



Research Paper

Comics As an Innovative Medium in Health Interventions: A Systematic Literature Review

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Abstract

Health interventions aim to improve individual and community well-being through disease prevention, health promotion, clinical treatment, and policy initiatives. Traditional communication methods, such as health talks, leaflets, and posters, often face limitations in multicultural and low-literacy populations, highlighting the need for innovative approaches. Comics, which integrate narrative and visual elements, offer an engaging, accessible, and versatile medium for health education and behaviour change. This systematic literature review (SLR) examined the use of comics in health interventions, analysing trends, thematic applications, implementation challenges, and research gaps. Searches were conducted across Scopus, Web of Science, and ERIC, focusing on studies published from 2000 onwards that specifically investigated comics in health contexts. Out of 336 studies identified, 63 (18.7%) were directly relevant, encompassing mental health and psychosocial support, sexual and reproductive health, patient education and medical procedures, disease prevention, and nutrition and lifestyle promotion. Findings indicate that comics enhance comprehension, retention, and engagement, particularly for sensitive topics, and are adaptable across cultural and clinical contexts. Interventions combining comics with interactive or blended learning approaches demonstrated improved self-efficacy and sustained behavioural change. Nevertheless, methodological limitations—including small, context-specific samples, short-term assessments, and underexplored cultural adaptation—limit generalisability and long-term evaluation. Overall, the study highlights the potential of comics as a complementary, evidence-based tool for health education and promotion. Future research should adopt robust, longitudinal, and culturally tailored designs with larger, more diverse populations and explore digital and interactive formats to maximise accessibility and sustained impact. Comics thus represent a promising strategy for inclusive, engaging, and effective health communication globally.

Keywords: behavioural change; comic-based interventions; health education; mental health; nutrition and lifestyle promotion; sexual and reproductive health; systematic literature review

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I. INTRODUCTION

Health interventions refer to systematically planned actions designed to improve the health status of individuals or communities through disease prevention, health promotion, clinical treatment, and public policy change. Such interventions may include immunisation programmes, regular health screenings, healthy lifestyle education, medical treatments, and community health policies. The primary aim of health interventions is to reduce disease risk, enhance quality of life, and ensure community well-being through evidence-based approaches tailored to the needs of target populations. Effective interventions are typically structured with clear objectives, grounded in epidemiological data and scientific research, and implemented systematically to achieve optimal health outcomes. This approach encompasses not only clinical aspects such as treatment and disease management but also broader strategies of prevention and health promotion, including health education, public policy, and community programmes.

Despite their importance, traditional methods such as health talks, printed leaflets, posters, or public announcements often remain linear and one-directional, limiting their effectiveness in multicultural societies characterised by diverse languages, health literacy levels, and cultural beliefs (World Health Organization, 2021). These limitations underscore the need for more interactive, inclusive, and adaptive mediums, such as

comics. Comics, combining narrative and visuals, can simplify complex health concepts in an engaging and accessible manner, bridging literacy gaps and strengthening emotional engagement with health messages (Al-Jawad, 2015; Williams, 2012; Febres-Cordero et al., 2023). Their adaptability to cultural and social contexts positions comics as a relevant communication tool across diverse populations. Overall, comics hold significant potential as an innovative medium that not only conveys information but also supports behavioural change through creative and interactive approaches, thereby reinforcing the effectiveness of modern health interventions.

Nevertheless, research on the use of comics as an intervention in education and health remains constrained by several challenges. Firstly, there is a lack of systematic studies that identify current trends in the application of comics, resulting in fragmented and limited empirical evidence across disciplines. Secondly, although comics have the potential to simplify complex concepts and engage diverse audiences, the themes of interventions implemented through this medium have not been comprehensively analysed, thereby limiting understanding of their suitability for specific health and educational contexts. Thirdly, the implementation of comic-based interventions faces persistent barriers, including negative perceptions of comics as unprofessional, limited acceptance among educators and health practitioners, and difficulties in accessing comprehensive research sources. Consequently, the potential of comics as a pedagogical and communicative tool remains underutilised, despite their capacity to enhance health literacy, community engagement, and intervention effectiveness. These issues underscore the need for further research to consolidate evidence, address existing challenges, and formulate strategies that strengthen the role of comics as an innovative, inclusive, and effective medium in education and health communication.

1.1 Research Objective

The objective of this study is to identify current research trends related to the use of comics as an intervention in education and health, to analyse the themes of interventions implemented through comics, and to examine the challenges and constraints in the application of comic-based interventions. In addition, the study aims to formulate recommendations for future research with the ultimate goal of strengthening the effectiveness of comic-based interventions within educational and health contexts.

1.2 Scope of Study

This study focuses on the use of comics as a medium for health interventions across several domains: mental health and psychosocial support, including emotional assistance and psychological recovery; sexual and reproductive health education, encompassing HIV and STI awareness to promote preventive behaviours; patient education and medical procedures, to improve understanding and adherence to treatment; health education and disease prevention, aimed at communicating risks and healthy lifestyle practices; and nutrition and lifestyle promotion, to encourage positive behavioural change. The study evaluates the effectiveness of these interventions, identifies implementation challenges, and examines the potential of comics as an innovative tool for health communication and education.

1.3 Significance of the Study

This study is significant for several reasons. It expands the literature on innovative health communication by systematically examining how comics can be used as an intervention medium, identifying current trends, thematic applications, and implementation challenges. The findings offer practical guidance for educators, health practitioners, and policymakers, showing how comics can improve health literacy, encourage behavioural change, and engage communities. The study also highlights the flexibility of comics across different cultural contexts, supporting inclusive and culturally sensitive approaches. Finally, the recommendations for future research provide a foundation for developing more effective health interventions, reducing disease burden, and enhancing community well-being.

II. LITERATURE REVIEW

Comics have emerged as an innovative medium in education and health interventions due to their unique capacity to integrate sequential text and images, delivering information in an engaging, accessible, and memorable manner (Williams, 2012; Al-Jawad, 2015; Green, 2010). By combining narrative and visual elements, comics enhance comprehension, retention, and learner engagement through visual storytelling. Their inherent flexibility allows adaptation across diverse cultural, linguistic, and socio-economic contexts, making them suitable for both clinical and community-based health interventions as well as formal and informal educational settings. Available in print or digital formats, comics can be tailored to accommodate varying literacy levels, learning preferences, and technological access, positioning them as a versatile and effective tool for communicating complex concepts in an interactive and culturally sensitive manner (George & Green, 2015; Sari et al., 2021).

Although comics have existed for over a century and have long been recognised as valuable educational resources, empirical research examining their systematic application as a literacy practice within schools and higher education remains limited (Cary, 2004; Griffith, 2010; Kachorsky & Reid, 2025; Williams, 2012). Existing studies often focus on general engagement or anecdotal outcomes, with few rigorously assessing the impact of comics on reading comprehension, critical thinking, or knowledge retention across disciplines. This underscores the need for structured investigations into how comics function not merely as supplementary learning materials but as intentional pedagogical tools that support literacy development, cognitive skill enhancement, and student engagement.

In contemporary education, the adoption of interactive, visually oriented pedagogies has become increasingly critical for engaging digital-age learners, particularly millennials, who are accustomed to multimedia and technology-rich environments (Fitria et al., 2023; Huang et al., 2024; Toh et al., 2017). Traditional text-based instructional approaches often struggle to convey abstract or complex concepts effectively, resulting in reduced comprehension, limited motivation, and lower retention. Integrating visual narratives, interactive elements, and multimodal content—hallmarks of comic-based pedagogy—can bridge these gaps, foster deeper understanding, stimulate critical thinking, and encourage active learner participation across diverse educational settings.

Evidence indicates that comics have been effectively applied across multiple academic disciplines, including history, science, mathematics, and language learning, while simultaneously enhancing cultural awareness, social values, and contextual understanding (Muzumdar, 2016; Tjakrawerdaja et al., 2025; Topkaya et al., 2023). In higher education, comics have shown potential to support the development of critical thinking, creativity, intrinsic motivation, and overall student engagement, although empirical studies remain sparse (Felsenthal, 2019; Putri & Prodjosantoso, 2020; Chun, 2009; Zimmerman, 2008). The sequential and narrative structure of comics facilitates contextualised learning, integrating visual and verbal information to improve knowledge processing, retention, and application. This dual-coding approach allows learners to interpret social, cultural, or health-related messages meaningfully, connecting abstract concepts to relatable scenarios (Williams, 2012; Green, 2010; George & Green, 2015). From a visual literacy perspective, comics actively engage learners in interpreting symbols, expressions, panel layouts, and interrelationships, fostering analytical skills, reflective thinking, and higher-order cognitive processes (Zimmerman, 2008; McCloud, 1993).

Despite these strengths, the implementation of comics in educational and health contexts faces several challenges, including limited resources, variations in educator expertise, content appropriateness, and differing learner preferences (Topkaya et al., 2023). Nevertheless, the literature consistently emphasises that comics are far more than entertainment; they function as evidence-based pedagogical instruments capable of enhancing literacy, promoting creativity, supporting critical thinking, and increasing engagement. Their adaptability and multimodal nature suggest that, when thoughtfully designed and implemented, comics can bridge the gap between abstract concepts and practical understanding, providing a robust foundation for future research and innovative teaching strategies across higher education and diverse academic disciplines (Huang et al., 2024; Pange, 2022; van der Sluis, 2025).

Overall, comics represent a versatile, inclusive, and effective medium for education and health communication, capable of delivering complex concepts in engaging, culturally sensitive, and cognitively supportive ways. Continued empirical investigation is necessary to systematically evaluate their pedagogical impact, particularly in fostering literacy, conceptual understanding, and active learner engagement across varied disciplines and populations.

III. METHODOLOGY

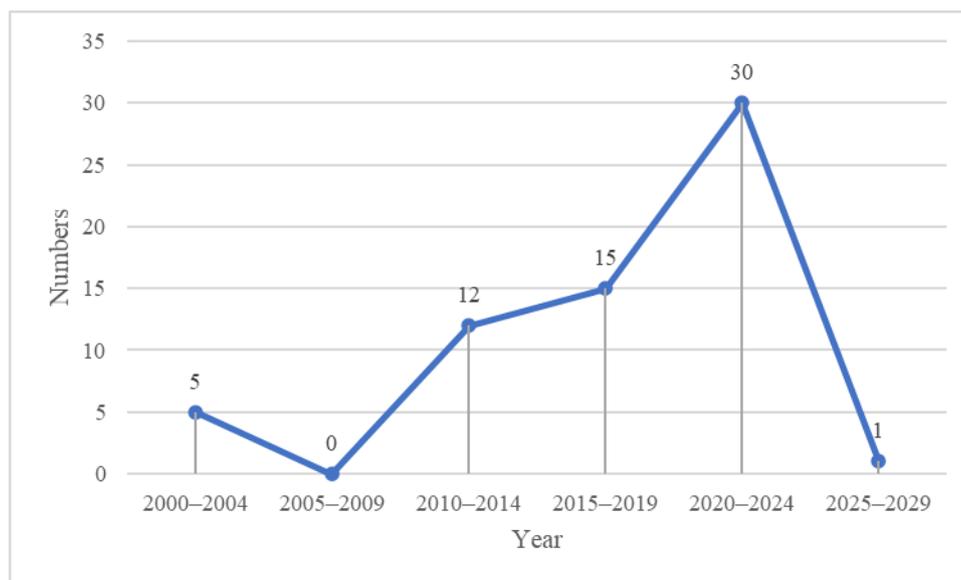
This study employed a **Systematic Literature Review (SLR)** to rigorously examine existing research on the use of comics in health interventions, ensuring a structured and comprehensive analysis of prevailing trends, thematic patterns, implementation challenges, and research gaps (Linnenluecke et al., 2019; Smela et al., 2023). Searches were conducted across leading international databases, including **Scopus, Web of Science, and ERIC**, with inclusion criteria focusing on studies published from 2000 onwards that specifically investigated comics in health intervention contexts, while studies unrelated to health or employing other media were excluded. The selected literature was analysed using a **thematic analysis** framework to systematically identify, categorise, and synthesise recurring themes related to pedagogical effectiveness, implementation barriers, and recommendations for future practice (Naeem et al., 2023; Thomas, 2006; Tracy, 2019; Patton, 2015). This approach facilitated critical interpretation of patterns across studies, highlighting current trends, uncovering knowledge gaps, and emphasising evidence-based best practices in employing comics as a pedagogical and communicative tool. By integrating rigorous database searches with structured thematic synthesis, the methodology provides a transparent, reproducible, and analytically robust foundation for understanding the role of comics in educational and health communication contexts.

IV. RESULT

This section presents the results of the analysis of trends in comic-based research within health interventions. Out of 336 studies reviewed, only 63 articles, approximately 18.7%, were directly related to health intervention contexts. These studies addressed a range of topics, including mental health and psychosocial support, sexual and reproductive health education encompassing HIV and STI awareness, patient education and medical procedures, disease prevention, and the promotion of nutrition and healthy lifestyles.

4.1 Trend in Studies on Comic-Based Interventions

Trend in studies on comic-based interventions captures how research using comics in education, health, and psychosocial support has evolved. It highlights shifts in study numbers, target groups, intervention types, and outcomes. Figure X illustrates this trend from 2000 to 2025



An analysis of publication trends in five-year intervals reveals a steady growth in research on comic-based interventions. Between 2000 and 2004, five studies were published, followed by a gap in 2005–2009. Publications then rose to 12 in 2010–2014 and 15 in 2015–2019, reflecting an early developmental phase in which researchers began to recognise the potential of visual narratives for enhancing engagement and understanding in educational and health interventions. A substantial increase to 30 publications in 2020–2024 highlights the growing acceptance of comics as a legitimate intervention medium, marking their transition from a supplementary communication tool to a central component in systematically evaluated interventions. The more than twofold rise compared with 2010–2014 underscores the emerging recognition of comics as an innovative strategy for delivering information and supporting behaviour change. Although only one study has been reported for 2025–2029 to date, this likely reflects the incompleteness of the period rather than a decline in research interest. Collectively, these trends suggest a consistent and strengthening upward trajectory in the use of comics for interventions, particularly evident in the most recent complete five-year interval. However, within the Malaysian context, research on comic-based health interventions remains limited, indicating a gap between global developments and local application.

4.2 Mental Health & Psychosocial Interventions

Mental health and psychosocial interventions are structured approaches designed not only to alleviate psychological symptoms but also to strengthen adaptability, enhance self-awareness, and promote holistic wellbeing across diverse cultural and social contexts. Table 1 presents the application of comics in studies conducted between 2014 and 2022.

Year	Authors	Population	Type of Intervention	Main Outcome
2014	Imamura, K., et al.	Healthy workers	Internet-based cognitive behavioural therapy in manga format	Reduction in subthreshold depression symptoms; demonstrated flexibility and accessibility of comics as a psychological intervention medium
2022	Ahuja, L., Hasan, F., Diedrichs, P. C., &	Hindi school adolescents in India	Comics as a body image intervention	Increased self-awareness; reflection on body image; high acceptance of the intervention

2022	Lewis-Smith, H., Hasan, F., Ahuja, L., White, P., & Diedrichs, P. C.	Adolescents in semi-rural schools in India	Structured comics for psychology education (RCT protocol)	Demonstrated potential as a structured psychology education tool; readiness for planned interventions
2025	Brandt, I., Some, S., Millogo, O., et al.	Adolescents and youth in Burkina Faso	Educational comics on mental health literacy (RCT protocol)	Improved mental health literacy; reduced stigma; better understanding of mental health concepts

The studies summarised in Table 2 demonstrate the diverse applications of comics as an intervention medium across multiple populations and settings. Ahuja et al. (2022) employed comics to address body image among Hindi school adolescents in India, enhancing self-awareness, promoting reflection, and achieving high intervention acceptance. Similarly, Lewis-Smith et al. (2022) implemented structured comics for psychology education in semi-rural Indian schools, highlighting their feasibility as a systematic educational tool. Brandt et al. (2025) expanded the use of comics to adolescents and youth in Burkina Faso, improving mental health literacy, reducing stigma, and facilitating understanding of mental health concepts. Earlier, Imamura et al. (2014) applied internet-based cognitive behavioural therapy in manga format to healthy workers, demonstrating reductions in subthreshold depression symptoms and illustrating the flexibility and accessibility of comics as a psychological intervention medium. Collectively, these findings suggest that comics are effective in conveying information and are adaptable across cultural and clinical contexts, reinforcing their potential as an innovative tool for both educational and health-related interventions.

4.3 Sexual & Reproductive Health / HIV & STI Education

Sexual and reproductive health (SRH), including HIV and STI education, comprises structured educational initiatives designed to improve knowledge, attitudes, and practices relating to sexual and reproductive wellbeing. Table 2 highlights the application of comics in studies undertaken between 2003 and 2020 within this context.

Year	Authors	Population / Context	Type of Intervention	Main Outcome
2003	Milleliri, J., Krentel, A., & Rey, J. L.	Adolescents in Gabon	Condom-use education comics	Increased awareness and positive attitudes towards condom use
2013	Obare, F., Birungi, H., Deacon, B., & Burnet, R.	School students in Nairobi, Kenya	HIV & AIDS education comics	Increased knowledge and awareness of HIV/AIDS prevention
2017	Mendelson, A., Rabinowicz, N., Reis, Y., Amarilyo, G., Harel, L., Hashkes, P. J., & Uziel, Y.	Children with juvenile idiopathic arthritis, Israel	Health education comics	Improved understanding of disease and self-care; demonstrated flexibility of comics in health education
2019	Anand, S., & Anand, S.	Adolescent girls in India	Grassroots comics on menstruation	Broke taboos; increased knowledge and awareness of reproductive health
2019	Sridhar, A., Friedman, S., Grotts, J. F., & Michael, B.	Adolescents in the United States	Theory-based comics on contraception	Enhanced subjective knowledge of contraceptive methods
2020	Ansari, R., Suwarni, L., Selviana, S., Mawardi, M., & Rochmawati, R.	Adolescents in Indonesia	Comics as an alternative medium for sexual health promotion	Facilitated communication of sensitive topics; improved adolescent sexual knowledge

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The studies summarised in Table 2 highlight the diverse applications of comics as an educational tool within sexual and reproductive health (SRH) interventions across multiple countries and populations. In India, Anand and Anand (2019) employed grassroots comics on menstruation with adolescent girls, successfully breaking social taboos and enhancing knowledge and awareness of reproductive health, while Ansari et al. (2020) used comics as an alternative medium for sexual health promotion among adolescents in Indonesia, facilitating discussion of sensitive topics and improving sexual knowledge. Comics have also been applied in clinical and specialised contexts: Mendelson et al. (2017) used health education comics with children diagnosed with juvenile idiopathic arthritis in Israel, improving disease understanding and self-care practices, and demonstrating the medium’s flexibility. In sub-Saharan Africa, Obare et al. (2013) showed that HIV & AIDS education comics enhanced knowledge and awareness among school students in Nairobi, Kenya, whereas Milleliri et al. (2003) reported that condom-use education comics increased awareness and positive attitudes toward condom use among adolescents in Gabon. In the United States, Sridhar et al. (2019) implemented theory-based comics on contraception, enhancing adolescents’ subjective knowledge of contraceptive methods. Collectively, these studies indicate that comics are effective in conveying SRH information, adaptable across cultural and clinical contexts, and capable of engaging both general and specialised populations. The findings also reveal a trend toward integrating narrative and visual elements to address sensitive topics, promote

behaviour change, and enhance comprehension, underscoring the potential of comics as a versatile and innovative medium in SRH education and intervention design.

4.4 Patient Education & Medical Procedures

Patient education and medical procedures involve the provision of information, guidance, and support to patients in order to enhance their understanding of medical treatments, procedures, and overall healthcare. Table 3 presents studies that applied comics within the context of patient education and medical procedures between 2015 and 2023.

Year	Authors	Population / Context	Type of Intervention	Main Outcome
2012	Kripalani, S., Schmotzer, B., & Jacobson, T. A.	Coronary heart disease patients	Graphic intervention for medication adherence	Improved medication adherence (IMAGE-CHD)
2014	Lo-Fo-Wong, D. N. N., et al.	Women with breast cancer	Graphic novel "Cancer in Full Colour"	Identification of patient psychological distress
2015	Furuno, Y., & Sasajima, H.	Stroke patients	Medical comics for informed consent	Facilitated patient understanding; supported informed consent
2015	Grootens-Wiegers, P., et al.	Children in medical research	Comics for informed consent procedures	Increased children's understanding of medical research
2016	Kassai, B., et al.	Children pre-anesthesia	Paediatric anesthesia comic leaflet	Reduced preoperative anxiety
2019	Brand, A., Gao, L., Hamann, A., Crayen, C., Brand, H., Squier, S. M., et al.	Patients prior to coronary angiography / PCI	Medical graphic narratives	Increased understanding of procedures; reduced periprocedural anxiety
2020	Arya, R., Ichikawa, T., Callender, B., Schultz, O., DePablo, M., Novak, K., et al.	Radiation therapy patients	CEBRE narrative comics for patient education	Improved understanding of radiation experiences; benefits of visual communication
2021	Ke, L. S., et al.	Older adults & family caregivers	Cartoon-based decision aid	Improved consistency in end-of-life care choices between patients and caregivers
2021	Kolberg, K., et al.	Adolescents & parents after traumatic brain injury	Comic-based discharge instructions	Increased knowledge and acceptance of discharge instructions
2021	Taha, S. M. H., & El Sayed, R.	Children pre-surgery	Preoperative educational comic story	Increased knowledge; reduced anxiety
2022	Garcia De Avila, M. A., et al.	Children, adolescents & parents	Preoperative educational comics	Reduced preoperative anxiety; improved understanding
2022	Kulkarni, M. M., et al.	Children pre-anesthesia	Paediatric anesthesia comic leaflet	Reduced preoperative anxiety
2022	Seeliger, B., et al.	Post-lung transplant patients	Graphic-narrative bronchoscopy informed consent	Improved patient satisfaction with consent process
2023	Bazzano, M., Mauceri, R., Marcon, G., & Campisi, G.	Patients undergoing oral biopsy	Novel graphics to reduce anxiety	Decreased patient anxiety during the procedure
2023	Kolcak, B., Ayhan, H., & Tastan, S.	Cardiac surgery patients on ventilators	Illustrated communication materials	Reduced anxiety; increased patient comfort

The studies summarised in Table 3 demonstrate the versatility of comics as a tool for patient education and procedural guidance across diverse clinical contexts, including radiation therapy (Arya et al., 2020), oral biopsies (Bazzano et al., 2023), coronary angiography and PCI (Brand et al., 2019), stroke (Furuno & Sasajima, 2015), and post-lung transplantation (Seeliger et al., 2022). Interventions utilised narrative or illustrated comics, graphic novels, and comic leaflets to simplify complex medical information, improve comprehension, reduce anxiety, and facilitate informed consent (Garcia De Avila et al., 2022; Taha & El Sayed, 2021; Kolcak et al., 2023). Comics were also applied to broader patient care, supporting decision-making in older adults and caregivers (Ke et al., 2021) and enhancing medication adherence and psychological assessment (Kripalani et al., 2012; Lo-Fo-Wong et al., 2014). Despite these positive outcomes, many studies were limited by small, context-specific samples and short-term assessments, restricting generalisability and long-term efficacy. Overall, the evidence highlights the potential of comics as an engaging, accessible medium for patient education, while emphasising the need for rigorous, longitudinal research to establish sustained impact across healthcare settings.

4.5 Health Education & Disease Prevention

Health education and disease prevention comprise strategies aimed at increasing knowledge, promoting healthy behaviours, and reducing the risk of illness across populations. By providing accessible information and practical guidance, such interventions empower individuals to make informed health decisions, adopt preventive

measures, and engage in behaviours that lower disease incidence. Table 4 presents studies conducted in this area between 2020 and 2023.

Table 4: Health Education & Disease Prevention				
Year	Authors	Population / Context	Type of Intervention	Main Outcome
2000	Pieper, C., & Homobono, A.	Diabetes patients & general population	Diabetes education comics	Improved knowledge and awareness
2003	el-Setouhy, M. A., & Rio, F.	Children, Egypt	Filariasis comics	Reduced stigma; increased knowledge
2012	Dandolini, B. W., et al.	School students, Brazil	Antibiotic education experiment	Increased rational knowledge of antibiotic use
2013	Branscum, P., Sharma, M., Wang, L. L., Wilson, B. R., & Rojas-Guyler, L.	Adolescents, USA	Obesity prevention comics	Increased knowledge; awareness of healthy lifestyles
2013	Dworkin, M. S., et al.	AIDS patients, USA	Food safety comics	Improved knowledge and self-reported behaviours
2013	Obare, F., et al.	School students, Kenya	HIV/AIDS comics	Increased knowledge and awareness of prevention
2017	Prado, C. C., et al.	General population, Brazil	Health education comics	Effective health promotion tool
2019	Sridhar, A., et al.	Adolescents, USA	Theory-based contraception comics	Improved subjective knowledge of contraceptive methods
2020	Ansari, R., Suwami, L., Selviana, S., Mawardi, M., & Rochmawati, R.	Adolescents, Indonesia	Sexual health promotion comics	Facilitated communication of sensitive topics; improved knowledge
2020	Palgunadi, I. N. P. T.	Primary school students, Indonesia	Oral hygiene promotion comics	Improved tooth brushing behaviours
2020	Sosiwan, A., et al.	Primary school students, Indonesia	Dental caries prevention comics	Increased knowledge of caries prevention
2020	Tri, W. N., et al.	Preschool children, Indonesia	Toothbrushing storytelling	Improved toothbrushing habits
2021	Hashemi, Z. S., et al.	Students, Iran	Blended learning with comics	Improved self-efficacy; better oral health behaviours
2022	Ahuja, L., Hasan, F., Diedrichs, P. C., & Lewis-Smith, H.	Hindi school adolescents, India	Body image comics	Increased self-awareness; high acceptance
2022	Pakpahan, O., et al.	Primary school students, Indonesia	Lecture vs health comics	Comics more effective in improving knowledge
2022	Reis, F., et al.	Children, Brazil	Pain neuroscience education comics	Validated comic; improved understanding of pain
2023	Florio, F. M., et al.	Children, Brazil	Fluoride toothpaste comics	Validated comic; improved understanding of safe usage
2023	Mansur, A., Sari, I. M., & Chan, C. M.	Primary school students, Malaysia	COVID-19 educational comics	Improved knowledge of COVID-19
2023	Sozangar, S., & Shahhosseini, S.	Students, Iran	Personal hygiene education comics	Improved social skills and hygiene awareness
2023	Suci Pratiwi, R., et al.	Primary school students, Indonesia	Oral and dental health comics	Improved oral health knowledge
2023	Sukarini, N. K., et al.	Hospitalised children, Indonesia	Health innovation comics	Reduced anxiety among children
2023	Triana, W., et al.	Adolescents, Indonesia	Digital reproductive health comics	Improved reproductive health behaviours
2024	Carneiro, F. S., et al.	Children, Brazil	Paediatric anaesthesia comic leaflet	Improved understanding of pre-anaesthesia care
2024	Luthfiana, N.	Primary school students, Indonesia	Health promotion comics	Increased basic health knowledge

The studies presented in Table 4 illustrate the expanding use of comics as a tool for health education and disease prevention across diverse populations and health topics. Interventions have targeted school-aged children, adolescents, patients with chronic conditions, and the general public, addressing areas such as sexual and reproductive health, oral hygiene, obesity prevention, diabetes education, infectious disease awareness, and pain neuroscience (Ahuja et al., 2022; Branscum et al., 2013; Pieper & Homobono, 2000; Triana et al., 2023). Comics were delivered in various formats, including narrative-based stories, digital comics, and comic leaflets, often simplifying complex information and making sensitive or abstract topics more accessible. Outcomes consistently demonstrate improvements in knowledge, awareness, and self-reported behaviours, as well as reductions in stigma and anxiety, underscoring the potential of visual storytelling to engage learners and enhance comprehension (Pakpahan et al., 2022; Sosiwan et al., 2020; Sukarini et al., 2023). Interventions that incorporated interactive or blended learning approaches were particularly effective in strengthening self-efficacy and supporting sustained behavioural change (Hashemi et al., 2021). However, most studies were context-

specific, involved small sample sizes, and relied on immediate post-intervention assessments, limiting generalisability and evaluation of long-term impact. Overall, the evidence supports comics as a versatile and innovative medium for health education and disease prevention, yet further rigorous, longitudinal, and culturally tailored research is needed to establish their effectiveness across populations and health domains.

4.6 Nutrition & Lifestyle Promotion

Nutrition and lifestyle promotion focuses on encouraging healthy eating, physical activity, and overall wellbeing to prevent diet-related diseases. Visual tools such as comics have emerged as effective methods to simplify complex information, engage audiences, and support behaviour change. Table 5 presents studies conducted in this area between 2013 and 2017.

Year	Authors	Population / Context	Type of Intervention	Main Outcome
2013	Branscum, P., Sharma, M., Wang, L. L., Wilson, B. R., & Rojas-Guyler, L.	Adolescents, USA	Obesity prevention comics	Increased knowledge; awareness of healthy lifestyles
2013	Dworkin, M. S., Peterson, C. E., Gao, W., Mayor, A., Hunter, R., & Negron, E.	AIDS patients, USA	Food safety comics	Improved knowledge and self-reported behaviours
2017	Leung, M. M., Green, M. C., Tate, D. F., Cai, J., Wyka, K., & Ammerman, A. S.	High school adolescents, USA	Manga promoting fruit consumption	Improved psychosocial outcomes; increased fruit intake
2020	Tri, W. N., Supriatin, U., Kurniasih, U., Lestari, S., Endang, S., & Siti, B.	Preschool children, Indonesia	Storytelling for oral hygiene	Improved oral hygiene and awareness
2020	Palgunadi, I. N. P. T.	Primary school students, Indonesia	Oral hygiene promotion comics	Improved tooth brushing behaviour
2021	Hashemi, Z. S., Khorsandi, M., Shamsi, M., & Moradzadeh, R.	Students, Iran	Blended learning with comics	Improved self-efficacy and oral health behaviours

The studies summarised in Table 5 demonstrate the application of comics and storytelling as tools to promote nutrition, oral hygiene, and healthy lifestyle behaviours across diverse populations and contexts. Interventions have targeted adolescents, preschool children, students, and clinical populations such as AIDS patients, with formats ranging from narrative comics and manga to oral hygiene storytelling and blended learning approaches (Branscum et al., 2013; Leung et al., 2017; Dworkin et al., 2013; Tri et al., 2020). Across these studies, outcomes consistently indicate improvements in knowledge, awareness, and self-reported behaviours, including enhanced fruit consumption, increased oral hygiene practices, and greater awareness of healthy lifestyle choices (Palgunadi, 2020; Hashemi et al., 2021). Notably, interventions that combined comics with interactive or blended learning methods appeared particularly effective in enhancing self-efficacy and sustaining behavioural change, highlighting the added value of integrating visual narratives with participatory approaches (Hashemi et al., 2021). Despite these positive findings, the majority of studies relied on small, context-specific samples and immediate post-intervention assessments, limiting the generalisability of results and leaving long-term impact uncertain. Collectively, the evidence supports the potential of comics as a versatile and engaging medium for nutrition and lifestyle promotion, while emphasising the need for more rigorous, longitudinal, and culturally tailored research to validate their effectiveness across settings.

V. DISCUSSION

Global trends indicate a rapid increase in comic-based health intervention studies, yet Malaysia's contribution remains limited, reflecting an underutilisation of comics in local health contexts compared with countries that have systematically evaluated their effectiveness. This disparity underscores that the potential of comics as an innovative medium for health education and promotion in Malaysia remains largely unexplored, presenting significant opportunities for future research to bridge the gap between global advancements and local applications. To address this gap, initial efforts should include systematic mapping of existing local studies to establish a baseline, followed by pilot projects across diverse health contexts such as mental health, sexual and reproductive health (SRH), patient education, and disease prevention. Effective implementation will require cultural adaptation to Malaysia's multilingual and multicultural environment, alongside collaborative partnerships among universities, healthcare providers, NGOs, and creative industries to ensure both scientific accuracy and contextual relevance. Integrating comic-based materials into health education curricula and community outreach programmes would normalise their use, while capacity-building initiatives can equip educators and practitioners with the skills to design and implement effective interventions. Policy recognition and dedicated funding streams are also essential to strengthen institutional support, while future research should explore longitudinal outcomes, digital dissemination, and comparative studies with countries that have successfully applied comic-based interventions.

Global evidence demonstrates that comics are highly effective in conveying health information, as their integration of visual narratives and text enhances comprehension, memory retention, and acceptance across diverse populations (Al-Jawad, 2015; Williams, 2012; Febres-Cordero et al., 2023). Clear and concise visuals simplify complex concepts, while storylines and relatable characters foster emotional engagement, allowing readers to connect with the messages being delivered. The ability of comics to reduce literacy barriers makes them suitable for individuals with varying educational backgrounds, while their inherent flexibility enables adaptation to specific cultural and social contexts (World Health Organization, 2021). These characteristics render comics effective across multiple intervention types, including health education, lifestyle promotion, disease prevention, and behaviour change initiatives. By combining text and imagery, comics convey health messages in an interactive and emotionally resonant manner, enhancing both comprehension and acceptance among culturally and educationally diverse communities.

A key advantage of comics lies in their integration of narrative and visual strategies, which facilitates the communication of sensitive or complex health topics, such as mental health, sexuality, and infectious diseases (McNicol, 2019; Al-Jawad, 2015). In SRH interventions, for instance, relatable characters and accessible storylines reduce stigma, improve clarity, and enhance memorability. The combination of emotional narrative and compelling visuals bridges gaps in understanding among individuals with varying literacy levels, fosters empathy, and increases receptivity to health messages. This dual approach positions comics as an inclusive, versatile, and contextually relevant medium that strengthens health literacy, motivates behavioural change, and supports the effective implementation of diverse health interventions.

Despite these promising findings, methodological limitations persist within the literature. Many studies rely on small, context-specific samples confined to schools, clinics, or local communities, which restricts generalisability to broader populations. Evaluations are frequently conducted post-intervention immediately, limiting insight into the long-term sustainability of behavioural change. Moreover, cultural adaptation remains underexplored, despite evidence that cultural norms and values significantly influence the acceptance of health messages (McNicol, 2019; Al-Jawad, 2015; Febres-Cordero et al., 2023; World Health Organization, 2021). These limitations highlight the need for future research that employs robust, longitudinal, and culturally contextualised study designs to assess sustained effectiveness across diverse populations and health domains.

In conclusion, comic-based health interventions consistently enhance knowledge, comprehension, and engagement across clinical and community contexts, with particularly strong effects among children and adolescents. They also reduce anxiety in clinical settings and can support self-efficacy and behaviour change, though evidence for sustained behavioural impact remains limited. While their global application demonstrates cultural adaptability, methodological heterogeneity and inconsistent outcome reporting constrain the comparability and generalizability of findings.

5.1 Implication of Studies

The findings of this study have several important implications for research, practice, and policy. Firstly, they reinforce the potential of comics as an innovative and versatile medium for health education, capable of enhancing comprehension, retention, and behavioural change through the integration of narrative and visual elements, particularly for sensitive or complex topics such as mental health, sexual and reproductive health, and disease prevention. Secondly, the results highlight the need for culturally adapted and contextually relevant interventions, emphasising that effective implementation in multilingual and multicultural settings like Malaysia requires collaboration among educators, healthcare providers, NGOs, and creative industries. Thirdly, the study underscores the importance of capacity-building initiatives to equip practitioners with the skills to design, implement, and evaluate comic-based interventions, while integration into curricula and community programmes can normalise their use and enhance reach. Fourthly, policy recognition and dedicated funding streams are essential to ensure institutional support, scalability, and sustainability. Finally, methodological limitations identified, including small and context-specific samples, short-term evaluations, and underexplored cultural adaptation, indicate that future research should prioritise robust, longitudinal, and culturally sensitive studies with larger, more diverse populations to validate effectiveness, assess long-term outcomes, and establish comics as an evidence-based tool for health promotion both locally and globally.

5.2 Recommendation

Based on the implications of this study, several recommendations are proposed to strengthen the application of comics in health interventions. Future initiatives should prioritise the systematic integration of comics as a medium for complex and sensitive health topics, including mental health, sexual and reproductive health, and disease prevention. Interventions must be culturally adapted and contextually relevant, particularly in multilingual and multicultural settings such as Malaysia, through collaborative partnerships among educators, healthcare providers, NGOs, and creative industries to ensure scientific accuracy and local relevance. Capacity-building programmes should be implemented to equip practitioners with the skills to design, implement, and

evaluate comic-based interventions, while incorporation into curricula and community programmes can normalise usage and expand reach. Policy recognition and dedicated funding streams are essential to secure institutional support, scalability, and sustainability. Moreover, future research should adopt robust, longitudinal, and culturally sensitive study designs with larger, more diverse samples, assess long-term outcomes, and explore digital and multimedia formats to maximise accessibility, engagement, and sustained effectiveness of comic-based health interventions.

5.3 Limitation

This study is subject to several limitations. Although the analysis of 63 studies offers valuable insights into current trends and thematic applications of comics in health interventions, the relatively small and context-specific sample limits the generalisability of the findings across diverse health topics and populations. Access to relevant articles was constrained by database subscription restrictions and limited availability, which may have resulted in the exclusion of potentially pertinent studies and narrowed the evidence base. Additionally, many included studies focused on specific intervention settings or health domains, restricting broader comparisons and comprehensive evaluation of effectiveness. Furthermore, most studies assessed outcomes immediately post-intervention, limiting understanding of long-term impacts. These limitations underscore the need for future research to employ larger and more diverse samples, overcome accessibility barriers, and adopt longitudinal, culturally contextualised, and multi-setting designs to strengthen the evidence base and validate the sustained effectiveness of comic-based health interventions.

VI. CONCLUSION

This systematic literature review highlights that comics are an innovative and versatile medium for health interventions, capable of enhancing health literacy, promoting behaviour change, and engaging diverse populations through the integration of narrative and visual elements. International evidence indicates that comics simplify complex health concepts, reduce literacy barriers, address sensitive topics such as sexual and reproductive health, and foster emotional engagement, thereby ensuring contextual relevance and inclusivity. Nevertheless, the relatively limited number of studies ($n = 63$) and their context-specific designs restrict the generalisability of findings, particularly in under-researched settings such as Malaysia. Methodological constraints—including small sample sizes, short-term evaluations, and limited cultural adaptation—further highlight the need for robust, longitudinal, and culturally contextualised research. Future studies should prioritise larger, heterogeneous samples, extended follow-up periods, and cross-cultural implementation to establish the long-term efficacy, scalability, and sustainability of comic-based interventions. Overall, comics demonstrate substantial potential as an evidence-based tool that complements conventional health education strategies, bridges knowledge gaps, and supports inclusive, engaging, and effective health communication both nationally and globally.

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