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REVIEW

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Understanding the psychosocial dilemma in breastfeeding: a narrative review of extended theory of planned behavior and its intervention strategies

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Abstract

Background Breastfeeding provides health benefits for both mothers and children. However, most families face challenges in initiating and maintaining breastfeeding owing to psychosocial factors. Despite the importance of these factors and their practical implications, comprehensive review research based on a robust theory in this area is lacking. This narrative review addresses this research gap by exploring the utility of the extended theory of planned behavior (ETPB) in understanding and promoting breastfeeding.

Methods A systematic search was conducted using the relevant Web of Science, Scopus, EBSCO, PubMed, and PsycINFO; 22 studies published between January 2000 and March 2023 were identified.

Results These included studies understanding the psychosocial factors of breastfeeding by introducing the ETPB framework, incorporating psychosocial factors such as affective attitude, instrumental attitude, injunctive norms, descriptive norms, perceived behavioral control, breastfeeding self-efficacy, moral norms, breastfeeding knowledge, and breastfeeding self-identity. Based on these factors, intervention strategies for breastfeeding enhancement were categorized into professional breastfeeding education, interpersonal social support, and personalized breastfeeding services.

Conclusions The 22 breastfeeding studies related to the ETPB model demonstrate its effectiveness in explaining the psychosocial factors influencing breastfeeding intention and duration. The model's application in intervention studies suggests that more diverse and proactive approaches are required to empower mothers. Future research should address societal context and cultural influences and expand interventions beyond essential information provision.

Keywords Breastfeeding, Extended theory of planned behavior, Psychosocial factors, Intervention strategies

Plain language summary

"In the quiet moments of breastfeeding, each mother battles a silent storm of personal fear and societal pressures, finding strength in the tender bond with her child." [1]

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We analyzed 22 studies using the extended theory of planned behavior to combine both theoretical and empirical insights into why mothers may find breastfeeding difficult. While breastfeeding provides great benefits to both babies and mothers, many families struggle to initiate and sustain it. Mothers and family members often face a dilemma when deciding whether to initiate, continue, or cease breastfeeding, as each option presents its own set of challenges. This dilemma is far more complex than most people think. Breastfeeding extends beyond the physical act itself, encompassing mental and social challenges that mothers often face. We found that when a mother decides to breastfeed, various factors, such as emotions, attitudes, knowledge, confidence, and societal expectations, can become obstacles in this journey. Thus, mothers who go through this dilemma urgently need support. This review identifies three key forms of support: learning more about breastfeeding, building a strong interpersonal network, and accessing tailored services. This support is essential for helping mothers overcome dilemmas and empowering them to enjoy the experience of breastfeeding. It is an act of love and should not become an unbearable burden. The present study highlights the factors influencing mothers to breastfeed and aims to provide them with the support they need. This goes beyond mere guidance; it is about cultivating a society where every mother's breastfeeding journey is embraced, respected, and empowered.

Background

Breastfeeding is a health-promoting and sustainable behavior that refers to the act of feeding babies their mothers' breast milk. Initiating and maintaining breastfeeding soon after birth benefits the health of the infant and mother as well as the mother-infant relationship [2, 3]. Breast milk contains a unique combination of nutrients and antibodies that can protect babies against infections, allergies, and chronic diseases such as asthma, obesity, and diabetes. Additionally, breastfeeding can reduce the risk of postpartum depression and breast cancer and promote weight loss in mothers [4]. The World Health Organization (WHO) has advocated breastfeeding over the last decades, recommending that mothers exclusively breastfeed their infants during the first 6 months of life and continue breastfeeding for up to two years of age [5]. However, breastfeeding rates remain low in countries or regions where formula is a standard option. For example, China reported an exclusive breastfeeding rate of only 29.2% for infants aged 0–6 months, which is well below the international average of 42% [6].

Despite being aware of the benefits of breastfeeding and intending to breastfeed, most mothers discontinue breastfeeding before completing the WHO-recommended 6 month period after childbirth [7]. This phenomenon is rarely caused by physiological factors; instead, it is often influenced by psychosocial factors [8]. Previous studies demonstrate that various psychosocial factors influence breastfeeding behavior, including individual psychological and social environmental factors [9]. Individual psychological factors include breastfeeding attitude, subjective norms, self-efficacy, moral norms, self-identity, and others. Additionally, social environmental factors such as social support and cultural norms significantly impact breastfeeding. Although these factors are significant and carry practical implications, previous empirical studies—whether observational or intervention—have only been able to confirm a limited number of factors within a single study. Comprehensive research in this area is still lacking, preventing an in-depth understanding of the breastfeeding dilemma. Therefore, it is crucial to identify a robust theoretical framework that can bridge this gap and effectively address the challenges of breastfeeding.

The breastfeeding self-efficacy theory, the theory of reasoned action, and the theory of planned behavior (TPB) are used in social psychology to study the relationship between psychosocial factors and breastfeeding [10]. The breastfeeding self-efficacy theory explores how a mother's experience, observation, and emotional state affect breastfeeding behavior [11]. This theory verifies that resources like self-efficacy and self-identity can help mothers initiate breastfeeding. The theory of reasoned action investigates the influence of attitude and subjective norms on breastfeeding behavior. To determine the effect of the control construct on breastfeeding behavior, perceived behavioral control was included to the TPB based on the theory of reasoned action [12]. The TPB can simultaneously verify how attitude, subjective norms, and perceived behavioral control affect breastfeeding intention and duration [13]. The breastfeeding self-efficacy theory emphasizes the influence of individual factors, whereas the theory of reasoned action places more emphasis on the impact of social environmental contexts. Compared with previous theories, the TPB attributes equal value to the influences of individual factors, the social environment, and control variables on breastfeeding behavior, providing a more comprehensive response to the question of how psychosocial factors affect breastfeeding behavior.

The TPB, developed by Ajzen in 1991 [14], posits that an individual's intention to perform a behavior is

influenced by attitude, subjective norms, and perceived behavioral control. These core constructs provide a universal framework for explaining various behaviors across different domains. However, the generality of TPB may limit its explanatory power for specific actions. Ajzen emphasized that when applying TPB to explain different behaviors [14, 15], it is necessary to determine the elements of the behavior based on specific behavior information, and additional factors may be included. In 1998, the theoretical description of "extended theory of planned behavior" (ETPB) was introduced by Conner and Armitage [16] in their review. They highlighted the TPB's success in predicting behavior but also identified limitations, such as incomplete consideration of influencing factors, insufficient attention to emotional components, and challenges in explaining behavior across diverse contexts. Their review examined empirical and theoretical evidence supporting the flexibility of ETPB, that is, including different additional variables into the TPB framework according to the characteristics of different behaviors.

The ETPB, based on the original TPB, enriches the theoretical framework by integrating elements beyond its primary constructs. This enhancement provides a more comprehensive understanding of the psychological mechanisms underlying specific behavior, thereby improving the accuracy of predictions regarding behavioral intentions and actions. Since the ETPB is developed according to the characteristics of different behaviors, there are no standard models or elements for the ETPB. In ETPB empirical research, researchers commonly use two methods to expand the TPB. First, dividing each core construct into two components is a primary way to integrate elements [17]. Second, researchers integrate factors based on theoretical background, features of the behavior, and previous research results [18]. Based on these methods, research across various domains has explored and refined the ETPB by incorporating constructs pertinent to specific behaviors. The ETPB is especially useful in explaining health-related behaviors, such as adopting a healthy diet, engaging in regular exercise, or adhering to medical treatment regimens [18]. In the realm of reproductive health, the ETPB has been instrumental in understanding and predicting behaviors such as contraceptive use, family planning decisions, prenatal care attendance, and breastfeeding [19].

Researchers often use the ETPB to explore the psychosocial factors that influence breastfeeding behavior, as it provides a more in-depth exploration and a nuanced understanding of breastfeeding behavior [13]. Various studies have explored different psychosocial factors [10, 20]. However, most empirical studies that used the ETPB as a framework to explore breastfeeding behavior considered only limited psychosocial factors at a time. Despite the importance of these factors and their practical implications, comprehensive research in this area is lacking. Additionally, few review studies have explored the ETPB as a theoretical framework for guiding breastfeeding-related research and informing development of interventions [21, 22]. This study investigates the psychosocial factors that can motivate and predict breastfeeding behavior and highlights intervention strategies to overcome the breastfeeding dilemma within the ETPB model.

Methods

Protocol and registration

Owing to the insufficient similarity in methods, predictors, and interventions, as well as the lack of data required to calculate effect sizes, we were unable to perform a meta-analysis. Therefore, we conducted a narrative review, also known as a traditional literature review. We employed narrative analysis to appraise and synthesize findings from multiple articles, identify research gaps, and suggest meaningful directions for future research. The study protocol is accessible through ResearchGate.[1] As this study is a narrative review, it does not involve direct human participants or data collection and thus does not require ethical approval and registration.

Search strategy

This narrative review uses the Web of Science, Scopus, EBSCO, PubMed, and PsycINFO. We included the articles published in English in peer-reviewed academic journals since 2000, as the ETPB was proposed in 1998. Studies' titles, abstracts, and keywords were searched using the following terms: (theory of planned behavior OR TPB) and (breastfeeding OR breast milk OR breastfeed), and (psychosocial factors OR psycho-social factors OR factors).

Eligibility criteria

To be included, studies had to meet the following criteria: (1) published in English in peer-reviewed academic journals between January 30, 2000, and March 30, 2023, (2) original quantitative, qualitative, or mixed-methods studies, reviews, or pre-prints, (3) focused on breastfeeding behavior, and (4) exclusively applied the TPB framework.

Study selection

Our research team removed duplicates before the initial screening and assessed the abstracts of the selected

[1] https://www.researchgate.net/publication/381961238_Study_Protocol_A_Narrative_Review_of_Psycho_Social_Factors_Influencing_Breastfeeding_under_the_Theory_of_Planned_Behavior_TPB

studies for inclusion. We excluded gray literature to ensure the quality of the selected studies and facilitate a systematic search. Any discrepancies were resolved through team discussions.

Data extraction

To systematically record and categorize the materials, members of our group collected information on the publications, such as sample demographics, methodology, participants, and conclusions. The results were evaluated to identify and eliminate discrepancies. We employed independent evaluators for data collection and used a double-blind review process to prevent bias. Additionally, we ensured that the evaluators and authors were unaware of each other's identities. We ensured transparency by recording the decisions related to the literature selection, including reasons for inclusion or exclusion.

Quality assessment and analysis

We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) extension for scoping reviews (PRISMA-ScR) checklist, a 22-item list created to provide direction on how to conduct this type of review and summarize and discuss the procedure and outcomes. Figure 1 presents the selection procedure following the PRISMA flow diagram. The quality of each study was appraised using the QualSyst checklist. This comprehensive 14-item checklist can be used to assess key elements, such as research questions, study design, subject and comparison group selection, intervention allocation, outcome definitions, and sample size [23].

Validation of intervention strategies

Based on the results and discussion materials from the 22 studies focused on various ETPB-linked psychosocial factors, the intervention strategies used or discussed in the included studies can be divided into three categories:

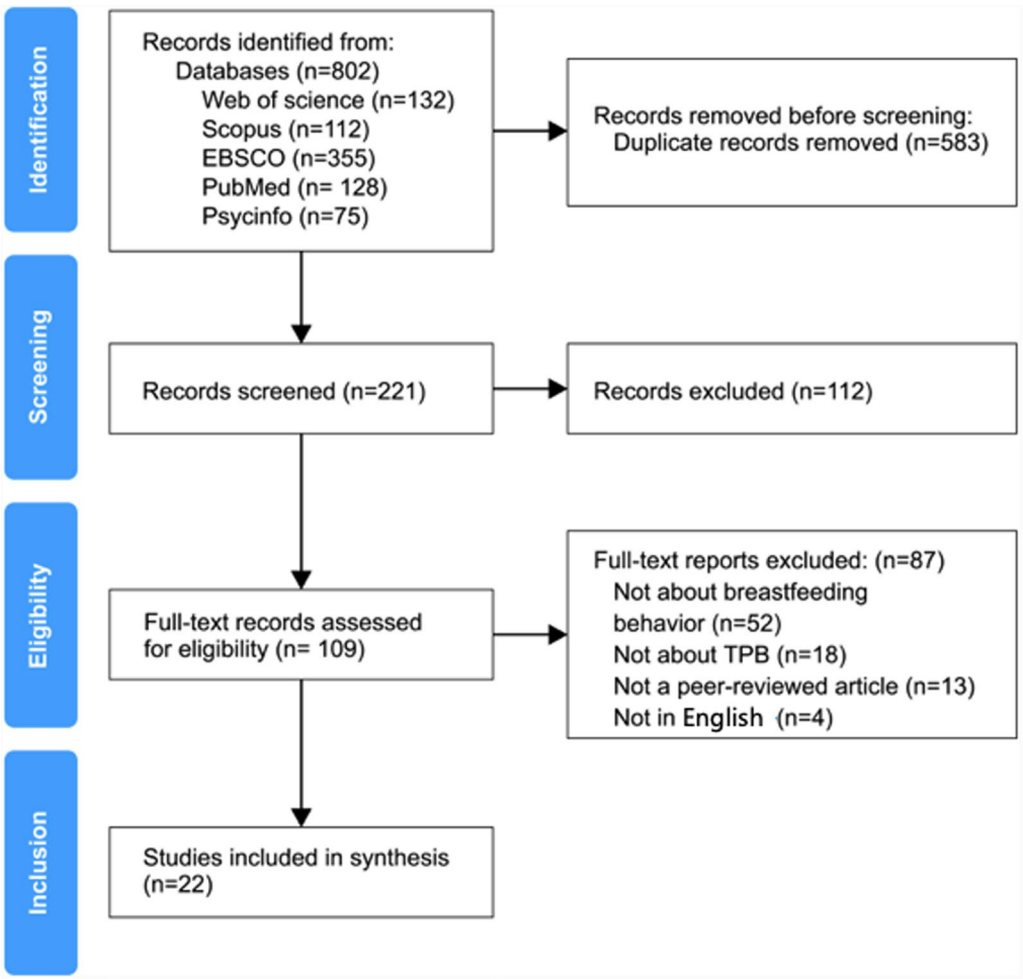

Fig. 1 Flow diagram of the search and selection process

professional breastfeeding education, interpersonal social support, and personalized breastfeeding services. These categories were validated by asking two independent experts in the field to independently review and assess the categorizations to confirm their robustness and relevance.

Results

After removing duplicates, 221 citations were identified from the electronic database searches and review article references. One hundred twelve articles were excluded based on their titles and abstracts, leaving 109 full-text articles for retrieval and eligibility evaluation. Among these articles, 87 were excluded for the following reasons: 52 studies did not specifically examine breastfeeding behavior, 18 studies did not exclusively utilize the TPB but combined it with other theoretical frameworks to explain breastfeeding behavior, 13 studies were not peer-reviewed, and four studies did not use English. The remaining 22 studies were included in the review. The main characteristics, findings, and QualSyst score of the reviewed studies are summarized in Additional file 1. Scores from the QualSyst checklist ranged from 1.21 to 1.71, indicating that all included studies have demonstrated adequate quality.

The 22 studies included in our research covered breastfeeding experiences of mothers from 10 different countries. Notably, 12 of these studies originated from middle to low-income countries in Asia, such as Iran, Malaysia, and Bangladesh. Additionally, the included studies covered a diverse range of maternal backgrounds, including adolescent mothers, those facing economic hardships, and mothers of premature infants. This diversity provided a comprehensive understanding of breastfeeding behaviors across various socio-economic and cultural contexts.

The ETPB model of breastfeeding

The TPB model was developed by Ajzen [24]. The model includes three core factors: behavioral attitudes (based on the advantages and disadvantages associated with a given behavior), subjective norms (based on the perception of the behavior by significant others), and perceived behavioral control (based on the degree of control the individual feels in carrying out the behavior) that can directly affect behavior intention [12]. Meanwhile, behavioral intention is the precursor to action, serving as a direct predictor of behavior [25]. The 22 included studies on breastfeeding found that breastfeeding intention was a significant predictor of breastfeeding duration, whereas the three core components predicted breastfeeding intention [26–29].

During the review process, we organized all variables included in the studies, excluding demographic factors. The results of this sorting are presented in Additional file 2. Among all the included studies, only six exclusively explored breastfeeding behavior using the three core factors of the TPB model, whereas the remaining 16 employed the ETPB model to investigate breastfeeding behavior.

We found for each included study that the criteria to choose additional elements for the ETPB in breastfeeding research follows a pattern similar to that of other behaviors in two ways. First, researchers typically expand the model based on behavior features, theoretical foundations, or existing research. Scrutiny of the 16 included papers revealed that researchers frequently include breastfeeding knowledge, moral norms, self-identity as independent variables, which significantly impact breastfeeding behavior. Given breastfeeding's altruistic and experiential characteristics, breastfeeding knowledge [19, 30–34], and moral norms [22, 33–36] are often incorporated as independent factors into the ETPB-based breastfeeding research. Additionally, self-identity [22, 29, 34, 36] as a key factor in breastfeeding self-efficacy theory has proven to have strong explanatory power.

Second, in addition to including new variables, nine of the included studies also found that the TPB model's three core variables can be explored by decomposing each of them into two components. For example, breastfeeding behavioral attitudes can be decomposed into affective and instrumental attitudes [19, 35, 37], breastfeeding subjective norms can be decomposed into injunctive and descriptive norms [35, 36, 38, 39], and breastfeeding perceived behavioral control can be decomposed into perceived difficulty (self-efficacy) and perceived control [19, 21, 35, 40]. Thus, the ETPB-based psychosocial factors presented in Fig. 2, supported by statistically significant findings of included studies, can effectively explain breastfeeding intention and duration.

Based on the included studies, these ETPB-based psychosocial factors significantly influence breastfeeding intention. Six studies specifically investigated pregnant mothers, while the remaining 16 studies demonstrated that psychosocial factors first affect intention and subsequently behavior. Regarding breastfeeding duration, the research primarily focused on time points of 1 month, 6 months, and 1 year, with a significant emphasis on the early postpartum stage, especially 6 months. For example, in a study of UK mothers, Bartle and Harvey reported that both breastfeeding knowledge and self-efficacy can significantly predict breastfeeding intention [21]. Lawton et al. reported that the ETPB model explained 59.1% of the variance in the intention to breastfeed and 34.7% of

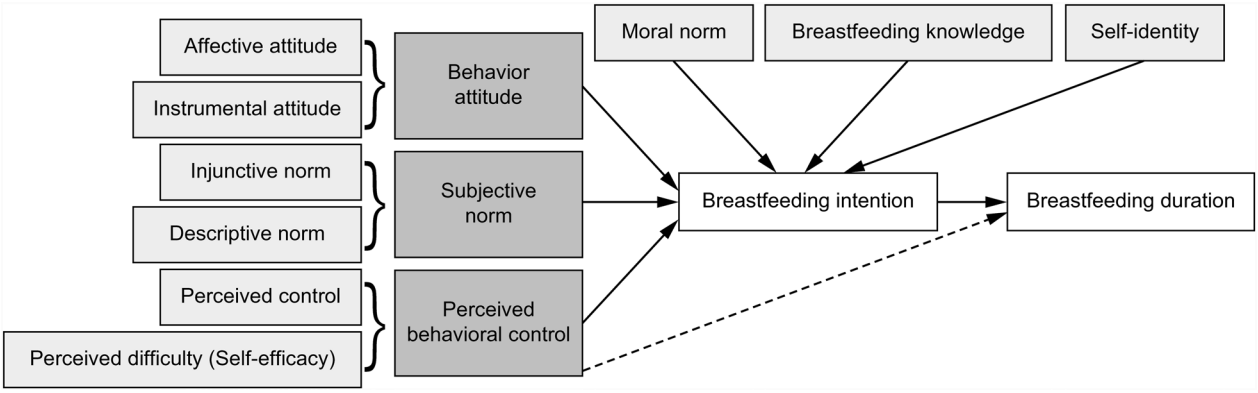

Fig. 2 Extended theory of planned behavior-based psychosocial factors that explain breastfeeding behavior

the variance in breastfeeding duration at 6 months [35] (Additional file 2).

Regarding target participants, the included studies often focused on specific characteristics, such as low socioeconomic level, exclusive breastfeeding experience, and preterm birth. The ETPB model has effectively explained different features of our target participants, as demonstrated in the following studies: six studies focused on pregnant mothers, two studies included preterm births, five studies examined women with exclusive breastfeeding experience, three studies investigated varying breastfeeding duration, and two studies included women from low socioeconomic backgrounds (Additional file 1). These 22 studies indicate that the ETPB model is applicable across a range of different target participants.

Impacts of ETPB-based psychosocial factors on breastfeeding

In this section, the findings translate the theoretical concepts of the TPB model into empirical reality, demonstrating how these concepts manifest in the breastfeeding experiences of women. By examining psychosocial factors, we highlight how these elements influence the breastfeeding intentions and behaviors of various target participants.

Behavior attitudes (including affective and instrumental attitudes)

Behavioral attitude, as the core construct of the TPB, refers to the degree of positive or negative evaluation of behavioral outcomes [25]. Affective attitude measures the emotional outcomes of breastfeeding mothers, whereas instrumental attitude is used to assess the actual benefits of breastfeeding behaviors [38].

Affective attitude toward breastfeeding determines whether the mother finds breastfeeding pleasurable and meaningful—for example, "Breastfeeding makes me happy" [38]. A positive affective attitude toward breastfeeding can allow mothers to enjoy breastfeeding, experience less depression, and increase the likelihood of independent adherence to breastfeeding [41]. The predictive power of affective attitudes in explaining breastfeeding considerably surpasses that of instrumental attitudes. Lawton et al. [35] surveyed different British ethnic groups (White British, South Asian, and other ethnic groups) and found that affective attitudes in different ethnic groups significantly predicted breastfeeding intention and duration at 6 months postpartum, whereas instrumental attitudes did not predict breastfeeding duration.

The instrumental breastfeeding attitude refers to the perception of the utility of breastfeeding, such as "I believe breastfeeding is beneficial to my child." In addition to the mother herself, the positive instrumental attitudes held by the father, paternal grandmother, or maternal grandmother can be significantly associated with the mother's breastfeeding intentions [19, 37]. However, despite positive instrumental attitudes, a lack of experience or knowledge makes breastfeeding behavior more likely to stop in the early stages. Ouyang and Nasrin found no correlation between the instrumental attitudes of fathers and the breastfeeding duration of infant mothers [19]. Rempel demonstrated that the instrumental attitudes of infants' grandmothers failed to predict a breastfeeding duration of 9 months [37].

Subjective norms (including injunctive and descriptive norms)

Subjective breastfeeding norms can be decomposed into descriptive and injunctive norms. Descriptive norms reflect an individual's subjective perception of the behaviors of people who are important to them. For example, someone might have the perception that "my mother breastfed her own babies for the first 6 months" [35, 38].

Injunctive norms, represent an individual's subjective belief about what important people think they should do, as well as their motivation to comply with these expectations. For instance, someone may express the agreement with the perception that "My mother thinks that I should breastfeed my baby for the first 6 months" [35, 38]. Additionally, subjective norms should be weighted by the motivation to comply with the significant others, like "Do I want to do what my mother wants?"[17]. In breastfeeding TPB studies, subjective norms typically pertain to injunctive norms. Consequently, the subjective norms discussed below primarily refer to injunctive norms.

The infant's paternal or maternal grandmother may influence the mother's breastfeeding behavior by asking whether breastfeeding is good for the baby. Such perceptions generate the subjective norms felt by mothers [40]. In a study of British families, Bartle and Harvey found that the duration of exclusive breastfeeding is influenced by infants' grandmothers who are not fully convinced of its benefits [21]. Several studies found that the subjective norms of hospital midwives and nurses also affect mothers, especially new mothers [42]. In an intervention study on Chinese mothers, Zhang et al. found that stronger supportive subjective norms from nurses and doctors regarding breastfeeding resulted in a higher maternal tendency to breastfeed [20]. Sampling studies of American, Chinese, and Malaysian mothers, regardless of whether they were intervention or cross-sectional studies, revealed an insignificant correlation between mothers' perception of subjective norms from midwives and breastfeeding duration [22, 31, 36].

Compared with breastfeeding attitude and perceived behavioral control, subjective norms were found to be statistically significant the fewest times in the included articles. Scholars have attempted to integrate descriptive norms into ETPB models to heighten their explanatory power; however, this has not been successful in breastfeeding behavior studies. According to the included studies, when both injunctive and descriptive norms were measured, descriptive norms could predict breastfeeding intention but not breastfeeding duration, whereas injunctive norms did not affect breastfeeding intention or duration [35, 36, 38, 39]. In a study on breastfeeding in Australian mothers, Hamilton et al. reported that the descriptive norms of the relevant group were associated with breastfeeding behavior but did not predict it [39].

Perceived behavioral control

Perceived behavioral control can be divided into perceived control and perceived difficulty [25]. Perceived control refers to the perception of an objective environment. Perceived difficulty is the perception of subjective competence and confidence in behavior performance [43]. Both self-efficacy and perceived difficulty represent an individual's capability to achieve a certain goal. In this regard, the ETPB generally uses self-efficacy instead of perceived difficulty in the model [44]. However, breastfeeding self-efficacy is an independent variable that significantly predicts breastfeeding behavior in related studies, and its explanatory power exceeds that of perceived behavioral control [21, 35, 40]. Researchers usually attach equal importance to breastfeeding self-efficacy and perceived behavioral control as independent, influential factors. Therefore, the present review explored breastfeeding self-efficacy separately. The *perceived behavioral control* discussed in the following sections refers to the mother's "perception of control" over the external world during breastfeeding.

Perceived behavioral control of breastfeeding measures how mothers perceive their level of control over breastfeeding—for example, "I am in a position to breastfeed" [35]. Perceived behavioral control directly predicts breastfeeding intention, and mothers with high scores exhibit significantly stronger feeding intentions than those with low scores [42]. Nevertheless, the explained variance of perceived behavioral control in breastfeeding duration differs across studies. Bajoulvand et al.'s study on Iranian mothers indicates that perceived behavioral control can predict breastfeeding duration [26]. However, in a study of British mothers, no significant association between breastfeeding behavior lasting 6–8 weeks postpartum and perceived behavior control scores was identified [21]. This led to conflicting results regarding the studies on perceived behavioral control of breastfeeding.

Breastfeeding self-efficacy

Dennis considered breastfeeding self-efficacy as independent of individual self-efficacy, which refers to infant mother's perceived self-competence in effectively breastfeeding their infants [45]. As illustrated by Bartle and Harvey [21], breastfeeding self-efficacy explained 47% of the variance in breastfeeding behavior in a regression model, with other ETPB factors considered as control variables. Breastfeeding self-efficacy is a substantial positive predictor of breastfeeding intention and duration [10]. Studies on breastfeeding have also found that breastfeeding self-efficacy can predict the intention to exclusively breastfeed, the success of breastfeeding in the first 2 months after delivery, and the risk of weaning [11, 35, 40].

Breastfeeding self-efficacy predicted breastfeeding behavior in different phases. Most studies on breastfeeding behavior tend to measure breastfeeding self-efficacy in the prenatal and early postnatal periods (24 h to 3 weeks postpartum) for mothers [35, 40]. Chipojola et al. reported that breastfeeding self-efficacy in the early

postnatal period is a significant predictor of breastfeeding duration because early postnatal mothers who successfully breastfeed can confirm their ability to do so, develop self-approval, and continue breastfeeding [10]. However, Galipeau et al. found that mothers with higher breastfeeding self-efficacy during prenatal care were more likely to overcome physiological breastfeeding difficulties and continue breastfeeding [46]. Although breastfeeding self-efficacy varies by stage, prenatal interventions on breastfeeding advice can help mothers feel more capable of breastfeeding after giving birth [47, 48].

Moral norms

Due to its altruistic nature, breastfeeding is subject to moral norms, which refer to individuals' perceptions of right and wrong and a sense of responsibility to perform or reject certain actions [13]. The difference between injunctive and moral norms is that the former refers to an individual's perception of external pressures to perform a behavior—for example, "My mother thinks I need to breastfeed"—while the latter refers to an individual's personal beliefs—for example, "If I don't breastfeed, I will feel guilty." Moral norms capture the internal moral compass that influences behavior, which is not fully encompassed by injunctive norms. This distinction is crucial for understanding how moral norms are driven by personal ethics rather than social expectations. The feelings of guilt or shame that may be experienced as a result of not living up to one's moral norms is a personal, internal reaction [34]. Iranian breastfeeding educational intervention studies have found that a mother's moral norms are a strong predictor of her breastfeeding intentions [33]. Moreover, Chinese breastfeeding intervention studies that inform prenatal mothers of their responsibilities and the potential consequences of not breastfeeding exhibit a significant increase in the number of breastfeeding mothers and indicate that these mothers have a greater sense of moral norms [39]. Lawton et al. suggested that moral norms are a significant predictor of breastfeeding behavior, following only behavioral attitudes [35].

Breastfeeding knowledge

Knowledge and information have significant effects on breastfeeding behaviors. The distribution of formula may undermine breastfeeding knowledge. Baby caregivers tend to exaggerate its adverse impacts by claiming "breastfeeding may spoil the mother's body shape" and "a mother with hepatitis B can't breastfeed." Breastfeeding knowledge is a significant predictor of breastfeeding intention and duration [49]. A survey in China revealed that, among factors influencing breastfeeding intention, breastfeeding knowledge was second only to behavioral attitude and exerted a considerably stronger influence than subjective norms or perceived behavioral control [20]. Mothers may access breastfeeding knowledge from a variety of sources, including relatives and friends, online information, doctors, and nurses; however, knowledge shared by midwives and nurses can affect breastfeeding the most [42]. A breastfeeding intervention study based on the ETPB demonstrated that the knowledge provided by midwives and nurses can significantly increase breastfeeding intentions [32].

Self-identity

Self-identity refers to the infant mother's subjective interpretation of what kind of mother they should be, such as "Breastfeeding is a critical part of my motherhood" [22]. Bajoulvand et al. conducted a study on Iranian mothers and reported that self-identity in breastfeeding could significantly predict breastfeeding intention, but not duration [26]. Nonetheless, a longitudinal study revealed that self-identity played a supportive role in encouraging infant mothers to adhere to breastfeeding [34].

Intervention strategies

In this narrative review covering 22 ETPB-related studies, a notable gap is apparent, with only four studies utilizing the ETPB framework for intervention research [10, 29, 32, 42]. These studies were predominantly centered on professional breastfeeding educational interventions within medical institutions. Notably, these studies (three from Iran [10, 29, 32] and one from China [42]) consistently demonstrate the significant impact of TPB-based breastfeeding interventions on improving breastfeeding attitudes, intentions, and knowledge. In the three prospective cohort studies, the experimental groups exhibited significantly higher breastfeeding knowledge and more positive attitudes and intentions compared to the control groups after the intervention [10, 29, 42]. In the single quasi-experimental study, the post-test results revealed a significant increase in breastfeeding intention following the intervention [32]. These studies uniformly illustrate the significant impact of such interventions on breastfeeding attitudes and intentions. Their approaches vary, targeting not just mothers of infants [10, 42] but also family members such as husbands [29, 32]. The remaining 18 empirical studies, while not interventionist, offer strategic interventions based on diverse ETPB-linked psychosocial factors, focusing on three main strategies: professional breastfeeding education, interpersonal social support, and personalized breastfeeding services. This classification was derived from and supported by the results and discussion sections of the included studies. To substantiate this classification, we will present detailed sentences and data from the original materials. Furthermore, the validity of this classification was

ensured through a review process involving two experts in the field.

As previously noted, earlier intervention studies have demonstrated the critical role of professional breastfeeding education, closely aligned with ETPB components such as affective attitude, instrumental attitude, and perceived control. All four intervention studies utilized professional breastfeeding education as the primary intervention method. These studies found that education can positively affect breastfeeding intention. However, only one study reported that education also has an effect on the early stage of breastfeeding (3 days–6 weeks postpartum). This educational approach is vital in equipping mothers with the necessary knowledge and confidence for successful breastfeeding. Moreover, the influence of the ETPB extends to enhancing interpersonal social support, which may help in establishing supportive norms and positively influencing attitudes and control, thereby fostering a supportive environment conducive to breastfeeding. Furthermore, personalized breastfeeding services are underscored, with a focus on addressing affective attitudes, perceived control, and self-efficacy in a manner tailored to the unique needs of individual mothers.

Professional breastfeeding education

The included intervention studies demonstrate that pregnant women and mothers of infants who received professional breastfeeding education were more likely to breastfeed successfully and continue doing so [10, 29, 32, 42]. Two of the four intervention studies included in our review involved educating the baby's father and grandmother. These studies found that educating others in the mother's environment can create a supportive atmosphere for breastfeeding [10, 29]. The remaining empirical studies proposed that the quantity and quality of professional breastfeeding education may be related to breastfeeding attitude, knowledge, and perceived behavior control [21, 28–30, 32, 33, 37].

The majority of the included studies suggest that professional breastfeeding education should focus on topics such as breastfeeding techniques, benefits of breastfeeding, management of breastfeeding problems, and ways to involve partners in breastfeeding support [34, 38, 40]. The effectiveness of professional breastfeeding education can be enhanced by using interactive teaching methods such as role-playing, group discussions, and individual counseling [38, 42]. Healthcare providers, including obstetricians, midwives, nurses, and lactation consultants, should actively provide evidence-based breastfeeding education to pregnant women and their families [31, 38]. By addressing knowledge gaps and concerns, professional breastfeeding education can empower mothers to make informed decisions about breastfeeding, increase their confidence in breastfeeding, and ultimately improve breastfeeding outcomes [31, 42].

Several studies have emphasized the importance of antenatal education in promoting successful breastfeeding outcomes. Saffari et al. found that attending breastfeeding classes during pregnancy was positively associated with exclusive breastfeeding among Iranian mothers [34]. Jeihooni et al. reported that an educational intervention program provided to pregnant women significantly improved their breastfeeding behavior [32]. Similarly, Ismail et al. indicated that attending antenatal clinics is a significant predictor of exclusive breastfeeding intention and behavior among women in Malaysia [22]. Collectively, these findings suggest that professional breastfeeding education, including antenatal education, plays a crucial role in the promotion of successful outcomes.

Interpersonal social support

Social support from various sources is crucial for breastfeeding mothers. Based on the empirical findings, the researchers identified three types of interpersonal social support: support from family, community, and healthcare professionals. Considering the ETPB framework, social support from various groups is related to instrumental attitudes, injunctive norms, and descriptive norms toward breastfeeding [11, 19, 31, 35, 36, 39, 44, 46, 50].

Family support is the most commonly relied-on form of support for breastfeeding mothers, with several studies emphasizing the significant impact of paternal support on the adoption and maintenance of breastfeeding [19, 39, 40]. For instance, research involving Bangladeshi mothers reveals that "fathers' knowledge about breastfeeding significantly shapes their supportive attitude towards exclusive breastfeeding for the mother," indicating that paternal emotional, informational, and practical support is crucial for mothers' adoption of exclusive breastfeeding [40]. Beyond familial backing, Bajoulvand et al. emphasize that "healthcare providers are advised to support primiparous women through lactation training," highlighting the pivotal role of medical support in facilitating successful breastfeeding [27]. Additionally, Jeihooni et al. point out that "a woman's community plays a role in encouraging mothers to breastfeed," suggesting that community-driven initiatives, such as guidance from health workers and lactation consultants, are instrumental in fostering breastfeeding success [34]. In clinical interventions, medical staff should establish a diverse interpersonal support network for infant mothers during the perinatal period, especially with support from fathers and community-based professionals.

Personalized breastfeeding services

According to the reviewed studies, personalized breastfeeding services, such as psychological counseling, multicultural support, and targeted physiological care, are effective interventions for preventing early weaning. From the ETPB perspective, these approaches provide personalized support tailored to the differences and needs of each breastfeeding mother, thus supporting their self-identity, affective attitude, and self-efficacy toward breastfeeding [26, 27, 35, 36, 38, 40, 42].

Studies of British, Italian, and Malaysian mothers have highlighted the significant impact of psychological well-being on breastfeeding adoption and maintenance [22, 36, 38]. These findings emphasize the importance of healthcare providers paying attention to mothers' psychological health and providing professional psychological counseling. For example, one study posits that "Breastfeeding training needs various method such as group discussion, questions and answers, and individual counselling." Moreover, multiple studies within diverse cultural settings have emphasized the importance of respecting customs and values. For instance, in certain regions of the Middle East or East Asia, there may be a preference for sons over daughters. In the discussion section of one breastfeeding study from Iran, the authors suggest "considering the role of interest in boys in similar cultures." This highlights how cultural norms and values can influence breastfeeding practices. By providing tailored support for interventions, this approach promotes culturally sensitive and effective care to improve patient outcomes [26, 27, 34]. Along these lines, personalized medical care should be provided to mothers with different characteristics, such as physiological (e.g., age, parity), sociocultural, and economic characteristics; in particular, close attention should be paid to first-time mothers and mothers of preterm infants [28, 32].

Discussion

The relevance of the 22 studies to the ETPB and breastfeeding lies in their collective contribution to understanding the psychosocial factors influencing breastfeeding initiation and continuation. These studies provide empirical support for how the ETPB shapes breastfeeding practices. The present study is a theoretical exploration that seeks to refine the ETPB model, and a narrative endeavor that delves into the real-world breastfeeding experiences of women. By elucidating these constructs, the studies validate and extend the theoretical foundations of the ETPB, addressing significant gaps in the literature and highlighting practical implications for interventions to promote breastfeeding among mothers.

Like previous studies, our work also leverages the TPB model to explore breastfeeding behavior. However, our research distinguishes itself by emphasizing the critical role of psychosocial factors, expanding upon the TPB framework, and applying a psychosocial perspective. This approach provides a unique and novel viewpoint in the analysis of breastfeeding dynamics. By incorporating additional psychosocial factors, the ETPB model offers enhanced predictive power in understanding breastfeeding behaviors compared to the traditional TPB. This model provides a holistic approach by considering both individual and social influences on breastfeeding, thereby offering a more nuanced understanding of breastfeeding. Moreover, the ETPB model informs the development of targeted intervention strategies that can be tailored to address specific psychosocial factors, leading to more effective and sustainable breastfeeding promotion efforts.

Various studies have exhibited that the ETPB effectively explains breastfeeding behavior. Among the 22 included studies, while attitude, subjective norm, perceived behavioral control, and intention are consistently addressed, breastfeeding knowledge (examined in 8 studies) and self-efficacy (explored in 5 studies) have been investigated more extensively than other determinants. However, the psychosocial factors whose explanatory powers were confirmed to be insufficient were excluded. ETPB studies on breastfeeding attitudes and perceived behavioral control adequately predicted breastfeeding behavior. In contrast, the influence of subjective norms could not be identified. In addition to the core factors, certain factors (such as breastfeeding self-efficacy) are strong predictors of breastfeeding behavior [11]. However, descriptive norms, which are supposed to play a role in breastfeeding behavior from a theoretical perspective, have been marked as contentious in different studies [38]. Furthermore, the analysis of psychosocial factors in different breastfeeding scenarios revealed differentiated patterns of findings. For example, subjective norms and breastfeeding knowledge are significantly more influential among first-time mothers than those with prior experience [21]. Future research on the ETPB model for breastfeeding behavior should highlight the integration and validation of the ETPB. The utility and intervention efficacy of the ETPB model in various breastfeeding scenarios must be clarified.

The studies included in the present review rarely considered the societal context of breastfeeding behavior. These studies neglected the influence of social or cultural factors exclusive to breastfeeding behavior. For instance, COVID-19, an emergency public health event, cannot be ignored when studying breastfeeding behaviors. One narrative review suggested that COVID-19 impacted breastfeeding, leading to distinct mental health outcomes [50]. However, to date, no study has explored the relationship between COVID-19 and breastfeeding from the

perspective of the ETPB. Another example is that phenomena such as intergenerational parenting may impact breastfeeding behavior [51]. In contrast to Western families who view breastfeeding as an individual choice, East Asians are more likely to consider breastfeeding to be a family decision, particularly with the involvement of the baby's grandparents [52]. Therefore, it is essential to consider the relationship between mothers-in-law and daughters-in-law and intergenerational parenting when studying breastfeeding behavior in some Eastern Asian cultures. On the one hand, the mother- and daughter-in-law relationship is of paramount importance in understanding the influence of descriptive and injunctive norms on mothers. On the other hand, intergenerational parenting is an upbringing condition with multiple family members involved in decision-making processes; thus, intergenerational parenting may be part of perceived control. We suggest that future ETPB models of breastfeeding behavior based on specific backgrounds should be developed in the future. Further research is needed to implement effective empirical breastfeeding and subsequent targeted interventions.

The present findings indicate that intervention studies using the ETPB model of breastfeeding behavior are relatively homogeneous. Breastfeeding intervention studies often have a limited scope, primarily providing pregnant women with basic information and responsibilities related to breastfeeding and aiming to improve their beliefs about the benefits of breastfeeding for infants [53]. Breastfeeding has advantages for both mothers and infants, including reducing the risk of breast and ovarian cancer in mothers and boosting postpartum metabolism. Breastfeeding is not yet universally recognized as both an altruistic and self-regarding reciprocal behavior. Evans and Ferguson suggested that altruistic and self-regarding behaviors can increase the predictive effect of perceived behavioral control [54]. Additionally, most intervention studies have involved infant mothers who passively received breastfeeding information, which can influence breastfeeding intention but not duration [13]. Studies have demonstrated that the affective attitude and breastfeeding self-efficacy of infant mothers are more significant predictors of breastfeeding intention and duration than other factors [55]. This highlights the importance of mothers' ability to "actively choose" to breastfeed, enhancing their breastfeeding behavior, satisfaction, and confidence, consequently promoting continued breastfeeding. Therefore, it may be possible to increase the incidence of breastfeeding in future intervention studies by increasing the transmission of "self-regarding beliefs" and "active choice" messages.

Based on the intervention strategies of the included ETPB studies, it is crucial for healthcare providers, policymakers, and researchers to expand their approach beyond basic information, to enhance the effectiveness of breastfeeding interventions. Policymakers are encouraged to develop and implement policies that promote breastfeeding-friendly workplaces, public spaces, and healthcare facilities. Furthermore, they should ensure that breastfeeding education is an integral part of prenatal and postnatal care programs and provide funding for breastfeeding support services and research. Researchers need to focus on exploring the broader societal and cultural factors influencing breastfeeding behavior. This includes investigating how different social support systems, community norms, and cultural practices impact breastfeeding rates and outcomes. Future studies should evaluate the long-term effects of various breastfeeding interventions and develop strategies to enhance their sustainability. A multifaceted approach involving healthcare providers, policymakers, and researchers is crucial for creating an environment that supports and promotes breastfeeding. By recognizing and addressing the diverse needs of breastfeeding mothers, we can help them overcome challenges and reap the benefits of breastfeeding for both them and their infants.

For further research, the breastfeeding-related ETPB model provides an effective framework for understanding and promoting breastfeeding behavior. In observational studies, the model integrates factors proven to significantly influence breastfeeding. These factors can be analyzed either separately or simultaneously, depending on the research context. By dividing core factors into two components and selecting relevant elements based on theoretical principles or group characteristics, the model enables a more tailored and in-depth understanding of breastfeeding. In intervention studies, ETPB-based educational programs effectively promote breastfeeding. The programs achieve this by enhancing maternal affective attitude and self-efficacy. Besides, interpersonal support and personalized services may enhance mothers' sense of agency and positive experiences, which can be further integrated and verified in subsequent research. Furthermore, the relationship between the TPB, ETPB, and breastfeeding-related ETPB model demonstrates a clear progression from basic theory to an extended framework and finally to its application in a specific field. This progression highlights the adaptability of the ETPB and provides valuable insights for its application in other domains.

This narrative review has limitations. First, although we used databases to collect and organize existing articles where possible, gathering gray literature and unpublished literature proved challenging, and we encountered issues with data legacy. Second, we could not perform a meta-analysis due to an insufficient number of articles

after screening, the insufficient similarity in methods, predictors, and interventions, as well as the lack of data required to calculate effect sizes. These limitations prevented us from supporting our findings with systematic evidence. Future studies could address this by expanding inclusion criteria and encouraging standardized reporting to facilitate meta-analytical synthesis. Third, even with the application of the ETPB, it is not possible to account for all potential psychosocial factors. Therefore, future studies should explore additional factors that may not have been considered by the ETPB. Fourth, the scope of the study was restricted by limiting the included literature to the breastfeeding behavior of infant mothers. Thus, it could not explore the adaptation of the ETPB to a broader range of breastfeeding-related behaviors, such as adolescent breastfeeding education and breast milk banking. Future research could aim to validate and expand the ETPB framework across diverse breastfeeding contexts to assess its adaptability and robustness.

Conclusions

It is important to both theoretically and narratively understand the breastfeeding dilemma. This study revealed that the ETPB effectively explains the psychosocial factors—affective and instrumental attitudes, injunctive and descriptive norms, perceived control, self-efficacy, moral norms, knowledge, and self-identity—that influence breastfeeding intention and duration. The intervention strategies identified, including professional breastfeeding education, interpersonal social support, and personalized breastfeeding services, underscore the need for targeted and multifaceted approaches to empower mothers. Future research should address the societal context and cultural influences, expanding interventions beyond the provision of essential information. This review offers a theoretical foundation and practical direction for understanding breastfeeding dilemma and enhancing support for breastfeeding mothers.

Abbreviations

WHO	World Health Organization
TPB	Theory of planned behavior
ETPB	Extended theory of planned behavior

Supplementary Information

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Additional file 1: Table S1. General information derived from the selected articles.

Additional file 2: Table S2. Extended theory of planned behavior-based psychosocial factors of the selected articles.

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Author contributions

LW: Conceptualization of this study, data collection, original draft preparation, methodology, formal analysis, writing, editing, and visualization. XXL: Project administration, supervision, and funding acquisition. HNI: Supervision. PYG: Methodology, investigation, data collection, and software. JY: Data collection and formal analyses. All authors read and approved the final manuscript.

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Availability of data and materials

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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