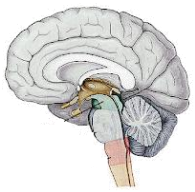
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THE EFFECTIVENESS OF HEALTH EDUCATION USING DIGITAL COMICS ON ADOLESCENTS' KNOWLEDGE ABOUT BULLYING

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ABSTRACT

Bullying is one of the juvenile delinquencies that often occurs in schools. One of the factors causing bullying is a lack of knowledge. Teenagers' knowledge about bullying is still in the low category. The aim of this research is to analyze the effectiveness of health education using digital comic media on teenagers' knowledge about bullying. This research design uses a quasi experimental design. The sample from this research were teenagers from SMK Pemuda 3 Kesamben, a total of 70 respondents with a sampling technique, namely non-probability sampling using the purposive sampling technique. The inclusion criteria for this study were teenagers in the middle phase who had an Instagram account. This research has 2 variables, namely health education using digital comic media and adolescent knowledge. The instrument used is a questionnaire. Data analysis used the Mann Whitney test, with a result of p = 0.023 for knowledge so that there was significant effectiveness between health education and digital comic media on knowledge, so this stated that there was effectiveness. The conclusion of this research is to increase teenagers' knowledge regarding bullying, this method can be used as an effective tool to increase knowledge.

INTRODUCTION

Bullying is a common juvenile crime in schools. Bullying poses a serious threat to adolescent development and has the potential to lead to violence in schools. Bullying is a global problem among adolescents that frequently occurs in schools. A study reported that most respondents had insufficient knowledge about bullying (41.9%). This statement indicates that some adolescents have insufficient knowledge about bullying. There is a relationship between knowledge and bullying incidents, and adolescents with low knowledge tend to behave as perpetrators of bullying (Suib & Safitri, 2022). Preventive education efforts have been shown to increase adolescents' knowledge about bullying (Agustiningrum et al., 2025).

An estimated 8 to 50 percent of adolescents in several Asian, American, and European countries experience bullying at school. The incidence of bullying in schools remains alarmingly high. According to the Indonesian Child Protection Commission (KPAI), bullying has the highest incidence among cases of violence against children. From 2011 to August 2014, the KPAI recorded 369 reports related to bullying issues. Bullying continues to occur annually in Indonesian educational settings. According to KPAI information, there were 17 recorded cases in 2021. Research by the East Java Child Protection Agency (LPA) recorded 536 cases as of November 2022, 37% of which were school bullying cases.

Bullying inevitably has an impact. Numerous studies conducted in Indonesian schools have shown that bullying has negative consequences, especially for its victims. These impacts include psychological well-being issues such as hopelessness, delayed developmental milestones, reduced trust in others, social isolation from friends or even parents, reduced self-confidence, and decreased academic achievement. The

most severe impact is the emergence of self-harm. International findings reinforce this picture: bullying is associated with mental health problems in adolescents (Wen et al., 2022), and bullying victimization is associated with suicidal ideation in students (Bezie et al., 2025). A decade-long systematic review also shows that the experience of being a victim of bullying impacts adolescents' mental health, although protective factors can mitigate these effects (Munawaroh et al., 2024).

Factors that lead adolescents to engage in bullying include external or environmental factors, such as parenting patterns and parents who provide insufficient guidance, and peers who frequently bully other children, including as a form of revenge. Systematic reviews and meta-analyses indicate that risk factors and protective factors within the family environment are associated with bullying victimization in children and adolescents (Grama et al., 2024). One factor underlying bullying and other forms of violence is ignorance. Health education can be conducted to increase adolescents' knowledge about bullying. Health education is a series of activities aimed at encouraging the adoption of healthy lifestyle habits. Health education can take the form of lectures and direct practice, and can be delivered through educational media such as pamphlets or booklets tailored to adolescents' needs.

Lack of information will impact adolescents' low knowledge. Meanwhile, knowledge can be improved through education. Discussions, lectures, and booklets are commonly used forms of education, but they tend to be boring and less impactful. Currently, adolescents are more interested in accessing information through electronic media. One activity frequently engaged in by adolescents is accessing Instagram. Education in the form of digital comics via Instagram can increase respondents' knowledge about bullying because the information is presented more clearly and easily accessed, while the engaging format of the comics makes respondents more enthusiastic about understanding and following the storyline. Previous research has shown that comic strips can be an effective learning medium for fostering caring character (Aulia & Wuryandani, 2019), character education-based comic media improves learning outcomes (Khasanah & Tirtoni, 2023), and comic media has been shown to increase adolescent knowledge in health education experiments (Sarliana et al., 2024). Interactive visual multimedia interventions have also been shown to improve children's literacy skills (Dong et al., 2024).

The results of a preliminary study conducted at SMK Pemuda 3 Kesamben by interviewing 10 students regarding bullying showed that 6 students did not know about bullying, 2 students were hesitant to answer, 8 students were often humiliated at school (non-physical bullying), and 2 students said they had experienced physical and non-physical bullying. Informing teachers is one way to prevent bullying from happening again, so that teachers can provide advice. Based on this background, this study was conducted to analyze the effectiveness of health education with digital comic media on adolescents' knowledge about bullying through quantitative research.

The regional picture also reinforces this urgency. Research on school adolescents from five Southeast Asian countries, including contexts close to Indonesia, found that both frequent and infrequent bullying victimization still occur at significant proportions (Peltzer & Pengpid, 2021). This means that Indonesian schools face challenges comparable to those in neighboring countries, while structured prevention programs are not yet routine in all schools. There is a real need for affordable, easily disseminated, and engaging educational interventions for adolescents, and this need is addressed by the use of digital comics through social media in this study.

Internationally, school-based bullying intervention programs have been shown to be effective, but their effect sizes are generally moderate, making media selection and delivery methods crucial determinants of success (Gaffney et al., 2019). Universal prevention programs involving the entire school community, such as Friendly Schools, have been shown to be effective in secondary school students (Cross et al., 2019). In addition to victims and perpetrators, bystanders play a key role: school climate influences bystanders' willingness to help victims (DiRussa et al., 2023), and programs that increase bystander knowledge have been shown to be effective in Indonesian schools (Purba & Mangunson, 2020). This study positions digital comics through Instagram as an educational medium relevant to adolescents' daily lives to address these needs.

METHOD

This study used a quasi-experimental design with a pretest and posttest design. The sampling technique used purposive sampling, by selecting students of SMK Pemuda 3 Kesamben as research respondents according to the inclusion criteria, namely middle-phase adolescents and having Instagram social media. The number of respondents was 70 people, consisting of 35 respondents in the experimental group and 35 respondents in the control group. This design was used to find the effect of something that was given a treatment. The experimental group was given health education treatment with digital comic media about bullying through Instagram, while the control group was given PowerPoint media. The research variables were health education with digital comic media and adolescent knowledge about bullying. The instrument used was a knowledge questionnaire. Data analysis was carried out using the Wilcoxon test to see differences in knowledge before and after the intervention in the group, and the Mann Whitney test to compare the two groups, with a significance level of $p < 0.05$. The research flow is presented in Figure 1.

1. RESULTS AND DISCUSSION

This study involved 70 respondents divided into the digital comic media group and the PowerPoint media group. Respondent characteristics, changes in knowledge before and after the intervention, and a comparison of the two groups are presented in Table 1, Table 2, and Figure 1.

Table 1. Adolescents' Knowledge Before and After Being Given Digital Comic Media about Bullying

	Median (Min-Max)	p-value
Before	16(11-20)	<0.001
After	18(13-20)	

Table 2. Analysis of Differences in Educational Media on Adolescents' Knowledge about Bullying Using Digital Comic Media and Power Point Media

Group	N	Median (Min-Max)	Sig
Digital comics	35	18(13-20)	0.023
power point	35	17(7-20)	

Most of the respondents from the digital comic media group and the power point media group were 16 years old, namely 20 people (57.0%) in the digital comic group and 13 people (37.0%) in the power point group. In the digital comic group, the respondents were predominantly female, with 30 people

(86.0%), as well as the power point group with 25 female respondents (71.0%). Respondents in the digital comic group who had received information about bullying were 9 people (26.0%), and in the power point group were 11 people (31.0%).

Based on Table 1, from 35 respondents in the digital comic group, there were results before being given treatment with a minimum value of 11 and a maximum value of 20. After being given treatment, the minimum value became 13 and the maximum value was 20, with the median increasing from 16 to 18.

The Wilcoxon statistical test with a significance level of $p < 0.05$ showed a significant result in the digital comic media group at $p < 0.001$. Since $p <= 0.05$, it can be interpreted as a meaningful difference. Thus, it can be concluded that there is a difference in knowledge before and after being given health education using digital comic media in adolescents.

Based on Table 2, the Mann-Whitney test results show a p-value of 0.023. Since $p <= 0.05$, these results indicate the effectiveness of health education using digital comics on adolescents' knowledge about bullying. Differences were also evident in the median posttest scores, which were 18 for the digital comic group and 17 for the PowerPoint group, with a minimum score of 13 and a maximum score of 20 for the digital comic group.

The increase in knowledge in the digital comics group aligns with how visual storytelling media works. Comics convey messages through images and storylines, making material considered difficult easier to follow. Research on interactive visual multimedia shows that the combination of images, text, and interaction improves students' literacy outcomes (Dong et al., 2024). Multicultural comic strips have been shown to be a learning medium that fosters caring character in students (Aulia & Wuryandani, 2019), and character education-based comic media improves student learning outcomes (Khasanah & Tirtoni, 2023). In the context of this study, digital comics emphasize visual messages through clear images and sequential stories, making it easier for respondents to understand the forms of bullying, their impacts, and how to respond to them.

The difference in results between the digital comics and PowerPoint groups suggests that the delivery medium also determines the effectiveness of education. PowerPoints generally contain text and few images, while digital comics are more engaging, easier to understand, and are delivered through social media, which teenagers access daily. Evidence from other studies supports this pattern: comics increased adolescents' knowledge about maturing marriageable age in an experimental study (Sarliana et al., 2024), the development of an educational game specifically designed to address bullying in junior high schools (Pratiwi et al., 2025), and bullying prevention education improved adolescents' knowledge (Agustiningrum et al., 2025). Thus, the superiority of digital comics in this study is not solely due to their content, but also to their format's suitability to adolescents' media habits.

These findings from one school need to be read within the broader epidemiological context of bullying. Research on school adolescents from five Southeast Asian countries found that frequent and infrequent bullying victimization remains prevalent (Peltzer & Pengpid, 2021). High prevalence was also reported among adolescents in Inner Mongolia, China (Zhang et al., 2024), in a national study of adolescents in Jordan (Shahrour et al., 2020), in an online survey of adolescents (Flowers et al., 2020), and in a systematic review of adolescent bullying and victimization in India (Thakkar et al., 2020). The

consistency of these cross-national findings suggests that students' low levels of knowledge in the study locations are not a local issue but rather a common issue for school adolescents, making prevention education a worthy addition to the school curriculum.

Increasing knowledge about bullying is crucial because of its impact on mental health. Bullying victimization is associated with mental health problems in adolescents (Wen et al., 2022) and with suicidal ideation in students in Africa (Bezie et al., 2025). Systematic reviews of protective factors suggest that environmental support and understanding can mitigate the impact of victimization experiences (Munawaroh et al., 2024). Certain forms of bullying, including homophobic bullying, have unique predictors and consequences in the school environment (Moyano & Sánchez-Fuentes, 2020). Adolescents who understand bullying, its impact, and how to report it are better positioned to protect themselves and their peers, whether they are potential victims, witnesses, or potential perpetrators.

However, knowledge is a gateway, not an end in itself. A meta-analysis of global school bullying intervention programs found significant but moderate effectiveness (Gaffney et al., 2019), and the universal Friendly Schools program emphasized engagement across the school ecosystem (Cross et al., 2019). Bystander behavior is strongly influenced by school climate (DiRussa et al., 2023); the SERASI program in Indonesia increased peer bystander knowledge about disability and bullying (Purba & Mangunson, 2020); peer support approaches through buddies became a prevention and intervention strategy in schools (Tzani-Pepelasi et al., 2019); and the CATZ intervention helped students cope with peer provocation without hostile attribution bias (Boulton & Macaulay, 2024). Therefore, digital comics should be positioned as part of a broader prevention program, rather than as a stand-alone intervention.

Environmental factors outside of school cannot be ignored either. A meta-analysis of parental risk and protective factors demonstrated the role of parenting styles and family involvement in bullying victimization (Grama et al., 2024). Research in Indonesia found that adolescent bullying behavior is influenced by the school environment and knowledge (Suib & Safitri, 2022). This means that increasing student knowledge through digital comics will be more impactful if accompanied by school-parent communication and consistent enforcement of rules, so that the messages students receive at school do not conflict with their experiences at home and in their social circles.

The practical implications of these findings are quite clear for nursing and schools. Health education using digital comics on Instagram can be an alternative nursing intervention to address psychosocial issues, particularly to reduce bullying behavior in adolescents. In educational institutions, particularly at SMK Pemuda 3 Kesamben, this medium can be used by guidance and counseling teachers as a means of preventing bullying behavior, as students gain a positive understanding through illustrated stories. Experience with bullying prevention education for elementary school students shows that a light and interactive educational format is acceptable at various levels of education (Makrufi et al., 2023). Schools can schedule this education regularly and link it to counseling services for students identified as being involved in bullying.

The magnitude of the difference between groups needs to be interpreted proportionally. While the median posttest difference of one point (18 versus 17) is not large in absolute terms, it was achieved in a brief educational intervention and is consistent with meta-analytic findings that anti-bullying programs

generally produce moderate effects (Gaffney et al., 2019). Across a limited range of questionnaire scores, the median shift, coupled with an increase in the minimum score for the digital comic group from 11 to 13, suggests improvement, particularly among students with the lowest prior knowledge, the group most in need of education. The practical significance lies in the equitable distribution of baseline knowledge about bullying, not in claims of behavioral change, which were not measured in this study.

The use of Instagram as a delivery channel also carries consequences that schools need to manage. Comic material shared through accounts or class groups must be ensured to contain only safe educational content, not to depict real-life experiences of students that are recognizable, and to be accompanied by teacher guidance on commenting etiquette. A supportive school climate remains a key pillar for transforming knowledge gained from digital media into courage to act (DiRussa et al., 2023), and a universal program involving the entire school community provides an institutional framework for program sustainability (Cross et al., 2019). With this management, the advantages of access and appeal of digital comics can be leveraged without compromising student protection.

Several limitations should be noted. This study used a quasi-experimental design without randomization, so initial differences between groups were not fully controlled. The study was conducted in only one school with a purposive sample predominantly of females, so generalization to a broader adolescent population requires caution. The outcome measured was knowledge through a questionnaire, not actual changes in bullying behavior, and measurements were taken immediately after the intervention, so long-term retention of knowledge is unknown. The original manuscript also did not report the results of validity and reliability tests of the questionnaire used. These limitations do not eliminate the findings of significant differences, but they do limit their interpretation.

CONCLUSIONS AND SUGGESTIONS

The conclusion that can be drawn from this study is that there is a difference in knowledge between before and after the intervention given in the experimental group, and education with digital comic media is effective compared to the control group that used PowerPoint. The implementation of health education interventions with digital comic media through Instagram can be a reference in efforts to prevent psychosocial problems, especially in adolescents, in order to increase knowledge and thus encourage the success of the growth and development process they experience.

For further research, further research is needed that places greater emphasis on the media used and adapts it to current developments, using randomization and a larger number of schools, and measuring knowledge retention and behavioral changes, not just knowledge immediately after the intervention. Furthermore, interventions should be provided to families and teachers as supporters of adolescents, as bullying prevention requires simultaneous support from the school and family environment. For schools, it is recommended that digital comics about bullying be part of a scheduled prevention program, accompanied by a clear and safe reporting channel for students.

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