(REVIEW ARTICLE)

Check for updates

The role of maternal dental anxiety on preschool children's dental visiting behavior: A health belief model-based scoping review

Diandra Alisha Ardianputri *, Tasya Nabila Ayu Herwina and R. Darmawan Setijanto

Bachelor Program in Dentritry, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

Abstract

Maternal dental anxiety (MDA) is a significant barrier to preschool children's dental visits and contributes to poor oral health status. This scoping review aims to map and analyze evidence from the literature regarding the relationship between MDA and maternal behavior in bringing their child to the dentist, using the Health Belief Model (HBM) as an analytical framework. A systematic search was conducted on databases such as Google Scholar, PubMed, and ScienceDirect, resulting in nine relevant studies that met the inclusion criteria for narrative analysis. The results show a strong and consistent relationship between the mother's anxiety level and dental visit avoidance, as well as poorer oral health status in the child, marked by increased caries scores (dmft/DMFT). Analysis through the HBM identifies that the mother's own anxiety functions as the main perceived barrier, while self-efficacy is a key factor in promoting positive behavior. In conclusion, MDA is a risk factor that contributes to an intergenerational "vicious cycle" of dental anxiety. Effective interventions must adopt a two-generation approach focused on reducing psychological barriers and increasing maternal self-efficacy through HBM-based educational programs to sustainably improve children's dental health.

Keywords: Maternal Dental Anxiety; Dental Visit Behavior; Preschool Children; Health Belief Model; Scoping Review

1. Introduction

Oral health is an integral part of general health and serves as a critical foundation for a child's growth and development, especially during the preschool years (3-5 years). In this golden period, healthy dental conditions not only support chewing and speech functions but also influence a child's psychosocial development and quality of life (Esa et al., 2020). However, data indicates that the prevalence of dental caries in early childhood in Indonesia remains very high. The Riset Kesehatan Dasar (Riskesdas) report consistently lists caries as one of the most frequently reported health problems, indicating significant challenges in dental health maintenance behaviors at the family level.

In the context of child health, mothers play a central role as the primary caregiver whose decisions directly affect a child's access to healthcare services, including regular dental visits. However, a mother's behavior is not only based on knowledge but is also heavily influenced by her psychological state. One psychological factor that has proven to be a significant barrier is Maternal Dental Anxiety (MDA) (Alhareky et al., 2021). MDA is defined as a specific fear or worry response experienced by mothers related to dental treatment. This anxiety can be unconsciously "transmitted" to the child, shaping a negative perception of dentists from an early age. Furthermore, anxious mothers tend to postpone or even cancel dental appointments for their children, which ultimately worsens the child's dental condition as they do not receive necessary preventive or curative treatments (Goyal et al., 2019).

To understand the complexity of a mother's decision-making process in seeking dental care for her child, a comprehensive health behavior theoretical framework is needed. The Health Belief Model (HBM) is one of the most

---

* Corresponding author: Diandra Alisha Ardianputri

widely used models for analyzing and predicting health behaviors. The HBM assumes that a person will take health-related action if they believe in several key components: (1) Perceived Susceptibility, an individual's belief about their vulnerability to a condition; (2) Perceived Severity, the belief in the seriousness of the condition and its consequences; (3) Perceived Benefits, the belief in the effectiveness of the recommended action; and (4) Perceived Barriers, the perception of obstacles or "costs" to performing the action (Xiang et al., 2020). In this context, the HBM can be used to dissect how a mother's perception of her child's risk of dental disease (susceptibility & severity) and the benefits of dental visits (benefits) clash with her own anxiety as a primary barrier (barriers).

Although the relationship between Maternal Dental Anxiety and the reduced frequency of children's dental visits has been widely researched, a gap remains in the literature regarding how this relationship can be systematically explained through the Health Belief Model framework. Most research tends to focus on a single aspect without comprehensively mapping how all HBM components interact to shape the behavior of an anxious mother. Therefore, this scoping review aims to map and analyze the existing evidence from the literature on the relationship between maternal dental anxiety and the behavior of mothers in taking their preschool-aged children to the dentist, using the Health Belief Model as the primary analytical framework

2. Material and methods

This study uses a scoping review design. This design was chosen to map the existing literature on the topic of the relationship between maternal dental anxiety and children's dental visit behavior, identify key concepts, and examine how the Health Belief Model (HBM) theoretical framework has been used to explain this phenomenon. This review follows the recommended framework for scoping reviews.

A systematic search for articles was conducted in September 2025 across several electronic databases, including Google Scholar, PubMed, and ScienceDirect. The search strategy was developed using a combination of relevant keywords based on the Population, Concept, and Context (PCC) framework. The keywords used in English and Indonesian were combined with Boolean operators (AND, OR) as follows: (maternal OR mother OR "ibu") AND ("dental anxiety" OR "dental fear" OR "kecemasan dental") AND ("dental visit" OR "dental attendance" OR "kunjungan gigi") AND ("preschool children" OR "anak prasekolah") AND ("Health Belief Model").

Articles identified from the initial search were then screened based on established inclusion and exclusion criteria.

Inclusion Criteria:

- The article is original research.
- The article explicitly discusses maternal dental anxiety as one of the primary variables.
- The article discusses dental visit behavior in preschool-aged children (3-5 years).
- The article uses or can be analyzed through the Health Belief Model (HBM) framework.
- The article was published in the last 10 years (2015–2025) to ensure the relevance of the findings.
- The article is available in full-text and written in English or Indonesian.
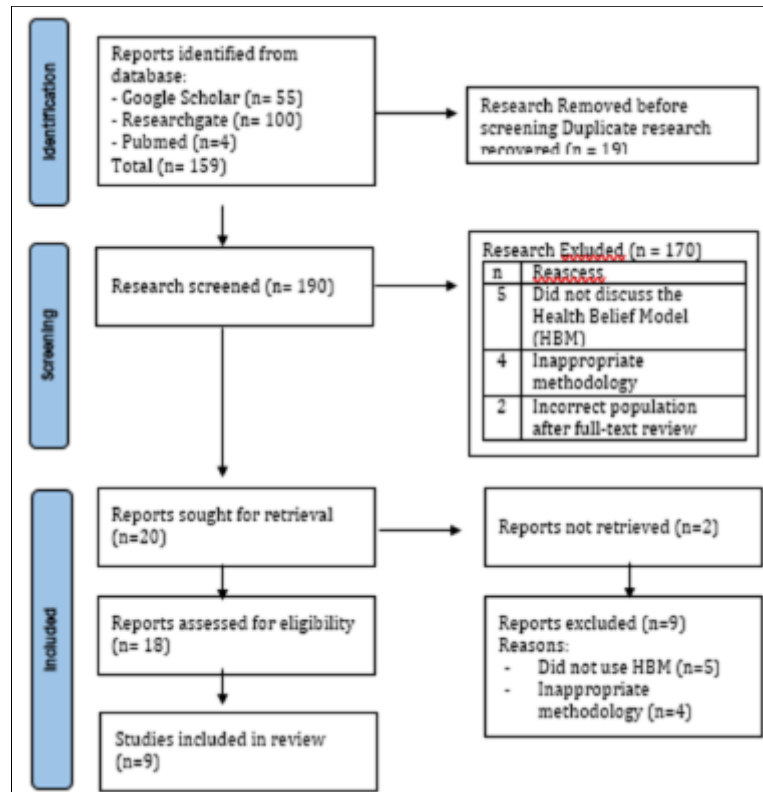
Exclusion Criteria:

- Articles that are not original research (e.g., literature review, systematic review, meta-analysis, editorial, case report).
- Articles that do not discuss one of the key variables (maternal anxiety, child's behavior, or HBM).
- Studies where the population is not mothers and preschool-aged children.
- Articles not available in full-text.

The article selection process is illustrated using the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram. This process consists of several stages:

- Identification: Collecting all articles from the initial database search.
- Screening: Removing duplicate articles, then screening articles by title and abstract to assess their relevance to the inclusion criteria.
- Eligibility: Articles that pass the initial screening are then read in full-text to confirm their eligibility. Articles that do not meet all inclusion criteria are excluded, with the reasons being noted.
- Final Inclusion: Articles that meet all criteria are included in the final synthesis.

After the final 9 articles were selected, the data extraction process was performed. Important information from each article, such as author's name, year, objective, methods, population, and key findings related to HBM and anxiety, was recorded in a synthesis table to facilitate analysis.

Data from the nine selected journals were extracted and analyzed using a narrative synthesis method. The findings from each study were grouped into themes relevant to the research question, particularly those related to the components of the Health Belief Model (perceived susceptibility, severity, benefits, and barriers) in the context of maternal dental anxiety.

Figure 1 Flow Chart PRISMA

3. Results

This scoping review analyzed nine relevant studies focused on maternal anxiety and its relationship with health behaviors, grounded in the Health Belief Model (HBM) theory. The findings from this review are presented in two parts: (1) A synthesis table summarizing each reviewed article, and (2) A narrative discussion integrating these findings thematically. Overall, the findings from various studies show that the HBM is a highly relevant framework for understanding how a mother's beliefs and psychological state, especially anxiety is a primary determinant of health behaviors, including the decision to seek dental care for their children.

Table 1 Synthesis of Key Findings from the Reviewed Literature on Maternal Dental Anxiety and Health Belief Model Components.

Author	Sample Population of the research	Sample Size of the research	Study Location of the research	Indicator Used of the research	Method	Results of the research
Salehnezhad et al. (2022)	Mothers of premature infants with retinopathy of prematurity (ROP).	67	Mashhad, Iran	HBM-based questionnaire; State-Trait Anxiety Inventory (STAI).	Randomized Controlled Trial (RCT)	The mean anxiety score in the intervention group significantly decreased from 67.0 to 38.5 (P≤0.001), while the control group showed no significant change. The scores of all HBM constructs (susceptibility, severity, benefits, barriers, and self-efficacy) significantly increased in the intervention group (P<0.001).
Turgut et al. (2024)	Mothers and children aged 4-12 years.	305 pairs	Turki	Modified Dental Anxiety Scale (MDAS) for mothers; Venham Picture Test (VPT) for children; DMFT Index.	Cross-sectional.	A strong positive correlation was found between maternal anxiety (MDAS) and child anxiety (VPT) in the 8-12 age group (rs=0.476), and a weaker but still significant positive correlation in the 4-7 age group (rs=0.282). There was also a significant positive relationship between maternal anxiety and children's DMFT scores in the 8-12 age group (rs=0.45, P<0.001).
Xiang et al. (2020)	Adolescents (Grade 2 students).	1207	Hong Kong	HBM-based questionnaire; Modified Child Dental Anxiety Scale (MCDAS); DMFT Index.	Cross-sectional; Path Analysis.	Path analysis showed that perceived susceptibility and greater severity were directly correlated with increased dental anxiety. Other HBM constructs like self-efficacy and perceived barriers influenced dental anxiety indirectly through their impact on oral health behaviors and DMFT scores.
Busato et al. (2017)	Mothers and children undergoing dental treatment.	40 pairs	Brazil	Corah's Scale for mothers; VPT for children.	Cross-sectional.	Maternal anxiety was found to influence child anxiety in 81.3% of cases (P=0.026). The local anesthesia procedure was the biggest cause of anxiety for mothers (60%). As many as

						40% of the children in this study showed some anxiety, ranging from fear to panic.
Goyal et al. (2019)	Mothers and children aged 2-5 years.	200 pairs	India	MDAS; Modified Gingival Index (MGI); dmft Index.	Cross-sectional.	There was a direct and statistically significant relationship between the level of maternal anxiety and the child's oral health. Children of mothers in the "phobic" category had the highest mean dmft (3.57 ± 1.58) and the highest Modified Gingival Index (MGI) score, indicating poorer oral health.
Pratiwi et al. (2023)	Pregnant women.	145	Indonesia	HBM-based questionnaire.	Cross-sectional.	The behavior of pregnant women in reducing their anxiety was significantly related to three HBM factors: perceived barrier (P=0.034), perceived susceptibility (P=0.016), and self-efficacy (P<0.001). Perceived severity and perceived benefit were not found to have a significant relationship.
Bagchi et al. (2017)	Preschool children (3-6 years) and their mothers.	297 pairs	India	Measurement of blood pressure and heart rate.	Quantitative; multiple visits.	Using physiological measurements, this study found that both children and mothers exhibited the highest levels of anxiety during the first dental visit. This level of anxiety decreased significantly in subsequent visits, indicating a pattern of adaptation and habituation to the dental environment.
Ratson et al. (2016)	Parents (from kibbutz and city communities).	74	Israel	*Corah's Dental Anxiety Scale* (DAS); *Dental Fear Survey* (DFS).	Cross-sectional.	This study found no statistically significant difference in the level of dental anxiety between different groups of parents. More importantly, gender was also not found to have a significant influence on the level of parental dental anxiety, challenging the traditional belief that women are more dentally anxious.

4. Discussion

In-depth analysis of the nine studies selected in this scoping review provides strong evidence supporting the main hypothesis: maternal dental anxiety (MDA) significantly shapes health behaviors and directly impacts the oral health status of preschool-aged children. This discussion will comprehensively detail the phenomenon of anxiety transmission, dissect the mechanisms of maternal behavior through the Health Belief Model (HBM) framework, and highlight the tangible clinical implications of this relationship.

4.1. The Core Phenomenon: Intergenerational Transmission of Anxiety

The foundation of this entire issue is the transmission of anxiety from mother to child, a phenomenon that has been consistently validated across various research contexts. The study by Busato et al. (2017) quantitatively confirms how strong this relationship is. In their research on 40 mother-child pairs in Brazil, it was found that maternal anxiety had a massive influence of 81.3% on the anxiety shown by the child while in the dental clinic. This figure provides a concrete picture of the magnitude of the mother's psychological impact on her child. This finding is not an anomaly. A more recent and larger-scale study by Turgut et al. (2024) on 305 mother-child pairs in Turkey also reached a similar conclusion. They not only confirmed a significant positive correlation between maternal and child anxiety but also found a direct clinical impact in the form of higher DMFT (tooth decay) scores in children of anxious mothers.

Providing a different dimension, Bagchi et al. (2017) presented physiological evidence of this phenomenon. By measuring blood pressure and heart rate, they objectively showed that the stress response patterns of mother and child run in parallel. Both showed the highest levels of anxiety on the first dental visit, which then gradually decreased in subsequent non-traumatic visits. This proves the existence of a learning and adaptation process, where positive experiences can reduce anxiety for both.

Traditionally, research has often focused on the role of the mother. However, Ratson et al., (2016) provide an important nuance. Their study in Israel comparing parents from various social backgrounds found no significant difference in dental anxiety levels between fathers and mothers. This finding challenges the old assumption and underscores that the father's role in this cycle of anxiety transmission is likely just as important and should not be overlooked in research or clinical interventions. Collectively, these four studies with diverse methodologies (questionnaires, physiological measurements) and in different populations (Brazil, Turkey, India, Israel) convincingly establish that the transmission of anxiety from parent to child is a real, measurable, and significant phenomenon.

4.2. The Analytical Framework: Dissecting Maternal Behavior with the Health Belief Model (HBM)

If anxiety transmission is the problem, then the Health Belief Model (HBM) is the tool for analyzing "why" and "how" this problem manifests in behavior. As an entry point, the literature review by Tiffany Adistyana Krishna Santi & Nabilla Pramadhani Kurniawan (2023) identifies the HBM as a highly relevant framework for explaining maternal behavior during periods of high health threat (the COVID-19 pandemic). Their review specifically highlights that perceived susceptibility and perceived severity are the most dominant HBM components in triggering maternal dental anxiety. A more in-depth analysis of the HBM constructs is presented by Xiang et al. (2020).

Through a sophisticated path analysis on adolescents in Hong Kong, they validated the previous finding: perceived susceptibility and severity are indeed direct predictors of the feeling of anxiety itself. However, more importantly, their study separated emotion from action. It was found that the strongest predictors for positive oral health behavior were not threat perception, but rather perceived barriers and self-efficacy. This is a crucial distinction: a mother may be well aware of her child's risk of dental disease, but her behavior is more determined by her belief in her ability to overcome her barriers.

In the Indonesian context, the study by Pratiwi et al. (2023) on pregnant women reinforces this finding. They found that the most significant factors related to a mother's behavior in reducing her anxiety were perceived barriers and self-efficacy. The perceived barriers were not only psychological but also economic, such as the inability to pay for professional help. Conversely, high self-efficacy empowered mothers to take positive action.

The ultimate proof of the HBM's power as an interventional model comes from the Randomized Controlled Trial (RCT) conducted by Salehnezhad et al. (2022). This study experimentally proved that the HBM is not just an explanatory model, but also a model for change. Their educational intervention, systematically designed to target all HBM constructs increasing perceived benefits and self-efficacy, while reducing perceived barriers was successful in significantly lowering maternal anxiety levels compared to the control group. This is causal evidence that by empowering mothers through the HBM, anxiety can be effectively managed. In short, these HBM-based studies show a clear pathway: threat

perception triggers the feeling of anxiety, but a mother's behavior is determined by the struggle between her perceived barriers (especially her own anxiety) and her self-efficacy (her belief that she can overcome that anxiety).

4.3. Clinical Implications: The Vicious Cycle and its Impact on Oral Health

The avoidance behavior explained by the HBM has real and detrimental clinical consequences for the child. The study by Goyal et al. (2019) in India clearly illustrates this impact. They found a direct relationship between the level of maternal anxiety and the manifestation of disease in the child. Specifically, children of mothers classified as "phobic" (the highest level of anxiety) had the highest mean dmft (tooth decay) and Modified Gingival Index (gingivitis) scores compared to other groups. This is undeniable clinical evidence that the mother's psychological state impacts the child's pathological condition. This finding is reinforced by Turgut et al. (2024), who also found a positive relationship between maternal anxiety and children's DMFT scores. The consistency of findings across different populations (India and Turkey) shows that this is a universal pattern.

These clinical findings perfectly support the "vicious cycle" model of dental anxiety described by Armfield et al. (2007). The cycle works as follows: the mother's anxiety leads to the postponement of preventive care; this postponement allows caries to develop and become more severe, causing pain; the eventual dental visit is then done under emergency conditions requiring more invasive and frightening treatment; this experience then reinforces the initial anxiety in the mother and instills trauma in the child, who will start their own cycle in the next generation.

In conclusion, this comprehensive review confirms that addressing the preschool child's dental health requires a two-generation approach. The focus cannot be solely on the child; it must also actively address the anxiety of their parents. Interventions proven to be effective, such as those based on the Health Belief Model, should become standard practice in pediatric dentistry to break the cycle of anxiety and improve long-term oral health outcomes.

5. Conclusion

Based on a scoping review of nine relevant studies, it can be concluded that maternal dental anxiety has a significant relationship and a direct impact on the behavior of mothers in bringing their preschool-aged children to the dentist, as well as on the child's overall oral health status. This relationship is manifested through several key mechanisms.

- Anxiety Transmission: There is strong evidence of intergenerational anxiety transmission, where the level of anxiety in the mother consistently correlates positively with and influences the level of anxiety experienced by her child in the dental environment.
- Behavioral Mechanism (HBM): The Health Belief Model (HBM) framework effectively explains why this phenomenon occurs. Although a mother may have a high perception of the susceptibility and severity of her child's dental disease, her own anxiety functions as a dominant psychological barrier. This barrier often overrides the intention to engage in healthy behavior, leading to postponement or avoidance of care.
- Clinical Impact: This avoidance behavior is not just a psychological issue but has real and measurable clinical consequences. Studies consistently show that children of mothers with high dental anxiety exhibit higher rates of caries (dmft/DMFT) and higher levels of gingivitis.

Therefore, the findings of this review highlight an important implication: interventions to improve children's dental health will not be optimal if they focus only on the child. A two-generation approach is needed that actively involves and addresses the psychological condition of the parents. Educational programs designed based on the HBM, which aim to reduce psychological barriers and increase maternal self-efficacy, show great potential in breaking this "vicious cycle" of anxiety. Such strategies should be a primary consideration in the clinical practice of pediatric dentistry as well as in the design of broader public health programs.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Alhareky M, Nazir MA, Alghamdi L, Alkadi M, Albeajan N, Alhossan M, et al. Relationship between maternal dental anxiety and children's dental caries in the eastern province of saudi arabia. *Clinical, Cosmetic and Investigational Dentistry*. 2021;13:187–94.

[2] Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: exploring the interplay between oral health, service utilization and dental fear. *BMC Oral Health*. 2007;7(1):1.

[3] Bagchi A, Lahiri B, Jalaluddin M, Kumar G, Das S, Dhull KS. Quantification and measurement of changes in anxiety level in preschool children and their mothers through multiple-visit dental treatment. *Journal of International Society of Preventive & Community Dentistry*. 2017;7(3):125-30.

[4] Bandura A. Social foundations of thought and action: A social cognitive theory. Englewood Cliffs: Prentice Hall; 1986.

[5] Besiroglu-Turgut E, Kayaalti-Yuksek S, Bulut M. Evaluation of the relationship between dental anxiety and oral health status of mothers and their children. *BMC Oral Health*. 2024;24(1):749.

[6] Busato P, Garbin RR, Santos CN, Paranhos LR, Rigo L. Influence of maternal anxiety on child anxiety during dental care: cross-sectional study. *Sao Paulo Medical Journal*. 2017;135(2):116-22.

[7] Esa R, Jamaludin M, Yusof ZYM. Impact of maternal and child dental anxiety on oral health-related quality of life of 5-6-year-old preschool children. *Health and Quality of Life Outcomes*. 2020;18(1):1–11.

[8] Goyal J, Menon I, Singh RP, Sharma A, Passi D, Bhagia P. Association between maternal dental anxiety and its effect on the oral health status of their child: An institutional cross sectional study. *Journal of Family Medicine and Primary Care*. 2019;8(2):535-8.

[9] Pratiwi IN, Pradanie R, Setyawati N, Ramoo V. Factors associated with behavior of reducing anxiety in pregnant women during COVID-19 pandemic. *Journal of Public Health and Emergency*. 2023;7:18.

[10] Ratson T, Blumer S, Peretz B. Dental Anxiety of Parents in an Israeli Kibbutz Population and their Prediction of their Children's Behavior in the Dental Office. *The Journal of Clinical Pediatric Dentistry*. 2016;40(4):306-11.

[11] Salehnezhad A, Zendetalab H, Naser S, Voshni HB, Abrishami M, Astaneh MA, et al. The effect of education based on the health belief model in improving anxiety among mothers of infants with retinopathy of prematurity. *Journal of Education and Health Promotion*. 2022;11:424.

[12] Santi TAK, Kurniawan NP. The influence of mother's belief on determining dental visit in pandemic covid-19: Literature review. *World Journal of Advanced Research and Reviews*. 2023;20(02):834-43.

[13] Xiang B, Wong HM, Perfecto AP, McGrath CPJ. Modelling health belief predictors of oral health and dental anxiety among adolescents based on the Health Belief Model: a cross-sectional study. *BMC Public Health*. 2020;20(1):1755.