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Animated Videos and Bundled Care Concepts in Health Education: A Scoping Review of Integration, Outcomes, and Implementation Gaps

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Abstract

Background: Conventional health education media such as leaflets and oral lectures are often limited in reaching patients with low health literacy, while animated videos and bundled care have each been shown to improve understanding and care outcomes. However, evidence regarding their integration remains scattered and has not been systematically mapped.
Aims: To map the evidence regarding the integration forms, measured outcomes, intervention designs, effectiveness, and implementation barriers of animated videos combined with bundled care in health education.
Methods: This scoping review was conducted following Arksey and O'Malley's framework and was reported according to PRISMA ScR guidelines. Searches were performed on three databases (EBSCO, PubMed, Scopus) for publications from 2020–2026, using combinations of keywords: ("animated video" OR "video animation") AND ("bundled care" OR "care bundle") AND ("health education" OR "knowledge").
Results: From 108 initial records, 99 records were screened after removing duplicates and ineligible records. Six studies met inclusion criteria (two RCTs, two quasi-experimental studies, one case-control study, and one systematic review). Animated videos consistently improved short-term knowledge, but only one study truly integrated videos into multicomponent bundled care with objective clinical outcomes. Effects on attitudes, satisfaction, and behaviors varied far more than effects on knowledge.
Conclusion: The combination of animated videos and bundled care is promising for health education, but the term "bundled care" is still used loosely, measurement instruments are generally unvalidated across populations, and evidence on behavioral change and long term clinical outcomes remains very limited. Standardization of bundle components and research designs capable of isolating video contributions from other bundle components are needed.

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INTRODUCTION

Health education remains one of the most frequently used nursing interventions to improve knowledge, change attitudes, and ultimately improve patient and family behaviors and clinical outcomes (Nutbeam, 2000; Green & Kreuter, 2005). For decades, the media used have been mostly leaflets, posters, and one-way oral counseling. Such media have real limitations: leaflets tend to be text dense and less friendly to groups with low health literacy, while oral counseling is highly dependent on the communication skills of individual health workers and is difficult to standardize across providers (Saudi et al., 2020; Sudore & Schillinger, 2009; Wilson & Wolf, 2009). These limitations have driven the development of multimedia-based educational media, one of which is animated video, which combines moving visuals, audio narration, and often cartoon characters that are easily identifiable by audiences across ages and cultural backgrounds (Adam et al., 2023; Nintao et al., 2023; Mayer, 2009). Recent evidence continues to support the use of animated videos for

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improving health knowledge and health-seeking behaviors across various populations (Chaiyakunapruk et al., 2024). Updated systematic reviews continue to reinforce the effectiveness of video animations for patient education, while also highlighting persistent gaps in long-term outcome measurement, as detailed further below. The effectiveness of animations is supported by cognitive theory, particularly the Cognitive Theory of Multimedia Learning (Mayer, 2009) and Dual Coding Theory (Paivio, 1986), which explain how visual and verbal information processed simultaneously can enhance learning and retention (Sweller et al., 2019).

Evidence regarding the effectiveness of animated videos as patient information tools has been summarized in a systematic review by Moe Byrne et al. (2022) which reviewed 38 controlled trials from 19 countries. The review showed that animation consistently outperformed standard care or verbal information in improving knowledge, but its effects on attitudes, cognition, and behavior were much more diverse and in some studies did not differ significantly from the comparison group (Deshpande et al., 2023; Feeley et al., 2022). Concurrent with these developments, the concept of bundled care originally developed in the context of ventilator associated pneumonia prevention in intensive care has begun to be applied more broadly to various clinical conditions in children and adults as evidence-based multicomponent intervention packages delivered simultaneously and consistently (Martinez Reviejo et al., 2023, Luo et al., 2024; Resar et al., 2012). Care bundles have been shown to reduce healthcare-associated infections, improve patient safety, and enhance clinical outcomes across diverse settings (Lilley & Anderson, 2023; Chenoweth, 2021; Weiner-Lastinger et al., 2019; Resar et al., 2005). Based on the description above, this article was prepared as a scoping review with the aim of mapping the evidence regarding the effectiveness of animated videos combined with bundled care in health education, including the forms of integration of the two components, outcomes and instruments used, video design characteristics, comparison of effectiveness with conventional methods, and implementation barriers reported in the literature.

While animated videos improve cognitive uptake and care bundles enforce clinical standardization, combining both offers a novel dual-pronged strategy to enhance both patient engagement and clinical compliance. Interestingly, these two approaches animated video as a message delivery modality and bundled care as a structured intervention package have begun to be combined in practice and research (Gilhooly et al., 2019; Kim et al., 2020). For example, in the management of severe childhood pneumonia, animated educational videos were combined with a series of nursing interventions including environmental care, family communication, respiratory management, oral care, and nutritional support (Luo et al., 2024). The integration of video animations into bundled care represents an innovative approach to enhance patient education and engagement within structured clinical protocols (Hansen et al., 2024; Cavalcante et al., 2025).

However, to the best of our initial search, no review has specifically mapped how animated videos are integrated into bundled care, what outcomes are measured, and the extent to which the design of both elements considers the characteristics of the target population. The existing literature is also highly heterogeneous in terms of study design, operational definitions, and outcome reporting. The scoping review approach is considered more appropriate than a systematic review, which requires homogeneity of questions and outcomes to draw definitive conclusions about effectiveness (Munn et al., 2018; Arksey & O'Malley, 2005; Levac et al., 2010). A scoping review allows us to map the breadth and nature of available evidence, identify conceptual and methodological gaps, and formulate a future research agenda (Peters et al., 2015; Colquhoun et al., 2014).

METHOD

This study employed a scoping review design following the five stage framework of Arksey and O'Malley (2005): (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) charting the data, and (5) collating, summarizing, and reporting the results. The review was reported using the PRISMA Extension for Scoping Reviews (PRISMA ScR) guidelines (Tricco et al., 2018; Page et al., 2021). This study did not register a protocol in a public registry such as Open Science Framework or PROSPERO, as scoping review protocols are not mandatory for this type of review (Munn et al., 2018; Peters et al., 2015). Searches were conducted on three electronic databases: EBSCO, PubMed, Scopus (as a register), for articles published between January 2020 and

June 2026. The search strategy combined Boolean operators and keywords/MeSH terms as follows: ("animated video" OR "video animation" OR "cartoon animation" OR "motion graphic" OR "animation education") AND ("bundled care" OR "care bundle" OR "cluster nursing" OR "bundle nursing") AND ("health education" OR "patient education" OR "health promotion" OR "patient knowledge")

The search was limited to full text articles in English or Indonesian. Reference lists of relevant articles were also manually searched (citation tracking) to capture additional studies that might have been missed by the database search strategy. The scoping review questions were formulated using the Population–Concept–Context (PCC) framework, as recommended by the Joanna Briggs Institute for scoping reviews (Peters et al., 2015; Munn et al., 2018).

Table 1. PCC Framework for Scoping Review Questions

PCC Element	Description
Population (P)	Patients, family members/caregivers, or the general public in healthcare settings
Concept (C)	Integration of animated videos and bundled care in health education, including intervention designs, measured outcomes, effectiveness, and implementation barriers
Context (C)	Healthcare settings including hospitals, community health centers, and public health programs, with no geographical restrictions (though the language restriction to English and Indonesian publications, described in the Methods, may have indirectly limited geographic and cultural scope)

Based on this framework, the primary research question was:
"How are animated videos integrated into bundled care in health education, what outcomes are measured, and what are the reported effectiveness and implementation barriers?"
The specific sub questions were:

1. How are animated videos integrated into bundled care components in patient, family, or community health education, and are bundle components clearly defined and evidence-based?
2. What outcomes are most frequently measured, and how valid and sensitive aretheir measurement instruments?
3. How are duration, language style, visualization, and health literacy level in animated videos adapted to respondents' demographic backgrounds?
4. What is the quantitative and qualitative effectiveness of animated video and bundled care combinations compared to conventional health education methods?
5. What implementation barriers are reported, including technological infrastructure, health worker workload, and patient resistance?

A standardized data extraction form was developed by the research team based on the PCC framework and previous scoping review guidance (Arksey & O'Malley, 2005; Levac et al., 2010; Tricco et al., 2018). The form was pilot-tested on two randomly selected studies to ensure all relevant information could be captured. Two reviewers (NK and LR) independently extracted data from each included study using the structured form. The extracted information included:

1. Bibliographic details: Author(s), year of publication, country of study origin, journal name
2. Study characteristics: Study design, aim/objective, setting
3. Population characteristics: Participant type, sample size, demographic information
4. Intervention details: Description of animated video (duration, content, language, delivery method), description of bundled care (components, definition, delivery)
5. Comparator: Comparison intervention or control group description
6. Outcome measures: Types of outcomes measured, instruments used, validity and reliability information
7. Main findings: Quantitative and qualitative results, effect sizes, statistical significance
8. Implementation barriers: Reported challenges in delivering the intervention

All extracted data were compiled into a summary table (Table 1) to facilitate cross study comparison and thematic analysis. The data extraction process was managed using Microsoft Excel for data organization and Mendeley for reference management.

Critical Appraisal / Risk of Bias Assessment

Consistent with standard scoping review methodology, this review did not conduct formal critical appraisal or risk of bias assessment of the included studies. The rationale for this approach is threefold:

1. Scoping reviews aim to map the breadth and nature of available evidence rather than synthesize evidence for clinical decision making or determine the effectiveness of interventions (Arksey & O'Malley, 2005; Munn et al., 2018; Peters et al., 2015).
2. Critical appraisal is not a mandatory component of scoping reviews according to the Joanna Briggs Institute methodology (Peters et al., 2015) and the PRISMA ScR guidelines (Tricco et al., 2018).
3. The included studies were highly heterogeneous in design (RCTs, quasi experiments, case control, systematic reviews), populations, and interventions, making a uniform quality assessment impractical and potentially misleading (Colquhoun et al., 2014; Pham et al., 2014).

However, this review acknowledged methodological limitations of individual studies in the Limitations section of the discussion, including small sample sizes, use of unvalidated instruments, and lack of long term outcome measurement. The following software and tools were used throughout the scoping review process:

Table 2. Software and Tools Used in the Scoping Review

Tool/Software	Purpose
Mendeley	Reference management, citation organization, and bibliography formatting
Microsoft Excel	Data extraction, data charting, and creating summary tables
Google Chrome	Database search and web based article retrieval

Extracted data were analyzed narratively using a thematic approach to identify main patterns related to: (1) forms of intervention integration, (2) types of outcomes measured, (3) video design characteristics, (4) effectiveness compared to conventional methods, and (5) implementation barriers. Narrative synthesis was conducted by grouping findings based on similar topics and presenting them in a structured manner according to the research questions. This scoping review has several methodological limitations that should be considered when interpreting the findings:

1. Heterogeneity: The diversity of study designs, populations, and interventions across included studies limits the ability to conduct quantitative synthesis or meta-analysis.
2. Language and time restrictions: Restriction to English and Indonesian language articles and publications from 2020–2026 may have missed relevant studies published in other languages or outside this time frame.
3. Sample sizes and instruments: Most included studies had relatively small sample sizes and used locally developed instruments that have not been psychometrically validated across populations, limiting generalizability.
4. Publication bias: The risk of publication bias may affect the availability of studies with negative or non significant results, potentially overestimating positive effects.
5. No protocol registration: This review did not register a protocol in a public registry, which may limit transparency and replicability (although protocol registration is not mandatory for scoping reviews).
6. No critical appraisal: The absence of formal quality assessment means that methodological limitations of individual studies are not systematically incorporated into the synthesis, though these are acknowledged in the discussion.

RESULTS AND DISCUSSION

Results

Search Results and Study Selection

The search across four databases (EBSCO, PubMed, Scopus, as a register) yielded 108 records (EBSCO n=8, PubMed n=23, Scopus n=73). After removing 9 duplicates (no records were marked ineligible by automation tools), 99 records were screened at the title and abstract stage. Of these,

64 records were excluded as irrelevant to the research topic, leaving 35 articles for full text assessment. However, 22 articles could not be retrieved (full text not accessible), leaving 13 articles assessed for eligibility. Of the 13 articles assessed, 6 articles were excluded because their outcomes did not include knowledge or attitudes, and 1 article was excluded because the intervention was not an animated video (it was a documentary video). Six studies met the inclusion criteria, consisting of five primary studies two RCTs (Nintao et al., 2023; Adam et al., 2023); two quasi-experimental studies: (Saudi et al., 2020; Astrid et al., 2023) and one case-control study (Luo et al., 2024) and one systematic review of 38 RCTs (Moe Byrne et al., 2022), which was included as a separate unit of analysis due to its high relevance to the review topic.

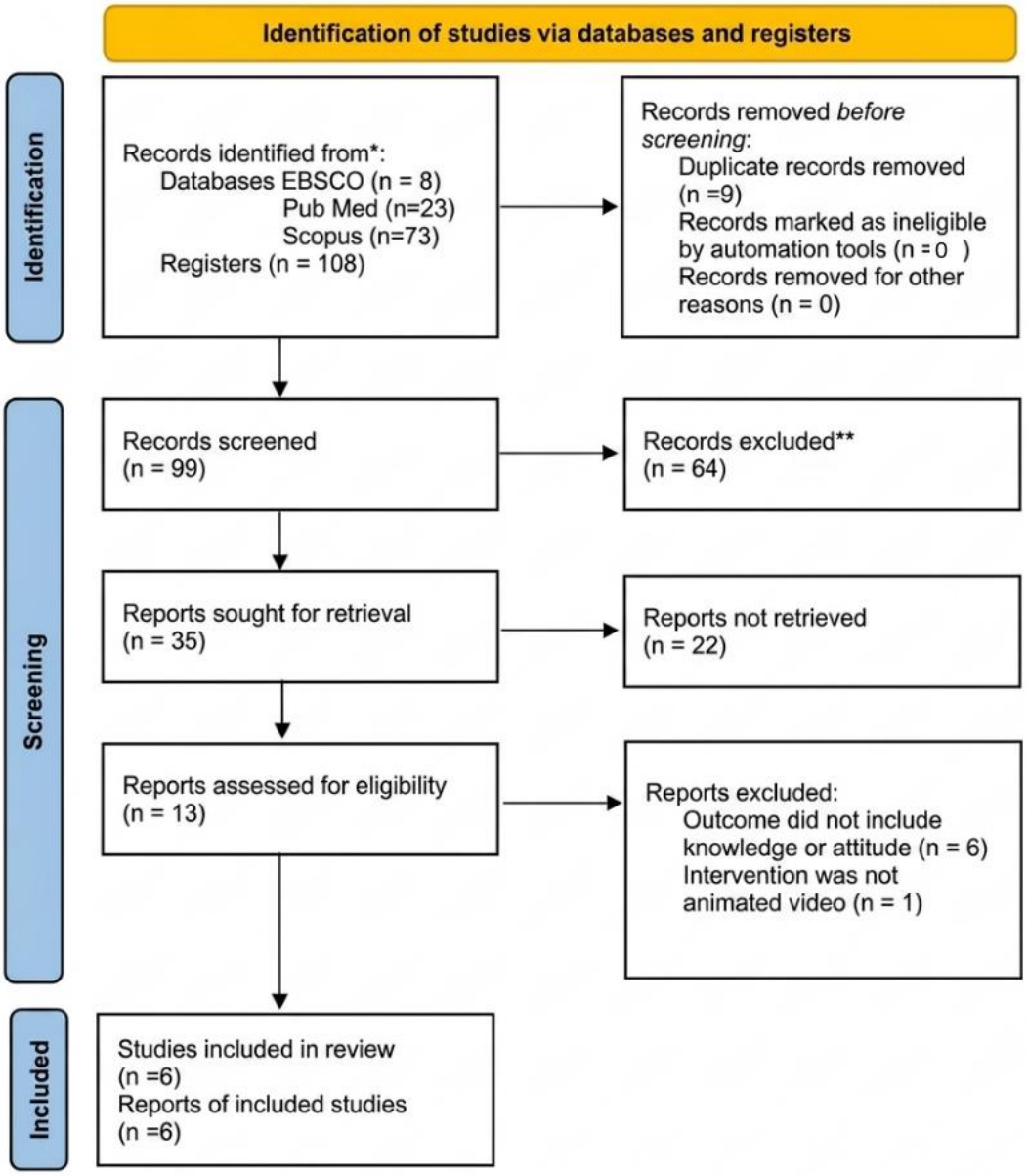

Figure 1. PRISMA Flow Diagram of Study Selection Process

Characteristics of Included Studies

Evidence from Primary Studies (n = 5) The five primary studies provided data from single populations, each with distinct clinical and geographical contexts: childhood pneumonia in Indonesia, severe childhood pneumonia in China, family resilience during the pandemic in Indonesia, perinatal health in South Africa, and prenatal screening in Thailand. The characteristics and main findings of these five studies are summarized in Table 3.

Table 3. Data Extraction of Primary Studies (n = 5)

No	Author (Year), Country	Study Design	Population (n)	Intervention Description	Comparator	Outcomes & Instruments	Main Results
1	Saudi et al. (2020), Indonesia	Quasi-experimental, pretest-posttestnonequivalent control group	Mothers of children with pneumonia (n=46; 23/23)	Mobile phone based educational video sent via WhatsApp, guided viewing 15 minutes then self-repeated 2–5 times; no structured bundle component	Leaflet	Knowledge questionnaire (13 items) & attitude (14 items); α=0.816/0.792; Fisher exact test	Knowledge & attitude significantly improved in video group (p=0.017; p=0.003); post test knowledge differed between groups (p=0.018), attitude did not (p=0.384)
2	Luo et al. (2024), China	Case control study	Children with severe pneumonia (n=140; 70/70)	5 component bundled care (environmental, family communication, respiratory management, oral care, nutrition) combined with animated video played repeatedly during therapy breaks	Routine care	Recovery time of temperature, oxygen saturation, heart rate, consciousness, respiratory rate; logistic regression of family anxiety	All clinical recovery times significantly shorter in observation group (p<0.001); nursing method & extrapulmonary complications predicted family anxiety (p<0.05)
3	Astrid et al. (2023), Indonesia	Quasi experimental pre post control	Residents of flats affected by COVID-19 (n=289; 197/92)	Two motion graphic videos (COVID-19 & family resilience) watched together 2 times per topic, 3-day interval; no multicomponent bundle	Group without intervention (education delayed)	COVID-19 knowledge & family resilience 8 function questionnaire (Likert scale)	Family resilience significantly increased (p=0.008); COVID-19 knowledge significantly increased (p<0.001)
4	Adam et al. (2023), South Africa	RCT	Pregnant women attending antenatal care (n=204 analyzed from 222 registered)	10 short animated story videos (SAS) on perinatal topics sent via WhatsApp, self watched once per video without accompaniment or additional bundle	Standard antenatal care (SMS MomConnect)	Knowledge score 28 questions; user satisfaction 8 item Kano scale	Knowledge increase small & non significant (+0.28 points; 95% UI −0.58–1.16); satisfaction very high (4.71/5)
5	Nintao et al. (2023), Thailand	RCT	Pregnant women undergoing cfDNA screening (n=165; 83/82)	4 minute animated educational video added after traditional face to face counseling (not a replacement)	Traditional counseling only	Knowledge score (0–18); anxiety attitude; satisfaction; screening acceptance rate	Knowledge score increase significantly higher in video group (+7.1±3.3 vs +4.2±2.5; p=0.03); attitude, satisfaction, & screening acceptance did not differ significantly

Source: Processed from five included primary studies (2020–2026). Each row represents findings from a single study population.

Video Design Characteristics of Primary Studies

Consistent with the second section of the extraction form described in the Methods, nine video design attributes across the five primary studies are summarized comparatively in Table 4.

Table 4. Video Design Characteristics in Five Primary Studies

Characteristic	Saudi et al. (2020)	Luo et al. (2024)	Astrid et al. (2023)	Adam et al. (2023)	Nintao et al. (2023)
Video duration	Not explicitly reported; initial session 15 min, self-repeated 2–5×	Not reported	2 videos: 4 min & 6 min	10 short videos, 1:33–4:22 minutes each	4 minutes
Delivery platform	WhatsApp, downloaded to Android phone	Played in hospital room (device not specified)	Shared screen (group) + uploaded to YouTube	WhatsApp	Video link, watched on participants' personal phones
Animation type	Not explicitly	Cartoon/character	Motion graphic	Short animated	Educational

Characteristic	Saudi et al. (2020)	Luo et al. (2024)	Astrid et al. (2023)	Adam et al. (2023)	Nintao et al. (2023)
	stated as animation; described as general audiovisual	animation preferred by children		storytelling (SAS), "glocalizable" characters	animation (style not specified)
Narration language	Indonesian (implied from respondent criteria)	Mandarin (implied from study location)	Indonesian	Not explicitly reported	Thai
Cultural adaptation	Not reported	Not detailed; characters adapted to children's preferences	Content adapted to Indonesian pandemic policies & context	"Glocalizable" character design, involving local mothers & health cadres	Developed by local Thai team
Accessibility	Not reported; required Android phone ownership (may limit access)	Not reported	Not reported	Not explicitly reported, but designed considering low literacy	Not reported
Exposure frequency	1× guided + 2–5× self-directed	Repeatedly (looping) during therapy breaks	2× per video, 3 day interval	1× per video (10 videos total)	1×
Viewing setting	Initially at hospital (accompanied), then independently at home	In children's inpatient room	Together (group), scheduled community sessions	Self-directed, personal/family phone	Private area at antenatal clinic, personal phone
Development/ production process	Developed by researchers, consulted with pediatric nursing lecturers, revised	Not detailed	Not detailed (videos already available, uploaded to YouTube)	Human-centered design with pregnant women, health cadres, and local animators	Developed & standardized by maternal-fetal team and pediatric genetics specialists

Source: Processed from five included primary studies. "Not reported" indicates that the attribute was not explicitly described in the original manuscript, not that the attribute was absent.

Evidence from Systematic Review (Moe Byrne et al., 2022; synthesis of 38 RCTs)

In contrast to the five studies above, the sixth evidence unit does not originate from a single population but rather represents a narrative synthesis of 38 randomized controlled trials involving 5,646 participants across 19 countries, encompassing cartoon, 3D, and whiteboard animations as educational media for medical procedures, chronic diseases, and health promotion. Given its nature as cross-study aggregated evidence, the findings from this review should be read as a general pattern across the broader video animation literature including but not limited to the bundled care context and not as the result of a single experiment. A summary of findings by outcome category is presented in Table 3; the nine video design attributes at the aggregate level of 38 RCTs are discussed narratively in the Critical Analysis section (point 3), as the range of values across studies is too wide to be represented as a single row per study.

Table 5. Summary of Aggregated Evidence from Systematic Review (Moe Byrne et al., 2022)

Outcome Category	Number of Studies Assessing	Results Supporting Animation	Null / No Difference Results	Notes
Knowledge	30 of 38 RCTs	19 studies (63%)	11 studies showed no significant difference	Animation advantage most consistent, especially vs standard care/verbal information; diminishes sharply vs booklets/static images
Attitudes & cognitions	21 of 38 RCTs	6 studies (29%)	14 null, 1 study showed lower results than comparator	Effects much more varied and inconsistent than knowledge outcomes
Behaviors	9 of 38 RCTs	4 studies (44%)	5 null	Least frequently measured outcome among the 38 RCTs reviewed

Source: Summarized from Moe Byrne et al. (2022). Numbers in the table represent the count of RCTs among the 38 reviewed, not the number of participants.

Critical Analysis

In each subsection below, findings from the five primary studies and aggregated findings from the systematic review of 38 RCTs (Moe Byrne et al., 2022) are deliberately presented separately so that readers can distinguish the weight and source of each claim.

Operational Definition and Intervention Integration

Evidence from primary studies: Review of the five primary studies shows that only one study (Luo et al., 2024) truly integrated animated video as a component within a clearly defined bundled care package, encompassing five elements: environmental care, family communication, respiratory management, oral care, and nutritional support. In this study, the video served an adjunctive function, played repeatedly during therapy breaks to build cooperation and reduce children's fear, while other bundle components such as oral care techniques or ventilator management remained directly delivered by nurses. In other words, the video here was not the primary teaching medium for each bundle component but rather a supplement reinforcing adherence and comfort during bundle implementation. The other four primary studies (Saudi et al., 2020; Astrid et al., 2023; Adam et al., 2023; Nintao et al., 2023) essentially tested animated videos as single media or as additions to a single comparator element such as face to face counseling, thus not meeting the definition of bundled care in the strict clinical nursing sense that is, a set of discrete, evidence-based procedural steps delivered simultaneously and consistently.

Evidence from systematic review: Moe Byrne et al. (2022) reported that among the 38 RCTs they reviewed, the majority also tested animation as a single intervention or added to one type of comparator (14 studies combined with booklets/standard consultation), rather than as part of a multicomponent bundle in the clinical sense. Thus, the "standalone video" pattern observed in four of the five primary studies above is consistent with the pattern in the majority of the 38 RCTs, leading to the conclusion that integration of video into bundled care remains an exception rather than a general rule in the currently available literature.

The use of the term "bundled" or "educational package" in some literature tends to be loose, conflating the meaning of clinical bundles with mere series of educational activities. Even in the sole primary study that explicitly mentions bundled care (Luo et al., 2024), the composition of five elements appears to have been developed based on team consensus and reference to general cluster nursing literature, rather than referring to a specific published clinical practice guideline for severe childhood pneumonia. Variation in bundle composition across potential future studies without uniform reference standards complicates cross study effectiveness comparisons and replication across institutions.

Health Outcomes and Metrics

Evidence from primary studies: The variables measured across the five primary studies were quite diverse: cognitive knowledge scores (Saudi et al. 2020; Nintao et al. 2023); Adam et al. 2023;), attitudes or anxiety levels (Saudi et al. 2020; Nintao et al. 2023), user satisfaction (Adam et al. 2023; Nintao et al. 2023), family resilience as a psychosocial construct (Astrid et al. 2023), and objective clinical outcomes including recovery time for body temperature, oxygen saturation, heart rate, consciousness, and respiratory rate (Luo et al. 2024). The objective clinical outcomes in Luo et al. (2024) study are relatively free from the self report bias inherent in knowledge or attitude questionnaires used in the other four primary studies, making them methodologically more convincing; however, because the intervention was multicomponent, this study cannot isolate the contribution of the animated video from the four other bundle components to clinical outcome improvement a design limitation not explicitly discussed by its original authors. Regarding instrument validity, most knowledge and attitude questionnaires in the primary studies were developed or adapted specifically for the respective studies and only tested for reliability on small, local pilot samples for example, the questionnaire in Saudi et al.'s study was tested on 20 respondents (α=0.816 for knowledge; α=0.792 for attitude), while the instrument in Nintao et al. (2023) study was adapted from a questionnaire validated at one hospital in Thailand (α=0.702). None of the five primary studies used instruments that had been psychometrically validated across countries or populations, so knowledge scores between studies cannot be directly compared. Timing of measurement in primary studies was also generally immediate or within a short post-intervention period (day seven in Saudi et al., the same day in Nintao et al. (2023), week three in

Astrid et al. 2023), meaning long term knowledge retention or attitude change is practically unmeasured.

Evidence from systematic review: As summarized in Table 3, among the 38 RCTs reviewed by Moe Byrne et al. (2022), knowledge was the most frequently measured outcome (30 of 38 studies), and the majority assessed it immediately after information exposure; only a small proportion conducted follow-up assessments ranging from one day to several months later. This pattern confirms on a much larger scale the same limitation observed in the five primary studies above namely the dominance of short term measurement and minimal long term retention data indicating that this gap is not merely a weakness of individual studies but rather a systematic pattern across the entire health video animation literature.

Intervention Design and Video Accessibility

Evidence from primary studies: Video duration in the five primary studies varied widely, ranging from short four minute videos added to traditional counseling (Nintao et al. 2023), four to six minute videos watched together in groups (Astrid et al. 2023), to 15 minute guided viewing repeated independently several times (Saudi et al. 2020). Regarding language and cultural adaptation, several primary studies showed good attention: videos in Nintao et al. and Saudi et al. were produced in national languages (Thai and Indonesian), while Adam et al. explicitly designed "glocalizable" animated characters to be relevant across cultural groups in South Africa and distributed via WhatsApp to reach populations with mixed literacy levels. However, none of the five primary studies explicitly tested or reported accommodations for groups with visual or hearing impairments, nor formally stratified video effectiveness by respondents' health literacy levels. Dependence on smartphone based distribution channels also warrants scrutiny as a selection bias source: Saudi et al.'s study explicitly required Android phone ownership as an inclusion criterion, systematically excluding mothers with low socioeconomic status or older age who lacked such devices.

Evidence from systematic review: At the aggregate level of 38 RCTs, Moe Byrne et al. (2022) reported a much wider animation duration range of 1.25 to 31 minutes, confirming that there is no consensus on the optimal "dose" of video exposure for health education across this entire literature branch not just in the five primary studies reviewed in this scoping review. Regarding health literacy inclusivity, the review noted that at least one of the 38 reviewed studies (Meppelink et al., 2015) specifically tested animation effectiveness in low versus high health literacy groups and found greater animation benefits for the low-literacy group an explicit inclusivity test not conducted by any of the five primary studies in this scoping review. This contrast suggests that attention to inclusive video design does exist in a small subset of the broader video animation literature, but has not been widely adopted in studies specifically combining video with bundled care.

Quantitative and Qualitative Effectiveness Compared to Conventional Methods

Evidence from primary studies: In Saudi et al.'s study, the percentage of mothers with good post test knowledge reached 73.9% in the video group compared to 60.9% in the leaflet group. In Nintao et al.'s study, the addition of video to traditional counseling resulted in a significantly higher knowledge score increase compared to counseling alone (+7.1±3.3 vs +4.2±2.5; p=0.03). Conversely, for attitude, satisfaction, and behavioral outcomes, the picture from primary studies was much more diverse: Saudi et al. found the between group attitude difference at post test was not significant (p=0.384); Nintao et al. found no significant differences in anxiety attitudes, satisfaction, or screening acceptance; and Adam et al. showed a striking dissociation pattern between near null statistical knowledge increase (+0.28 points, uncertainty interval crossing zero) and very high user satisfaction (4.71 out of 5). Among the five primary studies, only Luo et al. (2024), the sole bundled care study, demonstrated superiority in hard clinical outcomes (physiological recovery time), suggesting that meaningful clinical benefits likely require genuine multicomponent integration rather than merely incremental effects from video alone.

Evidence from systematic review: The pattern observed in the primary studies above, namely, video superiority in knowledge but inconsistency on attitudes and behaviors aligns with the aggregated picture from 38 RCTs in Table 3: animation was superior on knowledge in 19 of 30

RCTs that measured it (63%), especially when the comparator was standard care or verbal information, but this superiority diminished sharply to only a small proportion of comparisons when animation was compared to richer written media such as booklets or static images. Meanwhile, positive effects on attitudes/cognitions were observed in only 6 of 21 RCTs (29%) and positive effects on behaviors in only 4 of 9 RCTs (44%). This convergence between the five primary studies and the synthesis of 38 RCTs strengthens confidence that the "knowledge rises, attitudes/behaviors inconsistent" pattern is not a small sample coincidence, but rather a fairly robust pattern across the broader health video animation literature.

Implementation Barriers

Evidence from primary studies: Technology infrastructure barriers were most clearly depicted in Adam et al.'s study, which openly reported rolling power outages (load shedding) disrupting internet access in several communities, phones shared within families limiting viewing privacy, and a relatively high dropout rate (from 222 registered participants to 204 successfully interviewed), partly due to unreachable phone numbers. The device ownership based inclusion criteria in Saudi et al.'s study further confirm that technology access prerequisites can create equity gaps not discussed by the original authors as study limitations. Regarding health worker workload, bundled care in Luo et al.'s study required considerable additional nursing time oral care twice daily, ventilator tube replacement every seven days, individual diet coordination with hospital nutritionists, in addition to repeated video playback yet the study did not report staffing ratios or estimated additional time per patient required. Only Adam et al. addressed cost sustainability through relatively low cost production by local animators and redistribution via YouTube; the other four primary studies did not report production cost estimates nor post research video sustainability plans.

Evidence from systematic review: At the aggregate level, Moe Byrne et al. (2022) noted that none of the 38 RCTs they reviewed collected process data such as attention monitoring or eye tracking during video viewing, despite longstanding concerns in the literature that animations may only promote surface learning with limited attention spans. The absence of such process data across 38 RCTs confirms that the same gap in the five primary studies above also lacking formal measurement of patient resistance or engagement is not a specific study oversight, but rather a methodological gap seemingly common across this entire literature branch.

Discussion

This scoping review mapped evidence on the integration of animated videos and bundled care in health education across six studies (five primary studies and one systematic review of 38 RCTs). The findings reveal several important patterns that merit critical interpretation: the limited integration of animation within true bundled care, the dissociation between knowledge improvement and other outcomes, inconsistent definitions of bundled care, varied intervention characteristics affecting applicability, and multiple implementation barriers. Each of these findings is discussed below in relation to existing evidence, theoretical frameworks, and implications for practice and future research. Practical guidance for implementing care bundles is available through organizations such as the Institute for Healthcare Improvement (IHI, 2023).

The term "bundled care" is used inconsistently across the literature, with only Luo et al., (2024) using it in the strict clinical sense. When different studies use the same term for fundamentally different interventions, direct comparisons become invalid. Even in Luo et al., (2024) the bundle was developed through team consensus rather than published guidelines, complicating replication. Loose terminology creates implementation challenges when bundle components are not explicitly defined, practitioners cannot reliably implement with fidelity. To address this, researchers should adapt the TIDieR checklist (Hoffmann et al., 2014) to require specification of bundle components, evidence base, sequencing, and role of video within the bundle.

The video design characteristics identified in the Results section - duration, viewing arrangement, exposure frequency, language, cultural adaptation, accessibility features, delivery platform, and production process - represent intervention choices that likely moderate effectiveness. When comparing these design elements across the five primary studies, three comparisons in particular emerge as potentially important patterns worthy of further investigation.

Regarding video duration, Nintao et al.'s brief four-minute video, added onto traditional counseling, produced a significantly larger knowledge gain than counseling alone, while Saudi et al.'s considerably longer fifteen-minute guided session, reinforced by repeated self-viewing, also produced significant gains over a leaflet. Duration alone therefore does not predict effectiveness in this literature, and the much wider 1.25-31 minute range reported across the 38 RCTs in the systematic review confirms that no consensus "dose" has been established. This variability suggests that optimal duration likely depends on the complexity of the health topic, the target population's cognitive load capacity, and the viewing context, rather than there being a single ideal video length for all educational purposes.

Regarding viewing arrangement, Astrid et al.'s scheduled community sessions, in which residents watched two motion graphic videos together, produced significant gains in both COVID-19 knowledge and family resilience, a pattern directionally similar to the individually viewed videos in Adam et al. and Nintao et al. However, because no included study randomized group versus individual viewing of the same video, this review cannot determine whether group viewing adds a social reinforcement benefit beyond what individual viewing achieves. This represents an important gap in the evidence base, as group viewing could potentially enhance learning through shared discussion, peer support, and social modeling, while individual viewing might allow for greater privacy, self-paced learning, and repeated review. The choice between these delivery modes has practical implications for implementation in community versus clinical settings and warrants dedicated factorial research.

Concerning exposure frequency, Saudi et al. (2020) (one guided viewing plus two to five self-directed repetitions) and Luo et al. (2024) (video looped repeatedly during therapy breaks) both paired repeated exposure with an accompanied or integrated bundled care process and produced significant improvements, whereas the single exposure designs in Adam et al. and Nintao et al. produced smaller or statistically non-significant knowledge gains. This pattern is suggestive rather than conclusive, since repetition was confounded with accompaniment and bundle integration rather than tested as an isolated variable. From a cognitive learning perspective, repeated exposure may facilitate memory consolidation, reduce cognitive load, and allow for deeper processing of complex health information, particularly for populations with limited health literacy. However, the cost and feasibility of repeated viewing must be balanced against potential benefits, and future studies should systematically examine whether a minimum number of exposures is required for meaningful knowledge retention and behavior change.

The five primary studies showed wide variation in video duration, ranging from four-minute videos added to traditional counseling in Nintao et al., to four to six-minute videos watched together in groups in Astrid et al., to fifteen-minute guided viewing repeated independently several times in Saudi et al. This variation likely reflects differing assumptions about the optimal "dose" of video exposure for health education, but the absence of empirical justification for chosen durations in any of the studies limits the ability to draw conclusions about optimal length. Regarding language and cultural adaptation, several primary studies showed good attention to local relevance: videos in Nintao et al. and Saudi et al. were produced in national languages (Thai and Indonesian), while Adam et al. explicitly designed "glocalizable" animated characters to be relevant across cultural groups in South Africa and distributed via WhatsApp to reach populations with mixed literacy levels. However, adaptation often remained limited to translation rather than deep cultural tailoring of content, characters, and examples to specific cultural contexts, and none of the five primary studies explicitly tested or reported accommodations for groups with visual or hearing impairments. The absence of such accessibility features contradicts Universal Design principles and excludes populations with sensory impairments, representing a significant equity concern. Furthermore, none of the studies formally stratified video effectiveness by respondents' health literacy levels, despite Meppelink et al.'s (2015) finding from the broader animation literature that animation benefits low health literacy groups more, suggesting that videos may be particularly valuable for vulnerable populations but this hypothesis remains untested in the bundled care context. Dependence on smartphone-based distribution channels also warrants scrutiny as a selection bias source: Saudi et al.'s study explicitly required Android phone ownership as an inclusion criterion, systematically excluding mothers with low socioeconomic status or older age who lacked such devices, a limitation not discussed by the original authors as a study limitation.

Implementation barriers in low-resource settings represent another critical theme emerging from this review. Technology infrastructure barriers were most clearly depicted in Adam et al.'s study, which openly reported rolling power outages (load shedding) disrupting internet access in several communities, phones shared within families limiting viewing privacy, and a relatively high dropout rate (from 222 registered participants to 204 successfully interviewed), partly due to unreachable phone numbers. The device ownership based inclusion criteria in Saudi et al.'s study further confirm that technology access prerequisites can create equity gaps not discussed by the original authors as study limitations. Regarding health worker workload, bundled care in Luo et al.'s study required considerable additional nursing time oral care twice daily, ventilator tube replacement every seven days, individual diet coordination with hospital nutritionists, in addition to repeated video playback yet the study did not report staffing ratios or estimated additional time per patient required. Only Adam et al. addressed cost sustainability through relatively low cost production by local animators and redistribution via YouTube; the other four primary studies did not report production cost estimates nor post research video sustainability plans. At the aggregate level, Moe Byrne et al. (2022) noted that none of the 38 RCTs they reviewed collected process data such as attention monitoring or eye tracking during video viewing, despite longstanding concerns in the literature that animations may only promote surface learning with limited attention spans. The absence of such process data across 38 RCTs confirms that the same gap in the five primary studies above also lacking formal measurement of patient resistance or engagement is not a specific study oversight, but rather a methodological gap seemingly common across this entire literature branch.

Taken together, the findings above carry implications for both nursing practice and future research. For practice, animated video is best positioned as a complementary component embedded within a clinician-led care process rather than as a standalone substitute for direct patient interaction, since consistent gains in knowledge did not translate automatically into changed attitudes, satisfaction, or behavior in the studies reviewed. Institutions introducing animated video into patient education should pair it with a clearly specified bundled care protocol, build in accessibility features for people with sensory impairment or low-literacy, and provide equitable access pathways for patients who lack a personal smartphone or reliable connectivity. For research and theory, the review points to a need for standardized, TIDieR-based reporting of bundle composition, factorial designs capable of isolating the marginal contribution of video from other bundle elements, and outcome frameworks that extend beyond immediate knowledge testing to include behavioral and long-term clinical endpoints. These practice and research implications are elaborated further below.

Although this scoping review does not implement or evaluate a direct community intervention, its findings carry indirect implications for community health promotion. By systematically mapping how animated video and bundled care are combined, and by identifying which design features and implementation barriers most affect outcomes, this review provides evidence-based guidance that community health workers, Posyandu cadres, primary care nurses, and public health program planners can draw on when designing low-cost, scalable health education media for underserved populations. In particular, the finding that device-ownership and connectivity requirements can systematically exclude lower-income or older community members, as seen in Saudi et al., offers a concrete equity signal for community programs considering smartphone-based education: complementary delivery channels such as communal viewing at Posyandu or community health posts, as demonstrated in Astrid et al., should be provided alongside individual mobile delivery to avoid widening health-information disparities within the community.

Likewise, the review's emphasis on cultural and linguistic adaptation, accessibility for people with sensory impairment, and the value of pairing video with structured, hands-on care processes rather than treating video as a stand-alone substitute for personal contact, can directly inform how community health education materials are developed and delivered in Indonesian primary-care and community-service (Pengabdian Masyarakat) settings. In this sense, the review functions as a translational evidence base intended to indirectly strengthen the design, equity, and sustainability of future community-facing health education programs, including Posyandu-based

maternal and child health education, community nursing outreach, and hospital-to-community discharge preparation programs.

Implication

These observations carry three concrete implications for community-based practice. First, community health centers (Puskesmas) and Posyandu should budget for hybrid delivery, combining individual mobile distribution with communal screening sessions, rather than assuming universal smartphone or internet access among community members, so that lower-income and older residents are not systematically excluded from health education. Second, teams developing animated health content for community use should involve target community members and local cadres in the design process itself, following the human-centered, glocalization approach demonstrated by Adam et al., rather than relying on translation of existing videos alone, to ensure cultural and linguistic fit. Third, evaluation of community health education programs that use animated video should extend beyond immediate post-test knowledge scores to include indicators of reach among vulnerable subgroups and downstream behavior change, so that the indirect benefit of such programs to the wider community can be demonstrated with evidence rather than assumed.

Research contribution

This scoping review makes an important contribution to mapping the research landscape on the integration of animated videos and bundled care in health education, and its value lies less in a simple inventory of findings than in five specific accomplishments. First, it clarifies the operational definition of bundled care as the term is actually used in the animated video literature, showing that it is frequently applied to interventions that do not meet the multicomponent, evidence-based standard used in clinical bundle science, and proposing that a TIDieR based specification be adopted going forward. Second, it identifies concrete gaps in the existing research base, including the near absence of studies that genuinely embed video within a defined bundle, the reliance on locally developed and unvalidated outcome instruments, and the lack of formal engagement or process measures. Third, it develops a forward looking research agenda that translates these gaps into actionable design recommendations, among them factorial studies that separate video from other bundle components and economic evaluations that capture production and implementation costs. Fourth, it demonstrates, through convergent evidence from both the five primary studies and the synthesis of 38 randomized controlled trials, that improvements in knowledge do not guarantee corresponding changes in attitudes, satisfaction, or behavior, directly challenging the assumption that better-informed patients will necessarily act differently. Fifth, it demonstrates a near total absence of long-term outcome evaluation across this literature: measurement was overwhelmingly immediate or short term, so the durability of any knowledge gain and its downstream effect on clinical outcomes remain essentially unknown. Together these five contributions provide a more precise foundation than previously available for designing, reporting, and evaluating future interventions that combine animated video with bundled care.

Limitations

This scoping review has several limitations that should be considered. First, the heterogeneity of study designs, populations, and interventions across included studies limits the ability to conduct quantitative synthesis or meta analysis. Second, restricting the search to English and Indonesian language articles and publications within the last five years may have missed relevant studies published in other languages or outside this time frame. Third, most included studies had relatively small sample sizes and used instruments not validated across populations, so the generalizability of the findings should be interpreted with caution. Fourth, the risk of publication bias may affect the availability of studies with negative or non significant results.

Suggestions

Based on the findings and identified limitations, several suggestions for future research can be made. Future studies should ideally be designed with factorial designs capable of isolating the unique contribution of animated videos from other bundle components, comparing at least three

arms (bundle without video, bundle with video, and video alone) to isolate the marginal effect of each element. The composition of bundled care should refer to published and standardized clinical practice guidelines for specific conditions. Measurement of long-term outcomes, including knowledge retention beyond three months, behavioral changes such as medication adherence or self-care, and hard clinical outcomes such as recurrence rates, complications, or readmission is still rarely reported and should be prioritized in future study designs. The use of instruments that have been psychometrically validated across populations is essential.

CONCLUSION

This scoping review of six studies demonstrates that animated videos consistently provide benefits in short term knowledge improvement compared to conventional educational media, but these benefits are not always followed by meaningful changes in attitudes, satisfaction, or behaviors. The term "bundled care" in the literature related to animated videos is still used loosely, and only one of six studies truly integrated video into a clearly defined multicomponent intervention package. Measurement instruments are generally local in nature and have not been validated across populations, long term outcome measurement is nearly absent, and attention to video design inclusivity for vulnerable groups remains minimal. Implementation barriers in the form of technology infrastructure limitations, additional health worker workload, and selection bias due to device-ownership prerequisites further limit the generalizability of findings to broader contexts, especially in developing countries with limited resources.

Future studies need to be designed to separate the contribution of video from other bundle components, standardize bundle composition based on clinical practice guidelines, measure long term behavioral and clinical outcomes with validated instruments, and consider the cost and sustainability aspects of field implementation.

Ultimately, the evidence assembled here points to a single key message: animated video should be considered an enabling component within evidence-based bundled care, not a standalone educational intervention capable of driving clinical improvement on its own. Its consistent contribution is to the knowledge dimension of care, while the behavioral, motivational, and clinical gains that matter most to patients and health systems continue to depend on the surrounding bundle within which the video is delivered.

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AUTHOR CONTRIBUTION STATEMENT

NK contributed to conceptualization, literature search strategy development, and manuscript draft preparation; contributed to study selection, data extraction, and critical analysis; contributed to manuscript editing and overall supervision of the writing process. LR contributed to study selection, data extraction, and critical review of the manuscript. All authors read and approved the final manuscript.

AI DISCLOSURE STATEMENT

The authors used Claude (Anthropic) as a large language model during the preparation of this work for initial draft preparation, data extraction synthesis, and PRISMA flow diagram preparation. After using the tool, the authors thoroughly reviewed and edited the content as needed and take full responsibility for the content of this publication.

CONFLICTS OF INTEREST

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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