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The role of paternal support in breastfeeding outcomes: a meta-analytic review



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Abstract

Background The advantages of breastfeeding for maternal and child health have been widely acknowledged on an international scale. However, there is a paucity of research regarding the effectiveness of paternal support in breastfeeding. This study aimed to systematically review the impact of paternal support interventions on breastfeeding and to contribute additional evidence to inform current breastfeeding practices.

Methods A systematic search was conducted across multiple databases, including China National Knowledge Infrastructure (CNKI), Wanfang Data, the VIP Database, the Chinese Biomedical Literature Service System (SinoMed), PubMed, EMBASE, the Cochrane Library, and Web of Science, for randomized controlled trials (RCTs) related to breast-feeding and paternal support interventions, covering the period from the inception of the databases to June 2024. In accordance with the predefined inclusion and exclusion criteria, two researchers independently screened the literature and performed a meta-analysis via RevMan 5.4.1 software. The choice between fixed or random effects models was determined by the outcomes of the heterogeneity test, and relative risks (RR) along with 95% confidence intervals (CI) were computed.

Results A comprehensive search yielded 3065 studies, of which eight were included in the meta-analysis. These studies involved a total of 2531 participants, with 1306 in the intervention group and 1225 in the control group. The studies conducted across the United Kingdom, Australia, Canada, and China encompassed a variety of interventions, including breastfeeding education, consultations led by specialists, distribution of informational materials, utilization of educational media, facilitation of interactive discussions, provision of online support through phone or WeChat, dissemination of public account messages, training in breastfeeding techniques, postpartum social support, and guidance on maternal and newborn care. The meta-analysis results indicated that the rate of exclusive breastfeeding was significantly higher in the intervention group compared to the control group at various time points: within one week postpartum (RR 1.28; 95% CI 1.16, 1.42); at 30–42 days postpartum (RR 1.12; 95% CI 1.02, 1.23); and at three months postpartum (RR 1.35; 95% CI 1.21, 1.50). These findings suggest that paternal support interventions effectively enhance breastfeeding practices.

Conclusions The findings suggest that current evidence supports the efficacy of paternal support interventions in both the initiation and maintenance of breastfeeding.

Keywords Newborns, Breastfeeding, Paternal support, Randomized controlled trials, Meta-analysis

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Background

The significance of breastfeeding for both maternal and child health has gained widespread international recognition. Evidence suggests that the probability of breastfeeding more than doubles when appropriate protective measures and support systems are implemented [1]. In pursuit of this objective, the international community has undertaken numerous initiatives to enhance support for mothers and families. The theme for the 2024 World Breastfeeding Week, "Bridging the Gap: Comprehensive Support for Breastfeeding," underscores this commitment. Both UNICEF and the World Health Organization (WHO) have highlighted that the enhancement of breastfeeding support constitutes a collective responsibility, involving families, communities, healthcare professionals, and other key decision-makers. Furthermore, China has introduced the Breastfeeding Promotion Action Plan (2021-2025) to enhance collaboration across all societal sectors in order to foster a supportive environment for breastfeeding and to improve maternal and infant nutrition and health [2]. Nonetheless, as external barriers diminish, the attitudes of family members towards breastfeeding become increasingly significant.

Awaliyah et al. demonstrated that breastfeeding practices are shaped by multiple factors, with paternal support being pivotal in influencing mothers' decisions to breastfeed, the duration of breastfeeding, and their selfefficacy [3]. In certain patriarchal societies, women face multifaceted challenges in breastfeeding, stemming from social and economic factors [4], while men frequently occupy the role of primary medical decision-makers. Consequently, fathers are acknowledged as crucial advocates for the continuation of breastfeeding. Despite the growing acknowledgment of the critical role that fathers play in supporting breastfeeding, there remains a relative paucity of research on paternal support in this context.

Therefore, this study sought to elucidate the mechanisms by which paternal support influences the breastfeeding process and to examine the effects of paternal support interventions on breastfeeding outcomes. The findings are anticipated to serve as a valuable reference for clinical practitioners in the development of targeted intervention strategies. Additionally, the study offers insights aimed at enhancing current breastfeeding practices and improving the supportive behaviors of fathers of newborns through specific interventions. Furthermore, this study aims to provide insights for the formulation of breastfeeding support policies by pertinent governmental bodies and to enhance societal awareness regarding the involvement of fathers in the breastfeeding process.

Methods

This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [5]. The Population Intervention Comparator Outcome Study Design (PICOS) criteria were used to devise the review question and search terms [6]. The PICOS table is presented in Table 1.

Inclusion and exclusion criteria

Inclusion criteria were based on PICOS criteria (see Table 1). Fathers with healthy newborns were recruited, and the newborns received various modalities of oral feeding. Both the experimental and control groups received conventional treatment and standardized management.

The following criteria will be used to exclude studies: ① Non-Chinese or non-English literature; ② articles that are inaccessible in full text, duplicate publications, or are unpublished; ③ studies with incomplete data; ④ pregnant women with mental illness; ⑤ infants or pregnant women with contraindications to breastfeeding; ⑥ cases involving separation of mothers and infants; and ⑦ same-sex partners.

Systematic search and strategy

The review authors searched the studies using the following databases: China National Knowledge Infrastructure (CNKI), Wanfang Database, VIP Database, Chinese Biomedical Literature Service System (SinoMed), PubMed,

 Table 1
 Population intervention comparator outcome study design (PICOS) table

P - Population	Fathers of healthy newborns who are engaged in various forms of oral feeding
I – Intervention	Both the experimental and control groups will receive routine treatment and stand- ardized management. Additionally, the experimental group will receive various forms of support interventions from fathers
C – Comparator	Any comparator (most commonly, Usual Care)
O – Outcome	Exclusive breastfeeding rates were assessed at multiple time intervals and defined as no food or liquid other than breastmilk given to the infant in the last 24 h and included feeding expressed breast milk and undiluted drops or syrups consisting of vitamins, minerals, supplements, or medicines [4]
S - Study design	Randomized controlled trials (RCTs)

EMBASE, the Cochrane Library, and Web of Science, to identify randomized controlled trials (RCTs) pertaining to breastfeeding and paternal support interventions from the inception of each database up to June 2024. Furthermore, the reference lists of pertinent literature were also systematically reviewed.

The English search strategy incorporated the following terms: Tiab = ("father" OR "pater*" OR "dad" OR "spouse" OR "partner" OR "husband" OR "caregiver" OR "spouse" [Mesh Terms]) AND ("newborn" OR "infant" OR "neonate") AND ("support*" OR "involv*" OR "engag*" OR "join*" OR "participat*" OR "coparenting" OR "care, life support" [Mesh Terms]) AND ("breastfeed*"). This strategy was applied to databases, including PubMed, Embase, the Cochrane Library, and Web of Science. For Chinese databases such as CNKI, WanFang Database, VIP, and CBM, the search utilized keywords such as "father" and "breastfeeding".

Study selection and data extraction

Following the removal of duplicates, titles and abstracts were screened by two independent reviewers (SZ and JL). Full texts were subsequently assessed based on the inclusion and exclusion criteria established by the authors, with relevant data extracted and findings cross-verified. Any discrepancies identified in the included studies were addressed through discussion, and unresolved disagreements were resolved through consultation with a third researcher, LR). The literature screening process began with an initial review of titles and abstracts to exclude irrelevant studies. This was followed by a comprehensive examination of the full texts to make final decisions on inclusion. The primary focus of data extraction will encompass the following elements:

① Basic information, including title, first author or corresponding author, journal of publication, publication date, and type of study design; ② Baseline characteristics, including sample size, intervention measures, and evaluation of the intervention, among other factors; ③ The quality of the literature and outcome indicators.

Assessment of literature quality

The included literature was rigorously assessed according to the Cochrane Handbook for Systematic Reviews of Interventions, version 5.1 [7]. This tool primarily assessed the validity of randomized controlled trials (RCTs) on the basis of seven specific criteria: ① generation of the random sequence; ② concealment of the allocation sequence; ③ blinding of participants and personnel; ④ blinding of outcome assessors; ⑤ completeness of outcome data; ⑥ potential for selective reporting of results; and ⑦ other sources of bias. Evaluators were required to categorize each criterion as "low risk," "high risk," or "unclear." If the two evaluation results were inconsistent, all members of the research group needed to discuss and reach a consensus. The outcomes of the bias risk assessment were presented in a format that integrates both textual and graphical representations. Trial registries and protocols were searched to support the risk of bias assessment process.

Statistical analysis

The included studies were analyzed via RevMan 5.4.1 software to determine the presence of statistical heterogeneity. For categorical variables, the relative risk (RR) and 95% CI were utilized as the effect measure, with a P-value of less than 0.05 indicating statistical significance. If p > 0.1 and $l^2 < 50\%$, there was little heterogeneity among the studies, and a fixed-effects model was used; if p < 0.1 and $I^2 > 50\%$, there was significant heterogeneity among the studies, and a random-effects model was applied. Since I^2 revealed a significant heterogeneity $(I^2 = 19\%; p < 0.00001)$, a fixed-effects model was used. To increase the robustness of the assessment outcomes, subgroup analysis was performed in accordance with the bias assessment to identify sources of heterogeneity. Subgroups were set as: breastfeeding for < 1 week, 30-42days postpartum and 3 months postpartum.

Results

Search results and selection

A total of 3065 relevant articles were retrieved, comprising 779 from PubMed, 908 from Embase, 1135 from Web of Science (WOS), 139 from the Cochrane Library, 27 from the China National Knowledge Infrastructure (CNKI), 45 from Wanfang Data, 6 from the VIP Database, and 26 from SinoMed. Following independent screening by two reviewers who reached a consensus, 8 articles that met the established criteria were ultimately included. This process is summarized in the PRISMA flow diagram (Fig. 1).

Basic characteristics and quality assessment of the included studies

The studies encompassed various countries, comprising one study each from the United Kingdom, \ Australia and Canada, and five from China. These investigations primarily assessed exclusive breastfeeding rates at distinct temporal intervals: specifically, at 3 days postpartum, within the 30–42 day postpartum period, and at 3 months postpartum. The interventions employed in these studies were multifaceted, incorporating oral breastfeeding education, as well as consultations, lectures, or courses facilitated by breastfeeding specialists; distribution of breastfeeding information booklets; provision of educational videos or websites on breastfeeding; facilitation of



Fig. 1 PRISMA flowchart of study selection process

interactive discussions on breastfeeding; online follow-up via phone or WeChat groups; dissemination of breastfeeding knowledge through public accounts; instruction and training in breastfeeding techniques; postpartum social support programs; and guidance on maternal and newborn care skills. The quality assessment of the included studies was as follows: the baseline comparison between the intervention group and the control group revealed no statistically significant differences, indicating their comparability. The fundamental characteristics of the included studies are detailed in Table 2, while the methodological quality assessment is illustrated in Fig. 2.

Results of the meta-analysis

Impact of paternal support intervention on exclusive breastfeeding rates at different time periods.

The impact of father support interventions on exclusive breastfeeding rates is presented in a forest plot (Fig. 3).



Fig. 2 Bias risk ratio diagram and summary of bias risk

Eight studies [4, 8–14] encompassed a total of 2531 participants. The variability among the study results was relatively minimal (p=0.28, $I^2=19\%$), justifying the use of a fixed-effects model for analysis. The meta-analysis indicated that, in comparison with the control group, the paternal support intervention significantly increased the rate of exclusive breastfeeding (RR 1.24; 95% CI 1.15, 1.33, p < 0.00001) (Fig. 3).

As shown in Fig. 4, subgroup analysis was performed to examine exclusive breastfeeding rates across different time periods. Specifically, four studies [10–12, 14], encompassing a total of 552 participants, reported the effects of fathers' support interventions on exclusive breastfeeding rates within the first week. The results of the meta-analysis indicated that, compared with the control group, father support interventions significantly increased the rate of exclusive breastfeeding within one week postpartum. This finding was statistically significant (RR 1.28; 95% CI 1.16, 1.42, p < 0.00001). Additionally, five studies examined the impact of paternal support interventions on exclusive breastfeeding rates within 42 days postpartum, encompassing a total of 1139 participants [8, 9, 11–13]. The meta-analysis further demonstrated

that these interventions significantly increased the rate of exclusive breastfeeding between 30 and 42 days postpartum compared with the control group (RR 1.12; 95% CI 1.02, 1.23, p < 0.05). Three studies examined the impact of paternal support interventions on exclusive breastfeeding rates within the first three months postpartum, encompassing a total of 1502 participants [8, 9, 14]. The results of the meta-analysis indicated that, compared with the control intervention, the paternal support intervention significantly increased the rate of exclusive breastfeeding at three months postpartum (RR 1.35; 95% CI 1.21, 1.50, p < 0.0001) (Fig. 4).

Discussion

The results of the meta-analysis demonstrated that paternal support interventions significantly increased the rate of exclusive breastfeeding at various postpartum stages. Notably, interventions targeting fathers within the first three months postpartum markedly increase mothers' positive inclination toward exclusive breastfeeding. These findings underscore the critical role of fathers in promoting breastfeeding practices. Nevertheless, given that only one of the included studies utilized the six-month

Table 2 Basic	characteristics and quality assessment of t	he included	studies						
First author, Date	Abstract	Sample size		Intervention meas	ure	Intervenor	Intervention	Primary outcome	Quality grade
or publication		Intervention group	Control group	Intervention group	Control group		rrequency		
Abbass-Dick et al. Canada, 2015 [8]	Objective: To evaluate the effectiveness of a coparenting intervention on exclusive breastfeeding among primiparous mothers and fathres and fathres and submet the seconducted in a large teaching hospital in Toomto, Canada. Couples were randomized to receive either usual care ($n = 10$?) or a coparenting breastfeeding support intervention ($n = 10$?). Follow-up of exclusive breastfeeding and diverse secondary outcomes was conducted a fa 6 and 1.2 weeks postpartum ($n = 10$ %). Follow-up of breastfeeding at a 1.3 weeks postpartum ($p = 10$ %). Follow-up of breastfeeding at a 1.2 weeks postpartum ($p = 0.02$), hubugh proportionately more mothers in the intervention group than in the control group to breastfeeding at 0.2 were suchively propertionately more mothers in the intervention group than in the control group to a differences were not significant. Fathers in the intervention group than in the control group prosportionately more mothers in the intervention group than in the control group of a differences were not significant. Fathers in the intervention agroup than in the control group prosportum significantly more mothers in the intervention differences were not significant. Fathers in the finet were superstand with the intervention group than in the control group were addition, significantly more mothers in the intervention addition, patental involvent addition, patereal beastfeeding addition,	107	107	1, 2, 3, 4, 5	Usual care	Research assistant	At one, two, three, six and twelve weeks after bir th	Rate of exclusive breastfeeding at 6 and 12 weeks after birth	Ω

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First author, Date	Abstra ct	Sample size		Intervention meas	ure	Intervenor	Intervention	Primary outcome	Quality grade
		Intervention group	Control group	Intervention group	Control group		irequency		
2018 [4] 2018 [4]	Objective: To determine whether an intervention to involve the male partners of pregnant women in maternity care influenced care-seeking, heastifteding in each and contra- ceptive practices after childbirth in urban Burkina Faso Methods: In a non-blinded, multicenter, parallel-group, superiority trial, 1144 women were assigned by simple randomization to nov study amis. S33 entreed the interven- tion arm and S61 entered the control arm. All women were cohabiting with a male partner and had a low-risk pregnancy. Recruitment took place at 20 to 36 weeks' gestation af the primary health centers in Bobo-Diolulasso. The intervention comprised three educational session during pregnancy for individual couples; and (iii) a possinal couple counselling session. The control group necelved during pregnancy for individual couples; and (iii) a possinal couple counselling session. The control group necelved to more curpatient postinal couples on the pregnantum the intervention narm. 74% (43.2 / 583) of couples or men attended at least two study sessions. Attendance at two on more outpatient postinal caste consultation was exclusive frequent in the intervention than the control group fiels, difference. BD: 11.7%; 95% CI 0.0 17.5], as and 81 months postpartum (RD, 64%; 95% CI 0.0 10.17.5]. Sa months postpartum (RD, 64%; 95% CI 0.5 to 12.3) condusion: Involving men as sociated with better adherence to recom- mended healthy practices direct hidbirth	283	261	2, 5	Usual care	Midwife	Six hours after birth, and every Saturday moming: a total of 52 meetings	Rate of exclusive breast- feeding for 3 months after birth	<u>م</u>

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Eiret author Date	Abstract	Samula ciza		Intervention meacu	q	Intervenor	Intervention	Drimary outrome	Output the de
of publication		Intervention group	Control group	Intervention group	Control group		frequency		
Maycock et al. Australia, 2013 [9]	Background: Studies have identified numerous factors affect- ing breastfeeding initiation and duration, including maternal education, mode of delivery, birth weight, socioeconomic status, and support of the infant? father status, and support of the infant? father of an antenatal education session and postnatal support targeted to fathers of an antenatal education session and postnatal support targeted to fathers is a RCT to increase the initiation of breast- feeding that was conducted in 8 public maternity hospitals in PertII, Western Australia. A total of 699 couples were andomized within hospitals to either intervention or control groups. The any breastfeeding are for the intervention group was isgoinfor and postnatal support provided to fathers feeding that was conducted in 8 public maternity hospitals in PertII, Western Australia. A total of 699 couples were andomized within hospitals to either intervention or groups. The any breastfeeding in the intervention group was isgoinfor any breastfeeding in the intervention was 1.84 (1.06–2.33) and for socioeconomic status (SE), 1.56 (1.06–2.33) and for socioeconomic status (SE), 1.56 (1.06–2.30). The infants of fathers with how 55 (<i>p</i> =0.013) conclusion: Even a small increase in the stute status fachers (<i>p</i> < 0.011), and infants of fathers with how 55 (<i>p</i> =0.013) conclusion: Even a small increase in the stute who was fully in the intervention group at 6 weeks: 81.6% in the control group at 6 weeks: 81.6% in the intervention group to 57.2% in the control group	517	4 31	5	Usual care	Male guide	6 weeks and 6 months after birth	6-week feeding pattern, 6-week exclusive breast- feeding rate	ω

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First author, Date	Abstract	Sample size		Intervention meas	ure	Intervenor	Intervention	Primary outcome	Quality grade
		Intervention group	Control group	Intervention group	Control group		irequercy		
Chen et al. China, 2021 [10]	Objective: To explore the influence of enhanced father's participation in supportive nursing on the rate of breastfeed- ing and growth and development of newborns. Methods: A total of 96 newborns hospitalized in Jiangmen Central Hospital from January 2019 to December 2019 were selected and divided into a control group and an observa- tion group according to the random number rable method, with 48 newborns in each group. The control group was given routine nursing, and the observation group was given routine nursing, and the satisfaction of fathers were compared between the woo groups. Results: There were statistically significant differences between the observation group and the control group in terms of body mass head circumference, body length and other growth and devel- opment after 1 month ($pp < 0.03$). The breastfeeding rate in the observation group was higher than that in the control group, and the difference was statistically significant $p <$ group, and the difference was statistically significant $p <$ group and the difference was statistically significant $p <$ group and the difference was statistically dipher than that of the newborn, and improve the statisfaction of the newborn, of the newborn, and improve the statisfaction of the newborn.	84	48	2,4,6	Usual care	Nursing staff	72 h after birth, 1 month after dis- charge	Exclusive breastfeed- ing rate 2 h after birth and at discharge	Δ
Wang et al. China, 2022 [11]	Objective: To explore the influence of father participatory nursing on breastfeeding rate and growth and development of renorates. Meth- ods: 110 neonates born in our hospital from May 2019 to May 2021 were selected and randomly divided into control group. The control group, with 55 cases in each group. The control group was given nutrine nursing, and the experi- mental group was given tather participatory nursing on the basis of the control group. The prestreading rate and the growth and develop- ments in the two groups were compared. Results: After 3 days and 1 month of birth, the breastfeed- ing rates of the experimental group were higher than those of the control group (p < 005). I month between the two groups (p > 005). I month and body length, head circumferance and body length, head circumferance ing rates of the experimental group were higher than those of the control group (p < 005). Conclusions: Father participatory nursing can effectively improve the breastfeeding rate, here the growth is worthy of clinical promotion and application		22	1, 3, 6, 7, 8	Usual care	Nursing staff	Prenatal, hospi- talization, 3 days after birth, 1 month after birth	Breastfeeding rate 3 days after birth and 1 month after birth	۵

First author, Date	Abstract	Sample size		Intervention meas	ıre	Intervenor	Intervention	Primary outcome	Quality grade
		Intervention group	Control group	Intervention group	Control group		ireducire)		
Xia et al. China, 2022 [12]	Objective: To investigate the effect of father's participatory care on primiparous women's breastfeeding self-efficacy and newborn care sills. Methods: 56 cases of primigravid women who gave birth in the obstetrics department dependent of the hospital from January 2020 to June 2021 were ran- domly divided into 48 cases in the observation group and 48 cases in the control group. The control group implemented father-participatory care on the basis of the control group. The two groups were compared in terms of self-efficacy for breastfeeding, knowledge and skills related to newborn cases and exclusive breastfeeding rates before hospital discharge and 42 days postpartum Results: Maternal breastfeeding rates before hospital discharge and 42 days postpartum Results: Maternal breastfeeding self-efficacy and newborn care knowledge and skills were higher in the observa- tion group than in the control group, with statistically significant differences (p < 0.05); the exclusive breastfeeding rates of the observation group were higher than those of the control group before hospital differences (p < 0.05). Condusions: The father-participatory care program included fathers as the target of health education, and provided guid- ance and training to moders and their gouses on breast- feeding and newborn care, which has positive significant differences (p < 0.05). Condusions: The father-participatory care program included fathers as the target of health education, and provided guid- ance and training to moders and their gouse on breast- efficience of the observation group were higher there are of the mothers' mastery of mewborn care, which has positive significant efficance for promot- ing breastfeeding and improving the quality of postpartum health education	8	84	of . f	Usual care	Nursing staff	Prenatal and post- natal	Rate of exclusive breast- feeding before discharge and 42 days after birth	m
LI, China, 2021 [13]	Objective: To explore the application of father's participatory health education in maternal postpartum recovery Methods.'s for mothers admitted to the Obstentics Depart- ment of the hospital from January to December 2020 were selected for the study, and were andomly divided into the observation group and the control group, with 38 cases in each group. The control group, with 38 cases in each group. The control group, with 38 cases in each group. The control group, with 38 cases in each group was given routine perinatal care and health education. The two groups were observed and compared in terms of postpartum recovery and the implementation of exclusive lines/iteeding Results: The postnatal recovery of the observation group was better than that of the control group, with a statistically significant difference ($\rho < 0.05$); the exclusive with a statistically gignificant difference ($\rho < 0.05$); the exclusive with a statistically significant difference ($\rho < 0.05$); the exclusive with a statistically significant difference ($\rho < 0.05$); the exclusive with a statistically significant difference ($\rho < 0.05$); the exclusive with a statistically significant difference ($\rho < 0.05$); the exclusive with a statistically significant difference ($\rho < 0.05$); the exclusive with a statistically by mobilizing fathers to participate in postpartum recovery and newborn care, and giving effective support to mothers	ñ	Ř	1, 2, 10	Usual care	Nursing staff	Prenatal and post- natal	Exclusive breastfeeding for 42 days after birth	ω

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First author, Date	Abstract	Sample size		Intervention meas	ure	Intervenor	Intervention	Primary outcome	Quality grade
of publication		Intervention group	Control group	Intervention group	Control group		frequency		
2020 [1-4]	Objective: To explore the effect of father-participated nursing interventions on self-efficacy and behavior of breastfeed- ing morters based on self-efficacy theory, theory, theory and observation group according to the random number table method. 125 cases in each group in the con- rol group, the parturients were given routine nursing. In the observation group, were given routine nursing in the observation group, the parturients were given routine nursing. In the observation group, the parturients were given routine nursing in the observation group, the parturients were given routine nursing. In the observation group, the parturients were given routine nursing in the observation group, the parturients were given routine nursing in the observation group, the parturients were given father's participation number that must at a months postpart- turn, the maternal breastfeeding self-efficacy stores in both groups series compared by various scales, and the rates of exclusive breastfeeding self-efficacy scores in both groups significantly higher than that at 3 days postpartum (all $p < 0.05$). At 3 months postpartum (the neastfeeding self-efficacy scores in both groups significantly higher than that at 3 days postpartum (the neastfeeding self-efficacy scores in the observation group were significantly higher than that at 1 month ord 3 group ($p < 0.05$). At 3 months postpartum (the neastfeeding self-efficacy scores in the observation group were significantly higher than that it the control group ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum (the rate of exclusive breastfeeding of the observation group ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 months postpartum ($p < 0.05$). At 3 month	25	125	1, 2, 6, 8	Usual care	Nursing staff	Push popular sci- ence content every day within 100 days after birth; regular telephone follow-up	Rate of exclusive breast- feeding for 3 days and 3 months after birth	۵

Interventions: 1. Oral breastfeeding education; 2. Consultations, lectures, or courses led by breastfeeding specialists, 3. Distribution of breastfeeding information booklets; 4. Provision of educational videos or websites on breastfeeding; 5. Facilitation of interactive discussions on breastfeeding; 6. Online follow-up via phone or WeChat groups; 7. Dissemination of breastfeeding knowledge through public accounts; 8. Instruction and training in breastfeeding techniques; 9. Postpartum social support programs; 10. Guidance on maternal and newborn care skills

	Paternal Support		Usual Care		Risk Ratio			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl		M-H, Fixed, 95% Cl
Abbass-Dick , 2015	75	104	62	102	10.8%	1.19 [0.97, 1.44]		-
Chen , 2021	41	48	32	48	5.5%	1.28 [1.02, 1.62]		-
Daniele , 2018	232	535	161	511	28.5%	1.38 [1.17, 1.62]		+
Li, 2021	33	38	27	38	4.7%	1.22 [0.96, 1.55]		-
Maycock , 2013	164	353	133	298	25.0%	1.04 [0.88, 1.23]		+
Shi , 2020	95	125	67	125	11.6%	1.42 [1.17, 1.72]		-
Wang , 2022	51	55	43	55	7.4%	1.19 [1.01, 1.39]		+
Xia , 2022	43	48	37	48	6.4%	1.16 [0.97, 1.39]		-
Total (95% CI)		1306		1225	100.0%	1.24 [1.15, 1.33]		•
Total events	734		562					
Heterogeneity: $Chi^2 = 8.67$, $df = 7$ (P = 0.28); $l^2 = 19\%$								
Test for overall effect: $Z = 5.67 (P < 0.00001)$								Favours [control] Favours [experimental]

Fig. 3 Meta-analysis of the impact of paternal support interventions on exclusive breastfeeding rates

	Paternal Support		Usual Care		Risk Ratio		Risk Ratio			
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl	M-H, Fixed, 95% Cl			
1.1.1 <1 week										
Chen , 2021	41	48	32	48	4.1%	1.28 [1.02, 1.62]	· · · · · · · · · · · · · · · · · · ·			
Shi , 2020	95	125	67	125	8.5%	1.42 [1.17, 1.72]	│ • • • •			
Wang , 2022	51	55	43	55	5.5%	1.19 [1.01, 1.39]	· · · · · · · · · · · · · · · · · · ·			
Xia , 2022	43	48	37	48	4.7%	1.16 [0.97, 1.39]				
Subtotal (95% CI)		276		276	22.7%	1.28 [1.16, 1.42]				
Total events	230		179							
Heterogeneity: $Chi^2 =$	3.18, df = 3	(P = 0.3)	6); $I^2 = 6$	%						
Test for overall effect:	Z = 4.93 (P <	< 0.0000)1)							
1.1.2 30-42 days pos	stpartum									
Abbass-Dick, 2015	75	104	62	102	8.0%	1.19 [0.97, 1.44]				
Li, 2021	33	38	27	38	3.4%	1.22 [0.96, 1.55]	· · · · · · · · · · · · · · · · · · ·			
Maycock, 2013	164	353	133	298	18.3%	1.04 [0.88, 1.23]	_			
Wang , 2022	51	55	43	55	5.5%	1.19 [1.01, 1.39]	· · · · · · · · · · · · · · · · · · ·			
Xia , 2022	43	48	37	48	4.7%	1.16 [0.97, 1.39]				
Subtotal (95% CI)		598		541	39.9%	1.12 [1.02, 1.23]				
Total events	366		302							
Heterogeneity: $Chi^2 =$	2.24, df = 4	(P = 0.6)	9); $I^2 = 0$	%						
Test for overall effect:	Z = 2.38 (P =	= 0.02)								
1.1.3 3 months postp	artum									
Abbass-Dick, 2015	75	104	62	102	8.0%	1.19 [0.97, 1.44]	+			
Daniele , 2018	232	535	161	511	20.9%	1.38 [1.17, 1.62]	_			
Shi , 2020	95	125	67	125	8.5%	1.42 [1.17, 1.72]	$ \longrightarrow $			
Subtotal (95% CI)		764		738	37.4%	1.35 [1.21, 1.50]				
Total events	402		290							
Heterogeneity: Chi ² =	1.94, df = 2	(P = 0.3)	8); $I^2 = 0$	%						
Test for overall effect:	Z = 5.36 (P <	< 0.0000)1)							
Total (95% CI)		1638		1555	100.0%	1.24 [1.17, 1.32]	•			
Total events	998		771							
Heterogeneity: Chi ² =	11.66, df = 1	11 (P = 0)).39); I ² =	= 6%						
Test for overall effect: $Z = 7.12$ (P < 0.0001)										
Test for subgroup differences: $Chi^2 = 7.26$, $df = 2$ (P = 0.03), $l^2 = 72.5\%$										

Fig. 4 Subgroup analysis results of the impact of paternal support interventions on exclusive breastfeeding rates at various time periods

breastfeeding rate as an outcome indicator, the role of paternal support in the later stages of breastfeeding remains insufficiently elucidated. Consequently, future research must urgently expand sample sizes, adopt a multicenter design, and extend follow-up periods to facilitate more comprehensive and high-quality investigations.

Multiple studies have demonstrated that proactive paternal intervention in supporting breastfeeding significantly enhances both the success rate and the duration of breastfeeding [8, 15]. As highlighted during World Breastfeeding Week 2024, the concept of "partner sharing facilitates breastfeeding" underscores the importance of actively involving the father of a newborn in the breastfeeding process. This involvement can offer significant behavioral support to the mother, thereby enhancing her confidence in breastfeeding and positively influencing her mental health and self-efficacy. Consequently, this support can lead to increased breastfeeding rates [8]. The "Chinese Breastfeeding Influence Factors Survey Report" indicates that the support rates of grandmothers, grandmothers and fathers for breastfeeding in Chinese families was 89.4%, 87.7% and 89.6% [16]. Furthermore, paternal attitudes have a significantly positive effect on maternal adherence to exclusive breastfeeding within the first six months. The incidence of exclusive breastfeeding within this period is markedly greater among mothers who receive paternal support than among those who do not. Additionally, Drysdale's research findings indicate that women who receive support from their partners are three times more likely to practice exclusive breastfeeding than women in the control group who do not [17]. This observation aligns with the results of the present study and underscores the critical role of paternal support. However, other studies have reported that paternal support interventions do not significantly increase breastfeeding rates, which contrasts with the findings of this study. The discrepancy in these results may be attributed to the unique characteristics of the specific study samples. For example, a study conducted in Australia reported that participants already possessed higher levels of education, health literacy, and a strong predisposition to breastfeed at baseline, potentially diminishing the observable impact of supportive interventions within these cohorts [18]. This indicates that when evaluating the efficacy of paternal support interventions, it is crucial to consider the heterogeneity of the sample population and specific contextual factors. Within the family environment, fathers serve not only as emotional support pillars but also as essential contributors to the practical aspects of parenting. Unlike volunteers and healthcare professionals, fathers, as integral family members, may provide sustained care to mothers during the perinatal period, share parenting responsibilities, and offer emotional support, thereby demonstrating distinct advantages. Research suggests that fathers' immediate involvement in facilitating skin-to-skin contact and early breastfeeding initiation post-childbirth is critical for the successful commencement of breastfeeding [19]. Koksal's study highlights that paternal involvement in night-time childcare during the initial phase of breastfeeding facilitates increased rest for mothers, thereby positively influencing maternal recovery and breastfeeding outcomes [15]. Furthermore, research by Rempel et al. demonstrated a significant correlation between paternal emotional support during pregnancy and maternal self-efficacy in breastfeeding, which is instrumental in both the initiation and continuation of breastfeeding [20]. Moreover, extant research has shown that sustained emotional support from fathers is a critical determinant in the maintenance of prolonged breastfeeding [11, 15]. Nonetheless, practical implementation reveals a pronounced deficiency in paternal engagement in breastfeeding practices. This shortfall may be attributed to an amalgamation of factors, including sociocultural influences, gender role stereotypes, insufficient knowledge and education, occupational pressures and time limitations, lack of support and encouragement, communication barriers, and prevalent misconceptions regarding breastfeeding [16]. In numerous cultural contexts, breastfeeding is perceived as an intrinsic maternal responsibility, often leading to the marginalization or diminished significance of paternal roles. Furthermore, fathers may possess limited knowledge regarding the critical importance of breastfeeding and the ways in which they can provide support. This knowledge gap is frequently exacerbated by insufficient guidance and encouragement from healthcare professionals, societal norms, and familial expectations [21]. Additionally, occupational demands and time constraints constitute significant factors that influence the extent of paternal involvement. As the father is often the primary economic providers for their families, they encounter the challenge of balancing professional and familial responsibilities, particularly when paternity leave is limited. This constraint can result in reduced long-term involvement in breastfeeding practices [8]. Additionally, communication barriers and misconceptions surrounding breastfeeding may further impede fathers' active participation in this aspect of childcare [20]. To address these challenges, future research should consider practical factors and collaborate with health organizations to develop intervention programs that more effectively meet the needs of the target population [16]. This may encompass the provision of education and training, the enhancement of fathers' comprehension regarding the significance of breastfeeding, and the offering of practical support and resources to assist fathers in overcoming barriers to their participation in breastfeeding. Such interventions can increase the degree of paternal involvement in breastfeeding, thereby fostering a more supportive and conducive environment for both mothers and infants.

Research has substantiated the pivotal role of paternal support in promoting breastfeeding. However, on a global scale, particularly in developing countries, fathers often do not fully acknowledge the importance of their support in breastfeeding due to various impediments emanating from the health system, social environment, and personal factors. Additionally, there are notable disparities in intervention strategies and economic investments aimed at supporting breastfeeding across different regions. A UNICEF report indicates that only 15 countries worldwide have implemented three essential national policies to support family parenting [22]. Among these policies is the provision of four weeks of paid paternity leave for fathers, which facilitates their involvement in parenting and breastfeeding support. It is concerning that the majority of countries presently fail to acknowledge the critical role of fathers in breastfeeding support, thereby hindering the delivery of comprehensive breastfeeding assistance.

A study indicates that within the Syrian refugee community, breastfeeding decisions are predominantly made by mothers, with minimal paternal involvement and inadequate financial and practical support [23]. This affects maternal health and breastfeeding. Enhancing economic and social support, along with tailored policies for refugees, could boost family planning and create a more breastfeeding-friendly environment. In Vietnam, breastfeeding support initiatives frequently manifest as community-based activities aimed at fathers within regional contexts [24, 25]. Conversely, in China, interventions predominantly emphasize in-hospital care for mothers, supplemented by online follow-up post-discharge [10-14]. In developed nations such as Australia, multicenter and multi-institutional collaborative projects advance paternal support for breastfeeding through the development of targeted applications, such as Milk Man, thereby offering fathers a more accessible support environment [18]. These differences suggest that the efficacy of interventions may differ substantially across regions. Consequently, addressing the breastfeeding gap is important, future research should consider local socioeconomic conditions and cultural contexts when designing and implementing breastfeeding support interventions to ensure their effectiveness and adaptability.

Limitations

Although this study provides compelling evidence regarding the impact of paternal support interventions on breastfeeding outcomes, we acknowledge certain limitations that must be addressed in subsequent research: ① Scope of the literature search: This study is confined to the retrieval of publicly available literature in Chinese and English, potentially excluding research findings in other languages or unpublished results, which may impact the comprehensiveness of the literature review. ② Assessment of literature quality: The eight included studies were all evaluated as Grade B, suggesting that while the research findings possess a certain level of reliability, there remains substantial scope for enhancement in the overall quality of the literature. ③ Heterogeneity issues: Despite the heterogeneity test indicating minimal heterogeneity among the study results, potential clinical and methodological variations across different studies may still influence the interpretation of the findings. ④ Limitations of evaluation indicators: The evaluation indicators utilized in the literature are not sufficiently comprehensive, omitting critical measures such as breastfeeding self-efficacy and neonatal growth and development. Furthermore, owing to data constraints, an in-depth exploration of the specific mechanisms was not feasible.

Conclusion

In conclusion, this study elucidates the beneficial impact of paternal support interventions on enhancing breastfeeding rates. Educational initiatives directed at fathers represent a straightforward yet efficacious approach that markedly fosters breastfeeding practices among women. These interventions not only surpass conventional breastfeeding care methods but also lead to favorable outcomes in prolonging breastfeeding duration and increasing the rate of exclusive breastfeeding. Nevertheless, the existing body of research is predominantly based on a limited number of high-quality RCTs.

To enhance the efficacy of interventions, it is imperative to engage in a more thorough optimization and refinement of existing measures. This entails the meticulous improvement of intervention methodologies and a comprehensive analysis of potential barriers that impede paternal involvement in breastfeeding, with the aim of devising more precise and suitable solutions. We advocate that researchers increase the scale of their study samples, employ a multi-indicator comprehensive assessment approach, and endeavor to enhance the rigor of research design and the quality of the literature. Through the implementation of these measures, we aim to gather additional high-quality evidence to substantiate and reinforce the conclusions of this study, thereby offering a more robust scientific foundation for clinical practice.

Moreover, we advocate for future research to extend beyond the assessment of intervention effects to include an in-depth examination of the roles and experiences of fathers in the breastfeeding process, as well as their influence on the health outcomes of mothers and infants. This research will enhance our understanding of the importance of paternal involvement in breastfeeding and facilitate the development of more comprehensive support strategies to promote breastfeeding within the family context.

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Authors' contributions

Sisi Zhou conceptualised the paper, conducted the analysis and wrote the original draft. Sisi Zhou and Jia lu curated and analyzed data. Yang Wang, Lin

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Data availability

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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