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RESEARCH PROPOSAL

THE EFFECTIVENESS OF MOTIVATIONAL INTERVIEWING IN PREVENTING EARLY CHILDHOOD CARIES: A CLUSTER RANDOMISED CONTROLLED TRIAL AMONG MOTHERS OF INFANTS IN TERENGGANU

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LIST OF ABBREVIATIONS

AAPD	American Academy of Pediatrics Dentistry
AG	Anticipatory Guidance
DT	Dental Therapist
ECC	Early Childhood Caries
HBM	Health Belief Model
MCHC	Maternal and Child Health Clinic
MI	Motivational Interviewing
MITI	Motivational Interviewing Treatment Integrity
MOH	Ministry of Health
NOHPS	National Oral Health Survey of Preschool Children
UMT	Universiti Malaysia Terengganu
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Early childhood caries (ECC) is defined as the presence of one or more decayed (noncavitated or cavitated lesions), missing or filled tooth surfaces (due to caries), in any primary teeth of a child under the age of 6 (Ministry of Health, 2012). In children younger than 3 years old, any indication of smooth surface caries is classified as severe early childhood caries (S-ECC). S-ECC typically manifests suddenly, spreading extensively and swiftly, with a tendency to penetrate deep into the dental pulp in the primary teeth of young children. In the past, this condition was known by different names including rampant caries, nursing bottle caries, and baby bottle tooth decay (Ministry of Health, 2012).

ECC has a profound adverse effect on the oral health related quality of life of children. Toothache, painful sensation in the teeth, difficulty in chewing, dissatisfaction with teeth, and trouble sleeping are the most common impacts reported by parents (Singh et al., 2020). A study by Zaror et al. (2022) explored the links between the negative impact on dental condition and orofacial function in young children with extensive carious lesions, particularly on children's ability to chew and swallow. Oral pain, orthodontic problems such as malocclusion, enamel defects, and issues with eating and speaking can occur, as well as an increased risk for caries development in the permanent dentition, are among the long-term impacts of caries in children reported by Abanto et al. (2011).

The American Academy of Paediatric Dentistry (AAPD) acknowledges ECC as a significant, chronic condition that arises from an interplay of various factors over time (AAPD, 2017), and emphasizes the importance of anticipatory guidance (AG) in preventing ECC. AG refers to proactive, age-appropriate counselling that promotes health and prevents disease. In oral health, AG involves educating mothers and caregivers about effective oral health practices tailored to each stage of a child's development.

AG focuses on instilling preventive measures early in life (AAPD, 2022). Key recommendations include reducing the consumption of sugary liquids and solid foods, avoid prolonged breastfeeding (more than 12 months) after the eruption of the first primary tooth and the introduction of dietary carbohydrates, discontinuing baby bottle use between 12 to 18 months of age, and initiating oral hygiene practices as early as possible (AAPD, 2017), toothbrushing assisted by parents twice daily using an appropriately sized soft toothbrush with a tiny amount of fluoridated toothpaste (smear or rice-sized) for children under three years old while a pea-sized amount for while those aged three and above. Furthermore, the AAPD recommends professionally applied fluoride varnish treatments for children at risk of ECC and establishing a dental home within six months of the first tooth's eruption, but no later than 12 months of age (AAPD, 2017).

In Malaysia, the Ministry of Health (MOH) began providing oral healthcare services to infants and toddlers in 1991, starting with a pilot project in Sarawak aimed at addressing ECC through early intervention. In this project, dental nurses offered AG to parents and caregivers while also conducting brief oral examinations on toddlers at Maternal and Child Health Clinics (MCHCs). This successful program was later

adopted by other states and expanded as the Early Childhood Oral Health Programme in 2008 to include toddlers at childcare centres (Ministry of Health Malaysia, 2008). Besides focusing on captive groups of infants and toddlers who receive immunisations and check-ups at the MOH MCHCs, the Early Childhood Oral Health Programme also cover toddlers under the care of registered childcare centres and nurseries (Ministry of Health Malaysia, 2008).

AG plays a crucial role in early childhood oral healthcare by empowering parents and caregivers with knowledge and skills to establish preventive practices. Provision of parental education on preventive practices using AG can decrease a child's risks of developing ECC (AAPD, 2017). Delivering cost-effective sustained AG, which is periodic or continuous guidance or support provided by the health care workers or health care professionals, to the caretakers by education and technology will facilitate early diagnosis, improve oral hygiene practices, and initiate early intervention protocols that consequently can prevent ECC (Abirami et al., 2021). A study done in Johor, Malaysia showed that the provision of oral health knowledge using the AG technique in an intervention programme was effective in reducing ECC incidence among young children aged six and below, and improved mothers' oral health literacy after 3 years of implementation (Ismail et al., 2018).

Many health care conditions require behaviour change by the patient or parent to improve health outcomes. Poor outcomes may be attributed to the lack of adherence to the behaviour change recommendations. A shift from the authoritarian, expert providing advice to a more family-centred, collaborative model using motivational interviewing (MI) results in improved adherence (Gance-Cleveland, 2007) .

MI was introduced by William Miller in 1983 as a counselling method for promoting change in behaviour through collaboration and self-reflection (Miller & Rollnick, 2002). MI uses an empathic, collaborative style to elicit and build on clients' own reasons for their behavioural change (Hall, 2017; Rollnick et al., 2008). MI was proven efficacious with a range of health-related behaviours, including substance abuse, diet and exercise, and medication adherence (Hettema et al., 2005; Miller & Rollnick, 2023).

MI is a client-centred approach designed to enhance intrinsic motivation for change by exploring, identifying, and resolving doubts and ambivalence (Miller & Rollnick, 2023). A key motivation behind this method is the compassionate desire by the motivational interviewer to promote well-being, prevent or alleviate suffering, and facilitate positive change in clients. This underlying motivation often draws interviewers to roles such as counsellors, educators, or coaches, who accompany people on their life journey (Miller & Rollnick, 2023). A study conducted during the COVID-19 pandemic among mothers with young children aged nine to 24 months in India showed that providing AG via online MI improved the level of knowledge of mothers and caregivers in the prevention of ECC (Aravind et al., 2023).

1.2 Problem Statement

Despite the implementation of AG through the Early Childhood Oral Health Programme for over 15 years, the prevalence of ECC in Malaysia remains high, with only a slight reduction in caries prevalence from 2005 to 2015 (Ministry of Health Malaysia, 2015). This is evidenced by data from the Malaysian National Oral Health Survey of Preschool Children (NOHPS) in 2015, which reported a caries prevalence of 71.3% among 5-year-old children (Ministry of Health Malaysia, 2015). This figure falls

significantly short of the target set by the National Oral Health Plan (NOHP) 2011-2020, which aimed for a 50.0% caries-free rate among 5-year-olds by 2020. Although there was a reduction in caries severity, measured by the mean number of decayed and filled teeth (dft) from 5.8 in 1995 to 5.5 in 2005 and later to 4.83 in 2015, only a reduction of 1.0 was noted over a span of 20 years (Ministry of Health Malaysia, 2015).

Studies have shown that various barriers interfere with the practices of infant oral healthcare by parents. A study by Suprabha et al., (2021) showed that even though a vast majority of participants were aware of the significance of oral hygiene, they faced challenges in implementing proper home hygiene practices and lacked knowledge about the type of toothpaste and toothbrush to be used for their children (Suprabha et al., 2021).

Another study by Suprabha et al., (2023) showed that in children with ECC, infant feeding practices included prolonged breastfeeding or bottle-feeding beyond the required age, feeding at bedtime, and feeding sugary drinks. Although parents knew these feeding habits could increase the risk for caries, they lacked the self-efficacy to translate their knowledge into action during weaning and were unaware of infant oral hygiene practices (Suprabha et al., 2023).

In the Child Health 2021-2030: A National Framework to Reduce the Under-5 Mortality and Support Child Growth and Development by Child Health Sector Family Health Development Division, Ministry of Health Malaysia, it is highlighted that health education on dental care for children under five years has not been given sufficient emphasis. Results from the National Health Morbidity Survey 2016 survey (Institute for Public Health Ministry of Health Malaysia, 2016) showed that mothers' knowledge on oral health was low. Among those who received advice from oral healthcare

practitioners, only 26.5% thought it was very important to look after their child's oral health, indicating that receiving advice alone may not be sufficient to change maternal attitudes or increase the perceived importance of early oral healthcare (Institute for Public Health Ministry of Health Malaysia, 2016). Therefore, there is a need to strengthen the delivery of oral health education for mothers of infants in Malaysia (Ministry of Health Malaysia, 2021).

1.3 Justification of Study

The early years of life are a critical period for shaping oral health behaviours, and educating parents or caregivers at this stage can significantly influence their child's future oral health (Sohl et al., 2016). By assessing potential risk factors such as feeding practices, oral hygiene habits, and family history of dental caries, healthcare providers can offer tailored recommendations to reduce the likelihood of ECC (AAPD, 2022). Early intervention is strongly recommended by the AAPD, which emphasizes that oral health promotion should begin as early as infancy to establish lifelong preventive habits (AAPD, 2022).

In Malaysia, this responsibility for early oral health promotion is largely carried out by dental therapists. First introduced to the public dental workforce in 1948, these professionals, formerly known as dental nurses under the Dental Act 1971, offer limited dental care to children aged 17 and below under the supervision of dentists (Law of Malaysia Act 51, 2005). Their services include diagnosing, scaling and polishing, simple restorations, extracting deciduous teeth, applying fluoride varnishes, and placing fissure sealants. Beyond clinical procedures, dental therapists also deliver oral health education, offering AG to parents or caregivers at MCHCs, primary dental clinics, and

nurseries or kindergartens (Law of Malaysia Act 51, 2005). The Dental Act 2018 has extended their practice to private settings and raised the age limit for their services to 18 years old. However, their dental tasks remain largely unchanged, encompassing oral health promotion, education, and instruction (Laws of Malaysia Act 804, 2018).

Given their frontline role in preventive oral healthcare, there is a need for effective communication approaches that can enhance the delivery of health messages and foster behaviour change among parents. MI is a patient-centered consultation method that helps patients change their behaviors with maximum intrinsic motivation and minimum resistance (Miller & Rollnick, 2002). MI has been also successfully used in establishing preventive behaviors related to diseases such as diabetes, HIV infection, and AIDS (Rubak et al., 2005).

In dentistry, Weinstein et al. (2004) were the first to apply this technique. Their study focused on comparing the effectiveness of MI with traditional counselling methods (such as video and pamphlet) in promoting preventive behaviours among mothers of infants at high risk of developing caries. This pioneering work demonstrated the potential of MI to foster better oral health habits and reduce the incidence of caries in high-risk populations (Weinstein et al., 2004).

MI is conducted in a collaborative style that supports the autonomy and self-efficacy of the patient, using the patient's own reasons for change. This approach increases the patient's confidence and reduces defensiveness. MI keeps the responsibility for change with the patient and/or parent, which also help to decrease

staff burnout by reducing the pressure on healthcare providers (American Academy of Paediatric Dentistry, 2024).

In dentistry, this MI skill is very useful in counseling on brushing, flossing, fluoride varnish, reducing sugar sweetened beverages, and smoking cessation. The use of open-ended questions, affirmations, reflective listening, and summarizing (OARS) forms the foundation of a patient-centered approach. This approach is especially useful when dealing with resistance, emotional distress, or long-standing behavioural patterns. By promoting collaboration and respect, MI empowers both staff and patients while deliberately steering away from adversarial or shaming interactions (American Academy of Paediatric Dentistry, 2024).

MI is grounded in the establishment of dialogue and confidence between the patient and the instructing health professional. Conversations are guided to allow patients to define behavioral changes on their own accord, with a view to obtaining personal benefit (González-Del-Castillo-McGrath et al., 2014). Once patients identify their personal motivation for change, the instructor provides the information needed to achieve such change, based on a range of strategies selected by the patients and incorporated into their daily life, in accordance with the capacity of each individual (González-Del-Castillo-McGrath et al., 2014).

Jamieson et al. (2018) conducted a study on the dental disease outcomes following a 2-year oral health promotion program for Australian aboriginal children and their families. This study included MI interventions for mothers during pregnancy and when children were aged six months, 12 months and 18 months, along with the

provision of dental care to mothers during pregnancy, application of fluoride varnish to the teeth of the children, and delivery of AG. Findings from this study showed that the mean number of decayed teeth in children aged two years was lower in the intervention group (0.62) than children in the control group (0.89).

Jamieson et al. (2019) then conducted a secondary analysis of a randomized clinical trial to test the efficacy of similar interventions when participating children reached the age of five years. The study included 448 mother or caregiver–child dyads enrolled between February 2010 and May 2011. Participants were randomized into either the immediate intervention group or the delayed intervention group. The interventions, similar to those given in the previous study (Jamieson et al., 2018), included dental care to mothers during pregnancy, application of fluoride varnish to children's teeth, MI for pregnant mothers, and AG in the form of oral health educational packages.

Children in the immediate intervention group received these interventions at ages six months, 12 months, and 18 months, while those in the delayed intervention group received them at ages 24, 30, and 36 months. The mean number of decayed, missing or filled teeth (dmft) was 2.10 for the immediate intervention group and 2.91 for the delayed intervention group. This finding indicates that children in the delayed intervention group had a mean of 1.0 more whole tooth that had experienced dental disease than children in the immediate intervention group. Hence, this trial found that a multifaceted initiative including MI to reduce ECC continued to be efficacious in participating indigenous children aged five years, especially those residing in

nonmetropolitan locations and with teeth missing because of dental disease (Jamieson et al., 2019).

A study by Almugairin et al. (2025) revealed that while most mothers possessed moderate awareness of the harmful effects of prolonged oral habits, there remained a significant discrepancy between their knowledge and actual practices. This is evidenced by the results from the study that showed most mothers (92.9%) never consulted a dentist regarding their child's ongoing oral habits. The study highlights the importance of educational programs aimed at enhancing parental knowledge, attitudes, and practices concerning children's oral habits. It also underscores the need for improved dentist–parent communication about ongoing oral behaviours. Furthermore, tackling cultural beliefs and financial barriers may encourage greater use of dental services and lead to better oral health outcomes for children (Almugairin et al., 2025).

By incorporating MI into educational programs, a systematic review and meta-analysis by Colvara et al. (2021) demonstrated that MI can effectively modify knowledge and behaviours to reduce ECC, with a more significant impact on children with high caries experience. Additionally, another meta-analysis highlights the crucial role of MI in preventing ECC (Jahanshahi et al., 2022). The study concluded that the mere provision of information and oral care tools is inadequate; instead, MI promotes a deeper family-level understanding of oral health, resulting in more effective preventive practices (Jahanshahi et al., 2022).

In addition, MI is effective across all age groups, including both infants and children. The quality of each session often has a greater impact than its frequency. To achieve lasting behavioural change, consistent follow-up and ongoing support are

essential (Jahanshahi et al., 2022). Integrating MI into oral health interventions can play a significant role in reducing early childhood caries (ECC), ultimately contributing to improved oral health outcomes at the community level (Jahanshahi et al., 2022).

In light of the above findings, this study is well justified in exploring the use of MI to deliver AG to mothers of infants. This approach is essential for bridging the persistent gap between knowledge and practice, ensuring that mothers not only receive accurate information about infant oral healthcare but are also empowered with the motivation and confidence to apply appropriate oral health practices effectively.

1.4 Research Objectives

1.4.1 General Objectives

To assess the effectiveness of MI in delivering AG to mothers of infants for the prevention of ECC in Terengganu.

1.4.2 Specific Objectives

1) To determine the knowledge and practices regarding infant oral health care among mothers in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.
2) To determine the knowledge and practices regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
3) To compare the mean knowledge and practices score regarding infant oral health care among mothers in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.

4) To compare the mean knowledge and practices score regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
5) To compare the mean knowledge and practice scores regarding infant oral health care between mothers in the study group after receiving AG through MI and mothers in the control group after receiving the conventional MOH AG.
6) To compare the incidence of ECC and dental caries risk status among infants in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.
7) To compare the incidence of ECC and dental caries risk status among infants in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
8) To compare the incidence of ECC and dental caries risk status between infants in the study group (mothers received AG through MI) and infants in the control group (mothers received the conventional MOH AG).

1.4.3 Research Questions

1) What is the proportion of mothers in the study group with correct knowledge and practice regarding infant oral health care before and after receiving AG through MI.
2) What is the proportion of mothers in the control group with correct knowledge and practice regarding infant oral health care before and after receiving the conventional MOH AG.

3) What is the difference in knowledge and practice score regarding infant oral health care among mothers in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.
4) What is the difference in knowledge and practice score regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
5) What is the difference in mean knowledge and practice scores regarding infant oral health care between mothers in the study group after receiving AG through MI and mothers in the control group after receiving the conventional MOH AG.
6) What is the difference in incidence of ECC and dental caries risk status among infants in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.
7) What is the difference in incidence of ECC and dental caries risk status among infants in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
8) What is the difference in incidence of ECC and dental caries risk status between infants in the study group (mothers received AG through MI) and infants in the control group (mothers received the conventional MOH AG).

1.4.4 Research Hypothesis

1) The proportions of mothers in the study group with correct knowledge and practice regarding infant oral health care are significantly higher after receiving AG through MI.
2) The proportions of mothers in the control group with correct knowledge and practice regarding infant oral health care are significantly higher after receiving the conventional MOH AG.

3) There is a significant difference in the mean knowledge and practice scores regarding infant oral health care among mothers in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.
4) There is a significant difference in the mean knowledge and practice scores regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
5) The mean knowledge and practice scores regarding infant oral health care among mothers in the study group after receiving AG through MI are significantly higher compared to those in the control group after receiving the conventional MOH AG.
6) There is a significant difference in the incidence of ECC and dental caries risk status among infants in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.
7) There is a significant difference in the incidence of ECC and dental caries risk status among infants in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.
8) The incidence of ECC and the proportion of dental caries risk status among infants in the study group (whose mothers received AG through MI) is significantly lower compared to infants in the control group (whose mothers received the conventional MOH AG).

1.5 Conceptual Framework

This conceptual framework is adapted from Akhtari-Zavare et al. (2016) and is structured around the Health Belief Model (HBM). It illustrates the dynamic interaction

between individual factors, modifying factors, and outcomes related to mothers' practices in infant oral healthcare. The HBM is a psychological model developed to explain and predict health behaviors by focusing on the beliefs and attitudes of individuals. It posits that a person's engagement in health-promoting behavior is influenced by their perception of susceptibility to a condition, the perceived severity of that condition, perceived benefits of taking preventive action, and perceived barriers to taking that action, cues to action and self-efficacy that are considered key components that trigger and sustain health behaviors (Alyafei & Easton-Carr, 2024).

Perceived susceptibility component assesses the probability of acquiring an illness or encountering an undesirable outcome while perceived severity means understanding the severity of the illness, condition, or unfavourable outcome and what could happen if no additional action is taken (Alyafei & Easton-Carr, 2024). Perceived benefit means the effectiveness of various available actions to reduce the risk of illness are perceived while perceived barriers mean obstacles to performing a recommended health action that may stop one from doing what is recommended.

Self-efficacy component means an individual's belief in their capacity to perform a specific behavior or task effectively and the likelihood of a person engaging in a desired behavior. Cues to action, whether from one's surroundings or subjective experiences means the specific cues that can influence the actions one chooses to take or the stimuli that initiate the decision-making process to embrace a recommended health intervention (Alyafei & Easton-Carr, 2024).

In this study, the framework begins with sociodemographic factors, such as age, education, income, working status, and past exposure to oral health education, that can influence mothers' responses to the oral healthcare intervention as well as influence their

knowledge on infants' oral health. The association of ECC with the socioeconomic status (SES) has been well studied and documented (Jahanshahi et al., 2022). Studies showed that ECC is commonly found in children below the poverty line or with poor economic status, ethnic and racial minorities and children with single mothers, whose parents (especially mothers) have low educational level (Jahanshahi et al., 2022).

Meanwhile, the MI serves as a structured approach to improve mothers' knowledge regarding infants' oral health. A study by Aravind et al., (2023) showed that MI provides a better tool for increasing the level of knowledge of mothers and caregivers and provides the structural way of AG and self-motivating them to start practicing various steps to prevent ECC.

Towards the acceptance of new behaviour, adoption through a process based on knowledge will be longer-lasting than behaviour that is not based on knowledge (Parwati et al., 2021). Oral health-related knowledge is widely acknowledged as being associated with both adult and child oral health behaviours and outcomes (De Silva-Sanigorski et al., 2013), indicating that improvements in knowledge may translate into long-term behaviour change that supports oral health. Therefore, this framework incorporates knowledge of mothers on infant oral health as fundamental component in shaping their practices toward their infant oral health.

Hence, all the three factors which are, the sociodemographic factors, the MI, and the knowledge in infants' oral health will further influence the factors at the core of this framework which consists of the HBM components. The first HBM component which is perceived susceptibility, where mothers recognize their infant's risk of developing ECC (Liu et al., 2024). Next component is perceived seriousness, where they acknowledge the short term or long-term consequences of ECC, such as pain,

infection, and the need for future dental treatments. These perceptions serve as motivators for caregivers to take preventive actions towards ECC (Liu et al., 2024).

Then, perceived benefits of practicing infants' oral healthcare, such as improved oral health outcomes by reducing the caries lesions and reducing the caries risk exposure (Daly et al., 2016) while perceived barriers may include factors such as financial constraints, time limitations, or lack of knowledge among the caregivers (Lieneck et al., 2023). Overcoming these barriers is essential in encouraging behaviour change (Lieneck et al., 2023).

Next component is cues to action, particularly through MI interventions topic, that play a crucial role in triggering behavioural changes by enhancing awareness and promoting self-motivation. For example, these interventions can act as key triggers that prompt mothers to recognize the importance of early oral health care and take immediate steps toward adopting positive behaviours (Sidor & Dubin, 2025).

Another component of this framework is self-efficacy, which refers to the confidence of mothers in effectively implementing infants' oral healthcare practices (Finlayson et al., 2007). MI enhances self-efficacy by addressing ambivalence, strengthening motivation, and empowering mothers with the knowledge needed to establish good oral health routines for their infants (Jiang et al., 2020).

This, in turn, leads to practicing the infants' oral healthcare and ultimately improving oral health outcomes, including reduced prevalence of early dental caries lesions and lower exposure to dental caries risk factors. This is proven by studies, which showed that mothers' behaviours play a key role in a child's life, including regular dental care (Azevedo et al., 2015; Isong et al., 2012).

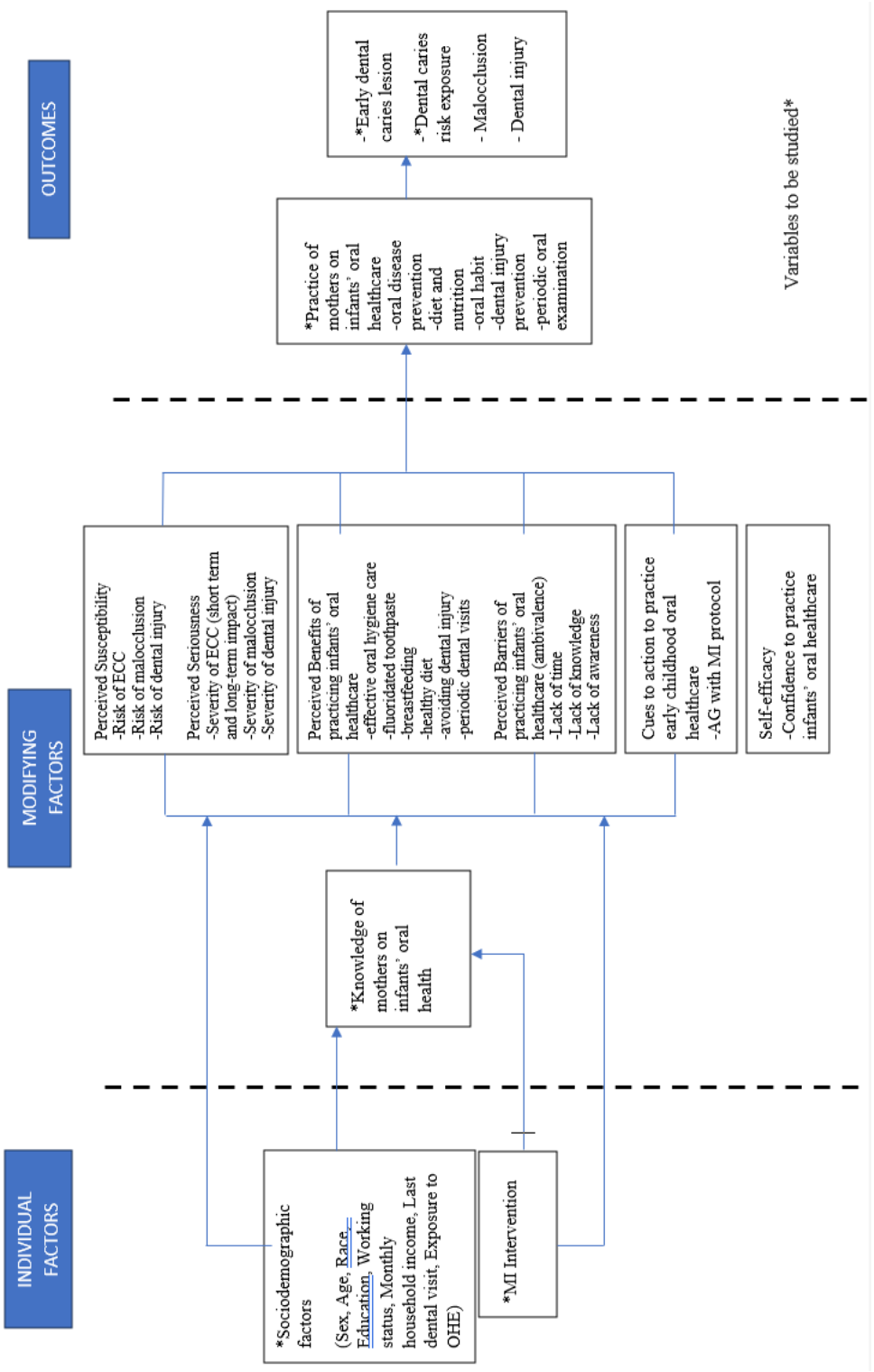

Figure 1.1 Conceptual Framework

CHAPTER 2

LITERATURE REVIEW

2.1 Prevention of Early Childhood Caries

The prevention of ECC requires a multi-level approach, emphasizing primary, secondary, and tertiary prevention. Early preventive strategies should begin as soon as possible, ideally before the eruption of the first primary tooth. Primary prevention plays a fundamental role in reducing ECC prevalence by promoting healthy behaviours, ensuring proper oral hygiene, and encouraging the use of fluoride. Effective preventive measures include early toothbrushing with fluoride toothpaste and addressing socio-behavioural risk factors such as feeding practices, caregiver awareness, and access to dental care. The integration of ECC prevention into existing primary healthcare programs, especially within maternal and child health services, is essential (World Health Organization, 2017).

Health promotion campaigns should target pregnant women, new mothers, and primary caregivers, reinforcing WHO guidelines on exclusive breastfeeding for the first six months, avoiding added sugars in complementary feeding up to two years of age, and maintaining limited free sugar intake beyond this period (World Health Organization, 2017). Caregivers should receive hands-on training on proper toothbrushing techniques, including the appropriate use of fluoride toothpaste, from the eruption of the first primary tooth. Additionally, early detection of carious lesions should be incorporated into routine child health assessments, such as during vaccination appointments and scheduled primary care visits (World Health Organization, 2017).

There is a growing recognition of the significance associated with the early detection and diagnosis of carious lesions to prevent their progression into irreversible cavitation. Many dental professionals encounter challenges when determining the appropriate timing for implementing preventive measures versus intervening in dental procedures (Al Saffan, 2023). The importances of early detection of enamel lesions include increasing the chance of detecting non-cavitated lesions which allows more possibility for non-invasive and micro-invasive treatments to be effective and the possibility of monitoring the lesion progression after providing non-invasive and micro-invasive measures (Mohamed Nur et al., 2023).

The successful management of ECC also relies on adequate training for all healthcare professionals involved in early childhood healthcare. Othan dental professional, the ECC prevention should be embedded within the training curricula of medical, and allied health professionals to ensure comprehensive knowledge and skill development. Furthermore, public health policies should facilitate access to affordable and effective fluoride toothpaste, promote a diet free from added sugars, foster a healthy living environment, and encourage community-based fluoride administration.

Secondary prevention focuses on the early detection of carious lesions before they progress into more severe forms (World Health Organization, 2017). Establishing clear diagnostic criteria for ECC and severe ECC is necessary to enhance early recognition. Training should extend beyond dental personnel to include general healthcare workers and caregivers, equipping them with the skills to identify early signs of tooth decay (World Health Organization, 2017).

However, a study by Blanchet et al. (2023) highlighted a gap in knowledge regarding ECC risk factors. While many oral hygiene measures were well understood, only about half of the dietary risk factors were recognized. The study also found that although healthcare providers frequently examined children's teeth, carious lesions were correctly identified in only half of the cases. Furthermore, a lack of awareness regarding the recommended age for a child's first dental visit was identified as a barrier to early intervention, with many children being referred to a dentist only when symptoms, such as pain, became evident (Blanchet et al., 2023).

Caries Risk Assessment (CRA) has emerged as a crucial tool in preventing dental caries. By systematically evaluating a patient's risk factors, dental professionals can tailor prevention strategies to individual needs. In particular, it aids clinicians in planning appropriate treatment modalities and implementing preventive measures tailored to individual risk profiles, ultimately contributing to improved clinical outcomes. Its widespread application in diverse dental care settings highlights its significance in guiding patient-centred care (Santhosh et al., 2019).

Caries risk is shaped by the complex interaction between risk and protective factors (Ng et al., 2024). Common risk factors include inadequate oral hygiene, past caries experience, a high-sugar diet, low plaque pH, enamel defects, reduced salivary flow, and a history of radiotherapy. Fortunately, various preventive strategies such as fluoride use, gum chewing, and application of dental sealants can help mitigate caries risk (Ng et al., 2024).

There are several well-recognized CRA tools used in dental practice to evaluate a patient's risk of developing dental caries. These include Caries Management by Risk

Assessment (CAMBRA), the American Dental Association (ADA) CRA forms, Cariogram, and the AAPD CRA forms that are designed for pediatric age groups: one for children aged five years and below, while another one is for those aged six and above. These tools consider a range of social, behavioural, general health conditions, as well as clinical conditions that include both risk and protective factors (Ng et al., 2024). These factors include frequent snacking, use of hypo-salivary medications, visible plaque, fluoride exposure, and presence of active carious lesions (American Academy of Pediatric Dentistry, 2022).

Given the global burden of ECC, the integration of CRA into paediatric dental care is more critical than ever. CRA enables clinicians to identify children at high risk and apply preventive strategies early, improving treatment outcomes (Ramos-Gomez et al., 2010). A study conducted in the United States utilizing CAMBRA for paediatric patients, combined with conventional restorative care and chemical therapy (antibacterials and fluoride), resulted in a 20%–38% reduction in caries progression among high-risk children (Featherstone & Chaffee, 2018). This finding underscores the importance of CRA in guiding evidence-based, preventive-focused oral healthcare for the paediatric population.

2.2 Anticipatory Guidance in Early Childhood Oral Healthcare and Early Childhood Caries Prevention

AG is a proactive approach in early childhood oral healthcare. It involves providing practical, age-appropriate advice and information to parents and caregivers about what to expect in their child's development and how to handle common issues or oral problems such as ECC before they develop. This guidance includes dietary advice

to encourage healthy eating habits and reduce sugar intake, teaching proper brushing and flossing techniques, emphasizing the importance of early and regular dental check-ups, advising on the use of fluoride toothpaste and treatments, and addressing habits like bottle-feeding at bedtime and frequent snacking (AAPD, 2017). By tailoring this information to the needs and preferences of parents, using clear and simple language, and providing visual aids, AG can be an effective tool in preventing ECC (Abirami et al., 2021).

The strength of AG lies in interpersonal dynamics. Traditional disease-based preventive programs are often unidirectional, with professionals providing information to the consumer (Nowak & Casamassimo, 1995). AG fosters interaction by requiring clinicians to seek information about a child's development from the parent and by directing clinicians to develop individualized plans or strategies. Motivating parents is relatively easy because they are eager to talk about their children. In addition, it is more effective for dentists to illustrate important concepts of dental health to parents when their own child serves as the model (Nowak & Casamassimo, 1995).

It was found that when parents are shown the anatomical landmarks in their child's mouth dental concepts are explained, telephone consultations become easier, unnecessary office visits are avoided, and the management of traumatic injuries is improved (Nowak & Casamassimo, 1995). AG addresses a long-standing motivational issue encountered in traditional disease-based programs: the repetition of simplistic messages. The message conveyed in AG changes or evolves as the patient grows (Nowak & Casamassimo, 1995).

In a scoping review by Alshammari et al. (2022) on AG's role in preventing dental caries, four randomized controlled trials found that the proportion of children with dental caries was lower in the intervention group compared with children from the control group (Ismail et al., 2018; Jamieson et al., 2018; Plutzer & Spencer, 2008; Wagner & Heinrich-Weltzien, 2016).

Besides reducing the risk of caries, AG can also include advice to minimize the risk for other common oral health problems in children such as malocclusion due to oral habits like nonnutritive sucking (e.g., digital and pacifier habits), bruxism, tongue thrust swallow, and abnormal tongue position (AAPD, 2022). Although early use of pacifiers and digit sucking are considered normal, pacifier use beyond 18 months can influence the developing orofacial complex (AAPD, 2024b). Children with nonnutritive sucking habits beyond age three have a higher incidence of malocclusions (AAPD, 2024a, 2024b). Early dental visits provide an opportunity to counsel parents to help their children stop sucking habits before malocclusion or skeletal dysplasia's occur (AAPD, 2024a, 2024b).

2.3 Barriers among Parents/ Caregivers in Early Childhood Oral Healthcare

A study by Poirier et al. (2021) was conducted to develop an understanding of the current barriers impeding parental efforts to establish oral health practices among indigenous children in Australia. The study utilized a qualitative design, employing an MI approach. Among the barriers among the parents discussed were knowledge factors, which are critical to ensuring strong oral health practices for their children. Many individuals expressed a desire for more education or knowledge in specific areas. Limited nutrition knowledge was a prominent theme across all interviews and

participants, besides concerning topics such as when children should have their first dental visit, when to start using a toothbrush, and how much toothpaste is safe for children (Poirier et al., 2021).

As a result from limited oral health knowledge, poor parental oral health practices, were also discussed as a barrier to establishing child oral health. Parents identified themselves as a negative influence on their children's sugar consumption, admitting that their own addiction to sugar made it difficult to justify limiting their children's intake (Poirier et al., 2021).

Parents in Australia also encountered challenges prioritising their child's needs and parenting goals. For example, time constraints, especially in the morning, led to oral health being considered a lower priority and resulted in toothbrushing not being done (Walsh et al., 2025). Parents' views on the importance of primary teeth influenced the oral care they provided. When some parents felt less motivated to establish strict oral health routines, believing that primary teeth, being temporary, did not require the same level of care as permanent teeth, this perception often led to less active engagement with oral health care as the temporary nature of primary teeth reduced the perceived urgency (Walsh et al., 2025).

Sullivan et al. (2022) highlighted in a systematic review that many caregivers lack the necessary knowledge and skills to promote good oral health practices in young children, leading to an increased risk of tooth decay and other oral health problems. Besides, the maternal behaviour such as lack of persistence with toothbrushing for the

children and giving in to the children's demands for sweet snacks as the barriers that can lead to ECC (Kim Seow, 2012).

While a study by Bakhurji et al. (2021) in Saudi Arabia among the dental practitioners stated that barriers interfering with performing AG mainly due to parents bring their children for the first time to a dentist only for emergency management or to address existing conditions. This suggests a lack of parental awareness or prioritization of routine dental visits which can contribute to delayed care and higher risk of ECC.

Findings from the National Health and Morbidity Survey (NHMS) 2016 in Malaysia revealed several key barriers among parents and caregivers in early childhood oral healthcare. A major barrier is the low perceived importance of oral health, as only one in four mothers considered it very important to care for their child's teeth. This is compounded by inconsistent oral hygiene practices, with a significant number of mothers not brushing or supervising their child's toothbrushing daily. Lack of awareness is also evident, as only about four in ten mothers knew that a child's first dental visit should occur before the age of two behaviour (Institute for Public Health Ministry of Health Malaysia, 2016).

Furthermore, most mothers had never taken their child for a dental visit, and even among those who were advised to do so, many believed their child was too young for treatment. Importantly, even among mothers who valued oral health, few translated that belief into action, indicating a gap between awareness and behaviour (Institute for Public Health Ministry of Health Malaysia, 2016).

A study conducted in Qatar by Al-Jaber et al. (2022) identified key areas where parental knowledge required improvement. These included understanding the appropriate amount of toothpaste for brushing and recognizing early signs of tooth demineralization. The most commonly incorrect responses were related to the correct amount of toothpaste for brushing (67%) and the recognition that white lines or white spots on teeth indicate early signs of tooth decay (52%) (Al-Jaber et al., 2022). Hence, the study reveals substantial gaps in parental knowledge of early childhood oral health, especially concerning the appropriate amount of toothpaste and the early indicators of tooth decay.

2.4 Methods of Delivering Motivational Interviewing

Studies have explored different delivery formats of MI. In a study by Weinstein et al., 2004), it delivered MI face-to-face to mothers of infants, with each subject received a pamphlet and viewed an 11-minute educational video. The MI session was conducted in 45 min, followed up with six telephone calls and two postal cards. This study reported significant reductions in ECC incidence over one year. Two years later, Weinstein et al. (2006) provide additional evidence of the efficacy of MI with mothers of young children after two years of follow-up, with enhanced preventive behaviour of mothers of young children at high risk of developing caries.

A systematic review by Colvara et al. (2021) stated that few studies include MI intervention with telephone calls as reminders or follow ups to MI face to face sessions such as study by Freudenthal & Bowen (2010) that used individualized MI intervention for one session around 20 to 30 minutes, with two telephone calls, whereas a study by Mohammadi et al. (2015) include one session of MI for 45 minutes, with six telephone

calls and two postal cards, while Riedy et al. (2015) include two telephone calls after prenatal phase and one telephone call after postpartum phase. Nevertheless, a study by Harrison et al. (2011) only included one to seven sessions without any telephone calls.

Group-based MI are also common as reported by Naidu et al. (2015). reported that group MI sessions for parents in a group when delivering oral health information had a positive effect on parent/ caregivers' oral health knowledge, attitudes and behaviours compared to traditional DHE (Naidu et al., 2015). Besides, study by Makvandi et al. (2015) was done with the first two sessions were a combination of interactive lecture and discussion using MI and in the last session, mothers discussed about how to overcome potential barriers of cleaning the children's teeth using MI approach.

Gillam & Yusuf (2019) in their literature review on brief MI in dental practice showed that skills and methods used to communicate effectively with patients are by using OARS which are open-ended questions, affirmations, reflective listening and summarizing. A flexible approach must be utilized, partly due to different patients being at different levels of readiness. It also highlighted that MI involves four processes which are engaging, focusing, evoking, planning, review and guiding, which supports the patient towards a positive behaviour change. This review had provided an overview on the topic for dental professionals as well as helpful suggestions for supporting a positive behaviour change in their dental practices (Gillam & Yusuf, 2019).

Weinstein et al. (2004) applied MI with mothers of infants and showed that building rapport and engagement early in the session was critical to encouraging parents to openly discuss their challenges in maintaining oral health routines. Harrison et al. (2010, 2011) further operationalized these steps by developing structured MI scripts for

use with pregnant women and new mothers, which guided practitioners in focusing discussions on feeding and brushing practices while evoking mothers' own motivations for change.

A scoping review done by Seven et al. (2023) on MI interventions aiming to improve health behaviours among cancer survivors. It showed that most studies in the review used principles of MI such as empathy expression, developing discrepancy, roll with resistance, and supporting self-efficacy to improve health behaviours among cancer survivors (Seven et al., 2023).

A randomized trial evaluated the effectiveness of a tailored educational intervention on oral health behaviours and new untreated carious lesions in low-income African- American children in Detroit, Michigan (Ismail et al., 2011). An interviewer who was trained in applying MI principles reviewed the dental examination findings with caregivers assigned to the intervention group and engaged the caregiver in a dialogue on the importance of and potential actions for improving the child's oral health. This study found that a single MI intervention had some reported positive oral health behaviours (Ismail et al., 2011).

2.5 Motivational Interviewing as a Behavioral Change Strategy

MI is a collaborative, goal-oriented style of communication designed to strengthen personal motivation and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion. The goal of MI is to focus on the 'why' to change health behaviour rather than the 'how', and to utilize internal motivation instead of persuasion. This is the reason why MI has become a widely accepted evidence-based approach (Pócs et al., 2017).

MI focuses on the client stating what motivates him/her, whereas in persuasion counselling the client is passive and the focus is on the doctor's reasoning (Griffith, 2008). Another advantage of client involvement is that autonomously motivated behaviour change is more durable than forced change (Sohl et al., 2016). However, it is not advisable to give full control to the client. The communication style of MI is based on building cooperation (guiding style), as opposed to when the doctor leads the conversation (directing style) or the client (following style). The controlling style used in persuasion counselling creates resistance and hinders the client's behaviour change (Dillard & Shen, 2005).

Discussion about change occurs in almost every branch of medicine and goes beyond the “big four” lifestyle habits which are smoking, excessive drinking, lack of exercise, and unhealthy diet, besides the use of aids, devices, or medicines. Patients often seem ambivalent or unmotivated, and clinicians typically try to advise them to change, using a directing style, which in turn generates resistance or passivity in the patient. Therefore, MI is an alternative approach to discussing behaviour change that fosters a constructive doctor-patient relationship and leads to better outcomes for patients (Miller & Rollnick, 2002).

MI is defined as a person-centred method of guiding to elicit and strengthen personal motivation for change. Its core clinical strategies include reflective listening and eliciting change talk (Resnicow & McMaster, 2012). MI encourages individuals to work through their ambivalence about behaviour change and to explore the discrepancy between their current behaviour and broader life goals and values (Resnicow & McMaster, 2012).

2.6 Motivational Interviewing Principles

Miller & Rollnick (2013) stated that the change process is difficult as human being naturally stay at their comfort zone. However, change sometimes cannot be avoidable. Whether they have to adapt themselves into new changes or are the one who decided to make the change. This situation put the client in the middle of intersection, whether to make change or do not make a change. This is ambivalence (Hall, 2017). There are many ways of addressing ambivalence and one of the example is by saying this to the client; "*Being a parent is a tough role for you and having a new baby is another situation requiring you to make certain decisions even though you are not sure about it"*. This type of statement acknowledges the parent's mixed feelings while normalizing that uncertainty is a natural part of the change process.

To effectively address ambivalence and guide parents through change, MI is built upon several core principles that provide a structured foundation for communication and behaviour change. These principles are often summarized by the acronym DARES, which stands for developing discrepancy, avoiding argumentation, rolling with resistance, expressing empathy, and supporting self-efficacy.

The principle of developing discrepancy involves helping clients to recognize the inconsistencies between their personal goals and values and their current harmful behaviours (Pócs et al., 2017). For example, when discussing night-time bottle feeding, the dentist can use developing discrepancy by saying, *"You want your baby to have strong teeth, but you're also worried that the bottle at night might cause damage."* This helps the mother see the gap between her goals and current behaviour.

Meanwhile the principle of avoiding argumentation is where practitioners are encouraged to lead the conversation in such a way that clients themselves generate arguments for change rather than being confronted directly (Pócs et al., 2017). Instead of arguing, the dentist applies avoiding argumentation by asking, *"What do you think are the good and not-so-good things about continuing this habit?"* This allows the mother to give her own reasons for change.

Closely related is the principle of rolling with resistance, which emphasizes respecting client autonomy, reducing defensiveness, and reinforcing the idea that the conversation is centred on the client's own choices (Pócs et al., 2017). If the mother becomes defensive, the dentist shows rolling with resistance by responding, *"It sounds like the bottle really helps you settle your baby, and that's important for you."* This respects her feelings without creating conflict.

The principle of expressing empathy highlights the importance of genuinely understanding and reflecting the client's feelings, experiences, and perspectives to build trust and rapport (Pócs et al., 2017). The dentist also uses expressing empathy, for example, *"You must be very tired at night, and brushing can feel like an extra burden."* This helps build trust and understanding.

Finally, supporting self-efficacy stresses that belief both from the client and the practitioner in the client's capacity to change is a crucial factor in promoting and sustaining behaviour change (Pócs et al., 2017). The dentist supports self-efficacy by highlighting her strengths: *You've already succeeded in stopping the use of a bottle during your infant's sleep, which shows that you are capable of making changes to protect your baby's teeth."* By acknowledging small but meaningful successes, the

dentist helps build the mother's confidence to take further steps toward sustaining healthier practices.

2.7 Motivational Interviewing Tools

MI employs a variety of practical tools to facilitate conversations about change and to strengthen a client's motivation. One widely used tool is decisional balance, which helps clients explore both the advantages and disadvantages of changing a behaviour compared to maintaining the status quo (Griffith, 2008). This tool is particularly useful during the focusing and evoking stages, especially when clients feel ambivalent. For instance, a dentist may ask a mother to consider about continuing the bottle at night, by increasing awareness of the risks and highlight the benefits of making a change.

Another commonly used approach is the readiness ruler (or change ruler technique), which invites clients to rate on a scale from 0 to 10 how important, ready, and confident they feel about making a change (Pócs et al., 2017). This simple scaling method allows for self-assessment, provides a starting point for further discussion, and can track motivation or progress over time. For example, if a mother reports being "6" on readiness to start brushing her baby's teeth nightly, the practitioner can follow up by asking why she chose 6 instead of 4, or what might help her move closer to 8, subtly evoking change talk and encouraging reflection.

When motivation appears low, the tool of asking about extremes can be particularly effective. This involves encouraging clients to imagine the worst possible consequences of not changing, as well as the best possible outcomes of making a change (Miller & Rollnick, 2002). For example, a dentist might ask a mother, *"If you continue*

giving the bottle at night, what do you think might happen to your baby's teeth in the future?" Then the dentist could follow with, *"And if you were successful in stopping night feeding, what would be the best outcome for your child's oral health?"*

Finally, MI practitioners often explore past successes to strengthen a client's confidence and self-efficacy (Miller & Rollnick, 2002). For instance, the dentist might say, *"Can you think of a time when you changed a habit for your baby's health, like adjusting feeding or visiting the clinic regularly? How did you manage that?"* By recalling her past achievements, the mother is reminded of her own ability to make positive changes, which increases her confidence to succeed in the current situation.

The MI tools described namely the decisional balance, readiness ruler, exploring extremes, and recalling past successes will be systematically incorporated into the MI protocol to guide the delivery of anticipatory guidance during each intervention session. These tools are not stand-alone techniques but are embedded within the focusing and evoking processes of MI to support mothers in exploring ambivalence, strengthening intrinsic motivation, and enhancing confidence toward oral health–related behaviour change. Thus, these tools are integrated as part of the structured MI framework in the intervention sessions, consistent with MI principles and stages of change.

2.8 Motivational Interviewing in Medical Care Settings

MI is a shared decision-making strategy for enhancing a patient's motivation to make a behaviour change (Schwartz, 2002). For example, in weight, tobacco, or safety counselling, it is a particularly helpful method in addressing resistance to change because it helps the healthcare professional to create an alliance with the patient irrespective of his or her willingness to make a change. Therefore, these MI methods

are effective in providing many types of AG in healthcare where a change is needed (Schwartz, 2002).

A randomized controlled trial was done to examine the effects of a MI intervention aimed at improving whole-person lifestyle and reducing cardiovascular disease risk profile (Sawyer et al., 2020). In the intervention group, the proportion of high wellness scores increased after the program. A whole-person lifestyle intervention incorporating MI for patients with metabolic syndrome can improve health by improving components of the cardiovascular disease risk profile and overall wellness. Efforts to improve the health of these patients may include MI to guide goal setting and address mental and spiritual health in addition to physical health (Sawyer et al., 2020).

A meta-analyses study revealed statistically significant mean intervention effects of MI in medical care with respect to a variety of health-relevant behaviour, in comparison to standard treatment and no treatment in the control groups (Bischof et al., 2020). Statistically significant effect sizes were reported for substance consumption, physical activity, body weight, treatment adherence, and willingness to change behaviour. Studies of the factors that contribute to the efficacy of MI suggest that it exerts its effects largely through the selective reinforcement of statements made by the patients themselves about potential changes in their behaviour (Bischof et al., 2020).

The central implication of study by Lundahl et al. (2013) is that MI can profitably be delivered by a range of professionals with a minimum investment of time in medical care settings in a variety of formats and time frames for patients of different ages, genders, and ethnicities. The review suggests medical providers can use MI to help patients exercise more, lose weight, lower HIV viral load, blood pressure and

cholesterol, reduce problematic substance use (perhaps even more effectively than in non-medical settings), and boost self-efficacy in their ability to make health-related behavioural changes (Lundahl et al., 2013).

A study by Almansour et al. (2023) concluded that lifestyle change is often a gradual process involving multiple efforts and setbacks. MI works on the basis the idea that change is a process, not an event. This interdisciplinary, whole-system approach helps address the known issue of uncertainty regarding change. MI serves people to achieve sustainable lifestyle changes and helps avoid the threat of non-communicable diseases with the roles of MI practitioners that are critical in obtaining satisfactory outcomes. Thus, expert practitioners are expected to commit time and effort, and to be interested in increasing skills and gaining methodological knowledge of this interdisciplinary approach (Almansour et al., 2023).

2.9 Motivational Interviewing in Oral Health Care Settings

Traditionally, chairside patient education has focused on clinicians exerting their expertise on patients. When patients fail to comply, clinicians may feel frustrated, potentially leading to 'victim blaming' the patient. Patient-centred methods, such as MI, provide a collaborative approach to behaviour change in a safe, non-judgmental, and supportive environment. This approach empowers patients to take control of their behaviours, increasing the likelihood of successful behaviour change (Gillam & Yusuf, 2019). This is particularly relevant to dental practice, where patients are seen regularly to maintain their oral health or receive dental treatment over repeated visits (Gillam & Yusuf, 2019). In studies where MI sessions lasted less than 20 minutes, 64% (7 out of

11 studies) showed a significant effect on behaviour change. The likelihood of an effect increased with the number of encounters and prolonged follow-up (Rubak et al., 2005).

Current evidence indicates that MI is more effective in changing patients' behaviours and improving their oral health compared to traditional health education methods that primarily focus on disseminating information and providing normative advice (Carra et al., 2020; Gao et al., 2014; Gillam & Yusuf, 2019; Kay et al., 2016). A scoping review of the use of MI in oral healthcare settings was conducted to collate current knowledge on this topic (Brennan & O'Driscoll, 2021). The findings indicate MI training has contributed to increased confidence, professionalism and relationship building among oral healthcare practitioners and consequently led to improved oral healthcare outcomes in patients across various oral health issues and preventive measures (Brennan & O'Driscoll, 2021).

A systematic review by Kay et al. (2016) found that MI can potentially help patients to improve their oral health by increasing their oral health knowledge and subsequently their oral health behaviours. The review included seven studies and found that MI improved patients' periodontal health and outperformed traditional methods of health education in five out of the seven studies (Kay et al., 2016). Another systematic review by Carra et al. (2020) demonstrated that MI promoted positive behaviour change and improved the oral health of patients with periodontal diseases. Examples of these improvements include decreased plaque levels, decreased bleeding upon probing, increased toothbrushing, and increased interdental cleaning (Carra et al., 2020).

The promising effectiveness of MI to promote behaviour change can also impact dental health education in dental schools. It is recognized that dental curricula are

limited in their teaching of behaviour change methods. Implementing MI in the curriculum would enable students to benefit from learning new skills to support their patients to positive behaviour change in oral health (Davis et al., 2008; Rollnick et al., 2008).

2.10 Motivational Interviewing in Early Childhood Caries Prevention

Multiple studies have been conducted on the prevention of ECC using MI. Given the importance of behaviour in dental disease aetiology, behavioural interventions are essential for the prevention and treatment of ECC. MI has been proposed as a potentially effective behavioural intervention for ECC prevention. Studies have evaluated the effectiveness of MI targeting parents and caregivers in reducing risk-related behaviours associated with ECC compared to conventional dental health education. These studies concluded that participants' knowledge significantly improved after the MI intervention (Mortazavi et al., 2021;Naidu et al., 2015;Henshaw et al., 2018). Furthermore, studies by Colvara et al. (2018); Faustino-Silva et al. (2019); Jiang et al. (2020) and Weinstein et al. (2004), found that MI sessions significantly decreased the mean decay-missing-filled surfaces (dmfs) index during follow-up.

A study conducted in Eastern Trinidad by Naidu et al., (2015) compared the effects of MI with traditional dental health education on oral health knowledge, attitudes, beliefs and behaviours among parents and caregivers of preschool children. At four-month follow-up, the test-group showed increases in mean child tooth brushing frequency and a reduction in oral health fatalism (Naidu et al., 2015). A reduction in oral health fatalism means a decrease in the belief that dental problems are inevitable and cannot be prevented or controlled**,** regardless of one's actions. The MI talk and telephone follow-up were well accepted and helpful in supporting parents' and

caregivers' efforts to improve oral health practices for their preschool children (Naidu et al., 2015).

A study was conducted to evaluate the effectiveness of MI and games in changing oral health behaviours among preschool children in Edko Administration, Beheira Governorate, Egypt. After six months of follow-up, preschool children in the experimental groups had significantly lower mean of Oral Hygiene Index-Simplified (OHI-S) scores compared with the control group. Therefore, it can be concluded that using MI as an oral health education tool was significantly more effective in promoting preschool children's oral hygiene and improving mothers' knowledge, attitude and oral health related practices than conventional education alone (Nomair et al., 2020).

CHAPTER 3

MATERIALS AND METHODS

3.1 Study Area

This study will be conducted at the Ministry of Health (MOH) Maternal and Child Health Clinics (MCHC) in Terengganu. These MCHCs potentially can capture the target population of this study, who are infants aged six months and their mothers when they come to the MCHCs for immunizations. The MCHCs services are generally available in all government health clinics (KK) throughout Malaysia (Ministry of Health Malaysia, 2025).

Terengganu is divided into eight districts with 45 health clinics providing health services to mothers and children: three health clinics in Kuala Nerus, three health clinics in Kuala Terengganu, 12 health clinics in Kemaman, seven health clinics in Dungun, seven health clinics in Besut, five health clinics in Hulu Terengganu, five health clinics in Marang, and three health clinics in Setiu (Ministry of Health Malaysia, 2022).

Of the eight districts in Terengganu, Setiu and Hulu Terengganu will be selected as the study areas. This is because these districts have similar economic backgrounds with a mean monthly household gross income between RM5577.00 to RM 5591.00. Additionally, the sex and child population distributions in both districts are relatively close (Department of Statistics Malaysia, 2025).

3.2 Research Design

This study is a two-arm, parallel-group cluster-randomized controlled trial with an allocation ratio of 1:1. This design assesses research treatments implemented at the cluster level in healthcare facilities and minimizes the potential for contact among

participants in separate groups, to ensure the efficacy of the intervention under investigation (Colvara et al., 2018).

The control group will receive the conventional MOH AG while the study group will receive AG through MI. This cluster-randomized controlled trial will adhere to the CONSORT 2025 recommendations to enhance the reporting of parallel-group randomized controlled trials. After obtaining the required ethical permissions, the principal investigator will register the trial with ClinicalTrials.gov.

3.3 Study Population

3.3.1 Reference Population

Mothers and their infants aged six months attending the MOH MCHCs in Terengganu.

3.3.2 Source Population

Mothers and their infants aged six months who attend the MOH MCHCs in Setiu and Hulu Terengganu districts.

3.3.3 Sampling Frame

Sampling frame will be based on the following: -

The cluster-level inclusion criteria selected for this study is the MCHCs in the same building area as the dental clinic that provides primary oral health care. This is to minimize the logistical barrier because oral healthcare personnels such as the dental officers and dental therapists are expected to deliver the AG on infant oral healthcare to parents and caregivers coming to the health clinics as part of the MOH Early Childhood

Oral Health Care Programme. Besides, since both the control and study groups are recruited from MCHCs that are located in the same building as the dental clinics, they have equal access to oral healthcare professionals, ensuring comparable exposure to dental services.

The sampling frame for infants and their mothers is as follows: -

Inclusion criteria:

- Mothers:
    - Malaysian citizens
    - Can read and understand Bahasa Malaysia
    - Aged 18 years old and above
- Infants:
    - Aged 6 months old (with or without erupted teeth)
    - Born full-term (≥37 weeks of gestation)
    - Without diagnosed congenital anomalies or syndromes

Exclusion criteria:

- Mothers
    - Mothers experiencing postpartum depression or other significant postnatal issues
- Infants
    - Diagnosed with special needs, chronic diseases, or developmental defects
    - Infants who are at risk for oral health problems due to pre-existing medical conditions

- Infants requiring specialized oral healthcare, such as those with cleft lip and palate, enamel hypoplasia

Infants aged six months will be included regardless of whether primary teeth have erupted or not, as this study aims to provide AG for oral health prior to or at the onset of tooth eruption. This is consistent with the MOH Early Childhood Oral Healthcare Programme and the AAPD recommendation that the first oral health visit and parental counselling occur by the age of one year or within six months of eruption of the first tooth (AAPD, 2022). Including infants without erupted teeth or those with delayed eruption allows the MI-based AG to address early preventive behaviours before tooth eruption, which is critical in preventing Early Childhood Caries (ECC) (M. E. Harrison et al., 2018; R. Harrison et al., 2010, 2011; R. L. Harrison et al., 2012; Weinstein, 2006; Weinstein et al., 2004, 2006).

While for those who are exclusively breastfed, although exclusive breastfeeding is not specifically mentioned in the inclusion or exclusion criteria, such infants will automatically be eligible to participate, as long as they meet the general inclusion criteria (i.e., healthy infants aged 6 months attending the clinic with their mothers). Exclusive breastfeeding is a common feeding practice and does not interfere with the objectives or procedures of this study; therefore, it is considered part of the normal population represented in this research.

3.4 Sample Size Determination

Sample sizes for specific objectives of the study were calculated.

3.4.1 Specific Objective 1

To determine the knowledge and practices regarding infant oral health care among mothers in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.

The sample size (Table 3.1) was calculated using the single proportion formula as follows:

$$n = \left(\frac{Z}{\Delta}\right)^2 \cdot p(1-p)$$

Where:

n=sample size; p=estimated prevalence; Δ=precision; Z = 1.96 for 95% CI

Table 3.1 Sample size for specific objective 1

Outcome	p	Δ	Z	n
Knowledge	90.5% parents or caregivers who knew the amount of toothpaste to be placed on a brush after receiving intervention that includes MI (Naidu et al., 2015)	0.05	1.96	132
Practice	95.3% caregivers who gave their child healthy meals brush after receiving intervention that includes MI (Ismail et al., 2011)	0.05	1.96	69

3.4.2 Specific Objective 2

To determine the knowledge and practices regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.

The sample size (Table 3.2) was calculated using the single proportion formula as follows:

$$n = \left(\frac{Z}{\Delta}\right)^2 \cdot p(1-p)$$

Where:

n=sample size; p=estimated prevalence; Δ=precision; Z = 1.96 for 95% CI

Table 3.2 Sample size for specific objective 2

Outcome	p	Δ	Z	n
Knowledge	90.0% parents or caregivers who knew that bacteria on children's teeth can cause cavities after receiving intervention that did not include MI (Naidu et al., 2015)	0.05	1.96	138
Practice	91.3% caregivers who gave their child healthy meals brush after receiving intervention that did not include MI (Ismail et al., 2011)	0.05	1.96	122

3.4.3 Specific Objective 3

To compare the mean knowledge and practice scores regarding infant oral health care among mothers in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.

The sample size was determined using G*Power software, selecting the t-test for "Means: Difference between two dependent means (matched pairs)," with the following parameters: α (Type I error) = 0.05, power (1-β) = 0.80, two-tailed analysis and effect size dz=0.5. The calculated sample size for objective 3 is 34.

3.4.4 Specific Objective 4

To compare the mean knowledge and practice scores regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG.

The sample size was determined using G*Power software, selecting the t-test for "Means: Difference between two dependent means (matched pairs)," with the following parameters using and two-tailed analysis and the values which are: α (Type I error) = 0.05, power (1-β) = 0.80, and effect size dz = 0.5. The calculated sample size for objective 4 is 34.

3.4.5 Specific Objective 5

To compare the mean knowledge and practice scores regarding infant oral health care between mothers in the study group after receiving AG through MI and mothers in the control group after receiving the conventional MOH AG.

The sample size was determined using G*Power software by selecting the t-test for "Means: Difference between two independent means (two groups)," with two-tailed analysis and the values in following parameters: α (Type I error) = 0.05, power (1-β) = 0.80, and effect size d=0.5. Sample size calculated for specific objective 5 is 128.

3.4.6 Specific Objective 6

To compare the incidence of ECC and dental caries risk status among infants in the study group before (at six months) and after (at nine and 12 months) receiving AG through MI.

The sample size was determined using G*Power software by selecting the Exact test family and the McNemar test for matched pairs**,** with two-tailed analysis and the following parameters: α (Type I error) = 0.05, power (1-β) = 0.80, estimated odds ratio = 3.2 (Mukhtar et al., 2023) , expected proportion of discordant pairs = 0.5 (Mukhtar et al., 2023). The calculated sample size for objective 6 is 60.

3.4.7 Specific Objective 7

To compare the incidence of ECC and dental caries risk status among infants in the study group before (at six months) and after (at nine and 12 months) receiving conventional MOH AG.

The sample size was determined using G*Power software by selecting the Exact test family and the McNemar test for matched pairs**,** with two-tailed analysis and the following parameters: α (Type I error) = 0.05, power (1-β) = 0.80, estimated odds ratio = 3.2 (Mukhtar et al., 2023) , expected proportion of discordant pairs = 0.5 (Mukhtar et al., 2023). The calculated sample size for objective 7 is 60.

3.4.8 Specific Objective 8

To compare the incidence of ECC and dental caries risk status between infants in the study group (mothers received AG through MI) and infants in the control group (mothers received the conventional MOH AG).

The sample size was determined using G*Power software by selecting the Exact test family and the statistical test of "Proportions: inequality, two independent groups (unconditional)", with two-tailed analysis and the following parameters: α (Type I error) = 0.05, power (1-β) = 0.80, with estimated odds ratio = 3.2, allocation ratio N2/N1 = 1. The calculated sample size for objective 8 is 104.

3.4.9 Conclusion on Sample Size Determination

Considering the available resources, a sample size of 138 participants from Objective 2 (To determine the knowledge and practices regarding infant oral health care among mothers in the control group before (at six months) and after (at nine and 12 months) receiving the conventional MOH AG is feasible for the study. Accounting for

a 10% dropout rate, the total sample size will increase to 152 participants. Since cluster trials typically require 50 to 100% more participants than individual randomized trials to maintain the same statistical power, an additional 76 respondents (50% of the initial 152 participants) will be included. As a result, a total of 228 infant-mother pairs will be recruited for the study.

3.5 Sampling Method

This study will employ a multistage sampling approach. In the first stage, a list of districts in Terengganu will be compiled. Two districts, Setiu and Hulu Terengganu, were purposively selected based on comparable sociodemographic characteristics, population distribution, and the availability of healthcare services from both public and private providers. These two districts were then randomized to determine their assignment as either the study district or the control district using the lottery method. District Setiu was allocated as the study group and Hulu Terengganu as the control group.

In Setiu, all three available MCHCs will be included in the study. In Hulu Terengganu, where there are five MCHCs, simple random sampling will be used to select three MCHCs. Then, a non-proportionate stratified random sampling method will be used, where an equal number of infant-mother pairs will be selected from each clinic, regardless of the total number of infants registered in that clinic. Following eligibility screening, systematic random sampling will be applied within each clinic stratum to recruit participants. This will ensure that every eligible infant-mother pair has an equal chance of being selected while maintaining a structured sampling approach.

As multiple factors are known to influence early childhood caries risk (Foxman et al., 2023; Manek et al., 2023; Ramírez-Trujillo et al., 2022), matching will be applied to ensure comparability between the study and control groups. Maternal age group and parity will be recorded for all participants to ensure a comparable baseline distribution of these characteristics (Foxman et al., 2023). A recruitment monitoring log will be used to record the number of participants enrolled in each maternal age group and parity category for both groups, and these distributions will be reviewed periodically during recruitment to ensure that no substantial imbalance occurs between the intervention and control groups (Higgins et al., 2019).

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The sampling method flow chart is depicted in Figure 3.1:-

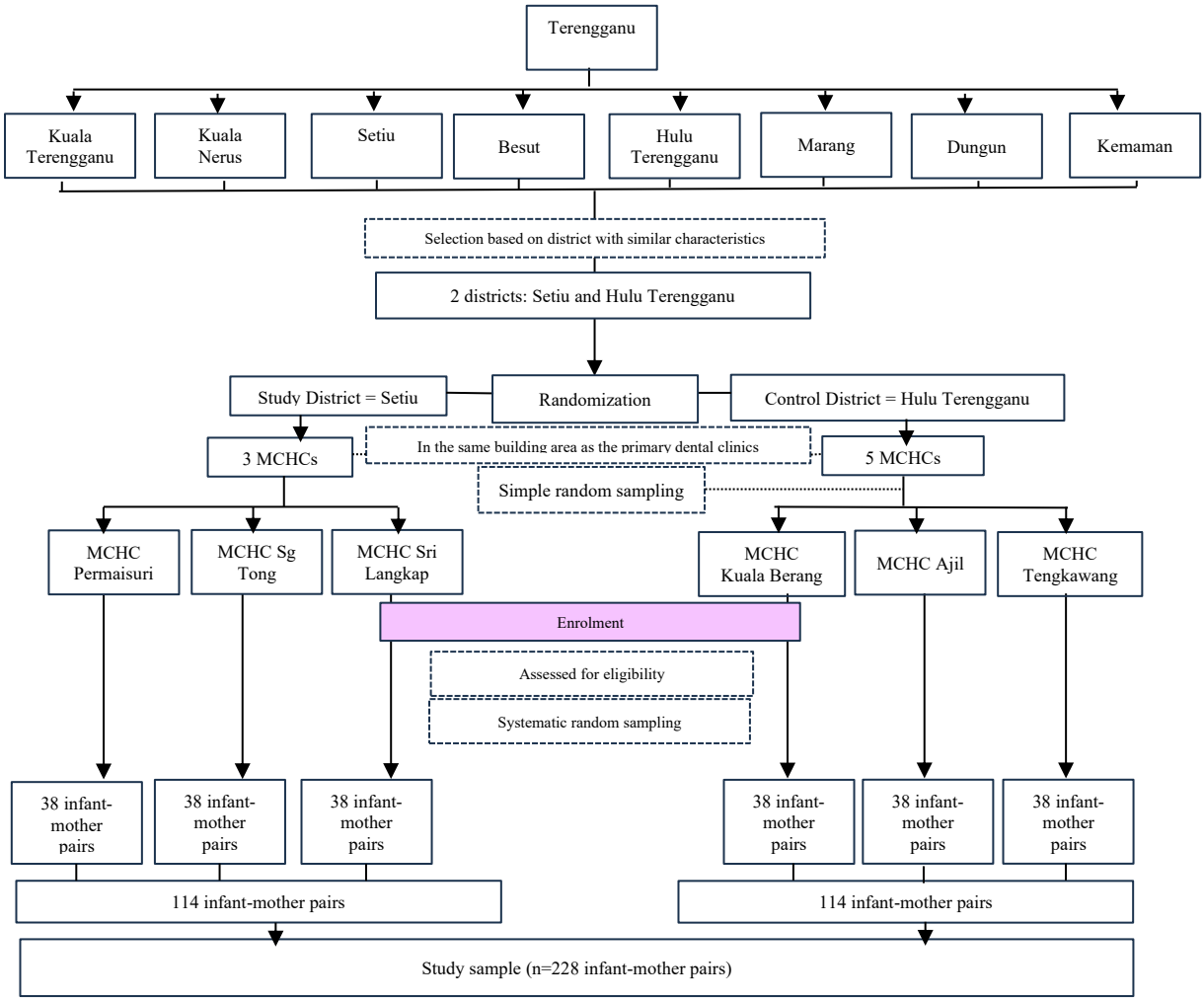

Figure 3.1 Sampling method of the study

The single-blinded method will be applied. The allocation of the intervention and control groups will be unknown to the mothers and their infants. Therefore, only the study investigator knows which group the participants belong to.

3.6 Variables and Research Tools

3.6.1 Variables

The variables of interest in the study are as follows:

1. Characteristics of mothers: age, relationship with the infant, race, monthly household income in Ringgit Malaysia (RM), last dental visit, exposure to infant oral health education.
2. Mothers' knowledge regarding infant oral health care.
3. Mothers' practice regarding infant oral health care.
4. Incidence of ECC of infants.
5. Dental caries risk status of infants.

3.6.2 Research Tools

This study will adopt the fidelity monitoring framework proposed by Bellg et al. (2004) which emphasizes three key elements including MI protocol development and its delivery steps, MI training, and MI fidelity assessments.

3.6.2(a) Motivational Interviewing Protocol

MI Protocol Development

An MI protocol will be developed to enhance the delivery of AG on early childhood oral healthcare. The protocol will draw upon foundational and well-established MI resources, including the work of Weinstein et al. (2004) and Weinstein (2006). These references provide a solid theoretical and practical framework for using MI techniques specifically within dental settings.

In addition, this protocol will be informed by MI scripts from a previous trial by Harrison et al. (2011), which were tailored for use with pregnant women and new mothers from the time of pregnancy through the eruption of their infant's first teeth up to approximately two years of age. The scripts were designed to support oral health

behaviour change during a critical window of a child's development and are highly relevant to the context of AG. The MI script is provided in the Appendix C.

Furthermore, slides from the Baby Teeth Talk Study which is a significant international research project conducted across Canada, New Zealand, and Australia (Jamieson et al., 2019) will also contribute to the development of this MI protocol. This study focused on reducing ECC through culturally appropriate and motivational strategies and offers valuable insights into the design and implementation of effective MI interventions in diverse populations. The slides from the Baby Teeth Talk Study are documented in Appendix D.

The development of this MI protocol will be carried out in collaboration with a team of experts comprising a dental officer, a dental public health specialist, a paediatric dental specialist, and one certified MI counsellor. This multidisciplinary team will ensure the protocol is both clinically relevant and methodologically rigorous, while maintaining fidelity to core MI principles.

The MI protocol will be used to standardize the approach across participants, ensuring consistency in delivery, and allowing for reliable evaluation of its effectiveness (Weinstein et al., 2014). It also provides a structured framework for engaging mothers in reflective conversation, identifying individual barriers and facilitators to behaviour change, and ultimately, assessing the contribution of MI to improved oral health outcomes in early childhood. As such, the protocol plays a central role in both the implementation and evaluation of the study (Weinstein et al., 2014).

Prior to the implementation of the main study, the MI protocol will be pretested among 10 mothers of infants attending the Maternal and Child Health (MCH) Clinic in

Jabi, Besut, Terengganu. These mothers are socio-demographically comparable to the target population in Setiu and Hulu Terengganu, where the actual study will be conducted (Hurst et al., 2015). The purpose of the pretest is to evaluate the clarity, acceptability, and feasibility of the MI protocol among representatives of the intended recipients of the intervention (Hurst et al., 2015). A pretest sample of approximately 10 participants is commonly recommended for preliminary testing to identify potential issues in intervention procedures before the main study (Hertzog, 2008).

All MI sessions conducted during the pretest will be audio-recorded and subsequently assessed by trained coder using the Motivational Interviewing Treatment Integrity (MITI) version 4.2.1 to evaluate fidelity and to identify areas for refinement prior to the full-scale implementation (Spreuwel et al., 2024).

MI Delivery Steps

The practical delivery of MI is structured through four interrelated processes. These processes which are engaging, focusing, evoking, and planning translate the principles into action, providing a clear framework for guiding parents through the change process (Miller & Rollnick, 2013). Engaging is for example where the dentist builds a trusting relationship with the mother by showing empathy, understanding, and genuine interest. Without proper engagement, meaningful change is unlikely. For example, a dentist might say, *"I understand it can be challenging to keep up with your baby's oral care, especially with so many other responsibilities. I'm here to listen and see how we can make things easier for you."*

Once engagement is established, the process moves to focusing, which means agreeing on a clear topic or goal to work on. This helps both the dentist and the mother

stay aligned, whether the focus is on infant feeding, oral hygiene, or dental visits. An example would be, *"You mentioned your baby still drinks from the bottle at night. Would it be okay if we talked about how night feeding can affect your baby's teeth?"*

The third process, evoking, is about drawing out the mother's own reasons for change rather than giving direct advice. This helps her express her concerns, abilities, and motivation, also known as "change talk." For instance, a dentist might ask, *"What worries you most about your baby's teeth if night bottle feeding continues?"* Hearing herself explain the reasons can be more motivating than being told what to do.

When the mother is ready, MI moves to planning. This stage focuses on turning intention into action by creating a clear, realistic plan. The dentist may help identify steps, explore possible barriers, and strengthen commitment. For example, *"You've decided to stop night bottle feeding. What is the first step you feel ready to take, and when would you like to start?"* This ensures motivation is translated into action.

A central concept in MI is ambivalence, the mixed feelings people often have about change. According to the Transtheoretical Model by (Prochaska & Di Clemente, 1982), motivation moves through stages: precontemplation, contemplation, preparation, action, maintenance, and relapse. Even when parents are already in the preparation or action stage, they may still feel ambivalent. The dentist's role is to recognize these moments and respond in a way that supports progress.

To manage ambivalence, MI uses tools like OARS (open questions, affirmations, reflections, summaries). Open-ended questions encourage the parent to talk more and explore their own feelings, rather than giving short yes/no answers. For example, the dentist might ask, *"What are your thoughts about brushing your baby's*

teeth every night?" This allows the mother to share her concerns or motivations in detail. Affirmations are positive statements that highlight the parent's strengths and efforts, which help build confidence. For instance, the dentist could say, *"You clearly care about your baby's health by coming to this appointment and asking questions."* This reinforces the mother's sense of capability.

Reflections involve listening carefully and then repeating or rephrasing what the parent says to show understanding. For example, if the mother says, *"It's hard to brush when I'm so tired at night,"* the dentist might reflect, *"You're exhausted at the end of the day, and brushing feels like an extra task."* This helps the mother feel heard and understood. Summaries bring together key points of the conversation to ensure clarity and reinforce motivation. For example, the dentist might say, *"So you're worried about cavities, you've tried brushing but find it difficult when you're tired, and you'd like to find an easier routine. Did I get that right?"* Summaries show respect for the parent's perspective and help organize the discussion.

These conversations often lead naturally to change talk, where the parent begins to voice their own reasons, desires, and abilities to change. In MI, change talk is a powerful indicator of progress, as the motivation for change comes from the parent rather than the practitioner. For example, a mother may say, *"I'm too busy with work, then I could not focus the baby's nutrition."* A reflective response could be, *"It sounds like your career is very important right now, but you also want to support your baby's health."* This helps shift the focus back toward motivation for change.

Change talk can be divided into two types. DARN (Desire, Ability, Reason, Need) reflects intention to change, such as saying, *"I want my baby to have healthy teeth,"* or *"I think I can stop night feeds."* Meanwhile, CAT (Commitment, Activation,

Taking Steps) shows action, such as, *"I will start brushing her teeth tonight,"* or *"I've already stop night feeds last week."* DARN statements indicate readiness, while CAT statements demonstrate that change is already happening.

Weinstein (2006) can also be referred to in the development of this MI protocol, as he outlined several key steps in delivering MI. These steps begin with Step 1, which involves building a therapeutic alliance between the interviewer and the mother. Establishing rapport and trust is essential, as a strong relationship lays the foundation for meaningful change (Weinstein 2006).

Step 2 involves engaging the mother in a conversation that encourages her to articulate reasons for change, such as avoiding sugary foods and drinks for their infants. Allowing the mother to voice her concerns helps her identify the problem and fosters intrinsic motivation to change. The interviewer acts as a facilitator, while the mother retains responsibility for deciding to act or change. Behavioural change is more likely when the individual perceives a problem and feels empowered to address it (Weinstein 2006).

In Step 3, the interviewer encourages self-motivational statements by asking questions, listening for self-motivational statements and paraphrasing them to reinforce the mother's intent and optimism. The more the mother talks about their infants' oral health problems and expresses her intent to act or change, the greater the likelihood of initiating change. Hearing herself acknowledge the problem and voice determination to solve it, is a key driver of action that facilitates action (Weinstein 2006).

Step 4 is about helping mother prepares for change. This is when mother makes self-motivational statements, and begins contemplating action, and the problems or

difficulties associated with it. While it is useful to continue encouraging self-motivational statements, the interviewer should now help identify potential obstacles or hurdles that interfere with action. The interviewer should encourage development of a plan to minimize or overcome these interferences.

When it is believed that the mother is very aware of the problem and desires to change or act, the interviewer should provide additional directions. The interviewer should first ask permission from the mother to solve the problem. Once permission is granted, the interviewer should give options to the mother (Weinstein 2006), for example by introducing of a menu of caries-preventive options (Weinstein et al., 2004). However, this study will utilize the flipcharts developed by Mukhtar et al. (2023) to explain on the AG that are relevant for mothers of 6-month-old and 9-month-old infants. This is based on study by Jamieson et al. (2018) that was implemented by combining the MI intervention with AG.

Step 5 involves roll with resistance to change (Hambrick, 2019). Where does the resistance come from? Resistance is a same side of sustain talk. As sustain talk is another side of coin of motivation the change talk. Resistance is a normal part of the change process and should be expected. Resistance should be viewed as the flipside of motivation. To foster motivation for change, it is essential to minimize resistance; when resistance is allowed to grow unchecked, motivation tends to dissipate. There are various forms of resistance, both active and passive. These include arguing, interrupting, denying, minimizing the problem, being pessimistic or fatalistic, and ignoring or side-tracking the discussion (Weinstein 2006). Addressing resistance with empathy and strategic communication helps maintain momentum toward change.

Step 6 is follow-up and relapse prevention. Relapse should not be seen as a failure but as a normal part of the change process. It shows that some steps have not been fully completed and that more learning or practice is needed. In this way, relapse becomes an opportunity to gain experience and move closer to long-term goals (Diclemente, 2007).

Relapse can occur in three stages. The first is emotional relapse, which happens before a person even thinks about returning to old behaviour. For example, a mother who feels stressed and exhausted may start neglecting her usual routine of brushing her child's teeth at night. The second stage is mental relapse, where there is an inner conflict with part of the mother wants to maintain good oral care, but another part thinks, *"Skipping one night of brushing won't hurt."* The final stage is physical relapse, when the old behaviour returns. For instance, the mother resumes giving her child a bottle of milk at bedtime, despite knowing it increases the risk of ECC.

Relapse prevention involves helping mothers to recognize early warning signs and develop coping strategies. In the above situation, the dentist could work with the mother to identify triggers such as fatigue at night and plan alternatives. Strategies may include asking another family member to help with brushing, preparing the toothbrush earlier in the evening, or using a soothing method other than the bottle to settle the child. By anticipating difficult situations and building practical solutions, the mother gains confidence and reduces the chance of future relapse.

Before ending the session, the dentist reassures the mother that setbacks are normal and that plans may need adjustments over time. Ongoing support is emphasized, such as discussing how to avoid adding sugar to the baby's bottle or finding easier routines that fit into daily life. Regular follow-ups in person by phone, are scheduled to

revisit goals, troubleshoot barriers, and adapt strategies as needed. These follow-ups help maintain motivation and support sustained behaviour change (Weinstein, 2006).

MI Training

All MI sessions will be conducted by the principal investigator, who had received formal training in MI under a certified MI counsellor at Universiti Malaysia Terengganu (UMT). This training has equipped the investigator with the necessary communication skills and understanding of MI principles to effectively elicit and strengthen the participants' intrinsic motivation to adopt preventive oral health practices for their infants. This training one of the elements that is needed in an MI fidelity assessment

MI Fidelity Assessment

Once the MI protocol is finalized, and the interventionist is trained, fidelity assessment will be conducted to evaluate the researcher's delivery skills in a real-use context (Bellg et al., 2004; Madson & Campbell, 2006).

According to Bellg et al. (2004), it is recommended that investigators not only institute treatment fidelity plans at the outset of the study but also maintain consistent efforts to adhere to a comprehensive treatment fidelity plan throughout the study period. In line with this recommendation, the fidelity assessment for this study will be conducted before and throughout the actual data collection period. This is to prepare the investigator (serving as the interventionist) to deliver the MI sessions competently and in accordance with MI principles and ensuring that the intervention is implemented consistently from the start until the end of the study (Bellg et al., 2004).

As this fidelity assessment is defined as the degree to which an intervention is implemented as intended, as an essential part of intervention research (Bellg et al., 2004; Santacroce et al., 2004; Spillane et al., 2007), it is very crucial in MI to ensure that treatment outcomes can be confidently attributed to the MI intervention (Atkinson & Woods, 2017; M et al., 2015; Madson & Campbell, 2006; Palacio et al., 2016; Ripplinger & Cascaes, 2022).

When assessing the integrity of the intervention, the assessor validates that an interventionist adheres to study protocols and avoids behaviours not consistent with study protocols (Howard et al., 2009; McHugo et al., 2007; Santacroce et al., 2004). In addition, fidelity assessments estimate the degree to which the intervention being delivered consistently to all participants in a study and that the intervention delivery was true to the theory and goals underlying the research (Bellg et al., 2004).

The MITI 4.2.1 (Motivational Interviewing Treatment Integrity) is a behavioural coding system designed to assess the fidelity of MI delivery (T. B. Moyers et al., 2014). It evaluates two main components which are Global Scores reflecting the overall spirit of MI across four dimensions (Cultivating Change Talk, Softening Sustain Talk, Partnership, and Empathy) and Behaviour Counts, which tally specific clinician behaviours such as open questions, affirmations, and reflections.

The MITI 4.2.1 scoring system provides suggested thresholds for assessing an interventionist's basic competence and proficiency in MI. These thresholds, based on expert opinion stated that a fair level of relational skills is indicated by a score of 3.5, while good technical skills require a score of 4. Interventionist should aim for at least 40% complex reflections (% CR), a reflection-to-question ratio (R: Q) of 1:1 or higher,

and a minimum of twice as many MI-adherent (MIA) behaviours compared to non-adherent (MINA) behaviours (T. B. Moyers et al., 2014).

This study will adopt a single assessor approach by certified MI counsellor (Ripplinger & Cascaes, 2022) with substantial experience in conducting MI. The assessor had undergone the MITI 4.2.1 Coding and Coaching Training, through online provided by the member of the Motivational Interviewing Network of Trainers (MINT). The role of the assessor is to code audio recordings reliably using the MITI framework (T. B. Moyers et al., 2014). The scoring will follow the standardized procedures outlined in the MITI 4.2.1 coding manual.

Fidelity coding is typically conducted on a random 20-minute segment of audio-recorded sessions of 20% to 25% from total MI sessions throughout the study period as shown by two previous studies (El-Mallakh et al., 2012; McCarthy et al., 2015). Both studies were conducted with only one practitioner delivering the intervention, providing an indication of the MI skill fluctuation in the practitioner delivering the intervention over time (Jelsma et al., 2015). The consent of clients will be obtained prior to the audio recording (Jelsma et al., 2015).

The selected sessions will be double coded by the assessor to mitigate bias and enhance reliability. Intra-reviewer variability, will be measured by intraclass correlation (ICC), and will be evaluated using random sample of MI audio recordings, with two repeated evaluations 30 days apart (Ripplinger & Cascaes, 2022). This approach balances methodological rigor with practical feasibility in fidelity assessment using the MITI 4.2.1 framework (T. B. Moyers et al., 2017). As a general rule regarding reliability, ICCs below 0.40 are considered poor, 0.40– 0.59 are fair, 0.60– 0.74 are good and 0.75 or above are excellent (Cicchetti, 1994; T. B. Moyers et al., 2017).

The Translation and Adaptation Process of the MITI 4.2.1

The MITI 4.2.1 will be translated into the Malay language to ensure alignment with the language used during MI sessions and to facilitate accurate fidelity coding by Malay-speaking coder. According to the authors of the MITI manual, the instrument is considered an open-source document that is freely available for use, including translation for research, training, and evaluation purposes. Previous translation efforts have successfully produced versions in several languages, including Spanish, Danish, Dutch, German, Norwegian, Cantonese, Japanese, and Korean, which are available through the Center on Alcohol, Substance Use and Addiction (CASAA), University of New Mexico website.

In line with the recommendations provided by the original MITI authors and the Scientific Advisory Committee of the Motivational Interviewing Network of Trainers (MINT), the translation of the MITI 4.2.1 into Malay will follow a scientifically sound translation and adaptation process to ensure conceptual equivalence and maintain the validity of the instrument (Moyers et al., 2023). There are two suggested approaches for the translation process. The first is a standard forward–backward translation method, which involves translation by an MI expert, followed by back-translation by a non-content expert, and subsequent comparison and refinement to resolve discrepancies. The second approach involves independent translation by two MI content experts, followed by comparison and consensus to produce a final version. Both approaches are considered methodologically rigorous; therefore, this study will adopt the second approach as recommended by MINT (Moyers et al., 2023).

The Malay version of translation was further reviewed by the research team, which consisted of an MI expert, a dental officer, a dental public health specialist, and

a paediatric specialist. The multidisciplinary review aimed to ensure clarity, cultural appropriateness, and relevance to the Malaysian healthcare context, particularly for MI sessions involving mothers of infants in oral health promotion settings.

The original MITI author, Dr. Denise Ernst, had expressed her support for the use, citation, and translation of the manual for research purposes. In written correspondence, she granted permission for the translation and adaptation of the MITI Coding Manual into the Malay language and encouraged its use in this study. The written permission from Dr. Denise Ernst is included in Appendix F, while the original English version of the MITI Coding Manual 4.2.1 is provided in Appendix G.

3.6.2(b) Self-Administered Questionnaire

Two sets of self-administered questionnaires from Mukhtar et al. (2023) will be used in this study as a data collection tool to gather information on maternal characteristics, as well as knowledge and practices related to infant oral healthcare at six to nine months and nine to 12 months.

Two items from the original validated questionnaire (Mukhtar et al., 2023) which are the participants' sex and relationship to the infant will be excluded in this study as they will not be applicable to the defined target population. This study will specifically include only mothers, regardless of biological relation, in accordance with the definition under the Laws of Malaysia Act 351 (1961), which are biological mothers, legal guardians, and other female caregivers who serve as the infant's primary caretaker. This minor adaptation will not affect the core constructs measured and will be still reviewed by two experts which are a dental public health specialist and a paediatric dental specialist to ensure the questionnaire's content validity remained intact.

The first set of the questionnaire was designed to assess knowledge and practices related to oral healthcare of infants aged six to nine months. The knowledge section consists of 15 items distributed across six sub-domains. The first sub-domain, dental growth and development, includes two items assessing the knowledge on whether the emergence of first primary tooth is during six-month-old and whether the mothers recognize that gums, tongue, and teeth are all components of the oral cavity. The second sub-domain, oral disease prevention, whether cleaning an infant's gum pads is considered necessary before tooth eruption and whether the most pivotal time for infants' oral hygiene routines is at night before bedtime.

Next, the third sub-domain is diet and nutrition, which includes items that assess mothers' knowledge on whether after breastfeeding or bottle feeding the teat should be removed from the baby's mouth to prevent milk stagnation, whether early exposure to sugary foods before two years of age should be avoided, and whether instant juices and flavoured milk can increase the dental caries risk. For the fourth sub-domain on oral habits, one item checks whether that teeth eruption causes fever. Another item asks whether the objects that are given to infants should be clean and safe to avoid any infections or choking risk. For the fifth subdomain on dental injury prevention, the item asks whether any possible occurrence of dental injury among infants aged six to nine months. These injuries can include bruised lips, ulcerated tongue, burned lips, and dislocated tooth.

Finally, the sixth sub-domain on periodic oral examination assesses the need of dental visit for infant with non- erupted teeth, and the second item assess whether such early visits can provide parents or caregivers with essential age-appropriate information on oral disease prevention.

There are three response options given for each knowledge statement in all the sub-domains which are true, false, and don't know. A score of one was given for correct responses and a zero for incorrect responses and don't know answers. The sum of the scores produced the total knowledge score that may range from zero to 15. A higher score indicates better knowledge.

The section on practices regarding oral healthcare of infants aged six to nine months has 11 items, distributed across the five sub-domains. The first sub-domain which is the oral disease prevention, has four items that asks whether mothers examine their baby's mouth with the answer option of yes or no. If the mothers answer yes, the next item asks aspects they examine (such as soft tissue, tooth eruption, tooth count and hard tissue or any other aspects not in the list). Next item assesses on the frequency of infant oral cleaning (on gums and teeth) with the few answer options (Yes, at least twice a day; Yes, once a day; Yes, but not every day; Never; Teeth have not yet erupted) and by what tools (e.g., dry cloth, damp cloth, fingers, soft/silicone/finger toothbrush, not yet started to clean, teeth not erupted) they clean the infant's gums and teeth.

Secondly, in the diet and nutrition sub-domain, there are three items that examine whether mothers have ever given their infants drinks other than milk or plain water either through bottles or cups/straw and what types of beverages were given, either cordial drinks or flavoured milk, or not giving any drinks other than milk or plain water or any other drink that is not in the list. It also asks whether the infant has ever been offered sugary snacks like creamed bread, biscuits, and cakes.

Thirdly, for oral habit sub-domain, the item asks whether the mother has ensured that objects or toys the baby puts in their mouth are safe and clean and the answer option is always, sometimes or never. Fourth sub-domain is oral injury prevention, with one

item explores whether the mother has ever let the baby to play with objects or engage in activities that pose a risk of oral injury. The response options are always, sometimes, or never. For periodic oral examination sub-domain, the item asks if the mother has ever taken the baby for an oral check-up at a dental clinic, with binary response options either yes or no.

The second set of the questionnaire was designed to assess knowledge and practices related to oral healthcare of infants aged nine to 12 months. The knowledge section consists of 19 items distributed across six sub-domains. The first sub-domain, dental growth and development, includes five items. These items assess knowledge on whether white or yellow spots on the surface of the teeth are early signs of dental caries, whether plaque is a white film containing bacteria that sticks to the surface of the teeth, whether plaque causes dental caries, whether the function of deciduous teeth in maintaining space for permanent teeth and whether the deciduous teeth is not important due to their temporary nature.

The second sub-domain, oral disease prevention, gauges the mother's knowledge on whether plaque can be removed by toothbrushing, whether fluoride toothpaste can prevent dental caries, and whether brushing a baby's teeth at night before bedtime as the most pivotal time.

The third sub-domain, diet and nutrition include items that assess mothers' knowledge on whether consumption of sweet snacks (more than three times per day) can increase caries risk. Another item explores whether the respondent can correctly identify foods containing hidden sugars, specifically in fresh fruits, instant baby puree, and instant baby rusks.

For the fourth sub-domain on oral habits, two items are included. One item examines knowledge on whether any risk of dental caries if a baby is let to sleep with milk pooling in their mouth. Another item evaluates whether the habits like pacifier use, or thumb-sucking should ideally stop by 18 months. The fifth sub-domain on dental injury prevention also has two items. One assesses on knowledge whether infants who are just learning to walk are at risk of falling and injuring their teeth. The second item tests on whether primary tooth trauma does not disturb permanent tooth development.

The last sub-domain on periodic oral examination includes three items. These assess knowledge on whether a baby with only one tooth does not need a dental visit, whether regular dental check-ups enable early prevention, and whether the recommended age for a baby's first dental visit should be no later than one year. For all knowledge items, three response options are given, which are true, false, and don't know. A score of one was given for correct responses and a zero for incorrect responses and don't know answers. The sum of the scores produced the total knowledge score that may range from zero to 19.

The section on practices regarding oral healthcare of infants aged nine to 12 months has 12 items, distributed across the five sub-domains. The first sub-domain is oral disease prevention that has six items, asking mothers whether they examine their infant's oral cavity at home and what aspects they should check such as the health of soft tissues (like the tongue, lips, gums, palate, and cheeks), tooth development, the number of teeth present, and the condition of hard tissues (teeth). Mothers are also asked whether they have ever cleaned their baby's teeth with few answer options (Yes, at least twice a day; Yes, once a day; Yes, but not every day; Never; Teeth have not yet erupted) and whether they have ever performed this cleaning at night before bedtime with answer

options always, sometimes and never. Additionally, it includes item on the tools used to clean infant's teeth (e.g., dry cloth, damp cloth, fingers, soft-bristled/silicone/finger toothbrushes, and whether fluoridated toothpaste is used or not, or toothpaste is not used at all. If it is used, mothers are further asked to estimate the size of toothpaste applied, using familiar size comparisons such as a grain of rice or a pea or full on the toothbrush.

In the second sub-domain on diet and nutrition, there are two items that explore whether the mothers have ever given sweet snack to the infant with the response options are four or more times per day, three or more times per day, not every day or never. Next item assesses whether the infant is given commercial baby food products such as fruit purees and baby rusks with the answer option is yes or no. For the third sub-domain on oral habit, the item asks on whether the mother has started training the baby to drink using a cup. The second item evaluates whether the mother lets the baby to fall asleep while suckling on breast milk or a bottle containing milk or sweet drinks. Both items for this second sub-domain have answer options either yes or no.

The fourth sub-domain, oral injury prevention, includes a single item that asks whether the baby is ever allowed to play with objects or engage in activities that may pose a risk of oral injury with answer options of always, sometimes or never. The final sub-domain, periodic oral examination, contains one item that assesses whether the mother has brought the baby to a dental clinic for an oral health examination with the answer of yes or no. Both questionnaires are attached in the Appendix G and H, respectively.

3.6.2(c) Incidence of Early Childhood Caries

The oral examination of the children will utilize the International Caries

Detection and Assessment System (ICDAS) to determine the incidence of ECC (Dikmen, 2015). ICDAS is a clinical scoring system that allows for the detection and assessment of caries activity. It was developed for use in clinical research, clinical practice and epidemiological purposes (Dikmen, 2015). The system is designed to detect the caries process at every stage and to characterize the activity status of lesions. One of the main advantages of ICDAS is its ability to evaluate non-cavitated lesions (Dikmen, 2015). According to Ekstrand et al., (2011), ICDAS can detect and assess approximal caries more successfully through intraoral examination than radiography. By identifying and assessing the severity of caries, ICDAS enables more effective prevention and treatment strategies.

The ICDAS index has been the primary index used for diagnosing dental caries lesions in oral health practices by the Ministry of Health Malaysia since 2013 (Oral Health Program, 2020). Clinical oral examination of the infants will be done by the principal investigator to determine the prevalence of early dental caries lesions and dental caries risk. The estimated time to complete the infant's clinical oral examination is approximately eight minutes. The principal investigator will be calibrated with a paediatric dentist at Hospital Pakar Universiti Sains Malaysia (HPUSM).

The ICDAS measures the surface changes due to carious lesions and potential histological depth by relying on surface characteristics. The examination of clean and dry teeth is the fundamental prerequisite for the application of the ICDAS method. The ICDAS examination will be conducted using gauze, which helps remove residual plaque and debris while allowing for the assessment of small cavitations, surface contour, and the histological depth of carious lesions based on surface characteristics.

A sharp explorer will not be used, as it does not improve detection accuracy and may damage the enamel affected by early carious lesions. Depending on the severity of the lesion, ICDAS detection codes for coronal caries range from zero to six. The assigned codes and corresponding criteria are summarized in Figure 3.2.

Table 3.3 ICDAS detection codes for coronal caries

Code	Description
0	Sound
1	First visual change in enamel (seen only after prolonged air drying or restricted to the confines of a pit or fissure)
2	Distinct visual change in enamel
3	Localized enamel breakdown (without clinical visual signs of dentinal involvement)
4	Underlying dark shadow from dentin
5	Distinct cavity with visible dentin
6	Extensive distinct cavity with visible dentin

The classification of ECC in this study was adapted from the ICDAS. However, the original seven ICDAS stages were simplified into four categories (0, 1, 2, and 3). In both clinical and epidemiological settings, this four-stage ECC classification facilitates simpler, faster, and more valid diagnostic decision-making, while also indicating stage-specific treatment options (Evans et al., 2018). Specifically, the code 0 represents a sound tooth, code 1 represents smooth white spot lesion, code 2 represents enamel breakdown, and code 3 represents cavity into dentine (Evans et al., 2018). A standard charting form will be used to record the clinical findings (Evans et al., 2018), as provided in Appendix B.

3.6.2(d) Dental Caries Risk Assessment

Caries Risk Assessment (CRA) is an evaluation of a patient's risk of developing caries. The assessment provides information that would be useful in the decision-making process, including determining additional diagnostic procedures, treatment planning, and recall appointments. The CRA also serves as an important tool in the

management of patients and is focused on the aims of maintaining health and preserving tooth structure for effective delivery of risk-based caries care that prevents new lesions, controls initial caries non-operatively and always preserves tooth tissue (American Academy of Pediatric Dentistry, 2022).

In this study, CRA will combine several factors deemed important in caries development and progression as follows: 1) presence of an active carious lesion, 2) oral hygiene, 3) exposure to sugary drinks and snacks, 4) night-time bottle feeding, and 5) fluoride exposure (American Academy of Pediatric Dentistry (2022). The following factors will be assessed and for each factor, the child will be categorized as having a high risk or not.

1. Presence of active carious lesions

A diagnosis of dental caries is made from the clinical examination. The presence of one or more active carious lesions (cavitated or non-cavitated) is considered high risk.

2. Oral Hygiene

The oral hygiene status of the infant will be assessed using the Silness-Loë index during the clinical examination (World Health Organization, 2013). The measurement of the state of oral hygiene is based on recording both soft debris and mineralised deposits on the teeth. Each of the four surfaces of the teeth (buccal, lingual, mesial, and distal) is given a score from zero to three (Figure 3.3) The presence of at least one tooth with a score of 2 is considered a high risk.

Table 3.4 The Silness-Loë index scoring

Score	Description
0	No plaque
1	A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be seen in situ only after the application of the disclosing solution or by using the probe on the tooth surface.
2	Moderate accumulation of soft deposits within the gingival pocket, or the tooth and gingival margin, which can be seen with the naked eye.
3	An abundance of soft matter within the gingival pocket and/or on the tooth and gingival margin.

3. Exposure to sugary drinks and snacks

The mothers will be asked about whether their infants are being given between meal sugary snacks or beverages more than three times each day within the past week. Consumption of sugar-containing snacks or beverages more than three times per day is considered high risk.

4. Night-time bottle feeding

A child who is put to bed with a bottle of milk or other drinks containing natural or added sugar is considered at high risk.

5. Fluoride Exposure

Not using fluoridated toothpaste or using fluoridated toothpaste less than once daily is considered high risk.

A checklist was prepared to record the findings in Appendix C. A child is considered at high risk for caries if he or she is found at high risk for any of the following factors:

a. Presence of one or more active carious lesions (cavitated or non-cavitated).

b. The presence of at least one tooth with a score 2 for plaque accumulation

c. Consumption of between meals sugar-containing snacks or beverages more than three times per day

d. Putting to bed with a bottle containing natural or added sugar

3.7 Operational Definition

1. MI is a patient-centred guiding method for enhancing motivation to change. MI is a collaborative process of decision-making. Its style is empathetic, nonjudgmental, supportive, and nonconfrontational. It acknowledges that behavior change is driven by motivation, not information (Miller & Rollnick, 2002).
2. A mother is defined by (Laws of Malaysia Act 351, 1961) as the primary caregiver of an infant, responsible for the child's support, health, and education, regardless of biological relation. This includes biological mothers, legal guardians, stepmothers, or any female guardian who has custody of the infant and takes care of them most of the time. This definition excludes biological mothers who work abroad or are unable to provide daily care for the infant.
    a. Duties of Guardian of Person (Section 3):
        i. The guardian (which can be a non-biological caretaker) is responsible for the child's custody, support, health, and education.
    b. Equality of Parental Rights (Section 5):
        i. The law grants equal rights to both parents regarding guardianship, meaning that a non-biological mother (such as a

stepmother or legal guardian) who takes primary responsibility for the child can also be included in the definition.

c. Appointment of Guardians (Sections 6, 7, and 8):
    i. The surviving parent or a court-appointed guardian (which can include non-biological caregivers) may assume full responsibility for the child.
    ii. In cases where both parents are deceased, a legal guardian is appointed (which could be a stepmother, foster mother, or other non-biological caregivers).
d. Protector as Temporary Guardian (Section 8A):
    i. In cases where an infant is abandoned or has no biological parent available, a temporary guardian (appointed by authorities) takes over custody, further supporting the inclusion of non-biological caregivers.

3. An infant refers to children aged one and below (Centres of Control Diseases, 2025)

3.8 Data Collection

Prior to data collection, the eligibility of participants will be determined based on predefined inclusion and exclusion criteria. Eligible participants will be identified during their scheduled visits to the MCHCs. A brief verbal screening will be conducted to confirm that they meet the inclusion criteria. Those who are found to be eligible will be approached by the researcher and invited to participate in the study.

Following informed consent and confirmation of eligibility, baseline maternal information, specifically maternal age and parity will be collected through verification from the maternal and child health records available at the clinic. These variables will be documented in a recruitment monitoring log to track the distribution of participants across maternal age groups and parity categories in both the intervention and control districts (Higgins et al., 2019).

To enhance comparability between groups, each participant in the intervention group will be matched with a participant from the control group based on similar maternal characteristics. Exact matching will be performed where possible; otherwise, the closest match within a predefined acceptable range will be selected. This approach maintains the integrity of the initial sampling process while reducing potential confounding through matching (Higgins et al., 2019). Maternal age will be categorized into four groups (18–24 years, 25–29 years, 30–34 years, and ≥35 years), while parity will be classified into two groups: primiparous (one previous birth) and multiparous (two or more previous births) (Alcock et al., 2025).

The purpose of the study, procedures involved, potential risks and benefits, and the voluntary nature of participation will be explained in detail to the participants. An information sheet will be provided in the Malay language. Participants will be assured of the confidentiality of their responses and informed that they may withdraw from the study at any time without affecting their access to healthcare services. Written informed consent will be obtained prior to any data collection activities. After consent has been obtained, the data collection will be proceeded.

Study group

The eligible six-month-old infants who attend the MCHC for the pneumococcal immunization (second dose) will undergo clinical oral examination and assessment of caries risk. Their mothers will be given the first set of questionnaires to assess knowledge and practices related to oral healthcare of infants aged 6 to 9 months. This stage of assessment is called baseline 1. The mothers will then be given the AG for six to nine-month-old infants through MI technique.

The MI session will be conducted one-to-one with the infant's mother. Each session will last approximately 30 minutes, as recommended by prior studies (Harrison et al., 2012; Jamieson et al., 2018; Saengtipbovorn, 2017; Weinstein et al., 2004), which have shown that such duration is both feasible and effective for facilitating meaningful dialogue and behaviour change.

After three months, the infants, who will be nine-month-old will undergo another clinical oral examination and an assessment of caries risk when they attend the MCHC for MMR immunization (first dose). Their mothers will be given the first set of questionnaires again to assess knowledge and practices related to oral healthcare of infants aged six to nine months. This stage of assessment is called evaluation 1.

Immediately following re-administration of the first set of the questionnaires, the second set of the questionnaires to assess knowledge and practices related to oral healthcare of infants aged nine to 12 months will be administered. This stage of knowledge and practices assessment is called baseline 2. The mothers will then be given the AG for nine to 12-month-old infants through MI technique.

After another three months, the infants, who will be 12-month-old will undergo the final clinical oral examination and assessment of caries risk when they attend the MCHC for MMR immunization (second dose). Their mothers will be given the second set of questionnaires again to assess knowledge and practices related to oral healthcare of infants aged nine to 12 months. This stage of assessment is called evaluation 2.

The estimated time for each clinical oral examination for infants, including assessment of caries risk is eight minutes, and for mothers to complete each set of questionnaires is around seven minutes. The AG delivery through MI technique, which includes the interactive one-to-one sessions with the mothers, is estimated to take approximately 30 minutes (Jamieson et al., 2018).Therefore, the anticipated overall duration of each respondent in the study group at 6 months is around 45 minutes.

At nine months, the data collection time will take approximately 52 minutes, covering the infant oral examination and assessment of caries risk, re-administration of the knowledge and practices questionnaire for six to nine months, delivery of age-appropriate AG for nine to 12 months through MI technique, and administration of knowledge and practices questionnaires for nine to 12 months. At 12 months, the data collection time will be around 15 minutes, covering the infant oral examination and assessment of caries risk, and re-administration of knowledge and practices questionnaire for nine to 12 months.

This intervention will be delivered to the selected participants who are waiting for their turn to meet the nurses or medical officers or family medicine specialists by

the well-trained principal investigator in MI. The MI intervention will include an interactive one-on-one session using the MI protocol tailored to meet the individual needs of each participant. An appropriate room or space will be identified at the selected MCHC for the conduct of the intervention (Harrison et al., 2011; Batliner et al., 2014). Two follow up phone calls will be conducted two weeks and one month after each of the MI intervention for each participant in the study group (Weinstein, 2006; Weinstein et al., 2004).

Control Group

The eligible six-month-old infants who attend the MCHC for the pneumococcal immunization (second dose) will undergo a clinical oral examination. Their mothers will be given the first set of questionnaires to assess knowledge and practices related to oral healthcare of infants aged six to nine months. This stage of assessment will be referred to as baseline 1. The mothers will then receive the conventional MOH AG according to the MOH Early Childhood Oral Healthcare Programme.

After three months, the infants, who will be nine-month-old, will undergo another clinical oral examination when they attend the MCHC for MMR immunization (first dose). Their mothers will be given the first set of questionnaires again to assess knowledge and practices related to oral healthcare of infants aged six to nine months. This stage of assessment will be referred to as evaluation 1. Immediately following re-administration of the first set of questionnaires, the second set of questionnaires to assess knowledge and practices related to oral healthcare of infants aged nine to 12 months will be administered. This stage of knowledge and practices assessment will be referred to as baseline 2.

After another three months, the infants, who will be 12-month-old, will undergo the final clinical oral examination when they attend the MCHC for MMR immunization (second dose). Their mothers will be given the second set of questionnaires again to assess knowledge and practices related to oral healthcare of infants aged nine to 12 months. This stage of assessment will be referred to as evaluation 2.

The estimated time for each clinical oral examination for infants, including the assessment of caries risk, will be approximately eight minutes. Completion of each set of questionnaires by the mothers is expected to take around seven minutes. Therefore, the anticipated overall duration of each respondent in the control group at 6 months (baseline 1) is around 15 minutes, covering the infant oral examination and the administration of the first set of questionnaires.

At nine months (evaluation 1), the data collection time is expected to take approximately 22 minutes, covering the infant oral examination, re-administration of the first set of questionnaires for six to nine months, and administration of the second set of questionnaires for nine to 12 months. At 12 months (evaluation 2), the data collection time will be approximately 15 minutes, covering the infant oral examination and re-administration of the second set of questionnaires for nine to 12 months. The intervention in the control group will consist only of the conventional MOH AG. No motivational interviewing (MI) or additional AG intervention will be provided to the control group.

3.9 Flow Chart of the Study

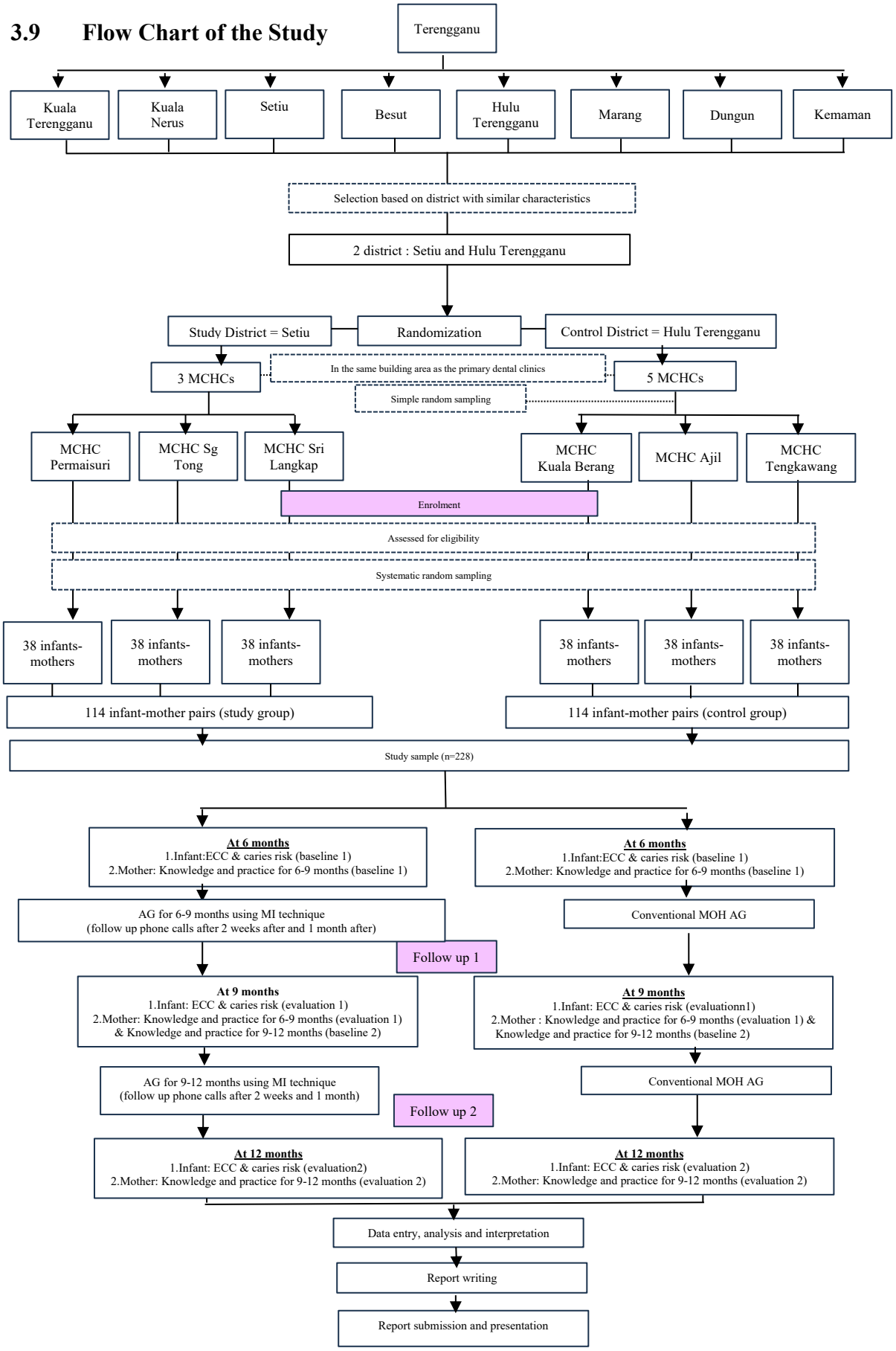

Figure 3.2 Flow Chart of the Study

3.10 Statistical Analysis

For Objectives 1 and 2, descriptive analysis will be used to summarize the knowledge and practices on infant oral health care among mothers in both the study and control groups. Frequency and percentages will be used to present the data. For Objectives 3 and 4, a paired t-test will be conducted to compare the mean knowledge and practice scores regarding infant oral health care before (at six months) and after (at nine and 12 months) the respective AG intervention within each group.

For Objective 5, an independent t-test will be used to compare the mean knowledge and practice scores between the study and control groups after they have received their respective AG interventions. For Objectives 6 and 7, the McNemar's test will be applied to compare the incidence of ECC and dental caries risk status within each group before and after the respective AG intervention.

For Objective 8, a Chi-Square test will be performed to compare the incidence of ECC and dental caries risk status between the study and control groups after the respective AG intervention. All analyses will be conducted using SPSS version 29.0, with significance set at $p < 0.05$.

3.11 Ethical Consideration

Ethical approval will be obtained from the Human Research and Ethics Committee of Universiti Sains Malaysia, Ministry of Health Malaysian Research Ethics Committee and National Medical Research Register, Ministry of Health Malaysia.

3.11.1 Subject Vulnerability

The research is on mothers and their infants who are considered the vulnerable group. Data collection using a self-administered questionnaire will not involve any

emotional disturbance or psychological distress. Thus, there will be minimal risk involved to the mothers and their infants. The clinical oral examination is also a standard clinical procedure that is highly recommended for all 6 to 12-month-old infants. The mothers of infants will be individually approached by the researcher while waiting for their infants' turn to be examined for vaccination appointment at MCHCs.

3.11.2 Withdrawal Criteria

The participants will be made aware that participation in the research is completely voluntary, and they have all rights to withdraw from the research at any time without any penalty or loss of benefits to which they are otherwise entitled. When withdrawing from the study, the participant should inform the research team of his/ her/ their decision. A participant may, but is not obligated to, give the research team their reason(s) for withdrawing from the study. When a participant withdraws from the study, any data collected from them up to the withdrawal will still be used for the study.

3.11.3 Risk of Study

The research study will not involve clinical trials, and self-administered questionnaire will not cause any emotional disturbance or psychological distress; thus, there will be minimal risk involved to the infants ang their mothers in the study as well as control group. This study does not impose any topical fluoride application on infants. Infants found with early dental caries lesions were referred to the nearest dental clinic for further management.

3.11.4 Declaration of Absence of Conflict of Interest

This study is conducted as per requirement to fulfil Doctorate in Dental Public Health programme under course GGA 608 (Research Project), thus there shall be no conflict of interest at any stage of the study.

3.11.5 Privacy and Confidentiality

Information obtained will be entered into SPSS software. Only research team members can access the data. The data of subjects will be kept private and confidential. All records will be kept confidential and will be available only to professional researchers, doctors, and staff. Subjects' names will be held on a password-protected database and will be linked only with a study identification number for this research. Instead of patient identifiers, the identification number will be used on the subject data sheets. All data will be entered into a computer that is password protected and will be maintained for a minimum of five years after the completion of study.

Subjects will not be allowed to view their study data, as it will be consolidated into a database. Subjects can write to the investigators to request access to study findings. Data obtained from this study will be published for knowledge purposes and will be presented as grouped data and thus will not identify the respondents individually. The data will not be disclosed to any parties working on this project unrelated to this study. The data will be destroyed after five years upon completion of this study.

3.11.6 Community Benefit

The questions in the questionnaire may not cause distress or anxiety, nor are they socially sensitive. Study procedures will be provided at no cost to the respondents. The potential benefit of participation in this study for mothers is an enhancement in

knowledge concerning the oral healthcare of infants based on their age-appropriate interval, as well as a tailored dental consultation in accordance with their child's vaccination appointment at the MCHCs. This study potentially benefit them by nurturing the appropriate knowledge and practices on infants' oral healthcare to ultimately reducing the ECC as well as their caries risk.

3.11.7 Study funding

The study is self-funded by researchers.

3.11.8 Honorarium and Incentives

Each respondent will receive a token of appreciation for their participation.

CHAPTER 4

EXPECTED RESULTS

Table 4.1 Characteristics of mothers (n=228)

Characteristics	Frequency (%)		
	Study	Control	Total
Age			
Relationship with infant			
Biological mother			
Stepmother			
Adoptive mother			
Others			
Race			
Malay			
Chinese			
Indian			
Bumiputera Sabah			
Bumiputera Sarawak			
Educational background			
No standard			
Primary school			
SRP/ PMR or equivalent			
SPM or equivalent			
Vocational training/ certificate			
STPM/Diploma or equivalent			
Degree (Bachelor/Master/Doctor of Philosophy)			
Working Status			

Employed	
Unemployed	
Monthly household income	
<RM4,849 (B40)	
RM4,850 – RM10,959 (M40)	
>RM10,960 (T20)	
Last dental visit	
Within the past 6 months	
Within the past 12 months	
More than 1 year	
Never	
Exposure to infant oral health education	
Dentist	
Medical doctor	
Dental nurse	
Medical nurse	
Reading materials	
Family members or friends	
Never had	

*mean (SD)

Table 4.2 Knowledge of 6-9 months infant oral health care among mothers in the study group (n=228)

Variable		Frequency (%)		
		Correct response	Incorrect response	Don't know response
Dental growth and development				
K01: Emergence of first primary tooth	Baseline 1			
	Evaluation 1			
K02: Component of oral cavity	Baseline 1			
	Evaluation 1			
Oral Disease Prevention				
K03: Need of oral cleaning for gum pads	Baseline 1			
	Evaluation 1			
K04: Pivotal time for oral cleaning	Baseline 1			
	Evaluation 1			
Diet and Nutrition				
K05: Breastfeeding and bottle feeding	Baseline 1			
	Evaluation 1			
K06: Sugary food intake	Baseline 1			
	Evaluation 1			
K07: Instant juices and flavoured milk intake	Baseline 1			
	Evaluation 1			
Oral Habits				
K08: Teething	Baseline 1			
	Evaluation 1			
K09: Teething objects' safety and cleanliness	Baseline 1			
	Evaluation 1			
Dental Injury Prevention				
Possible occurrence of dental injury among infants:				
K10: Bruised lips	Baseline 1			
	Evaluation 1			
K11: Ulcerated tongue	Baseline 1			
	Evaluation 1			
K12: Burned lips	Baseline 1			

	Evaluation 1
K13: Dislocated tooth	Baseline 1
	Evaluation 1
Periodic oral examination	
K14: Need of dental visit for infant with non- erupted teeth	Baseline 1
	Evaluation 1
K15: Every infant should have an oral health risk assessment	Baseline 1
	Evaluation 1

Table 4.3 Practice of 6-9 months infant oral health care among mothers in the study group (n=228)

Variable		Frequency (%)	
		Inappropriate response	Appropriate response
Oral Disease Prevention			
P01: Examining infant oral cavity	Baseline 1		
	Evaluation 1		
Frequency of infant oral cleaning:			
P02: Gums	Baseline 1		
	Evaluation 1		
P03: Teeth	Baseline 1		
	Evaluation 1		
Tool used to clean infant oral cavity for:	Evaluation 1		
P04: Gums	Baseline 1		
	Evaluation 1		
P05: Teeth	Baseline 1		
	Evaluation 1		
Diet and Nutrition			
Drinks other than plain water and milk given through:			
P06: Bottle	Baseline 1		
	Evaluation 1		
P07: Cup or straw	Baseline 1		
	Evaluation 1		
P08: Sugary food intake	Baseline 1		
	Evaluation 1		
Oral Habits			
P09 Teething objects' safety and cleanliness	Baseline 1		
	Evaluation 1		
Oral Injury Prevention			
P10 Letting infant playing with risky objects	Evaluation 1		
	Baseline 1		
Periodic oral examination			
P11 Bringing infant to dental clinic	Baseline 1		
	Evaluation 1		

[a]Only for infant with erupted teeth

Table 4.4 Knowledge of 9-12 months infant oral health care among mothers in the study group (n=228)

Variable		Frequency (%)		
		Correct response	Incorrect response	Don't know response
Dental growth and development				
K01: White spots on primary tooth surface	Baseline 2			
	Evaluation 2			
K02: Dental plaque contains bacteria	Baseline 2			
	Evaluation 2			
K03: Dental plaque may cause dental caries	Baseline 2			
	Evaluation 2			
K04: Deciduous teeth function as space maintainer	Baseline 2			
	Evaluation 2			
K05: Deciduous teeth are not important	Baseline 2			
	Evaluation 2			
Oral Disease Prevention				
K06: Dental plaque removal with mechanical method	Baseline 2			
	Evaluation 2			
K07: Fluoride toothpaste helps preventing dental caries	Baseline 2			
	Evaluation 2			
K08: Pivotal time for toothbrushing	Baseline 2			
	Evaluation 2			
Diet and Nutrition				
K09: Frequent cariogenic food intake causes dental caries	Baseline 2			
	Evaluation 2			
Food containing hidden sugar includes:				
K10: Fresh fruits	Baseline 2			
	Evaluation 2			
K11: Instant baby puree	Baseline 2			

	Evaluation 2
K12: Instant baby rusk	Baseline 2
	Evaluation 2
Oral Habits	
K13: Letting infants fall asleep with milk in the mouth	Baseline 2
	Evaluation 2
K14: Non-nutritive sucking habit should stop at 18 months	Baseline 2
	Evaluation 2
Dental Injury Prevention	
K15: Dental injury may occur during infant walking training	Baseline 2
	Evaluation 2
K16: Primary tooth trauma influences towards permanent tooth development	Baseline 2
	Evaluation 2
Periodic oral examination	
K17: Need of dental visit for infant with at least one erupted tooth	Baseline 2
	Evaluation 2
K18: Importance of regular infant dental check-ups	Baseline 2
	Evaluation 2
K19: First dental visit should be at least at 12 months old	Baseline 2
	Evaluation 2

Table 4.5 Practice of 9-12 months infant oral health care among mothers in the study group (n=228)

Variable		Frequency (%)	
		Inappropriate response	**Appropriate response**
Oral Disease Prevention			
P01: Examining infant oral cavity	Baseline 2		
	Evaluation 2		
P02: Infant toothbrushing practice conduct	Baseline 2		
	Evaluation 2		
P03: Infant toothbrushing at night before sleep	Baseline 2		
	Evaluation 2		
P04: Tool used for infant toothbrushing	Baseline 2		
	Evaluation 2		
P05: Fluoridated toothpaste usage	Baseline 2		
	Evaluation 2		
P06: Fluoridated toothpaste amount	Baseline 2		
	Evaluation 2		
Diet and Nutrition			
P07: Sugary snacking habits frequency	Baseline 2		
	Evaluation 2		
P08: Feeding infants with instant puree or baby rusk	Baseline 2		
	Evaluation 2		
Oral Habits			
P09: Infant training to sip water from a cup	Baseline 2		
	Evaluation 2		
P10: Letting infants fall asleep with milk in the mouth	Baseline 2		
	Evaluation 2		
Dental Injury Prevention			
P11: Letting infants play with risky objects	Baseline 2		
	Evaluation 2		
Periodic oral examination			
P12 Bringing infant to dental clinic	Baseline 2		
	Evaluation 2		

[a]Only for infant with erupted teeth

Table 4.6 Knowledge of 6-9 months infant oral health care among mothers in the control group (n=228)

)

Variables		Frequency (%)		
		Correct response	**Incorrect response**	**Don't know response**
Dental growth and development				
K01: Emergence of first primary tooth	Baseline 1			
	Evaluation 1			
K02: Component of oral cavity	Baseline 1			
	Evaluation 1			
Oral Disease Prevention				
K03: Need of oral cleaning for gum pads	Baseline 1			
	Evaluation 1			
K04: Pivotal time for oral cleaning	Baseline 1			
	Evaluation 1			
Diet and Nutrition				
K05: Breastfeeding and bottle feeding	Baseline 1			
	Evaluation 1			
K06: Sugary food intake	Baseline 1			
	Evaluation 1			
K07: Instant juices and flavoured milk intake	Baseline 1			
	Evaluation 1			
Oral Habits				
K08: Teething	Baseline 1			
	Evaluation 1			
K09: Teething objects' safety and cleanliness	Baseline 1			
	Evaluation 1			

Dental Injury Prevention	
Possible occurrence of dental injury among infants:	
K10: Bruised lips	Baseline 1
	Evaluation 1
K11: Ulcerated tongue	Baseline 1
	Evaluation 1
K12: Burned lips	Baseline 1
	Evaluation 1
K13: Dislocated tooth	Baseline 1
	Evaluation 1
Periodic oral examination	
K14: Need of dental visit for infant with non- erupted teeth	Baseline 1
	Evaluation 1
K15: Every infant should have an oral health risk assessment	Baseline 1
	Evaluation 1

Table 4.7 Practice of 6-9 months infant oral health care among mothers in the control group (n=228)

Variable		Frequency (%)	
		Inappropriate response	Appropriate response
Oral Disease Prevention			
P01: Examining infant oral cavity	Baseline 1		
	Evaluation 1		
Frequency of infant oral cleaning:			
P02: Gums	Baseline 1		
	Evaluation 1		
P03: Teeth	Baseline 1		
	Evaluation 1		
Tool used to clean infant oral cavity for:			
P04: Gums	Baseline 1		
	Evaluation 1		
P05: Teeth	Baseline 1		
	Evaluation 1		
Diet and Nutrition			
Drinks other than plain water and milk given through:			
P06: Bottle	Baseline 1		
	Evaluation 1		
P07: Cup or straw	Baseline 1		
	Evaluation 1		
P08: Sugary food intake	Baseline 1		
	Evaluation 1		
Oral Habits			
P09: Teething objects' safety and cleanliness	Baseline 1		
	Evaluation 1		
Dental Injury Prevention			
P10: Letting infant playing with risky objects	Baseline 1		

	Evaluation 1
Periodic oral examination	
P11: Bringing infant to dental clinic	Baseline 1
	Evaluation 1

[a]Only for infant with erupted teetth

Table 4.8 Knowledge of 9-12 months infant oral health care among mothers in the control group (n=228)

Variable		Frequency (%)		
		Correct response	Incorrect response	Don't know response
Dental growth and development				
K01: White spots on primary tooth surface	Baseline 2			
	Evaluation 2			
K02: Dental plaque contains bacteria	Baseline 2			
	Evaluation 2			
K03: Dental plaque may cause dental caries	Baseline 2			
	Evaluation 2			
K04: Deciduous teeth function as space maintainer	Baseline 2			
	Evaluation 2			
K05: Deciduous teeth are not important	Baseline 2			
	Evaluation 2			
Oral Disease Prevention				
K06: Dental plaque removal with mechanical method	Baseline 2			
	Evaluation 2			
K07: Fluoride toothpaste helps preventing dental caries	Baseline 2			
	Evaluation 2			
K08: Pivotal time for toothbrushing	Baseline 2			
	Evaluation 2			
Diet and Nutrition				
K09: Frequent cariogenic food intake causes dental caries	Baseline 2			
	Evaluation 2			
Food containing hidden sugar includes:				
K10: Fresh fruits	Baseline 2			
	Evaluation 2			
K11: Instant baby puree	Baseline 2			
	Evaluation 2			
K12: Instant baby rusk	Baseline 2			
	Evaluation 2			

Oral Habits	
K13: Letting infants fall asleep with milk in the mouth	Baseline 2
	Evaluation 2
K14: Non-nutritive sucking habit should stop at 18 months	Baseline 2
	Evaluation 2
Dental Injury Prevention	
K15: Dental injury may occur during infant walking training	Baseline 2
	Evaluation 2
K16: Primary tooth trauma influences towards permanent tooth development	Baseline 2
	Evaluation 2
Periodic oral examination	
K17: Need of dental visit for infant with at least one erupted tooth	Baseline 2
	Evaluation 2
K18: Importance of regular infant dental check- ups	Baseline 2
	Evaluation 2
K19: First dental visit should be at least at 12 months old	Baseline 2
	Evaluation 2

Table 4.9 Practice of 9-12 months infant oral health care among mothers in the control group (n=228)

Variables		Frequency (%)	
		Inappropriate response	**Appropriate response**
Oral Disease Prevention			
P01: Examining infant oral cavity	Baseline 2		
	Evaluation 2		
P02: Infant toothbrushing practice conduct	Baseline 2		
	Evaluation 2		
P03: Infant toothbrushing at night before sleep	Baseline 2		
	Evaluation 2		
P04: Tool used for infant toothbrushing	Baseline 2		
	Evaluation 2		
P05: Fluoridated toothpaste usage	Baseline 2		
	Evaluation 2		
P06: Fluoridated toothpaste amount	Baseline 2		
	Evaluation 2		
Diet and Nutrition			
P07: Sugary snacking habits frequency	Baseline 2		
	Evaluation 2		
P08: Feeding infants with instant puree or baby rusk	Baseline 2		
	Evaluation 2		
Oral Habits			
P09: Infant training to sip water from a cup	Baseline 2		
	Evaluation 2		
P10: Letting infants fall asleep with milk in the mouth	Baseline 2		
	Evaluation 2		
Dental Injury Prevention			
P11: Letting infant playing with risky objects	Baseline 2		
	Evaluation 2		
Periodic oral examination			
P12: Bringing infant to dental clinic	Baseline 2		
	Evaluation 2		

[a]Only for infant with erupted teeth

Table 4.10 Knowledge and practice score on infant oral health care of mothers in the study group (n=228)

Variable		Mean (SD)	Mean diff (95% CI)	t-stat (df)[a]	p-value[a]
Knowledge score	Baseline 1				
	Evaluation 1				
	Baseline 2				
	Evaluation 2				
Practice score	Baseline 1				
	Evaluation 1				
	Baseline 2				
	Evaluation 2				

[a]Paired t-test, df= degree of freedom

Table 4.11 Knowledge and practice score on infant oral health care of mothers in the control group (n=228)

Variable		Mean (SD)	Mean diff (95% CI)	t-stat (df)	p-value[a]
Knowledge score	Baseline 1				
	Evaluation 1				
	Baseline 2				
	Evaluation 2				
Practice score	Baseline 1				
	Evaluation 1				
	Baseline 2				
	Evaluation 2				

[a]Paired t-test, df= degree of freedom

Table 4.12 Knowledge and practice score on infant oral health care between mothers in the study and control group (n=228)

Variables		Mean (SD)			
		Study group	**Control group**	**t-stat (df)[a]**	**p-value[a]**
Knowledge score	Baseline 1				
	Evaluation 1				
	Baseline 2				
	Evaluation 2				
Practice score	Baseline 1				
	Evaluation 1				
	Baseline 2				
	Evaluation 2				

[a]Independent t-test, df= degree of freedom

Table 4.13 Early dental caries lesion of infants in study group (n=114)

Variables	Frequency (%)		
	Baseline	**Evaluation 1**	**Evaluation 2**
Early dental caries lesion			
Sound			
Non-cavitated lesion			
Cavitated lesion			

Table 4.14 Caries risk assessment of infants in the study group group (n=114)

Variable		Frequency (%)	
		Not present	**Present**
Risk Factor 1	Baseline		
≥1 active carious lesion (cavitated or non-cavitated)[a]	Evaluation 1		
	Evaluation 2		
Risk Factor 2	Baseline		
Visible plaque (having at least 1 tooth with grade 2 plaque accumulation-Silness & Löe Plaque Index)[a]	Evaluation 1		
	Evaluation 2		
Risk Factor 3	Baseline		
between meal sugar-containing snacks or beverages >3 times per day	Evaluation 1		
	Evaluation 2		
Risk Factor 4	Baseline		
Child is put to bed with a bottle containing natural or added sugar	Evaluation 1		
	Evaluation 2		
Risk Factor 5	Baseline		
Not using fluoridated toothpaste to clean the erupted tooth[a]	Evaluation 1		
	Evaluation 2		

[a]Infant with erupted teeth

Table 4.15 Dental caries risk exposure of infants in the study group (n=114)

Variables	Percentage (%) Baseline	Evaluation 1	p-value	Percentage (%) Baseline	Evaluation 2	p-value
Dental caries risk exposure						
Low risk						
High risk						

[a]McNemar test, *statistically significant ($p<0.05$)

Table 4.16 Early dental caries lesion of infants in control group (n=114)

Variables	Frequency (%)		
	Baseline	**Evaluation 1**	**Evaluation 2**
Early dental caries lesion			
Sound			
Non-cavitated lesion			
Cavitated lesion			

Table 4.17 Caries risk assessment of infants in the control group (n=114)

Variable		Frequency (%)	
		Not present	Present
Risk Factor 1			
≥1 active carious lesion (cavitated or non-cavitated)[a]	Baseline		
	Evaluation 1		
	Evaluation 2		
Risk Factor 2			
Visible plaque (having at least 1 tooth with grade 2 plaque accumulation- Silness & Löe Plaque Index)[a]	Baseline		
	Evaluation 1		
	Evaluation 2		
Risk Factor 3			
Between meal sugar-containing snacks or beverages >3 times per day	Baseline		
	Evaluation 1		
	Evaluation 2		
Risk Factor 4			
Child is put to bed with a bottle containing natural or added sugar	Baseline		
	Evaluation 1		
	Evaluation 2		
Risk Factor 5			
Not using fluoridated toothpaste to clean the erupted tooth[a]	Baseline		
	Evaluation 1		
	Evaluation 2		

[a]Infant with erupted teeth

Table 4.18 Dental caries risk exposure of infants in the control group (n=114)

Variables	Percentage (%)			Percentage (%)		
	Baseline	**Evaluation 1**	**p-value**	**Baseline**	**Evaluation 2**	**p-value**
Dental caries risk exposure						
Low risk						
High risk						

[a]McNemar test, *statistically significant ($p<0.05$)

Table 4.19 Early dental caries lesion between infants in the intervention and control group (n=114)

Variables		Frequency (%)		
		Study group	**Control group**	**Fisher's Exact Test *p* value[a]**
Early dental caries lesion	Evaluation 1			
	Sound			
	Non-cavitated			
	Cavitated			
Early dental caries lesion	Evaluation 2			
	Sound			
	Non-cavitated			
	Cavitated			

[a]Fisher's exact test, (early dental caries lesion status is only for infant with erupted teeth)

Table 4.20 Dental caries risk exposure between infants in the intervention and control group (n=228)

Variable		Frequency			
		Study group	Control group	χ^2 (df)[a]	*p* value[a]
Dental caries risk exposure	Evaluation 1				
	Low risk				
	High risk				
Dental caries risk exposure	Evaluation 2				
	Low risk				
	High risk				

[a]Chi-square test, df= degree of freedom

CHAPTER 5

GANTT CHART

Table 5.1 Gantt chart for research project

Activity	2024	2025						2026						2027			
	Oct-Dec	Jan-Feb	Mac-Apr	May - Jun	July-Aug	Sept-Oct	Nov-Dec	Jan-Feb	Mac-Apr	May – Jun	July-Aug	Sept-Oct	Nov-Dec	Jan-Feb	Mac-Apr	May - Jun	July-Aug
Preparation of research proposal	→	→															
Ethical clearance (JEPEM/MREC)			→	→	→												
Preparation and Development of MI Protocol/Script Translation/Adaptation of MI Script					→	→											
Pretest at MOH MCHCs Trg							→	→									
Data collection								→	→	→	→	→	→	→			
Data entry, data analysis								→	→	→	→	→	→	→			
Report write-up								→	→	→	→	→	→	→			
Report submission															→	→	

CHAPTER 6

BUDGET PROPOSAL

Table 6.1 Budget for research project

Vot and Vot Details	Unit	Price (RM)/unit	Expenditure (RM)
Vot 21000: Traveling, Transportation and Cost of living allowance			
Presentation at conference (X 3times)			
Attending 1 international conference			
Return airfare	1	1200.00	1200.00
Lodging/ hotel	4	300.00	1200.00
Subsistence	4	100.00	400.00
Fare for land transport	3	100.00	300.00
Attending 1 local conference			
Return airfare	1	300.00	300.00
Lodging/ hotel	3	230.00	690.00
Subsistence	3	70.00	210.00
Fare for land transport	2	100.00	200.00
Subjects recruitment (dental clinics in Trg)	8	8	64.00
AG with MI sessions: 4 weeks x travel 2x/week x (16km x 0.50 cent)	3	8	24.00
Intervention: 3 x (16km x 0.50cent)	8	8	64.00
Post-intervention: 4 weeks x travel 2x/week x (16km x 0.50 cent)	19	8hours/day (16 x 0.50cent)	152.00
Parking fee (0.50cent for 30minutes)			
Vot 23000: Perhubungan Utiliti			
Vot 27000: Research material and supplies			
Office supply			
A4 papers	3 rim	13.00	39.00
Clear pocket file	130	0.30	39.00
Double-sided tape	5 rim	5.00	25.00
Paper file	130	0.50	65.00
Ball pens	200	0.40	80.00

Oral health assessment			
Latex gloves	5 boxes	13.00	65.00
Disposable mouth mirror	2(100/pack)	35.00	70.00
Pen torch	1	15.00	15.00
Facial mask	2 boxes	50.00	100.00
Vot 29000: Professional services			
Printing			
Questionnaire, cover letter, inform consent (pre-test)	30	1.20	36.00
Questionnaire, cover letter, inform consent (baseline, evaluation 1 and 2)	130 x 3	1.20	468.00
Honorarium			
Pre-test	30	10.00	300.00
Respondent (MI sessions)	130	10.00	1300.00
Respondent (MI sessions)	130	10.00	1300.00
Respondent (after MI sessions)	82	10.00	820.00
Refreshment			
Refreshment (study subjects)	88	10.00	880.00
Refreshment (control subjects)	50	10.00	500.00
Others			
Registration fee for attending 1 international conference	1	1200.00	1200.00
Registration fee for attending 1 local conference	1	500.00	500.00
Workshop fees (statistics workshop, scientific writing, and other relevant workshops)			500.00
Publication fee			18,000.00
Total			**40,995.50**

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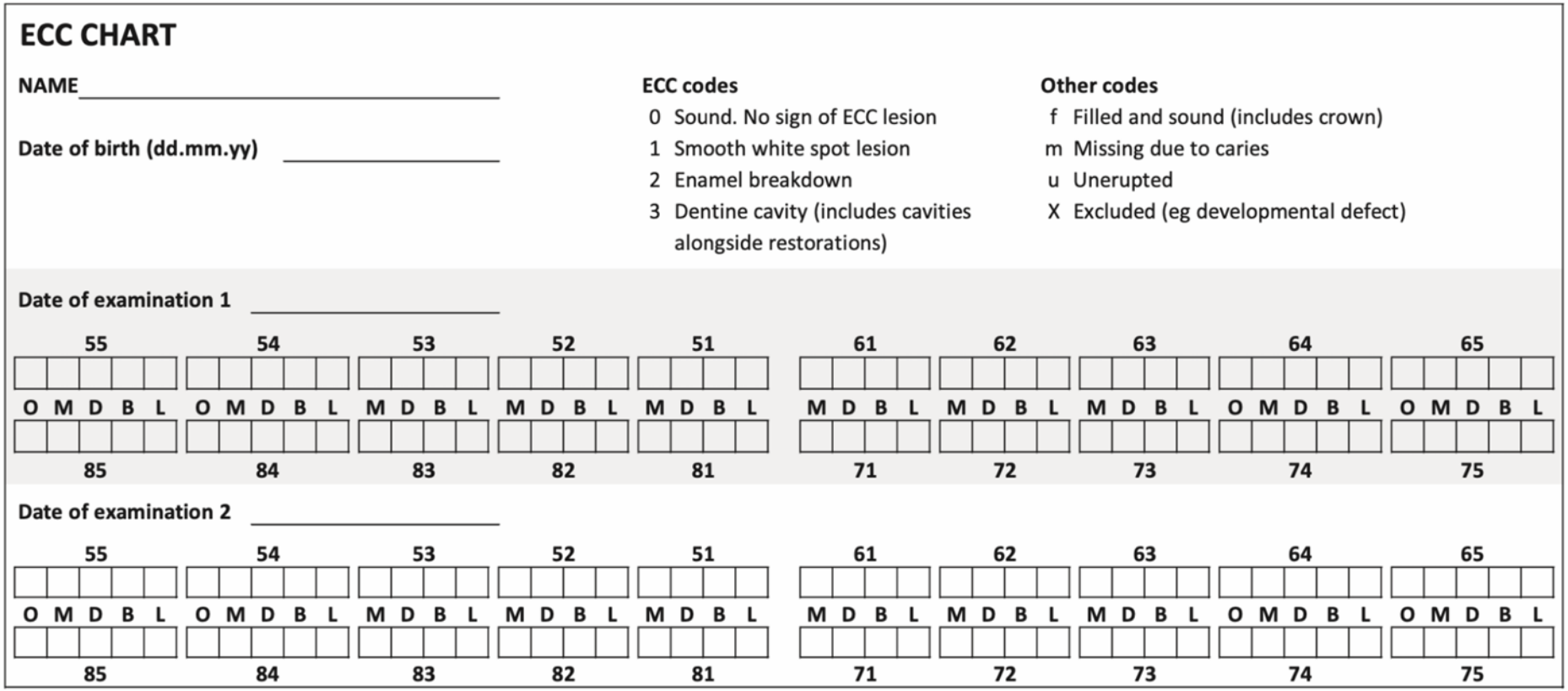
APPENDICES

APPENDIX A



The Early Childhood Caries Chart for use During Clinical Oral Examination

APPENDIX B

Checklist for Infant Caries-risk Assessment

Risk	Factors
☐	≥1 active carious lesion (cavitated or non-cavitated)
☐	Visible plaque (having at least 1 tooth with grade 2 plaque accumulation- Silness & Löe Plaque Index)
☐	>3 between meal sugar-containing snacks or beverages per day
☐	Child is put to bed with a bottle containing natural or added sugar
☐	Not using fluoridated toothpaste to clean the erupted tooth

APPENDIX C

"I wish my child would have beautiful teeth"
Kimaa Miywaapitet Nitawaashiim
Motivational Interviewing Script
(For pregnant woman or new moms before first baby tooth comes in)

You might need to say to a mom-to-be or new mom at the first session:

- ❑ *"It may seem early, but I would like to talk about your new baby's teeth"*
- ❑ *"What we say to each other will be confidential"*
- ❑ *"I will be looking at my guidebook and taking notes as we talk" or, if mom will be more comfortable, make notes after she leaves*

❑ **Visit #1: During pregnancy**

❑ **Visit #2: At 2- or 4-months immunization appointment**

Background for pregnancy and new moms before first baby tooth comes in

Why is it so important for mom-to-be or new mom to have a healthy mouth?

For a cavity to start, at least 3 factors are required

1. Sugary foods and/or drinks
2. Cavity-causing bacteria (germs)
3. Susceptible teeth

Babies are not born with cavity-causing bacteria (germs*) in their mouth

**These germs are usually passed from a mom to her baby*

How does a mom spread these germs to her baby?

If mom has cavities that have not been fixed, or does not keep her teeth as clean as she should, she will have cavity-causing germs on her teeth and in her saliva (spit)

Therefore, whenever a mom
-kisses her baby
-licks a soother to make it clean
-blows on her baby's food
-or, any of those good things that we expect moms to do, she is at risk of passing on these germs to her baby.

How does a mom stop spreading these germs to her baby?

A mom should have all her cavities fixed and brush her teeth regularly. Cutting down on sugary foods and drinks and chewing xylitol-containing gum will help stop new cavities from forming in her mouth.

That is why the themes of the counseling that you will do ***before*** a baby gets any teeth are:

1. Improving Mom's oral health

2. Stopping the spread of cavity-causing bacteria (germs) from mom to child

1. ASK QUESTIONS: **WHY ASK QUESTIONS?**
   1. To show your concern or empathy for mom and her new baby
      - Counseling, like motivational interviewing, works best when you have developed a relationship with a mom
        - when you know her, even a little bit
   2. To get mom to talk, so you are not doing all of the talking
      - You should do more listening than talking

❑ Only ask the type of questions that you are comfortable with
An indirect question might be best! For example
- ❑ *"Some parents have had problems with their own teeth, so they worry about their children's teeth…what about you?*

❑ Or you could ask other questions, just to get mom talking
- ❑ "*Do you have other children*?" (write down children's names and ages)
- ❑ Comment about other children, for example, *"It must be hard for you to have time for yourself as well as look after……"*
- ❑ Encourage the mother to tell you about the pregnancy. For example,
  - *"Are you sleeping and eating okay?"*
  - *"Do you work outside of the home?"*
- ❑ Respond to the mother by nodding and paraphrasing. Encourage her *"Tell me more."* Write down important points in her folder.

➢ At our workshop, we decided not to dwell on the past, but look to a positive future.
➢ You also felt that moms may not want to talk (with you) about their own, or their other children's teeth especially if there have been "problems"
➢ So, we will move on to asking what a mom wants for her new baby's teeth

❑ Ask mom what she wants for her child's teeth
- ❑ *"If we could change the future, leaving the past behind, tell me what you would want for the dental health/teeth of your child?"*
- ❑ *"Tell me more."* or *"Anything else?"*_____.
- ❑ Repeat back to mom what she has just told you. This lets her know that you have been listening!
  - *"Let me be sure that I understand. You would like your child to……"*
- ❑ Write down what she wants:
  _____

2. BE POSITIVE ABOUT HOW GOOD A PARENT SHE IS TO WANT THESE THINGS FOR HER NEW BABY.
   - *"You are/will be a really good mom"*
   - *"You really love that baby."*
   - *"You are really good at…."*

3. SAYING IT AGAIN MAKES IT SO!
   - that is, say things to motivate mom
   - *"I think I heard you say you want your baby to have great teeth. Did I get it right?"*
   - *"Your child will thank you (for doing this)."*

4. REFLECT, LISTEN AND SUMMARIZE!
   - summarize dental health wish here
   - *"Please tell me again what you want for your child's dental health, so I can be sure I get it right"*

5. TIME TO MOVE ON TO THE MENU

Providing information to a parent who is ready to do something:
- *"In order to (repeat again mom's dental wish), I want to share with you some things we have recently learned."*
- *"Would you like to hear about them?"*

Ask her permission!
- *"We have spoken to many moms about what we can do to help our children have healthy teeth. They suggested that we talk to other moms during pregnancy or before the baby gets her/his first tooth. That is why we are with you now."*
- *"Some of the steps that were suggested for moms are on a list (menu) that I would like to show you."*
  - Explain to mom that if her teeth are healthy, her baby will have a better chance of healthy teeth**. (Background in box on page 1.)**
  - Emphasize choice: no need to choose everything*!*

- Show mom the menu.

Menu for pregnant woman or new mom before first baby tooth comes in

1. Brush my own teeth with toothpaste at least once a day.
2. If it has been more than 6 months since I went to the dental clinic, I will make an appointment for a check-up.
3. I will have healthy meals and snacks in my diet
4. I will drink less pop or drink pop only with meals.
5. I will only chew sugar-free gum.
6. I will always hold my baby during feeding, then lay him/her down to sleep and, if he/she wakens, I will give water, not formula or juice
7. I will sometimes give my new baby a soother if he/she is fussy, not a bottle.
8. Other_____

If time permits, do the following or go on to #6 and do this next visit:

a. Review the menu items

"Let's look at the items on the menu, talk about each of them briefly, and you decide which ones are for you."

The following is an example:
"Is it possible for you to brush your teeth with toothpaste at least once a day?
"What problems would you face if you tried to do this?" E.g. lack of time

b. Review the rest of the list:
   - *"What problems would you face if you tried to do any of the others that you have chosen?"* Examples of problems below
     - fear of the dentist,
     - lack of time
     - hard to get an appointment at the clinic
     - good food is too expensive*!*

c. Say, "*Maybe you have some ideas of your own on what to do?*
Be positive about any idea. "*That is a great idea!*"

d. Identify additional benefits
   - *"Let's talk about the additional benefits of each item you have chosen."*
   - *"Any other good things that would happen when you for example,*
     - Change snacking habits— I will be healthier (less weight problems, diabetes, heart problems);
     - Cut down on pop (I will save money)
   - *"Is this what YOU want to do?"* _____

6. INCREASE MOM'S BELIEF IN HERSELF THAT SHE CAN DO THIS

- ❑ Say supportive words: ***"I can tell that you are/will be a great parent/mom…"***
- ❑ Highlight her competence and abilities: ***"I can tell that you are/will be a great parent/mom…"***
- ❑ Encourage her to tell you again what she wants for her child: ***"Tell me again what you want for your child's teeth/smile?***
- ❑ Remind her of outcome if she did nothing: ***"If someone chose not to do anything to help a child have healthy teeth, what would happen?"***

7. IF MOM IS "RESISTANT": TIME TO CHANGE YOUR APPROACH!

- ❑ If a mom argues, interrupts, or shows reluctance. Do not argue with her
  - Try something different, for example,
    - Emphasize choice.
    - Agree with mother: *"It's your choice. I'm not here to make your decision"*
  - Shift into reverse—that is, go back to the beginning
    - Work on rapport and trust: *"I really believe in you, your child will have great teeth because of you"*
    - Ask questions, listen
  - If mother is not ready to make commitment do not press her; say,
    - "*If you are not quite ready yet to take the steps we have gone over, I do not want you to go ahead and make a commitment. This is too important to decide now.*
    - *"Go home and think it over."*
    - *"I will see you when you bring in your new baby for his/her 2-month immunization, and we can talk about it further."*
    - *"I hope everything goes well for you."*

8. WHAT TO SAY WHEN YOU HEAR:

"Baby teeth are not important."
"All kids get cavities; it is normal…."
"My family doesn't have strong teeth; our teeth decay/go bad easily……"

- ➢ Listen to what mom is saying.
  "I understand what you are saying; we used to believe that too…"
- ➢ Say, as we discussed "new knowledge exists":
  "Recently research has given us new information/approaches…"
- ➢ Remind mom about what you said about mom spreading germs to baby, etc.

9. ENDGAME

- ❑ Give a copy of the menu to mom
  "I am going to give you a copy of your menu"
  "The items that you chose are checked off"
  "You know where to contact me if you have more questions"
- ❑ Anticipate problems
  "Not everything goes the way we plan.
  "There are always problems."
- ❑ Encourage contact with CHR
  "Feel free to call me if you have any problems with your men"
  "I appreciate your situation and your willingness to try."

APPENDIX D

The Role of Motivational Interviewing in the Baby Teeth Talk Study

Presented by
Shauna McGregor, RDH
Community Research Assistant
Baby Teeth Talk Study

1

A little bit about me…

- Shauna McGregor
- Registered Dental Hygienist
- Community Research Assistant for Baby Teeth Talk Study (Winnipeg Site)
- 8 years experience in Dental field
- Worked in Baffin Island, Churchill MB and various Community dental clinics in Winnipeg, MB
- Joined the Baby Teeth Talk Study in August 2011

2

Baby Teeth Talk Study

- The Baby Teeth Talk Study is an International research project taking place in Canada, New Zealand and Australia
- The aim of the study is to improve the dental health of Aboriginal children, by working with their mothers from the time that they are pregnant

3

Baby Teeth Talk Study

- The project hopes to result in an improvement in the dental health (less tooth decay) of young Aboriginal children.
- This project also aims to help develop parents' understanding about the health of their child's teeth, mouth and gums and build their confidence in managing their own oral health and that of their families.

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Baby Teeth Talk Study Four Interventions

1. Dental care for moms-to-be during pregnancy
2. Fluoride varnish applications to children's teeth
3. Anticipatory guidance
4. Motivational Interviewing

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Baby Teeth Talk Study

- Recruitment for the study took place from September 2011 to November 2012
- Recruited 89 expecting mothers
- Completed Phase 1
  - Initial questionnaire, dental screening, anticipatory guidance, Motivational interviewing
- Started Phase 2
  - Mother and baby return when baby is 6 months, fluoride varnish applied to baby teeth, anticipatory guidance and motivational interview session

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What I know and what I have learned about Motivational Interviewing(MI)

- Can not be taught or learnt in one hour
- Takes time and practice to master skills and to be confident in MI

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Objectives

- "Spirit" of MI
- Four Processes of MI:
  - Engaging, Focusing, Evoking, Planning
- O.A.R.S: four Strategies of MI:
  - Open-ended questions, Affirm, Reflective Listening, Summarize
- Guiding Principles of MI (RULE)
- Change Talk- DARN CAT
- Ambivalence
- Rolling with Resistance
- Strengthening commitment

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Objectives continued

- Outline how MI is used in the Baby Teeth Talk Study
  - Opening statement
  - Establish Rapport
  - Ask for Change Talk
  - Agenda Setting
  - Ask-Provide-ask
  - Readiness Ruler
  - Invite commitment language
  - Summarizing with the change plan and take home sheet
  - Closing the conversation

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What is Motivational Interviewing (MI)?

Motivational Interviewing is

"a collaborative, person-centered form of guiding to elicit and strengthen motivation for change"
-Miller & Rollnick 2009

" it is a collaborative conversation to strengthen a person's own motivation for and commitment to change"
-Miller & Rollnick 2010

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- Motivational Interviewing centres on exploring and resolving ambivalence and evokes the motivational processes within the individual that facilitates change.

"People are generally better persuaded by the reasons which they have themselves discovered than by those which have come in to the mind of others"
- Blaise Pascal

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The "Spirit" of MI

"it involves guiding more than directing, dancing rather than wrestling, listening at least as much as telling"
-Miller & Rollnick

MI is not a technique for tricking people into doing what they want

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The "Spirit" of MI

- Three basic elements to the spirit of MI
  - Collaboration (vs. Confrontation)
  - Evocation (Drawing Out, rather than Imposing Ideas)
  - Autonomy (vs. Authority)

These describe the underlying "spirit" of MI, the mindset with which one approaches conversation with clients about behavior change.

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O.A.R.S. 4 Strategies of MI in early stages

- **O**pen-ended Questions
- **A**ffirmations
- **R**eflective Listening
- **S**ummarize

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O.A.R.S

- Open-Ended Questions
  - Gather broad descriptive information
  - Facilitate Dialogue
  - Often start with words like "how" or "what" or "tell me about"
  - Avoid asking questions where the response is a Yes or No

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O.A.R.S

- Affirmations
  - Recognize clients strengths
  - Build rapport
  - Be sincere
  - Supports and promotes self-efficacy
  - Acknowledges the difficulties the client has experienced
  - Validates

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O.A.R.S

- Reflective Listening
  - Begins with a way of listening
  - It includes an interest in what the person has to say and a desire to truly understand how the person sees things or how they feel
  - Its hypothesis testing
  - What you think a person means may not be what they mean

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Examples of Reflective Listening

- Repeating- simplest
  - Direct restatement of what person said
- Rephrasing- substitutes synonyms
  - Saying the same thing in slightly different words
- Paraphrasing- major restatement
  - Making a guess about meaning, continuing the paragraph, usually adds something that was not directly said

Other types of reflection

- Double-sided reflection
  - Captures both sides of the ambivalence
- Amplified reflection
  - Overstates what the person

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O.A.R.S

- Summarize
  - Reinforce what has been said
  - Communicates interest and understanding
  - Shows that you have been listening carefully and prepare the client to move on

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The Four processes of Motivational Interviewing

Four processes that guide the practice of MI

1. Engaging
2. Focusing
3. Evoking
4. Planning

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The Four processes of Motivational Interviewing continued

- **Engaging**
  - Process by which both parties establish a helpful connection and working relationship
- **Focusing**
  - Process by which you develop and maintain a specific direction in the conversation about change
- **Evoking**
  - Involves eliciting the client's own motivations for change
  - It occurs when there is focus on a particular change and you harness the client's own ideas and feelings about why and how they might do it
  - Having a person voice argument for change
- **Planning**
  - Encompasses both developing commitment to change and formulating a specific plan of action

Motivational Interviewing, 3rd edition, Miller & Rollnick, 2013

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4 guiding principles of MI R.U.L.E

1. **R:** Resist the Righting Reflex
2. **U:** Understand your Patient's Motivations
3. **L:** Listen to your patient with empathy
4. **E:** Empower your patient, encouraging hope and optimism

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R: Resist the Righting Reflex

- As helping professionals we often want to set things right, to prevent harm, to heal and to promote well being
- We want to fix problems and help people

There is a natural human tendency to resist persuasion. Especially when the person is **ambivalent** about change

- If you argue for change the patient argues against it

MI evokes the argument for change from the patient

- Ironically acknowledging the others rights and freedom not to change that can sometimes make change possible

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U: Understand Patients Motivation

- Be interested in the patients own concerns, values and motivations.
- It is the patients reasons for change that will most likely lead to change
- Even with time limits, better to ask patient why they would want to make a change than spend time telling them why they should change

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L:Listen to your Patients

- MI involves at least as much listening as informing
- Normal expectation that as health care providers we have the answers and will give them to the client
- When it comes to behavior change the answers most likely lie within the client and finding them requires some listening

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E: Empower your Patients

- Help the patient explore how they can make a difference in their own health
- The patient becomes your consultant on their own lives and how best to accomplish behavior change
- Important role is to support their hope that such change is possible and can make a difference in their health

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Change

A patient who is active in the consultation, thinking aloud about the why and how of change is more likely to do something about it afterward

Ask people why they do not change a behavior and they will gladly tell you, and in that process of telling you, they reinforce the status quo

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Ambivalence
Stuck in the middle

Ambivalence is defined as

Simultaneous and contradictory attitudes of feelings (as attraction and repulsion) towards and object, person or action

The experience of having thoughts and/or emotions of both positive and negative valence towards someone or something

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Ambivalence sounds like…

- Cold feet
- Mixed feelings
- Sitting on the fence
- I do but I don't…
- I want to but…
- Lack of motivation

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Ambivalence: both sides are already within the person

- If you argue for one side, an ambivalent person is likely to defend the other side
- As a person defends the status quo, the likelihood of change decreases

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Three communication styles

- **Follow**- Listening Predominates
- **Directing**-Tell person what to do with or without explaining or rationale
- **Guiding** helps patient find the way

Guiding is well suited to helping people solve behavior-change problems

- MI is a refined form of the Guiding style
- All 3 styles are useful and can be used

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A good guide will…

- **Ask** where the person wants to go and get to know him or her a bit
- **Inform** the person about options and see what makes sense to them
- **Listen** to and respect what person wants to do and offer help accordingly

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Change Talk: What we're ultimately fishing for

Preparatory Change Talk

Desire to change (want, like, wish…)

Ability to change (can, could…)

Reasons to change (If… then)

Need to change (need, have to, go to…)

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Change Talk
Reflects resolution of ambivalence

Implementing Change Talk

Commitment (intention, decision)

Activation (ready, prepared, willing)

Taking Steps (taking specific actions to change)

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Eliciting Change Talk
The simplest way is to Ask for it

Strategies for Evoking Change Talk

- **Ask Evocative questions**
  - open-ended questions
- **Explore Decisional Balance**
  - pros and cons
- **Good things/ Not-so-good things**
  - positives and negatives of target behavior
- **Ask for Elaboration/ Examples**
  - ask for more details… "In what ways", "tell me more"
- **Look Forward**
  - What would happen if continues as they are
- **Query Extremes**
  - What is the worst things that might happen
- **Explore Goals and Values**
  - Ask clients guiding values are. What do they want in life
- **Come alongside**
  - Side with the negative (status quo) side of ambivalence. "perhaps____ is so important to you that you won't give it up, no matter the cost"
- **Use change Ruler**
  - Ask on a Scale of 1-10 how important is it to make the change
  - Ask on a scale of 1-10 how confident client is in ability in making change

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Generic Questions about change

- "why might you want to change" (D)
- "If you did decide to make this change, how would you do it" (A)
- "What are the three most important benefits that you see in making this change" (R)
- "How important is it to you to make this change" (N)
- "What do you think you will need to do" (C)
- "What are you already doing to be healthy" (T)

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Roll with Resistance

- Resistance is the other side of ambivalence
- Do not argue against it; pushing against resistance reinforces it
- Effective responses that can defuse resistance and refocus on change

Signs of resistance

Arguing- challenging, hostility

Interrupting-taking over, cutting off

Ignoring- inattention, non-answer, no response

Denying-blaming, disagreeing, excusing

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The use of MI in the Baby Teeth Talk Study

Outline of a MI session with a study participant

1. Structuring (opening) statement
2. Getting to know each other- establishing rapport/discussion of a typical day
3. Ask for change talk
4. Agenda Setting – selecting a topic/ target behavior
5. Ask-Provide-Ask
6. Rulers – Measuring Importance and confidence
7. Invite commitment language
8. Summarizing with the Change plan and Take home Sheet
9. Closing conversation

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Oral Health Motivational Interviewing Script

- Structuring and opening statements
  - Thank mom for participating in the study, give explanation of the purpose of the study. Explain that we want to find better ways to promote healthy teeth and prevent tooth decay among Aboriginal children.
  - Explain that we will be discussing ways to help keep teeth healthy during pregnancy and how to care for baby's teeth
- Getting to know each other
  - Establish a rapport
  - Share information about myself with the participant
  - Invite them to share information about themselves with me
  - Talk about a typical for them

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Asking for Change Talk

- Discuss things that the client already knows about the topic
- Ask permission to talk about oral health topics
- Ask client questions that promote discussion and elicit change talk
  - What concerns do you have?
  - What goals do you have for your child's teeth and mouth?
  - What might be worrying or concerning you today?
  - What makes you want to change the way you care for your baby's teeth?

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Agenda Setting

- Find out where the client wants to go
- Client is given as much decision-making freedom as possible
- Negotiate the agenda
  - Here are some things we can do to ensure that our baby has healthy teeth…
  - Would it be ok if I shared some of this information with you?
- Ask permission
  - Would it be ok if we spent some time talking about…today…?

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Examples from Baby Teeth Talk Study

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Ask- Provide-Ask

Using the oral health messages for specific topics chosen from agenda setting sheet

- What do you know about this topic? I am happy to share ideas with you.
- We know that this is a way to do this…what do you think about that ? How does that fit with what you do now?

Ask what the client thinks about what you said.

- Roll with Resistance in this section

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Readiness for Change Ruler

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Measuring Importance

Importance Ruler

On a scale of 0-10 where 0 is not at all important and 10 is extremely important, how important is making the change to___you today?

" What are some things that make this change important to you"?

" why are you a 7 and not a 0"

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Measuring Confidence

Confidence Ruler

Let's think about how confident you are about making the change of…

On a scale of 0-10 where 0 is not at all confident and 10 is extremely confident, how confident do you feel?

"What does it mean to be a…"

" what would help you to feel more confident to make this change"

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Invite commitment Language

Key questions to invite commitment language

- What do you think the first step would be to reach the goal (target behavior)?
- Where would you like to go now?
- What would you like to do now?
- What do you think will happen if you don't change…?
- What concerns you about the current situation?

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Summarizing with a change plan and take home sheet

- Encourage the parent to keep the change plan simple and use their own language:
- Be SPECIFIC- reduce, increase, taper off, quit
- Be MEASURABLE- how much, how often
- Be APPROPRIATE- what will help the most?
- Be REALISTIC- when, how, who, what?
- Be TIME SENSITIVE- deadline, beginning date, level of activity,

Summarize the plan- have parent fill out the sheet

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My Plan

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Closing conversation

Thank you for talking with me about you and your baby. I find it helpful to understand more about you and your family. I will see you again when the baby is six months old. We will begin by talking about what you have chosen and planned to work on from today. Next time we will choose another topic to discuss.

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Reflection

- Still have lots to learn about MI
- Learn something different each MI session with participant
- No MI session is the same
- Challenges
  - Quiet mom
- MI coach
  - Tele-conferences 2x month
  - Discuss challenges, strategies, review

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Video

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Questions?

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Thank you

Contact info
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babyteethtalk@mich.ca
Phone: 204-789-3346

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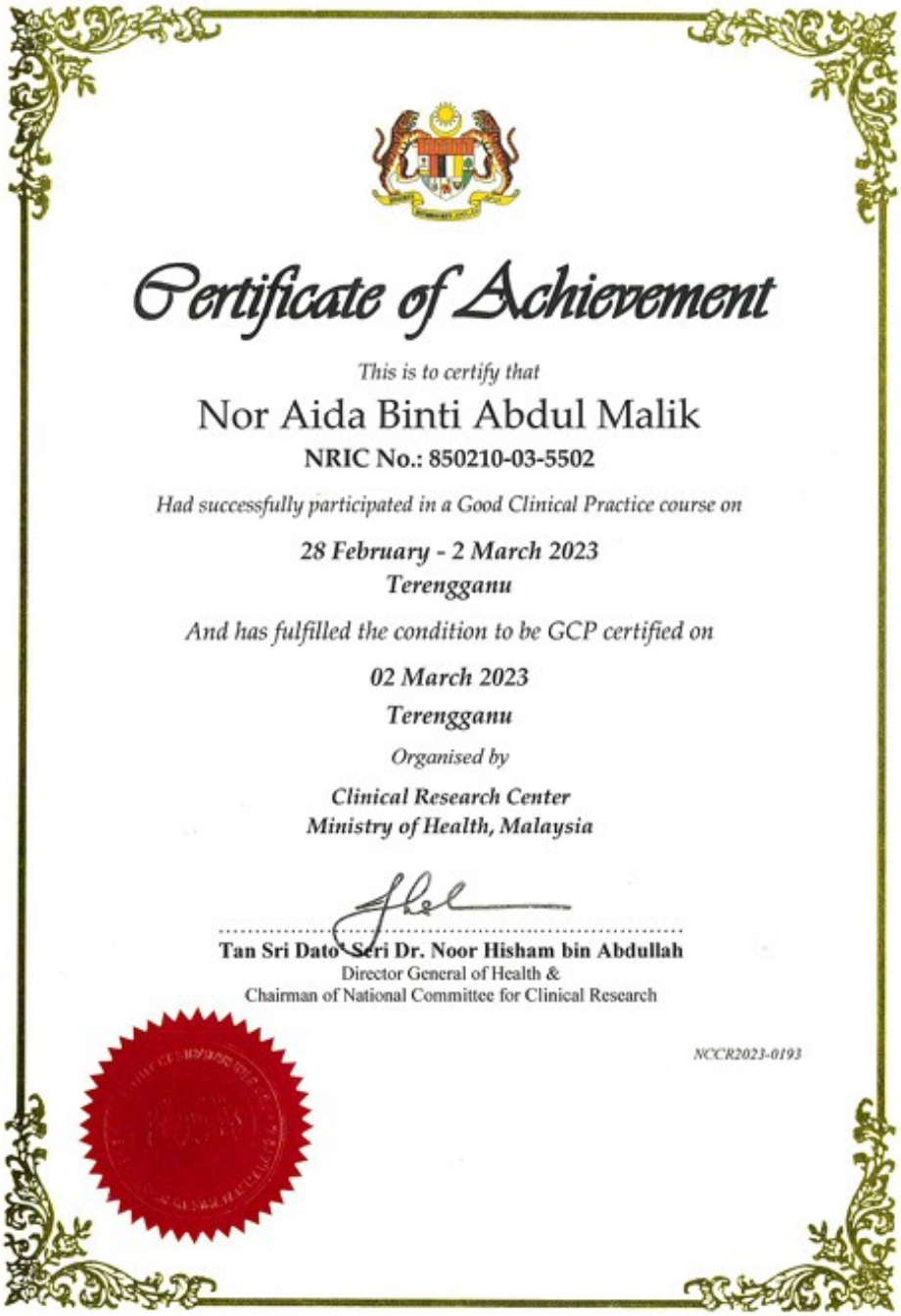
Resources

- Motivational Interviewing in Health Care: Helping patients change behavior. Rollnick, S., Miller, W.R., & Butler, C.C. (2008)
- Motivational Interviewing: Preparing people for Change. Miller, W.R., & Rollnick, S. Guilford Press (2002)
- http://motivationalinterview.org
- Kamilla L. Venner, PhD UNM/CASAA (May 2011)

55

APPENDIX E



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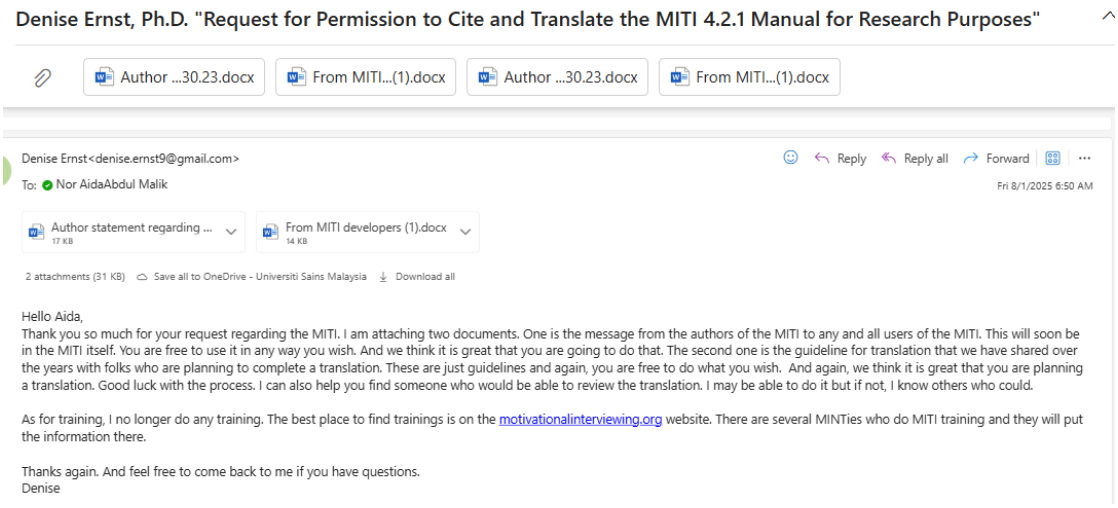

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Hello Aida,
Thank you so much for your request regarding the MITI. I am attaching two documents. One is the message from the authors of the MITI to any and all users of the MITI. This will soon be in the MITI itself. You are free to use it in any way you wish. And we think it is great that you are going to do that. The second one is the guideline for translation that we have shared over the years with folks who are planning to complete a translation. These are just guidelines and again, you are free to do what you wish. And again, we think it is great that you are planning a translation. Good luck with the process. I can also help you find someone who would be able to review the translation. I may be able to do it but if not, I know others who could.

As for training, I no longer do any training. The best place to find trainings is on the motivationalinterviewing.org website. There are several MINTies who do MITI training and they will put the information there.

Thanks again. And feel free to come back to me if you have questions.
Denise