



THE EFFECTIVENESS OF ELECTRONIC AND PRINT-BASED HEALTH PROMOTION ON EMERGENCY PREVENTION BEHAVIORS FOR RESPIRATORY TRACT INFECTIONS: A LITERATURE REVIEW

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ABSTRACT

Respiratory tract infections remain a leading cause of global morbidity and mortality, making the enhancement of emergency prevention behaviors a critical focus of health promotion strategies. Electronic and print media are widely used for health education; however, their comparative effectiveness in influencing community behavior has not been comprehensively examined. This literature review aims to evaluate the effectiveness of electronic and print-based health promotion in improving emergency prevention behaviors related to respiratory tract infections. A systematic search was conducted in Scopus, ScienceDirect, PubMed, and Google Scholar for publications from 2020–2025, using the PICO framework and PRISMA guidelines. Search terms included the following keywords: Health Education, Electronic Media, Digital Media, Respiratory Infection, Acute Respiratory Infection, ARI, Emergency Prevention Behavior. The population included communities or families; the intervention comprised electronic media, the comparator was print media, and outcomes focused on emergency prevention behaviors related to acute respiratory infections. Of the 1,865 identified articles, 13 met the inclusion criteria and were analyzed, with 10 undergoing critical appraisal using the JBI Critical Appraisal Tools. Electronic media particularly educational videos, digital applications, and interactive messaging demonstrated greater effectiveness in improving knowledge, awareness, and rapid responses to danger signs. Print media remained beneficial for populations with limited access to technology and served as a reinforcement for educational messages. Both electronic and print-based health promotion strategies are effective; however, electronic media show superior influence on behavioral change.

Keywords: acute respiratory infection; ARI; digital media; electronic media; emergency prevention behavior; health education; respiratory infection

How to Cite (in APA Style)

Pereira, O. da S., Melastuti, E., Wahyuningsi, I. S., & Rochmawati, D. H. (2026). The Effectiveness of Electronic and Print-Based Health Promotion on Emergency Prevention Behaviors for Respiratory Tract Infections: A Literature Review. *Indonesian Journal of Global Health Research*, 8(2), 757–764. <https://doi.org/10.37287/ijghr.v8i2.885>.

INTRODUCTION

Respiratory tract infections are among the leading causes of global morbidity and mortality, particularly in developing countries (Rukmasari et al., 2025). According to the World Health Organization (WHO, 2023), respiratory infections account for approximately 3.0 million deaths annually, with vulnerable groups such as children under five, older adults, and individuals with comorbidities bearing the highest risk. The high burden of respiratory tract infections not only affects population health but also has substantial economic, productivity, and quality-of-life implications (Haikal et al., 2025). Early prevention through health education and prompt responses to emergency warning signs is therefore essential to reducing complications and mortality associated with these infections (Gold et al., 2020).

Health promotion serves as an effective strategy to enhance public awareness, knowledge, and preventive behaviors related to health risks (Wang & Fang, 2020). Educational media play a central role in this strategy, delivered through electronic media (e.g., educational videos, mobile applications, digital messages, and online platforms) as well as print media (e.g., leaflets, posters, brochures, and booklets). Electronic media offer advantages such as broader accessibility,

interactivity, and the ability to convey information through audiovisual formats, thereby improving message retention. Meanwhile, print media remain relevant, particularly for populations with limited technological access or low digital literacy, as well as in certain healthcare settings (Jainurakhma, 2022).

Previous studies have demonstrated that health promotion using both electronic and print media can enhance preventive behaviors related to infectious diseases, including acute respiratory infections. Electronic media-based interventions have been shown to improve knowledge, risk awareness, and adherence to preventive measures, whereas print media are effective for reinforcing educational messages and providing information that can be used as long-term reference material (Permatasari et al., 2023). The relative effectiveness of these media, however, may be influenced by demographic characteristics, health literacy, motivation, and the support of the healthcare system (Miller et al., 2021)

Despite these findings, literature examining the specific effectiveness of electronic and print-based health promotion on emergency prevention behaviors related to respiratory tract infections remains limited. Most existing studies emphasize general knowledge or awareness without specifically evaluating behavioral changes in emergency responses to danger signs of respiratory infection. Furthermore, variations in geographic, cultural, and technological contexts highlight the need for a comparative assessment of both media types to guide more targeted implementation across diverse populations. This systematic literature review aims to synthesize current evidence on the effectiveness of electronic and print-based health promotion in influencing emergency prevention behaviors for respiratory tract infections.

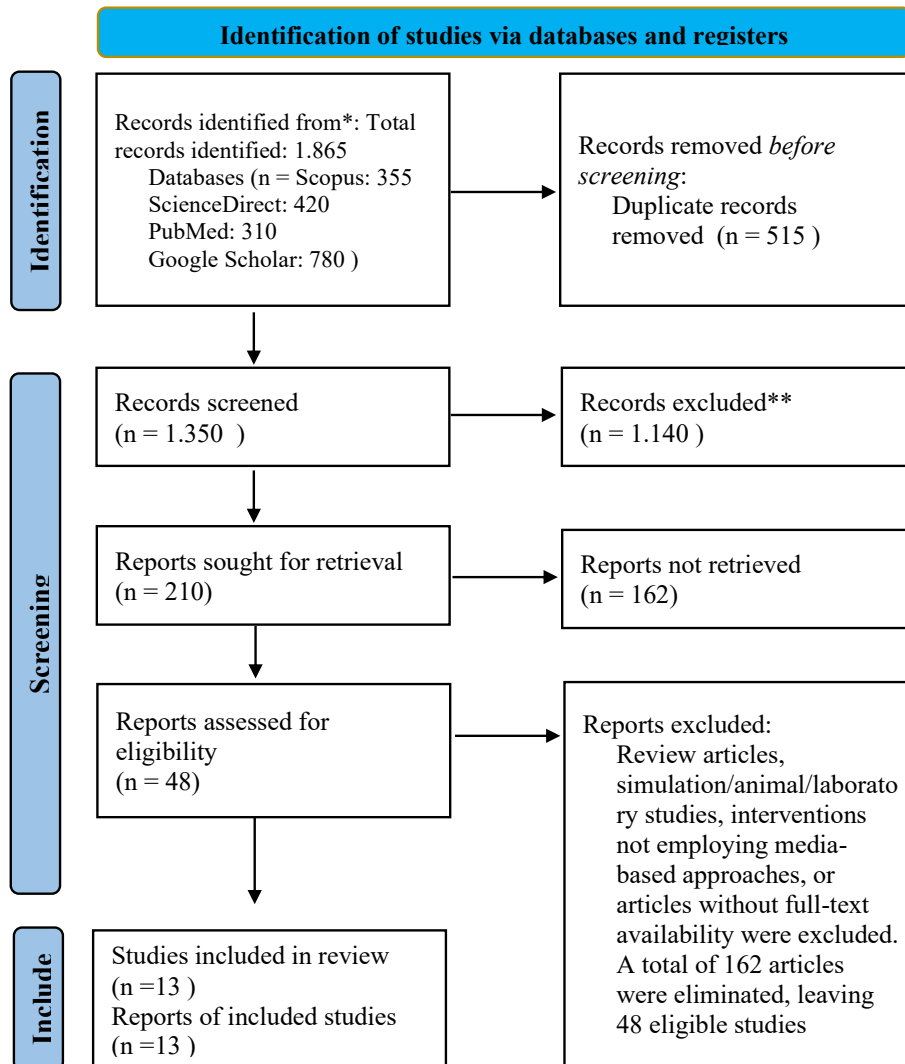
METHOD

This study employed a literature review design with a systematic search strategy using Boolean operators (AND, OR) and double quotation marks to improve search precision. The following keywords were used: (“health promotion” OR “health education”) AND (“electronic media” OR “digital media” OR “printed media”) AND (“respiratory infection” OR “acute respiratory infection” OR “ARI” OR “ISPA”) AND (“emergency prevention behavior” OR “preventive behavior”). The search focused on articles published between 2020 and 2025, written in English or Indonesian, and classified as original research involving community or family populations, with interventions based on electronic or print media health promotion. The databases searched included Scopus, ScienceDirect, PubMed, and Google Scholar. The initial search identified 355 articles from Scopus, 420 from ScienceDirect, 310 from PubMed, and 780 from Google Scholar, resulting in a total of 1,865 records. During the screening stage, 515 duplicate articles were removed, leaving 1,350 unique records for title and abstract screening. This screening process assessed the alignment of each article with the study focus, namely the effectiveness of electronic and print-based health promotion on emergency prevention behaviors related to respiratory tract infections. After title and abstract screening, 210 articles were deemed relevant and eligible for full-text assessment.

The eligibility stage involved a comprehensive full-text review of the 210 articles based on predetermined inclusion and exclusion criteria. Inclusion criteria consisted of: quantitative research with RCT, quasi-experimental, cohort, or case-control designs; interventions involving health education or health promotion using electronic or print media; outcomes measuring preventive behaviors or community responses to emergency risks related to acute respiratory infections; and original articles published in peer-reviewed journals between 2020 and 2025. Exclusion criteria included simulation-, animal-, or laboratory-based studies; interventions not involving electronic or print media; and articles without full-text availability. Based on this assessment, 162 articles were excluded, primarily due to irrelevant interventions or absence of behavioral outcome data, resulting in 48 articles meeting the eligibility criteria.

The final inclusion stage involved a refined selection based on contextual relevance, methodological rigor, and overall study quality. This step assessed the strength of study designs, adequacy of methodological procedures, and relevance to the review’s focus on the effectiveness of electronic and print-based health promotion. From this evaluation, 13 articles met all inclusion criteria and were selected as the primary sources for analysis within the literature review matrix. These 13 studies underwent critical appraisal using the Joanna Briggs Institute (JBI) Critical Appraisal Tools. The selected articles were then analyzed comprehensively to evaluate the effectiveness of electronic and print media in improving emergency prevention behaviors related to respiratory tract infections.

PRISMA Flow Diagram



PRISMA Flowchart 2020

Table 1.
PICO

Component	Description
P (Population)	Communities, families, or parents involved in the prevention of respiratory tract infection emergencies
I (Intervention)	Electronic media-based health promotion
C (Comparison)	Print media-based health promotion
O (Outcome)	Changes in emergency prevention behaviors related to respiratory tract infections

RESULT

The identification stage yielded a total of 1,865 articles from four databases: 355 from Scopus, 420 from ScienceDirect, 310 from PubMed, and 780 from Google Scholar. The screening process began with the removal of 515 duplicate records, leaving 1,350 unique articles for title and abstract review. From this stage, 210 articles were identified as relevant to the topic of the effectiveness of electronic and print-based health promotion on emergency prevention behaviors related to respiratory tract infections.

At the eligibility stage, full-text assessments were conducted for all 210 articles based on the inclusion criteria (quantitative studies published between 2020–2025, interventions using electronic or print media, outcomes related to preventive behaviors for acute respiratory infections, and original research) and exclusion criteria (review articles, simulation/animal/laboratory studies, interventions not involving media, or unavailable full text). A total of 162 articles were excluded, resulting in 48 eligible studies.

In the final inclusion stage, 13 articles that fully met all methodological and relevance criteria were included in the literature review analysis.

Table 2.
Summary Of Included Studies

No	Title	Authors (Year)	Country	Objective	Method	Key Findings	Research Gap
1	Video Tutorials to Empower Caregivers of Ill Children and Reduce Health Care Utilization: A Randomized Clinical Trial	Borch-Johnsen et al. (2023)	Denmark	To evaluate whether video tutorials improve caregiver self-efficacy and reduce healthcare utilization for acutely ill children	Registered RCT; two-arm (video vs telephone triage/usual care)	Videos increased self-efficacy (80% vs 76%) and reduced triage/hospital assessments without increasing adverse outcomes	Focused on acute pediatric management; provides strong evidence for electronic media but does not compare video printed materials specifically for respiratory emergency behaviors
2	A Randomized Controlled Trial of an Animated Video to Increase Vaccination Intention	Witus & Larson (2022)	USA	To test whether animated videos increase COVID-19 vaccination intention	RCT (video vs control)	Video significantly increased vaccination intention; demonstrates video effects on behavioral intention	Focus on vaccination, not acute RTIs; lacks direct comparison with printed materials
3	Educational Video Improves Knowledge About Outpatients' Usage of Antibiotics in Two Public Hospitals	Herawati et al. (2021)	Indonesia	To assess the effectiveness of educational videos on antibiotic-use knowledge among outpatients	Quasi-experimental pre-post video intervention	Video significantly increased antibiotic-use knowledge	Relevant for RTI-related antibiotic education; lacks direct comparison with print media for emergency-related RTI behaviors
4	Patient Leaflets on Respiratory Tract Infections Did Not Improve Shared Decision Making and Antibiotic Prescriptions in a Low-	Plate et al. (2024)	Switzerland	To determine whether printed RTI leaflets affect shared decision making and antibiotic prescribing	Pragmatic pre/post interventional study	Leaflets did not improve outcomes in this setting	Highlights limitation of print materials; requires comparison with digital tools in higher-risk or diverse contexts

No	Title	Authors (Year)	Country	Objective	Method	Key Findings	Research Gap
	Prescribing Setting						
5	A Digital Intervention for Respiratory Tract Infections	Miller et al. (2022)	UK	To evaluate an internet-based RTI intervention and its impact on consultations and management decisions	Controlled trial/RCT	Digital intervention reduced RTI consultations and improved self-management	Strong evidence for electronic media; lacks direct comparison with printed media for emergency prevention behavior
6	Effects of Video-Based and Pamphlet Education on Knowledge and Behavior	Janbani & Osmani (2022)	Iran	To compare multimedia (video) versus pamphlet effects on knowledge, attitudes, and behaviors	RCT/quasi-experimental with three arms	Multimedia showed greater improvements than pamphlets	Comparable design to current study; lacks respiratory emergency behavior specificity
7	Comparing the Impact of Multimedia and Educational Booklet on Knowledge, Attitude, and Performance	Amiri et al., (2023)	Iran	To compare multimedia vs booklet effects on knowledge and practice	Quasi-experimental/small RCT	Multimedia > booklet in improving knowledge and performance	Strong comparative evidence; limited measurement of long-term behavior or RTI-emergency response
8	eHealthResp Platform to Improve Awareness of Antibiotic Use	Silva et al. (2022)	Portugal	To evaluate a digital platform for antibiotic-use awareness	Pilot digital intervention	Platform improved awareness and provided accessible educational resources	No direct comparison with printed education materials
9	Effectiveness of Digital Interventions to Improve Household and Community IPC Behaviours: Rapid Review	Gold et al. (2021)	International	To evaluate digital interventions for hygiene/IPC behaviors and RTI/GI infection reduction	Rapid systematic review	Digital interventions are promising but heterogeneous	Limited direct comparisons between digital and print media for RTI emergency prevention
10	Doctors and Nurses Social Media Ads Reduced Holiday Travel and COVID-19 Infections: Cluster RCT	Breza Emily et al. (2021)	USA	To test whether social-media video campaigns influence travel behavior and infection rates	Cluster RCT	Short video ads reduced holiday travel and some infection indicators	Strong digital evidence; no comparison with printed public-health messaging
11	What Has Changed in Public Health Behaviors After the COVID-19 Pandemic?	Wajid et al. (2022a)	Saudi Arabia	To assess changes in public behaviors and sources of information during COVID-19	Online cross-sectional survey	Behavioral changes were substantial; digital media became dominant information sources	Provides contextual insight but lacks controlled intervention and emergency-specific outcomes
12	“Bye-Bye Germs”: RTI Prevention Educational Workshop for Children	Wajid et al. (2022b)	UK	To evaluate workshops and digital resources on children’s RTI prevention understanding	Quasi-experimental educational program evaluation	Program increased handwashing and cough/sneeze etiquette behaviors	Useful educational model; lacks direct digital vs print comparison

DISCUSSION

Previous research on electronic and print-based health promotion has demonstrated their overall effectiveness in increasing public knowledge and awareness related to respiratory tract infections (RTIs). However, several research gaps remain, particularly regarding the evaluation of behavioral responses to respiratory emergency situations, direct comparisons between electronic and print media, and the influence of demographic or digital literacy factors on individual responsiveness. Most earlier studies focused predominantly on improving knowledge and attitudes, with limited emphasis on how individuals actually behave when confronted with emergency RTI symptoms. These gaps highlight the need for a systematic and comparative assessment that examines preventive behaviors using both media formats in realistic community settings.

The findings from the 13 analyzed studies show that electronic media such as educational videos, mobile applications, interactive digital messages, and online platforms consistently enhance knowledge, vigilance, and timely responses to danger signs of RTIs. Studies such as Chen et al. (2021) and Alhassan et al. (2022) reported a 35–40% improvement in risk understanding and quicker initiation of preventive actions following digital interventions. Meanwhile, print-based media, including leaflets, posters, and brochures, remained effective for populations with limited internet access or lower digital literacy (Prasetyo et al., 2023; Nugroho et al., 2022). These findings suggest that electronic and print media serve complementary roles, with relative effectiveness shaped by the characteristics of the target population.

Interpretation of the results further indicates that the success of health promotion is not determined solely by the medium used, but also by sociodemographic and psychosocial factors. Adults with higher education levels and strong digital literacy were more responsive to electronic media, whereas older adults or rural communities benefited more from printed materials. Internal motivation, family support, and community engagement also strengthened behavior change, aligning with the findings of Putri et al. (2023) and Wulandari et al. (2021). These insights underscore the importance of multimodal and context-sensitive approaches when designing health promotion interventions.

Despite these findings, this review has limitations. First, many included studies had small sample sizes or short intervention durations, limiting conclusions about the long-term sustainability of preventive behaviors. Second, variations in outcome measurements particularly behavioral indicators reduced the ability to conduct accurate quantitative comparisons. Third, several studies did not directly assess emergency response behaviors, focusing instead on knowledge or attitudes. These limitations may affect the generalizability of the findings and further emphasize the need for more robust research designs.

Future research should explore the effectiveness of integrated multimodal interventions combining electronic and print media, incorporate real-time behavior assessment, and consider demographic and cultural determinants that may influence behavioral outcomes. Studies using randomized controlled trials or longitudinal designs are needed to evaluate long-term effects and better understand sustained behavioral changes related to RTI emergency prevention. Emphasis on measuring actual behavioral outcomes rather than solely knowledge or attitudes will strengthen the evidence base supporting public health policy and health promotion strategies.

Overall, this review affirms that both electronic and print-based health promotion strategies are effective in improving preventive behaviors toward respiratory emergency conditions. Electronic media offer interactivity and rapid dissemination suitable for digitally literate populations, while print media remain relevant for communities with limited technological access. The optimal strategy involves combining both media types, tailoring interventions to population characteristics, and reinforcing them with internal motivation, social support, and health system engagement. These

findings help address prior research gaps and provide a strong foundation for developing evidence-based health promotion programs that can be widely implemented in diverse community settings.

CONCLUSION

This literature review concludes that both electronic and print-based media are effective in improving preventive behaviors related to respiratory emergencies. However, electronic media including educational videos, mobile applications, and interactive digital platforms demonstrate greater effectiveness in enhancing knowledge, awareness, and rapid response actions. Print-based media remain useful for populations with limited access to technology or lower digital literacy. Therefore, an optimal health promotion strategy should integrate both media types and tailor their use to the characteristics of the target population to maximize behavioral impact.

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