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**The Effect of Basic Life Support Education Using E-Booklet Media on Students  
Knowledge Level at MAN Sidoarjo**

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**ABSTRACT**

**Background:** Out-of-hospital cardiac arrest is the leading cause of sudden death, which can be minimized by providing Basic Life Support (BLS) quickly and appropriately. **Object:** This study aims to determine the effect of BLS education using e-booklets on the knowledge level of 10th grade students at MAN Sidoarjo. **Method:** This study used a pre-experimental design with a one-group pretest-posttest approach. The sample consisted of 82 students selected using simple random sampling. The research instrument was a questionnaire consisting of 20 questions. Data analysis was performed using the Wilcoxon Signed Rank Test. **Results:** The results showed that before the education was provided, most students had insufficient knowledge (62.2%), and after the education was provided, there was a significant increase with 79.3% of students in the good knowledge category. The statistical test results showed a significance value of 0.000 ( $p < 0.05$ ), which means that there was a significant effect of BLS education through e-booklets on increasing student knowledge. **Conclusion:** E-booklets have proven to be an effective educational medium in improving students' knowledge of BLS. It is recommended that e-booklets be used more widely in BLS learning and training activities in schools to improve students' preparedness in dealing with emergencies.

**Keywords:** Basic Life Support, E-Booklet, Knowledge, Education

**BACKGROUND**

Cardiac arrest is one of the leading causes of death worldwide that requires immediate and appropriate treatment. According to the American Heart Association (AHA, 2020), sudden cardiac arrest outside of a hospital has a low survival rate of only about 10%. This is because most victims do not immediately receive Basic Life Support (BLS) from people around them. The WHO (2020) also states that cardiovascular diseases, including cardiac arrest, contribute to approximately 17.9 million deaths each year and are the leading cause of death globally.

In Indonesia, the prevalence of heart disease tends to increase every year.

(Riskasdas, 2018) recorded a prevalence rate of heart disease of 1.5% of the total population. Based on a report from the Ministry of Health (2021), the number of cardiac arrest cases in Indonesia is quite high, but the number of people who are able to perform BLS is still low. This is because BLS knowledge and skills are not widely taught, either in schools or in communities. In East Java alone, the number of heart failure patients has reached 54,000 cases (Siallagan, 2021). In Sidoarjo Regency, there are 3,968 people with heart disease (Fahmi, 2023). This data shows the high risk of cardiac arrest in the Sidoarjo area and the importance of

increasing community preparedness, including among teenagers.

Teenagers, especially high school students, have great potential as first responders when emergencies occur in schools and communities. However, previous studies show that most students have never received education about first aid. (Susilo et al., 2022) states that the majority of high school students have inadequate knowledge about first aid measures. In fact, teenagers play an important role in providing first aid before medical personnel arrive.

In reality, however, many students still lack adequate knowledge about basic life support. Initial survey results at MAN Sidoarjo show that most students have never received education related to BLS, with only 13.4% of students having previously obtained information, and even then, most of it came from social media or extracurricular activities such as PMR and Scouts. This situation indicates that students' knowledge of BLS is still very limited, putting them at risk of being unable to provide appropriate first aid if they encounter a sudden cardiac arrest case in the school environment.

In Sidoarjo Regency, there are 3,968 people with heart disease (Fahmi, 2023). This data shows the high risk of cardiac arrest in the Sidoarjo area and the importance of increasing community preparedness, including among teenagers.

One effort to improve students' knowledge of Basic Life Support is through health education using appropriate media. The success of education is greatly influenced by the media used. Digital media, especially e-booklets, are considered effective because they are more attractive, easily accessible, and allow students to learn independently. (Pawiliyah et al., 2023) also emphasize that digital media-based education can significantly improve adolescents' health knowledge.

Based on a preliminary survey at MAN Sidoarjo, most students have never

received education about Basic Life Support. This indicates an urgent need to provide educational interventions using media that are appropriate for the characteristics of the students. Therefore, this study was conducted with the aim of determining the effect of providing Basic Life Support education using e-booklets on the level of knowledge of students at MAN Sidoarjo.

## RESEARCH METHODS

### Materials and Method

This study used a pre-experimental design with a one-group pretest-posttest approach, involving one group of students without a control group. The study population consisted of all 460 tenth-grade students at MAN Sidoarjo, and the sample was determined using the Slovin formula with a precision level of 10%, resulting in 82 respondents selected through simple random sampling.

The independent variable in this study was Basic Life Support (BLS) education using e-booklets, while the dependent variable was students' level of knowledge about BLS. The data collection instrument was a knowledge questionnaire consisting of 20 questions using a Guttman scale (correct = 1, incorrect = 0). The questionnaire was validated on 50 respondents with all items found to be valid (calculated  $r > 0.279$ ) and highly reliable (Cronbach's Alpha = 0.946).

The intervention was delivered using a e-booklet, which contained explanations of the definition of BHD, its objectives, indications, safety chain, and procedural steps for CPR and airway opening. The intervention consisted of a single educational session lasting approximately 30–45 minutes, beginning with a pretest, distribution of the e-booklet, presentation of the material by the researcher, and then students were asked to read independently using their own devices. After that, a posttest was administered approximately 30 minutes

after the intervention was completed to assess short-term changes in knowledge.

Data collection was conducted using Google Forms, followed by editing, coding, entry, cleaning, and scoring. Univariate analysis was used to describe respondent characteristics and knowledge distribution before and after education. Because normality tests showed that the data were not normally distributed, bivariate analysis used the Wilcoxon Signed Rank Test to determine differences

in knowledge before and after the intervention. Research ethics were fulfilled through informed consent, respondent anonymity, data confidentiality, and ethical approval from the KEPK Poltekkes Kemenkes Surabaya.

### **RESULT AND DISCUSSION**

General data in this study includes gender, prior knowledge, and source of information

**Table 1.**

Frequency Distribution of General Data on Grade X Students at MAN Sidoarjo, in June 2025

<b>Characteristic</b>	<b>Category</b>	<b>Frequency</b>	<b>Percentage(%)</b>
<b>Gender</b>	Male	36	<b>43,9</b>
	Female	46	<b>56,1</b>
	Total	82	<b>100</b>
<b>Received infomation</b>	Yes	11	<b>13,4</b>
	No	71	<b>86,6</b>
	Total	82	<b>100</b>
<b>Source of information</b>	None	71	<b>86,6</b>
	Social media	7	<b>8,5</b>
	Extracurricular Activities	4	<b>44,9</b>
	Total	82	<b>100</b>

Table 1 shows of the 82 students, the majority were female (46 people, 56.1%) and male (36 people, 43.9%), indicating a relatively balanced distribution. Most students (86.6%) had never received information about Basic Life Support (BLS), while 11 students (13.4%) had

received information, mainly from social media (8.5%) and extracurricular activities such as PMR or Scouts (4.9%). This shows that the BLS education received by students is still limited and informal.

**Table 2.**

Frequency distribution of grade X students' knowledge of basic life support before education was provided

<b>Knowledge Before Education</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Good</b>	9	11
<b>Adequate</b>	22	26,8
<b>Inadequate</b>	51	62,2

Knowledge Before Education	Frequency	Percentage (%)
<b>Total</b>	82	100

The results of the study of 82 tenth-grade students before education showed that most students had inadequate knowledge (62.2%), 26.8% had adequate knowledge, and only 11% had good knowledge. This

shows that students' knowledge of BLS was still inadequate before the intervention.

**Table 3**

Frequency distribution of grade X students' knowledge about basic life support after being given education using e-booklets.

Knowledge After Education	Frequency	Percentage (%)
<b>Good</b>	65	79,3
<b>Adequate</b>	17	20,7
<b>Total</b>	82	100

The results of the study on 82 tenth-grade students showed that after receiving education on Basic Life Support using e-booklet media, most students (79.3%) had good knowledge, 20.7% were in the adequate category, and none were in the

low knowledge category. These findings indicate a significant increase in knowledge after receiving education.

**Table 4.**

Results of the Wilcoxon Signed Rank Test

Knowledge	N	Z	P
Pretest-Posttest			.00
Negative	0		
Positive Ranks	82b	41.50	3403.00
Ties	0c		
Total	82		

Based on the results of the Wilcoxon Signed Rank Test, all students (100%) experienced an increase in knowledge scores after the intervention (positive ranks), with no decrease or unchanged scores (negative ranks and ties = 0). The mean rank value of 41.50 with a rank sum of 3403.00 indicates a consistent increase. Thus, there was a significant difference

between the scores before and after education, indicating that the intervention through e-booklets had a positive impact on improving student knowledge.

### Discussion

The results of this study indicate a significant increase in knowledge among 10th grade students at MAN Sidoarjo after

being given Basic Life Support (BLS) education using e-booklets. Before receiving education, the majority of students were in the inadequate knowledge category (62.2%), with only a small percentage having good knowledge (11%). After receiving education, the students' knowledge level increased to good (79.3%), and no students were in the inadequate knowledge category anymore. The Wilcoxon Signed Rank Test statistical test produced a p-value of 0.000 ( $p < 0.05$ ), which means there was a significant difference between the students' knowledge scores before and after receiving education. This proves that the use of e-booklets as an educational medium is effective in increasing students' knowledge about BLS.

The results of this study are in line with a study (Susilo, et al., 2022) which states that the majority of high school students have inadequate knowledge about BLS before being given health education, but experience a significant increase after being given health education. Another study by (Pawiliyah, et al., 2023) also found that the use of digital media is proven to be effective in improving adolescent health literacy because it is in line with their habits of being familiar with technology. Thus, the results of this study support that digital media-based education, such as e-booklets, can be an effective strategy to increase student knowledge.

Based on previous research conducted by (Alfaridzi, 2023), it is known that providing education on basic life support (BLS) using e-booklets has a significant effect on increasing students' knowledge. This study was conducted on students who are members of the Youth Red Cross (PMR) at SMA Negeri 1 Purwareja Klampok. The results of the study showed that students experienced a significant increase in knowledge after receiving educational material through e-booklets. This was evidenced by a comparison of the mean pretest and

posttest scores, where the mean pretest score before the education was 12.08, while after the education with e-booklets, the mean posttest score increased to 16.89. Thus, this study reinforces the finding that the use of e-booklets as a learning tool can help improve students' knowledge of basic life support material effectively.

Compared to other learning methods, according to (Sariyansah, 2014) in (Alfaridzi, 2023), it is explained that booklets have proven to be more effective than lectures without media in increasing the knowledge of tofu factory workers regarding work safety equipment in Kalibening Village, Banjarnegara. This is because booklets make it easier for students to read and understand the material. This is because booklets use a combination of text and images as a medium for conveying health messages. Booklets are a form of educational media that combine written information with visuals to convey messages in a simple book format. The advantages of booklets include their ability to present material more comprehensively and provide more extensive information than verbal communication (Mayasari et al., 2020). The material presented in booklets is generally clearer, more systematic, and educational in nature, which is one of its main advantages. This finding is in line with research (Nurul, 2020) which shows that booklets are effective as a medium for health education.

The results of this study can be analyzed further using Bloom's theory, particularly in the cognitive domain. Bloom divides cognitive abilities into six levels: remembering, understanding, applying, analyzing, evaluating, and creating. The use of learning media greatly influences the extent to which students are able to achieve these levels. Traditional lecture methods usually only activate the levels of remembering and understanding because the flow of communication is one-way and students tend to be passive. In contrast, the use of e-booklets facilitates

multisensory learning (text, images, diagrams), enabling students to gain a deeper understanding. With a systematic structure and clear visuals, e-booklets help students not only remember the definitions, objectives, and indications of BHD, but also understand and apply the steps of CPR.

According to researchers, the effectiveness of e-booklets lies in the combination of practical digital access with structured, clear presentation of material, reinforced by attractive and interactive visuals. E-booklets are easily accessible anytime and anywhere, allowing students to learn according to their time and needs. In addition, the visualizations in e-booklets help strengthen students' memory because the information is presented not only in text form but also through pictures, diagrams, or illustrations. This is what supports the significant increase from 62.2% of students with inadequate knowledge to 79.3% of students with good knowledge after the intervention.

In e-booklets, there are several factors that influence the success of the counseling process, including the ability to attract attention, the presence of images that support the theme, the choice of font color, and the use of language that is easily understood by the target audience. Based on the researcher's assumption, the increase in student knowledge occurred because of the respondents' interest in the appearance of the e-booklet and the use of simple language that was easy to understand.

Overall, the results of this study indicate that e-booklets are an effective, practical educational medium that is well-suited to the characteristics of the younger generation. The use of this medium is expected to become an alternative in health education in schools to improve students' preparedness for emergency situations such as cardiac arrest.

## CONCLUSION

From the results of the study, it can be concluded as follows:

1. The level of knowledge of 10th grade students at MAN Sidoarjo before being given Basic Life Support (BLS) education using e-booklets was mostly in the inadequate category.
2. The level of knowledge of tenth grade students at MAN Sidoarjo after being given Basic Life Support (BLS) education using e-booklets mostly showed an increase to the good category.

Providing Basic Life Support (BLS) education using e-booklets had an effect on increasing the knowledge of tenth grade students at MAN Sidoarjo.

## SUGGESTION

1. For schools  
Schools are encouraged to incorporate BLS education as part of routine health education activities. The use of e-booklets should be considered a sustainable learning tool to strengthen students' readiness in emergency situations.
2. For teachers  
Teachers can utilize e-booklets as supplementary learning materials to improve student engagement and comprehension, especially in topics related to health and safety. Integrating digital media into classroom activities may enhance students' learning experiences.
3. For Healthcare Providers  
Puskesmas or related health institutions should collaborate with schools to provide regular BLS training. Combining e-booklet education with hands-on CPR practice would offer a more comprehensive understanding and skill development.
4. For Students  
Students should optimize the use of e-booklets as self-learning resources to broaden their knowledge of BLS and

be better prepared to act as first responders in emergency situations.

5. For Future Researchers

Further research is recommended to involve a control group to compare the effectiveness of different learning media. Long-term evaluations should be conducted to assess knowledge retention. Future studies may also explore the effectiveness of other digital media such as videos, mobile applications, or interactive modules in improving BLS knowledge.

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