




# Health Cadre Mentoring Model in Stunting Prevention Programs: A Systematic Literature Review

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**Aim:** Stunting remains a major public health problem in low- and middle-income countries, including Indonesia, with long-term consequences for physical growth, cognitive development, and adult productivity. Health cadres (community health workers/CHWs) play a crucial role in community-based stunting prevention; however, evidence regarding effective mentoring models remains fragmented.

**Purpose:** This review aims to synthesize evidence on health cadre mentoring models in stunting prevention, with particular attention to behavioral change components and their theoretical underpinnings.

**Patients and Methods:** A systematic literature review was conducted following PRISMA 2020 guidelines. Articles published between 2014 and 2025 were retrieved from five databases: PubMed, ScienceDirect, Google Scholar, SpringerLink, and Scopus. A total of 1475 records were identified, with 1310 articles remaining after duplicate removal. After title and abstract screening, 99 full-text articles were assessed for eligibility, and 52 studies were included. Methodological quality was appraised using the Joanna Briggs Institute (JBI) tools. Data were analyzed using a thematic (narrative) synthesis and mapped to behavior change theories.

**Results:** The 52 included studies describe diverse mentoring models, including structured training, interpersonal communication, participatory approaches, growth monitoring, quality improvement, and digital platforms. These interventions were associated with improvements in cadre knowledge, skills, and engagement, and with changes in family health behaviors. Evidence regarding impacts on child growth and stunting outcomes was mixed and context-dependent. Key enabling factors included continuous supervision, cultural adaptation, and multisectoral collaboration, while challenges related to sustainability and resource constraints were frequently reported.

**Conclusion:** Health cadre mentoring models show potential to strengthen cadre capacity and support behavior change for stunting prevention. However, the effectiveness of these interventions varies across contexts and implementation characteristics, and evidence on long-term impacts on child nutritional status remains limited. Further research is needed to develop sustainable, context-specific, and system-integrated mentoring approaches.

**Keywords:** stunting, health cadres, mentoring models, behavior change

## Introduction

Stunting remains an urgent public health issue in Indonesia, particularly during the first 1000 days of life (from conception to a child's second birthday). This condition is characterized by impaired physical growth in children (height below the age-standard) and has long-term impacts on cognitive development, metabolic health, and productivity in adulthood.<sup>1-3</sup> Globally, approximately 22% of children under five years old experience stunting, equivalent to more than 149 million children.<sup>4,5</sup> The prevalence of stunting in Indonesia has declined from 24.4% in 2021 to 21.5% in 2023; however, this remains above the WHO threshold (<20%) and national targets.<sup>6,7</sup>

Various efforts have been implemented to address stunting, including nutrition supplementation, breastfeeding promotion, and community-based interventions. One key strategy is a family-based approach involving health cadres (community health workers/CHWs), who provide mentoring to families at risk of stunting across the life cycle. Cadres

play a central role due to their close social relationships with the community.<sup>8–11</sup> The effectiveness of cadres in performing their roles is strongly influenced by the mentoring models applied. Well-designed mentoring can enhance cadre competencies, strengthen motivation, and improve program continuity and community acceptance.<sup>12,13</sup>

In this review, mentoring models are defined as structured approaches that include training, supervision, feedback mechanisms, and community-based interactions such as home visits and participatory activities. Previous studies have highlighted the importance of continuous support for cadres, including training, supervision, and appropriate educational tools, in improving child feeding practices and service delivery.<sup>14</sup> However, these studies are often fragmented and context-specific. Although the role of health cadres in stunting prevention is well recognized, there remains a lack of systematic evidence comparing different mentoring models. Most existing studies are descriptive and focus on local program implementation, without providing comprehensive analysis of mentoring structures, key components, and their relative effectiveness across settings.

Furthermore, the literature synthesizing essential elements of mentoring models such as training approaches, supervision mechanisms, communication strategies, and sustainability remains limited. This gap hinders the development of scalable and evidence-based mentoring frameworks.

Therefore, a systematic literature review (SLR) is needed to identify, evaluate, and synthesize health cadre mentoring models in stunting prevention programs. This review aims to provide a comprehensive understanding of existing approaches, highlight their strengths and limitations, and inform the development of more effective, adaptive, and sustainable interventions.

Based on this rationale, the present review addresses the following research questions:

1. What types of cadre mentoring interventions have been implemented to prevent stunting?
2. What behavioral change components (knowledge, skills, attitudes, motivation, advocacy, and communication) are addressed in these interventions?
3. How do these interventions align with behavior change theories in influencing family practices such as exclusive breastfeeding, complementary feeding, and health service utilization?

This review further maps intervention components to behavior change constructs (knowledge, skills, attitudes, motivation, communication, and advocacy) using established theories, including the Theory of Planned Behavior, Social Cognitive Theory, and the Health Belief Model, to better understand the mechanisms underlying mentoring effectiveness.

## Materials and Methods

### Study Design

This study is a systematic literature review conducted in accordance with the PRISMA 2020 guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).<sup>15</sup> The review aims to identify, evaluate, and synthesize current evidence on health cadre mentoring models in stunting prevention programs.

### Eligibility Criteria

The research questions were formulated using the PICCO framework (Population, Intervention, Context, Comparison, and Outcome). The detailed PICCO components, along with the inclusion and exclusion criteria, are presented in [Table 1](#).

### Selection Process

A systematic search was conducted across five electronic databases: PubMed, Scopus, ScienceDirect, SpringerLink, and Google Scholar. The search covered publications from 2014 to 2025. The search strategy combined keywords and MeSH terms related to stunting, community health workers, and mentoring. An example of the search string used was: (“stunting” OR “child malnutrition”) AND (“health cadres” OR “community health workers”) AND (“mentoring” OR “training” OR “capacity building”). The search strategy was adapted for each database. In addition to database searching, supplementary searches were conducted through manual searching and snowballing of reference lists from relevant articles.

**Table 1** The PICCO Framework, Inclusion and Exclusion Criteria

Category	Inclusion Criteria	Exclusion Criteria
1. Population (P): health cadres such as Posyandu cadres and village midwives 2. Intervention (I): mentoring, training, capacity strengthening, supervision, empowerment 3. Context (C): stunting prevention programs and child nutrition interventions 4. Comparison (C): no mentoring or conventional approaches 5. Outcome (O): changes in cadre competencies, program effectiveness, and impact on family practices related to stunting prevention.	1. Primary research studies (quantitative, qualitative, or mixed-methods) 2. Published between 2014 and 2025 3. Peer-reviewed articles written in English or Indonesian to ensure contextual relevance 4. Full-text available 5. Studies addressing mentoring, training, supervision, or empowerment of health cadres in stunting prevention or community-based nutrition contexts	1. Editorials, opinion pieces, commentaries, or narrative reviews 2. Articles not involving health cadres or unrelated to stunting or nutrition 3. Studies focusing solely on clinical interventions without community or cadre involvement 4. Studies with insufficient methodological information

All retrieved records were exported and screened using Rayyan web-based systematic review software (Rayyan QCRI) to facilitate blinded screening. Title and abstract screening, followed by full-text assessment, were conducted independently by two reviewers. Discrepancies between reviewers were resolved through discussion and consensus. The study selection process is presented in a PRISMA 2020 flow diagram.

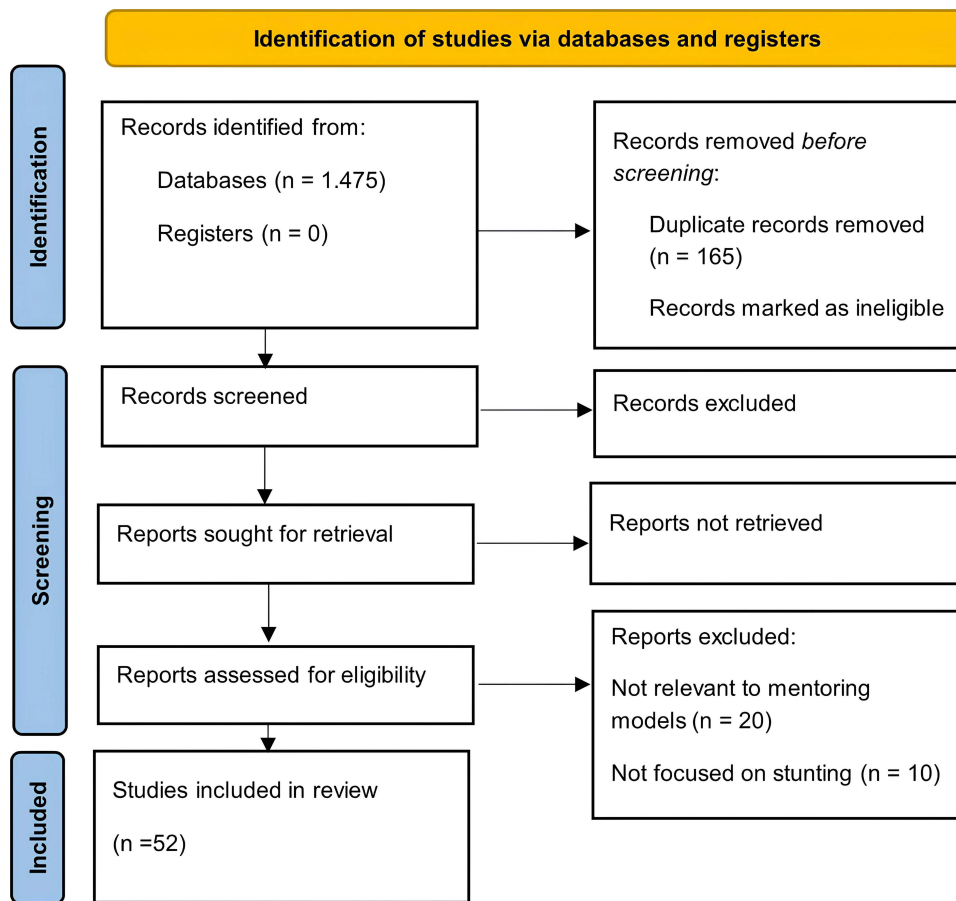
## Quality Appraisal and Risk of Bias Management

The results of this process were presented in a PRISMA 2020 flow diagram (Figure 1). The methodological quality of the included studies was assessed using the JBI Critical Appraisal Tools, with adjustments made according to each study design (quantitative, qualitative, or mixed-methods). This appraisal ensured that only studies with sufficient methodological rigor were considered reliable for inclusion in the synthesis. No studies were excluded solely based on quality assessment; instead, studies were categorized according to their methodological quality and this was taken into account during data interpretation to maintain the validity and credibility of the review findings.<sup>16</sup> Data from the selected studies were systematically extracted, including authors, year, study location, research design, participant characteristics, type of intervention, and main outcomes. Data analysis was conducted using a thematic synthesis approach, allowing grouping of data according to key themes such as mentoring forms, training media, the role of cadres in stunting prevention, and the intervention's impact on child nutritional status.<sup>17</sup> Visualization of the synthesis results could include thematic tables, inter-theme relationship matrices, or word clouds using software such as NVivo.<sup>18</sup>

In addition to thematic grouping, the extracted findings were further mapped onto established behavior change theories to analyze how mentoring interventions address components such as knowledge, skills, attitudes, motivation, advocacy, and communication. Theoretical lenses applied in this review included the Theory of Planned Behavior (Ajzen, 1991), Social Cognitive Theory (Bandura, 1986), and the Health Belief Model (Rosenstock, 1974). This step enabled a structured interpretation of the behavioral mechanisms underlying cadre mentoring models, ensuring that the synthesis not only describes interventions but also explains how they align with behavior change frameworks.

In addition to presenting a data synthesis, this review also identifies research gaps, such as the absence of mentoring models specifically designed for rural communities with limited resources, and the lack of longitudinal studies measuring the sustained impact of interventions. The theoretical contribution of this review lies in expanding the understanding of evidence-based cadre capacity-building models, while its practical contribution provides recommendations for policies aimed at improving cadre quality to support stunting prevention programs at the community level.

To reduce bias, we adopted several strategies: (1) using two independent reviewers for screening, data extraction, and coding; (2) applying the JBI appraisal tools and recording study quality within the synthesis; (3) conducting sensitivity analyses by excluding low-quality studies to test the robustness of the findings; (4) triangulating evidence across multiple outcomes (knowledge, practice, anthropometry) rather than relying on single indicators; and (5) explicitly addressing potential language and publication bias in the limitations section.



**Figure 1** Prisma Flow Diagram.

## Results

A total of 52 studies were included in this review. The characteristics of the included studies are summarized in [Table 2](#). The studies were identified from multiple electronic databases, including PubMed, ScienceDirect, and Google Scholar, the latter of which enabled the inclusion of relevant Indonesian-language studies indexed in SINTA. Articles indexed in SINTA are provided in [Table S1](#). The studies were conducted across various low and middle-income countries and employed diverse designs, including quasi-experimental, randomized controlled trials, qualitative, and mixed-methods approaches. The study populations primarily involved health cadres or community health workers, as well as target groups such as pregnant women and mothers of young children.

The interventions identified were heterogeneous, encompassing training, home visits, group education, and digital-based approaches, with durations ranging from single-session activities to long-term programs. Most studies implemented structured training interventions, often combined with home visits or supportive supervision. The outcomes assessed across studies included improvements in cadre capacity, maternal health practices, and child nutritional status. The majority of studies reported improvements in cadre knowledge, skills, and engagement, while only a smaller proportion reported direct effects on child nutritional outcomes such as stunting reduction or anthropometric improvements.

The methodological quality of the included studies was assessed using the Joanna Briggs Institute (JBI) critical appraisal tools, with the results presented in [Table 3](#). Overall, most studies were classified as moderate quality, while a substantial proportion achieved high quality. Randomized controlled trials generally demonstrated higher methodological rigor, whereas quasi-experimental and descriptive studies tended to show moderate quality due to limitations such as the absence of control groups, shorter intervention duration, and incomplete reporting of follow-up or attrition. No studies were excluded based on quality assessment, as all met the minimum inclusion criteria.

**Table 2** Characteristics Study

No	Author (Year)	Country	Study Design	Population/Sample	Intervention	Duration	Main Findings
1	Etrawati et al (2023) <sup>19</sup>	Indonesia	Quasi-experimental (2 groups)	23 Posyandu cadres	Cadre training (health education to improve knowledge)	1 session	Significant improvement in cadre knowledge ( $p = 0.002$ ).
2	Naimoli et al (2014) <sup>20</sup>	Global (multi-country)	Conceptual model based on literature review and expert consultation	Community Health Workers (CHWs)	Development of CHW performance model (no direct intervention)	Model developed over 2 years	The CHW logic model emphasized that CHW performance depends on technical, social, and incentive support from both community and health systems.
3	Mulyati & Astuti (2020) <sup>21</sup>	Indonesia	Quasi-experimental pre-post design	90 mothers & cadres	Health education intervention for mothers and cadres (collaborative approach)	3 months	Significant increase in knowledge among both mothers and cadres ( $p = 0.001$ ).
4	Kusumawati et al (2024) <sup>22</sup>	Indonesia	Qualitative (observation, interview, document analysis)	Health cadres in Ternyang Village	Needs-based cadre training program	Intensive short-term training	Cadre capacity increased up to 70% in mastering basic competencies; improved coordination and service efficiency.
5	Mediani, H. S., Nurhidayah, I., & Lukman, M. (2020) <sup>11</sup>	Indonesia	Descriptive study	44 health cadres from all sub-districts in Karawang	Intensive cadre training (knowledge and motivation enhancement)	One intensive training session	77.55% cadres had good knowledge; 68.26% had moderate motivation; improvements were noted after training.
6	Van Boetzelaer et al (2019) <sup>23</sup>	Ethiopia	Mixed-methods pilot study	57 Community-Based Distributors (CBDs); 44 selected for intervention	Training + supervision + job aids for community-based distributors	3 months of implementation + 1-day refresher training; job aid development took $\pm 2$ years prior	91% passed skill assessment ( $\geq 80\%$ score); average performance score 89.9% during intervention; performance improved by 2% with each supervisory visit.
7	Altobelli et al (2020) <sup>24</sup>	Peru	Cluster-randomized controlled trial	606 mothers and children aged 0–23 months (baseline & endline)	Positive Deviance/Heath (PD/Heath) nutrition intervention	4 years (2010–2014)	SH intervention significantly improved HAZ among children of literate mothers ( $\beta = 0.77$ ; CI: 0.23–1.31; $p < 0.01$ ); no significant effect for children of illiterate mothers.
8	Shonchoy et al (2023) <sup>25</sup>	Bangladesh	Stepped-wedge RCT (individual, single-blind)	1188 intervention households and 451 controls; children aged 3–21 months	Integrated Home-based Growth Monitoring and Counseling (IHGMC)	6 months (Sep 2019 – Feb 2020); follow-up evaluation after 13 months	IHGMC improved HAZ (+0.58 SD), WAZ (+0.43 SD); significantly reduced stunting and underweight; stronger effects in boys.

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Table 2 (Continued).

No	Author (Year)	Country	Study Design	Population/Sample	Intervention	Duration	Main Findings
9	le Roux et al (2020) <sup>26</sup>	South Africa	Non-randomized two-group comparison (quasi-experimental)	1310 mothers and infants; 636 intervention, 674 control	CHW-led home visiting intervention (maternal and child health support)	±12–18 months from program start; outcomes measured until infants reached 6 months	Intervention mothers more likely to exclusively breastfeed for 6 months (OR = 1.8), less likely to mix formula with porridge (OR = 0.4); children had lower odds of wasting (OR = 0.5) and fewer common illnesses (IRR = 0.8).
10	Rockers et al (2023) <sup>27</sup>	Rwanda	Cluster-randomized controlled trial	1095 caregiver–child dyads from 51 WBOTs (607 intervention, 488 control)	CHW home visits combined with early childhood development intervention	2 years (until child age 24 months); evaluation conducted one year post-intervention	Positive effects observed in households with consistent CHW visits (per-protocol).
11	Horwood et al (2017) <sup>28</sup>	South Africa	Cluster Randomized Controlled Trial (CRCT)	30 supervisors & 240 CHWs; 736 mothers with infants <12 months at baseline; 606 at follow-up	Continuous Quality Improvement (CQI) for CHWs	15 months (including 3-month CQI adaptation period)	CHW intervention increased antenatal visits (29% → 75.7%) and postnatal visits (30.3% → 72.6%), maternal knowledge (43% → 49%, $p = 0.008$ ), and 6-week EBF (65.1% → 76.7%, $p = 0.02$ ).
12	Siswati et al (2022) <sup>29</sup>	Indonesia	Single-group pre-test post-test intervention	30 health cadres in two high-stunting villages	Training + home visits (CGM, CDM, IYCF intervention)	2 days training + 4 weeks home visits	Training significantly improved cadre knowledge in CGM ( $\beta = 8.57$ ), CDM ( $\beta = 9.27$ ), IYCF ( $\beta = 11.7$ ); also improved confidence, self-efficacy, and perceived effectiveness during home visits.
13	Weningtyas et al (2023) <sup>30</sup>	Indonesia	Pre-experimental, one-group pre-test post-test design	20 Posyandu cadres in Dilem Village	Short training on early stunting detection	120 minutes (1 session)	Average knowledge scores increased by 16.5 points (58 → 74.5; $p < 0.001$ ); 17 out of 20 participants improved their scores.
14	Irdawati et al (2024) <sup>31</sup>	Indonesia	Quasi-experimental, pre-test post-test with control group	42 active Posyandu cadres (19 intervention, 23 control)	Training using educational media (pocketbook and growth monitoring card/KMS)	One-time training; evaluated twice post-intervention (week 1 and week 2)	Intervention group showed significant improvement: 15.21 → 17.05 → 19.68 ( $p = 0.003$ ; effect size = 0.96); control group stagnated at second post-test.
15	Fink et al (2017) <sup>32</sup>	Zambia	Open-label Cluster Randomized Controlled Trial (CRCT) with 3 groups: HBGM, CBGM +NS, control	547 children aged 6–24 months from 127 villages	Growth monitoring tools (posters) + parental education	10 months (poster once; 3 community meetings, Oct 2014 – Jul 2015)	HBGM improved weight-for-age (WAZ) by +0.183 SD and protein consumption.
16	Juarez et al (2021) <sup>33</sup>	Guatemala	Quality Improvement (QI) study with longitudinal pre–post evaluation	±165 children <5 years (125 households), agrarian Maya communities	Quality Improvement (QI) intervention with growth monitoring, supplementation, and cadre engagement	2 years (Oct 2017 – Dec 2019)	Stunting decreased from 42.4% → 30.6%; mean HAZ improved from –1.77 → –1.47 ( $p = 0.04$ ); program processes (growth monitoring, supplementation) significantly improved.

17	Galasso et al (2019) <sup>34</sup>	Madagascar	Cluster Randomized Controlled Trial (CRCT), 5 intervention arms	3738 mothers and children <12 months; 125 program sites	Multi-arm nutrition and behavior change intervention (including LNS and BCC)	2 years (2014–2016)	No significant main effects across full sample.
18	Abiyu & Belachew (2020) <sup>35</sup>	Ethiopia	Cluster-RCT (intervention and control groups)	612 infants <6 months (306 intervention, 306 control); involvement of mothers, fathers, and grandmothers	Behavior Change Communication (BCC) on complementary feeding involving family members	9 months (Apr – Dec 2017)	Significant improvements in diet: milk (RR = 1.8), eggs (RR = 3), vitamin A fruits/vegetables (RR = 2.7), other fruits/vegetables (RR = 5), animal-source foods (RR = 2); MDD (8% → 21%, RR = 3), MMF (39% → 62%, RR = 2.4), MAD (5.6% → 16%, RR = 2.7); all p < 0.05.
19	Chapman et al (2024) <sup>36</sup>	Indonesia & Senegal	Double case study using participatory methods (WeValue InSitu + PEX-FGD)	83 participants from 20 groups: mothers, fathers, grandmothers, teachers, farmers, traders, health workers, administrators	Culturally adapted nutrition intervention (participatory, value-based approach)	2 weeks of data collection per site (Dec 2019–Jan 2020 in Indonesia; Dec 2020 in Senegal), ~200 research hours	Identified dominant cultural values: religious importance (Islam), patriarchal family structures, significant roles of fathers & grandmothers, food-sharing practices, local food beliefs during pregnancy; culturally informed protocol developed (egg supplementation for pregnant women).
20	Patel et al (2024) <sup>37</sup>	India	Intervention development using Theory of Change (ToC) + process evaluation via Program Impact Pathway (PIP)	2501 pregnant women (<20 weeks gestation), followed until infants reached 18 months; involving ASHA and nurse-midwives	mHealth-supported CHW intervention (M-SAKHI program)	From <20 weeks gestation until infants were 18 months old	mHealth improved ASHA motivation and performance, participant knowledge on nutrition, antenatal care, IYCF, hygiene, and increased health service use and infant growth.
21	Robert et al (2017) <sup>38</sup>	Cambodia	Multi-stage formative research with ethnographic approach: interviews, FGDs, facility observations, household trials	3 health facilities and covered communities; informants included health workers (doctors, nurses, nutritionists) and mothers of children aged 6–18 months	Facility- and community-based nutrition education and behavior change intervention	3 months formative stage and initial intervention; long-term outcomes reported in follow-up studies	Improved maternal understanding and acceptance of nutrition messages; established nutrition promotion culture in facilities; enhanced consistency and coverage of education. Long-term follow-up showed >½ reduction in stunting and improved nutrient intake.
22	Tomlinson et al (2015) <sup>39</sup>	South Africa	Cluster Randomized Controlled Trial (CRCT)	1238 pregnant women; 644 intervention (PIP), 594 control (SC); followed until infants aged 6 months	CHW home visiting intervention focusing on maternal and child care	11 antenatal and postnatal visits per participant; 6 months follow-up	Infants of depressed mothers in the intervention group had better height-for-age growth compared to control; no significant effect on weight; intervention did not reduce maternal depression but improved caretaking, positively impacting infant growth.

(Continued)

**Table 2** (Continued).

No	Author (Year)	Country	Study Design	Population/Sample	Intervention	Duration	Main Findings
23	Onah et al (2024) <sup>40</sup>	Pakistan	Cluster-RCT, 4 arms	1745 children aged 6–23 months from BISP beneficiary families; 200 LHW clusters (50 per arm)	Unconditional Cash Transfer (UCT) + Lipid-Based Nutrient Supplement (LNS) ± SBCC	18 months (May 2017 – Jul 2019)	UCT+LNS reduced stunting 8.3% (12 mo) & 7.6% (24 mo); UCT+LNS+SBCC reduced stunting 10% & 7.5%; UCT+SBCC alone not significant. Cost/DALY averted: USD 243–787 (UCT+LNS), USD 743–2888 (UCT+LNS+SBCC).
24	Cooper et al (2019) <sup>41</sup>	Kenya	Formative qualitative research (FGDs + in-depth interviews)	150 participants: 24 mothers, 12 grandmothers, 12 TBAs, 6 health workers, 24 CHWs, 46 fathers, 26 community leaders	Integrated MIYCN + PFFP education via CHWs	Dec 2015 – Jan 2016 research; service strengthening 2014–2015	Early breastfeeding delayed; prelacteal feeding common; poor perceptions of maternal diet; low knowledge on LAM; PFFP rarely used, often waiting for menstruation return; men dominant in FP decisions; mothers resumed work before 1 month postpartum.
25	Mistry et al (2019) <sup>42</sup>	India	Post-program comparison study using national cross-sectional survey (quasi-experimental)	3009 mother–child pairs <5 years (1557 intervention; 1452 control)	CHW-led nutrition counseling intervention	±3 years (2012–2015/2016 survey)	Lower stunting prevalence in intervention areas (28.8% vs 37.2%; aOR = 0.75; p = 0.012); higher exclusive breastfeeding (72.7% vs 59.4%; p = 0.008); higher ≥4 food groups consumption (42.9% vs 34.1%; p < 0.001).
26	Beatty et al (2023) <sup>43</sup>	Indonesia	Cluster Randomized Controlled Trial (CRCT)	190 sub-districts (95 intervention, 95 control), 9120 households, >780 villages, >9000 children aged 0–35 months	Multisectoral stunting reduction program (health, nutrition, sanitation, IFA, breastfeeding promotion)	3.5 years (2014–2018), evaluation in 2019	No significant impact on stunting (0.5 pp; CI –3.0–4.1); however, improvements were observed in IFA tablet consumption (+8.7 pp), exclusive breastfeeding (+8.7 pp), and child meal frequency (+8.5 pp).
27	Desi et al (2023) <sup>44</sup>	Indonesia	Quasi-experiment (pre–post one group design)	35 posyandu cadres (aged 15–44 years), purposive sampling	Cadre training on MUAC, Hb measurement, and stunting detection	6 months (May–Oct 2022)	Knowledge increased from 72.01 → 93.31; MUAC skills: 7.71 → 19.43; Hb measurement skills: 9.71 → 15; stunting detection ability improved from 0% → 100% (p < 0.001).
28	Sitorus et al (2021) <sup>45</sup>	Indonesia	Quasi-experiment (pretest–posttest one group design)	30 posyandu cadres (random sampling)	Cadre training (knowledge and skills improvement)	1 month (Sept–Oct 2020)	Knowledge improved from 32.8 → 87.1 (p < 0.001); skills improved from 25.8 → 79.2 (p < 0.001).
29	Abdulloeva et al (2025) <sup>46</sup>	Bangladesh	Mixed-method (household survey, service observation, in-depth interviews and key informant interviews)	1166 respondents (337 pregnant women, 490 infants <6 months, 339 children aged 6–23 months); 965 service delivery points observed; 207 community health workers	Strengthening GMP, ANC services, and nutrition service delivery	Approximately 9 months (implemented since March 2023, evaluated in January 2024)	Significant improvement in growth monitoring and promotion (GMP) services in intervention areas; higher protocol adherence; improved ANC services and distribution of iron–folic acid and calcium supplements

30	Maust et al (2015) <sup>47</sup>	Mali	Cluster Randomized Controlled Trial (CRCT)	1957 children aged 6–59 months with GAM	Integrated community-based management of acute malnutrition (CMAM) with peer support	12 weeks	Integrated management achieved 83% recovery and 71% coverage, higher than standard benchmarks.
31	Hasanah et al (2024) <sup>48</sup>	Indonesia	One-group pretest–posttest	28 cadres	Cadre training (structured sessions to improve knowledge)	10 hours (5 sessions × 2.5 hours)	Cadre knowledge increased significantly after training ( $p < 0.05$ ); training proved effective.
32	Akhmadi et al (2021) <sup>49</sup>	Indonesia	Quasi-experiment (2 groups)	69 cadres (intervention), 53 cadres (control)	Care for Child Development (CCD) training with role play and demonstrations	2 days (intervention), 1 day (control)	CCD training significantly improved cadres' knowledge, attitudes, and self-efficacy ( $p < 0.001$ ). Role play and demonstrations were effective for attitude change.
33	Astuti Nur et al (2025) <sup>50</sup>	Indonesia	Pre-experiment (pre–post)	36 posyandu cadres	Cadre training with hands-on practice	3 days (25–27 Oct 2022)	Significant improvement in cadres' knowledge and skills after training ( $p < 0.001$ ). Hands-on practice activities were highly effective.
34	Komakech et al (2024) <sup>51</sup>	Uganda	Cluster randomized trial	390 pregnant women and their partners + infants	Nutrition education intervention involving fathers and families	9 months (March–Dec 2022)	Significant improvement in intervention group: LAZ +2.03 SD, WAZ +1.27 SD compared to control.
35	Glenn et al (2021) <sup>52</sup>	Bangladesh	Qualitative (FGD)	43 CHW supervisors from 7 districts (IYCF mentoring program)	IYCF mentoring program for CHWs (with supervision and incentives component)	2009–2014 (A&T program); evaluation 2 years post-program	Withdrawal of incentives led to decreased cadre motivation, reduced household visits, lower service quality, and CHW retention problems.
36	Kang et al (2017) <sup>53</sup>	Bangladesh	Cluster RCT	1218 infants aged 0–6 months	Behavior Change Communication (BCC)-based nutrition intervention	12 months	Significant improvement in LAZ (+0.21 SD); 4% point reduction in stunting.
37	Mapesa, Meme & Muthamia (2020) <sup>54</sup>	Kenya	Mixed-methods (survey + FGDs)	Mothers with infants aged 0–5 months ( $n = 234$ )	Community-based nutrition education and mentoring	Not specified (continuous community intervention)	Low exclusive breastfeeding knowledge (<50%); malnutrition identification 74%, causes only 58%; complementary feeding frequency 80%; introduction of complementary foods 61%. Nutrition practices improved with community mentoring.
38	Yeasmin et al (2021) <sup>55</sup>	Bangladesh	Exploratory qualitative study (embedded in trial)	320 pregnant women and mothers with children <24 months in 16 villages	Group-based CHW intervention using storytelling and participatory learning	9 months	Storytelling format improved participation; father involvement supported behavioral change; low attendance limited impact; self-assessment motivated change

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**Table 2** (Continued).

No	Author (Year)	Country	Study Design	Population/Sample	Intervention	Duration	Main Findings
39	Gladstone et al (2018) <sup>56</sup>	Malawi	Pilot mixed-methods (quantitative & qualitative)	48 caregiver–child pairs + 12 Health Surveillance Assistants (HSAs)	Early child development (ECD) intervention delivered by CHWs	6 months	Well accepted by the community; improved responsive caregiving; strengthened mother–child interaction; early child development indicators improved
40	Omer et al (2023) <sup>57</sup>	Ethiopia	Community-based Cluster RCT	243 children aged 6–18 months (IG = 122, CG = 121)	Child-owned poultry intervention to improve nutrition and hemoglobin	6 months	Hb increased by +053 g/dL; anemia risk decreased by 64% (OR = 0.36); CAS reduced by 57%; morbidity impact not significant
41	Hemlock et al (2024) <sup>58</sup>	Malawi	Cluster Randomized Controlled Trial	3015 mothers and children aged 6–18 months	Integrated nutrition + early child development (ECD) intervention	10 months	Intervention significantly improved child development scores in the 12–17 month age group
42	Rahman et al (2015) <sup>59</sup>	Bangladesh	Quasi-experimental (non-randomized, pre-post with control)	7200 women (baseline), 4800 women (endline) with children aged 12–59 months or recent pregnancy	Community-based maternal and neonatal health program via CHWs	5 years (2008–2013)	Home deliveries decreased from 84.3% → 71.2% (p < 0.001); increased use of skilled birth attendants; improved newborn care practices; significantly reduced infant mortality
43	Jahir et al (2021) <sup>60</sup>	Bangladesh	Descriptive qualitative (Process evaluation)	64 in-depth interviews with CHWs, mothers, fathers, mothers-in-law, supervisors, and policymakers	CHW-led group sessions + home visits with digital support (tablets)	10 months (bi-monthly sessions + home visits)	Success factors: intensive training, one-on-one supervision, technology (tablets), early CHW introduction to communities
44	Marume et al (2022) <sup>61</sup>	Zimbabwe	Descriptive evaluative quantitative	60 health facilities, 60 nurses, 100 VHVs (cadres), 850 caregivers (300 exit interviews, 450 community interviews)	Evaluation of growth monitoring and referral system (no direct intervention)	Not explicitly specified (medical record review & interviews within a survey period)	Most facilities had weighing scales, but height measurement was poorly recorded. Many malnourished children went undetected and were not referred for care
45	Gelli et al (2020) <sup>62</sup>	Malawi	Cluster Randomised Controlled Trial (RCT)	60 Community-Based Childcare Centres (CBCCs), preschool children, and smallholder farming households	Integrated nutrition–agriculture–ECD intervention (CBCC-based program)	12 months	This study tests an integrated nutrition–child–agriculture intervention in CBCCs. Primary outcomes include food intake, nutrition status, child development, and household agricultural results. No outcomes yet as this is a protocol study
46	Gnanaselvam, Johnson & Shetty (2025) <sup>63</sup>	India	Anekal Taluk, Bengaluru Urban District, Karnataka, India	Cross-sectional before–after study (mixed-method)	Training-based mentoring program for Anganwadi workers	381 Anganwadi workers (AWWs); 303 reassessed after 6 months	1-day training for each of 9 groups; total evaluation period of 6 months

47	Wanda et al (2025) <sup>64</sup>	Indonesia	Depok City, West Java, Indonesia	Qualitative descriptive study (interpretivist paradigm)	Qualitative evaluation of cadre practices (no direct intervention)	Conducted between August–September 2023	Identified four key issues: (1) barriers to measurement accuracy; (2) varied cadre skills; (3) mothers' behavior influenced by children's reactions; and (4) strategies to handle traumatized children. Highlighted the need for training and supervision to improve reliability and child-centered measurement approaches
48	Irdawati et al (2024) <sup>65</sup>	Indonesia	Gatak District, Sukoharjo Regency, Central Java, Indonesia	Quasi-experimental design (pre-test–post-test with control group)	Cadre training with educational tools (pocketbook, KMS)	3 evaluation points: pre-test, post-test 1 (1 week after training), post-test 2 (several weeks later)	Significant increase in knowledge scores in the intervention group (from 15.21 ± 2.39 to 19.68 ± 2.38; $p = 0.003$ ; effect size = 0.96); control group showed minimal improvement
49	Sukmawatii et al (2025) <sup>66</sup>	Indonesia	Jambi City, Indonesia	Cross-sectional mixed-method study	Participatory mentoring/empowerment of cadres	Conducted between January–March 2024 (analyzed and published in 2025)	Cadre empowerment through participatory mentoring improved mothers' knowledge and behavior regarding child feeding and hygiene; 78.6% of cadres demonstrated strong mentoring ability; 65.3% of mothers reported better child-feeding practices
50	Widiasih et al (2025) <sup>1</sup>	Indonesia	Bangka Belitung Province, Indonesia	Mixed-methods (embedded design: quantitative survey, qualitative interview, and observation)	Assessment of cadre capacity (no direct intervention; observational)	Conducted over three phases (October–December 2022)	52% of cadres had low-to-very-low knowledge; many made errors in anthropometric measurements; three themes identified: understanding of stunting causes, cadres' preventive roles, and experiences during COVID-19.
51	Astutik, J., Suprpto, B., & Abidin, Z. (2025) <sup>67</sup>	Indonesia	Mulyoagung Village, Dau Sub-district, Malang Regency, East Java, Indonesia	Community service (participatory approach with training and mentoring design)	Community-based cadre training and mentoring program	Conducted in 4 stages (identification, socialization, implementation, evaluation) during Dec 2024 – Apr 2025	Cadres' understanding of stunting, causes, and impacts improved significantly. Cadres applied training in community programs and disseminated information through PKK and Posyandu activities.
52	Eny & Dwiyantri (2025) <sup>68</sup>	Indonesia	Mondokan Village, Sragen Regency, Central Java, Indonesia	Quasi-experimental (one-group pre-test and post-test design, no control group)	Mentoring intervention for pregnant women (stunting prevention education)	1 month (3 mentoring sessions)	Significant improvement in knowledge and attitudes of pregnant women regarding stunting prevention ( $p = 0.000$ ).

**Table 3** Quality Assessment of Included Studies (JBI)

No	Author (Year)	Study Design	JBI Tool	Score	Quality
1	Etrawati et al (2023) <sup>19</sup>	Quasi-experimental (2 groups)	10 item JBI	7/10	Moderate
2	Naimoli et al (2014) <sup>20</sup>	Conceptual model (literature + expert)	10 item JBI	7/10	Moderate
3	Mulyati & Astuti (2020) <sup>21</sup>	Quasi-experimental pre-post	10 item JBI	8/10	High
4	Kusumawati et al (2024) <sup>22</sup>	Qualitative (observation, interview, document analysis)	10 item JBI	8/10	High
5	Mediani et al (2020) <sup>11</sup>	Descriptive study	10 item JBI	6/10	Moderate
6	Van Boetzelaer et al (2019) <sup>23</sup>	Mixed-methods pilot study	10 item JBI	8/10	High
7	Altobelli et al (2020) <sup>24</sup>	Cluster-RCT	10 item JBI	9/10	High
8	Shonchoy et al (2023) <sup>25</sup>	Stepped-wedge RCT	10 item JBI	8/10	High
9	le Roux et al (2020) <sup>26</sup>	Non-randomized two-group comparison	10 item JBI	7/10	Moderate
10	Rockers et al (2023) <sup>27</sup>	Cluster-RCT	10 item JBI	8/10	High
11	Horwood et al (2017) <sup>28</sup>	Cluster-RCT	10 item JBI	9/10	High
12	Siswati et al (2022) <sup>29</sup>	Single-group pre-test post-test	10 item JBI	9/10	High
13	Weningtyas et al (2023) <sup>30</sup>	Pre-experimental, one-group pre-test post-test	10 item JBI	6/10	Moderate
14	Irdawati et al (2024) <sup>31</sup>	Quasi-experimental pre-test post-test with control	10 item JBI	7/10	Moderate
15	Fink et al (2017) <sup>32</sup>	Open-label Cluster-RCT, 3 groups	10 item JBI	8/10	High
16	Juarez et al (2021) <sup>33</sup>	Quality Improvement (longitudinal pre-post)	10 item JBI	7/10	Moderate
17	Galasso et al (2019) <sup>34</sup>	Cluster-RCT, 5 arms	10 item JBI	8/10	High
18	Abiyu & Belachew (2020) <sup>35</sup>	Cluster-RCT (intervention vs control)	10 item JBI	8/10	High
19	Chapman et al (2024) <sup>36</sup>	Double case study (participatory)	10 item JBI	7/10	Moderate
20	Patel et al (2024) <sup>37</sup>	Intervention development using ToC + PIP	10 item JBI	6/10	Moderate
21	Robert et al (2017) <sup>38</sup>	Multi-stage formative research, ethnographic	10 item JBI	6/10	Moderate
22	Tomlinson et al (2015) <sup>39</sup>	Cluster-RCT	10 item JBI	8/10	High
23	Onah et al (2024) <sup>40</sup>	Cluster-RCT, 4 arms	10 item JBI	8/10	High
24	Cooper et al (2019) <sup>41</sup>	Formative qualitative research	10 item JBI	6/10	Moderate
25	Mistry et al (2019) <sup>42</sup>	Post-program comparison study (quasi-experimental)	10 item JBI	6/10	Moderate
26	Beatty et al (2023) <sup>43</sup>	Cluster-RCT	10 item JBI	7/10	Moderate
27	Desi et al (2023) <sup>44</sup>	Quasi-experiment, pre-post one group	10 item JBI	9/10	High
28	Sitorus et al (2021) <sup>45</sup>	Quasi-experiment, pre-post one group	10 item JBI	9/10	High
29	Abdulloeva et al (2025) <sup>46</sup>	Mixed-method	10 item JBI	9/10	High
30	Maust et al (2015) <sup>47</sup>	Cluster-RCT	10 item JBI	7/10	Moderate
31	Hasanah et al (2024) <sup>48</sup>	One-group pretest-posttest	10 item JBI	6/10	Moderate
32	Akhmadi et al (2021) <sup>49</sup>	Quasi-experiment (2 groups)	10 item JBI	6/10	Moderate
33	Astuti Nur et al (2025) <sup>50</sup>	Pre-experiment	10 item JBI	5/10	Moderate

(Continued)

**Table 3** (Continued).

No	Author (Year)	Study Design	JBI Tool	Score	Quality
34	Komakech et al (2024) <sup>51</sup>	Cluster RCT	10 item JBI	7/10	Moderate
35	Glenn et al (2021) <sup>52</sup>	Kualitatif (FGD)	10 item JBI	7/10	Moderate
36	Kang et al (2017) <sup>53</sup>	Cluster RCT	10 item JBI	7/10	Moderate
37	Mapesa et al (2020) <sup>54</sup>	Mixed-methods	10 item JBI	7/10	Moderate
38	Yeasmin et al (2021) <sup>55</sup>	Kualitatif	10 item JBI	7/10	Moderate
39	Gladstone et al (2018) <sup>56</sup>	Pilot mixed-methods	10 item JBI	8/10	High
40	Omer et al (2023) <sup>57</sup>	Cluster RCT	10 item JBI	7/10	Moderate
41	Hemlock et al (2024) <sup>58</sup>	Cluster Randomized Controlled Trial	10 item JBI	9/10	High
42	Rahman et al (2015) <sup>59</sup>	Quasi-experimental pre–post dengan kontrol	10 item JBI	7/10	Moderate
43	Jahir et al (2021) <sup>60</sup>	Kualitatif deskriptif (process evaluation)	10 item JBI	8/10	High
44	Marume et al (2022) <sup>61</sup>	Deskriptif evaluatif kuantitatif	10 item JBI	7/10	Moderate
45	Gelli et al (2020) <sup>62</sup>	Cluster Randomized Trial (Protocol Study)	10 item JBI	6/10	Moderate
46	Gnanaselvam et al (2025) <sup>63</sup>	Cross-sectional before–after (mixed-method)	JBI Cross-sectional (8 item)	6/8	High
47	Wanda et al (2025) <sup>64</sup>	Qualitative descriptive	JBI Qualitative (10 item)	8/10	High
48	Irdawati et al (2024) <sup>65</sup>	Quasi-experimental (pre–post + control)	JBI Quasi (10 item)	9/10	High
49	Sukmawatii et al (2025) <sup>66</sup>	Cross-sectional mixed-method	JBI Cross-sectional (8 item)	7/8	High
50	Widiasih et al (2025) <sup>1</sup>	Mixed-method (embedded)	JBI Mixed/Analytical Cross-sectional	8/10	High
51	Astutik et al (2025) <sup>67</sup>	Community service (training and mentoring)	JBI Quasi/Pre–Post Non-Control	6/9	Moderate
52	Eny & Dwiyantri (2025) <sup>68</sup>	Quasi one-group pre–post	JBI Quasi (9 item)	5/9	Moderate

The findings were further synthesized using a thematic approach to identify key patterns in mentoring interventions for stunting prevention. This synthesis generated five major themes: forms of mentoring, training media, duration of intervention, roles of health cadres, and impact on outcomes. The summary of this thematic synthesis is presented in Table 4. Interventions that incorporated participatory approaches and continuous supervision were more frequently associated with positive outcomes compared to short-term or one-time interventions.

**Table 4** Thematic Synthesis of Findings

Theme	Sub-Theme	Description	Supporting Evidence
Forms of Mentoring	Training-based	Structured training is the most common approach to improve knowledge, skills, and attitudes of health cadres	Majority of studies (eg, Etrawati, Kusumawati, Desi, Sitorus)
Forms of Mentoring	Home visits	Home visits provide individualized education, growth monitoring, and early detection of nutritional problems	Multiple studies (eg, Shonchoy, Rockers, le Roux, Tomlinson)
Training Media	Printed media	Modules, booklets, and pocketbooks are widely used due to accessibility and low cost	Common across many studies (eg, Sitorus, Irdawati)
Training Media	Digital media	mHealth, SMS, and apps support continuous education and communication	Emerging use (eg, Patel, Jahir)

(Continued)

**Table 4** (Continued).

Theme	Sub-Theme	Description	Supporting Evidence
Duration of Intervention	Short-term	Short interventions improve knowledge quickly but have limited sustainability	Frequently reported across studies
Duration of Intervention	Long-term	Longer interventions with supervision show stronger and sustained outcomes	Studies such as Onah, Rockers, Juarez
Roles of Cadres	Educator	Cadres deliver nutrition education and promote healthy behaviors	Consistent finding across studies
Roles of Cadres	Mediator	Cadres act as a bridge between community and health systems	Observed in multiple studies
Roles of Cadres	Social mobilizer	Cadres support community engagement and participation	Reported in several studies
Impact on Outcomes	Cadre capacity	Interventions improve knowledge, skills, and confidence of cadres	Majority of studies
Impact on Outcomes	Family practices	Improved feeding practices, breastfeeding, and care behaviors	Multiple studies
Impact on Outcomes	Child nutrition	Some studies report improvements in HAZ, WAZ, and stunting reduction	Limited but significant evidence

Importantly, the identified themes also highlight the influence of social and cultural contexts in shaping the implementation and effectiveness of mentoring interventions. Variations in community engagement, local beliefs, and resource availability were found to affect how mentoring strategies were delivered and adopted, indicating the need for a context-sensitive mentoring model for stunting prevention. Several studies reported that culturally adapted and community-based approaches were associated with better acceptance and sustainability of interventions.

## Discussion

The findings of this review indicate that mentoring interventions for health cadres generally show positive effects on cadre capacity and family-level practices. Most of the included studies reported improvements in cadre knowledge, skills, and engagement, indicating consistent positive effects at the individual level. However, the results across studies are mixed and context dependent, particularly when considering variations in study design, intervention characteristics, and outcome measures.

Most studies consistently reported improvements in cadres' knowledge, skills, and engagement following training and mentoring interventions. Training and home visits appear to play complementary roles, where training provides foundational competencies and home visits facilitate practical application and closer interaction with families. A substantial number of studies implemented structured training, often combined with supervision or home visits, suggesting that multi-component interventions are more effective. Nevertheless, the effectiveness of these approaches is influenced by how they are implemented. Participatory<sup>1,67</sup> and experience-based methods<sup>24</sup> tend to produce better engagement and learning outcomes compared to one-way instructional approaches.

Despite these positive findings, not all studies demonstrated significant effects, particularly on child nutritional outcomes. Only a smaller proportion of studies reported measurable improvements in child nutritional outcomes, such as stunting reduction or anthropometric indicators. Some large-scale or multisectoral interventions reported no significant impact on stunting reduction, suggesting that improvements in cadre capacity do not always directly translate into measurable child health outcomes. In addition, several studies indicated that the effectiveness of interventions depends on contextual factors, such as the consistency of home visits<sup>46,63,64,66</sup> and duration of the program. For example, interventions were more effective when implemented continuously and supported by regular supervision, while short-term or less intensive programs showed more limited and less sustainable effects. Furthermore, we found that the majority of mentoring programs were short-term, lasting less than six months. Some were even conducted in a single training

session without adequate follow-up, as shown in the studies by Mediani et al and Etrawati et al.<sup>11,19</sup> Only a small number of studies have medium- to long-term interventions ( $\geq 6$  months), carried out in a phased and sustained manner, such as those by Onah et al, Rockers et al, and Juarez et al.<sup>27,40</sup>

This discrepancy may be explained by the imbalance in intervention focus. Most mentoring programs primarily targeted knowledge and skill development, while fewer interventions explicitly addressed behavioral determinants such as motivation, social norms, and environmental constraints. When mapped to behavior change theories, most interventions aligned with constructs from the Social Cognitive Theory and Theory of Planned Behavior, particularly in improving knowledge and self-efficacy, while components of the Health Belief Model were less frequently addressed.

This review also highlights differences in outcomes across levels. While improvements in intermediate outcomes, such as cadre knowledge and family practices, were frequently observed, evidence on long-term outcomes, including child nutritional status, remains limited and inconsistent. This suggests that strengthening cadre capacity alone may not be sufficient without broader system support and sustained implementation.

Variations in findings may also be influenced by differences in study design and methodological quality. Studies with more rigorous designs, such as randomized controlled trials<sup>25,27,28,32,34,35,39,40,43,47,51,53,57,58,69</sup> tended to provide more robust evidence, whereas studies with simpler designs often reported improvements primarily in short-term or self-reported outcomes. This underscores the importance of interpreting the findings cautiously in light of the overall quality of evidence.

In addition, contextual and cultural factors play an important role in determining intervention effectiveness. Most mentoring models identified in this review were relatively generic and not specifically tailored to local cultural contexts, which may limit their relevance and long-term sustainability. Several studies highlighted the importance of culturally adapted and community-based approaches in improving intervention acceptance and sustainability.<sup>49,66</sup> Interventions that incorporated culturally adapted approaches and community engagement strategies tended to show more meaningful and contextually appropriate outcomes.

## Limitation

This review has several limitations. The heterogeneity of study designs, intervention types, and outcome measures precluded a quantitative synthesis. In addition, many studies focused on short-term outcomes, with limited evidence on long-term impacts. Although this review included studies published in both English and Indonesian, differences in language and database indexing may still introduce potential bias.

## Conclusion

This systematic literature review synthesizes evidence from 52 studies on health cadre mentoring models for stunting prevention. The findings indicate that most mentoring interventions are effective in improving cadre knowledge, skills, and engagement; however, only a smaller proportion of studies demonstrate direct effects on child nutritional outcomes. Mentoring approaches that combine structured training, supervision, and community-based activities appear to be more effective, particularly when implemented continuously rather than as short-term interventions. Participatory and culturally adapted approaches were also associated with better acceptance and sustainability of interventions.

Despite these positive findings, the limited impact on child nutritional outcomes suggests that strengthening cadre capacity alone may not be sufficient. Future interventions should integrate behavior change theory more explicitly and address broader determinants such as motivation, social norms, and environmental factors to achieve sustained improvements. Overall, health cadre mentoring models have strong potential to support stunting prevention programs; however, their effectiveness depends on implementation quality, contextual adaptation, and long-term system support. Further research is needed to develop and evaluate sustainable, context-sensitive, and theory-informed mentoring models.

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