



Breast Cancer Prevention Education for Adolescents through Timun Mas Folklore-Based Comics at Sekolah Rendah Islam I Musleh, Melaka, Malaysia

Wahyuni Arumsari^{1,*}, Restu Ayu Eka Pustika Dewi², Inderiyani³, Chairunisa Nur Rarastiti⁴

^{1,2} Program Studi Administrasi Kesehatan, Fakultas Ilmu Kesehatan, Universitas Ivet, Indonesia

³ Akademi Farmasi Yarsi Pontianak, Indonesia

⁴ Program Studi Gizi, Fakultas Ilmu Kesehatan, Universitas Ivet

✉ wahyuni.arumsari@unisvet.ac.id

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ABSTRACT

Breast cancer remains one of the leading global public health problems and continues to contribute significantly to morbidity and mortality among women worldwide. The increasing incidence of breast cancer in Southeast Asia highlights the importance of strengthening preventive education and health literacy among adolescents. This community service program aimed to improve adolescents' awareness and understanding of early breast cancer prevention through the use of Timun Mas folklore-based educational comics at Sekolah Rendah Islam I Musleh. The program employed a participatory educational approach involving upper elementary school students aged 11–12 years old. Activities were conducted through four stages: preparation, educational intervention, participatory interactive activities, and evaluation. Educational sessions combined interactive counseling, comic reading, group discussions, educational games, and reflective activities. The educational comics integrated health messages regarding healthy lifestyles, body awareness, reproductive health literacy, and the use of herbal plants such as temulawak, moringa leaves, and lemon within culturally familiar folklore narratives. The results demonstrated high participant enthusiasm and active engagement throughout the activities. Participants showed strong interest in the visual storytelling approach, which facilitated better understanding of health messages compared to conventional lecture-based methods. Positive feedback from school representatives indicated that the comics were attractive, communicative, and appropriate for elementary school students, while also highlighting the novelty of the educational media within the school environment. Furthermore, the availability of multimedia facilities at the school provides opportunities for future development of digital interactive comics and augmented reality (AR)-based educational media. Overall, the program demonstrated that folklore-based comics can serve as innovative, culturally responsive, and engaging health promotion media for adolescent breast cancer prevention education.

Kanker payudara merupakan salah satu permasalahan kesehatan masyarakat global yang utama dan terus berkontribusi secara signifikan terhadap angka kesakitan dan kematian perempuan di seluruh dunia. Peningkatan insiden kanker payudara di kawasan Asia



Tenggara menunjukkan pentingnya penguatan edukasi preventif dan literasi kesehatan pada remaja. Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan kesadaran dan pemahaman remaja mengenai pencegahan dini kanker payudara melalui penggunaan komik edukasi berbasis folklore Timun Mas di Sekolah Rendah Islam I Musleh. Program ini menggunakan pendekatan edukatif partisipatif yang melibatkan siswa sekolah dasar tingkat atas berusia 11–12 tahun. Kegiatan dilaksanakan melalui empat tahapan, yaitu persiapan, intervensi edukasi, kegiatan interaktif partisipatif, dan evaluasi. Sesi edukasi dikombinasikan dengan penyuluhan interaktif, membaca komik, diskusi kelompok, permainan edukatif, dan aktivitas reflektif. Komik edukasi mengintegrasikan pesan kesehatan mengenai pola hidup sehat, kesadaran menjaga kesehatan tubuh, literasi kesehatan reproduksi, serta pemanfaatan tanaman herbal seperti temulawak, daun kelor, dan lemon dalam narasi folklore yang dekat dengan budaya. Hasil kegiatan menunjukkan antusiasme dan keterlibatan aktif peserta yang tinggi selama pelaksanaan kegiatan. Pendekatan visual storytelling pada komik terbukti membantu peserta memahami pesan kesehatan dengan lebih baik dibandingkan metode ceramah konvensional. Umpan balik positif dari pihak sekolah menunjukkan bahwa media komik dinilai menarik, komunikatif, dan sesuai dengan karakteristik siswa sekolah dasar, sekaligus menjadi media edukasi yang belum pernah digunakan sebelumnya di lingkungan sekolah. Selain itu, tersedianya fasilitas multimedia di sekolah membuka peluang pengembangan komik digital interaktif dan media edukasi berbasis augmented reality (AR) di masa mendatang. Secara keseluruhan, program ini menunjukkan bahwa komik berbasis folklore dapat menjadi media promosi kesehatan yang inovatif, komunikatif, dan responsif budaya dalam edukasi pencegahan kanker payudara pada remaja.

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A. INTRODUCTION

Breast cancer remains one of the most significant global public health challenges and continues to contribute substantially to morbidity and mortality among women worldwide. According to the World (World Health Organization, 2026a) breast cancer accounted for approximately 2.3 million new cases globally in 2022, representing around 11.6% of all cancer cases worldwide and making it the most commonly diagnosed cancer internationally. Breast cancer also contributed to nearly 670,000 deaths globally, indicating its persistent burden on global health systems (World Health Organization, 2026b). In Southeast Asia, the incidence of breast cancer continues to rise due to changes in lifestyle, reproductive behavior, urbanization, and limited preventive awareness among younger populations (Shin HR et al., 2010). These conditions indicate the urgent need for preventive interventions emphasizing health literacy and early education among adolescents.

In Indonesia, breast cancer remains the most prevalent cancer among women. Ferlay J et al., 2024 in Global Cancer Observatory (GLOBOCAN) reported that breast cancer contributed



approximately 16.2% of all cancer cases in Indonesia, with more than 68,000 new cases recorded annually. Furthermore, breast cancer is one of the leading causes of cancer-related mortality among Indonesian women. Similarly, Malaysia faces a substantial breast cancer burden. Reports from the (Ministry of Health Malaysia, 2024) indicate that breast cancer accounts for approximately 19% of all cancer cases. The age-standardized incident rate (ASR) increased from 34,1 per 100,000 population in 2012-2016 became 38.9 per 100,000 population in 2017-2021 (Ministry of Health Malaysia, 2025). These epidemiological conditions highlight the importance of strengthening preventive education and promoting early awareness regarding breast cancer risks and healthy behaviors among adolescents.

Adolescence represents a critical developmental stage in which cognitive frameworks, attitudes, and health behaviors begin to form and may persist into adulthood (World Health Organization, 2025). Research in public health and behavioral sciences demonstrates that preventive health education introduced during adolescence significantly influences future health decision-making and lifestyle practices (UNESCO, 2020). However, conventional breast cancer education programs frequently rely on one-directional instructional methods that are often insufficient to engage adolescents who are highly influenced by digital communication, visual media, storytelling, and interactive educational experiences (Saputri et al., 2024). Studies conducted internationally have shown that innovative visual-based educational interventions, including comics, digital storytelling, and game-based learning, can improve adolescents' engagement, knowledge retention, and preventive health behavior more effectively than traditional educational approaches (Ridha et al., 2022; Septialti et al., 2022).

The use of comics as a health promotion medium has increasingly gained recognition within health education because visual narratives can simplify complex medical information while simultaneously enhancing emotional engagement and cognitive understanding (Ansari et al., 2020). Educational comics have been effectively utilized in reproductive health promotion, cancer prevention campaigns, and adolescent behavioral interventions in various countries. Previous studies demonstrate that narrative-based visual learning media contribute positively to knowledge acquisition, attitude formation, and self-efficacy related to preventive health behaviors (Abu-Ras et al., 2025). Furthermore, folklore-based educational approaches provide additional cultural relevance because they integrate local wisdom, traditional narratives, and familiar moral storytelling into health promotion strategies, thereby increasing adolescents' acceptance and psychological connection with the educational messages delivered (Sabri et al., 2024).

The importance of culturally adaptive educational media is particularly relevant in Southeast Asian societies, where folklore remains an integral component of social and cultural learning. The Indonesian folklore *Timun Mas* (Golden Cucumber) contains moral values emphasizing courage, intelligence, resilience, and self-protection, making it highly relevant for adaptation into preventive health education. Transforming folklore narratives into health communication media enables adolescents to engage with health messages through culturally familiar and emotionally meaningful storytelling approaches.

This community service program was developed based on prior scientific evidence demonstrating the effectiveness of folklore-based digital comics in improving breast cancer prevention behavior among Generation Z populations. A study conducted by Dewi et al., 2025 entitled "*The Effectiveness of Digital Comic Modification of Golden Cucumber Folklore on Breast Cancer Prevention Behavior with Herbal Plants in Gen Z*" found that folklore-modified digital comics significantly influenced breast cancer prevention behavior among Generation Z adolescents. The study employed a pre-experimental one-group pretest-posttest design involving 79 participants selected through purposive sampling in Semarang, Indonesia. Statistical analysis using the Wilcoxon test demonstrated a significant effect ($p = 0.001$),



indicating that the digital comic intervention effectively improved preventive behavior regarding breast cancer and herbal-based prevention approaches. The researchers also recommended further development of more interactive and visually engaging educational comics to increase adolescents' participation and educational effectiveness. These findings provide an important empirical foundation for implementing this international community service initiative using *Timun Mas* folklore-based comics as an innovative and culturally contextualized medium for adolescent breast cancer prevention education.

From a policy perspective, this initiative aligns with Undang-Undang No. 17 Tahun 2023 tentang Kesehatan, which emphasizes promotive and preventive healthcare approaches through health literacy strengthening, community empowerment, and innovation in health education. In Malaysia, this program also supports preventive health promotion initiatives advocated by the Ministry of Health Malaysia, particularly concerning adolescent health education and cancer awareness within school-based settings (Ministry of Health Malaysia, 2025). Moreover, the program contributes directly to the achievement of the United Nations Sustainable Development Goals, especially SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education), through the implementation of innovative, inclusive, and culturally responsive health education strategies (United Nations, 2025).

Therefore, the implementation of *Breast Cancer Prevention Education for Adolescents through Timun Mas Folklore-Based Comics at Sekolah Rendah Islam I Musleh, Melaka, Malaysia* represents an important transdisciplinary initiative integrating cultural literacy, adolescent education, and health promotion through innovative educational media. This program is expected to strengthen adolescents' awareness and preventive behavior regarding breast cancer while simultaneously promoting culturally meaningful and engaging health education approaches within international community engagement contexts.

B. METHODS

This community service program employed a participatory educational approach utilizing folklore-based comics as a health promotion strategy for breast cancer prevention among adolescents. The activity was conducted at Sekolah Rendah Islam I Musleh, Melaka, Malaysia in collaboration with the Komunitas Dosen Multidisipliner Indonesia. The target participants were upper elementary school students (Grades 5 and 6) aged approximately 11–12 years old, as part of an early preventive health education initiative implemented through interactive and culturally contextualized learning approaches.

The implementation of the program consisted of four major stages: preparation, educational intervention, participatory interactive activities, and evaluation. During the preparation stage, the community service team conducted internal coordination, prepared the educational comics, and arranged the technical aspects of the program implementation. The educational media used in this activity was a *Timun Mas* folklore-based comic containing messages related to breast cancer prevention through the use of herbal plants such as *temulawak* (*Curcuma xanthorrhiza*), moringa leaves (*Moringa oleifera*), and lemon (*Citrus limon*). The development of the comic had previously been carried out through a research and product development process using a visual storytelling approach adapted to adolescents' cognitive and psychosocial developmental characteristics in order to enhance attractiveness and comprehension. Prior to implementation, the community service team coordinated with the school and local partners regarding technical arrangements, scheduling, and participant involvement. Educational materials were delivered communicatively and interactively while considering the participants' cultural background and learning environment.

The educational intervention stage was conducted through interactive counseling sessions combined with activities involving reading and understanding the *Timun Mas* folklore-based

educational comics. During these sessions, participants were introduced to the importance of early breast cancer prevention through healthy lifestyle behaviors, body health awareness, basic reproductive health literacy, and knowledge regarding herbal plants that may contribute to breast cancer prevention. The folklore storytelling approach was utilized to strengthen participants' emotional engagement, thereby facilitating easier acceptance and understanding of health messages.

To increase participant involvement, the activities were also combined with group discussions, question-and-answer sessions, educational games, and reflective activities related to the comic storyline. This participatory approach aimed to enhance active engagement, strengthen understanding of health-related materials, and encourage participants' critical thinking and communication skills throughout the learning process. Program evaluation was conducted through direct observation of participants' engagement and enthusiasm during the activities, as well as participant feedback regarding their understanding of the educational materials and the use of comics as a health education medium. Activity documentation was conducted through field notes and photographic documentation as part of the community service reporting process.

Through this method, the community service program is expected to improve adolescents' awareness and understanding regarding the importance of early breast cancer prevention while simultaneously introducing an innovative, communicative, and culturally responsive health education model suitable for adolescent learners.

C. RESULTS AND DISCUSSION

The community service program on breast cancer prevention through *Timun Mas* folklore-based comics was conducted at Sekolah Rendah Islam I Musleh involving Grade 5 and Grade 6 students aged approximately 11–12 years old. The activities were implemented interactively and participatively through health education sessions, comic reading activities, group discussions, educational games, and question-and-answer sessions related to the importance of early breast cancer prevention.

The implementation results demonstrated that participants showed high enthusiasm throughout the educational activities. This was reflected in their active involvement in reading the comics, answering questions, participating in discussions, and expressing opinions regarding the storyline of the *Timun Mas* comic. The use of a folklore-based visual storytelling approach proved to facilitate participants' understanding of health messages more effectively compared to conventional educational methods. Familiarity with the folklore narrative created emotional engagement among participants, allowing health messages to be more easily accepted and understood without making the learning process feel monotonous or overly formal.



Figure 1. Timun Mas folklore-based educational comic used in the health promotion program.

The educational comics used in this program contained messages related to maintaining body health, implementing healthy lifestyle behaviors, recognizing breast cancer risk factors, and introducing herbal plants such as *temulawak* (*Curcuma xanthorrhiza*), moringa leaves (*Moringa oleifera*), and lemon (*Citrus limon*), which possess antioxidant properties and potential health benefits. Participants showed considerable interest in the visual illustrations and storyline because the educational content was delivered using simple language, attractive illustrations, and characters closely related to children's daily experiences. These findings indicate that culturally based educational media can serve as an innovative alternative for improving health literacy among early adolescents.



Figure 2. Students participating in a Timun Mas folklore-based health education activity

Based on observational findings during the activities, participants became more actively engaged when health materials were delivered through visual media and educational games compared to traditional lecture-based methods. Group discussions and reflective sessions also helped participants connect the health messages presented in the comics with their daily lives. Several participants were able to explain the importance of maintaining body health, consuming healthy foods, and understanding that disease prevention should begin from an early age.



Figure 3. Students engaging in group discussion activities using Timun Mas folklore-based educational comics

In addition to participant observations, the school also provided highly positive feedback regarding the use of folklore-based educational media. According to statements from the

principal and teachers at Sekolah Rendah Islam I Musleh, educational media such as the *Timun Mas* comic specifically designed for breast cancer prevention had never previously been used within the school learning environment. The school representatives considered the folklore-based comic approach to be attractive, communicative, and highly suitable for elementary school students' characteristics. Teachers and school administrators also expressed expectations that similar educational media could be further expanded and implemented across all grade levels within the school.

Furthermore, the school stated that all classrooms at Sekolah Rendah Islam I Musleh had already been integrated with multimedia facilities, creating opportunities for future technology-based educational media development. This condition opens possibilities for further innovations in the form of interactive digital comics, educational animations, augmented reality (AR), and other multimedia-based learning tools to enhance student engagement and learning experiences more effectively.

The findings of this program are consistent with various previous studies examining comic-based health education interventions among adolescents. A literature review conducted by Septialti et al., 2022 concluded that health comics significantly improve adolescents' health knowledge because they combine simple language, visual illustrations, and narrative approaches that align with adolescents' cognitive characteristics. Comic-based educational media were found to increase learning motivation, reduce boredom, and facilitate understanding of sensitive health-related topics among young learners. Furthermore, a study by (Rusmini et al., 2025) on breast self-examination (BSE) education using comic media among female students demonstrated significant improvements in participants' knowledge, attitudes, and practical skills following comic-based interventions. These findings reinforce the argument that comics are not merely informational tools, but also effective behavioral intervention media capable of influencing health-related attitudes and practices.



Figure 4. Group photo of participants and facilitators after the educational activity at Sekolah Rendah Islam I Musleh

The results of this program are also supported by international studies on narrative-based health communication. Research published in *Telematics and Informatics* emphasized that visual health narratives and storytelling approaches possess stronger capabilities in generating emotional engagement, audience attention, and message retention compared to conventional informational communication methods. Narrative-based visual communication enables audiences to understand complex health issues through more human-centered and memorable approaches (Ma et al., 2023). In line with current developments in health education, educational media are increasingly integrating digital technology, multimedia systems, and interactive narrative visualization. Recent studies on narrative medical visualization emphasize that combining visual elements, storytelling, and interactive



technologies can substantially improve public understanding of complex health issues while enhancing communication effectiveness among younger populations (Meuschke et al., 2021). This aligns with the conditions at Sekolah Rendah Islam I Musleh, where multimedia facilities have already been integrated into all classrooms, thereby creating strong opportunities for the future development of interactive digital comics, augmented reality (AR)-based learning, and AI-assisted educational media for adolescent health promotion.

Beyond providing health education, this activity also contributed to strengthening cultural literacy and promoting transdisciplinary learning through the integration of health, culture, and visual education. The program demonstrated that innovative, communicative, interactive, and culturally responsive educational media can serve as effective strategies for improving adolescents' health awareness from an early age. Overall, this community service activity illustrates that *Timun Mas* folklore-based comics can function as attractive and easily understandable health education media for elementary school adolescents. This approach not only increased participants' engagement during the learning process but also opened opportunities for the development of more innovative and adaptive culture- and technology-based health promotion models within international educational environments.

D. CONCLUSION

The community service program entitled *Breast Cancer Prevention Education for Adolescents through Timun Mas Folklore-Based Comics at Sekolah Rendah Islam I Musleh, Melaka, Malaysia* successfully addressed the need for innovative and culturally adaptive health education media for adolescents. The program demonstrated that folklore-based comics can effectively improve adolescents' awareness and understanding of early breast cancer prevention, healthy lifestyle behaviors, body health awareness, and basic reproductive health literacy. The interactive and participatory educational approach increased students' engagement, enthusiasm, and active participation throughout the learning process. The integration of *Timun Mas* folklore into health education also strengthened cultural literacy and made health messages easier to understand compared to conventional approaches. Positive responses from school representatives highlighted the novelty, relevance, and suitability of the educational comics for elementary school students. Furthermore, the availability of multimedia facilities at the school provides opportunities for future development of digital interactive comics, augmented reality (AR), and multimedia-based health education platforms. However, this activity was limited to short-term implementation and observational evaluation without quantitative behavioral measurements. Therefore, future programs are recommended to incorporate pretest-posttest evaluations, broader participant coverage, and technology-integrated educational media to improve effectiveness and sustainability.

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F. AUTHOR CONTRIBUTIONS

Conceptualization and activity design: Komunitas Dosen Multidisipliner Indonesia (KDMI), Filda Rahmiati (FR), Wahyuni Arumsari (WA), Inderiyani (I), Maria Denok Bakti Agustiningrum (MDBA), and Lenny Kurniati (LK). Activity implementation: WA, I, MDBA, LK. Educational media preparation: Restu Ayu Eka Pustika Dewi (RAEPD), WA. Activity coordination: KDMI, FR, WA, I, MDBA, LK. Data observation and impact evaluation: WA, I. Article preparation and drafting: WA, RAEPD, I. Results analysis and discussion development: WA, RAEPD, I. Article revision and final editing: WA, RAEPD, I. All authors have read and approved the final version of the manuscript.

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