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The Effect of Health Education Using Audio Visual Simulation (SIMAV) Method on First Aid Knowledge of Adolescents in Kadugede Subdistrict, Kuningan Regency

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***Abstact*—First aid knowledge among adolescents is crucial for handling emergency situations effectively. Health education using the** Audio Visual Simulation (SIMAV) method **is considered an interactive and efficient strategy to improve understanding. This study was conducted to assess the impact of SIMAV-based health education on adolescents' knowledge of first aid in Kadugede Subdistrict, Kuningan Regency. A quasi-experimental design employing a one-group pretest–posttest approach without a control group was utilized. The study involved 17 adolescents who were selected using purposive sampling. Knowledge was measured using a validated questionnaire Data were collected prior to and following the intervention. The analysis was performed using the Wilcoxon Signed Ranks Test. The findings revealed that the average pre-test score was 58.24 (SD = 13.91), which increased to 80.29 (SD = 7.39) in the post-test. The Wilcoxon test demonstrated a statistically significant enhancement in participants' knowledge after the intervention (p < 0.001).All participants demonstrated an increase in scores, with none showing a decrease or no change.**Conclusion: **Health education using the SIMAV method is effective in enhancing adolescents' first aid knowledge and can be implemented as an interactive educational strategy**.

Keywords— ***Health Education; Audio Visual Simulation (SIMAV); First Aid Knowledge; Adolescents***

I. INTRODUCTION

Emergency situations such as injuries, traffic accidents, fainting, bleeding, and respiratory arrest remain public health problems that frequently occur among adolescents. The World Health Organization (WHO) emphasizes that unintentional injuries represent one of the primary contributors to morbidity and mortality in the adolescent age group globally, particularly in developing countries (1). Adolescents, as an active and productive age group, have a high risk of experiencing or witnessing emergency situations; therefore, first aid knowledge and skills are essential basic competencies. Adequate first aid knowledge has been proven to reduce the severity of injuries, prevent complications, and increase survival chances before professional medical assistance becomes available (2).

In addition to the high incidence of emergency events among adolescents, individual and community preparedness plays a crucial role in the emergency response system (3). In many rural and semi-rural areas, access to immediate professional medical services is often limited by geographical distance, transportation barriers, and availability of healthcare personnel. Under such circumstances, first aid provided by bystanders becomes a decisive factor in determining patient outcomes during the critical pre-hospital phase (4).

However, various studies indicate that the level of first aid knowledge among adolescents is still low to moderate. Studies by (5) reported that most adolescents do not yet understand basic first aid principles, such as the management of bleeding, fall injuries, and respiratory arrest. This low level of knowledge is influenced by limitations in health education methods that remain conventional, less interactive, and not tailored to adolescents' learning characteristics (6). Therefore, innovative health education methods are needed to optimally improve understanding in an engaging and easily comprehensible manner (7).

Adolescents represent a strategic target group for health education interventions due to their high learning capacity,

adaptability, and potential role as agents of change within their communities (8). One educational method considered effective is Audio Visual Simulation (SIMAV), a learning approach that combines audiovisual media with real-life situation simulations (9). This method allows learners to see, hear, and directly practice emergency scenarios, thereby increasing cognitive engagement and knowledge retention. Recent studies show that audiovisual- and simulation-based learning is significantly more effective than lecture-based methods in improving health knowledge and skills among adolescents (10). This approach is also aligned with experiential learning theory, which emphasizes direct experience as a key factor in enhancing understanding. Furthermore, by (11) simulation-based audiovisual education aligns well with adolescents' cognitive and psychosocial characteristics, as it promotes active participation, contextual learning, and experiential problem-solving. By exposing learners to realistic emergency scenarios in a controlled environment, SIMAV enables adolescents to develop situational awareness, critical thinking, and confidence in responding to emergencies. Based on this background, this study aims to analyze the effect of SIMAV-based health education on the level of first aid knowledge among adolescents in Kadugede Subdistrict, Kuningan Regency. This research is important as an effort to strengthen community-based health promotion and education and as a basis for developing innovative, applicable, and adolescent-appropriate first aid education strategies at the village level.

II. METHOD

This study employed a quasi-experimental design using a one-group pre-test and post-test approach without a control group Harerimana, A., Duma, S. E., & Mtshali, N. G. (2023). The study was conducted in Kadugede Subdistrict, Kuningan Regency. The sample consisted of 17 adolescents selected through purposive sampling based on predetermined inclusion criteria. The intervention was health education using the Audio Visual Simulation (SIMAV) method, covering basic first aid materials such as bleeding management, fainting, and initial responses to emergency conditions. The education was delivered in one structured session with a duration of approximately 60 minutes. First aid knowledge was assessed using a questionnaire that had previously undergone validity and reliability testing,administered before (pre-test) and after (post-test) the intervention. Data were analyzed using the Wilcoxon Signed Ranks Test to determine differences in knowledge levels before and after the intervention, using a significance threshold of $p < 0.05$

III. RESULTS AND DISCUSSION

1. Average First Aid Knowledge Before Health Education Using SIMAV

TABLE 1. FIRST AID KNOWLEDGE BEFORE HEALTH EDUCATION USING SIMAV USING AUDIO VISUAL SIMULATION (SIMAV)

Knowledge	Mean	Median	Std. Deviation	Min–Max
Before	58.24	65.00	13.91	30–75

Based on Table 1, respondents' first aid knowledge before receiving health education using SIMAV showed a mean score of 58.24 with a median of 65.00. The standard deviation of 13.91 indicates considerable variation in knowledge among respondents. The lowest score was 30 and the highest was 75, indicating that prior to the intervention there were respondents with low to moderate levels of knowledge.

2. Average First Aid Knowledge After Health Education Using SIMAV

TABLE 2. FIRST AID KNOWLEDGE AFTER HEALTH EDUCATION USING AUDIO VISUAL SIMULATION (SIMAV)

Knowledge	Mean	Median	Std. Deviation	Min–Max
After	80.29	80.00	7.38	65–90

Based on Table 2, respondents' first aid knowledge after receiving health education using SIMAV showed a significant increase. The mean score of 80.29 with a median of 80.00 indicates that most respondents achieved a good level of knowledge. The standard deviation of 7.38 reflects less variation compared to before the intervention, indicating more evenly distributed knowledge levels. The minimum score of 65 and maximum score of 90 show that All respondents were classified as having a moderate to high level of knowledge.

3. Effect of Health Education Using SIMAV on First Aid Knowledge

TABLE 3. EFFECT OF HEALTH EDUCATION USING (SIMAV) ON FIRST AID KNOWLEDGE

Knowledge	Mean	Median	Std. Deviation	Min–Max	p-value
Before	58.24	65.00	13.91	30–75	0.000
After	80.29	80.00	7.38	65–90	

The mean knowledge score prior to the intervention (pre-test) was 58.24 ± 13.91, whereas the post-intervention (post-test) mean rose to 80.29 ± 7.39. All participants (100%) demonstrated an improvement in their knowledge scores, with none showing a decline or no change. The Wilcoxon Signed Ranks Test revealed a statistically significant difference between pre- and post-intervention scores ($p < 0.001$). These results suggest that SIMAV-based health education significantly enhances adolescents' knowledge of first aid.

The results of this study show that health education using the Audio Visual Simulation (SIMAV) method accompanied by practical simulations significantly improved first aid knowledge among adolescents. The increase in mean knowledge scores from 58.24 to 80.29 and the significant Wilcoxon test result ($p < 0.001$) indicate that this method is effective in enhancing adolescents' understanding of emergency management. These findings are consistent with recommendations from the World Health Organization (2023),

which emphasize that first aid education is more effective when it involves active and contextual learning.

The substantial increase in knowledge scores suggests that SIMAV facilitates not only short-term information acquisition but also deeper conceptual understanding. Active engagement through audiovisual exposure and hands-on simulation allows adolescents to process information through multiple sensory channels, which enhances cognitive integration and recall during emergency situations.

In this study, SIMAV not only used audiovisual media in the form of educational videos but was also accompanied by simulated first aid scenarios resembling real conditions, such as bleeding management and fainting (12). The simulations demonstrated first aid steps systematically, allowing participants to observe, understand the sequence of actions, and discuss appropriate responses (13). This approach enables learning through simulated experience, which has been shown to be more effective than lecture-based methods alone (14). By presenting realistic emergency scenarios, SIMAV helps bridge the gap between theoretical knowledge and practical application. Adolescents are able to visualize the consequences of incorrect actions and understand the importance of timely and appropriate first aid measures, thereby strengthening their situational awareness and decision-making abilities

The inclusion of simulation in SIMAV plays an important role in improving knowledge because adolescents do not merely receive information passively but also develop procedural understanding. A study by (15) showed that simulation-based first aid education improves adolescents' understanding, readiness, and confidence in dealing with emergency situations. This explains why all respondents in this study experienced increased knowledge scores with no decreases or unchanged scores. The absence of stagnant or declining scores among participants indicates that SIMAV accommodates diverse learning styles and effectively engages adolescents with varying baseline knowledge levels. Simulation-based learning creates a safe environment for trial and error, which encourages active participation and reduces fear of making mistakes.

The effectiveness of SIMAV combined with simulation can also be explained by experiential learning theory, which states that learning becomes more meaningful when participants are involved in experiences that resemble real-life situations. (16) emphasized that learning processes involving active observation, reflection, and meaning-making lead to stronger knowledge retention. Simulation in SIMAV helps adolescents envision their role as first responders, thereby increasing cognitive preparedness in emergency situations.

Through experiential learning cycles, adolescents are able to reflect on observed scenarios, internalize correct first aid procedures, and mentally rehearse appropriate responses. This process contributes to long-term knowledge retention and enhances their confidence to act effectively when confronted with real emergencies. Therefore, the findings of this study suggest that SIMAV combined with simulation is an effective health education method for improving first aid knowledge among adolescents. This method is suitable for implementation in school- and community-based health promotion programs because it is interactive, easy to understand, and aligned with adolescents' learning characteristics. The implementation of SIMAV has the potential to strengthen adolescents' roles as initial first responders in their communities.

IV. CONCLUSIONS

Health education using the Audio Visual Simulation (SIMAV) method accompanied by simulation is proven to be effective in improving first aid knowledge among adolescents. A statistically significant difference was observed in knowledge levels before and after the intervention with all respondents experiencing increased knowledge scores. SIMAV is an interactive and easily understood educational approach that is well suited to adolescents' learning characteristics in dealing with emergency situations.

These findings indicate that SIMAV has strong potential to be adopted as a standard health education strategy in school- and community-based settings. By combining audiovisual media with realistic simulations, SIMAV enhances adolescents' cognitive engagement and preparedness to respond appropriately during emergency events. Moreover, the consistent improvement in knowledge across all participants suggests that SIMAV is effective regardless of initial knowledge levels. This method supports experiential and active learning processes, which contribute to better knowledge retention and confidence in applying first aid skills. Therefore, the implementation of SIMAV may play a strategic role in strengthening adolescents' capacity as early responders and in supporting broader community emergency preparedness and public health promotion efforts.

Nevertheless, several limitations of this study should be recognized. First, the research was carried out among a specific group of adolescents, which may restrict the generalizability of the results to different age groups or cultural settings. Second, the study mainly evaluated short-term improvements in knowledge and did not examine long-term retention or the practical application of first aid skills in real emergency situations. Furthermore, the intervention was based on structured simulations, which may not entirely reflect the complexity and unpredictability of actual emergency events.

Further studies are recommended to overcome these limitations by investigating the effectiveness of the SIMAV method in various populations and different contextual settings. Longitudinal studies are needed to evaluate knowledge retention over time and to determine whether improved knowledge translates into competent first aid performance during actual emergencies. Further investigations could also compare SIMAV with other educational approaches to identify the most effective strategies for promoting both cognitive and practical first aid competencies among adolescents.

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