RESEARCH

THE EFFECT OF THEORY-BASED RESEARCH ON BREASTFEEDING: A SYSTEMATIC REVIEW AND METAANALYSIS

Abstract

The aim of this study is to systematically review the results of theory-based research on breastfeeding and to perform a meta-analysis of the available evidence. The literature review for this systematic review was conducted between September and October 2022 by using five electronic databases PubMed, Cochrane Library, Web of Science, ULAKBIM. Published articles were scanned using MeSH-based keywords. Only Randomized Controlled Trials (RCTs) conducted in the last five years were included. The data were analyzed using the Review Manager computer program (Version 5.3). Two randomized controlled trials were included in the meta-analysis. All of the studies were combined for breastfeeding information, time to start breastfeeding, and five-course (breast milk only, breast milk, and formula). The meta-analysis revealed that theory-based education increased the rate of breastfeeding information of pregnant women in the postpartum period (OR: 0.73 95% CI: 0.51 to 1.05, Z = 1.69, p: 0.09), the rate of exclusive breastfeeding (OR: 1.80 95% CI: 1.26 to 2.57, Z = 3.23, p: 0.001) and decreased the rate of feeding intake (OR: 0.49 95% CI: 0.33 to 0.74, Z = 3.41, p: 0.0007). The study findings found that education did not affect the rate of early initiation of breastfeeding between groups ((OR: 1.31 95% CI: 0.91 to 1.90, Z = 1.45, p: 0.15) and was not significant. This study provides sufficient evidence that theory-based training has positive effects on breastfeeding attitudes and behaviors.

Keywords: Breast milk, breastfeeding, metaanalysis, model, theory.

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ARAŞTIRMA

KURAM TEMELLİ ARAŞTIRMALARIN EMZİRME ÜZERİNE ETKİSİ: SİSTEMATİK DERLEME VE METAANALİZ

Öz

Bu çalışmanın amacı kuram temelli yapılan araştırmaların emzirme üzerine sonuçlarını sistematik olarak gözden geçirmek ve mevcut kanıtların meta analizini yapmaktır. Bu sistematik derleme için literatür taraması Eylül-Ekim 2022 tarihleri arasında, beş elektronik veri tabanı PubMed, Cochrane Kütüphanesi, Web of Science, ULAKBİM kullanılarak gerçekleştirildi. Yayınlanmış makaleler MeSH tabanlı anahtar kelimeler kullanılarak tarandı. Yalnızca son beş yılda yapılan Randomize Kontrollü Çalışmalar (RKÇ) dahil edildi. Veriler, Review Manager bilgisayar programı (Sürüm 5.3) kullanılarak analiz edildi. İki randomize kontrollü çalışma meta-analize dahil edildi. Çalışmaların tamamı emzirme bilgisi, emzirmeye başlama zamanı,

beşlenme şekli (sadece anne sütü, anne sütü ve mama) için birleştirildi. Meta-analiz, kurama dayalı eğitimin gebe kadınların postpartum dönemdeki emzirme bilgisi oranını (OR: 0.73 95% CI: 0.51 to 1.05, Z = 1.69, p: 0.09), sadece anne sütü alma oranını (OR: 1.80 95% CI: 1.26 to 2.57, Z = 3.23, p:0.001) arttırdığı, mama alma oranını (OR: 0.49 95% CI: 0.33 to 0.74, Z = 3.41, p: 0.0007) azalttığını ortaya koydu. Çalışma bulguları eğitimin erken dönemde emzirmeye başlama oranını gruplar arasında ((OR: 1.31 95% CI: 0.91 to 1.90, Z = 1.45, p: 0.15) etkilemediği ve anlamlı olmadığı bulundu. Bu çalışma, kuram temelli eğitimlerin emzirme tutum ve davranışları üzerine olumlu etkilerinin olduğuna dair yeterli kanıt sunmaktadır.

Anahtar Kelimeler: Anne sütü, emzirme, model, metaanaliz, kuram.

1. Introduction

Breastfeeding has been considered sacred throughout human history and has lasted for thousands of years as a form of nutrition for babies without alternatives (1). According to the WHO's "State of the World's Children: Children, food and nutrition report, 2018, 3/1 of all children are either malnourished or overweight. Almost two out of every three children between the ages of 6 months and two years do not receive foods to support their growth and development during what we call the critical window period (2). Although there is no other situation that is so beneficial to both mother and baby, breastfeeding rates are not at the desired level in the world and in our country. There are many factors related to mother and baby that affect the breastfeeding of babies. In addition to these factors, the fact that mothers cannot receive effective, professional support during breastfeeding makes it difficult to solve the problems experienced and adversely affects the continuation of successful breastfeeding (3).

Theory is generally defined as a tool that is commonly used to understand, control, predict, and explain what exists, and that allows the systematic emergence of truth that serves a specific purpose (4,5). Discipline-specific knowledge production and accumulation can be realized by deciding the problem in the light of theories, solving the problem with theory-based research, testing and developing theories. There is a mutually dynamic process between theory and research: research supports theory, theory generates the research question, and guides the research process (6,7). The use of theory provides a systematic approach to studies and also sets standards for applications (4,5,8). In addition, models and theories play an important role in the synthesis of the relationship between research and knowledge. By using these models and theories, it was ensured that the quality of education and care was increased and the development of practices based on holistic care was guided (9).

In theory-based research, the aim is neither to develop a new theory nor to determine the validity of an existing theory. The aim here is to reveal the conceptual framework of the research and to discuss the theoretical framework. At the same time, it is to put all stages of research into a conceptual framework and to make sense of it (7). Although many researches have been conducted to increase breastfeeding rates, there have been no systematic reviews and meta-analyses examining the effectiveness of theory-based interventions. The aim of this study is to systematically review the breastfeeding outcomes of theory-based research and to perform a meta-analysis of the available evidence.

2. Material and Method

In this study, systematic review and meta-analysis of studies evaluating the effect of theory-based education on breastfeeding outcomes was performed. In the preparation of the systematic review and meta-analysis, the PRISMA (Preferred Reporting Items for Systematic Reviews and Declaration of Meta-Analysis) (10) was followed by the directive. To control the risk of bias during the study, the two researchers independently conducted a literature review, article selection, data extraction, and quality assessment of the included articles. In the event of disagreement on any issue, all the researchers were brought together for a discussion and a final consensus. During the study, no situation requiring deviation from protocol was encountered.

2.1. Eligibility criteria

The following criteria (PICOS) were taken into consideration in the selection of the studies to be included in the study: Participant (P): Pregnant and puerperal women who received training based on the course. The women included in the study had the following criteria for inclusion. (1): Pregnant women who do not have a disability related to pregnancy, (2) pregnant women who do not have psychological problems, (3) pregnant women who can be contacted. Intervention (I): Methods related to training. The training includes the following criteria (1): face-to-face trainings on theory-based breastfeeding, (2): counseling on theory-based breastfeeding. (3): Onlie counseling on breastfeeding based on rules. Comparison (C): Routine maintenance. Results (0): Breastfeeding knowledge level, breastfeeding start time, diet. Study design (S): Randomized controlled trials and controlled groups were included. Educational studies that are not based on theory in pregnant women or in the postpartum period, studies reflecting women with psychological problems, articles evaluating the effect of breastfeeding outside education, and traditional and systematic reviews were excluded.

2.2. Search strategy

The literature review for this systematic review was conducted between September and October 2022 using five electronic databases (PubMed, CINAHL, Scopus, WOS and ULAKBİM). Theory-based education given to pregnant and postpartum women was screened using medical topics or keywords to evaluate their breastfeeding status. The keywords were: “breastfeeding,” OR “human milk,” AND “model,” OR”theory,” OR “education,” AND “nulliparous”OR “primiparuos”. The search strategy was changed according to the characteristics of each database. In addition, reviews on articles included in systematic reference lists and other previous systematic reviews were checked to reach further studies.

2.3. Selection of studies and data extraction

After removing duplicate articles from different databases, two researchers (A.Y.K. and F.Ş.B.) independently conducted literature review, article selection, data extraction and quality evaluation of the included articles to control the risk of bias during the study. The two independent reviewers first scanned the titles and abstracts to determine which studies met the inclusion and exclusion criteria. Full texts that met the inclusion criteria but could not be identified in the title/abstract scan were examined. In studies where consensus could not be reached, the researchers considered working as partners. A data extraction tool developed by the researchers was used to obtain the research data. Two reviewers (A.Y.K. and F.Ş.B.) obtain data on the location and year of the study, publication year, research design, sample size, the effect of theory-based education on breastfeeding knowledge level, the time of starting breastfeeding and the effect on diet (Table 1).

Table 1. General Features of the Included Studies

Author (reference)\ Publication date\ Country	Study design **Population**	**The inclusion and exclusions criteria**	**Education protocol**	**Comparisons** **Drop out** **Outcome**	**Results**
Admasu et al., 2022,(12) Ethiopia	RCT* 285 Pregnant women (EG: 143, CG: 142)	**Inclusion criteria**: Pregnants between 26-32 weeks of gestation and permanent residents of the study area were included in the study. **Exclusion criteria:** Pregnant women who were critically ill or unable to communicate during the study period were excluded from the study.	Intervention group; 3 weeks once a week for 30-35 minutes and postpartum 3. Training based on the Health Belief Model was given in the form of monthly reminders.	Routine maintenance EG=12;CG:13 Data Collection Form	Breastfeeding education [AOR 1.55, 95% CI (1.02, 23.36)], institutional birth [AOR 2.29, 95% CI (1.21, 4·35)], vaginal delivery [AOR 2.85, 95% CI (1.61, 5.41)] and pre-breastfeeding nutrition [AOR 0.47, 95% CI (0.25, 0.85)] were the determinants of early initiation of breastfeeding. Breastfeeding education [AOR 1·72, 95% CI (1.12, 264)] and institutional childbirth [AOR 2·36, 95% CI (1·28, 4·33)] were also determinants of breastfeeding. breastfeeding practices
Zhu et al., ,2017, (11) China	RCT* 288 mothers (EG: 157, CG:131)	**Inclusion criteria:** Eligible participants were primitive mothers who were willing to participate in the study, accompanied by important people, could read, write, and communicate in Chinese, and had no serious obstetric complications or other medical illnesses that permanently or temporarily hindered them. postpartum bleeding, acute phase hepatitis, HIV positive or psychiatric illness such as breastfeeding. In addition, the criteria for their babies included: gestational age ≥37 weeks, birth weight ≥2500 g, Apgar score of 5 min≥8 and those who do not have any condition that prohibits breastfeeding or diseases that need to be referred to the neonatal intensive care unit .	**Intervention group:** Participants in the intervention group were given standard obstetric care and a TPB-based intervention program. Mothers began phone counseling within three days of discharge and weekly up to 6 weeks after delivery. Each call lasted 20-30 minutes. The content of the personal counseling included emphasizing the importance of breastfeeding, providing emotional support, reinforcing coping strategies and dealing with the problems that mothers face with breastfeeding after discharge.	Routine maintenance None BKS* BAPT*	Scores of the four determinants were also significantly higher in the experimental group than in the control group at 3 days and 6 weeks, with the exception of breastfeeding control at 6 weeks, which resulted in higher rates of breastfeeding alone at 3 days and 6 weeks. the experimental group is more than the control group

RCT: Randomized Control Trials, EG: Experimental Group, CG: Control Group, BKS: Breastfeeding Knowledge Scale, BAPT: Modified Breastfeeding Attrition Prediction Tool

2.4. Evaluation of the methodological quality of the studies

The quality of the articles in randomized controlled trials and the Version 2 of the Cochrane Risk-of-Bias tool (RoB-2) were used for randomized trials.

2.5. The data analysis

Meta-analysis was performed using Review Manager 5.4 (The Nordic Cochrane Center, Copenhagen, Denmark) for data analysis. The heterogeneity between the studies was evaluated using Cochran's Q test and Higgins' I^2, and it was accepted that I^2 greater than 50% showed significant heterogeneity. Accordingly, random effect results were taken into account when I^2 was greater than 50%, and fixed effect results were taken into account if it was less than the value. Odds ratio (OR) for categorical variables, mean difference (MD) and standardized mean difference (SMD) for continuous variables were calculated. MD or SMD, along with the corresponding 95% confidence interval (CI), is appropriately pooled for continuous variables based on whether the results are measured on the same scales. All tests were calculated from two-pronged tests, and a p value of less than 0.05 was considered statistically significant.

2.6. Risk of bias

All selected articles were independently conducted by an author (EIC) using the Cochrane tool to assess the risk of nepotism. The criteria outlined in the Cochrane Handbook for Systematic Investigations of Interventions are; were classified into six areas: ((random sequence generation (selection bias), allocation obfuscation (selection bias), blinding of participants and staff (performance bias), blinding of outcome evaluation (detection bias), handling of missing outcome data (attrition bias), selective outcome reporting (notification bias), and other potential sources of bias (conflict of interest and funding sources)). The risk of bias for each area was classified as "low risk", "high risk" or "uncertain risk" according to the decision criteria in the "bias risk" assessment tool.

3. Results

3.1. Literature review

The PRISMA flowchart for literature review and selection is summarized in Figure 1. A total of 546 studies were reached through electronic database research and manual search. 546 articles, the full text of which can be accessed, were examined. Titles and abstracts were read to identify the relevant articles, 539 articles were removed because they did not meet the criteria for review articles, protocols, duplications, different populations and inclusion. The remaining seven full texts were evaluated for eligibility. Two RCT articles were included in the quantitative synthesis because they met the desired criteria (Figure 1). Table 1; The two RCTs included outline the study. RCTs were ranked chronologically from the nearest date to the farthest.

3.2. Study characteristics

This systematic review and meta-analysis included two studies involving a total of 550 pregnant and puerperal women to assess the impact of theory-based education on breastfeeding outcomes conducted in the two countries; China (11), Ethiopia (12). One of all the studies included in the meta-analysis is in RCT and controlled design (12). The characteristics of the studies are summarized in Table 1. From the articles included in the study, Admasu et al.(12) gave 30-35 minutes of training on nutrition to pregnant women in the intervention group once a week for three weeks and then three. It includes monthly recall training. Zhu et al. (11) provided mothers in the intervention group with breastfeeding support counseling on the first postpartum day before discharge and six. A total of two training sessions were held per week and weekly telephone consultation was provided. While the duration of the interventions of the studies included in the review ranged from 3 weeks to 6 weeks, Admasu et al. (12) provided reminder training in his study. In most of the articles, women in the control group received standard obstetric care. All groups in the study were completed with 2 groups, not intervention and control groups. Women in the intervention group received interventions that included the following educational models for

breastfeeding outcomes: In the study of Admasu et al. (12), used the Health Belief Model in their educational intervention on nutrition to pregnant women, while Zhu et al. (11) used the Theory of Planned Behavior. From the studies, Admasu et al. (12) reported early initiation of breastfeeding, administration of prelacteal nutrients and colostrum in intervention and control groups. Zhu et al. (11) Primary output postpartum 3. While the Daily Breastfeeding Information Scale (BKS) and the Modified Breastfeeding Attrition Predictor (BAPT) values were evaluated, the secondary output was evaluated by the Breastfeeding Information Scale (BKS) and the Modified Breastfeeding Attrition Prediction Instrument (BAPT).

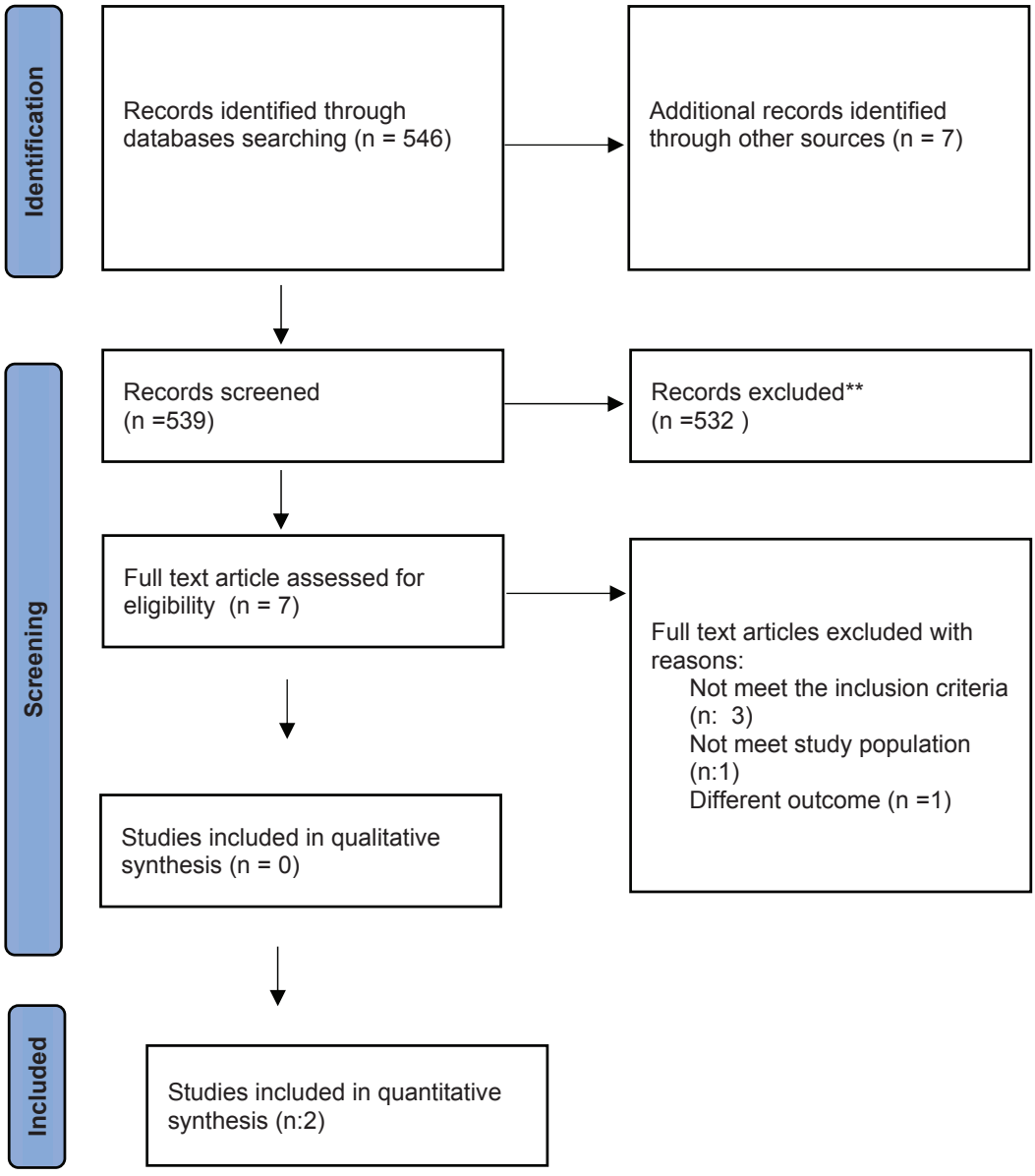

Figure 1. PRISMA flow diagram.
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

3.3. Outcomes

The results of the meta-analysis were presented as Forest Pilot. In the included researches, information about breastfeeding was examined as breastfeeding information and breastfeeding practices. Results in the research, Zhu et al. (11) postpartum 3. The Breastfeeding Information Scale of the Day (BKS) and the Breastfeeding Information Scale (BKS) and Admasu et al. (12) in the second follow-up evaluated not with a tool with validity and reliability, but with a tool based on measuring the breastfeeding practice and knowledge they created.

3.3.1. Effect of breastfeeding

Knowledge In all studies examined on the effect of theory-based education on breastfeeding knowledge, the authors reported results on the effect of theory-based education on breastfeeding knowledge. The average pooled results of the studies show that breastfeeding knowledge was a significant difference between the groups in the post-educational period based on theory (OR: 0.73 95% CI: 0.51 to 1.05, Z = 1.69, p: 0.09) (Figure 2).

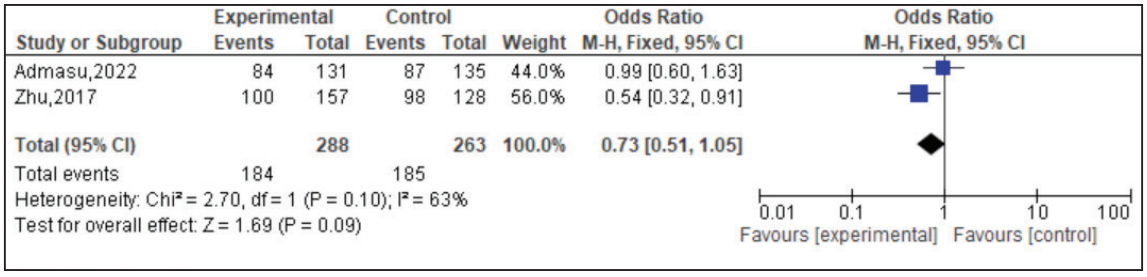

Figure2: Meta-analysis results on the effect of education on the breastfeeding information

3.3.2. Effect on breastfeeding practices

In all studies examined on the effect of instruction-based education on breastfeeding (breastfeeding alone), the authors reported results on the effect of theory-based education on breastfeeding alone. The average pooled results of the studies only show that breastfeeding rates were a significant difference between the groups in the post-training period (OR: 1.80 95% CI: 1.26 to 2.57, Z = 3.23, p: 0.001) (Figure 3).

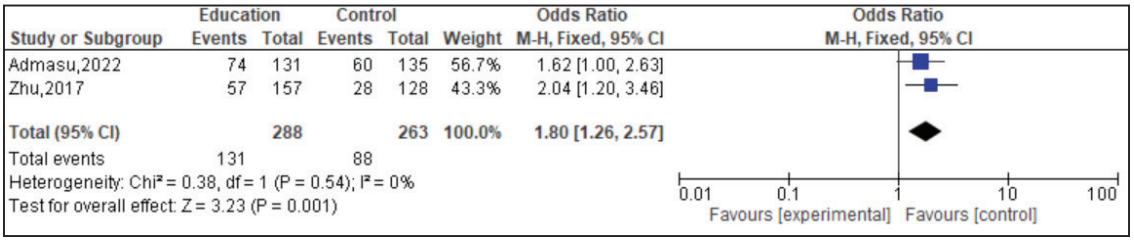

Figure3: Meta-analysis results on the effect of education on only breastfeeding

3.3.3. Breast milk and formula

In all the studies examined on the effect of theory-based education on breast milk and formula giving (mixed type nutrition), the authors reported results on the effect of theory-based education on breast milk and feeding The average pooled results of the studies show that breast milk and feeding rates were a significant difference between the groups in the post-training period (OR: 0.49 95% CI: 0.33 to 0.74, Z = 3.41, p: 0.0007) (Figure 4).

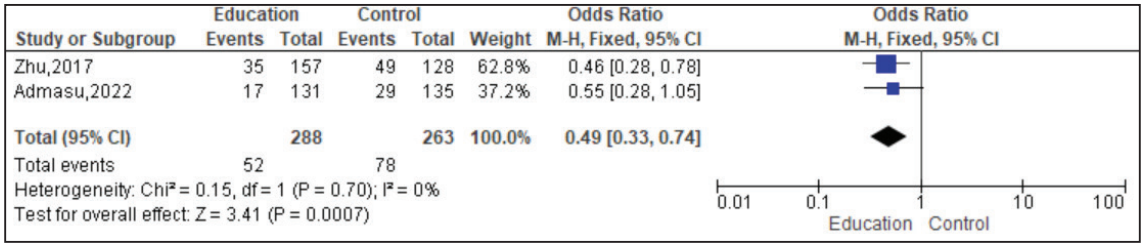

Figure4: Meta-analysis results on the effect of education on breastfeeding and formula ratio

3.3.4. Early start of breastfeeding after childbirth

The effect of instruction-based training on the time to start breastfeeding. In all the studies examined, the authors reported results on the effect of theory-based education on the time to start breastfeeding. The average pooled results of the studies show that there was no significant difference between the groups in the post-training period of early start time to breastfeeding (OR: 1.31 95% CI: 0.91 to 1.90, Z = 1.45, p: 0.15) (Figure 5).

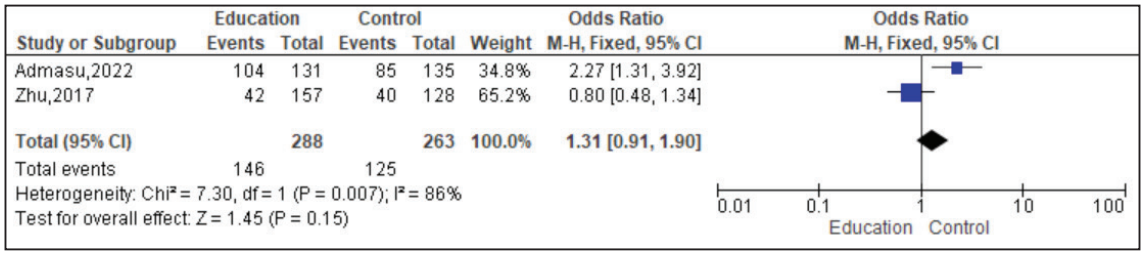

Figure 5: Meta-analysis results on the effect of education on early breastfeeding start

3.4. Risk of bias assessment

All studies identified an adequate method for the random assignment of participants to training groups (11,12). Therefore, these studies in this area were evaluated as low risk of nepotism. Studies were judged to be at risk of uncertainty bias due to insufficient information or lack of mention of factors about randomization or allocation confidentiality (11,12). In the two studies included in the meta-analysis, it was not possible for the participants and researchers who participated in the experiment to be blind to the study, therefore, all studies were evaluated under the risk of bias in blinding the participants and employees and this was taken into account when interpreting the findings (11, 12). Zhu et al. (11), it is at high risk of blinding outcome evaluation. In the study of Admasu et al. (12), it was concluded that there was a risk of uncertainty bias in blinding the outcome assessment and not mentioning the risk of nepotism error. Two studies (11,12) had a low risk of attrition. Because in these two studies, the cessations were balanced between the intervention and control groups, or there were few releases that did not affect the study (11,12). In all studies included in the meta-analysis, they were assessed at risk of reporting low bias because they discussed the reported significant results, including negative outcomes, and matched those reported in their records. For each study included, important concerns about other possible sources of bias that had not previously been addressed in the above categories were disclosed. In particular, a declaration of conflict of interest and a source of funding were sought. None of the included studies reported any other risk of bias (11, 12) (Figure 6).

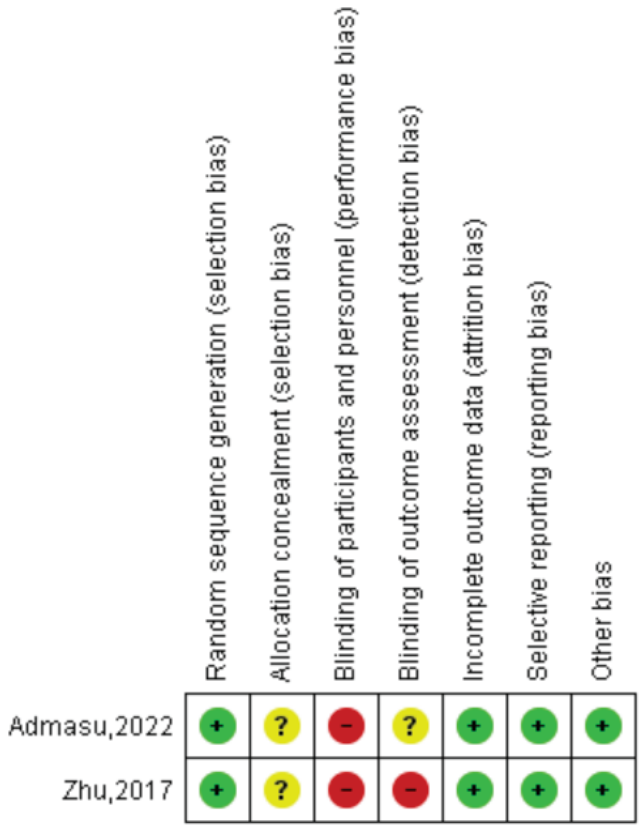

Figure 6. Risk of bias domains: ROB-2 *ROB-2: Risk-of-Bias tool for randomized trials.

4. Discussion

The aim of this study is to systematically review the breastfeeding outcomes of theory-based research and to perform a meta-analysis of the available evidence. As a result of the research, the results of this meta-analysis, which examined the effect of Kurama-based interventions on breastfeeding, found that education increased the knowledge of breastfeeding in mothers and that they showed only breastfeeding attitude. In addition, it was determined that the educational intervention for breastfeeding based on theory would be effective before or after birth.

Breastfeeding is the best way to ensure optimal nutrition for babies. However, many mothers are unable to start breastfeeding early and only breastfeed as recommended due to the lack of necessary information and support. Designing and implementing effective health education programs is essential for successful health interventions. Successful education depends on the correct use of theories and models in health education (13-15). In the studies carried out, the breastfeeding problems experienced by the mother and the breastfeeding attitude affect the way she feeds her baby and the duration of breastfeeding (16,17). According to the results of this metaanalysis, it was found that theory-based interventions increased the knowledge about breastfeeding in mothers and showed only breastfeeding attitude. Karaahmet and Bilgiç (18) In their study, it was reported that breastfeeding education given to mothers positively affected breastfeeding attitude in the intervention group and increased the duration of feeding only with breast milk. It has been reported that the theory-based behavioral intervention made to the mothers of babies fed with formula formula after birth is not effective in formula feeding and formula intake (19). In parallel with the literature, it was seen that theory-based interventions had a positive effect on breastfeeding attitude and breastfeeding alone.

Since breastfeeding rates are still 40% in the first six months globally, the effect of various intervention methods on breastfeeding time is being examined by randomized controlled trials (20). Among the different approaches to intervention, those with prenatal and/or postnatal education and support show positive results in breastfeeding outcomes (21). In the study conducted to inform pregnant women in Germany, it was reported that it was effective on maternal, neoanatal health outcomes and breastfeeding (22). Although postpartum interventions are frequently studied, research on the effect of education given to pregnant women on maternal, neonatal and breastfeeding outcomes is limited (23). In the studies included in the metaanalysis, although one study intervened in the prenatal period (12) and one study intervened in the postpartum period (11), it was found to positively affect breast milk and breastfeeding behaviors in the intervention groups. In a similar meta-analysis study, it was reported that prenatal or/or postpartum breastfeeding education and counseling may positively affect breastfeeding attitude and breastfeeding duration, especially in the first two postpartum months (20). A breastfeeding promotion program that included prenatal education provided by a breastfeeding counselor followed by a peer-led postpartum support group was found to significantly improve continuing to breastfeed alone (24); additional proactive phone-based peer support has been reported to increase breastfeeding rate alone at six months (25). Although the findings of metaanalysis are in parallel with the literature, there is a need for randomized controlled trials examining the effect of educational intervention, especially in pregnancy.

5. Conclusion

In the results of this meta-analysis, which examined the effect of court-based interventions on breastfeeding, it was found that education increased the knowledge of breastfeeding in mothers and that they showed only breastfeeding attitude. In addition, it was determined that the educational intervention for breastfeeding based on theory would be effective before or after birth. The included studies showed that the intervention had no effect on early onset of breastfeeding after birth. Although there are interventions that may be effective in breastfeeding in the literature, it was found that the results of the study examining the effect of theory-based interventions on breastfeeding outcomes were quite limited. Further randomized controlled trials examining the effect of theory-based interventions on breastfeeding outcomes may be proposed.

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