RESEARCH

Development and psychometric evaluation of a theory of planned behavior model-based instrument for evaluation of determinants of oral health behaviors in mothers of children younger than six years in Iraq

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Abstract

Background The theory of planned behavior (TPB) is one of the most commonly used theories to explain oral health behaviors. To gain a deeper understanding of the determinants of oral health behaviors, we aimed to design and evaluate the psychometrics of a theory of planned behavior model-based instrument for assessing the determinants of oral health behaviors in mothers of children younger than six years in Iraq.

Methods Questionnaires and guidelines related to the topic were searched in 2023, and the appropriate items based on the domains of the TPB model were extracted. The items were revised and completed to develop the initial version of the instruments. Face validity and content validity of the instrument were assessed. The content validity index (CVI) and content validity ratio (CVR) were calculated subsequently. The construct validity was examined by confirmatory factor analysis (CFA). Cronbach's alpha, intra-class correlation coefficient (ICC), and percentage of agreement were employed to check the tool's internal consistency and reproducibility reliability. The data were analyzed using SPSS version 25 and Amos software.

Results The questionnaire had adequate content validity (CVR ≥ 0.75, CVI ≥ 0.75). The percentage of agreement, Kappa, and ICC coefficients were 57.1–95.3%, 0.52–0.89, and 0.43–0.90, respectively. The p-value for ICC was significant in all cases ($p < 0.001$).

For the internal stability of the tool to keep Cronbach's alpha values > 0.7 for all domains, we had to omit three questions from attitude, one from subjective norms, and one from perceived behavioral control. In terms of construct validity, the results were as follows: the Goodness of Fit Index (GFI) was 0.942, the Comparative Fit Index (CFI) was 0.900, the Adjusted Goodness of Fit Index (AGFI) was 0.921, and the Root Mean Square Error of Approximation (RMSEA) was 0.046. These values indicate that the instrument demonstrates appropriate construct validity based on the TPB.

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Conclusion The psychometric evaluation of the designed instrument showed that it was a valid and reliable tool in Arabic-speaking countries for determining child-related oral health behaviors in mothers of children under six years old.

Keywords Theory of planned behavior, Psychometric properties, Oral health, Children

Introduction

Dental caries is the most common oral health issue influencing children globally. It can result in discomfort, tooth pain, tooth loss, and difficulties in eating [1, 2]. Early childhood caries (ECC) are any caries that occur in children under 72 months [3].

Due to its prevalence and impact, ECC have nearly become a public health issue in many countries. In 2020, Mohsen Kazeminia et al. conducted a meta-analysis reviewing 81 studies investigating the prevalence of dental caries in primary teeth between 1995 and 2019. They concluded that the prevalence of dental caries in primary teeth in children worldwide, with a sample size of 80,405, was 46.2% [4].

The available data on the caries experience of children under six years old in Iraq is limited, and the findings indicate an alarming situation. A study conducted by Al-Abbasi focused on kindergarten children aged four to five years in the Al-Basrah Governorate indicated that the prevalence of dental caries among the children was 80.8%. The average score for missing, decayed, and filled teeth (dmft) was five for girls and six for boys [5]. In another study in Iraq, among 946 kindergarten children, the dmft score was 4.1 ± 4.0 for girls and 4.8 ± 4.1 for boys [6]. Dental caries in early childhood can predict future caries that affect children's functions, body growth, and development by interfering with comfort, nutrition, preschool participation, and delayed language development in children and imposing a financial burden on their families [7].

The main determinants of dental caries include factors associated with oral hygiene, family background, child characteristics, eating habits, and infant feeding [8]. An article by Yu et al. (2024) pinpointed the role of high sugar consumption in the development of ECC as a significant risk factor related to the microbial etiology of ECC, emphasizing the well-established important role of dietary habits in the etiopathogenesis of ECC [9].

On the other hand, behaviors such as service utilization have been mentioned to be of high value in children's oral health. A review article emphasized the importance of dental visits for children's health and recommended that children have their first dental visit when their first tooth erupts or by the age of one [10]. The frequency of tooth brushing has also been declared as another behavioral risk factor in children [11].

Although oral health is essential, preschool children's oral health practice is unsatisfactory. One study demonstrated that 61% of preschool children do not brush their teeth [12]. Parents, particularly mothers, play a key role in children's oral health behaviors. Previous studies have shown that the reason for the failure to prevent ECC is that the effect of dental cleaning as a preventive factor is not sufficient. This may be due to parents' lack of awareness, inadequate brushing, or their children's uncooperative behavior, as they might resist opening their mouths [13].

Health behavior theories can assist in identifying the fundamental factors that influence oral health-related behaviors. Numerous theories explain human behavior, with one frequently applied in oral health being the theory of planned behavior (TPB) [14]. Unlike other behavioral theories, TPB is a versatile approach that includes various factors, enhancing the explained variance and enabling its application in different contexts. The TPB outlines the key components of healthy behavior, including intention, subjective norm, attitude, and perceived behavioral control [15].

Based on the TPB, individuals' behavior is influenced by their intentions. The attitude to the perceived behavioral control behavior and subjective norm shapes this intention. Attitude refers to the beliefs regarding the positive or negative outcomes of the behavior. Subjective norm pertains to an individual's perceptions of what others (such as family, primary care providers, and dentists) think about the specific behavior the individual should adopt. Perceived behavioral control reflects the extent to which an individual believes the behavior is within their control [16].

Encouraging healthy oral health behaviors in children is strongly recommended, and a deeper understanding of the key factors influencing these behaviors is essential for developing effective programs. Only a few theory-based studies have explored the determinants of children's oral health behaviors [15–17]. In Iraq, despite the poor oral health of the children and high rates of ECC, studies on determinants of oral health behaviors leading to ECC are rare. To gain a deeper understanding of the determinants of oral health behaviors, we aimed to design and validate a survey tool based on TPB to work on underlying factors leading to child-related oral health behaviors of Mothers in Iraq. The developed questionnaire can effectively

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support evidence-based interventions and behavioral strategies targeted at this susceptible population.

Methods

The tool development study's topic-based review, item pool, and content validity were conducted in Tehran, Iran. In contrast, the face and construct validity data were performed in Baghdad and Wasit, Iraq. The questionnaire was developed based on a literature review and Ajzen's TPB questionnaire concepts, including four primary constructs of behavior intention, subjective norm, attitude, and perceived behavioral control [15, 17–19].

We considered the TPB instrument and its domains as the main framework of our new instrument. Then, topic-related questionnaires were searched and examined individually to collect appropriate items (item pool). The selected items were reviewed by two experts independently. If necessary, questions were added or deleted. Based on the TPB model, they were placed in four dimensions and one output variable, namely mothers' behavior regarding oral health care of the children (Table 1).

The scale was translated from English into Arabic using the forward–backward (round-trip) translation [20] by two independent translators who were experts in this field. It included 42 closed-ended questions designed to assess the impact of the constructs of the TPB on subjects' intentions to enhance their oral health behaviors, organized into the following six sections:

Part 1: attitude

This section included eight items on how participants felt regarding doing certain oral health behaviors (Having healthy baby teeth is beneficial for the baby's growth and general health, Brushing a child's teeth is important for his health, It is important to me that my child has healthy teeth, I must take my child for a routine dental check-up, It is good for my child to brush his teeth daily, Reducing sugary foods is ideal for my child, It is suitable for my child to have a routine dental exam, I need to reduce my child's sugar intake).

Part 2: subjective norms

Six items for each behavior were designed to assess subjective norms (I take my child to the dentist routinely for a check-up, I brush my child's teeth daily, I limit the consumption of sweet and sugary foods for my child, I brush my child's teeth every day, I reduce the consumption of sweet and sugary food for my child). Answers were assessed on a five-point Likert scale from (0) totally disagree to (4) totally agree.

Part 3: perceived behavior control

Nine items were designated to assess perceived behavior control for each behavior (It's easy for me to brush my child's teeth daily, I am confident that I can brush my child's teeth every day, despite too much work, impatience, forgetfulness, etc., I can brush my child's teeth every day if I wish, it is easy for me to reduce my child's consumption of milk and sugar products, In spite of too much work, impatience, forgetfulness, etc., I can reduce the consumption of dairy products and sugar in my child, It is easy for me to take my child to the dentist for a routine check-up, I am confident that I can take my child to the dentist for a routine check-up, despite a lot of work, impatience, forgetfulness, etc., I can routinely take my child to the dentist for a checkup.

Table 1 Major topics and sub-topics to be included in the questionnaire from the primary version to the final questionnaire

Major topics	Sub-topics	Items (n) in the primary questionnaire	Items (n) in the final questionnaire
Attitudes toward oral health	1. The child's healthy teeth 2. Sugar intake 3. Routine dental check-up	8	5
Oral health behavior in children	1. Oral hygiene (start, supervision, frequency) 2. Dental visit 3. Sugar intake	7	7
Behavior intention (Try/Plan)	1. Oral hygiene 2. Sugar intake 3. Dental visit	6	6
Perceived behavior control (convenience/ having confidence/ in spite of works	1. Oral hygiene 2. Sugar intake 3. Dental visit	9	8
Subjective norms (agree/expect)	1. Oral hygiene 2. Dental visit 3. Sugar intake	6	5

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Part 4: behavior intention

This section assessed the intent to (try to), and three questions were designed for this section. They included (brushing my child's teeth two times a day, taking my child for a dental checkup, limit my child's consumption of sweet snacks and I have planned to brush my child's teeth two times a day, limit my child's consumption of sweet snacks, take my child for a dental checkup).

Part 5: mothers' behavior regarding their children's oral health

This part had seven questions that evaluated how often the child's teeth were brushed. The questions were: How do you brush the child's teeth? Do you rinse your child's mouth with water after eating sweets? How many times a day does your child use sweet snacks or sweet drinks (hot or cold)? Do you use fluoridated toothpaste when brushing your child's teeth? When was the child's first dental visit? How often do you take your child to the dentist?

Part 6: Demographic data

This section included the age of mother and child, child gender, marital status of the mother (married, single, divorced), and parents' education (Academic/ Nonacademic) based on previous studies' common demographic acquirements [15, 17–19].

Response alternative

The mothers' behavior regarding the oral health of their children was evaluated via five questions: one about the child's tooth brushing frequency (from 0 = irregular or never to 3 = once a day or more than once a day)) and the child's tooth brushing frequency aided by the parent (a 3-point scale from 0 = never to 3 = always), the child's previous and first dental visit, and the last frequency of sugar snack.

The answers to all TPB construct items were measured on a four-point scale from zero (totally disagree) to four (totally agree).

Content and face validity

Eight experts were consulted to ensure the questionnaires were simple, relevant, clear, and necessary. The expert panel included five community oral health specialists, one preventive dentistry specialist, and two pediatric dentists, comprising six Iranian and two Iraqi dentists. They evaluated the questionnaire for grammatical accuracy and the organization of items within the constructs. The average age of the expert panel was 40 years, with each member having at least five years of academic experience, and 50% of the panelists were female. Items with a content validation ratio (CVR) below 0.75 were revised, while the threshold for retaining items based on the content validity index (CVI) was set at 0.75 for the eight experts. The S-CVR and S-CVI were also calculated as the mean value of I-CVRs and I-CVIs for each construct and the questionnaire [20].

Face validity was qualitatively evaluated, and 20 mothers were interviewed using the questionnaire. They discussed the questionnaire items for clarity, vagueness, and difficulty understanding their meaning in their language [21].

Construct validity

Confirmatory factor analysis was used to show how many items to measure a construct were correctly selected. In confirmatory factor analysis, we ensured the existence of a regular factor structure [22].

The cross-sectional part of the study was conducted from April 2023 to December 2023 in Baghdad, the capital of Iraq, and Kut-Wasit Governorate. The sample included 926 mothers with children under six referred to randomly selected mother and child clinics. This encompassed 14 health centers in Baghdad (eight urban and six rural) and nine health centers in Kut-Wasit (five urban and four rural). Data were collected using a self-administered questionnaire distributed to residents of a capital city, a town, and rural areas of Iraq. For the confirmatory factor analysis, 20 individuals were evaluated for each item on the tool, resulting in a total of 926 participants examined for this purpose [22].

The inclusion criteria were Iraqi nationality, children aged 12 to 71 months at the time of data collection, parents' ability to understand the questionnaire, and parents' willingness to sign the informed consent letter. The exclusion criteria were: children with non-Iraqi nationalities, children in early mixed dentition, children who had any erupting permanent teeth such as the first permanent molar, children whose parents failed to attend the day of the interview, children with major debilitating illnesses or disabilities, the presence of a significant health issue or a primary systemic disease.

Reliability of the study tool

We used the test–retest method to check the questionnaire's reliability in terms of stability over time. For this purpose, the mothers were asked to complete the scale twice at two weeks. To calculate the reliability of the total score of the questionnaire, the intra-class correlation coefficient (ICC) and to evaluate the reliability of each item, the percentage of agreement was calculated so that coefficients smaller than 0.4, coefficients from 0.4 to 0.75 and coefficients > 0.75 had poor, good and excellent reproducibility, respectively [23].

Cronbach's alpha was calculated to measure internal agreement. This represents the appropriateness of

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a group of items that measure a construct. When alpha was equal to 0.7 or more, the items remained in the instrument.

Statistical analysis

Data were analyzed using SPSS 25 and Amos software. The reliability of the tool was assessed through several methods. First, we checked the stability of the questions over time using the test–retest method. Next, we evaluated the reliability of the total questionnaire score by calculating the intra-class correlation coefficient (ICC). Additionally, we measured the reliability of individual items by determining the percentage of agreement. Finally, we assessed internal validity using Cronbach's alpha coefficient. The construct validity was checked using confirmatory factor analysis (CFA). As CFA concentrates on individual variables (Likert scale) rather than latent variables (continuous scale), a normality test was not carried out. The following parameters evaluated the fit of various CFA models to indicate a good fit [22]: root mean square error approximation (RMSEA) < 0.05, comparative fit index (CFI) ≥ 0.90, goodness of fit index (GFI) ≥ 0.90, and adjusted goodness of fit index (AGFI) ≥ 0.5. The CMIN/DF < 3 was considered good. Regarding the RMSEA index, values less than 0.10 for this index indicated an acceptable fit of the model with the data [22]. The parameters were decided to be comparable according to the common indices used by previous studies [18–23]. According to the large sample size, the results of $\chi 2$ statistic for models were not considered.

Results

Background characteristics

The average age of the expert panel was 40 (SD = 5). Each member had at least five years of academic experience, and 50% of the panelists were female.

The total number of questionnaires received was 926. Of the children, most were female, 59.5% (551), and the mean age of the children was 3.98 years (SD = 0.93). The mean age of the mothers was 30.0 years (SD = 5.2), and 19.3% had a university education.

CVR and CVI

In the primary draft, CVR for Attitude towards oral health was under 0.75 in one of the attitude questions and three of perceived behavior control. For behavior intention and subjective norms, all items were in acceptable value. Regarding CVI, all items had the minimum acceptable values (Table 2).

In the second version (after applying experts' comments) of CVR, all items related to attitude, oral health behavior in children, behavior intention, perceived

behavior control, and subjective norms had acceptable values (Table 2). The CVI-S and CVR-S values were 0.98 and 0.91, respectively.

Confirmatory factor analysis

In terms of construct validity, the following indices were estimated: GFI was 0.942, CFI was 0.900, AGFI was 0.921, and RMSEA was 0.046. These results indicate that the instrument based on the TPB demonstrates appropriate construct validity. Additionally, the CMIN/DF ratio was 2.956, which is considered good since it is below the threshold of 3. Regarding the RMSEA index, values less than 0.05 show the model's good fit [22]. Regarding the CFI and GFI indices, values above 0.9 and AGFI values above 0.5 indicate the appropriate and desirable model fit. The items and different domains of the instrument in AMOS software are demonstrated in Fig. 1.

Reliability

To check the reliability of each item, the percentage of agreement, the Kappa coefficient of the questions, the ICC coefficient, and the *p*-value of the ICC index were calculated following a test–retest of the questionnaire with 20 mother and child pairs not included in the primary sample. The percentage of agreement, the Kappa coefficient, and the ICC coefficient were in the range of 57.1–95.3%, 0.52–0.89, and 0.43–0.90, respectively. The *p*-value for ICC was significant in all cases ($p < 0.001$).

To maintain the tool's internal stability and keep Cronbach's alpha values > 0.7 for all domains, we had to omit three questions on attitude, one on subjective norms and one on perceived behavioral control.

The English version of the final questionnaire exists in Supplementary file 1-Quastionnaire.

Discussion

The Theory of Planned Behavior (TPB) is a social cognitive theory that effectively connects beliefs to behavior, making it relevant in various fields, including health-related research. TPB identifies three types of beliefs that influence an individual's intention to perform a specific behavior. Furthermore, TPB suggests that a person's behavior is primarily driven by their behavioral intention, which is influenced by three components: attitude, perceived behavioral control, and subjective norms. This study was conducted to design and evaluate a psychometric instrument based on the theory of planned behavior, which aims to assess the determinants of oral health behaviors among mothers of children under six years old in Iraq. According to the findings, the designed instrument based on the TPB model had a face, content, and construct validity appropriate for use in Arabic-speaking societies. To check the content validity, eight experts

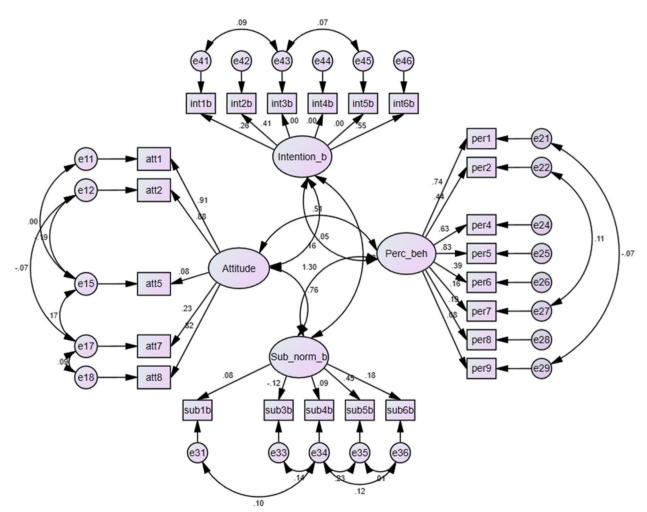Al-Sarray *et al. BMC Oral Health*   (2025) 25:181

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Table 2 Content validity of the questionnaire by CVR and CVI values

Items	I-CVI			I-CVR primary	I-CVR final
	Simplicity	**Relevance**	**Clarity**	**Necessity**	
Attitudes towards oral health					
1 Having healthy teeth is beneficial for the baby's growth and general health	1	1	1	1	1
2 Brushing a child's teeth is important for his health	1	1	1	1	1
3 It is important to me that my child has healthy teeth	1	1	1	1	1
4 It is important for me to take my child for a routine dental check-up	1	1	1	1	1
5 It is good for my child to brush his teeth daily	1	1	1	1	1
6 Reducing sugary foods is good for my child	1	1	1	0.750	0.750
7 It is good for my child to have a routine dental exam	1	1	1	1	1
8 It is important to reduce my child's sugar intake	1	1	1	0.500	1
Scale measures	**1**			**0.960**	
Oral health behavior in children					
1 Who brushes the child's teeth?	1	1	1	0.750	0.750
2 How often are the child's teeth brushed?	1	1	1	0.750	0.750
3 Do you rinse your child's mouth with water after eating sweets?	1	1	1	1	1
4 How many times a day does your child use sweet snacks or sweet drinks?	1	1	0.875	1	1
5 Do you use fluoridated toothpaste when brushing your child's teeth?	1	1	0.875	1	1
6 When was the child's first dental visit?	1	1	1	1	1
7 When do you take your child to the dentist?	1	1	1	1	1
Scale measures	**0.980**			**0.920**	
Behavior intention					
1 I brush my child's teeth twice a day (try)	1	1	1	1	1
2 I take my child for a dental check-up (try)	1	1	1	1	1
3 I reduce my child's consumption of sweet snacks (try)	1	1	1	1	1
4 I brush my child's teeth twice a day (I have)	1	1	1	1	1
5 I limit my child's consumption of sweet snacks (I have)	1	1	1	1	1
6 I take my child for a dental checkup (I have)	1	1	1	1	1
Scale measures	**1**			**1**	
Perceived behavior control					
1 It's easy for me to brush my child's teeth every day	1	1	1	0.750	0.750
2 I am confident that I can brush my child's teeth every day	0.875	1	1	0.500	0.750
3 In spite of too much work, impatience, forgetfulness, etc., I can brush my child's teeth every day	0.875	0.875	1	0.750	0.750
4 If I want, it is easy for me to reduce my child's consumption of milk and sugar products	0.875	1	0.875	0.750	0.750
5 I am sure that I can reduce my child's consumption of milk and sugary products	0.875	1	1	0.5	1
6 In spite of too much work, impatience, forgetfulness, etc., I can reduce my child's consumption of sweet and sugary food	0.750	1	0.750	0.750	0.750
7 It is easy for me to take my child to the dentist for a routine check-up	1	1	1	0.750	0.750
8 I am confident that I can take my child to the dentist for a routine check-up	0.875	1	1	0.250	1
9 In spite of work pressure, impatience, forgetfulness, etc., I can routinely take my child to the dentist for a check-up	0.875	1	1	0.750	0.750
Scale measures	**0.940**			**0.800**	
Subjective Norms					
1 Brush my child's teeth every day (Most people important to me agree/confirm)	1	1	1	1	1
2 Reduce my child's consumption of sweet and sugary foods (Most people important to me agree/confirm)	1	1	1	1	1
3 Take my child to the dentist routinely for a check-up (Most people important to me agree/confirm)	1	1	1	1	1
4 Brush my child's teeth every day (Most people important to me expect)	1	1	1	0.750	0.750

Table 2 (continued)

Items	I-CVI				I-CVR primary	I-CVR final
	Simplicity	Relevance	Clarity	Necessity		
5 Reduce the consumption of sweet and sugary items for my child (Most people important to me expect)	1	1	1	0.750		0.750
6 Routinely take my child to the dentist for a check-up (Most people important to me expect)	1	1	1	0.750		0.750
Scale measures	1			0.870		
Total scale measure	0.980			0.910		

Fig. 1 The items and domains of the instrument based on the theory of planned behavior model according to standardized coefficients on the arrows (Int: intention, Att: attitude, Per: perceived behavior control, Sub-norm: subjective norm)

were asked to express their opinions about the level of simplicity, clarity, relevancy, and necessity of the instrument items. The CVI was calculated for all items, which was above 0.75 in most cases, indicating the desirable content validity of the instrument. In general, the high content validity indices can confirm the desirability of

the tool's content validity [22]. The present instrument's CVI-S and CVR-S values were 0.98 and 0.91, compared to 0.79 and 0.87 in a previous study on the same mother and child population [15]. These values were as high as 1.00 and 0.89 for another TPB-based instrument on the adult population [18]. Regarding internal stability, our

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Cronbach's alpha values were > 0.7 for all domains while being more than 0.75 or 0.80 in some other studies [15, 18]. Therefore, our alpha values were appropriate.

A meta-analysis by Hamilton et al. examined the behaviors of parents aimed at promoting their children's health, referred to as parent-for-child health behaviors. The study's findings supported the theory by demonstrating that intention mediates participation in parent-for-child health behaviors. Furthermore, perceived behavioral planning and control were found to directly predict behavior, with planning partially mediating the relationship between intention and behavior [24].

Previous studies in Canada, Ireland, Romania, Saudi Arabia, and Iran [15, 25–28] have reported acceptable fit indices for TPB instruments and that constructs from the TPB model may be predictors of parents' intentions to improve oral health behaviors. They concluded that the ideal way to improve behaviors is to change attitudes, enhance perceived behavior control, and emphasize the positive influence of close relationships. Also, following these strategies can improve adherence to the recommended practices and could be a helpful framework for designing oral health promotion and intervention programs.

TPB also demonstrated acceptable psychometric properties in oral health professionals. The results indicated that the TPB questionnaire used in this study had desirable validity and reliability for evaluating Indonesian dentists' perceived behavior control, subjective norm, attitude, and intention in delivering preventive care for preschool children [29].

All three indices indicated the questionnaire's reliability was acceptable. Moreover, the internal stability of the tool was checked and confirmed based on the estimation of Cronbach's alpha values.

TPB has been used in fields other than oral health and has demonstrated favorable validity. Guraya et al. [30] constructed and conducted expert validation of a modified TPB scale to evaluate alterations in professional behaviors in medical students. It was concluded that the TPB-based tool designed to assess professional education demonstrated favorable and measurable content validity. TPB has also applications in professional education [30]. Mirzaei et al. reported that the designed TPB tool was a valid and reliable scale to find the intention determinants to quit waterpipe smoking among Iranian rural adults [31]. However, there are certain limitations in the compilation of this TPB-based questionnaire. This framework is a standard model based on the assumption that model constructs alone can induce behavioral change while at the same time, mothers' behavior could be affected by other situations. The present study's strengths include using the standard design method and validating a model-based questionnaire and appropriate sample size. The cluster random sampling from a capital, a town, suburb, and rural areas leads to a representative sample of the target population. The final content of the items can also be applied in other populations such as school age, adolescents and young adults following validation process.

Conclusion

The Arabic version of the theory of planned behavior model-based instrument for evaluating determinants of oral health behaviors in mothers of children under 6 years of age was valid and reliable. It can be used to determine the mothers' intention to adopt oral health behaviors regarding their children's health in Arabic-speaking countries.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12903-025-05566-6.

Supplementary Material 1.

Declarations

Ethics approval and consent to participate
The study was carried out in compliance with the Helsinki Declaration The research protocol was approved by the Research Ethics Committee of Tehran University of Medical Sciences (TUMS.DENTISTRY.REC.1401.105) and the College of Dentistry Research Ethics Committee of Mustansiriyah University (MUPEDO1.REC132).
The subjects gave informed consent before their recruitment. Participants could leave the research at any time, and their information remained confidential.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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