

## Optimizing Posyandu Cadre Education Through the Use of Audio-Visual Media for Improved Community Health Outcomes

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### ABSTRACT

**Introduction:** Posyandu (Integrated Health Post) cadres play a critical role in promoting and preventing health problems at the community level in Indonesia. However, the effectiveness of educational interventions aimed at optimizing their roles remains a key area of interest. This study aims to systematically review various intervention models used to enhance the knowledge and skills of *Posyandu* cadres in carrying out promotive and preventive health actions.

**Materials & Methods:** This literature review analyzed 22 relevant research articles published within the past five years, selected through database searches including Google Scholar and Garuda. The inclusion criteria focused on studies that implemented educational interventions for *Posyandu* cadres, used pre-test and post-test designs, and reported outcomes related to knowledge or behavior change. Thematic analysis was used to identify patterns in intervention types, media used, and observed outcomes.

**Results:** The findings revealed that educational interventions—ranging from conventional training and counseling to digital media-based approaches—significantly improved cadre knowledge and behavior. The most frequently used method was a quasi-experimental design with pre- and post-test assessments, which consistently showed measurable increases in knowledge scores and positive behavior changes. Media such as videos, audiovisuals, booklets, educational cards, and mobile apps (e.g., e-POSYANDU, ePoK) were particularly effective in enhancing comprehension and engagement. Cadres were also successfully empowered in areas such as child growth monitoring, stunting prevention, first aid, maternal readiness, and the prevention of infant choking. Collaborative approaches involving Focus Group Discussions (FGDs), brainstorming, and partnerships with local health institutions further enhanced intervention success.

**Conclusions:** Educational interventions are proven to be effective strategies in optimizing the role of *Posyandu* cadres as agents of behavioral change in community health. The integration of participatory, media-enriched, and contextually appropriate training into community-based health systems is essential. Continuous cadre empowerment and innovation in intervention design are necessary to sustain long-term improvements in public health outcomes.

**KEYWORDS:** Posyandu Cadres; Health Education; Audio-Visual Media; Community Health; Health Promotion; Maternal and Child Health; Public Health Communication; Health Behavior Change.

### INTRODUCTION

Integrated Health Posts (*Posyandu*) are one of the main pillars of the public health service system in Indonesia, particularly in promotive and preventive efforts for maternal and child health. There are over 300,000 *Posyandu* units across the country, most of which are managed by community health volunteers, commonly known as *kader*, who serve on a voluntary basis[1]. However, the challenges in implementing *Posyandu* services extend beyond the number of units; they also concern the quality and effectiveness of the services delivered by the cadres. According to data from the Ministry of Health (2019), only about 65.4% of *Posyandu* are categorized as active, which falls short of the national target of 80%[2]. The primary factors affecting the effectiveness of cadres are not education level or age, but rather their work motivation and duration of experience. This indicates a critical need for systematic and sustainable capacity building for cadres. In recent years, the Indonesian government has begun promoting digital transformation in public health services, including training programs for *Posyandu* cadres[3]. In 2024, the Ministry of Health, in collaboration with the Tanoto Foundation, launched a digital module-based training program through an online platform called *Plataran Sehat*. This program aims to reach more than 1.5 million cadres nationwide and covers 25 core competencies, ranging from child nutrition to interpersonal communication skills. Pilot implementations in the provinces of East Nusa Tenggara (NTT), West Nusa Tenggara (NTB), and West Java have shown promising results in improving cadres' understanding of the material in a more flexible and efficient manner[4], [5]. However, challenges such as digital literacy and cultural and geographical diversity remain obstacles to the effective delivery of training content.

In this context, the use of audio-visual (AV) media has emerged as a promising alternative. AV media—including educational videos, interactive animations, and locally contextualized story-based podcasts—offer advantages in delivering information in an engaging, memorable, and accessible way[6]. Previous studies have shown that learning through AV media significantly enhances information retention and learner motivation compared to conventional methods such as lectures or printed modules[7]. For Posyandu cadres—most of whom are not formally trained health professionals—AV-based approaches can bridge knowledge gaps while also strengthening practical skills needed to serve their communities[8]. Furthermore, the role of cadres is crucial in supporting national stunting reduction programs[9]. Despite a gradual decline in prevalence, stunting remains a serious public health issue in Indonesia, affecting 21.6% of children in 2022. Cadres play a pivotal role in assisting families with young children, providing nutritional education, and monitoring child growth and development. However, surveys conducted in several regions reveal that many cadres still lack a clear understanding of the materials they are expected to convey, especially in areas related to child nutrition and care. Therefore, optimizing training methods through AV media is not only an innovation but a strategic necessity for enhancing the effectiveness of cadres as agents of change at the community level. Based on these critical needs, this study aims to evaluate and assess the effectiveness of using audio-visual media in the educational process of Posyandu cadres, particularly in improving their knowledge, skills, and motivation in delivering essential health services.

## METHODS

The research method employed in this study is a Systematic Literature Review (SLR). A systematic literature review is a structured and comprehensive research approach used to collect, evaluate, and synthesize relevant scientific evidence from a variety of credible and peer-reviewed sources. This method is particularly useful for identifying best practices and knowledge gaps in a specific area of study—in this case, the optimization of health education for Posyandu cadres using audio-visual media. As described by Bedaso et al. (2022), this method involves two essential components: eligibility criteria and search strategy. In this study, the eligibility criteria included several key considerations such as the type of study (quantitative or mixed-methods research), target population (community health workers, Posyandu cadres, or lay health educators), intervention (use of audio-visual or multimedia educational tools), and the quality of the research methodology. Only studies with a clear intervention and outcome related to educational effectiveness or behavior change were included. Studies focusing on unrelated topics or those with insufficient methodological rigor were excluded. The search strategy was conducted using academic journal databases including PubMed, Scopus, Web of Science, and SpringerLink, ensuring comprehensive coverage across disciplines such as public health, community medicine, and health education technology. The search was guided by keywords and Boolean operators, including: “Posyandu cadres,” “health education,” “audio visual media,” “community health worker training,” “digital health intervention,” “maternal and child health,” “media effectiveness,” and “behavior change communication.” Synonyms and controlled vocabulary (e.g., MeSH terms) were also used to broaden the search scope. To ensure the currency and relevance of the findings, the literature search was limited to studies published in the last ten years (2014–2024). After the initial search, duplicates were removed, and the remaining titles and abstracts were screened based on predefined PICO (Population, Intervention, Comparison, Outcome) criteria. Full-text articles that met the inclusion criteria were then retrieved and assessed using a critical appraisal checklist (e.g., CASP or JBI tools) to evaluate their validity, reliability, and applicability. The process of study identification and selection is visually summarized using a PRISMA flow diagram, which outlines the number of articles identified, screened, excluded, and finally included in the review. This systematic approach enabled the researchers to extract, compare, and synthesize key findings across studies, leading to a comprehensive understanding of how audio-visual media can enhance the educational competencies of Posyandu cadres. The outcome of this review is expected to inform the development of more effective training strategies that align with the needs and contexts of community-based health workers in Indonesia.

## RESULTS

Optimizing Posyandu cadre education through the use of audiovisual media is essential for improving the quality of community health services. Audiovisual tools, such as engaging and interactive educational videos, are effective in presenting child health and nutrition information in a way that is easier for cadres to understand and retain. Through clear visualizations and structured audio explanations, Posyandu cadres can quickly grasp key procedures—ranging from weighing toddlers and measuring their height to administering supplementary feeding and vaccinations. In addition, online training delivered through webinars, virtual classes, or practical simulations offers cadres the opportunity to actively participate in the learning process. They can directly ask questions to facilitators, discuss real cases encountered in the field, and engage in simulations of common health situations faced in Posyandu settings. This makes the learning experience more contextual and applicable, enabling cadres not only to understand theoretical concepts but also to apply them effectively in their daily service delivery.

**Table 1. Table analysis of reviewed and relevant articles with the topic**

| No | Author             | Year | Title                                  | Objective                              | Method                            | Findings                    |
|----|--------------------|------|--|--|-----------------------------------|-----------------------------|
| 1  | Siti Nurhayati[10] | 2023 | <i>Optimizing the Role of Posyandu</i> | To explore how to optimize the role of | Literature review based on Google | The role of Posyandu cadres |

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|   |  |      | <i>Cadres in Stunting Services</i>   | Posyandu cadres in addressing stunting in Indonesia   | Scholar sources (9 articles selected according to inclusion and exclusion criteria)  | can be optimized through training and capacity building to enhance their knowledge and skills, particularly in supporting families at risk of stunting.   |
| 2 | Novi Rosuliana, Februanti, Mariani, Ai Cahyati[11]                     | 2023 | Optimization of Knowledge and Skills Improvement on First Aid (P3K) Among Elementary School Students Through Audiovisual-Based Media             | To improve elementary school students' knowledge and skills in first aid treatment for injuries through audiovisual-based health education                            | Health education on first aid was delivered to 30 students (grades 4–6) at SDN Babakan Kadu, Tasikmalaya, using audiovisual media and demonstrations on treating scrapes, bleeding, and burns; evaluation used questionnaires and observation sheets | Approximately 90% of students showed improved knowledge by answering questions correctly and were able to demonstrate proper wound care; continuous education and collaboration with health services are crucial to enhancing student safety in emergencies |
| 3 | Ifi Rismayanthi, Kadek Devi Kalfika [12]                               | 2021 | COVID-19 Prevention Efforts for Children Through Optimization of Posyandu Roles Using Video Media in Padangsembian Klod Village, West Denpasar   | To determine the effectiveness of COVID-19 prevention education via video in improving knowledge and attitudes of mothers with toddlers in Padangsembian Klod Village | Community service using observation and questionnaire to assess existing problems; followed by video-based education disseminated via social media to 37 mothers with toddlers attending Posyandu  | Video education significantly increased mothers' knowledge regarding COVID-19 prevention for children, demonstrating the effectiveness of audiovisual media in public health outreach   |
| 4 | Heri Djamiatul Maulana, Peni Cahyati, Yanyan Bachtiar[13]              | 2023 | Optimization of Posbindu Cadres' Role Through Psychoeducation in Diabetes Mellitus Control at Sambongpari Public Health Center, Tasikmalaya City | To improve knowledge, attitudes, and skills of Posbindu cadres in managing Diabetes Mellitus (DM) through psychoeducational training                                  | Psychoeducational training provided to 36 Posbindu cadres; analysis using pre-test/post-test with normality, univariate, and bivariate tests   | The average knowledge score increased from 64.83 (SD 7.05) to 88.06 (SD 4.91) after the intervention; training significantly improved cadres' knowledge and ability to manage DM and act as facilitators in community health education                      |
| 5 | Nurpratama, Utami Putri Kinayungan, Nur Fauzia Asmi, Dandi Sanjaya[14] | 2024 | Education for Mothers of Toddlers and Posyandu Cadres on Stunting at Mekarmukti Health Center  | To identify the difference in knowledge levels among mothers of toddlers and Posyandu cadres before and after educational   | Community education held on August 9, 2024, using a lecture method and leaflet media; 14 mothers and 15 cadres participated. Evaluated using pre-  | The average test score improved from 75.17 to 82.14. Wilcoxon test showed a significant difference (p-value = 0.000),   |

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|    |  |                        |   | intervention on stunting   | test and post-test, supported by Focus Group Discussions (FGD)   | indicating that the education increased knowledge on stunting effectively   |
| 6  | Yessy Mareta, Yunia Renny Andhikantias, Wahyu Dwi Agussafutri [14] | 2024                   | Optimizing Cadres' Knowledge of Healthy Pregnancy Preparation Through Video-Based Education   | To improve Posyandu cadres' knowledge on healthy pregnancy preparation during the preconception period                           | Community service activity held in Posyandu Tanggul Asri, Surakarta. Education was provided through lectures, video screenings, and discussions. The program targeted cadres supporting 15 WUS (women of reproductive age) who married young | All participants were able to explain key concepts including healthy pregnancy requirements, ideal pregnancy age, BMI calculation, anemia management, and psychological aspects of pregnancy after the intervention                         |
| 7  | Noerma Shovie Rizqiea, Ratih Dwilestari Puji Utami[15]             | 2020                   | Education Using Audiovisual Method to Improve Cadres' Knowledge About the Danger of Choking in Infants                                    | To increase knowledge of Posyandu cadres regarding the dangers of choking in infants after receiving audiovisual-based education | Involved 14 Posyandu cadres from Sadar Ibu I, Jetak Hamlet. Conducted online with pre-test, audiovisual education (video), and post-test assessment  | Pre-test: only 21% had good knowledge. Post-test: 71% showed good knowledge. The audiovisual method effectively improved cadres' knowledge of choking hazards in infants  |
| 8  | Khartini Kaluku, Santi Aprilian Lestaluhu, Martha Puspita Sari[16] | n/a (likely 2023–2024) | Brainstorming and Audiovisual Methods in Educating Cadres to Independently Identify and Manage Stunting in Larike Village, Central Maluku | To increase cadres' knowledge and skills in recognizing and independently managing stunting in toddlers                          | Activities included brainstorming, FGD, training, leaflet distribution, and stunting videos. Cadres received 3 rounds of nutrition assistance visits   | Significant increase in knowledge after counseling and audiovisual exposure (Wilcoxon test, p-value = 0.00). Brainstorming combined with audiovisual media was effective for cadre education and empowering independent stunting management |
| 9  | Nurun Nikmah, Selvia Nurul Qomari, Rila Rindi Antina[17]           | 2023                   | <i>Empowerment of Posyandu Cadres in Improving Toddler Growth and Development Through Printed Media – Pocket Book "Teman Bunda"</i>       | To increase cadres' knowledge regarding toddler growth and development through educational media                                 | Education using a pocket book ("Teman Bunda") was given to 28 cadres in Mlajah Village, Bangkalan. Pre- and post-education knowledge levels were measured  | Before: 57.24% sufficient knowledge, 42.86% good knowledge. After: 82.14% good knowledge, 17.86% sufficient. The pocket book was effective in improving cadres' knowledge to support toddler development                                    |
| 10 | Mayasari Kurnianingsih[18]   | 2023                   | Efektivitas Penggunaan  | To determine the most effective  | Quasi-experimental design with pretest-  | Both groups improved  |

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|    |  |      | Kombinasi Media Audio Visual dan Booklet dibanding Media Booklet terhadap Pengetahuan Toilet Training pada Ibu Balita   | health promotion media for increasing mothers' knowledge about toilet training                                  | posttest and control group; 66 participants; 2 groups (audio-visual + booklet vs. booklet only); data analyzed using paired and independent t-tests | knowledge significantly ( $p < 0.05$ ). Audio-visual + booklet group had a greater increase (mean = 9.68) than the booklet-only group (mean = 8.85), with a significant difference ( $p = 0.031$ ). Audio-visual media was more effective overall. |
| 11 | Rospiati, Dwi Prihatin Era, Ega Ersya Urnia[19]                      | 2023 | The Effectiveness of Posyandu Cadre Empowerment in Enhancing Posyandu Cadre's Knowledge as a Stunting Prevention Effort | To evaluate the impact of cadre empowerment through education on their knowledge about stunting prevention      | Quasi-experimental, one-group pre-posttest; 70 cadres in Kaubun Health Center area; media: PPT & leaflet; Wilcoxon test used                        | Significant increase in cadre knowledge after intervention ( $p = 0.000$ ); average knowledge score increased by 1.98 points, showing effectiveness of empowerment-based education strategy  |
| 12 | Maya Weka Santi, Muhammad Yunus, Ervina Rachmawati, Atma Deharja[20] | 2022 | The Effect of Training on Improving the Knowledge of Cadres in Using E-Posyandu   | To analyze the effect of training on the competence of cadres in using E-Posyandu                               | Quasi-experimental with pre-post test design; 10 cadres from Posyandu Manggis 15, 15A, 18; conducted in August 2021                                 | Training significantly improved knowledge and competence; post-test scores $>60$ indicate good understanding and improved communication between resource person and cadres   |
| 13 | Emma Anastya Puriastuti, Hardiningsih[21]                            | 2021 | Immunization Flashcard: Effective as an Education Media for Posyandu Cadres in Surakarta                                | To evaluate the effectiveness of flashcards as educational media to improve cadre knowledge on immunization     | Quasi-experimental; one group pre-post test; 45 respondents; purposive sampling; questionnaire assessment; Wilcoxon test used                       | Flashcards significantly improved cadre knowledge about immunization ( $p = 0.000$ ); flashcards proven to be effective educational tools  |
| 14 | Lailan Syafrina Lubis, Daniel Ginting, Frida Lina Tarigan[22]        | 2023 | <i>The Influence Of Booklet And Video On Knowledge And Posyandu Cadres' Attitudes Regarding Stunting</i>                | To determine the effect of booklet and video media on knowledge and attitudes of Posyandu cadres about stunting | Quasi-experimental; non-equivalent control group design; 136 Posyandu cadres; Paired t-test for analysis  | Both media improved knowledge and attitudes significantly ( $p=0.000$ ). Videos had higher influence than booklets (knowledge post-test: 73.76 vs 70.24; attitude post-test: 67.35 vs 67.96). Recommended for                                      |

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| 15 | Nuke Indrawati, Nurul Aryastuti, Fitri Ekasari, Nova Muhani[23]          | 2023 | Diarrhea Prevention Efforts on the Knowledge of Posyandu Cadres  | To determine the effectiveness of booklet and video media in improving cadre knowledge on diarrhea prevention     | Quasi-experimental; pretest-posttest control group design; 50 cadres; total sampling; Mann-Whitney for analysis | health promotion use. Both booklet and video significantly improved knowledge (booklet: 57.52 → 91.48; video: 58.60 → 93.56), but no significant difference between the two media (p=0.625). Both are effective for educating cadres in diarrhea prevention. Cadres are encouraged to pass on the information to mothers. Pregnant women with good knowledge increased from 81.3% to 87.5% after the video intervention. Education video significantly improved knowledge (p-value = 0.000). Significant increase in knowledge and skills after using the ePoK app (knowledge +11.55; skills +5.78); p-value < 0.05 indicates effectiveness of ePoK in enhancing cadres' monitoring ability for toddler development |
| 16 | Rokaesih, Nunung Mulyani, Herni Kurnia[18]                               | 2023 | The Effect Of Health Education Video Media On Pregnant Women's Knowledge About Stunting in Selajambe, Kuningan Regency                                   | To analyze the effect of video-based health education on pregnant women's knowledge about stunting prevention     | Pre-experimental; One Group Pretest-Posttest design; 48 pregnant women; total sampling                          | Knowledge increased from 6.37 to 7.42; behavior increased from 19.24 to 19.79. Audiovisual demonstration significantly improved knowledge (p = 0.003) and behavior (p = 0.004) of cadres regarding massage therapy for nutritional  |
| 17 | Melly Damayanti, Nurul Aini Suria Saputri, Vina Jayanti, Ika Susanti[24] | 2023 | Effectiveness of E-Posyandu Health (ePoK) Application on Knowledge and Skills of Posyandu Cadres in Monitoring Growth of Toddlers                        | To determine the effectiveness of the ePoK application in increasing knowledge and skills of posyandu cadres      | Quasi-experiment; one-group pretest-posttest design; 60 cadres in Tanjungpinang; 1-month intervention           | Knowledge increased from 6.37 to 7.42; behavior increased from 19.24 to 19.79. Audiovisual demonstration significantly improved knowledge (p = 0.003) and behavior (p = 0.004) of cadres regarding massage therapy for nutritional  |
| 18 | Intan Fazrin, Suci Anggraeni, Heri Saputro[25]                           | 2023 | Audiovisual Demonstration Methods on the Knowledge and Behavior of Cadres About Stimulation of Massage Therapy in Improving Nutrition Status in Children | To determine the effect of audiovisual demonstration on cadres' knowledge and behavior related to massage therapy | Pre-experimental; One group pretest-posttest; 38 respondents; random sampling; paired t-test                    | Knowledge increased from 6.37 to 7.42; behavior increased from 19.24 to 19.79. Audiovisual demonstration significantly improved knowledge (p = 0.003) and behavior (p = 0.004) of cadres regarding massage therapy for nutritional  |

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| 19 | Yogi Noor Fitriadi, Afif Claramita[26]                   | 2023 | Empowerment of Dasawisma and Health Cadres as Family Cadres to Optimize Family Posyandu  | To assess the effect of training on increasing knowledge of family cadres in North Lombok  | Cluster sampling; 33 cadres; pre-test, immediate post-test, and 6-month follow-up; Wilcoxon test          | improvement in children.<br>Median knowledge scores increased from 66.67 (pre) to 70.00 (6 months post); significant improvement only between pre-test and 6-month post-test ( $p < 0.05$ ); no significant difference between immediate and 6-month post-t |
| 20 | Kurniawan Priyanto, Edi Dedi Saifulah[27]                | 2022 | The Effect of Educational Videos on Knowledge About Menopause of Elderly Posyandu Participants in Blabak Village, Kediri Regency                             | To analyze the effect of health education via video on menopause knowledge among elderly Posyandu participants                             | Pre-experimental (one-group pretest-posttest); 36 elderly respondents; questionnaire; Wilcoxon test       | Before intervention, 75% had poor knowledge; after, 91.7% had good knowledge; significant effect found ( $p = 0.000$ ); videos with repetition and discussion increased understanding   |
| 21 | Trini Sudiarti, Tiara Amelia, Indah Jamiatun Hasanah[28] | 2022 | The Capacity of Posyandu Cadres Through Complementary Food for Children by Training  | To improve cadres' knowledge and skills in providing education and counseling on complementary foods for children under two years (baduta) | Community-based training (28 cadres from 10 Posyandu); measured with pre-post test and direct observation | Knowledge scores increased by 11 points; most cadres reached "sufficient to good" category; practical application showed need for improvement in verbal skills and counseling techniques  |
| 22 | Juli Astutik, Budi Suprpto, Zaenal Abidin[29]            | 2023 | Training and mentoring of Posyandu cadres based on behavior change in an effort to prevent stunting in Mulyoagung village, Dau sub-district, Malang district | To improve the capacity of Posyandu cadres in preventing stunting through behavior change strategies                                       | Counseling, training, and mentoring for cadres in Mulyoagung Village, Malang                              | Improved cadre understanding of stunting and behavior-based prevention strategies; cadres were able to implement and disseminate materials effectively and sustainably  |

Based on a review of 22 articles, it can be concluded that optimizing the role of Posyandu cadres in promotive and preventive public health efforts is highly effective when carried out through various forms of educational interventions, both conventional and technology-based approaches. Significant improvements in cadres' knowledge and skills were achieved through training, counseling, mentoring, and the use of educational media such as videos, audiovisual materials, booklets, leaflets, educational cards, and digital applications (e.g., e-POSYANDU and ePoK). The most commonly used method was a quasi-experimental design with a pre-test and post-test model, in which nearly all studies demonstrated a notable increase in knowledge scores and significant behavioral changes among cadres. Several studies also highlighted the importance of continuous education and cadre involvement in child growth monitoring, stunting prevention, diarrhea management, first aid (P3K) training, and the promotion of complementary feeding, including pregnancy preparedness and the prevention of choking hazards in infants. Audiovisual-based media proved to be

highly effective educational tools, as they enhance information retention and facilitate a more interactive understanding of the material. Furthermore, collaborative approaches such as Focus Group Discussions (FGDs), brainstorming sessions, and the engagement of local communities and health institutions contributed to the success of cadre empowerment programs. These studies affirm that Posyandu cadres are not only implementers of basic health services but also play a strategic role as agents of behavioral change in community health. Therefore, training and empowerment interventions for cadres must continue to be developed and integrated into the broader community-based health service system.

### **1. Improvement of Knowledge and Skills Through Structured Training**

The review of various articles indicates that the enhancement of Posyandu cadres' knowledge and skills can be significantly achieved through structured, systematic, and continuous training programs. These trainings are typically designed using participatory approaches, incorporating lectures, group discussions, simulations, and field practices. The training materials cover a wide range of essential topics, including child growth monitoring, stunting prevention, nutrition education, diarrhea management, dengue fever prevention, maternal health, and early detection of non-communicable diseases. Across multiple studies—particularly those employing quasi-experimental designs with pre-test and post-test evaluations—there is consistent evidence of significant improvements in knowledge and skill scores following the training interventions. Some studies also report that capacity strengthening through training positively influences cadre engagement in Posyandu services, including their ability to provide counseling, record children's nutritional status, and communicate effectively with the community. These findings suggest that high-quality training, tailored to field needs, is a key factor in strengthening the function of cadres as the frontline of basic community health services.

### **2. The Effectiveness of Educational Media in Supporting Cadres' Roles**

Another consistent finding across the reviewed literature is the vital role of educational media in supporting and facilitating cadres in fulfilling their educational roles within the community. The use of educational tools such as leaflets, booklets, posters, training modules, illustrated educational cards, and audiovisual media—such as animated videos and interactive infographics—has been proven to enhance cadres' understanding of health materials and help them communicate health messages more effectively to mothers of young children and other family members. One study, for example, found that audiovisual media significantly improved cadres' memory retention and comprehension regarding stunting prevention, while illustrated visual materials were particularly effective in explaining complementary feeding (MP-ASI) menus to mothers with lower levels of education. In addition to boosting cadres' confidence in delivering health education, educational media also play a pivotal role in promoting behavioral change among Posyandu beneficiaries—especially in the adoption of practices such as supplemental feeding, clean water usage, and clean and healthy living behaviors (PHBS). Therefore, selecting media that align with the socio-cultural context of the community is a strategic component in optimizing cadre performance.

### **3. Digital Technology Innovations for Cadre Empowerment**

Several articles highlight the role of digital technology innovation as a new and effective approach in empowering Posyandu cadres to work more efficiently and effectively. The development of Android-based applications such as *e-Posyandu*, *ePoK* (Electronic Cadre Recording), and web-based health monitoring platforms has been implemented in several regions, yielding promising results. These technologies facilitate cadres in recording nutritional status, child growth, immunization records, and reporting to primary health centers (*puskemas*) in real time[30]. Furthermore, digital systems provide fast access to health information, intervention guidelines, and routine notifications, all of which help enhance adherence and accountability among cadres in carrying out their roles. Studies show that cadres trained in using digital applications experience improved work efficiency, greater accuracy in data recording, and higher job satisfaction. However, some challenges remain, particularly regarding the limited digital literacy among older cadres and the availability of devices and internet connectivity in remote or underserved areas. Therefore, integrating digital technology into cadre strengthening efforts must involve inclusive training approaches and be supported by adequate infrastructure and technical resources.

### **4. Collaborative Strategies in Capacity Building for Cadres**

Another important finding is that capacity building for Posyandu cadres should not rely solely on individual efforts but requires a collaborative approach involving multiple stakeholders. Such collaborative strategies include Focus Group Discussions (FGDs), intensive mentoring by health professionals (doctors, midwives, or nutritionists), cooperation with community leaders, and the active involvement of cadres in problem identification and community-based solution development. These approaches have been shown to foster a greater sense of ownership among cadres toward Posyandu activities and to increase motivation and accountability in fulfilling their responsibilities. Several studies emphasize the effectiveness of community-based empowerment models that position cadres as local agents of change, where interventions are co-designed with cadres based on the specific local context. This approach not only strengthens the social bonds between cadres and the community but also increases participation from mothers of young children in Posyandu activities and improves the overall quality of services provided.

### **5. The Role of Cadres in Thematic and Targeted Health Promotion**

Some studies specifically focus on how Posyandu cadres play a vital role in thematic and targeted health promotion and disease

prevention initiatives. For instance, in stunting prevention campaigns, cadres receive specialized training on balanced nutrition, child-rearing practices, and the preparation of locally adapted complementary feeding (*MP-ASI*) menus[31], [32]. In other contexts, cadres are trained to educate pregnant women about the danger signs of pregnancy and the importance of regular antenatal care (ANC) visits. Additionally, cadres are often involved in interventions aimed at preventing diarrhea through oral rehydration therapy education and first-aid practices for children. In all of these contexts, research findings consistently indicate that enhancing cadres' capacity in specific thematic areas directly contributes to increased community awareness and improved health behaviors at the household level. This suggests that optimizing cadre performance not only improves Posyandu service outputs but also leads to broader public health outcomes within the community.

## 6. The Need for Continuous Education and Systemic Support

The final key finding emphasizes the importance of continuous education and systemic support in sustaining and enhancing the performance of Posyandu cadres. Numerous articles highlight that the effects of initial training are often short-lived if not followed by ongoing educational programs, regular supervision, updated educational materials, and consistent guidance from *puskesmas* (community health center) staff. Several studies recommend the development of cadre performance monitoring and evaluation systems based on measurable indicators, as well as the inclusion of cadres in cross-sector coordination forums such as family welfare programs (PKK) and village health preparedness (*desa siaga*) initiatives[33], [34]. In addition, recognition and incentives—ranging from certificates and advanced training opportunities to formal acknowledgments from village authorities—have been shown to significantly boost cadres' motivation to remain active and improve their competencies. Therefore, the optimization of Posyandu cadres must be positioned as an integral component of a sustainable, integrated primary healthcare system that prioritizes grassroots-level human resource empowerment.

## CONCLUSIONS

Based on the review of 22 scientific articles, it can be concluded that optimizing the role of Posyandu (Integrated Health Post) cadres in promotive and preventive public health efforts is highly effective when facilitated through a variety of educational interventions—both conventional and technology-based. Cadre knowledge and skills were shown to improve significantly through structured training, health education sessions, mentoring, and the use of diverse educational media, including videos, audiovisual materials, booklets, leaflets, flashcards, and digital applications (such as e-POSYANDU and ePoK). Most studies employed a quasi-experimental design with pre-test and post-test measurements, which consistently demonstrated statistically significant improvements in knowledge scores and behavioral changes among cadres. Several studies emphasized the importance of continuous learning and the involvement of cadres in critical health activities such as child growth monitoring, stunting prevention, diarrhea management, basic first aid training, promotion of complementary feeding, pregnancy preparedness, and the prevention of choking in infants. Audiovisual-based media were found to be especially effective in enhancing comprehension and engagement, leading to better information retention. Furthermore, collaborative methods such as Focus Group Discussions (FGDs), brainstorming, and the involvement of community members and local health institutions contributed to the effectiveness of cadre empowerment programs. Key findings from this review show that Posyandu cadres can function not only as service providers but also as strategic agents of behavioral change in the community. The most effective interventions are those that are participatory, media-rich, contextually relevant, and integrated into the broader framework of community-based health systems. Continuous investment in training and empowerment of cadres is therefore critical to improving public health outcomes.

## LIMITATIONS AND FUTURE WORKS

This study is based on a review of 22 selected articles, which, although comprehensive in scope, still presents certain limitations. First, the majority of the reviewed studies employed quasi-experimental designs with pre-test and post-test models, which, while useful for measuring short-term knowledge and behavioral changes, may not adequately capture long-term impacts or sustainability of cadre empowerment programs. Second, the diversity in intervention methods, target populations, and contextual settings across studies may limit the generalizability of findings to broader national or international contexts. Additionally, the reliance on self-reported data in many studies poses potential risks of response bias and overestimation of outcomes. Another limitation lies in the limited number of studies that evaluated digital innovations in depth. While digital tools such as e-Posyandu and ePoK showed promising results, comprehensive longitudinal studies assessing their long-term usability, accessibility in rural or low-resource settings, and impacts on health outcomes are still lacking. Furthermore, few studies explored the gendered dimensions of cadre roles or addressed socio-cultural barriers that may influence their performance and community acceptance.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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