for me as well as for his grandparents who look after him when I am not there. I am free to finish my household work once I give him bottle and even he enjoys it.

Interviewer: So it sounds like you have tried not giving him bottle before, so what made you try that?

Mother: I have been reading that there are chances of infections. I did not know about the dental cavities but yes he does get constipated. But, other children of his age too suffer at times from infections so bottle feeding may not be the only reason.

Interviewer: OK, so you are worried about the bottle feeding and the associated risks at the same time you are not sure if bottle feeding should be discontinued.

Mother: Exactly, I mean he looks healthy enough for his age and at present I don't know if bottle feeding is harming him or no. It is very difficult to stop the practice.

Interviewer: But like you said, you had tried before and you were successful to manage him for a day, how did that happen?

Mother: I was at home, it was a long weekend. I thought there is no need of any external source of milk since I am there to cook for him. And having my husband with me made it easier to manage.

Interviewer: OK, so having your job started, you find it difficult and you prefer to hand him the bottle.

Mother: yes, correct!

Interviewer: How did you manage to succeed when you had decided to quit earlier?

Mother: May be because of my husband being at home with me. Also, I had things running back of the mind that probably he is getting ill because of the bottle and I am guilty for it.

Interviewer: So, you were aware that the risks are scarier than the benefits. But now you are not finding it necessary to discourage bottle feeding.

Mother: No, I am not supposed to bottle feed him just because it is easy for me or because he cries and demands. But, I have been trying to feed him in cup and instructing his grandparents to feed him in cup but don't work out effectively as I should.

Interviewer: so it seems that you are doing best of what you can.

Mother: Yes, I am trying my best.

Interviewer: It sounds that you want to discontinue bottle feeding at the same time a part of you is depended on the bottle.

Mother: Yes. I try it almost every Sunday when we are home.

Interviewer: So, if you decide to quit, on the scale of 1 to 10, 1 being not confident and 10 being confident, where do you think you land?

Mother: 5?

Interviewer: Why not 2 or 3?

Mother: Because I have tried doing it before and I think I can but the schedule and lifestyle makes it hard. He is depended on bottle because I cannot be available all the time.

Interviewer: So it seems that you have a lot of reasons to quit his bottle feeding practice as against its benefits. You have been successful to but right now you doubt your ability to make this possible. What do you think can be done?

Mother: I don't know. I need little help and I am not confident about this.

Interviewer: If you want I can actually help you with some good ideas and option which can be successful if you attempt. For e.g. .we can start with use of sipper with water or use of cup and spoon.

Mother: But I don't know how his grandparents will react and how I will make time for this.

Interviewer: Sure, we can talk about the options which fit into your schedule.

Mother: Yes, I am ok with that.

Interviewer: So, if you are willing I will be happy to guide you how to go about the process.

Mother: Sure, let us do it.

© 2021 Acharya and Jawdekar; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/77956>